GEN-2013-002/019

MODIFICATION REQUEST IMPACT STUDY

By SPP Generator Interconnection

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REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION	COMMENTS
06/16/2026	EPE Consulting	Initial Report	

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EXECUTIVE SUMMARY

Southwest Power Pool (SPP) requested that Electric Power Engineers, LLC (EPE) perform a Modification Request Impact Study (MRIS) for GEN-2013-002/019, an active Generation Interconnection Request (GIR) with a Point of Interconnection (POI) at the Monolith 115 kV substation (bus# 640591).

GEN-2013-002/019 project currently interconnects in the Southwestern Public Service (SPS) control area with a capacity of 124.2 MW as shown in Table ES-1 below. This Study has been requested to evaluate the modification of GEN-2013-002/019 to change the inverter configuration from thirty-five (35) PE FS4010M solar inverters to thirty-six (36) PE FS4010 solar inverters split between the two MPTs for a total capacity of 144.36 MVA. Additionally, collector impedance, transformer specifications and gen-tie parameters are updated.

The generating capacity for GEN-2013-002/019 (128.88 MW) exceeds its Generator Interconnection Agreement (GIA) Interconnection Service amount, 124.2 MW, 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 modified configuration for GEN-2013-002/019 is shown in Table ES-1.

SPP determined that power flow should not be performed as the request was dispatched to its full capacity in all of its DISIS group-specific power flow models. However, SPP determined that the change of inverters and connection scheme required short circuit and dynamic stability analyses.

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

The existing and modified configurations for GEN-2013-02/019 are shown in

Table ES-2.

Table ES-1: GEN-2013-002/019 Modified Configuration

REQUEST	POINT OF INTERCONNECTION	EXISTING GENERATOR CONFIGURATION	GIA CAPACITY (MW)
GEN-2013-002/019	Monolith 115 kV Substation (640591)	36 x PE FS4010 4.01 MVA Solar Inverters	124.2

Table ES-2: GEN-2013-002/019 Modification Request

FACILITY	EXISTING GENERATING FACILITY CONFIGURATION	MODIFICATION GENERATING FACILITY CONFIGURATION	
Point of Interconnection	Monolith 115 kV Substation (640591)	Monolith 115 kV Substation (640591)	
Configuration/Capacity	35 x FS4010M 4.01 MVA Solar Inverters	36 x PE FS4010 4.01 MVA Solar Inverters	
Generation Interconnection Line	Length = 3 miles	Length = 1.77 miles	
	R = 0.0027 pu	R = 0.0017 pu	
	X = 0.0160 pu	X = 0.0091 pu	
	B = 0.0024 pu	B = 0.0015 pu	
Main Substation Transformer[1]	R = 0.0040 pu	R = 0.0024 pu	R = 0.0020 pu
	X = 0.0799 pu	X = 0.0815	X = 0.0860 pu
	Winding MVA = 84 MVA	Winding MVA = 51 MVA	Winding MVA = 102 MVA
	Rating MVA = 140 MVA	Rating MVA = 85 MVA	Rating MVA = 170 MVA
Equivalent Collector Line[2]	R = 0.0068 pu	R = 0.0063 pu	R = 0.0011 pu
	X = 0.0106 pu	X = 0.0084 pu	X = 0.0012 pu
	B = 0.0625 pu	B = 0.05697 pu	B = 0.0075 pu
GSU Transformer[1]	Gen Equivalent Qty: 35	Gen Equivalent Qty: 20	Gen Equivalent Qty: 16
	R = 0.0076 pu	R = 0.0087 pu	R = 0.0087 pu
	X = 0.0570 pu	X = 0.0896 pu	X = 0.0896 pu
	Winding MVA = 135 MVA	Winding MVA = 84.94 MVA	Winding MVA = 67.95 MVA
	Rating MVA = 135 MVA	Rating MVA = 82 MVA	Rating MVA = 65.6 MVA
Generator Dynamic Model[3] & Power Factor	REGCA1 Leading and Lagging: ±0.9	REGCAU1[3] Leading and Lagging: ±0.8	
Reactive Power Devices	N/A	N/A	N/A
1) X/R based on Winding MVA, 2) All pu are on 100 MVA Base 3) DYR stability model name			

SPP performed the analyses using the modification request data based on the DISIS-2022-001-1 study models:

1. 2025 Summer Peak (25SP),
2. 2025 Winter Peak (25WP)

All analyses were performed using the Siemens PTI PSS/E[1] version 34 software and the results are summarized below.

The results of the charging current compensation analysis using the 25SP models showed that the GEN-2013-002 project needed a 1.6 MVAr shunt reactor on the 34.5 kV bus of the project substation with the modifications in place. 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 charging current compensation analysis is provided as information to the Interconnection Customer and Transmission Owner (TO) and/or Transmission Operator. The applicable reactive power requirements will be further reviewed by the Transmission Owner and/or Transmission Operator.

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-2013-002/019 contribution to three-phase fault currents in the immediate transmission systems at or near the GEN-2013-002/019 POI showed that there were multiple 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 34.9.3 software for the two modified study models: 25SP and 25WP. The results of the dynamic stability analysis showed that there were several existing base case issues found in the original DISIS-2022-001-1 cases and the case with the GEN-2013-002/019 modification. These issues were not attributed to GEN-2013-002/019 modification request and are detailed in Appendix F.

There were no damping or voltage recovery violations attributed to the GEN-2013-002/019 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.

The requested modification has been determined by SPP to **not be 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.

[1] Power System Simulator for Engineering

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.

SCOPE OF STUDY

Southwest Power Pool (SPP) requested that Electric Power Engineers, LLC (EPE) performed a Modification Request Impact Study (Study) for GEN-2013-002/019. 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.

POWERFLOW ANALYSIS

SPP determined that powerflow should not be performed because the technology type of the request was unchanged with the modification.

STABILITY ANALYSIS, SHORT CIRCUIT ANALYSIS

To determine whether stability and short circuit analyses are required, SPP evaluates the difference between 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.

REACTIVE POWER ANALYSIS

SPP requires that a charging current compensation analysis be performed on the requested modification configuration as it is a non-synchronous resource. The charging current

compensation analysis determines the capacitive effect at the POI caused by the project's collector system and transmission line's capacitance. A shunt reactor size is determined in order to offset the capacitive effect and maintain zero (0) MVAr flow at the POI while the project's generators and capacitors are offline.

STUDY LIMITATIONS

The assessments and conclusions provided in this report are based on assumptions and information provided to SPP by others. While the assumptions and information provided may be appropriate for the purposes of this report, SPP does not guarantee that those conditions assumed will occur. In addition, SPP 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.

PROJECT AND MODIFICATION REQUEST

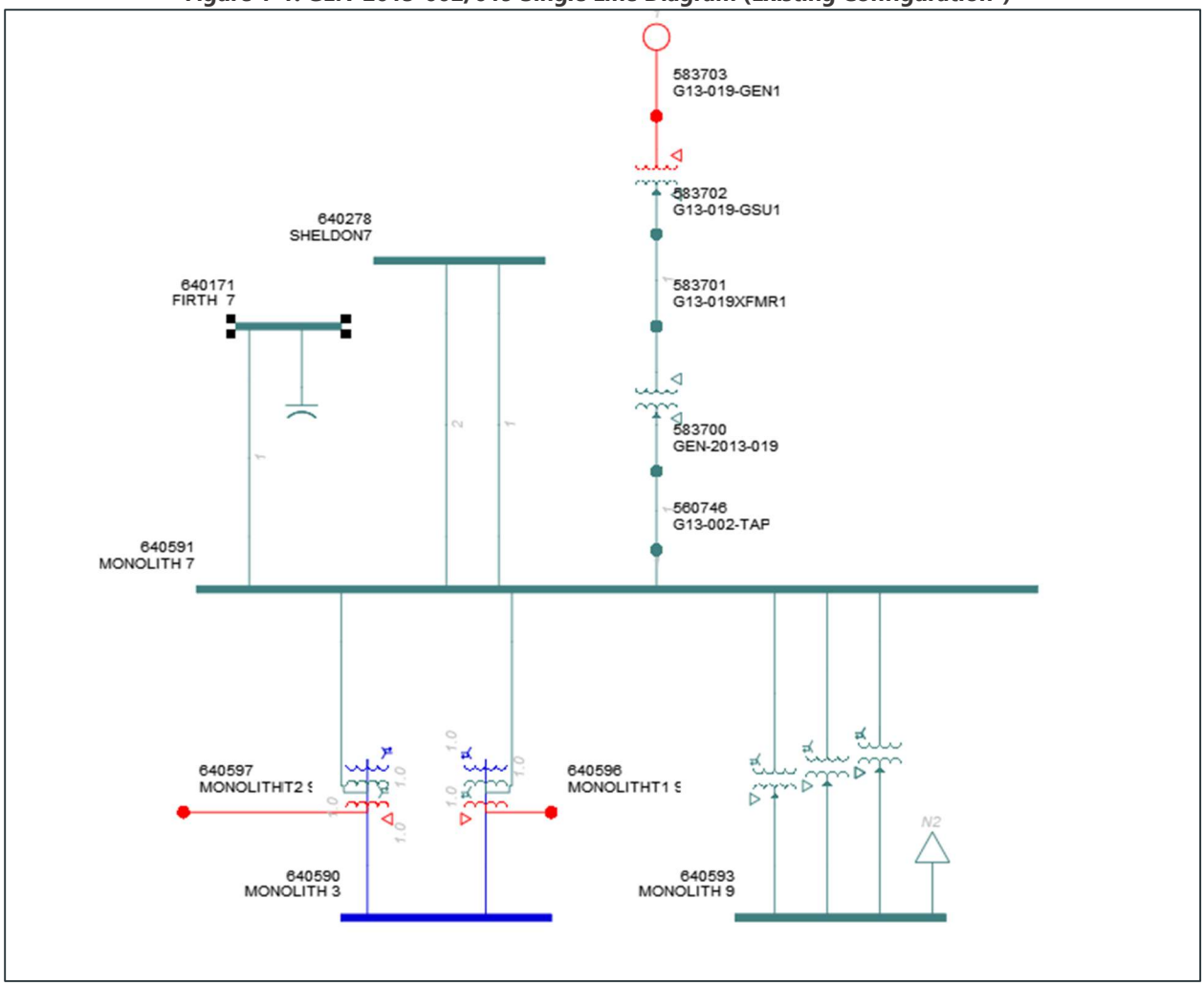
GEN-2013-002/019 Interconnection Customer has requested a modification to its Interconnection Request (IR) with a Point of Interconnection (POI) at the Monolith 115 kV substation (bus# 640591). At the time of report posting, GEN-2013-002/019 is an active Interconnection Request with a fully executed Interconnection Agreement (IA). GEN-2013-002/019 is a solar plant with a maximum summer and winter queue capacity of 124.2 MW with Energy Resource Interconnection Service (ERIS) and Network Resource Interconnection Service (NRIS).

Figure 1-1 shows the powerflow model single line diagram for the existing GEN-2013-002/019 configuration using the DISIS-2022-001 stability models. The GEN-2013-002/019 project interconnects in the Nebraska Public Power District (NPPD) control area with a capacity of 124.2 MW as shown in Table 1-1 below.

Table 1-1: GEN-2013-002/019 Existing Configuration

REQUEST	POINT OF INTERCONNECTION	EXISTING GENERATOR CONFIGURATION	GIA CAPACITY (MW)
GEN-2013-002/019	Monolith 115 kV Substation (640591)	36 x PE FS4010 4.01 MVA Solar Inverters	124.2

Figure 1-1: GEN-2013-002/019 Single Line Diagram (Existing Configuration*)



*based on the DISIS-2022-001 stability models

This Study has been requested by the Interconnection Customer to evaluate the modification of GEN-2013-002/019 dynamic model. The generating capacity for GEN-2013-002/019 (128.88 MW) exceeds its Generator Interconnection Agreement (GIA) Interconnection Service amount of 124.2 MW, 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.

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

Figure 1-2 shows the powerflow model single line diagram for the GEN-2013-002/019 modification. The existing and modified configurations for GEN-2013-002/019 are shown in Figure 1-2: GEN-2013-002/019 Single Line Diagram (Modification Configuration)

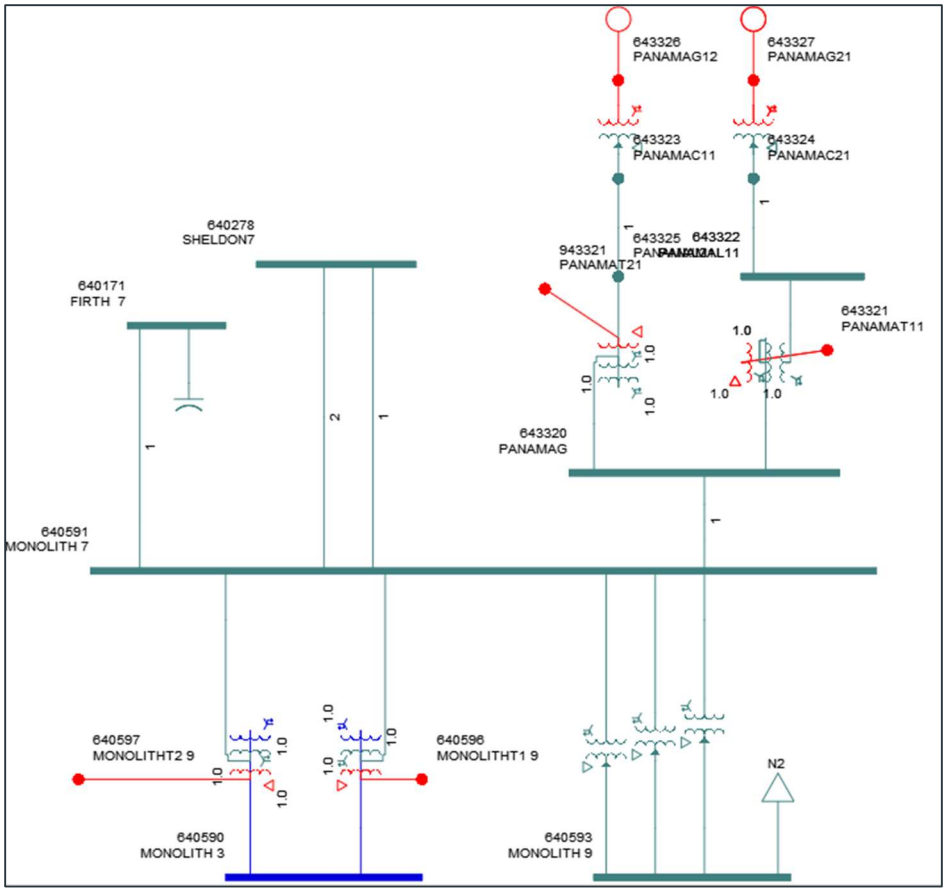

643326
PANAMAG12
643327
PANAMAG21
643323
PANAMAC11
643324
PANAMAC21
640278
SHELDON7
640171
FIRTH 7
943321
PANAMAT21
643325
643322
643321
PANAMAT11
643320
PANAMAG
640591
MONOLITH 7
640597
MONOLITHT2 9
640596
MONOLITHT1 9
N2
640590
MONOLITH 3
640593
MONOLITH 9

Table 1-2.

Figure 1-2: GEN-2013-002/019 Single Line Diagram (Modification Configuration)

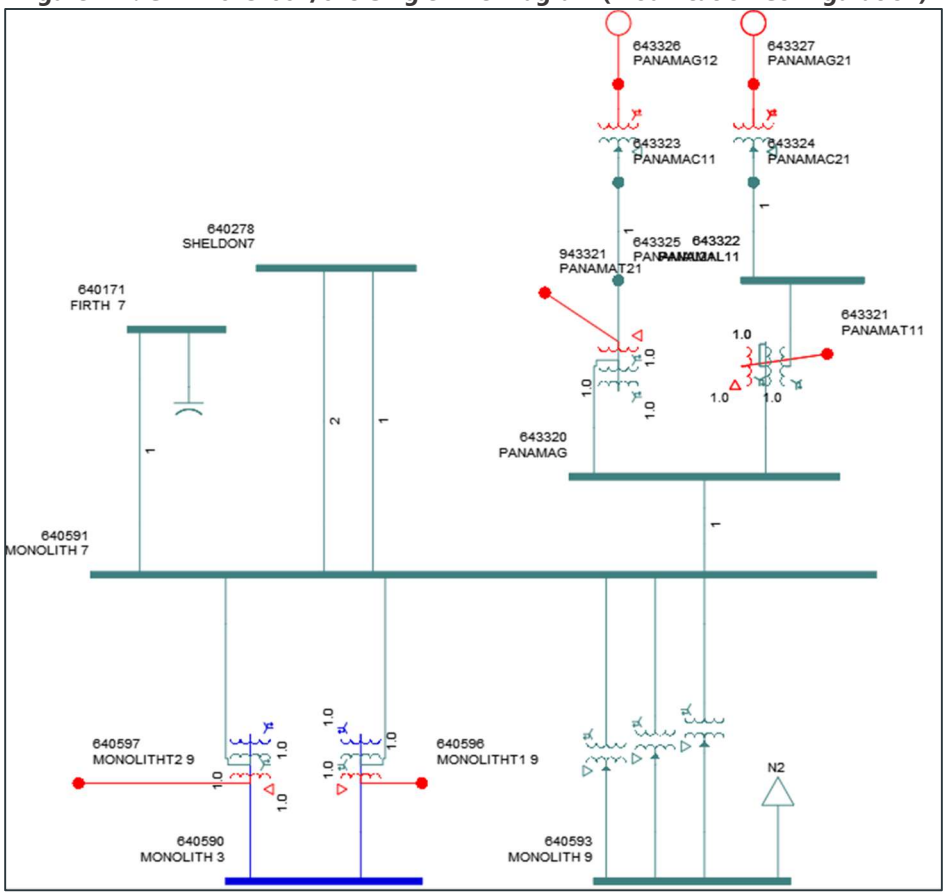


Table 1-2: GEN-2013-002/019 Modification Request

FACILITY	EXISTING GENERATING FACILITY CONFIGURATION	MODIFICATION GENERATING FACILITY CONFIGURATION	
Point of Interconnection	Monolith 115 kV Substation (640591)	Monolith 115 kV Substation (640591)	
Configuration/Capacity	35 x FS4010M 4.01 MVA Solar Inverters	36 x PE FS4010 4.01 MVA Solar Inverters	
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	R = 0.0027 pu	R = 0.0017 pu	
	X = 0.0160 pu	X = 0.0091 pu	
	B = 0.0024 pu	B = 0.0015 pu	
Main Substation Transformer[1]	R = 0.0040 pu	R = 0.0024 pu	R = 0.0020 pu
	X = 0.0799 pu	X = 0.0815	X = 0.0860 pu
	Winding MVA = 84 MVA	Winding MVA = 51 MVA	Winding MVA = 102 MVA
	Rating MVA = 140 MVA	Rating MVA = 85 MVA	Rating MVA = 170 MVA
Equivalent Collector Line[2]	R = 0.0068 pu	R = 0.0063 pu	R = 0.0011 pu
	X = 0.0106 pu	X = 0.0084 pu	X = 0.0012 pu
	B = 0.0625 pu	B = 0.0072 pu	B = 0.0075 pu
GSU Transformer[1]	Gen Equivalent Qty: 35	Gen Equivalent Qty: 20	Gen Equivalent Qty: 16
	R = 0.0076 pu	R = 0.0087 pu	R = 0.0087 pu
	X = 0.0570 pu	X = 0.0896 pu	X = 0.0896 pu
	Winding MVA = 135 MVA	Winding MVA = 84.94 MVA	Winding MVA = 67.95 MVA
	Rating MVA = 135 MVA	Rating MVA = 82 MVA	Rating MVA = 65.6 MVA
Generator Dynamic Model[3] & Power Factor	REGCA1 Leading and Lagging: ±0.9	REGCAU1[3] Leading and Lagging: ±0.8	
Reactive Power Devices	N/A	N/A	N/A
1) X/R based on Winding MVA, 2) All pu are on 100 MVA Base 3) DYR stability model name			

EXISTING VERSUS MODIFICATION COMPARISON

To determine which analyses are required for the study, the differences between the existing configuration and the requested modification were evaluated. SPP performed this comparison and the resulting analyses using a set of modified study models developed based on the modification request data and the DISIS-2022-001 study models.

The methodology and results of the comparisons are described below. The analysis was completed using PSS/E version 34.9.3 software.

STABILITY MODEL PARAMETERS COMPARISON

SPP determined that short circuit and dynamic stability analyses were required because of the change in dynamic models. 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 required, a turbine parameters comparison was not needed for the determination of the scope of the study.

EQUIVALENT IMPEDANCE COMPARISON CALCULATION

As the inverter 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.

REACTIVE COMPENSATION ANALYSIS

The reactive compensation analysis was performed for GEN-2013-002/019 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.

METHODOLOGY AND CRITERIA

The GEN-2013-002/019 generators and capacitors were switched out of service while other system elements remained in-service. A shunt reactor was tested at the project's collection substation 345 kV bus and the wind unit's collector substation 34.5 kV bus to set the MVAr flow into the POI to approximately 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).

SPP performed the charging current compensation analysis using the modification request data based on the 2025 Summer Peak (25SP) DISIS-2022-001 stability study models.

RESULTS

The results from the analysis showed that the GEN-2013-002/019 project needed approximately 1.6 MVAr of inductive compensation on the 34.5 kV bus to reduce the POI MVAr to zero.

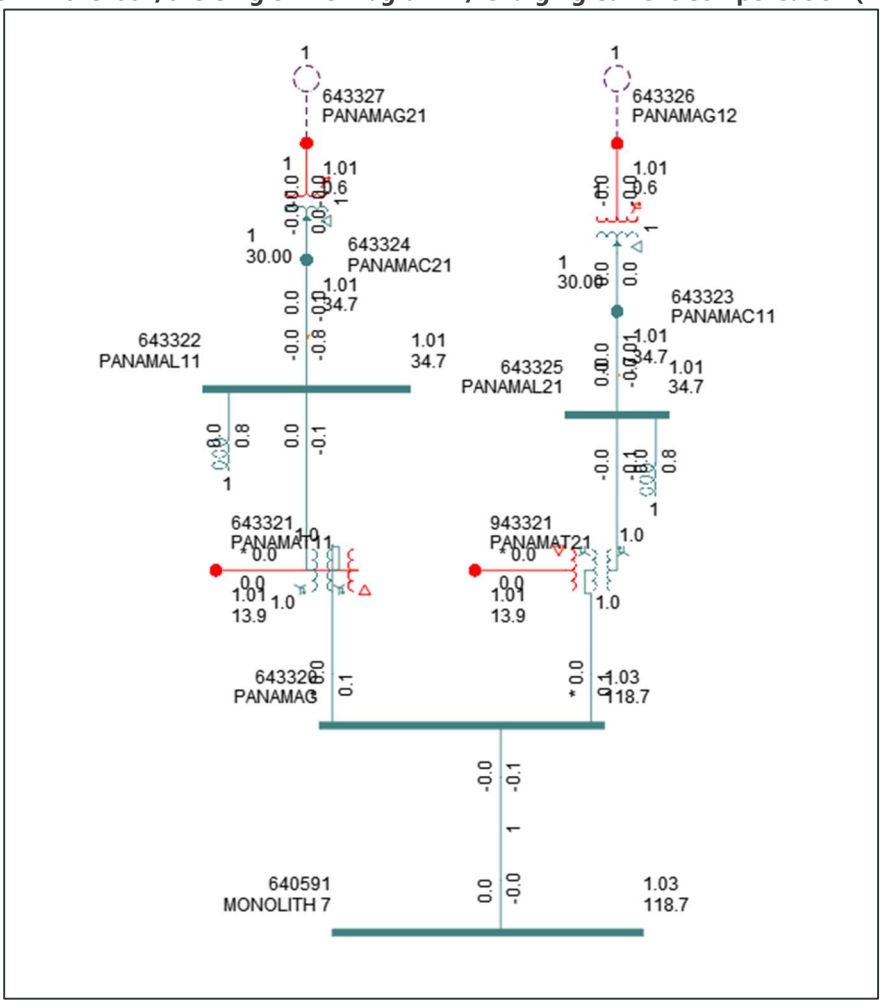
Figure 2-1 illustrates the shunt reactor size needed to reduce the POI MVAr to approximately zero with the updated topology. The final shunt reactor requirements for GEN-2013-002/019 are shown in Table 2-1.

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

Table 2-1: Shunt Reactor Size for Reduced Generation Study (Modification)

MACHINE	POI BUS NUMBER	POI BUS NAME	REACTOR SIZE (MVAR)
			25SP
GEN-2013-002/019	640591	Monolith 115 kV Substation	1.6

Figure 2-1: GEN-2013-002/019 Single Line Diagram w/ Charging Current Compensation (Modification)



SHORT CIRCUIT ANALYSIS

A short circuit study was performed using the 25SP model for GEN-2013-002/019. The detailed results of the short circuit analysis are provided in Appendix B.

METHODOLOGY

The short circuit analysis included applying a three-phase fault on buses up to 5 levels away from the 115 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-2013-002/019 online.

SPP created a short circuit model using the 25SP DISIS-2022-001 stability study model by adjusting the GEN-2013-002/019 short circuit parameters consistent with the modification data. The adjusted parameters are shown in Table 3-1 below.

Table 3-1: Short Circuit Model Parameters*

PARAMETER	VALUE BY GENERATOR BUS#	
	643326	643327
Machine MVA Base	82	65.6
R (pu)	0.852	0.852
X'' (pu)	0.962	0.962

*pu values based on Machine MVA Base

RESULTS

The results of the short circuit analysis for the 25SP model are summarized in Table 3-1 and Table 3-2. The GEN-2013-002/019 POI bus (Monolith 115 kV Substation - 640591) fault current magnitudes are provided in Table 3-1 showing a maximum fault current of 41.88 kA with the GEN-2013-002/019 project online. Table 3-2 shows the maximum fault current magnitudes and fault current increases with the GEN-2013-002/019 project online.

There were four buses with a pre-existing maximum three-phase fault current over 40 kA. These buses are highlighted in Appendix B. The maximum GEN-2013-002/019 contribution to three-phase fault current was about 1.166% and 0.4825 kA.

Table 3-1: POI Short Circuit Results

CASE	GEN-OFF CURRENT (KA)	GEN-ON CURRENT (KA)	KA CHANGE	%CHANGE
25SP	41.3966	41.8791	0.4825	1.166%

Table 3-2: 25SP Short Circuit Results

VOLTAGE (KV)	MAX. CURRENT (KA)	MAX KA CHANGE	MAX %CHANGE
69	5.376	0.0016	0.03%
115	43.1937	0.4825	1.17%
161	47.3108	0.0053	0.01%
230	16.9449	0.005	0.03%
345	37.0747	0.0998	0.43%
Max	**47.3108**	**0.4825**	**1.17%**

DYNAMIC STABILITY ANALYSIS

SPP performed a dynamic stability analysis to identify the impact of the inverter configuration change and other modifications to GEN-2013-002/019. The analysis was performed according to SPP's Disturbance Performance Requirements2 shown in Appendix C. The modification details are described in the Project and section and the dynamic modeling data is provided in Appendix A. The existing original case issues and simulation plots can be found in Appendix F.

In addition to the request under study, surplus requests GEN-2024-SR10 and GEN-2025-SR5 share a POI with GEN-2013-002/019. In order to assess the modification request with and without the presence of these requests, the study was performed in two scenarios:

1. Scenario 1: GEN-2013-002/019 (643326, 643327) were dispatched at full GIA capacity (124.2 MW) and other requests at the POI dispatched at base with surplus requests offline.
2. Scenario 2: GEN-2013-002/019 (643326, 643327), GEN-2024-SR10 and GEN-2025-SR5 dispatched at full (124.2 MW) and other requests at the POI dispatched at base.

METHODOLOGY AND CRITERIA

The dynamic stability analysis was performed using models developed with the requested GEN-2013-002/019 configuration of 36 x PE FS4010 4.01 MVA Solar Inverters (REGCAU1). This stability analysis was performed using PTI's PSS/E version 34.9.3 software.

The modifications requested for the GEN-2013-002/019 project were used to create modified stability models for this impact study based on the DISIS-2022-001 stability study models:

1. 2025 Summer Peak (25SP)
3. 2025 Winter Peak (25WP)

The modified dynamic model data for the GEN-2013-002/019 project is provided in Appendix A. The modified powerflow 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.

During the fault simulations, the monitored areas included all buses and radially connected facilities within five buses of the Request's POI. The active power (PELEC), reactive power (QELEC),

[2] SPP Disturbance Performance Requirements: https://www.spp.org/documents/28859/spp%20disturbance%20performance%20requirements%20(twg%20approved).pdf

and terminal voltage (ETERM) were monitored for GEN-2013-002/019 and other requests within the monitored area. The machine rotor angle for synchronous machines the studied area were monitored. In addition, the voltage and frequency of all 69 kV and above buses within the study area were monitored.

FAULT DEFINITIONS

EPE developed and simulated faults for GEN-2013-002/019 using the modified study models. 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 Appendix D. These contingencies were applied to the modified 25SP and 25WP models for both scenarios.

RESULTS

Appendix E includes the relevant results of the fault events simulated for each of the modified cases. Existing original case issues are documented separately in Appendix F. The associated stability plots are also provided in Appendix F.

The results of the dynamic stability analysis showed that there were several existing original case issues found in the original DISIS-2022-001-1 case and the case with the GEN-2013-002/019 modification. These issues were not attributed to the GEN-2013-002/019 modification request and detailed in Appendix F.

There were no damping or voltage recovery violations attributed to the GEN-2013-002/019 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.

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 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.

RESULTS

The modified generating capacity of GEN-2013-002/019 (128.88 MW) exceeds the GIA Interconnection Service amount, 124.2 MW, as listed in Appendix A of the GIA. GEN-2013-002/019 inverters are rated at 3.58 MW and use a power plant controller (PPC) to limit the total power injected into the POI.

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.

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.

RESULTS

SPP determined the requested modification is **not a Material Modification** based on the results of this Modification Request Impact Study performed by SPP. SPP evaluated the impact of the requested modification on the prior study results. SPP 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 enough to change the previously studied powerflow conclusions.

This determination implies that any network upgrades already required by GEN-2013-002/019 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.

APPENDIX A: GEN-2013-002/019 GENERATOR DYNAMIC MODEL

```
// Panama Energy Center
//
// GEN-2013-002+019 (Solar 124.2MW @ POI)
//  Bus 643327: 16 X PE FS4010M HEM Gen3 (Solar)
//  Bus 643326: 20 X PE FS4010M HEM Gen3 (Solar)
// Freq droop set to 5% with 36 mHz dbd
// Voltage droop set to 3% at 0.95 pf
//
643327 'USRMDL' 1  'REGCAU1'  101   1    1   14    3    4
@!/ Lvplsw
1
@!/ Tg          Rrpwr       Brkpt       Zerox     Lvpl1
0.0060       10.000       0.0100       0.0000    1.0000
@!/ Volim       Lvpnt1      Lvpnt0      Iolim     Tfltr
2.0000       0.0100       0.0000      -1.0000    0.006
@!/ Khv         Iqrmax      Iqrmin      Accel
0.0000       30.000      -30.000       1.0000/
 643327 'USRMDL' 1  'REECAU1'  102    0    6    45   6   9
@!/ Bus#          PFflag        Vflag         Qflag        Pflag        PQflag
0             0             0             0          0                    0
@!/ Vdip          Vup           Trv           dbd1         dbd2
```

0.8500 2.0000 0.0060 -0.0010 0.0010

@!/ Kqv Iqh1 Iql1 Vref0 Iqfrz

2.6 2.0000 -2.0000 0.0000 0.0000

@!/ Thld Thld2 Tp QMax QMin

0.0000 0.0000 0.0060 0.4229 -0.4229

@!/ Vmax Vmin Kqp Kqi Kvp

1.2000 -1.2000 1.0000 5.0000 1.0000

@!/ Kvi Vbias Tiq dPmax dPmin

5.0000 0.0000 0.0060 30.000 -30.000

@!/ Pmax Pmin Imax Tpord Vq1

0.8732 0.0000 1.0000 0.0250 0.1000

@!/ Iq1 Vq2 Iq2 Vq3 Iq3

1.0000 1.1000 1.0000 0.0000 0.0000

@!/ Vq4 Iq4 Vp1 Ip1 Vp2

0.0000 0.0000 0.1000 1.0000 1.1000

@!/ Ip2 Vp3 Ip3 Vp4 Ip4

1.0000 0.0000 0.0000 0.0000 0.0000/

643327 'USRMDL' 1 'REPCAU1' 107 0 7 27 7 9

@!/ Bus# LDC_FromBus LDC_ToBus LDC_ID VCFlag Refflag Fflag

643320 643320 640591 '1' 0 1 1

@!/ Tfltr Kp Ki Tft Tfv

0.0200 3.0000 6.000 0.0000 0.0250

@!/ Vfrz Rc Xc Kc emax

0.8500 0.0000 0.0000 0.0603 1.0000

```
@!/ emin          dbd1          dbd2          QMax          QMin
-1.0000         0.0000         0.0000         0.4229      -0.4229
@!/ Kpg           Kig           Tp            fdbd1         fdbd2
0.0100          2.0000         0.0200        -0.0006        0.0006
@!/ femax         femin         Pmax          Pmin          Tg
10000.0        -10000.0        0.8732        0.0000        0.1000
@!/ Ddn           Dup
17.4634         17.4634 /
/ LOW VOLTAGE PROTECTIONS
     64332701   'VTGDCAT'    643327    643327 '1 '
                                @!/ Vlow          Vup           RlTm          BrTm
                                  0.90          10.00         120.00        0.00/
     64332702   'VTGDCAT'    643327    643327 '1 '
                                @!/ Vlow          Vup           RlTm          BrTm
                                  0.80          10.00         60.000        0.00/
     64332703   'VTGDCAT'    643327    643327 '1 '
                                @!/ Vlow          Vup           RlTm          BrTm
                                  0.70          10.00         21.000        0.00/
     64332704   'VTGDCAT'    643327    643327 '1 '
                                @!/ Vlow          Vup           RlTm          BrTm
                                  0.50          10.00         10.000        0.00/
/ HIGH VOLTAGE PROTECTIONS
     64332705   'VTGDCAT'    643327    643327 '1 '
                                @!/ Vlow          Vup           RlTm          BrTm
```

```
                                0.00          1.10          120.00        0.00/
    64332706   'VTGDCAT'    643327    643327 '1 '
                               @!/ Vlow          Vup           RlTm          BrTm
                                0.00          1.15          60.000        0.00/
    64332707   'VTGDCAT'    643327    643327 '1 '
                               @!/ Vlow          Vup           RlTm          BrTm
                                0.00          1.20          2.000         0.00/
    64332708   'VTGDCAT'    643327    643327 '1 '
                               @!/ Vlow          Vup           RlTm          BrTm
                                0.00          1.25          0.200         0.00/
/ LOW FREQUENCY PROTECTIONS
    64332709   'FRQDCAT'    643327   643327 '1 '
                               @!/ Flow          Fup           RlTm          BrTm
                                58.0          100.0         300.000       0.00/
    64332710   'FRQDCAT'    643327   643327 '1 '
                               @!/ Flow          Fup           RlTm          BrTm
                                56.5          100.0         1.000         0.00/
    64332711   'FRQDCAT'    643327   643327 '1 '
                               @!/ Flow          Fup           RlTm          BrTm
                                55.0          100.0         0.100         0.00/
/ HIGH FREQUENCY PROTECTIONS
    64332712  'FRQDCAT'    643327   643327  '1 '
                               @!/ Flow          Fup           RlTm          BrTm
                                00.0          62.0          300.000       0.00/
```

```
    64332713  'FRQDCAT'    643327   643327  '1 '
                                @!/ Flow          Fup          RlTm          BrTm
                                  00.0          63.5          1.000          0.00/
    64332714  'FRQDCAT'    643327   643327  '1 '
                                @!/ Flow          Fup          RlTm          BrTm
                                  00.0          65.0          0.100          0.00/
//
//
//
643326 'USRMDL' 1  'REGCAU1'  101   1    1   14    3    4
@!/ Lvplsw
1
@!/ Tg          Rrpwr       Brkpt       Zerox     Lvpl1
0.0060       10.000       0.0100       0.0000    1.0000
@!/ Volim       Lvpnt1       Lvpnt0       Iolim     Tfltr
2.0000       0.0100       0.0000      -1.0000    0.006
@!/ Khv         Iqrmax       Iqrmin       Accel
0.0000       30.000      -30.000       1.0000/
643326 'USRMDL' 1  'REECAU1'  102    0    6    45   6   9
@!/ Bus#           PFflag         Vflag         Qflag         Pflag         PQflag
0              0              0              0          0                    0
@!/ Vdip          Vup           Trv           dbd1         dbd2
0.8500         2.0000         0.0060        -0.0010       0.0010
@!/ Kqv           Iqh1          Iql1          Vref0        Iqfrz
```

2.6 2.0000 -2.0000 0.0000 0.0000

@!/ Thld Thld2 Tp QMax QMin

0.0000 0.0000 0.0060 0.4229 -0.4229

@!/ Vmax Vmin Kqp Kqi Kvp

1.2000 -1.2000 1.0000 5.0000 1.0000

@!/ Kvi Vbias Tiq dPmax dPmin

5.0000 0.0000 0.0060 30.000 -30.000

@!/ Pmax Pmin Imax Tpord Vq1

0.8732 0.0000 1.0000 0.0250 0.1000

@!/ Iq1 Vq2 Iq2 Vq3 Iq3

1.0000 1.1000 1.0000 0.0000 0.0000

@!/ Vq4 Iq4 Vp1 Ip1 Vp2

0.0000 0.0000 0.1000 1.0000 1.1000

@!/ Ip2 Vp3 Ip3 Vp4 Ip4

1.0000 0.0000 0.0000 0.0000 0.0000/

643326 'USRMDL' 1 'REPCAU1' 107 0 7 27 7 9

@!/ Bus# LDC_FromBus LDC_ToBus LDC_ID VCFlag Refflag Fflag

643320 643320 640591 '1' 0 1 1

@!/ Tfltr Kp Ki Tft Tfv

0.0200 3.0000 6.000 0.0000 0.0250

@!/ Vfrz Rc Xc Kc emax

0.8500 0.0000 0.0000 0.0482 1.0000

@!/ emin dbd1 dbd2 QMax QMin

```
-1.0000         0.0000         0.0000         0.4229      -0.4229
@!/ Kpg           Kig            Tp            fdbd1         fdbd2
0.0100         2.0000         0.0200        -0.0006        0.0006
@!/ femax         femin          Pmax          Pmin          Tg
10000.0        -10000.0        0.8732        0.0000        0.1000
@!/ Ddn           Dup
17.4634         17.4634 /
/ LOW VOLTAGE PROTECTIONS
     64332601   'VTGDCAT'    643326    643326 '1 '
                                @!/ Vlow          Vup           RlTm          BrTm
                                  0.90          10.00         120.00        0.00/
     64332602   'VTGDCAT'    643326    643326 '1 '
                                @!/ Vlow          Vup           RlTm          BrTm
                                  0.80          10.00         60.000        0.00/
     64332603   'VTGDCAT'    643326    643326 '1 '
                                @!/ Vlow          Vup           RlTm          BrTm
                                  0.70          10.00         21.000        0.00/
     64332604   'VTGDCAT'    643326    643326 '1 '
                                @!/ Vlow          Vup           RlTm          BrTm
                                  0.50          10.00         10.000        0.00/
/ HIGH VOLTAGE PROTECTIONS
     64332605   'VTGDCAT'    643326    643326 '1 '
                                @!/ Vlow          Vup           RlTm          BrTm
                                  0.00          1.10          120.00        0.00/
```

```
    64332606  'VTGDCAT'   643326   643326 '1 '
                          @!/ Vlow        Vup         RlTm        BrTm
                            0.00          1.15        60.000      0.00/
    64332607  'VTGDCAT'   643326   643326 '1 '
                          @!/ Vlow        Vup         RlTm        BrTm
                            0.00          1.20        2.000       0.00/
    64332608  'VTGDCAT'   643326   643326 '1 '
                          @!/ Vlow        Vup         RlTm        BrTm
                            0.00          1.25        0.200       0.00/
/ LOW FREQUENCY PROTECTIONS
    64332609  'FRQDCAT'   643326   643326 '1 '
                          @!/ Flow        Fup         RlTm        BrTm
                            58.0          100.0       300.000     0.00/
    64332610  'FRQDCAT'   643326   643326 '1 '
                          @!/ Flow        Fup         RlTm        BrTm
                            56.5          100.0       1.000       0.00/
    64332611  'FRQDCAT'   643326   643326 '1 '
                          @!/ Flow        Fup         RlTm        BrTm
                            55.0          100.0       0.100       0.00/
/ HIGH FREQUENCY PROTECTIONS
    64332612  'FRQDCAT'   643326   643326  '1 '
                          @!/ Flow        Fup         RlTm        BrTm
                            00.0          62.0        300.000     0.00/
    64332613  'FRQDCAT'   643326   643326  '1 '
```

@!/ Flow	Fup	RlTm	BrTm
00.0	63.5	1.000	0.00/

64332614 'FRQDCAT' 643326 643326 '1 '

@!/ Flow	Fup	RlTm	BrTm
00.0	65.0	0.100	0.00/

APPENDIX B: GEN-2013-002/019 SHORT CIRCUIT RESULTS

Group	Bus Number	Bus Name	Bus Voltage (kV)	Request Not In Service 25SP Fault Current 3-Phase (kA)	Request In Service 25SP Fault Current 3-Phase (kA)	Change in Fault Current (kA)
02 NEBRASKA	300039	7FAIRPT	345	12.1849	12.1854	0.0005
02 NEBRASKA	300076	5FAIRPTB2	161	16.6819	16.6821	0.0002
02 NEBRASKA	301559	5FAIRPTXF3	161	16.6933	16.6936	0.0003
02 NEBRASKA	541147	ST JOE_CAP5	161	17.6788	17.6791	0.0003
02 NEBRASKA	541197	MULLNCR7	345	7.8632	7.8634	0.0002
02 NEBRASKA	541199	ST JOE 7	345	19.1873	19.1882	0.0009
02 NEBRASKA	541253	ST JOE 5	161	19.8551	19.8555	0.0004
02 NEBRASKA	541257	COOK 5	161	13.8892	13.8894	0.0002
02 NEBRASKA	541258	WOODBIN5	161	16.7557	16.756	0.0003
02 NEBRASKA	541394	AVENUECTY 5	161	9.4447	9.4448	0.00001
02 NEBRASKA	541400	EASTOWN7	345	17.843	17.8436	0.0006
02 NEBRASKA	541401	EASTOWN5	161	17.1382	17.1385	0.0003
02 NEBRASKA	541510	HOLT 7	345	9.1517	9.1522	0.0005
02 NEBRASKA	541511	ROCKCK7	345	7.3421	7.3424	0.0003
02 NEBRASKA	541517	HOLT_REACT7	345	9.1022	9.1026	0.0004
02 NEBRASKA	542980	NASHUA 7	345	21.4143	21.4146	0.0003
02 NEBRASKA	542982	IATAN 7	345	29.1993	29.1997	0.0004
02 NEBRASKA	585241	GEN-2015-088	345	11.8044	11.8206	0.0162
02 NEBRASKA	635000	CBLUFFS3	345	32.5719	32.5759	0.004
02 NEBRASKA	635017	ATCHSN 3	345	16.6709	16.6741	0.0032
02 NEBRASKA	635018	WESTBORO 3	345	15.8988	15.9016	0.0028
02 NEBRASKA	635570	ORIENT 3	345	17.5443	17.5449	0.0006
02 NEBRASKA	637084	J476 SHENHLL	345	15.8182	15.8209	0.0027
02 NEBRASKA	640065	AXTELL 3	345	10.0839	10.0857	0.0018
02 NEBRASKA	640074	BEAT. S7	115	5.2258	5.2272	0.0014
02 NEBRASKA	640076	BEATRCE7	115	12.8161	12.8248	0.0087

Group	Bus Number	Bus Name	Bus Voltage (kV)	Request Not In Service 25SP Fault Current 3-Phase (kA)	Request In Service 25SP Fault Current 3-Phase (kA)	Change in Fault Current (kA)
02 NEBRASKA	640088	BPS SUB7	115	15.601	15.6154	0.0144
02 NEBRASKA	640105	CARLJCT7	115	5.5563	5.5571	0.0008
02 NEBRASKA	640111	CLATONA7	115	10.4805	10.4929	0.0124
02 NEBRASKA	640125	COLMB.E3	345	10.5083	10.5119	0.0036
02 NEBRASKA	640127	COLMB.E7	115	22.4656	22.4696	0.004
02 NEBRASKA	640139	COOPER 3	345	26.0013	26.0116	0.0103
02 NEBRASKA	640140	COOPER 5	161	17.3886	17.3909	0.0023
02 NEBRASKA	640141	COOPER_ESST8	69	4.4629	4.4629	0
02 NEBRASKA	640143	COOPER_602 8	69	1.9242	1.9243	1E-04
02 NEBRASKA	640153	CRETE__7	115	8.1653	8.1754	0.0101
02 NEBRASKA	640169	FAIRBRY7	115	5.0334	5.034	0.0006
02 NEBRASKA	640171	FIRTH 7	115	6.8037	6.8126	0.0089
02 NEBRASKA	640174	FRIEND 7	115	5.487	5.4895	0.0025
02 NEBRASKA	640178	GENEVA 7	115	9.6249	9.6278	0.0029
02 NEBRASKA	640179	GENEVA 8	69	4.1401	4.1405	0.0004
02 NEBRASKA	640200	GR ISLD4	230	16.9399	16.9449	0.005
02 NEBRASKA	640208	HARBINE7	115	6.6813	6.6826	0.0013
02 NEBRASKA	640234	HUMBOLT5	161	7.7646	7.7651	0.0005
02 NEBRASKA	640235	HUMBOLT7	115	5.9458	5.9461	0.0003
02 NEBRASKA	640271	MCCOOL 3	345	11.1152	11.1247	0.0095
02 NEBRASKA	640272	MCCOOL 7	115	13.9541	13.9596	0.0055
02 NEBRASKA	640273	MCCOOL 8	69	5.3755	5.376	0.0005
02 NEBRASKA	640277	MOORE 3	345	23.5907	23.6905	0.0998
02 NEBRASKA	640278	SHELDON7	115	42.7714	43.1937	0.4223
02 NEBRASKA	640312	PAULINE3	345	8.2008	8.2038	0.003
02 NEBRASKA	640313	PAULINE7	115	15.8447	15.8475	0.0028
02 NEBRASKA	640316	PAWNEEL7	115	11.4629	11.4687	0.0058
02 NEBRASKA	640342	SHELCRK3	345	10.8988	10.9016	0.0028
02 NEBRASKA	640361	STEINER7	115	4.2627	4.2631	0.0004
02 NEBRASKA	640362	STERLNG7	115	4.6564	4.6597	0.0033
02 NEBRASKA	640372	SUTTON 7	115	6.3109	6.3117	0.0008
02 NEBRASKA	640374	SWEET W3	345	10.3257	10.3271	0.0014

Group	Bus Number	Bus Name	Bus Voltage (kV)	Request Not In Service 25SP Fault Current 3-Phase (kA)	Request In Service 25SP Fault Current 3-Phase (kA)	Change in Fault Current (kA)
02 NEBRASKA	640413	YORK SW7	115	8.0463	8.0479	0.0016
02 NEBRASKA	640426	STEELEC7	115	4.9129	4.9134	0.0005
02 NEBRASKA	640446	COOPER 8	69	4.5561	4.5562	1E-04
02 NEBRASKA	640525	TOBIAS 3	345	11.8044	11.8206	0.0162
02 NEBRASKA	640590	MONOLITH 3	345	23.0701	23.1694	0.0993
02 NEBRASKA	640591	MONOLITH 7	115	41.3966	41.8791	0.4825
02 NEBRASKA	645454	S3454 3	345	31.4633	31.4755	0.0122
02 NEBRASKA	645455	S3455 3	345	35.5378	35.5486	0.0108
02 NEBRASKA	645456	S3456 3	345	37.0658	37.0747	0.0089
02 NEBRASKA	645458	S3458 3	345	29.5881	29.6002	0.0121
02 NEBRASKA	645459	S3459 3	345	26.7134	26.7176	0.0042
02 NEBRASKA	645740	S3740 3	345	25.2286	25.2343	0.0057
02 NEBRASKA	646206	S1206 5	161	47.3055	47.3108	0.0053
02 NEBRASKA	646263	S1263 5	161	8.1002	8.1008	0.0006
02 NEBRASKA	646280	S1280 5	161	10.102	10.1029	0.0009
02 NEBRASKA	647102	HYDCAP 8	69	4.1575	4.1583	0.0008
02 NEBRASKA	647103	ENRON 8	69	4.0176	4.0182	0.0006
02 NEBRASKA	647966	S966 8	69	0.4766	0.4766	0
02 NEBRASKA	647968	S968 8	69	4.099	4.0994	0.0004
02 NEBRASKA	647969	S969 8	69	4.043	4.0437	0.0007
02 NEBRASKA	647970	S970 8	69	4.0199	4.0204	0.0005
02 NEBRASKA	647974	S974 8	69	5.1348	5.1364	0.0016
02 NEBRASKA	650114	NW68HOLDRG3	345	17.4981	17.5345	0.0364
02 NEBRASKA	650185	WAGENER 3	345	21.3685	21.4082	0.0397
02 NEBRASKA	650189	103&ROKEBY3	345	21.0616	21.1055	0.0439
02 NEBRASKA	650208	W LINCOLN 7	115	22.4777	22.5037	0.026
02 NEBRASKA	650210	NW70FAIRFD7	115	21.3072	21.3302	0.023
02 NEBRASKA	650214	NW68HOLDRG7	115	25.6901	25.724	0.0339
02 NEBRASKA	650216	SW27&F 7	115	22.1927	22.219	0.0263
02 NEBRASKA	650217	8&N 7	115	24.521	24.5531	0.0321
02 NEBRASKA	650218	3&VANDORN 7	115	22.0237	22.0519	0.0282
02 NEBRASKA	650229	27&PLR 7	115	20.9344	20.968	0.0336

Group	Bus Number	Bus Name	Bus Voltage (kV)	Request Not In Service 25SP Fault Current 3-Phase (kA)	Request In Service 25SP Fault Current 3-Phase (kA)	Change in Fault Current (kA)
02 NEBRASKA	650230	2&N 7	115	26.3172	26.3546	0.0374
02 NEBRASKA	650238	20PIONEERS7	115	27.9471	27.9961	0.049
02 NEBRASKA	650242	FOLSM&PHIL7	115	28.5703	28.6359	0.0656
02 NEBRASKA	650246	SW7&BENNET7	115	23.35	23.4064	0.0564
02 NEBRASKA	650247	40&BENNET 7	115	21.4849	21.5241	0.0392
02 NEBRASKA	650250	40&ROKEBY 7	115	21.3757	21.4118	0.0361
02 NEBRASKA	650255	56&PLR 7	115	19.2352	19.2619	0.0267
02 NEBRASKA	650257	56&ELK TAP7	115	25.5952	25.6315	0.0363
02 NEBRASKA	650258	40&GERTIE 7	115	23.6325	23.6652	0.0327
02 NEBRASKA	650270	70&CALVERT7	115	27.9951	28.0381	0.043
02 NEBRASKA	650271	81&OCHENEY7	115	25.5291	25.5667	0.0376
02 NEBRASKA	650272	91&A 7	115	22.0158	22.0399	0.0241
02 NEBRASKA	650273	93&O 7	115	22.8237	22.8484	0.0247
02 NEBRASKA	650274	91&HWY2 7	115	21.9253	21.9575	0.0322
02 NEBRASKA	650276	76&ROKEBY 7	115	17.7627	17.7867	0.024
02 NEBRASKA	650285	WAGENER 7	115	33.5999	33.6435	0.0436
02 NEBRASKA	650290	ROKEBY 7	115	26.6635	26.7165	0.053
02 NEBRASKA	653571	GR ISLD3	345	12.4383	12.4431	0.0048
02 NEBRASKA	653871	GR ISLD-LNX3	345	12.3054	12.31	0.0046
02 NEBRASKA	760746	GEN-2017-115	345	8.1744	8.1748	0.0004
02 NEBRASKA	761208	GEN-2017-210	345	9.7229	9.73	0.0071
02 NEBRASKA	761292	GEN-2017-181	345	6.6541	6.6588	0.0047
02 NEBRASKA	761313	GEN-2017-182	345	5.5554	5.5586	0.0032
02 NEBRASKA	761376	GEN-2017-183	345	7.1444	7.1444	0
02 NEBRASKA	761383	G17-183-TAP	345	15.6026	15.6029	0.0003
02 NEBRASKA	762691	GEN-2018-033	345	24.0257	24.0308	0.0051
02 NEBRASKA	763725	GEN-2019-041	115	41.2927	41.7726	0.4799
02 NEBRASKA	764705	GEN-2020-038	345	25.2286	25.2343	0.0057
02 NEBRASKA	764795	GEN-2020-094	345	11.583	11.5892	0.0062
02 NEBRASKA	764805	G20-094-TAP	345	16.3588	16.3714	0.0126
02 NEBRASKA	765550	GEN-2021-027	115	33.9481	34.2713	0.3232
02 NEBRASKA	765620	GEN-2021-034	115	20.7855	20.8177	0.0322

Group	Bus Number	Bus Name	Bus Voltage (kV)	Request Not In Service 25SP Fault Current 3-Phase (kA)	Request In Service 25SP Fault Current 3-Phase (kA)	Change in Fault Current (kA)
02 NEBRASKA	765710	GEN-2021-043	115	24.8256	24.8712	0.0456
02 NEBRASKA	766250	GEN-2021-108	345	22.9125	22.9172	0.0047

APPENDIX C: SPP DISTURBANCE PERFORMANCE REQUIREMENTS

REVISION HISTORY

Version Number	Author	Change Description	Comments
1.0 (1/13/2013)	Transient Stability Task Force	First draft	TWG approval of Rotor Angle Damping
1.1 (7/31/2013)	Transmission Working Group	Approval of entire document	Approval of both Rotor Angle Damping and Transient Voltage requirements and addressed items regarding SPPR figure.
2.0 (12/15/2015)	Transmission Working Group	Revision to Transient Voltage Requirements	Addition of 2.5 seconds delay of looking at voltage being above 0.7 p.u.
3.0 (7/21/2016)	Dynamic Load Task Force	Revision to Rotor Angle Damping Requirements	Edited verbiage to clarify rotor angle requirements.

OVERVIEW

These Disturbance Performance Requirements ("Requirements") shall be applicable to the Bulk Electric System within the Southwest Power Pool Planning Area. Utilization of these Requirements applies to all registered entities within the Southwest Power Pool Planning Area. These Requirements shall not be applicable to facilities that are not part of Bulk Electric System. More stringent Requirements are at the sole discretion of each Transmission Planner.

Transient and dynamic stability assessments are generally performed to assure adequate avoidance of loss of generator synchronism and prevention of system voltage collapse within the first 20 seconds after a system disturbance. These Requirements provide a basis for evaluating the system response during the initial transient period following a disturbance on the Bulk Electric System by establishing minimum requirements for machine rotor angle damping and transient voltage recovery.

ROTOR ANGLE DAMPING REQUIREMENT

Machine Rotor Angles shall exhibit well damped angular oscillations following a disturbance on the Bulk Electric System for all NERC TPL-001-4 P1 through P7 events.

Machines with rotor angle deviations greater than or equal to 16 degrees (measured as absolute maximum peak to absolute minimum peak) shall be evaluated against SPPR1 or SPPR5 requirements below. Machines with rotor angle deviations less than 16 degrees which do not exhibit convergence shall be evaluated on an individual basis. Rotor angle deviations will be calculated relative to the system swing machine.

Well damped angular oscillations shall meet one of the following two requirements when calculated directly from the rotor angle:

1. Successive Positive Peak Ratio One (SPPR1) must be less than or equal to 0.95 where SPPR1 is calculated as follows:

$$SPPR1 = \frac{\text{Peak Rotor Angle of } 2^{nd} \text{ Positive Peak minus Minimum Value}}{\text{Peak Rotor Angle of } 1^{st} \text{ Positive Peak minus Minimum Value}} \leq 0.95$$

-or- $\text{Damping Factor \%} = (1 - SPPR1) \times 100\% \geq 5\%$

The machine rotor angle damping ratio may be determined by appropriate modal analysis (i.e. Prony Analysis) where the following equivalent requirement must be met:

$$\text{Damping Ratio} \geq 0.0081633$$

2. Successive Positive Peak Ratio Five (SPPR5) must be less than or equal to 0.774 where SPPR5 is calculated as follows:

$$SPPR5 = \frac{\text{Peak Rotor Angle of } 6^{th} \text{ Positive Peak minus Minimum Value}}{\text{Peak Rotor Angle of } 1^{st} \text{ Positive Peak minus Minimum Value}} \leq 0.774$$

-or- $\text{Damping Factor \%} = (1 - SPPR5) \times 100\% \geq 22.6\%$

The machine rotor angle damping ratio may be determined by appropriate modal analysis (i.e. Prony Analysis) where the following equivalent requirement must be met:

$$\text{Damping Ratio} \geq 0.0081633$$

Qualitatively, these Requirements are shown in Figure 1 & 2 below.

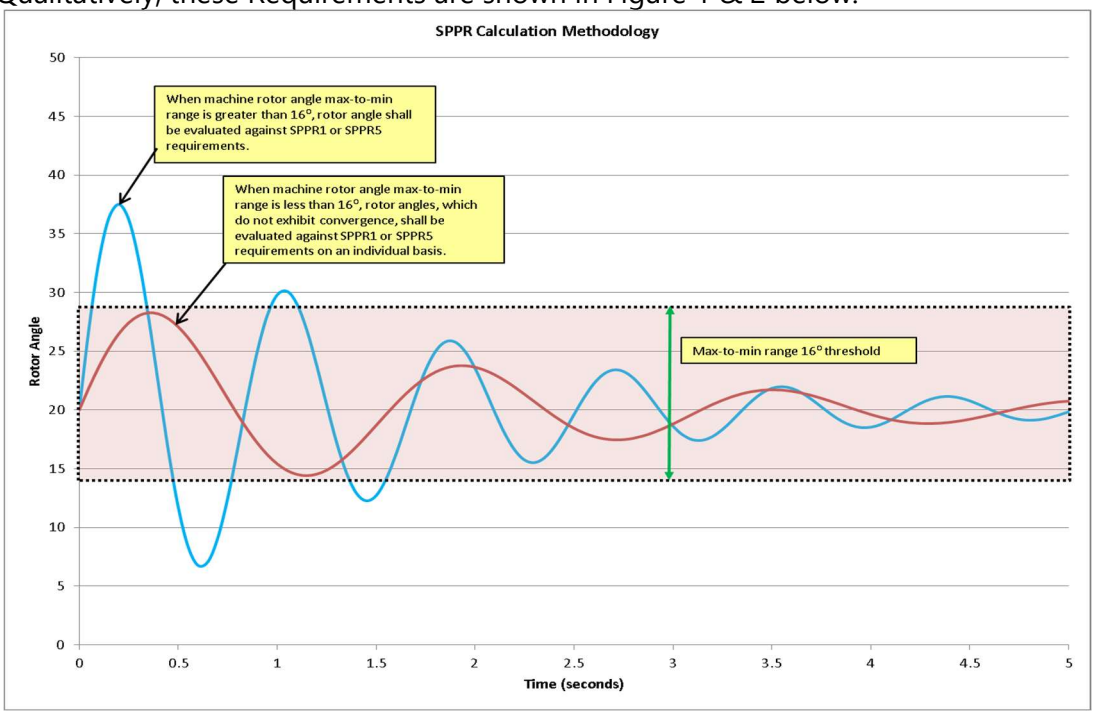


Figure 1. Applicability of 16 Degree Threshold

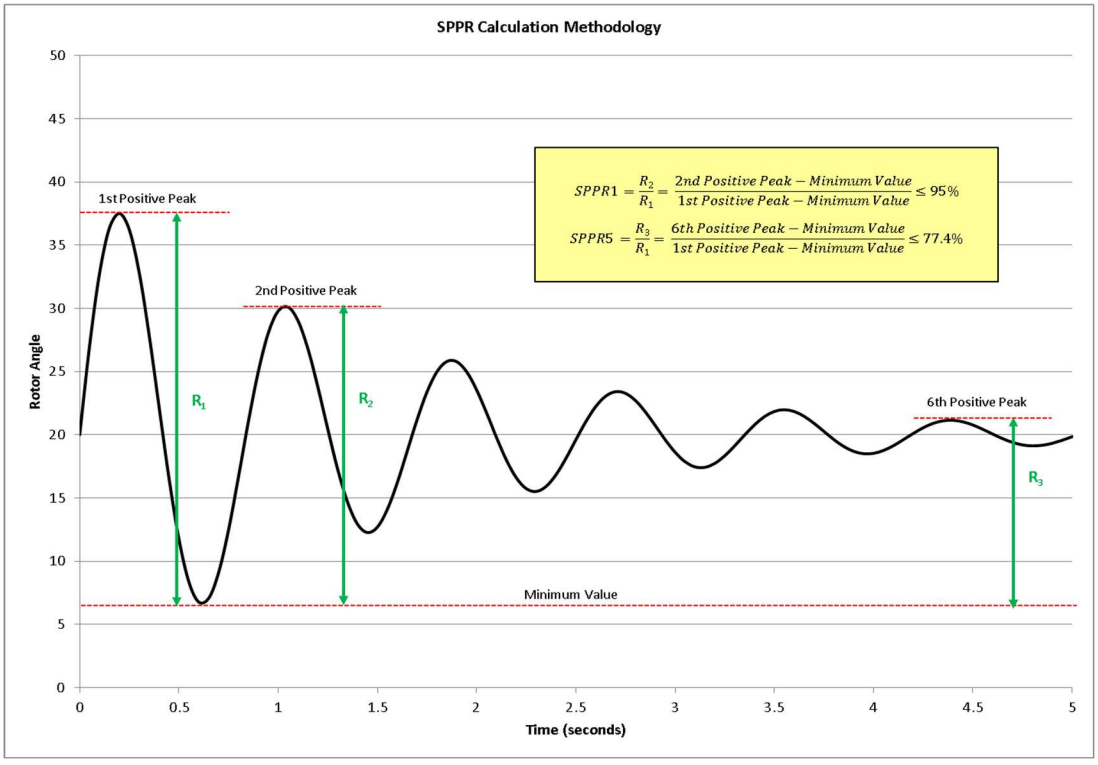


Figure 2. SPPR1 and SPPR5 Calculations

TRANSIENT VOLTAGE RECOVERY REQUIREMENT

Bus voltages on the Bulk Electric System shall recover above 0.70 per unit, 2.5 seconds after the fault is cleared. Bus voltages shall not swing above 1.20 per unit after the fault is cleared, unless affected transmission system elements are designed to handle the rise above 1.2 per unit.

Qualitatively, this Requirement is shown in Figure 3 below.

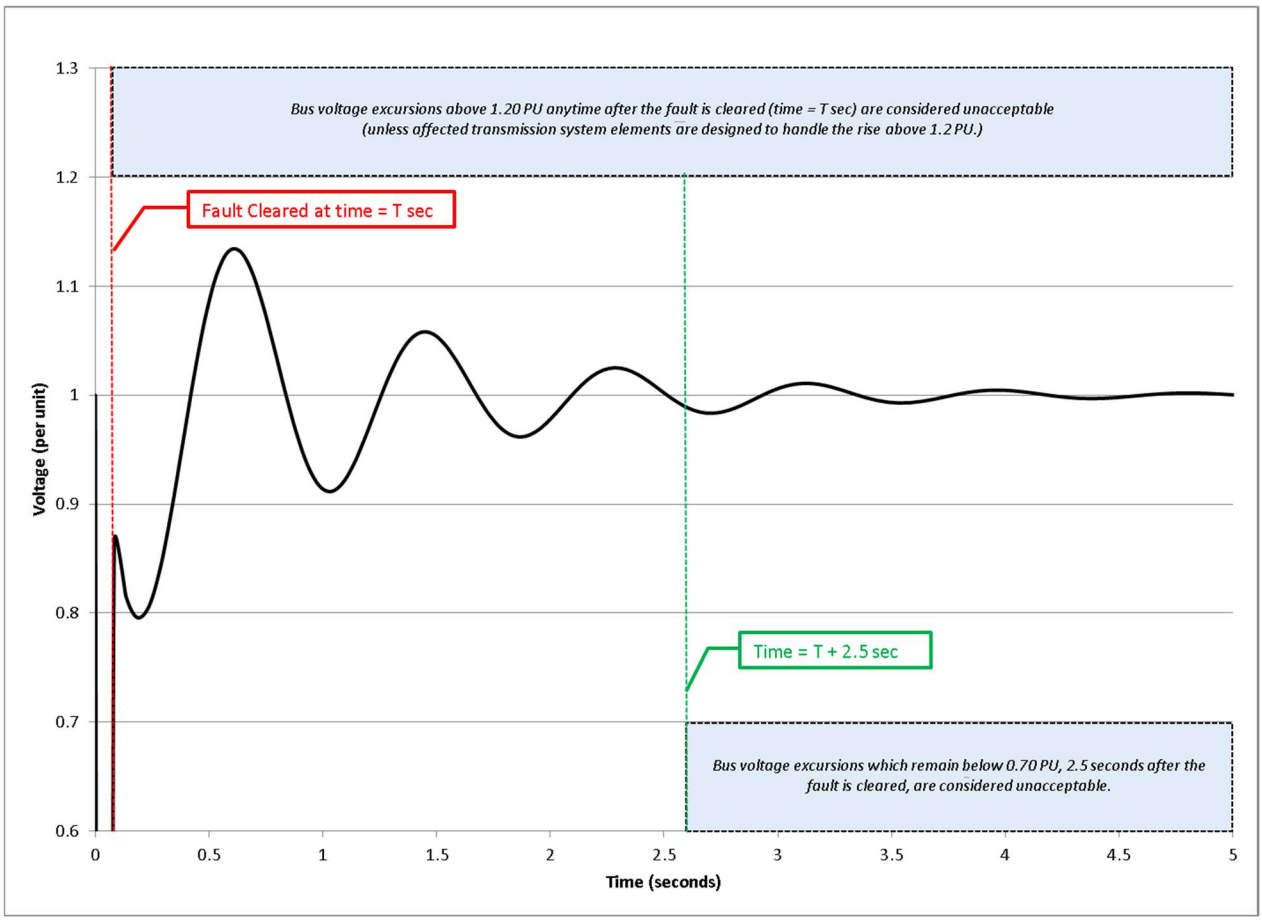


Figure 3. Transient Voltage Recovery Requirement

APPENDIX D: FAULT DEFINITIONS

Fault ID	Planning Event	Fault Description
G02_P1_Fault_001	P1	3 Phase fault on ATCHSN 3 345.00 (635017) 345 kV Bus a. Apply fault at the ATCHSN 3 345.00 (635017) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. ATCHSN 3 (635017) 345.0 kV Fixed Shunt Device # c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_002	P1	3 Phase fault on CBLUFFS3 345.00 (635000) 345 kV Bus a. Apply fault at the CBLUFFS3 345.00 (635000) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. CBLUFFS3 (635000) 345.0 kV to S3456 3 (645456) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_003	P1	3 Phase fault on ATCHSN 3 345.00 (635017) 345 kV Bus a. Apply fault at the ATCHSN 3 345.00 (635017) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. ATCHSN 3 (635017) 345.0 kV to COOPER 3 (640139) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_004	P1	3 Phase fault on MC REAC2 345.00 (541412) 345 kV Bus a. Apply fault at the MC REAC2 345.00 (541412) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. MULLNCR7 (541197) 345.0 kV to HOLT 7 (541510) 345.0 kV Transmission Circuit #1 b.2. MC REAC1 (541411) 345.0 kV Fixed Shunt Device # b.3. MC REAC2 (541412) 345.0 kV Fixed Shunt Device # c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_005	P1	3 Phase fault on ST JOE_CAP5 161.00 (541147) 161 kV Bus a. Apply fault at the ST JOE_CAP5 161.00 (541147) 161 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. ST JOE 5 (541253) 161.0 kV to COOK 5 (541257) 161.0 kV Transmission Circuit #1 b.2. ST JOE_CAP5 (541147) 161.0 kV Fixed Shunt Device # c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_006	P1	3 Phase fault on STRANGR7 345.00 (532772) 345 kV Bus a. Apply fault at the STRANGR7 345.00 (532772) 345 kV Bus

Fault ID	Planning Event	Fault Description
		b. Clear fault after 6 cycles and trip the faulted elements: b.1. STRANGR7 (532772) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_007	P1	3 Phase fault on STRANGR7 345.00 (532772) 345 kV Bus a. Apply fault at the STRANGR7 345.00 (532772) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. STRANGR7 (532772) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #2 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_008	P1	3 Phase fault on W LINCOLN 7 115.00 (650208) 115 kV Bus a. Apply fault at the W LINCOLN 7 115.00 (650208) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. W LINCOLN 7 (650208) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_009	P1	3 Phase fault on NW70FAIRFD7 115.00 (650210) 115 kV Bus a. Apply fault at the NW70FAIRFD7 115.00 (650210) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. NW70FAIRFD7 (650210) 115.0 kV to NW68HOLDRG7 (650214) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_010	P1	3 Phase fault on NW56&MORTN7 115.00 (650207) 115 kV Bus a. Apply fault at the NW56&MORTN7 115.00 (650207) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. NW56&MORTN7 (650207) 115.0 kV to NW70FAIRFD7 (650210) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_011	P1	3 Phase fault on NW12&ARBOR7 115.00 (650226) 115 kV Bus a. Apply fault at the NW12&ARBOR7 115.00 (650226) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. NW56&MORTN7 (650207) 115.0 kV to NW12&ARBOR7 (650226) 115.0 kV Transmission Circuit #1 b.2. 19&ALVO 7 (650215) 115.0 kV to NW12&ARBOR7 (650226) 115.0 kV Transmission Circuit #1 b.3. NW12&ARBOR7 (650226) 115.0 kV to NW12&AR 9 (650326) 12.5 kV to 261TERTIARY (650526) 7.2 kV Three Winding #1
G02_P1_Fault_012	P1	3 Phase fault on 2&N 7 115.00 (650230) 115 kV Bus a. Apply fault at the 2&N 7 115.00 (650230) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. NW68HOLDRG7 (650214) 115.0 kV to SW27&F 7 (650216) 115.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.2. SW27&F 7 (650216) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.3. SW27&F 7 (650216) 115.0 kV to SW27&F 9 (650316) 12.5 kV to 161TERTIARY (650516) 7.2 kV Three Winding #1 b.6. 2&N 7 (650230) 115.0 kV Fixed Shunt Device #
G02_P1_Fault_013	P1	3 Phase fault on NW68HOLDRG7 115.00 (650214) 115 kV Bus a. Apply fault at the NW68HOLDRG7 115.00 (650214) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. NW68HOLDRG7 (650214) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_014	P1	3 Phase fault on 8&N 7 115.00 (650217) 115 kV Bus a. Apply fault at the 8&N 7 115.00 (650217) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 8&N 7 (650217) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_015	P1	3 Phase fault on 27&PLR 7 115.00 (650229) 115 kV Bus a. Apply fault at the 27&PLR 7 115.00 (650229) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 27&PLR 7 (650229) 115.0 kV to 40&ROKEBY 7 (650250) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_016	P1	3 Phase fault on 27&PLR 7 115.00 (650229) 115 kV Bus a. Apply fault at the 27&PLR 7 115.00 (650229) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 27&PLR 7 (650229) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_017	P1	3 Phase fault on 3&VANDORN 7 115.00 (650218) 115 kV Bus a. Apply fault at the 3&VANDORN 7 115.00 (650218) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 3&VANDORN 7 (650218) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.2. 3&VANDORN 7 (650218) 115.0 kV to 20PIONEERS7 (650238) 115.0 kV Transmission Circuit #1 b.3. 3&VANDORN 7 (650218) 115.0 kV to 3VANDORN 9 (650318) 13.2 kV to 181TERTIARY (650518) 7.2 kV Three Winding #1
G02_P1_Fault_018	P1	3 Phase fault on 2&N 7 115.00 (650230) 115 kV Bus a. Apply fault at the 2&N 7 115.00 (650230) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 2&N 7 (650230) 115.0 kV to 20PIONEERS7 (650238) 115.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_019	P1	3 Phase fault on 20PIONEERS7 115.00 (650238) 115 kV Bus a. Apply fault at the 20PIONEERS7 115.00 (650238) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 20PIONEERS7 (650238) 115.0 kV to FOLSM&PHIL7 (650242) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_020	P1	3 Phase fault on 20PIONEERS7 115.00 (650238) 115 kV Bus a. Apply fault at the 20PIONEERS7 115.00 (650238) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 20PIONEERS7 (650238) 115.0 kV to 40&GERTIE 7 (650258) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_021	P1	3 Phase fault on 20PIONEERS7 115.00 (650238) 115 kV Bus a. Apply fault at the 20PIONEERS7 115.00 (650238) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 20PIONEERS7 (650238) 115.0 kV to 70&CALVERT7 (650270) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_022	P1	3 Phase fault on SHELDON7 115.00 (640278) 115 kV Bus a. Apply fault at the SHELDON7 115.00 (640278) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. SHELDON7 (640278) 115.0 kV to FOLSM&PHIL7 (650242) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_023	P1	3 Phase fault on FOLSM&PHIL7 115.00 (650242) 115 kV Bus a. Apply fault at the FOLSM&PHIL7 115.00 (650242) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. FOLSM&PHIL7 (650242) 115.0 kV to SW7&BENNET7 (650246) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_024	P1	3 Phase fault on FOLSM&PHIL7 115.00 (650242) 115 kV Bus a. Apply fault at the FOLSM&PHIL7 115.00 (650242) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. FOLSM&PHIL7 (650242) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_025	P1	3 Phase fault on SHELDON7 115.00 (640278) 115 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply fault at the SHELDON7 115.00 (640278) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. SHELDON7 (640278) 115.0 kV to SW7&BENNET7 (650246) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_026	P1	3 Phase fault on SW7&BENNET7 115.00 (650246) 115 kV Bus a. Apply fault at the SW7&BENNET7 115.00 (650246) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. SW7&BENNET7 (650246) 115.0 kV to 40&BENNET 7 (650247) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_027	P1	3 Phase fault on 40&BENNET 7 115.00 (650247) 115 kV Bus a. Apply fault at the 40&BENNET 7 115.00 (650247) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 40&BENNET 7 (650247) 115.0 kV to 40&ROKEBY 7 (650250) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_028	P1	3 Phase fault on 40&BENNET 7 115.00 (650247) 115 kV Bus a. Apply fault at the 40&BENNET 7 115.00 (650247) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 40&BENNET 7 (650247) 115.0 kV to 76&ROKEBY 7 (650276) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_029	P1	3 Phase fault on 91&HWY2 7 115.00 (650274) 115 kV Bus a. Apply fault at the 91&HWY2 7 115.00 (650274) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 91&HWY2 7 (650274) 115.0 kV to 76&ROKEBY 7 (650276) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_030	P1	3 Phase fault on 40&ROKEBY 7 115.00 (650250) 115 kV Bus a. Apply fault at the 40&ROKEBY 7 115.00 (650250) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 40&ROKEBY 7 (650250) 115.0 kV to 56&PLR 7 (650255) 115.0 kV Transmission Circuit #1 b.2. 56&PLR 7 (650255) 115.0 kV to 91&HWY2 7 (650274) 115.0 kV Transmission Circuit #1 b.3. 56&PLR 7 (650255) 115.0 kV to 56&PLR 9 (650355) 12.5 kV to 551TERTIARY (650555) 7.2 kV Three Winding #1 b.6. 40&ROKEBY 7 (650250) 115.0 kV Fixed Shunt Device #
G02_P1_Fault_031	P1	3 Phase fault on 84LEIGHTON7 115.00 (650267) 115 kV Bus a. Apply fault at the 84LEIGHTON7 115.00 (650267) 115 kV Bus

Fault ID	Planning Event	Fault Description
		b. Clear fault after 7 cycles and trip the faulted elements: b.1. 84LEIGHTON7 (650267) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_032	P1	3 Phase fault on 70&CALVERT7 115.00 (650270) 115 kV Bus a. Apply fault at the 70&CALVERT7 115.00 (650270) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 70&CALVERT7 (650270) 115.0 kV to 81&OCHENEY7 (650271) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_033	P1	3 Phase fault on 81&OCHENEY7 115.00 (650271) 115 kV Bus a. Apply fault at the 81&OCHENEY7 115.00 (650271) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 81&OCHENEY7 (650271) 115.0 kV to 91&HWY2 7 (650274) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_034	P1	3 Phase fault on 81&OCHENEY7 115.00 (650271) 115 kV Bus a. Apply fault at the 81&OCHENEY7 115.00 (650271) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 81&OCHENEY7 (650271) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_035	P1	3 Phase fault on 120&ALVO 7 115.00 (650279) 115 kV Bus a. Apply fault at the 120&ALVO 7 115.00 (650279) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. 120&ALVO 7 (650279) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_036	P1	3 Phase fault on NW68HOLDRG3 345.00 (650114) 345 kV Bus a. Apply fault at the NW68HOLDRG3 345.00 (650114) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. NW68HOLDRG3 (650114) 345.0 kV to WAGENER 3 (650185) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_037	P1	3 Phase fault on S3454 3 345.00 (645454) 345 kV Bus a. Apply fault at the S3454 3 345.00 (645454) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S3454 3 (645454) 345.0 kV to WAGENER 3 (650185) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault

Fault ID	Planning Event	Fault Description
		d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_038	P1	3 Phase fault on MOORE 3 345.00 (640277) 345 kV Bus a. Apply fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. MOORE 3 (640277) 345.0 kV to 103&ROKEBY3 (650189) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_039	P1	3 Phase fault on MOORE 3 345.00 (640277) 345 kV Bus a. Apply fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. MOORE 3 (640277) 345.0 kV to NW68HOLDRG3 (650114) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_040	P1	3 Phase fault on COLMB.E3 345.00 (640125) 345 kV Bus a. Apply fault at the COLMB.E3 345.00 (640125) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. COLMB.E3 (640125) 345.0 kV to NW68HOLDRG3 (650114) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_041	P1	3 Phase fault on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. WAGENER 3 (650185) 345.0 kV to 103&ROKEBY3 (650189) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_042	P1	3 Phase fault on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. WAGENER 7 (650285) 115.0 kV to WAGENER 3 (650185) 345.0 kV to WAGENER1 9 (650385) 13.8 kV Three Winding #1
G02_P1_Fault_043	P1	3 Phase fault on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. WAGENER 7 (650285) 115.0 kV to WAGENER 3 (650185) 345.0 kV to WAGENER2 9 (650485) 13.8 kV Three Winding #2
G02_P1_Fault_044	P1	3 Phase fault on NW68HOLDRG3 345.00 (650114) 345 kV Bus a. Apply fault at the NW68HOLDRG3 345.00 (650114) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. NW68HOLDRG7 (650214) 115.0 kV to NW68HOLDRG3 (650114) 345.0 kV to NW68HOL1 9 (650314) 13.8 kV Three Winding #1

Fault ID	Planning Event	Fault Description
G02_P1_Fault_045	P1	3 Phase fault on MOORE 3 345.00 (640277) 345 kV Bus a. Apply fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. MOORE 3 (640277) 345.0 kV to MONOLITH 3 (640590) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_046	P1	3 Phase fault on COOPER 3 345.00 (640139) 345 kV Bus a. Apply fault at the COOPER 3 345.00 (640139) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. COOPER 3 (640139) 345.0 kV to MONOLITH 3 (640590) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_047	P1	3 Phase fault on MCCOOL 3 345.00 (640271) 345 kV Bus a. Apply fault at the MCCOOL 3 345.00 (640271) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. MCCOOL 3 (640271) 345.0 kV to MOORE 3 (640277) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_048	P1	3 Phase fault on COLMB.E3 345.00 (640125) 345 kV Bus a. Apply fault at the COLMB.E3 345.00 (640125) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. COLMB.E3 (640125) 345.0 kV to SHELCRK3 (640342) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_049	P1	3 Phase fault on BPS SUB7 115.00 (640088) 115 kV Bus a. Apply fault at the BPS SUB7 115.00 (640088) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. BPS SUB7 (640088) 115.0 kV to SHELDON7 (640278) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_050	P1	3 Phase fault on CRETE__7 115.00 (640153) 115 kV Bus a. Apply fault at the CRETE__7 115.00 (640153) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. CRETE__7 (640153) 115.0 kV to SHELDON7 (640278) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_051	P1	3 Phase fault on SHELDON7 115.00 (640278) 115 kV Bus a. Apply fault at the SHELDON7 115.00 (640278) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements:

Fault ID	Planning Event	Fault Description
		b.1. SHELDON7 (640278) 115.0 kV to MONOLITH 7 (640591) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_052	P1	3 Phase fault on SHELDON7 115.00 (640278) 115 kV Bus a. Apply fault at the SHELDON7 115.00 (640278) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. SHELDON7 (640278) 115.0 kV to MONOLITH 7 (640591) 115.0 kV Transmission Circuit #2 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_053	P1	3 Phase fault on MOORE 3 345.00 (640277) 345 kV Bus a. Apply fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. SHELDON7 (640278) 115.0 kV to MOORE 3 (640277) 345.0 kV to MOORE 9 (640280) 13.8 kV Three Winding #1
G02_P1_Fault_054	P1	3 Phase fault on COLMB.E3 345.00 (640125) 345 kV Bus a. Apply fault at the COLMB.E3 345.00 (640125) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. COLMB.E7 (640127) 115.0 kV to COLMB.E3 (640125) 345.0 kV to COLMB.T9 (640129) 13.8 kV Three Winding #1
G02_P1_Fault_055	P1	3 Phase fault on MONOLITH 3 345.00 (640590) 345 kV Bus a. Apply fault at the MONOLITH 3 345.00 (640590) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. MONOLITH 7 (640591) 115.0 kV to MONOLITH 3 (640590) 345.0 kV to MONOLITHT1 9 (640596) 13.8 kV Three Winding #1
G02_P1_Fault_056	P1	3 Phase fault on MONOLITH 3 345.00 (640590) 345 kV Bus a. Apply fault at the MONOLITH 3 345.00 (640590) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. MONOLITH 7 (640591) 115.0 kV to MONOLITH 3 (640590) 345.0 kV to MONOLITHT2 9 (640597) 13.8 kV Three Winding #1
G02_P1_Fault_057	P1	3 Phase fault on S3451 3 345.00 (645451) 345 kV Bus a. Apply fault at the S3451 3 345.00 (645451) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S3451 3 (645451) 345.0 kV to S3454 3 (645454) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_058	P1	3 Phase fault on S3454 3 345.00 (645454) 345 kV Bus a. Apply fault at the S3454 3 345.00 (645454) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S3454 3 (645454) 345.0 kV to S3455 3 (645455) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault

Fault ID	Planning Event	Fault Description
		d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_059	P1	3 Phase fault on COOPER 3 345.00 (640139) 345 kV Bus a. Apply fault at the COOPER 3 345.00 (640139) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. COOPER 3 (640139) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_060	P1	3 Phase fault on S3456 3 345.00 (645456) 345 kV Bus a. Apply fault at the S3456 3 345.00 (645456) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S3456 3 (645456) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_061	P1	3 Phase fault on S3458 3 345.00 (645458) 345 kV Bus a. Apply fault at the S3458 3 345.00 (645458) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S3458 3 (645458) 345.0 kV to S3740 3 (645740) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_062	P1	3 Phase fault on S3454 3 345.00 (645454) 345 kV Bus a. Apply fault at the S3454 3 345.00 (645454) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S3454 3 (645454) 345.0 kV to S1254 5 (646254) 161.0 kV to S1254T19 (648254) 13.8 kV Three Winding #1
G02_P1_Fault_063	P1	3 Phase fault on 7FAIRPT 345.00 (300039) 345 kV Bus a. Apply fault at the 7FAIRPT 345.00 (300039) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. 7FAIRPT (300039) 345.0 kV to ST JOE 7 (541199) 345.0 kV Transmission Circuit #1 b.2. 7FAIRPT (300039) 345.0 kV to COOPER 3 (640139) 345.0 kV Transmission Circuit #1 b.3. 5FAIRPTB2 (300076) 161.0 kV to 5FAIRPTXF3 (301559) 161.0 kV Transmission Circuit #1 b.4. 5FAIRPTXF3 (301559) 161.0 kV to 7FAIRPT (300039) 345.0 kV Two Winding #3
G02_P1_Fault_064	P1	3 Phase fault on FAIRBRY7 115.00 (640169) 115 kV Bus a. Apply fault at the FAIRBRY7 115.00 (640169) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. FAIRBRY7 (640169) 115.0 kV to HARBINE7 (640208) 115.0 kV Transmission Circuit #1 b.2. FAIRBRY7 (640169) 115.0 kV to FAIRBRYG (640170) 34.5 kV to FAIRBURY T19 (643056) 13.8 kV Three Winding #1 b.4. FAIRBURY T19 (643056) 13.8 kV to FAIRBRYG (640170) 34.5 kV to FAIRBRY7 (640169) 115.0 kV Three Winding #1
G02_P1_Fault_065	P1	3 Phase fault on STEINER7 115.00 (640361) 115 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply fault at the STEINER7 115.00 (640361) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. BEATRCE7 (640076) 115.0 kV to STEINER7 (640361) 115.0 kV Transmission Circuit #1 b.2. HUMBOLT7 (640235) 115.0 kV to STEINER7 (640361) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_066	P1	3 Phase fault on CLATONA7 115.00 (640111) 115 kV Bus a. Apply fault at the CLATONA7 115.00 (640111) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. BPS SUB7 (640088) 115.0 kV to CLATONA7 (640111) 115.0 kV Transmission Circuit #1 b.2. CLATONA7 (640111) 115.0 kV to SHELDON7 (640278) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_067	P1	3 Phase fault on STERLNG7 115.00 (640362) 115 kV Bus a. Apply fault at the STERLNG7 115.00 (640362) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. FIRTH 7 (640171) 115.0 kV to STERLNG7 (640362) 115.0 kV Transmission Circuit #1 b.2. FIRTH 7 (640171) 115.0 kV to MONOLITH 7 (640591) 115.0 kV Transmission Circuit #1 b.3. FIRTH 7 (640171) 115.0 kV to FIRTH 9 (640172) 34.5 kV to FIRTH T1 9 (643057) 13.8 kV Three Winding #1 b.5. STERLNG7 (640362) 115.0 kV to S974 8 (647974) 69.0 kV to STERLING T19 (643144) 13.8 kV Three Winding #1 b.6. FIRTH T1 9 (643057) 13.8 kV to FIRTH 9 (640172) 34.5 kV to FIRTH 7 (640171) 115.0 kV Three Winding #1 b.7. STERLING T19 (643144) 13.8 kV to S974 8 (647974) 69.0 kV to STERLNG7 (640362) 115.0 kV Three Winding #1
G02_P1_Fault_068	P1	3 Phase fault on PAWNEEL7 115.00 (640316) 115 kV Bus a. Apply fault at the PAWNEEL7 115.00 (640316) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. PAWNEEL7 (640316) 115.0 kV to SEWARD 7 (640340) 115.0 kV Transmission Circuit #1 b.2. PAWNEEL7 (640316) 115.0 kV to NW68HOLDRG7 (650214) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_069	P1	3 Phase fault on DAVIDCY7 115.00 (640157) 115 kV Bus a. Apply fault at the DAVIDCY7 115.00 (640157) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. COLMB.E7 (640127) 115.0 kV to DAVIDCY7 (640157) 115.0 kV Transmission Circuit #1 b.2. DAVIDCY7 (640157) 115.0 kV to WAHOO 7 (640402) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault

Fault ID	Planning Event	Fault Description
G02_P1_Fault_070	P1	3 Phase fault on AXTELL 3 345.00 (640065) 345 kV Bus a. Apply fault at the AXTELL 3 345.00 (640065) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. AXTELL 7 (640066) 115.0 kV to AXTELL 3 (640065) 345.0 kV to AXTELL 9 (640067) 13.8 kV Three Winding #1
G02_P1_Fault_071	P1	3 Phase fault on E.COL. 4 230.00 (640126) 230 kV Bus a. Apply fault at the E.COL. 4 230.00 (640126) 230 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. COLMB.E7 (640127) 115.0 kV to E.COL. 4 (640126) 230.0 kV to COLMB.ESTT39 (643036) 13.8 kV Three Winding #1
G02_P1_Fault_072	P1	3 Phase fault on COOPER 3 345.00 (640139) 345 kV Bus a. Apply fault at the COOPER 3 345.00 (640139) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. COOPER 5 (640140) 161.0 kV to COOPER 3 (640139) 345.0 kV to COOPER T2 9 (640142) 13.8 kV Three Winding #1
G02_P1_Fault_073	P1	3 Phase fault on COOPER 3 345.00 (640139) 345 kV Bus a. Apply fault at the COOPER 3 345.00 (640139) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. COOPER 5 (640140) 161.0 kV to COOPER 3 (640139) 345.0 kV to COOPER T5 9 (643172) 13.8 kV Three Winding #1
G02_P1_Fault_074	P1	3 Phase fault on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. GR ISLD4 (640200) 230.0 kV to GR ISLD3 (653571) 345.0 kV to GR ISLD T6 9 (643071) 13.8 kV Three Winding #3
G02_P1_Fault_075	P1	3 Phase fault on HUMBOLT5 161.00 (640234) 161 kV Bus a. Apply fault at the HUMBOLT5 161.00 (640234) 161 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. HUMBOLT7 (640235) 115.0 kV to HUMBOLT5 (640234) 161.0 kV to HUMBOLDT T29 (643087) 13.8 kV Three Winding #1
G02_P1_Fault_076	P1	3 Phase fault on MCCOOL 3 345.00 (640271) 345 kV Bus a. Apply fault at the MCCOOL 3 345.00 (640271) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. MCCOOL 7 (640272) 115.0 kV to MCCOOL 3 (640271) 345.0 kV to MCCOOL19 (640274) 13.8 kV Three Winding #1
G02_P1_Fault_077	P1	3 Phase fault on PAULINE3 345.00 (640312) 345 kV Bus a. Apply fault at the PAULINE3 345.00 (640312) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. PAULINE7 (640313) 115.0 kV to PAULINE3 (640312) 345.0 kV to PAULINE9 (640315) 13.8 kV Three Winding #1
G02_P1_Fault_078	P1	3 Phase fault on SHELCRK3 345.00 (640342) 345 kV Bus a. Apply fault at the SHELCRK3 345.00 (640342) 345 kV Bus

Fault ID	Planning Event	Fault Description
		b. Clear fault after 6 cycles and trip the faulted elements: b.1. SHELCRK4 (640343) 230.0 kV to SHELCRK3 (640342) 345.0 kV to SHELLCRK T19 (643136) 13.8 kV Three Winding #1
G02_P1_Fault_079	P1	3 Phase fault on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. GR ISLD3 (653571) 345.0 kV to GR ISLD4 (640200) 230.0 kV to GR ISL19 (653314) 13.8 kV Three Winding #1
G02_P1_Fault_080	P1	3 Phase fault on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. GR ISLD3 (653571) 345.0 kV to GR ISLD4 (640200) 230.0 kV to GR ISL29 (653316) 13.8 kV Three Winding #2
G02_P1_Fault_081	P1	3 Phase fault on STEELEC7 115.00 (640426) 115 kV Bus a. Apply fault at the STEELEC7 115.00 (640426) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. STEELEC7 (640426) 115.0 kV Fixed Shunt Device # c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_082	P1	3 Phase fault on COOPER 869.000 (640446) 69 kV Bus a. Apply fault at the COOPER 869.000 (640446) 69 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. COOPER 8 (640446) 69.0 kV Fixed Shunt Device # c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_083	P1	3 Phase fault on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. GR ISLD3 (653571) 345.0 kV Fixed Shunt Device # c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_084	P1	3 Phase fault on FIRTH 7 115.00 (640171) 115 kV Bus a. Apply fault at the FIRTH 7 115.00 (640171) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. FIRTH 7 (640171) 115.0 kV Fixed Shunt Device # c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_085	P1	3 Phase fault on KNOB HL3 115.00 (533332) 115 kV Bus a. Apply fault at the KNOB HL3 115.00 (533332) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements:

Fault ID	Planning Event	Fault Description
		b.1. KNOB HL3 (533332) 115.0 kV to STEELEC7 (640426) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_086	P1	3 Phase fault on MCCOOL 3 345.00 (640271) 345 kV Bus a. Apply fault at the MCCOOL 3 345.00 (640271) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. MCCOOL 3 (640271) 345.0 kV to GR ISLD3 (653571) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_087	P1	3 Phase fault on SWEET W3 345.00 (640374) 345 kV Bus a. Apply fault at the SWEET W3 345.00 (640374) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. SWEET W3 (640374) 345.0 kV to GR ISLD3 (653571) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_088	P1	3 Phase fault on S3455 3 345.00 (645455) 345 kV Bus a. Apply fault at the S3455 3 345.00 (645455) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S3455 3 (645455) 345.0 kV to S3456 3 (645456) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_089	P1	3 Phase fault on S3455 3 345.00 (645455) 345 kV Bus a. Apply fault at the S3455 3 345.00 (645455) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S3455 3 (645455) 345.0 kV to S3740 3 (645740) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_090	P1	3 Phase fault on S3456 3 345.00 (645456) 345 kV Bus a. Apply fault at the S3456 3 345.00 (645456) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S3456 3 (645456) 345.0 kV to S3459 3 (645459) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_091	P1	3 Phase fault on HUMBOLT5 161.00 (640234) 161 kV Bus a. Apply fault at the HUMBOLT5 161.00 (640234) 161 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault

Fault ID	Planning Event	Fault Description
G02_P1_Fault_092	P1	3 Phase fault on S1263 5 161.00 (646263) 161 kV Bus a. Apply fault at the S1263 5 161.00 (646263) 161 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_093	P1	3 Phase fault on COOPER 5 161.00 (640140) 161 kV Bus a. Apply fault at the COOPER 5 161.00 (640140) 161 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_094	P1	3 Phase fault on () kV Bus a. Apply fault at the () kV Bus b. Clear fault after cycles and trip the faulted elements: b.1. S968 8 (647968) 69.0 kV to S969 8 (647969) 69.0 kV Transmission Circuit #1 b.2. S969 8 (647969) 69.0 kV to S974 8 (647974) 69.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_095	P1	3 Phase fault on HYDCAP 8 69.000 (647102) 69 kV Bus a. Apply fault at the HYDCAP 8 69.000 (647102) 69 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. HYDCAP 8 (647102) 69.0 kV to ENRON 8 (647103) 69.0 kV Transmission Circuit #1 b.2. HYDCAP 8 (647102) 69.0 kV to S970 8 (647970) 69.0 kV Transmission Circuit #1 b.3. HYDCAP 8 (647102) 69.0 kV to S974 8 (647974) 69.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_096	P1	3 Phase fault on S3456 3 345.00 (645456) 345 kV Bus a. Apply fault at the S3456 3 345.00 (645456) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S3456 3 (645456) 345.0 kV to S1206 5 (646206) 161.0 kV to S3456T49 (648256) 13.8 kV Three Winding #1
G02_P1_Fault_097	P1	3 Phase fault on HOLT 7 345.00 (541510) 345 kV Bus a. Apply fault at the HOLT 7 345.00 (541510) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. HOLT 7 (541510) 345.0 kV to HOLT_REACT7 (541517) 345.0 kV Transmission Circuit #z1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_098	P1	3 Phase fault on RLHILLS3 345.00 (635100) 345 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply fault at the RLHILLS3 345.00 (635100) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. RLHILLS3 (635100) 345.0 kV to ORIENT 3 (635570) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_099	P1	3 Phase fault on S HILLS 3 345.00 (635568) 345 kV Bus a. Apply fault at the S HILLS 3 345.00 (635568) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S HILLS 3 (635568) 345.0 kV to ORIENT 3 (635570) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_100	P1	3 Phase fault on ORIENT 3 345.00 (635570) 345 kV Bus a. Apply fault at the ORIENT 3 345.00 (635570) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. ORIENT 3 (635570) 345.0 kV to MADISON3 (635635) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_101	P1	3 Phase fault on G13-002-019H115.00 (90002) 115 kV Bus a. Apply fault at the G13-002-019H115.00 (90002) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. G13-002-019H (90002) 115.0 kV to MONOLITH 7 (640591) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_102	P1	3 Phase fault on ST JOE_CAP5 161.00 (541147) 161 kV Bus a. Apply fault at the ST JOE_CAP5 161.00 (541147) 161 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. ST JOE_CAP5 (541147) 161.0 kV to ST JOE 5 (541253) 161.0 kV Transmission Circuit #r c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_103	P1	3 Phase fault on ST JOE 7 345.00 (541199) 345 kV Bus a. Apply fault at the ST JOE 7 345.00 (541199) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. ST JOE 7 (541199) 345.0 kV to EASTOWN7 (541400) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_104	P1	3 Phase fault on ST JOE 7 345.00 (541199) 345 kV Bus a. Apply fault at the ST JOE 7 345.00 (541199) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. ST JOE 7 (541199) 345.0 kV to COOPER 3 (640139) 345.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_105	P1	3 Phase fault on ST JOE 7 345.00 (541199) 345 kV Bus a. Apply fault at the ST JOE 7 345.00 (541199) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. ST JOE 7 (541199) 345.0 kV to G17-183-TAP (761383) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_106	P1	3 Phase fault on ST JOE 5 161.00 (541253) 161 kV Bus a. Apply fault at the ST JOE 5 161.00 (541253) 161 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. ST JOE 5 (541253) 161.0 kV to WOODBIN5 (541258) 161.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_107	P1	3 Phase fault on ST JOE 5 161.00 (541253) 161 kV Bus a. Apply fault at the ST JOE 5 161.00 (541253) 161 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. ST JOE 5 (541253) 161.0 kV to AVENUECTY 5 (541394) 161.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_108	P1	3 Phase fault on EAST 5 161.00 (541254) 161 kV Bus a. Apply fault at the EAST 5 161.00 (541254) 161 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. EAST 5 (541254) 161.0 kV to EASTOWN5 (541401) 161.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_109	P1	3 Phase fault on IND PRK5 161.00 (541256) 161 kV Bus a. Apply fault at the IND PRK5 161.00 (541256) 161 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. IND PRK5 (541256) 161.0 kV to EASTOWN5 (541401) 161.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_110	P1	3 Phase fault on EASTOWN7 345.00 (541400) 345 kV Bus a. Apply fault at the EASTOWN7 345.00 (541400) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. EASTOWN7 (541400) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_111	P1	3 Phase fault on HOLT 7 345.00 (541510) 345 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply fault at the HOLT 7 345.00 (541510) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. HOLT 7 (541510) 345.0 kV to ROCKCK7 (541511) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_112	P1	3 Phase fault on HOLT 7 345.00 (541510) 345 kV Bus a. Apply fault at the HOLT 7 345.00 (541510) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. HOLT 7 (541510) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_113	P1	3 Phase fault on HOLT 7 345.00 (541510) 345 kV Bus a. Apply fault at the HOLT 7 345.00 (541510) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. HOLT 7 (541510) 345.0 kV to GEN-2017-115 (760746) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_114	P1	3 Phase fault on NASHUA 7 345.00 (542980) 345 kV Bus a. Apply fault at the NASHUA 7 345.00 (542980) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. NASHUA 7 (542980) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_115	P1	3 Phase fault on G16-050-TAP 345.00 (560082) 345 kV Bus a. Apply fault at the G16-050-TAP 345.00 (560082) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. G16-050-TAP (560082) 345.0 kV to AXTELL 3 (640065) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_116	P1	3 Phase fault on G13-002-TAP 115.00 (560746) 115 kV Bus a. Apply fault at the G13-002-TAP 115.00 (560746) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. None to None Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_117	P1	3 Phase fault on G13-002-TAP 115.00 (560746) 115 kV Bus a. Apply fault at the G13-002-TAP 115.00 (560746) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. None to MONOLITH 7 (640591) 115.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_118	P1	3 Phase fault on GEN-2015-088345.00 (585241) 345 kV Bus a. Apply fault at the GEN-2015-088345.00 (585241) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. GEN-2015-088 (585241) 345.0 kV to TOBIAS 3 (640525) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_119	P1	3 Phase fault on ATCHSN 3 345.00 (635017) 345 kV Bus a. Apply fault at the ATCHSN 3 345.00 (635017) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. ATCHSN 3 (635017) 345.0 kV to WESTBORO 3 (635018) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_120	P1	3 Phase fault on WESTBORO 3 345.00 (635018) 345 kV Bus a. Apply fault at the WESTBORO 3 345.00 (635018) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. WESTBORO 3 (635018) 345.0 kV to ORIENT 3 (635570) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_121	P1	3 Phase fault on WESTBORO 3 345.00 (635018) 345 kV Bus a. Apply fault at the WESTBORO 3 345.00 (635018) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. WESTBORO 3 (635018) 345.0 kV to J476 SHENHLL (637084) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_122	P1	3 Phase fault on AXTELL 3 345.00 (640065) 345 kV Bus a. Apply fault at the AXTELL 3 345.00 (640065) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. AXTELL 3 (640065) 345.0 kV to PAULINE3 (640312) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_125	P1	3 Phase fault on BEAT. S7 115.00 (640074) 115 kV Bus a. Apply fault at the BEAT. S7 115.00 (640074) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. BEAT. S7 (640074) 115.0 kV to BEATRCE7 (640076) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_126	P1	3 Phase fault on BEATRCE7 115.00 (640076) 115 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply fault at the BEATRCE7 115.00 (640076) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. BEATRCE7 (640076) 115.0 kV to BPS SUB7 (640088) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_127	P1	3 Phase fault on BEATRCE7 115.00 (640076) 115 kV Bus a. Apply fault at the BEATRCE7 115.00 (640076) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. BEATRCE7 (640076) 115.0 kV to BPS SUB7 (640088) 115.0 kV Transmission Circuit #2 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_128	P1	3 Phase fault on BEATRCE7 115.00 (640076) 115 kV Bus a. Apply fault at the BEATRCE7 115.00 (640076) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. BEATRCE7 (640076) 115.0 kV to HARBINE7 (640208) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_129	P1	3 Phase fault on CARLJCT7 115.00 (640105) 115 kV Bus a. Apply fault at the CARLJCT7 115.00 (640105) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. CARLJCT7 (640105) 115.0 kV to GENEVA 7 (640178) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_130	P1	3 Phase fault on COL.COG7 115.00 (640119) 115 kV Bus a. Apply fault at the COL.COG7 115.00 (640119) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. COL.COG7 (640119) 115.0 kV to COLMB.E7 (640127) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_131	P1	3 Phase fault on COLMB.E7 115.00 (640127) 115 kV Bus a. Apply fault at the COLMB.E7 115.00 (640127) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. COLMB.E7 (640127) 115.0 kV to COLMBUS7 (640136) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_132	P1	3 Phase fault on COOPER_ESST869.000 (640141) 69 kV Bus a. Apply fault at the COOPER_ESST869.000 (640141) 69 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. COOPER_ESST8 (640141) 69.0 kV to COOPER 8 (640446) 69.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_133	P1	3 Phase fault on CRETE__7 115.00 (640153) 115 kV Bus a. Apply fault at the CRETE__7 115.00 (640153) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. CRETE__7 (640153) 115.0 kV to FRIEND 7 (640174) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_134	P1	3 Phase fault on FAIRBRY7 115.00 (640169) 115 kV Bus a. Apply fault at the FAIRBRY7 115.00 (640169) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. FAIRBRY7 (640169) 115.0 kV to HEBRN N7 (640218) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_135	P1	3 Phase fault on FRIEND 7 115.00 (640174) 115 kV Bus a. Apply fault at the FRIEND 7 115.00 (640174) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. FRIEND 7 (640174) 115.0 kV to GENEVA 7 (640178) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_136	P1	3 Phase fault on GENEVA 7 115.00 (640178) 115 kV Bus a. Apply fault at the GENEVA 7 115.00 (640178) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. GENEVA 7 (640178) 115.0 kV to MCCOOL 7 (640272) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_137	P1	3 Phase fault on GENEVA 7 115.00 (640178) 115 kV Bus a. Apply fault at the GENEVA 7 115.00 (640178) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. GENEVA 7 (640178) 115.0 kV to SUTTON 7 (640372) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_138	P1	3 Phase fault on HARBINE7 115.00 (640208) 115 kV Bus a. Apply fault at the HARBINE7 115.00 (640208) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. HARBINE7 (640208) 115.0 kV to STEELEC7 (640426) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_139	P1	3 Phase fault on HASTING7 115.00 (640215) 115 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply fault at the HASTING7 115.00 (640215) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. HASTING7 (640215) 115.0 kV to PAULINE7 (640313) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_140	P1	3 Phase fault on HASTING7 115.00 (640215) 115 kV Bus a. Apply fault at the HASTING7 115.00 (640215) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. HASTING7 (640215) 115.0 kV to PAULINE7 (640313) 115.0 kV Transmission Circuit #2 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_141	P1	3 Phase fault on HILDRTH7 115.00 (640222) 115 kV Bus a. Apply fault at the HILDRTH7 115.00 (640222) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. HILDRTH7 (640222) 115.0 kV to PAULINE7 (640313) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_143	P1	3 Phase fault on MCCOOL 7 115.00 (640272) 115 kV Bus a. Apply fault at the MCCOOL 7 115.00 (640272) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. MCCOOL 7 (640272) 115.0 kV to YORK SW7 (640413) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_144	P1	3 Phase fault on MOORE 3 345.00 (640277) 345 kV Bus a. Apply fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. MOORE 3 (640277) 345.0 kV to TOBIAS 3 (640525) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_145	P1	3 Phase fault on PAULINE3 345.00 (640312) 345 kV Bus a. Apply fault at the PAULINE3 345.00 (640312) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. PAULINE3 (640312) 345.0 kV to TOBIAS 3 (640525) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_146	P1	3 Phase fault on PAULINE7 115.00 (640313) 115 kV Bus a. Apply fault at the PAULINE7 115.00 (640313) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. PAULINE7 (640313) 115.0 kV to ROSEMONT 7 (640583) 115.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
G02_P1_Fault_148	P1	c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault 3 Phase fault on STEELEC7 115.00 (640426) 115 kV Bus a. Apply fault at the STEELEC7 115.00 (640426) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. STEELEC7 (640426) 115.0 kV to S.FLATS.PLT7 (640558) 115.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 7 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_152	P1	3 Phase fault on S3454 3 345.00 (645454) 345 kV Bus a. Apply fault at the S3454 3 345.00 (645454) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. S3454 3 (645454) 345.0 kV to S3740 3 (645740) 345.0 kV Transmission Circuit #1 c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_161	P1	3 Phase fault on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. GR ISLD3 (653571) 345.0 kV to GR ISLD-LNX3 (653871) 345.0 kV Transmission Circuit #z c. Wait 20 cycles, and then reclose the faulted elements in (b) back into the Fault d. Leave Fault on for 6 cycles, then trip the faulted elements in (b) and clear the fault
G02_P1_Fault_163	P1	3 Phase fault on ST JOE 7 345.00 (541199) 345 kV Bus a. Apply fault at the ST JOE 7 345.00 (541199) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. ST JOE 7 (541199) 345.0 kV to ST JOE 5 (541253) 161.0 kV to STJOE 1T (541370) 13.8 kV Three Winding #22
G02_P1_Fault_164	P1	3 Phase fault on ST JOE 7 345.00 (541199) 345 kV Bus a. Apply fault at the ST JOE 7 345.00 (541199) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. ST JOE 7 (541199) 345.0 kV to ST JOE 5 (541253) 161.0 kV to STJOE 2T (541371) 13.8 kV Three Winding #33
G02_P1_Fault_165	P1	3 Phase fault on EASTOWN7 345.00 (541400) 345 kV Bus a. Apply fault at the EASTOWN7 345.00 (541400) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. EASTOWN7 (541400) 345.0 kV to EASTOWN5 (541401) 161.0 kV to EASTOWN1 (541402) 13.8 kV Three Winding #11
G02_P1_Fault_166	P1	3 Phase fault on IATAN 7 345.00 (542982) 345 kV Bus a. Apply fault at the IATAN 7 345.00 (542982) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. IATAN 7 (542982) 345.0 kV to IATAN5 (541350) 161.0 kV to IATAN 11 (541150) 14.4 kV Three Winding #11

Fault ID	Planning Event	Fault Description
G02_P1_Fault_167	P1	3 Phase fault on AXTELL 3 345.00 (640065) 345 kV Bus a. Apply fault at the AXTELL 3 345.00 (640065) 345 kV Bus b. Clear fault after 6 cycles and trip the faulted elements: b.1. AXTELL 7 (640066) 115.0 kV to AXTELL 3 (640065) 345.0 kV to AXTELL 9B (999002) 13.8 kV Three Winding #2
G02_P1_Fault_168	P1	3 Phase fault on GENEVA 7 115.00 (640178) 115 kV Bus a. Apply fault at the GENEVA 7 115.00 (640178) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. GENEVA 8 (640179) 69.0 kV to GENEVA 7 (640178) 115.0 kV to GENEVA T2 9 (643062) 13.8 kV Three Winding #1
G02_P1_Fault_169	P1	3 Phase fault on MCCOOL 7 115.00 (640272) 115 kV Bus a. Apply fault at the MCCOOL 7 115.00 (640272) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. MCCOOL 8 (640273) 69.0 kV to MCCOOL 7 (640272) 115.0 kV to MCCOOL T1 9 (643171) 13.8 kV Three Winding #1
G02_P1_Fault_170	P1	3 Phase fault on PAULINE7 115.00 (640313) 115 kV Bus a. Apply fault at the PAULINE7 115.00 (640313) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. PAULINE8 (640314) 69.0 kV to PAULINE7 (640313) 115.0 kV to PAULINE T2 9 (643121) 13.8 kV Three Winding #1
G02_P1_Fault_171	P1	3 Phase fault on COOPER 5 161.00 (640140) 161 kV Bus a. Apply fault at the COOPER 5 161.00 (640140) 161 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. COOPER 8 (640446) 69.0 kV to COOPER 5 (640140) 161.0 kV to COOPER T6 9 (643173) 13.8 kV Three Winding #1
G02_P1_Fault_172	P1	3 Phase fault on STEINER7 115.00 (640361) 115 kV Bus a. Apply fault at the STEINER7 115.00 (640361) 115 kV Bus b. Clear fault after 7 cycles and trip the faulted elements: b.1. S966 8 (647966) 69.0 kV to STEINER7 (640361) 115.0 kV to STEINER T1 9 (643143) 13.8 kV Three Winding #1
G02_P4_Fault_001	P4	Single Phase Fault with Stuck Breaker on ST JOE 7 345.00 (541199) 345 kV Bus a. Apply Fault at the ST JOE 7 345.00 (541199) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ST JOE 7 (541199) 345.0 kV to ST JOE 5 (541253) 161.0 kV to STJOE 2T (541371) 13.8 kV Three Winding #33
G02_P4_Fault_002	P4	Single Phase Fault with Stuck Breaker on ST JOE 7 345.00 (541199) 345 kV Bus a. Apply Fault at the ST JOE 7 345.00 (541199) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ST JOE 7 (541199) 345.0 kV to COOPER 3 (640139) 345.0 kV Transmission Circuit #1
G02_P4_Fault_003	P4	Single Phase Fault with Stuck Breaker on HASTING4 230.00 (640214) 230 kV Bus a. Apply Fault at the HASTING4 230.00 (640214) 230 kV Bus b. Clear Fault after 16 cycles and trip the following elements:

Fault ID	Planning Event	Fault Description
		b.1. HASTING7 (640215) 115.0 kV to PAULINE7 (640313) 115.0 kV Transmission Circuit #1
		b.2. HASTING7 (640215) 115.0 kV to PAULINE7 (640313) 115.0 kV Transmission Circuit #2
		b.3. HASTING7 (640215) 115.0 kV to EGYCNTR7 (641087) 115.0 kV Transmission Circuit #1
		b.4. HASTING7 (640215) 115.0 kV to HASTCTY7 (641088) 115.0 kV Transmission Circuit #z1
		b.5. E7THST 7 (641085) 115.0 kV to HASTCTY7 (641088) 115.0 kV Transmission Circuit #1
		b.6. EGYCNTR7 (641087) 115.0 kV to HASTCTY7 (641088) 115.0 kV Transmission Circuit #1
		b.7. HASTING7 (640215) 115.0 kV to HASTING9 (640216) 34.5 kV to HASTINGS T19 (643076) 13.8 kV Three Winding #1
		b.8. HASTING7 (640215) 115.0 kV to HASTING9 (640216) 34.5 kV to HASTINGS T29 (643077) 13.8 kV Three Winding #1
		b.9. HASTCTY7 (641088) 115.0 kV to HASTING4 (640214) 230.0 kV to HASTINGS T39 (643075) 13.8 kV Three Winding #1
G02_P4_Fault_004	P4	Single Phase Fault with Stuck Breaker on ST JOE 7 345.00 (541199) 345 kV Bus a. Apply Fault at the ST JOE 7 345.00 (541199) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ST JOE 7 (541199) 345.0 kV to ST JOE 5 (541253) 161.0 kV to STJOE 1T (541370) 13.8 kV Three Winding #22
G02_P4_Fault_005	P4	Single Phase Fault with Stuck Breaker on CARLJCT7 115.00 (640105) 115 kV Bus a. Apply Fault at the CARLJCT7 115.00 (640105) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. CARLJCT7 (640105) 115.0 kV to GENEVA 7 (640178) 115.0 kV Transmission Circuit #1 b.2. CARLJCT7 (640105) 115.0 kV to HEBRN N7 (640218) 115.0 kV Transmission Circuit #1 b.3. CARLJCT7 (640105) 115.0 kV to CARLJCT9 (640106) 34.5 kV to CARLTNJCTT19 (643030) 13.8 kV Three Winding #1 b.4. CARLJCT7 (640105) 115.0 kV to CARLJCT8 (640415) 69.0 kV to CARLTNJCTT29 (643031) 13.8 kV Three Winding #1
G02_P4_Fault_006	P4	Single Phase Fault with Stuck Breaker on CRETE__7 115.00 (640153) 115 kV Bus a. Apply Fault at the CRETE__7 115.00 (640153) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. CRETE__7 (640153) 115.0 kV to FRIEND 7 (640174) 115.0 kV Transmission Circuit #1 b.2. CRETE__7 (640153) 115.0 kV to SHELDON7 (640278) 115.0 kV Transmission Circuit #1 b.3. CRETE__7 (640153) 115.0 kV to CRETE G (640154) 34.5 kV to CRETE T1 9 (643048) 13.8 kV Three Winding #1 b.4. CRETE__7 (640153) 115.0 kV to CRETE G (640154) 34.5 kV to CRETE T2 9 (643049) 13.8 kV Three Winding #1
G02_P4_Fault_007	P4	Single Phase Fault with Stuck Breaker on GENEVA 7 115.00 (640178) 115 kV Bus a. Apply Fault at the GENEVA 7 115.00 (640178) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. CARLJCT7 (640105) 115.0 kV to GENEVA 7 (640178) 115.0 kV Transmission Circuit #1 b.2. FRIEND 7 (640174) 115.0 kV to GENEVA 7 (640178) 115.0 kV Transmission Circuit #1 b.3. GENEVA 7 (640178) 115.0 kV to MCCOOL 7 (640272) 115.0 kV Transmission Circuit #1 b.4. GENEVA 7 (640178) 115.0 kV to SUTTON 7 (640372) 115.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.5. GENEVA 7 (640178) 115.0 kV to GENEVA 8 (640179) 69.0 kV to GENEVA T2 9 (643062) 13.8 kV Three Winding #1
G02_P4_Fault_008	P4	Single Phase Fault with Stuck Breaker on HARBINE7 115.00 (640208) 115 kV Bus a. Apply Fault at the HARBINE7 115.00 (640208) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. BEATRCE7 (640076) 115.0 kV to HARBINE7 (640208) 115.0 kV Transmission Circuit #1 b.2. FAIRBRY7 (640169) 115.0 kV to HARBINE7 (640208) 115.0 kV Transmission Circuit #1 b.3. HARBINE7 (640208) 115.0 kV to STEELEC7 (640426) 115.0 kV Transmission Circuit #1
G02_P4_Fault_009	P4	Single Phase Fault with Stuck Breaker on HEBRN N7 115.00 (640218) 115 kV Bus a. Apply Fault at the HEBRN N7 115.00 (640218) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. CARLJCT7 (640105) 115.0 kV to HEBRN N7 (640218) 115.0 kV Transmission Circuit #1 b.2. FAIRBRY7 (640169) 115.0 kV to HEBRN N7 (640218) 115.0 kV Transmission Circuit #1 b.3. HEBRN N7 (640218) 115.0 kV to HEBRON G (640012) 13.8 kV Two Winding #1 b.4. HEBRN N7 (640218) 115.0 kV to HEBRON 7 (640220) 115.0 kV Transmission Circuit #1
G02_P4_Fault_010	P4	Single Phase Fault with Stuck Breaker on MCCOOL 7 115.00 (640272) 115 kV Bus a. Apply Fault at the MCCOOL 7 115.00 (640272) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. GENEVA 7 (640178) 115.0 kV to MCCOOL 7 (640272) 115.0 kV Transmission Circuit #1 b.2. MCCOOL 7 (640272) 115.0 kV to YORK SW7 (640413) 115.0 kV Transmission Circuit #1 b.3. MCCOOL 7 (640272) 115.0 kV to MCCOOL 3 (640271) 345.0 kV to MCCOOL19 (640274) 13.8 kV Three Winding #1 b.4. MCCOOL 7 (640272) 115.0 kV to MCCOOL 8 (640273) 69.0 kV to MCCOOL T1 9 (643171) 13.8 kV Three Winding #1
G02_P4_Fault_011	P4	Single Phase Fault with Stuck Breaker on PAULINE7 115.00 (640313) 115 kV Bus a. Apply Fault at the PAULINE7 115.00 (640313) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HASTING7 (640215) 115.0 kV to PAULINE7 (640313) 115.0 kV Transmission Circuit #1 b.2. HASTING7 (640215) 115.0 kV to PAULINE7 (640313) 115.0 kV Transmission Circuit #2 b.3. HILDRTH7 (640222) 115.0 kV to PAULINE7 (640313) 115.0 kV Transmission Circuit #1 b.4. PAULINE7 (640313) 115.0 kV to ROSEMONT 7 (640583) 115.0 kV Transmission Circuit #1 b.5. PAULINE7 (640313) 115.0 kV to PAULINE3 (640312) 345.0 kV to PAULINE9 (640315) 13.8 kV Three Winding #1 b.6. PAULINE7 (640313) 115.0 kV to PAULINE8 (640314) 69.0 kV to PAULINE T2 9 (643121) 13.8 kV Three Winding #1
G02_P4_Fault_012	P4	Single Phase Fault with Stuck Breaker on SEWARD 7 115.00 (640340) 115 kV Bus a. Apply Fault at the SEWARD 7 115.00 (640340) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. PAWNEEL7 (640316) 115.0 kV to SEWARD 7 (640340) 115.0 kV Transmission Circuit #1 b.2. RISNGCY7 (640328) 115.0 kV to SEWARD 7 (640340) 115.0 kV Transmission Circuit #1 b.3. SEWARD 7 (640340) 115.0 kV to TAMORA 7 (640375) 115.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.4. SEWARD 7 (640340) 115.0 kV to SEWARD 9 (640341) 34.5 kV to SEWARD T1 9 (643134) 13.8 kV Three Winding #1 b.5. SEWARD 7 (640340) 115.0 kV to SEWARD 9 (640341) 34.5 kV to SEWARD T2 9 (643135) 13.8 kV Three Winding #1
G02_P4_Fault_013	P4	Single Phase Fault with Stuck Breaker on SUTTON 7 115.00 (640372) 115 kV Bus a. Apply Fault at the SUTTON 7 115.00 (640372) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. GENEVA 7 (640178) 115.0 kV to SUTTON 7 (640372) 115.0 kV Transmission Circuit #1 b.2. SUTTON 7 (640372) 115.0 kV to EGYCNTR7 (641087) 115.0 kV Transmission Circuit #1 b.3. SUTTON 7 (640372) 115.0 kV to SUTTON 8 (640373) 69.0 kV to SUTTON T1 9 (643149) 13.8 kV Three Winding #1
G02_P4_Fault_014	P4	Single Phase Fault with Stuck Breaker on YORK SW7 115.00 (640413) 115 kV Bus a. Apply Fault at the YORK SW7 115.00 (640413) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MCCOOL 7 (640272) 115.0 kV to YORK SW7 (640413) 115.0 kV Transmission Circuit #1 b.2. YORK 7 (640411) 115.0 kV to YORK SW7 (640413) 115.0 kV Transmission Circuit #1 b.3. YORK SW7 (640413) 115.0 kV to YORK SW9 (640414) 34.5 kV to YORK.SW T1 9 (643168) 13.8 kV Three Winding #1 b.4. YORK SW7 (640413) 115.0 kV to YORK.SW T2 8 (640447) 69.0 kV to YORK.SW T2 9 (643176) 13.8 kV Three Winding #1
G02_P4_Fault_015	P4	Single Phase Fault with Stuck Breaker on BEATRCE7 115.00 (640076) 115 kV Bus a. Apply Fault at the BEATRCE7 115.00 (640076) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. BEAT. S7 (640074) 115.0 kV to BEATRCE7 (640076) 115.0 kV Transmission Circuit #1 b.2. BEATRCE7 (640076) 115.0 kV to BPS SUB7 (640088) 115.0 kV Transmission Circuit #1 b.3. BEATRCE7 (640076) 115.0 kV to HARBINE7 (640208) 115.0 kV Transmission Circuit #1 b.4. BEATRCE7 (640076) 115.0 kV to BEATRCE9 (640077) 34.5 kV to BEATRICE T19 (643013) 13.8 kV Three Winding #1
G02_P4_Fault_016	P4	Single Phase Fault with Stuck Breaker on BEATRCE7 115.00 (640076) 115 kV Bus a. Apply Fault at the BEATRCE7 115.00 (640076) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. BEATRCE7 (640076) 115.0 kV to BPS SUB7 (640088) 115.0 kV Transmission Circuit #2 b.2. BEATRCE7 (640076) 115.0 kV to STEINER7 (640361) 115.0 kV Transmission Circuit #1 b.3. BEATRCE7 (640076) 115.0 kV to BEATRCE9 (640077) 34.5 kV to BEATRICE T29 (643014) 13.8 kV Three Winding #1
G02_P4_Fault_017	P4	Single Phase Fault with Stuck Breaker on COLMBUS7 115.00 (640136) 115 kV Bus a. Apply Fault at the COLMBUS7 115.00 (640136) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COLMB.E7 (640127) 115.0 kV to COLMBUS7 (640136) 115.0 kV Transmission Circuit #1 b.2. KELLY 7 (640134) 115.0 kV to COLMBUS7 (640136) 115.0 kV Transmission Circuit #1 b.3. COLMBUS7 (640136) 115.0 kV to SILVRCK7 (640345) 115.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.4. COLMBUS7 (640136) 115.0 kV to COLMBUS9 (640137) 34.5 kV to COLUMBUS T69 (643042) 13.8 kV Three Winding #1
G02_P4_Fault_018	P4	Single Phase Fault with Stuck Breaker on COLMB.E7 115.00 (640127) 115 kV Bus a. Apply Fault at the COLMB.E7 115.00 (640127) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COLMB.E7 (640127) 115.0 kV to COLMBUS7 (640136) 115.0 kV Transmission Circuit #1 b.2. E.COL. 4 (640126) 230.0 kV to COLMB.E7 (640127) 115.0 kV to COLMB.ESTT39 (643036) 13.8 kV Three Winding #1 b.4. COLMB.E7 (640127) 115.0 kV to COLMB.E9 (640128) 34.5 kV to COLMB.ESTT19 (643037) 13.8 kV Three Winding #1 b.5. COLMB.E7 (640127) 115.0 kV to COLMB.E9 (640128) 34.5 kV to COLMB.ESTT29 (643038) 13.8 kV Three Winding #1
G02_P4_Fault_019	P4	Single Phase Fault with Stuck Breaker on COLMB.E3 345.00 (640125) 345 kV Bus a. Apply Fault at the COLMB.E3 345.00 (640125) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COL.COG7 (640119) 115.0 kV to COLMB.E7 (640127) 115.0 kV Transmission Circuit #1 b.2. COLMB.E7 (640127) 115.0 kV to DAVIDCY7 (640157) 115.0 kV Transmission Circuit #1 b.3. COLMB.E3 (640125) 345.0 kV to COLMB.E7 (640127) 115.0 kV to COLMB.T9 (640129) 13.8 kV Three Winding #1
G02_P4_Fault_020	P4	Single Phase Fault with Stuck Breaker on STEELEC7 115.00 (640426) 115 kV Bus a. Apply Fault at the STEELEC7 115.00 (640426) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HARBINE7 (640208) 115.0 kV to STEELEC7 (640426) 115.0 kV Transmission Circuit #1 b.2. STEELEC9 (640427) 4.2 kV to STEELEC7 (640426) 115.0 kV Two Winding #1 b.3. STEELEC7 (640426) 115.0 kV to Fixed Shunt Device #
G02_P4_Fault_021	P4	Single Phase Fault with Stuck Breaker on BEATRCE7 115.00 (640076) 115 kV Bus a. Apply Fault at the BEATRCE7 115.00 (640076) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. BEAT. S7 (640074) 115.0 kV to BEATRCE7 (640076) 115.0 kV Transmission Circuit #1 b.2. BEATRCE7 (640076) 115.0 kV to BPS SUB7 (640088) 115.0 kV Transmission Circuit #1 b.3. BEATRCE7 (640076) 115.0 kV to BPS SUB7 (640088) 115.0 kV Transmission Circuit #2 b.4. BEATRCE7 (640076) 115.0 kV to HARBINE7 (640208) 115.0 kV Transmission Circuit #1 b.5. BEATRCE7 (640076) 115.0 kV to STEINER7 (640361) 115.0 kV Transmission Circuit #1 b.6. BEATRCE7 (640076) 115.0 kV to BEATRCE9 (640077) 34.5 kV to BEATRICE T19 (643013) 13.8 kV Three Winding #1 b.7. BEATRCE7 (640076) 115.0 kV to BEATRCE9 (640077) 34.5 kV to BEATRICE T29 (643014) 13.8 kV Three Winding #1
G02_P4_Fault_022	P4	Single Phase Fault with Stuck Breaker on COLMBUS7 115.00 (640136) 115 kV Bus a. Apply Fault at the COLMBUS7 115.00 (640136) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COL.SE 7 (640124) 115.0 kV to COLMBUS7 (640136) 115.0 kV Transmission Circuit #1 b.2. COLMB.E7 (640127) 115.0 kV to COLMBUS7 (640136) 115.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.3. KELLY 7 (640134) 115.0 kV to COLMBUS7 (640136) 115.0 kV Transmission Circuit #1 b.4. COLMBUS7 (640136) 115.0 kV to COLMBS3G (640008) 13.8 kV Two Winding #1 b.5. COLMBUS7 (640136) 115.0 kV to GENOA 7 (640181) 115.0 kV Transmission Circuit #1 b.6. COLMBUS7 (640136) 115.0 kV to SILVRCK7 (640345) 115.0 kV Transmission Circuit #1 b.7. COLMBUS7 (640136) 115.0 kV to COLMBUS9 (640137) 34.5 kV to COLUMBUS T59 (643041) 13.8 kV Three Winding #1 b.8. COLMBUS7 (640136) 115.0 kV to COLMBUS9 (640137) 34.5 kV to COLUMBUS T69 (643042) 13.8 kV Three Winding #1
G02_P4_Fault_023	P4	Single Phase Fault with Stuck Breaker on COLMB.E7 115.00 (640127) 115 kV Bus a. Apply Fault at the COLMB.E7 115.00 (640127) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COL.COG7 (640119) 115.0 kV to COLMB.E7 (640127) 115.0 kV Transmission Circuit #1 b.2. COLMB.E7 (640127) 115.0 kV to COLMBUS7 (640136) 115.0 kV Transmission Circuit #1 b.3. COLMB.E7 (640127) 115.0 kV to DAVIDCY7 (640157) 115.0 kV Transmission Circuit #1 b.4. COLMB.E7 (640127) 115.0 kV to COLMB.E3 (640125) 345.0 kV to COLMB.T9 (640129) 13.8 kV Three Winding #1 b.5. COLMB.E7 (640127) 115.0 kV to E.COL. 4 (640126) 230.0 kV to COLMB.ESTT39 (643036) 13.8 kV Three Winding #1 b.6. COLMB.E7 (640127) 115.0 kV to COLMB.E9 (640128) 34.5 kV to COLMB.ESTT19 (643037) 13.8 kV Three Winding #1 b.7. COLMB.E7 (640127) 115.0 kV to COLMB.E9 (640128) 34.5 kV to COLMB.ESTT29 (643038) 13.8 kV Three Winding #1
G02_P4_Fault_024	P4	Single Phase Fault with Stuck Breaker on STEELEC7 115.00 (640426) 115 kV Bus a. Apply Fault at the STEELEC7 115.00 (640426) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. KNOB HL3 (533332) 115.0 kV to STEELEC7 (640426) 115.0 kV Transmission Circuit #1 b.2. HARBINE7 (640208) 115.0 kV to STEELEC7 (640426) 115.0 kV Transmission Circuit #1 b.3. STEELEC7 (640426) 115.0 kV to S.FLATS.PLT7 (640558) 115.0 kV Transmission Circuit #1 b.4. STEELEC9 (640427) 4.2 kV to STEELEC7 (640426) 115.0 kV Two Winding #1 b.5. STEELEC_KXL9 (640440) 6.9 kV to STEELEC7 (640426) 115.0 kV Two Winding #1
G02_P4_Fault_025	P4	Single Phase Fault with Stuck Breaker on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply Fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HOLT.CO3 (640510) 345.0 kV to GR ISLD-LNX3 (653871) 345.0 kV Transmission Circuit #1 b.2. GR ISLD3 (653571) 345.0 kV to GR ISLD-LNX3 (653871) 345.0 kV Transmission Circuit #z b.3. GR ISLD3 (653571) 345.0 kV to Fixed Shunt Device #
G02_P4_Fault_026	P4	Single Phase Fault with Stuck Breaker on S3455 3 345.00 (645455) 345 kV Bus a. Apply Fault at the S3455 3 345.00 (645455) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3455 3 (645455) 345.0 kV to S3456 3 (645456) 345.0 kV Transmission Circuit #1 b.2. S3455 3 (645455) 345.0 kV to S1255 5 (646255) 161.0 kV to S3455T19 (648255) 13.8 kV Three Winding #1

Fault ID	Planning Event	Fault Description
G02_P4_Fault_027	P4	Single Phase Fault with Stuck Breaker on S3456 3 345.00 (645456) 345 kV Bus a. Apply Fault at the S3456 3 345.00 (645456) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3456 3 (645456) 345.0 kV to S3459 3 (645459) 345.0 kV Transmission Circuit #1 b.2. S3456 3 (645456) 345.0 kV to S1206 5 (646206) 161.0 kV to S3456T49 (648256) 13.8 kV Three Winding #1
G02_P4_Fault_028	P4	Single Phase Fault with Stuck Breaker on S3456 3 345.00 (645456) 345 kV Bus a. Apply Fault at the S3456 3 345.00 (645456) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3456 3 (645456) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1 b.2. S3456 3 (645456) 345.0 kV to S1206 5 (646206) 161.0 kV to S3456T49 (648256) 13.8 kV Three Winding #1
G02_P4_Fault_029	P4	Single Phase Fault with Stuck Breaker on S3459 3 345.00 (645459) 345 kV Bus a. Apply Fault at the S3459 3 345.00 (645459) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3456 3 (645456) 345.0 kV to S3459 3 (645459) 345.0 kV Transmission Circuit #1 b.2. S3459 3 (645459) 345.0 kV to S1209 5 (646209) 161.0 kV to S3459T69 (648359) 13.8 kV Three Winding #1
G02_P4_Fault_030	P4	Single Phase Fault with Stuck Breaker on S3456 3 345.00 (645456) 345 kV Bus a. Apply Fault at the S3456 3 345.00 (645456) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S1206 5 (646206) 161.0 kV to S1216 5 (646216) 161.0 kV Transmission Circuit #1 b.2. S3456 3 (645456) 345.0 kV to S1206 5 (646206) 161.0 kV to S3456T49 (648256) 13.8 kV Three Winding #1
G02_P4_Fault_031	P4	Single Phase Fault with Stuck Breaker on S1263 5 161.00 (646263) 161 kV Bus a. Apply Fault at the S1263 5 161.00 (646263) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S1258 5 (646258) 161.0 kV to S1263 5 (646263) 161.0 kV Transmission Circuit #1 b.2. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to GEN-2019-009 (763505) 161.0 kV Transmission Circuit #1 b.4. W BROCK8 (647111) 69.0 kV to S963 8 (647963) 69.0 kV Transmission Circuit #1 b.5. W BROCK8 (647111) 69.0 kV to S967 8 (647967) 69.0 kV Transmission Circuit #1 b.6. S1263 5 (646263) 161.0 kV to W BROCK8 (647111) 69.0 kV to S1263T19 (648263) 13.8 kV Three Winding #1
G02_P4_Fault_032	P4	Single Phase Fault with Stuck Breaker on S1280 5 161.00 (646280) 161 kV Bus a. Apply Fault at the S1280 5 161.00 (646280) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1
G02_P4_Fault_033	P4	Single Phase Fault with Stuck Breaker on HUMBOLT5 161.00 (640234) 161 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply Fault at the HUMBOLT5 161.00 (640234) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HUMBOLT5 (640234) 161.0 kV to S1398 5 (646398) 161.0 kV Transmission Circuit #1 b.2. S1398 5 (646398) 161.0 kV to S1399 5 (646399) 161.0 kV Transmission Circuit #1 b.3. HUMBOLT5 (640234) 161.0 kV to HUMBOLT7 (640235) 115.0 kV to HUMBOLDT T29 (643087) 13.8 kV Three Winding #1
G02_P4_Fault_034	P4	Single Phase Fault with Stuck Breaker on HUMBOLT5 161.00 (640234) 161 kV Bus a. Apply Fault at the HUMBOLT5 161.00 (640234) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1398 5 (646398) 161.0 kV Transmission Circuit #1 b.3. S1398 5 (646398) 161.0 kV to S1399 5 (646399) 161.0 kV Transmission Circuit #1
G02_P4_Fault_035	P4	Single Phase Fault with Stuck Breaker on HUMBOLT5 161.00 (640234) 161 kV Bus a. Apply Fault at the HUMBOLT5 161.00 (640234) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S975 8 (647975) 69.0 kV to S975T4 9 (648275) 13.8 kV Three Winding #1
G02_P4_Fault_036	P4	Single Phase Fault with Stuck Breaker on HUMBOLT5 161.00 (640234) 161 kV Bus a. Apply Fault at the HUMBOLT5 161.00 (640234) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HUMBOLT5 (640234) 161.0 kV to HUMBOLT7 (640235) 115.0 kV to HUMBOLDT T29 (643087) 13.8 kV Three Winding #1 b.2. HUMBOLT5 (640234) 161.0 kV to S975 8 (647975) 69.0 kV to S975T4 9 (648275) 13.8 kV Three Winding #1
G02_P4_Fault_037	P4	Single Phase Fault with Stuck Breaker on MADISON3 345.00 (635635) 345 kV Bus a. Apply Fault at the MADISON3 345.00 (635635) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ORIENT 3 (635570) 345.0 kV to MADISON3 (635635) 345.0 kV Transmission Circuit #1 b.2. BOONVIL3 (635630) 345.0 kV to MADISON3 (635635) 345.0 kV Transmission Circuit #1 b.3. MADISON3 (635635) 345.0 kV to NORWLK3 (635640) 345.0 kV Transmission Circuit #1
G02_P4_Fault_038	P4	Single Phase Fault with Stuck Breaker on ATCHSN 3 345.00 (635017) 345 kV Bus a. Apply Fault at the ATCHSN 3 345.00 (635017) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ATCHSN 3 (635017) 345.0 kV to FRMRCTY B1 9 (635019) 34.5 kV Two Winding #1 b.2. ATCHSN 3 (635017) 345.0 kV to COOPER 3 (640139) 345.0 kV Transmission Circuit #1
G02_P4_Fault_039	P4	Single Phase Fault with Stuck Breaker on S HILLS 3 345.00 (635568) 345 kV Bus a. Apply Fault at the S HILLS 3 345.00 (635568) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S HILLS 3 (635568) 345.0 kV to ORIENT 3 (635570) 345.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.2. S HILLS 3 (635568) 345.0 kV to BOONVIL3 (635630) 345.0 kV Transmission Circuit #1
G02_P4_Fault_040	P4	Single Phase Fault with Stuck Breaker on ORIENT 3 345.00 (635570) 345 kV Bus a. Apply Fault at the ORIENT 3 345.00 (635570) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. RLHILLS3 (635100) 345.0 kV to ORIENT 3 (635570) 345.0 kV Transmission Circuit #1 b.2. ORIENT 3 (635570) 345.0 kV to MADISON3 (635635) 345.0 kV Transmission Circuit #1
G02_P4_Fault_041	P4	Single Phase Fault with Stuck Breaker on RLHILLS3 345.00 (635100) 345 kV Bus a. Apply Fault at the RLHILLS3 345.00 (635100) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. RLHILLS3 (635100) 345.0 kV to RLHILLS B2 9 (635103) 34.5 kV Two Winding #1 b.2. RLHILLS3 (635100) 345.0 kV to ORIENT 3 (635570) 345.0 kV Transmission Circuit #1
G02_P4_Fault_042	P4	Single Phase Fault with Stuck Breaker on RLHILLS3 345.00 (635100) 345 kV Bus a. Apply Fault at the RLHILLS3 345.00 (635100) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. RLHILLS3 (635100) 345.0 kV to RLHILLS B1 9 (635101) 34.5 kV Two Winding #1 b.2. RLHILLS3 (635100) 345.0 kV to ORIENT 3 (635570) 345.0 kV Transmission Circuit #1
G02_P4_Fault_043	P4	Single Phase Fault with Stuck Breaker on S HILLS 3 345.00 (635568) 345 kV Bus a. Apply Fault at the S HILLS 3 345.00 (635568) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S HILLS 3 (635568) 345.0 kV to ORIENT 3 (635570) 345.0 kV Transmission Circuit #1 b.2. S HILLS 3 (635568) 345.0 kV to STH HILL WD (637047) 345.0 kV Transmission Circuit #1
G02_P4_Fault_044	P4	Single Phase Fault with Stuck Breaker on NW68HOLDRG3 345.00 (650114) 345 kV Bus a. Apply Fault at the NW68HOLDRG3 345.00 (650114) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. NW68HOLDRG3 (650114) 345.0 kV to WAGENER 3 (650185) 345.0 kV Transmission Circuit #1 b.2. NW68HOLDRG3 (650114) 345.0 kV to NW68HOLDRG7 (650214) 115.0 kV to NW68HOL1 9 (650314) 13.8 kV Three Winding #1
G02_P4_Fault_045	P4	Single Phase Fault with Stuck Breaker on NW68HOLDRG3 345.00 (650114) 345 kV Bus a. Apply Fault at the NW68HOLDRG3 345.00 (650114) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MOORE 3 (640277) 345.0 kV to NW68HOLDRG3 (650114) 345.0 kV Transmission Circuit #1 b.2. NW68HOLDRG3 (650114) 345.0 kV to NW68HOLDRG7 (650214) 115.0 kV to NW68HOL1 9 (650314) 13.8 kV Three Winding #1
G02_P4_Fault_046	P4	Single Phase Fault with Stuck Breaker on NW68HOLDRG3 345.00 (650114) 345 kV Bus a. Apply Fault at the NW68HOLDRG3 345.00 (650114) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COLMB.E3 (640125) 345.0 kV to NW68HOLDRG3 (650114) 345.0 kV Transmission Circuit #1 b.2. MOORE 3 (640277) 345.0 kV to NW68HOLDRG3 (650114) 345.0 kV Transmission Circuit #1
G02_P4_Fault_047	P4	Single Phase Fault with Stuck Breaker on NW68HOLDRG3 345.00 (650114) 345 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply Fault at the NW68HOLDRG3 345.00 (650114) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COLMB.E3 (640125) 345.0 kV to NW68HOLDRG3 (650114) 345.0 kV Transmission Circuit #1 b.2. NW68HOLDRG3 (650114) 345.0 kV to WAGENER 3 (650185) 345.0 kV Transmission Circuit #1
G02_P4_Fault_048	P4	Single Phase Fault with Stuck Breaker on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply Fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3454 3 (645454) 345.0 kV to WAGENER 3 (650185) 345.0 kV Transmission Circuit #1 b.2. WAGENER 3 (650185) 345.0 kV to WAGENER 7 (650285) 115.0 kV to WAGENER2 9 (650485) 13.8 kV Three Winding #2
G02_P4_Fault_049	P4	Single Phase Fault with Stuck Breaker on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply Fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. WAGENER 3 (650185) 345.0 kV to 103&ROKEBY3 (650189) 345.0 kV Transmission Circuit #1 b.2. WAGENER 3 (650185) 345.0 kV to WAGENER 7 (650285) 115.0 kV to WAGENER1 9 (650385) 13.8 kV Three Winding #1
G02_P4_Fault_050	P4	Single Phase Fault with Stuck Breaker on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply Fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. WAGENER 3 (650185) 345.0 kV to 103&ROKEBY3 (650189) 345.0 kV Transmission Circuit #1 b.2. WAGENER 3 (650185) 345.0 kV to WAGENER 7 (650285) 115.0 kV to WAGENER2 9 (650485) 13.8 kV Three Winding #2
G02_P4_Fault_051	P4	Single Phase Fault with Stuck Breaker on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply Fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. NW68HOLDRG3 (650114) 345.0 kV to WAGENER 3 (650185) 345.0 kV Transmission Circuit #1 b.2. WAGENER 3 (650185) 345.0 kV to WAGENER 7 (650285) 115.0 kV to WAGENER1 9 (650385) 13.8 kV Three Winding #1
G02_P4_Fault_052	P4	Single Phase Fault with Stuck Breaker on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply Fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3454 3 (645454) 345.0 kV to WAGENER 3 (650185) 345.0 kV Transmission Circuit #1 b.2. NW68HOLDRG3 (650114) 345.0 kV to WAGENER 3 (650185) 345.0 kV Transmission Circuit #1
G02_P4_Fault_053	P4	Single Phase Fault with Stuck Breaker on 103&ROKEBY3 345.00 (650189) 345 kV Bus a. Apply Fault at the 103&ROKEBY3 345.00 (650189) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MOORE 3 (640277) 345.0 kV to 103&ROKEBY3 (650189) 345.0 kV Transmission Circuit #1 b.2. WAGENER 3 (650185) 345.0 kV to 103&ROKEBY3 (650189) 345.0 kV Transmission Circuit #1
G02_P4_Fault_054	P4	Single Phase Fault with Stuck Breaker on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply Fault at the WAGENER 3 345.00 (650185) 345 kV Bus

Fault ID	Planning Event	Fault Description
		b. Clear Fault after 16 cycles and trip the following elements: b.1. WAGENER 3 (650185) 345.0 kV to 103&ROKEBY3 (650189) 345.0 kV Transmission Circuit #1
G02_P4_Fault_055	P4	Single Phase Fault with Stuck Breaker on MOORE 3 345.00 (640277) 345 kV Bus a. Apply Fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MOORE 3 (640277) 345.0 kV to 103&ROKEBY3 (650189) 345.0 kV Transmission Circuit #1
G02_P4_Fault_056	P4	Single Phase Fault with Stuck Breaker on NW12&ARBOR7 115.00 (650226) 115 kV Bus a. Apply Fault at the NW12&ARBOR7 115.00 (650226) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. NW56&MORTN7 (650207) 115.0 kV to NW70FAIRFD7 (650210) 115.0 kV Transmission Circuit #1 b.2. NW56&MORTN7 (650207) 115.0 kV to NW12&ARBOR7 (650226) 115.0 kV Transmission Circuit #1 b.3. NW70FAIRFD7 (650210) 115.0 kV to NW68HOLDRG7 (650214) 115.0 kV Transmission Circuit #1 b.4. 19&ALVO 7 (650215) 115.0 kV to NW12&ARBOR7 (650226) 115.0 kV Transmission Circuit #1 b.5. NW70FAIRFD7 (650210) 115.0 kV to NW70FAIRFD9 (650310) 12.5 kV to 101TERTIARY (650510) 7.2 kV Three Winding #1 b.6. NW12&ARBOR7 (650226) 115.0 kV to NW12&AR 9 (650326) 12.5 kV to 261TERTIARY (650526) 7.2 kV Three Winding #1
G02_P4_Fault_057	P4	Single Phase Fault with Stuck Breaker on NW68HOLDRG3 345.00 (650114) 345 kV Bus a. Apply Fault at the NW68HOLDRG3 345.00 (650114) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. NW70FAIRFD7 (650210) 115.0 kV to NW68HOLDRG7 (650214) 115.0 kV Transmission Circuit #1 b.2. NW68HOLDRG3 (650114) 345.0 kV to NW68HOLDRG7 (650214) 115.0 kV to NW68HOL1 9 (650314) 13.8 kV Three Winding #1
G02_P4_Fault_058	P4	Single Phase Fault with Stuck Breaker on NW68HOLDRG7 115.00 (650214) 115 kV Bus a. Apply Fault at the NW68HOLDRG7 115.00 (650214) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. PAWNEEL7 (640316) 115.0 kV to NW68HOLDRG7 (650214) 115.0 kV Transmission Circuit #1 b.2. NW70FAIRFD7 (650210) 115.0 kV to NW68HOLDRG7 (650214) 115.0 kV Transmission Circuit #1
G02_P4_Fault_059	P4	Single Phase Fault with Stuck Breaker on 2&N 7 115.00 (650230) 115 kV Bus a. Apply Fault at the 2&N 7 115.00 (650230) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. NW68HOLDRG7 (650214) 115.0 kV to SW27&F 7 (650216) 115.0 kV Transmission Circuit #1 b.2. SW27&F 7 (650216) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.3. NW68HOLDRG3 (650114) 345.0 kV to NW68HOLDRG7 (650214) 115.0 kV to NW68HOL1 9 (650314) 13.8 kV Three Winding #1 b.5. SW27&F 7 (650216) 115.0 kV to SW27&F 9 (650316) 12.5 kV to 161TERTIARY (650516) 7.2 kV Three Winding #1 b.9. 2&N 7 (650230) 115.0 kV to Fixed Shunt Device #
G02_P4_Fault_060	P4	Single Phase Fault with Stuck Breaker on NW68HOLDRG7 115.00 (650214) 115 kV Bus a. Apply Fault at the NW68HOLDRG7 115.00 (650214) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements:

Fault ID	Planning Event	Fault Description
		b.1. PAWNEEL7 (640316) 115.0 kV to NW68HOLDRG7 (650214) 115.0 kV Transmission Circuit #1 b.2. NW68HOLDRG7 (650214) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1 b.3. Trip Bus #
G02_P4_Fault_061	P4	Single Phase Fault with Stuck Breaker on 2&N 7 115.00 (650230) 115 kV Bus a. Apply Fault at the 2&N 7 115.00 (650230) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. NW68HOLDRG7 (650214) 115.0 kV to SW27&F 7 (650216) 115.0 kV Transmission Circuit #1 b.2. NW68HOLDRG7 (650214) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1 b.3. SW27&F 7 (650216) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.4. SW27&F 7 (650216) 115.0 kV to SW27&F 9 (650316) 12.5 kV to 161TERTIARY (650516) 7.2 kV Three Winding #1 b.7. 2&N 7 (650230) 115.0 kV to Fixed Shunt Device # b.8. Trip Bus #
G02_P4_Fault_062	P4	Single Phase Fault with Stuck Breaker on 8&N 7 115.00 (650217) 115 kV Bus a. Apply Fault at the 8&N 7 115.00 (650217) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 8&J 9 (650100) 34.5 kV to 171TERTIARY (650517) 34.5 kV Transmission Circuit #1 b.2. 8&N 7 (650217) 115.0 kV to 17&HOLDRGE7 (650219) 115.0 kV Transmission Circuit #1 b.3. 8&N 7 (650217) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.4. 8&N 7 (650217) 115.0 kV to 8&N A9 (650317) 13.2 kV to 171TERTIARY (650517) 34.5 kV Three Winding #1 b.5. 8&N 7 (650217) 115.0 kV to 8&N B9 (650417) 13.2 kV to 172TERTIARY (650617) 7.6 kV Three Winding #1
G02_P4_Fault_063	P4	Single Phase Fault with Stuck Breaker on 27&PLR 7 115.00 (650229) 115 kV Bus a. Apply Fault at the 27&PLR 7 115.00 (650229) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 27&PLR 7 (650229) 115.0 kV to 40&ROKEBY 7 (650250) 115.0 kV Transmission Circuit #1 b.2. 27&PLR 7 (650229) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1 b.3. 27&PLR 7 (650229) 115.0 kV to 27&PLR A9 (650329) 12.5 kV to 291TERTIARY (650529) 7.2 kV Three Winding #1 b.4. 27&PLR 7 (650229) 115.0 kV to 27&PLR B9 (650429) 12.5 kV to 292TERTIARY (650629) 7.2 kV Three Winding #1
G02_P4_Fault_064	P4	Single Phase Fault with Stuck Breaker on 2&N 7 115.00 (650230) 115 kV Bus a. Apply Fault at the 2&N 7 115.00 (650230) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. NW68HOLDRG7 (650214) 115.0 kV to SW27&F 7 (650216) 115.0 kV Transmission Circuit #1 b.2. SW27&F 7 (650216) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.3. 8&N 7 (650217) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.4. SW27&F 7 (650216) 115.0 kV to SW27&F 9 (650316) 12.5 kV to 161TERTIARY (650516) 7.2 kV Three Winding #1 b.7. 2&N 7 (650230) 115.0 kV to Fixed Shunt Device #

Fault ID	Planning Event	Fault Description
G02_P4_Fault_065	P4	Single Phase Fault with Stuck Breaker on 3&VANDORN 7 115.00 (650218) 115 kV Bus a. Apply Fault at the 3&VANDORN 7 115.00 (650218) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 8&N 7 (650217) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.2. 3&VANDORN 7 (650218) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.3. 3&VANDORN 7 (650218) 115.0 kV to 20PIONEERS7 (650238) 115.0 kV Transmission Circuit #1 b.4. 3&VANDORN 7 (650218) 115.0 kV to 3VANDORN 9 (650318) 13.2 kV to 181TERTIARY (650518) 7.2 kV Three Winding #1
G02_P4_Fault_066	P4	Single Phase Fault with Stuck Breaker on 3&VANDORN 7 115.00 (650218) 115 kV Bus a. Apply Fault at the 3&VANDORN 7 115.00 (650218) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 3&VANDORN 7 (650218) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.2. 3&VANDORN 7 (650218) 115.0 kV to 20PIONEERS7 (650238) 115.0 kV Transmission Circuit #1 b.3. 2&N 7 (650230) 115.0 kV to 20PIONEERS7 (650238) 115.0 kV Transmission Circuit #1 b.4. 3&VANDORN 7 (650218) 115.0 kV to 3VANDORN 9 (650318) 13.2 kV to 181TERTIARY (650518) 7.2 kV Three Winding #1
G02_P4_Fault_067	P4	Single Phase Fault with Stuck Breaker on 2&N 7 115.00 (650230) 115 kV Bus a. Apply Fault at the 2&N 7 115.00 (650230) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. W LINCOLN 7 (650208) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.2. 2&N 7 (650230) 115.0 kV to 20PIONEERS7 (650238) 115.0 kV Transmission Circuit #1
G02_P4_Fault_068	P4	Single Phase Fault with Stuck Breaker on 2&N 7 115.00 (650230) 115 kV Bus a. Apply Fault at the 2&N 7 115.00 (650230) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. W LINCOLN 7 (650208) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.2. NW68HOLDRG7 (650214) 115.0 kV to SW27&F 7 (650216) 115.0 kV Transmission Circuit #1 b.3. SW27&F 7 (650216) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.4. SW27&F 7 (650216) 115.0 kV to SW27&F 9 (650316) 12.5 kV to 161TERTIARY (650516) 7.2 kV Three Winding #1 b.7. 2&N 7 (650230) 115.0 kV to Fixed Shunt Device #
G02_P4_Fault_069	P4	Single Phase Fault with Stuck Breaker on 3&VANDORN 7 115.00 (650218) 115 kV Bus a. Apply Fault at the 3&VANDORN 7 115.00 (650218) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 3&VANDORN 7 (650218) 115.0 kV to 2&N 7 (650230) 115.0 kV Transmission Circuit #1 b.2. 3&VANDORN 7 (650218) 115.0 kV to 20PIONEERS7 (650238) 115.0 kV Transmission Circuit #1 b.3. 20PIONEERS7 (650238) 115.0 kV to 40&GERTIE 7 (650258) 115.0 kV Transmission Circuit #1 b.4. 3&VANDORN 7 (650218) 115.0 kV to 3VANDORN 9 (650318) 13.2 kV to 181TERTIARY (650518) 7.2 kV Three Winding #1
G02_P4_Fault_070	P4	Single Phase Fault with Stuck Breaker on 20PIONEERS7 115.00 (650238) 115 kV Bus a. Apply Fault at the 20PIONEERS7 115.00 (650238) 115 kV Bus

Fault ID	Planning Event	Fault Description
		b. Clear Fault after 16 cycles and trip the following elements: b.1. 20PIONEERS7 (650238) 115.0 kV to 40&GERTIE 7 (650258) 115.0 kV Transmission Circuit #1 b.2. 20PIONEERS7 (650238) 115.0 kV to 70&CALVERT7 (650270) 115.0 kV Transmission Circuit #1
G02_P4_Fault_071	P4	Single Phase Fault with Stuck Breaker on 20PIONEERS7 115.00 (650238) 115 kV Bus a. Apply Fault at the 20PIONEERS7 115.00 (650238) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 20PIONEERS7 (650238) 115.0 kV to FOLSM&PHIL7 (650242) 115.0 kV Transmission Circuit #1 b.2. 20PIONEERS7 (650238) 115.0 kV to 70&CALVERT7 (650270) 115.0 kV Transmission Circuit #1
G02_P4_Fault_072	P4	Single Phase Fault with Stuck Breaker on 20PIONEERS7 115.00 (650238) 115 kV Bus a. Apply Fault at the 20PIONEERS7 115.00 (650238) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 2&N 7 (650230) 115.0 kV to 20PIONEERS7 (650238) 115.0 kV Transmission Circuit #1 b.2. 20PIONEERS7 (650238) 115.0 kV to FOLSM&PHIL7 (650242) 115.0 kV Transmission Circuit #1
G02_P4_Fault_073	P4	Single Phase Fault with Stuck Breaker on FOLSM&PHIL7 115.00 (650242) 115 kV Bus a. Apply Fault at the FOLSM&PHIL7 115.00 (650242) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SHELDON7 (640278) 115.0 kV to FOLSM&PHIL7 (650242) 115.0 kV Transmission Circuit #1 b.2. 20PIONEERS7 (650238) 115.0 kV to FOLSM&PHIL7 (650242) 115.0 kV Transmission Circuit #1
G02_P4_Fault_074	P4	Single Phase Fault with Stuck Breaker on FOLSM&PHIL7 115.00 (650242) 115 kV Bus a. Apply Fault at the FOLSM&PHIL7 115.00 (650242) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 20PIONEERS7 (650238) 115.0 kV to FOLSM&PHIL7 (650242) 115.0 kV Transmission Circuit #1 b.2. FOLSM&PHIL7 (650242) 115.0 kV to SW7&BENNET7 (650246) 115.0 kV Transmission Circuit #1
G02_P4_Fault_075	P4	Single Phase Fault with Stuck Breaker on FOLSM&PHIL7 115.00 (650242) 115 kV Bus a. Apply Fault at the FOLSM&PHIL7 115.00 (650242) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. FOLSM&PHIL7 (650242) 115.0 kV to SW7&BENNET7 (650246) 115.0 kV Transmission Circuit #1 b.2. FOLSM&PHIL7 (650242) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1
G02_P4_Fault_076	P4	Single Phase Fault with Stuck Breaker on FOLSM&PHIL7 115.00 (650242) 115 kV Bus a. Apply Fault at the FOLSM&PHIL7 115.00 (650242) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SHELDON7 (640278) 115.0 kV to FOLSM&PHIL7 (650242) 115.0 kV Transmission Circuit #1 b.2. FOLSM&PHIL7 (650242) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1
G02_P4_Fault_077	P4	Single Phase Fault with Stuck Breaker on SW7&BENNET7 115.00 (650246) 115 kV Bus a. Apply Fault at the SW7&BENNET7 115.00 (650246) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. FOLSM&PHIL7 (650242) 115.0 kV to SW7&BENNET7 (650246) 115.0 kV Transmission Circuit #1 b.2. SW7&BENNET7 (650246) 115.0 kV to 40&BENNET 7 (650247) 115.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
G02_P4_Fault_078	P4	Single Phase Fault with Stuck Breaker on SW7&BENNET7 115.00 (650246) 115 kV Bus a. Apply Fault at the SW7&BENNET7 115.00 (650246) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SHELDON7 (640278) 115.0 kV to SW7&BENNET7 (650246) 115.0 kV Transmission Circuit #1 b.2. SW7&BENNET7 (650246) 115.0 kV to 40&BENNET 7 (650247) 115.0 kV Transmission Circuit #1
G02_P4_Fault_079	P4	Single Phase Fault with Stuck Breaker on SW7&BENNET7 115.00 (650246) 115 kV Bus a. Apply Fault at the SW7&BENNET7 115.00 (650246) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SHELDON7 (640278) 115.0 kV to SW7&BENNET7 (650246) 115.0 kV Transmission Circuit #1 b.2. FOLSM&PHIL7 (650242) 115.0 kV to SW7&BENNET7 (650246) 115.0 kV Transmission Circuit #1
G02_P4_Fault_080	P4	Single Phase Fault with Stuck Breaker on 40&BENNET 7 115.00 (650247) 115 kV Bus a. Apply Fault at the 40&BENNET 7 115.00 (650247) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SW7&BENNET7 (650246) 115.0 kV to 40&BENNET 7 (650247) 115.0 kV Transmission Circuit #1 b.2. 40&BENNET 7 (650247) 115.0 kV to 40&ROKEBY 7 (650250) 115.0 kV Transmission Circuit #1
G02_P4_Fault_081	P4	Single Phase Fault with Stuck Breaker on 40&BENNET 7 115.00 (650247) 115 kV Bus a. Apply Fault at the 40&BENNET 7 115.00 (650247) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 40&BENNET 7 (650247) 115.0 kV to 40&ROKEBY 7 (650250) 115.0 kV Transmission Circuit #1 b.2. 40&BENNET 7 (650247) 115.0 kV to 76&ROKEBY 7 (650276) 115.0 kV Transmission Circuit #1
G02_P4_Fault_082	P4	Single Phase Fault with Stuck Breaker on 40&BENNET 7 115.00 (650247) 115 kV Bus a. Apply Fault at the 40&BENNET 7 115.00 (650247) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SW7&BENNET7 (650246) 115.0 kV to 40&BENNET 7 (650247) 115.0 kV Transmission Circuit #1 b.2. 40&BENNET 7 (650247) 115.0 kV to 76&ROKEBY 7 (650276) 115.0 kV Transmission Circuit #1
G02_P4_Fault_083	P4	Single Phase Fault with Stuck Breaker on 40&ROKEBY 7 115.00 (650250) 115 kV Bus a. Apply Fault at the 40&ROKEBY 7 115.00 (650250) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 27&PLR 7 (650229) 115.0 kV to 40&ROKEBY 7 (650250) 115.0 kV Transmission Circuit #1 b.2. 40&ROKEBY 7 (650250) 115.0 kV to 56&PLR 7 (650255) 115.0 kV Transmission Circuit #1 b.3. 56&PLR 7 (650255) 115.0 kV to 91&HWY2 7 (650274) 115.0 kV Transmission Circuit #1 b.4. 56&PLR 7 (650255) 115.0 kV to 56&PLR 9 (650355) 12.5 kV to 551TERTIARY (650555) 7.2 kV Three Winding #1 b.7. 40&ROKEBY 7 (650250) 115.0 kV to Fixed Shunt Device #
G02_P4_Fault_084	P4	Single Phase Fault with Stuck Breaker on 56&PLR 7 115.00 (650255) 115 kV Bus a. Apply Fault at the 56&PLR 7 115.00 (650255) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 40&BENNET 7 (650247) 115.0 kV to 40&ROKEBY 7 (650250) 115.0 kV Transmission Circuit #1 b.2. 40&ROKEBY 7 (650250) 115.0 kV to 56&PLR 7 (650255) 115.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.3. 56&PLR 7 (650255) 115.0 kV to 91&HWY2 7 (650274) 115.0 kV Transmission Circuit #1 b.4. 56&PLR 7 (650255) 115.0 kV to 56&PLR 9 (650355) 12.5 kV to 551TERTIARY (650555) 7.2 kV Three Winding #1
G02_P4_Fault_085	P4	Single Phase Fault with Stuck Breaker on 40&ROKEBY 7 115.00 (650250) 115 kV Bus a. Apply Fault at the 40&ROKEBY 7 115.00 (650250) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 27&PLR 7 (650229) 115.0 kV to 40&ROKEBY 7 (650250) 115.0 kV Transmission Circuit #1 b.2. 40&BENNET 7 (650247) 115.0 kV to 40&ROKEBY 7 (650250) 115.0 kV Transmission Circuit #1
G02_P4_Fault_086	P4	Single Phase Fault with Stuck Breaker on 40&GERTIE 7 115.00 (650258) 115 kV Bus a. Apply Fault at the 40&GERTIE 7 115.00 (650258) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 20PIONEERS7 (650238) 115.0 kV to 40&GERTIE 7 (650258) 115.0 kV Transmission Circuit #1 b.2. 56&EVERETT7 (650256) 115.0 kV to 56&ELK TAP7 (650257) 115.0 kV Transmission Circuit #1 b.3. 56&ELK TAP7 (650257) 115.0 kV to 40&GERTIE 7 (650258) 115.0 kV Transmission Circuit #1 b.4. 56&ELK TAP7 (650257) 115.0 kV to 70&CALVERT7 (650270) 115.0 kV Transmission Circuit #1 b.5. 40&GERTIE 7 (650258) 115.0 kV to 40&GE A9 (650358) 13.2 kV to 581TERTIARY (650558) 7.2 kV Three Winding #1 b.6. 40&GERTIE 7 (650258) 115.0 kV to 40&GE B9 (650458) 13.2 kV to 582TERTIARY (650658) 7.6 kV Three Winding #1
G02_P4_Fault_087	P4	Single Phase Fault with Stuck Breaker on 84FLETCHER7 115.00 (650284) 115 kV Bus a. Apply Fault at the 84FLETCHER7 115.00 (650284) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 84LEIGHTON7 (650267) 115.0 kV to 84FLETCHER7 (650284) 115.0 kV Transmission Circuit #1 b.2. 84LEIGHTON7 (650267) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1 b.3. 84&BLUFF 7 (650275) 115.0 kV to 84FLETCHER7 (650284) 115.0 kV Transmission Circuit #1 b.4. 84FLETCHER7 (650284) 115.0 kV to 84&FL 9 (650384) 13.2 kV to 841TERTIARY (650584) 7.2 kV Three Winding #1
G02_P4_Fault_088	P4	Single Phase Fault with Stuck Breaker on 93&O 7 115.00 (650273) 115 kV Bus a. Apply Fault at the 93&O 7 115.00 (650273) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 84LEIGHTON7 (650267) 115.0 kV to 93&O 7 (650273) 115.0 kV Transmission Circuit #1 b.2. 84LEIGHTON7 (650267) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1 b.3. 70&CALVERT7 (650270) 115.0 kV to 93&O 7 (650273) 115.0 kV Transmission Circuit #1 b.4. 93&O 7 (650273) 115.0 kV to 93&O 9 (650373) 12.5 kV to 731TERTIARY (650573) 9.2 kV Three Winding #1
G02_P4_Fault_089	P4	Single Phase Fault with Stuck Breaker on 70&CALVERT7 115.00 (650270) 115 kV Bus a. Apply Fault at the 70&CALVERT7 115.00 (650270) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 20PIONEERS7 (650238) 115.0 kV to 70&CALVERT7 (650270) 115.0 kV Transmission Circuit #1 b.2. 70&CALVERT7 (650270) 115.0 kV to 81&OCHENEY7 (650271) 115.0 kV Transmission Circuit #1
G02_P4_Fault_090	P4	Single Phase Fault with Stuck Breaker on 56&ELK TAP7 115.00 (650257) 115 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply Fault at the 56&ELK TAP7 115.00 (650257) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 20PIONEERS7 (650238) 115.0 kV to 70&CALVERT7 (650270) 115.0 kV Transmission Circuit #1 b.2. 56&EVERETT7 (650256) 115.0 kV to 56&ELK TAP7 (650257) 115.0 kV Transmission Circuit #1 b.3. 56&ELK TAP7 (650257) 115.0 kV to 40&GERTIE 7 (650258) 115.0 kV Transmission Circuit #1 b.4. 56&ELK TAP7 (650257) 115.0 kV to 70&CALVERT7 (650270) 115.0 kV Transmission Circuit #1
G02_P4_Fault_091	P4	Single Phase Fault with Stuck Breaker on 93&O 7 115.00 (650273) 115 kV Bus a. Apply Fault at the 93&O 7 115.00 (650273) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 84LEIGHTON7 (650267) 115.0 kV to 93&O 7 (650273) 115.0 kV Transmission Circuit #1 b.2. 70&CALVERT7 (650270) 115.0 kV to 81&OCHENEY7 (650271) 115.0 kV Transmission Circuit #1 b.3. 70&CALVERT7 (650270) 115.0 kV to 93&O 7 (650273) 115.0 kV Transmission Circuit #1 b.4. 93&O 7 (650273) 115.0 kV to 93&O 9 (650373) 12.5 kV to 731TERTIARY (650573) 9.2 kV Three Winding #1
G02_P4_Fault_092	P4	Single Phase Fault with Stuck Breaker on 81&OCHENEY7 115.00 (650271) 115 kV Bus a. Apply Fault at the 81&OCHENEY7 115.00 (650271) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 81&OCHENEY7 (650271) 115.0 kV to 91&HWY2 7 (650274) 115.0 kV Transmission Circuit #1 b.2. 81&OCHENEY7 (650271) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1
G02_P4_Fault_093	P4	Single Phase Fault with Stuck Breaker on 81&OCHENEY7 115.00 (650271) 115 kV Bus a. Apply Fault at the 81&OCHENEY7 115.00 (650271) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 70&CALVERT7 (650270) 115.0 kV to 81&OCHENEY7 (650271) 115.0 kV Transmission Circuit #1 b.2. 81&OCHENEY7 (650271) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1
G02_P4_Fault_094	P4	Single Phase Fault with Stuck Breaker on 81&OCHENEY7 115.00 (650271) 115 kV Bus a. Apply Fault at the 81&OCHENEY7 115.00 (650271) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 70&CALVERT7 (650270) 115.0 kV to 81&OCHENEY7 (650271) 115.0 kV Transmission Circuit #1 b.2. 81&OCHENEY7 (650271) 115.0 kV to 91&HWY2 7 (650274) 115.0 kV Transmission Circuit #1
G02_P4_Fault_095	P4	Single Phase Fault with Stuck Breaker on 40&ROKEBY 7 115.00 (650250) 115 kV Bus a. Apply Fault at the 40&ROKEBY 7 115.00 (650250) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 40&ROKEBY 7 (650250) 115.0 kV to 56&PLR 7 (650255) 115.0 kV Transmission Circuit #1 b.2. 56&PLR 7 (650255) 115.0 kV to 91&HWY2 7 (650274) 115.0 kV Transmission Circuit #1 b.3. 81&OCHENEY7 (650271) 115.0 kV to 91&HWY2 7 (650274) 115.0 kV Transmission Circuit #1 b.4. 56&PLR 7 (650255) 115.0 kV to 56&PLR 9 (650355) 12.5 kV to 551TERTIARY (650555) 7.2 kV Three Winding #1 b.7. 40&ROKEBY 7 (650250) 115.0 kV to Fixed Shunt Device #
G02_P4_Fault_096	P4	Single Phase Fault with Stuck Breaker on 40&ROKEBY 7 115.00 (650250) 115 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply Fault at the 40&ROKEBY 7 115.00 (650250) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 40&ROKEBY 7 (650250) 115.0 kV to 56&PLR 7 (650255) 115.0 kV Transmission Circuit #1 b.2. 56&PLR 7 (650255) 115.0 kV to 91&HWY2 7 (650274) 115.0 kV Transmission Circuit #1 b.3. 91&HWY2 7 (650274) 115.0 kV to 76&ROKEBY 7 (650276) 115.0 kV Transmission Circuit #1 b.4. 56&PLR 7 (650255) 115.0 kV to 56&PLR 9 (650355) 12.5 kV to 551TERTIARY (650555) 7.2 kV Three Winding #1 b.7. 40&ROKEBY 7 (650250) 115.0 kV to Fixed Shunt Device #
G02_P4_Fault_097	P4	Single Phase Fault with Stuck Breaker on 91&HWY2 7 115.00 (650274) 115 kV Bus a. Apply Fault at the 91&HWY2 7 115.00 (650274) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 81&OCHENEY7 (650271) 115.0 kV to 91&HWY2 7 (650274) 115.0 kV Transmission Circuit #1 b.2. 91&HWY2 7 (650274) 115.0 kV to 76&ROKEBY 7 (650276) 115.0 kV Transmission Circuit #1
G02_P4_Fault_098	P4	Single Phase Fault with Stuck Breaker on 120&ALVO 7 115.00 (650279) 115 kV Bus a. Apply Fault at the 120&ALVO 7 115.00 (650279) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 120&ALVO 7 (650279) 115.0 kV to WAVERLY 7 (650283) 115.0 kV Transmission Circuit #1 b.2. 120&ALVO 7 (650279) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1 b.3. 120&ALVO 7 (650279) 115.0 kV to 120&ALVO 9 (650379) 12.5 kV to 791TERTIARY (650579) 7.2 kV Three Winding #1
G02_P4_Fault_099	P4	Single Phase Fault with Stuck Breaker on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply Fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 84LEIGHTON7 (650267) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1 b.2. WAGENER 3 (650185) 345.0 kV to WAGENER 7 (650285) 115.0 kV to WAGENER2 9 (650485) 13.8 kV Three Winding #2
G02_P4_Fault_100	P4	Single Phase Fault with Stuck Breaker on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply Fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 81&OCHENEY7 (650271) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1 b.2. WAGENER 3 (650185) 345.0 kV to WAGENER 7 (650285) 115.0 kV to WAGENER2 9 (650485) 13.8 kV Three Winding #2
G02_P4_Fault_101	P4	Single Phase Fault with Stuck Breaker on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply Fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 120&ALVO 7 (650279) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1 b.2. WAGENER 3 (650185) 345.0 kV to WAGENER 7 (650285) 115.0 kV to WAGENER1 9 (650385) 13.8 kV Three Winding #1
G02_P4_Fault_102	P4	Single Phase Fault with Stuck Breaker on WAGENER 3 345.00 (650185) 345 kV Bus a. Apply Fault at the WAGENER 3 345.00 (650185) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements:

Fault ID	Planning Event	Fault Description
		b.1. 81&OCHENEY7 (650271) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1 b.2. WAGENER 3 (650185) 345.0 kV to WAGENER 7 (650285) 115.0 kV to WAGENER1 9 (650385) 13.8 kV Three Winding #1
G02_P4_Fault_103	P4	Single Phase Fault with Stuck Breaker on WAGENER 7 115.00 (650285) 115 kV Bus a. Apply Fault at the WAGENER 7 115.00 (650285) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 84LEIGHTON7 (650267) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1 b.2. 120&ALVO 7 (650279) 115.0 kV to WAGENER 7 (650285) 115.0 kV Transmission Circuit #1
G02_P4_Fault_104	P4	Single Phase Fault with Stuck Breaker on ROKEBY 7 115.00 (650290) 115 kV Bus a. Apply Fault at the ROKEBY 7 115.00 (650290) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. NW68HOLDRG7 (650214) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1 b.2. ROKEBY 7 (650290) 115.0 kV to ROKEBY 2G (650092) 13.8 kV Two Winding #1 b.3. Trip Bus #
G02_P4_Fault_105	P4	Single Phase Fault with Stuck Breaker on ROKEBY 7 115.00 (650290) 115 kV Bus a. Apply Fault at the ROKEBY 7 115.00 (650290) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. NW68HOLDRG7 (650214) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1 b.2. ROKEBY 7 (650290) 115.0 kV to ROKEBY 3G (650093) 13.8 kV Two Winding #1 b.3. Trip Bus #
G02_P4_Fault_106	P4	Single Phase Fault with Stuck Breaker on ROKEBY 7 115.00 (650290) 115 kV Bus a. Apply Fault at the ROKEBY 7 115.00 (650290) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. FOLSM&PHIL7 (650242) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1 b.2. ROKEBY 7 (650290) 115.0 kV to ROKEBY 2G (650092) 13.8 kV Two Winding #1
G02_P4_Fault_107	P4	Single Phase Fault with Stuck Breaker on ROKEBY 7 115.00 (650290) 115 kV Bus a. Apply Fault at the ROKEBY 7 115.00 (650290) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 27&PLR 7 (650229) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1 b.2. FOLSM&PHIL7 (650242) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1
G02_P4_Fault_108	P4	Single Phase Fault with Stuck Breaker on ROKEBY 7 115.00 (650290) 115 kV Bus a. Apply Fault at the ROKEBY 7 115.00 (650290) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 27&PLR 7 (650229) 115.0 kV to ROKEBY 7 (650290) 115.0 kV Transmission Circuit #1 b.2. ROKEBY 7 (650290) 115.0 kV to ROKEBY 1G (650091) 13.8 kV Two Winding #1
G02_P4_Fault_109	P4	Single Phase Fault with Stuck Breaker on MOORE 3 345.00 (640277) 345 kV Bus a. Apply Fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MCCOOL 3 (640271) 345.0 kV to MOORE 3 (640277) 345.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.2. MOORE 3 (640277) 345.0 kV to 103&ROKEBY3 (650189) 345.0 kV Transmission Circuit #1
G02_P4_Fault_110	P4	Single Phase Fault with Stuck Breaker on MOORE 3 345.00 (640277) 345 kV Bus a. Apply Fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MCCOOL 3 (640271) 345.0 kV to MOORE 3 (640277) 345.0 kV Transmission Circuit #1 b.2. MOORE 3 (640277) 345.0 kV to NW68HOLDRG3 (650114) 345.0 kV Transmission Circuit #1
G02_P4_Fault_111	P4	Single Phase Fault with Stuck Breaker on SHELDON7 115.00 (640278) 115 kV Bus a. Apply Fault at the SHELDON7 115.00 (640278) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SHELDON7 (640278) 115.0 kV to HALLAM3G (640021) 13.8 kV Two Winding #1 b.2. SHELDON7 (640278) 115.0 kV to SW7&BENNET7 (650246) 115.0 kV Transmission Circuit #1
G02_P4_Fault_112	P4	Single Phase Fault with Stuck Breaker on SHELDON7 115.00 (640278) 115 kV Bus a. Apply Fault at the SHELDON7 115.00 (640278) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. BPS SUB7 (640088) 115.0 kV to SHELDON7 (640278) 115.0 kV Transmission Circuit #1 b.2. SHELDON7 (640278) 115.0 kV to SHELDN1G (640019) 13.8 kV Two Winding #1
G02_P4_Fault_113	P4	Single Phase Fault with Stuck Breaker on SHELDON7 115.00 (640278) 115 kV Bus a. Apply Fault at the SHELDON7 115.00 (640278) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. CLATONA7 (640111) 115.0 kV to SHELDON7 (640278) 115.0 kV Transmission Circuit #1 b.2. CRETE__7 (640153) 115.0 kV to SHELDON7 (640278) 115.0 kV Transmission Circuit #1
G02_P4_Fault_114	P4	Single Phase Fault with Stuck Breaker on SHELDON7 115.00 (640278) 115 kV Bus a. Apply Fault at the SHELDON7 115.00 (640278) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SHELDON7 (640278) 115.0 kV to SHELDN2G (640020) 13.8 kV Two Winding #1 b.2. SHELDON7 (640278) 115.0 kV to MONOLITH 7 (640591) 115.0 kV Transmission Circuit #1
G02_P4_Fault_115	P4	Single Phase Fault with Stuck Breaker on MOORE 3 345.00 (640277) 345 kV Bus a. Apply Fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SHELDON7 (640278) 115.0 kV to FOLSM&PHIL7 (650242) 115.0 kV Transmission Circuit #1 b.2. MOORE 3 (640277) 345.0 kV to SHELDON7 (640278) 115.0 kV to MOORE 9 (640280) 13.8 kV Three Winding #1
G02_P4_Fault_116	P4	Single Phase Fault with Stuck Breaker on SWEET W3 345.00 (640374) 345 kV Bus a. Apply Fault at the SWEET W3 345.00 (640374) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SWEET W3 (640374) 345.0 kV to GR ISLD3 (653571) 345.0 kV Transmission Circuit #1
G02_P4_Fault_117	P4	Single Phase Fault with Stuck Breaker on SWEET W3 345.00 (640374) 345 kV Bus a. Apply Fault at the SWEET W3 345.00 (640374) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements:

Fault ID	Planning Event	Fault Description
		b.1. AXTELL 3 (640065) 345.0 kV to SWEET W3 (640374) 345.0 kV Transmission Circuit #1 b.2. GENTLMN3 (640183) 345.0 kV to SWEET W3 (640374) 345.0 kV Transmission Circuit #2
G02_P4_Fault_118	P4	Single Phase Fault with Stuck Breaker on SWEET W3 345.00 (640374) 345 kV Bus a. Apply Fault at the SWEET W3 345.00 (640374) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. GENTLMN3 (640183) 345.0 kV to SWEET W3 (640374) 345.0 kV Transmission Circuit #2 b.2. SWEET W3 (640374) 345.0 kV to GR ISLD3 (653571) 345.0 kV Transmission Circuit #1
G02_P4_Fault_119	P4	Single Phase Fault with Stuck Breaker on AXTELL 3 345.00 (640065) 345 kV Bus a. Apply Fault at the AXTELL 3 345.00 (640065) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. AXTELL 3 (640065) 345.0 kV to SWEET W3 (640374) 345.0 kV Transmission Circuit #1
G02_P4_Fault_120	P4	Single Phase Fault with Stuck Breaker on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply Fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SWEET W3 (640374) 345.0 kV to GR ISLD3 (653571) 345.0 kV Transmission Circuit #1 b.2. GR ISLD4 (640200) 230.0 kV to GR ISLD3 (653571) 345.0 kV to GR ISL29 (653316) 13.8 kV Three Winding #2 b.3. GR ISL29 (653316) 13.8 kV to GR ISLD3 (653571) 345.0 kV to GR ISLD4 (640200) 230.0 kV Three Winding #2
G02_P4_Fault_121	P4	Single Phase Fault with Stuck Breaker on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply Fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MCCOOL 3 (640271) 345.0 kV to GR ISLD3 (653571) 345.0 kV Transmission Circuit #1 b.2. GR ISLD4 (640200) 230.0 kV to GR ISLD3 (653571) 345.0 kV to GR ISL19 (653314) 13.8 kV Three Winding #1 b.3. GR ISL19 (653314) 13.8 kV to GR ISLD3 (653571) 345.0 kV to GR ISLD4 (640200) 230.0 kV Three Winding #1
G02_P4_Fault_122	P4	Single Phase Fault with Stuck Breaker on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply Fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COLMB.W4 (640131) 230.0 kV to GR ISLD4 (640200) 230.0 kV Transmission Circuit #1 b.2. GR ISLD4 (640200) 230.0 kV to GR ISLD3 (653571) 345.0 kV to GR ISLD T6 9 (643071) 13.8 kV Three Winding #3
G02_P4_Fault_123	P4	Single Phase Fault with Stuck Breaker on PAULINE3 345.00 (640312) 345 kV Bus a. Apply Fault at the PAULINE3 345.00 (640312) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. AXTELL 3 (640065) 345.0 kV to PAULINE3 (640312) 345.0 kV Transmission Circuit #1 b.2. PAULINE3 (640312) 345.0 kV to TOBIAS 3 (640525) 345.0 kV Transmission Circuit #1 b.3. PAULINE3 (640312) 345.0 kV to PAULINE7 (640313) 115.0 kV to PAULINE9 (640315) 13.8 kV Three Winding #1
G02_P4_Fault_124	P4	Single Phase Fault with Stuck Breaker on AXTELL 3 345.00 (640065) 345 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply Fault at the AXTELL 3 345.00 (640065) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. AXTELL 3 (640065) 345.0 kV to SWEET W3 (640374) 345.0 kV Transmission Circuit #1 b.2. AXTELL 3 (640065) 345.0 kV to AXTELL 7 (640066) 115.0 kV to AXTELL 9 (640067) 13.8 kV Three Winding #1
G02_P4_Fault_125	P4	Single Phase Fault with Stuck Breaker on AXTELL 3 345.00 (640065) 345 kV Bus a. Apply Fault at the AXTELL 3 345.00 (640065) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. AXTELL 7 (640066) 115.0 kV to AXTELL 3 (640065) 345.0 kV to AXTELL 9 (640067) 13.8 kV Three Winding #1
G02_P4_Fault_126	P4	Single Phase Fault with Stuck Breaker on AXTELL 3 345.00 (640065) 345 kV Bus a. Apply Fault at the AXTELL 3 345.00 (640065) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. AXTELL 3 (640065) 345.0 kV to PAULINE3 (640312) 345.0 kV Transmission Circuit #1
G02_P4_Fault_127	P4	Single Phase Fault with Stuck Breaker on AXTELL 3 345.00 (640065) 345 kV Bus a. Apply Fault at the AXTELL 3 345.00 (640065) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. AXTELL 3 (640065) 345.0 kV to PAULINE3 (640312) 345.0 kV Transmission Circuit #1 b.2. AXTELL 3 (640065) 345.0 kV to SWEET W3 (640374) 345.0 kV Transmission Circuit #1
G02_P4_Fault_128	P4	Single Phase Fault with Stuck Breaker on MOORE 3 345.00 (640277) 345 kV Bus a. Apply Fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MOORE 3 (640277) 345.0 kV to MONOLITH 3 (640590) 345.0 kV Transmission Circuit #1 b.2. MOORE 3 (640277) 345.0 kV to SHELDON7 (640278) 115.0 kV to MOORE 9 (640280) 13.8 kV Three Winding #1
G02_P4_Fault_129	P4	Single Phase Fault with Stuck Breaker on MOORE 3 345.00 (640277) 345 kV Bus a. Apply Fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MOORE 3 (640277) 345.0 kV to TOBIAS 3 (640525) 345.0 kV Transmission Circuit #1 b.2. MOORE 3 (640277) 345.0 kV to SHELDON7 (640278) 115.0 kV to MOORE 9 (640280) 13.8 kV Three Winding #1
G02_P4_Fault_130	P4	Single Phase Fault with Stuck Breaker on MOORE 3 345.00 (640277) 345 kV Bus a. Apply Fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MOORE 3 (640277) 345.0 kV to MONOLITH 3 (640590) 345.0 kV Transmission Circuit #1 b.2. MOORE 3 (640277) 345.0 kV to 103&ROKEBY3 (650189) 345.0 kV Transmission Circuit #1
G02_P4_Fault_131	P4	Single Phase Fault with Stuck Breaker on MOORE 3 345.00 (640277) 345 kV Bus a. Apply Fault at the MOORE 3 345.00 (640277) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MOORE 3 (640277) 345.0 kV to TOBIAS 3 (640525) 345.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.2. MOORE 3 (640277) 345.0 kV to NW68HOLDRG3 (650114) 345.0 kV Transmission Circuit #1
G02_P4_Fault_132	P4	Single Phase Fault with Stuck Breaker on COOPER 3 345.00 (640139) 345 kV Bus a. Apply Fault at the COOPER 3 345.00 (640139) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ST JOE 7 (541199) 345.0 kV to COOPER 3 (640139) 345.0 kV Transmission Circuit #1 b.2. ATCHSN 3 (635017) 345.0 kV to COOPER 3 (640139) 345.0 kV Transmission Circuit #1
G02_P4_Fault_133	P4	Single Phase Fault with Stuck Breaker on COOPER 3 345.00 (640139) 345 kV Bus a. Apply Fault at the COOPER 3 345.00 (640139) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 3 (640139) 345.0 kV to COOPER1G (640009) 22.0 kV Two Winding #1 b.2. COOPER 3 (640139) 345.0 kV to MONOLITH 3 (640590) 345.0 kV Transmission Circuit #1
G02_P4_Fault_134	P4	Single Phase Fault with Stuck Breaker on COOPER 3 345.00 (640139) 345 kV Bus a. Apply Fault at the COOPER 3 345.00 (640139) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 3 (640139) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1 b.2. COOPER 3 (640139) 345.0 kV to COOPER 5 (640140) 161.0 kV to COOPER T2 9 (640142) 13.8 kV Three Winding #1
G02_P4_Fault_135	P4	Single Phase Fault with Stuck Breaker on COOPER 3 345.00 (640139) 345 kV Bus a. Apply Fault at the COOPER 3 345.00 (640139) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. COOPER 3 (640139) 345.0 kV to COOPER 5 (640140) 161.0 kV to COOPER T2 9 (640142) 13.8 kV Three Winding #1
G02_P4_Fault_136	P4	Single Phase Fault with Stuck Breaker on COOPER 3 345.00 (640139) 345 kV Bus a. Apply Fault at the COOPER 3 345.00 (640139) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 7FAIRPT (300039) 345.0 kV to ST JOE 7 (541199) 345.0 kV Transmission Circuit #1 b.2. 7FAIRPT (300039) 345.0 kV to COOPER 3 (640139) 345.0 kV Transmission Circuit #1 b.3. 5FAIRPTB2 (300076) 161.0 kV to 5FAIRPTXF3 (301559) 161.0 kV Transmission Circuit #1 b.4. 5FAIRPTXF3 (301559) 161.0 kV to 7FAIRPT (300039) 345.0 kV Two Winding #3 b.5. COOPER 3 (640139) 345.0 kV to COOPER 5 (640140) 161.0 kV to COOPER T5 9 (643172) 13.8 kV Three Winding #1
G02_P4_Fault_137	P4	Single Phase Fault with Stuck Breaker on SHELCRK3 345.00 (640342) 345 kV Bus a. Apply Fault at the SHELCRK3 345.00 (640342) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COLMB.E3 (640125) 345.0 kV to SHELCRK3 (640342) 345.0 kV Transmission Circuit #1 b.2. SHELCRK3 (640342) 345.0 kV to SHELCRK4 (640343) 230.0 kV to SHELLCRK T19 (643136) 13.8 kV Three Winding #1
G02_P4_Fault_138	P4	Single Phase Fault with Stuck Breaker on COLMB.E3 345.00 (640125) 345 kV Bus a. Apply Fault at the COLMB.E3 345.00 (640125) 345 kV Bus

Fault ID	Planning Event	Fault Description
		b. Clear Fault after 16 cycles and trip the following elements: b.1. COLMB.E3 (640125) 345.0 kV to SHELCRK3 (640342) 345.0 kV Transmission Circuit #1 b.2. COLMB.E3 (640125) 345.0 kV to NW68HOLDRG3 (650114) 345.0 kV Transmission Circuit #1 b.3. COLMB.E3 (640125) 345.0 kV to COLMB.E7 (640127) 115.0 kV to COLMB.T9 (640129) 13.8 kV Three Winding #1
G02_P4_Fault_139	P4	Single Phase Fault with Stuck Breaker on MONOLITH 3 345.00 (640590) 345 kV Bus a. Apply Fault at the MONOLITH 3 345.00 (640590) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 3 (640139) 345.0 kV to MONOLITH 3 (640590) 345.0 kV Transmission Circuit #1 b.2. MONOLITH 3 (640590) 345.0 kV to MONOLITH 7 (640591) 115.0 kV to MONOLITHT2 9 (640597) 13.8 kV Three Winding #1
G02_P4_Fault_140	P4	Single Phase Fault with Stuck Breaker on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply Fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. GR ISLD4 (640200) 230.0 kV to GR ISLD7 (640201) 115.0 kV to G.I.T219 (640203) 13.8 kV Three Winding #1 b.2. GR ISLD4 (640200) 230.0 kV to GR ISLD3 (653571) 345.0 kV to GR ISLD T6 9 (643071) 13.8 kV Three Winding #3
G02_P4_Fault_141	P4	Single Phase Fault with Stuck Breaker on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply Fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. GR ISLD4 (640200) 230.0 kV to GR ISLD7 (640201) 115.0 kV to G.I.T219 (640203) 13.8 kV Three Winding #1 b.2. GR ISLD4 (640200) 230.0 kV to GR ISLD3 (653571) 345.0 kV to GR ISL29 (653316) 13.8 kV Three Winding #2 b.5. GR ISL29 (653316) 13.8 kV to GR ISLD3 (653571) 345.0 kV to GR ISLD4 (640200) 230.0 kV Three Winding #2
G02_P4_Fault_142	P4	Single Phase Fault with Stuck Breaker on GR ISLD3 345.00 (653571) 345 kV Bus a. Apply Fault at the GR ISLD3 345.00 (653571) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MCCOOL 3 (640271) 345.0 kV to GR ISLD3 (653571) 345.0 kV Transmission Circuit #1 b.2. SWEET W3 (640374) 345.0 kV to GR ISLD3 (653571) 345.0 kV Transmission Circuit #1 b.3. GR ISLD3 (653571) 345.0 kV to GR ISLD-LNX3 (653871) 345.0 kV Transmission Circuit #z b.4. GR ISLD3 (653571) 345.0 kV to GR ISLD4 (640200) 230.0 kV to GR ISLD T6 9 (643071) 13.8 kV Three Winding #3 b.5. GR ISLD3 (653571) 345.0 kV to GR ISLD4 (640200) 230.0 kV to GR ISL19 (653314) 13.8 kV Three Winding #1 b.6. GR ISLD3 (653571) 345.0 kV to GR ISLD4 (640200) 230.0 kV to GR ISL29 (653316) 13.8 kV Three Winding #2 b.7. GR ISLD3 (653571) 345.0 kV to Fixed Shunt Device #
G02_P4_Fault_143	P4	Single Phase Fault with Stuck Breaker on S3454 3 345.00 (645454) 345 kV Bus a. Apply Fault at the S3454 3 345.00 (645454) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements:

Fault ID	Planning Event	Fault Description
		b.1. S3451 3 (645451) 345.0 kV to S3454 3 (645454) 345.0 kV Transmission Circuit #1
		b.2. S1249 5 (646249) 161.0 kV to S1254 5 (646254) 161.0 kV Transmission Circuit #1
		b.3. S1254 5 (646254) 161.0 kV to S1281 5 (646281) 161.0 kV Transmission Circuit #1
		b.4. S3454 3 (645454) 345.0 kV to S1254 5 (646254) 161.0 kV to S1254T19 (648254) 13.8 kV Three Winding #1
G02_P4_Fault_144	P4	Single Phase Fault with Stuck Breaker on S3454 3 345.00 (645454) 345 kV Bus a. Apply Fault at the S3454 3 345.00 (645454) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3454 3 (645454) 345.0 kV to S3455 3 (645455) 345.0 kV Transmission Circuit #1 b.2. S1249 5 (646249) 161.0 kV to S1254 5 (646254) 161.0 kV Transmission Circuit #1 b.3. S1254 5 (646254) 161.0 kV to S1281 5 (646281) 161.0 kV Transmission Circuit #1 b.4. S3454 3 (645454) 345.0 kV to S1254 5 (646254) 161.0 kV to S1254T19 (648254) 13.8 kV Three Winding #1
G02_P4_Fault_145	P4	Single Phase Fault with Stuck Breaker on COOPER 5 161.00 (640140) 161 kV Bus a. Apply Fault at the COOPER 5 161.00 (640140) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. COOPER 5 (640140) 161.0 kV to COOPER 8 (640446) 69.0 kV to COOPER T6 9 (643173) 13.8 kV Three Winding #1
G02_P4_Fault_146	P4	Single Phase Fault with Stuck Breaker on S963 8 69.000 (647963) 69 kV Bus a. Apply Fault at the S963 8 69.000 (647963) 69 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER_602 8 (640143) 69.0 kV to COOPER 8 (640446) 69.0 kV Transmission Circuit #z1 b.2. COOPER_602 8 (640143) 69.0 kV to S973 8 (647973) 69.0 kV Transmission Circuit #1 b.3. AUBRNT 8 (647101) 69.0 kV to S963 8 (647963) 69.0 kV Transmission Circuit #1 b.4. W BROCK8 (647111) 69.0 kV to S963 8 (647963) 69.0 kV Transmission Circuit #1 b.5. S963 8 (647963) 69.0 kV to S973 8 (647973) 69.0 kV Transmission Circuit #1 b.6. S963 8 (647963) 69.0 kV to S977 8 (647977) 69.0 kV Transmission Circuit #1
G02_P4_Fault_147	P4	Single Phase Fault with Stuck Breaker on S968 8 69.000 (647968) 69 kV Bus a. Apply Fault at the S968 8 69.000 (647968) 69 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. TECUMSH8 (647400) 69.0 kV to S968 8 (647968) 69.0 kV Transmission Circuit #1 b.2. S967 8 (647967) 69.0 kV to S968 8 (647968) 69.0 kV Transmission Circuit #1 b.3. S968 8 (647968) 69.0 kV to S969 8 (647969) 69.0 kV Transmission Circuit #1 b.4. S969 8 (647969) 69.0 kV to S974 8 (647974) 69.0 kV Transmission Circuit #1
G02_P4_Fault_148	P4	Single Phase Fault with Stuck Breaker on HYDCAP 8 69.000 (647102) 69 kV Bus a. Apply Fault at the HYDCAP 8 69.000 (647102) 69 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HYDCAP 8 (647102) 69.0 kV to ENRON 8 (647103) 69.0 kV Transmission Circuit #1 b.2. HYDCAP 8 (647102) 69.0 kV to S970 8 (647970) 69.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.3. HYDCAP 8 (647102) 69.0 kV to S974 8 (647974) 69.0 kV Transmission Circuit #1 b.4. NC SYRA8 (647402) 69.0 kV to S970 8 (647970) 69.0 kV Transmission Circuit #1 b.5. NC SYRA8 (647402) 69.0 kV to S971 8 (647971) 69.0 kV Transmission Circuit #1
G02_P4_Fault_149	P4	Single Phase Fault with Stuck Breaker on () kV Bus a. Apply Fault at the () kV Bus b. Clear Fault after cycles and trip the following elements: b.1. HYDCAP 8 (647102) 69.0 kV to S974 8 (647974) 69.0 kV Transmission Circuit #1 b.2. S968 8 (647968) 69.0 kV to S969 8 (647969) 69.0 kV Transmission Circuit #1 b.3. S969 8 (647969) 69.0 kV to S974 8 (647974) 69.0 kV Transmission Circuit #1 b.4. S974 8 (647974) 69.0 kV to STERLNG7 (640362) 115.0 kV to STERLING T19 (643144) 13.8 kV Three Winding #1
G02_P4_Fault_150	P4	Single Phase Fault with Stuck Breaker on STERLNG7 115.00 (640362) 115 kV Bus a. Apply Fault at the STERLNG7 115.00 (640362) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HYDCAP 8 (647102) 69.0 kV to ENRON 8 (647103) 69.0 kV Transmission Circuit #1 b.2. HYDCAP 8 (647102) 69.0 kV to S970 8 (647970) 69.0 kV Transmission Circuit #1 b.3. HYDCAP 8 (647102) 69.0 kV to S974 8 (647974) 69.0 kV Transmission Circuit #1 b.4. S969 8 (647969) 69.0 kV to S974 8 (647974) 69.0 kV Transmission Circuit #1 b.5. S974 8 (647974) 69.0 kV to STERLNG7 (640362) 115.0 kV to STERLING T19 (643144) 13.8 kV Three Winding #1
G02_P4_Fault_151	P4	Single Phase Fault with Stuck Breaker on MULLNCR7 345.00 (541197) 345 kV Bus a. Apply Fault at the MULLNCR7 345.00 (541197) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MULLNCR7 (541197) 345.0 kV to MC REAC1 (541411) 345.0 kV Transmission Circuit #z1 b.2. MULLNCR7 (541197) 345.0 kV to MC REAC2 (541412) 345.0 kV Transmission Circuit #z1 b.3. MULLNCR7 (541197) 345.0 kV to MC REAC3 (541413) 345.0 kV Transmission Circuit #z1 b.4. MULLNCR7 (541197) 345.0 kV to KETCHEM7 (541500) 345.0 kV Transmission Circuit #1 b.5. MULLNCR7 (541197) 345.0 kV to HOLT 7 (541510) 345.0 kV Transmission Circuit #1
G02_P4_Fault_152	P4	Single Phase Fault with Stuck Breaker on NASHUA 7 345.00 (542980) 345 kV Bus a. Apply Fault at the NASHUA 7 345.00 (542980) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HAWTH 7 (542972) 345.0 kV to NASHUA 7 (542980) 345.0 kV Transmission Circuit #1 b.2. NASHUA 7 (542980) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #1 b.3. NASHUA 7 (542980) 345.0 kV to G17-183-TAP (761383) 345.0 kV Transmission Circuit #1 b.4. NASHUA 7 (542980) 345.0 kV to NASHUA-5 (543028) 161.0 kV to NASH T11 (543640) 13.8 kV Three Winding #11
G02_P4_Fault_153	P4	Single Phase Fault with Stuck Breaker on IATAN 7 345.00 (542982) 345 kV Bus a. Apply Fault at the IATAN 7 345.00 (542982) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. STRANGR7 (532772) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.2. STRANGR7 (532772) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #2
		b.3. EASTOWN7 (541400) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #1
		b.4. IAT G1 1 (542957) 24.0 kV to IATAN 7 (542982) 345.0 kV Two Winding #1
		b.5. IAT G2 1 (542962) 24.5 kV to IATAN 7 (542982) 345.0 kV Two Winding #1
		b.6. NASHUA 7 (542980) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #1
		b.7. IATAN 7 (542982) 345.0 kV to IATAN5 (541350) 161.0 kV to IATAN 11 (541150) 14.4 kV Three Winding #11
G02_P4_Fault_154	P4	Single Phase Fault with Stuck Breaker on ST JOE 7 345.00 (541199) 345 kV Bus a. Apply Fault at the ST JOE 7 345.00 (541199) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ST JOE_CAP5 (541147) 161.0 kV to ST JOE 5 (541253) 161.0 kV Transmission Circuit #r b.2. ST JOE 5 (541253) 161.0 kV to COOK 5 (541257) 161.0 kV Transmission Circuit #1 b.3. ST JOE 5 (541253) 161.0 kV to WOODBIN5 (541258) 161.0 kV Transmission Circuit #1 b.4. ST JOE 5 (541253) 161.0 kV to AVENUECTY 5 (541394) 161.0 kV Transmission Circuit #1 b.5. ST JOE 5 (541253) 161.0 kV to ST JOE 7 (541199) 345.0 kV to STJOE 1T (541370) 13.8 kV Three Winding #22 b.6. ST JOE 5 (541253) 161.0 kV to ST JOE 7 (541199) 345.0 kV to STJOE 2T (541371) 13.8 kV Three Winding #33
G02_P4_Fault_155	P4	Single Phase Fault with Stuck Breaker on ST JOE 7 345.00 (541199) 345 kV Bus a. Apply Fault at the ST JOE 7 345.00 (541199) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. 7FAIRPT (300039) 345.0 kV to ST JOE 7 (541199) 345.0 kV Transmission Circuit #1 b.2. ST JOE 7 (541199) 345.0 kV to EASTOWN7 (541400) 345.0 kV Transmission Circuit #1 b.3. ST JOE 7 (541199) 345.0 kV to COOPER 3 (640139) 345.0 kV Transmission Circuit #1 b.4. ST JOE 7 (541199) 345.0 kV to G17-183-TAP (761383) 345.0 kV Transmission Circuit #1 b.5. ST JOE 7 (541199) 345.0 kV to ST JOE 5 (541253) 161.0 kV to STJOE 1T (541370) 13.8 kV Three Winding #22 b.6. ST JOE 7 (541199) 345.0 kV to ST JOE 5 (541253) 161.0 kV to STJOE 2T (541371) 13.8 kV Three Winding #33
G02_P4_Fault_156	P4	Single Phase Fault with Stuck Breaker on AVENUECTY 5 161.00 (541394) 161 kV Bus a. Apply Fault at the AVENUECTY 5 161.00 (541394) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ST JOE 5 (541253) 161.0 kV to AVENUECTY 5 (541394) 161.0 kV Transmission Circuit #1 b.2. MIDWAY_5 (541369) 161.0 kV to AVENUECTY 5 (541394) 161.0 kV Transmission Circuit #1
G02_P4_Fault_157	P4	Single Phase Fault with Stuck Breaker on EASTOWN7 345.00 (541400) 345 kV Bus a. Apply Fault at the EASTOWN7 345.00 (541400) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ST JOE 7 (541199) 345.0 kV to EASTOWN7 (541400) 345.0 kV Transmission Circuit #1 b.2. EASTOWN7 (541400) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #1 b.3. EASTOWN7 (541400) 345.0 kV to EASTOWN5 (541401) 161.0 kV to EASTOWN1 (541402) 13.8 kV Three Winding #11

Fault ID	Planning Event	Fault Description
G02_P4_Fault_158	P4	Single Phase Fault with Stuck Breaker on EASTOWN7 345.00 (541400) 345 kV Bus a. Apply Fault at the EASTOWN7 345.00 (541400) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. EAST 5 (541254) 161.0 kV to EASTOWN5 (541401) 161.0 kV Transmission Circuit #1 b.2. IND PRK5 (541256) 161.0 kV to EASTOWN5 (541401) 161.0 kV Transmission Circuit #1 b.3. EASTOWN5 (541401) 161.0 kV to EASTOWN7 (541400) 345.0 kV to EASTOWN1 (541402) 13.8 kV Three Winding #11
G02_P4_Fault_159	P4	Single Phase Fault with Stuck Breaker on HOLT 7 345.00 (541510) 345 kV Bus a. Apply Fault at the HOLT 7 345.00 (541510) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MULLNCR7 (541197) 345.0 kV to HOLT 7 (541510) 345.0 kV Transmission Circuit #1 b.2. HOLT 7 (541510) 345.0 kV to ROCKCK7 (541511) 345.0 kV Transmission Circuit #1 b.3. HOLT 7 (541510) 345.0 kV to HOLT_REACT7 (541517) 345.0 kV Transmission Circuit #z1 b.4. HOLT 7 (541510) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1 b.5. HOLT 7 (541510) 345.0 kV to GEN-2017-115 (760746) 345.0 kV Transmission Circuit #1
G02_P4_Fault_160	P4	Single Phase Fault with Stuck Breaker on ROCKCK7 345.00 (541511) 345 kV Bus a. Apply Fault at the ROCKCK7 345.00 (541511) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HOLT 7 (541510) 345.0 kV to ROCKCK7 (541511) 345.0 kV Transmission Circuit #1 b.2. ROCKCK7 (541511) 345.0 kV to OUTLAW (541543) 345.0 kV Transmission Circuit #1 b.3. ROCKCK7 (541511) 345.0 kV to ROCKCK_T1_1 (541512) 34.5 kV to ROCKCK_TR1_1 (541508) 13.2 kV Three Winding #1 b.4. ROCKCK7 (541511) 345.0 kV to ROCKCK_T2_1 (541515) 34.5 kV to ROCKCK_TR2_1 (541509) 13.2 kV Three Winding #1
G02_P4_Fault_161	P4	Single Phase Fault with Stuck Breaker on EAST 5 161.00 (541254) 161 kV Bus a. Apply Fault at the EAST 5 161.00 (541254) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. EAST 5 (541254) 161.0 kV to WOODBIN5 (541258) 161.0 kV Transmission Circuit #1 b.2. EAST 5 (541254) 161.0 kV to EASTOWN5 (541401) 161.0 kV Transmission Circuit #1
G02_P4_Fault_162	P4	Single Phase Fault with Stuck Breaker on IND PRK5 161.00 (541256) 161 kV Bus a. Apply Fault at the IND PRK5 161.00 (541256) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. LAKE RD5 (541255) 161.0 kV to IND PRK5 (541256) 161.0 kV Transmission Circuit #1 b.2. IND PRK5 (541256) 161.0 kV to EASTOWN5 (541401) 161.0 kV Transmission Circuit #1
G02_P4_Fault_163	P4	Single Phase Fault with Stuck Breaker on COOK 5 161.00 (541257) 161 kV Bus a. Apply Fault at the COOK 5 161.00 (541257) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ST JOE 5 (541253) 161.0 kV to COOK 5 (541257) 161.0 kV Transmission Circuit #1 b.2. COOK 5 (541257) 161.0 kV to EDMOND5 (541355) 161.0 kV Transmission Circuit #1
G02_P4_Fault_164	P4	Single Phase Fault with Stuck Breaker on WOODBIN5 161.00 (541258) 161 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply Fault at the WOODBIN5 161.00 (541258) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ST JOE 5 (541253) 161.0 kV to WOODBIN5 (541258) 161.0 kV Transmission Circuit #1 b.2. EAST 5 (541254) 161.0 kV to WOODBIN5 (541258) 161.0 kV Transmission Circuit #1
G02_P4_Fault_165	P4	Single Phase Fault with Stuck Breaker on STRANGR7 345.00 (532772) 345 kV Bus a. Apply Fault at the STRANGR7 345.00 (532772) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HOYT 7 (532765) 345.0 kV to STRANGR7 (532772) 345.0 kV Transmission Circuit #1 b.2. STRANGR7 (532772) 345.0 kV to 87TH 7 (532775) 345.0 kV Transmission Circuit #1 b.3. STRANGR7 (532772) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #1 b.4. STRANGR7 (532772) 345.0 kV to IATAN 7 (542982) 345.0 kV Transmission Circuit #2 b.5. STRANGR7 (532772) 345.0 kV to GEN-2016-174 (588250) 345.0 kV Transmission Circuit #1 b.6. STRANGR7 (532772) 345.0 kV to STRANGR3 (533268) 115.0 kV to STRAN1 1 (532811) 14.4 kV Three Winding #1 b.7. STRANGR7 (532772) 345.0 kV to STRANGR3 (533268) 115.0 kV to STRAN3 1 (532816) 14.4 kV Three Winding #1
G02_P4_Fault_166	P4	Single Phase Fault with Stuck Breaker on KNOB HL3 115.00 (533332) 115 kV Bus a. Apply Fault at the KNOB HL3 115.00 (533332) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MARSHAL3 (533303) 115.0 kV to KNOB HL3 (533332) 115.0 kV Transmission Circuit #1 b.2. KNOB HL3 (533332) 115.0 kV to GRNLEAF3 (539665) 115.0 kV Transmission Circuit #1 b.3. KNOB HL3 (533332) 115.0 kV to STEELEC7 (640426) 115.0 kV Transmission Circuit #1
G02_P4_Fault_167	P4	Single Phase Fault with Stuck Breaker on HUMBOLT5 161.00 (640234) 161 kV Bus a. Apply Fault at the HUMBOLT5 161.00 (640234) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1398 5 (646398) 161.0 kV Transmission Circuit #1 b.3. HUMBOLT5 (640234) 161.0 kV to HUMBOLT7 (640235) 115.0 kV to HUMBOLDT T29 (643087) 13.8 kV Three Winding #1 b.4. HUMBOLT5 (640234) 161.0 kV to S975 8 (647975) 69.0 kV to S975T4 9 (648275) 13.8 kV Three Winding #1
G02_P4_Fault_168	P4	Single Phase Fault with Stuck Breaker on S3451 3 345.00 (645451) 345 kV Bus a. Apply Fault at the S3451 3 345.00 (645451) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. FC1A 5 (645100) 161.0 kV to S1251 5 (646251) 161.0 kV Transmission Circuit #1 b.2. S3451 3 (645451) 345.0 kV to FT CAL1G (645001) 22.0 kV Two Winding #1 b.3. S3451 3 (645451) 345.0 kV to S3454 3 (645454) 345.0 kV Transmission Circuit #1 b.4. S3451 3 (645451) 345.0 kV to S3459 3 (645459) 345.0 kV Transmission Circuit #1 b.5. S3451 3 (645451) 345.0 kV to S3451-RAUN 3 (645551) 345.0 kV Transmission Circuit #z1 b.6. S3451 3 (645451) 345.0 kV to GEN-2018-025 (762603) 345.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.7. S1251 5 (646251) 161.0 kV to S1297 5 (646297) 161.0 kV Transmission Circuit #1 b.8. S1251 5 (646251) 161.0 kV to S1298 5 (646298) 161.0 kV Transmission Circuit #1 b.9. S1251 5 (646251) 161.0 kV to S1341 5 (646341) 161.0 kV Transmission Circuit #1 b.10. S3451 3 (645451) 345.0 kV to S1251 5 (646251) 161.0 kV to S3451T39 (648251) 13.8 kV Three Winding #1 b.11. S3451 3 (645451) 345.0 kV to S1251 5 (646251) 161.0 kV to S3451T49 (648351) 13.8 kV Three Winding #1
G02_P4_Fault_169	P4	Single Phase Fault with Stuck Breaker on S3454 3 345.00 (645454) 345 kV Bus a. Apply Fault at the S3454 3 345.00 (645454) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3451 3 (645451) 345.0 kV to S3454 3 (645454) 345.0 kV Transmission Circuit #1 b.2. S3454 3 (645454) 345.0 kV to S3455 3 (645455) 345.0 kV Transmission Circuit #1 b.3. S3454 3 (645454) 345.0 kV to S3740 3 (645740) 345.0 kV Transmission Circuit #1 b.4. S3454 3 (645454) 345.0 kV to WAGENER 3 (650185) 345.0 kV Transmission Circuit #1 b.5. S1249 5 (646249) 161.0 kV to S1254 5 (646254) 161.0 kV Transmission Circuit #1 b.6. S1254 5 (646254) 161.0 kV to S1281 5 (646281) 161.0 kV Transmission Circuit #1 b.7. S3454 3 (645454) 345.0 kV to S1254 5 (646254) 161.0 kV to S1254T19 (648254) 13.8 kV Three Winding #1
G02_P4_Fault_170	P4	Single Phase Fault with Stuck Breaker on S3455 3 345.00 (645455) 345 kV Bus a. Apply Fault at the S3455 3 345.00 (645455) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3454 3 (645454) 345.0 kV to S3455 3 (645455) 345.0 kV Transmission Circuit #1 b.2. S3455 3 (645455) 345.0 kV to S3456 3 (645456) 345.0 kV Transmission Circuit #1 b.3. S3455 3 (645455) 345.0 kV to S3740 3 (645740) 345.0 kV Transmission Circuit #1 b.4. S3455 3 (645455) 345.0 kV to S3761 3 (645761) 345.0 kV Transmission Circuit #1 b.5. S1221 5 (646221) 161.0 kV to S1255 5 (646255) 161.0 kV Transmission Circuit #1 b.6. S1233 5 (646233) 161.0 kV to S1255 5 (646255) 161.0 kV Transmission Circuit #1 b.7. S1255 5 (646255) 161.0 kV to S1259 5 (646259) 161.0 kV Transmission Circuit #1 b.8. S1255 5 (646255) 161.0 kV to S1361 5 (646361) 161.0 kV Transmission Circuit #1 b.9. S3455 3 (645455) 345.0 kV to S1255 5 (646255) 161.0 kV to S3455T19 (648255) 13.8 kV Three Winding #1 b.10. S3455 3 (645455) 345.0 kV to S1255 5 (646255) 161.0 kV to S3455T39 (648355) 13.8 kV Three Winding #1
G02_P4_Fault_171	P4	Single Phase Fault with Stuck Breaker on S1206 5 161.00 (646206) 161 kV Bus a. Apply Fault at the S1206 5 161.00 (646206) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. CBLUFFS3 (635000) 345.0 kV to S3456 3 (645456) 345.0 kV Transmission Circuit #1 b.2. CBLUFFS5 (635001) 161.0 kV to S1206 5 (646206) 161.0 kV Transmission Circuit #1 b.3. S3455 3 (645455) 345.0 kV to S3456 3 (645456) 345.0 kV Transmission Circuit #1 b.4. S3456 3 (645456) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1 b.5. S3456 3 (645456) 345.0 kV to S3459 3 (645459) 345.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.6. S1201 5 (646201) 161.0 kV to S1206 5 (646206) 161.0 kV Transmission Circuit #1
		b.7. S1206 5 (646206) 161.0 kV to SARPY 3G (645033) 13.8 kV Two Winding #1
		b.8. S1206 5 (646206) 161.0 kV to S1216 5 (646216) 161.0 kV Transmission Circuit #1
		b.9. S1206 5 (646206) 161.0 kV to S1232 5 (646232) 161.0 kV Transmission Circuit #1
		b.10. S1206 5 (646206) 161.0 kV to S1244 5 (646244) 161.0 kV Transmission Circuit #1
		b.11. S906 N 8 (647006) 69.0 kV to SARPY 1G (645031) 13.8 kV Two Winding #1
		b.12. S906 N 8 (647006) 69.0 kV to 6815TP98 (647017) 69.0 kV Transmission Circuit #1
		b.13. S906 N 8 (647006) 69.0 kV to S906 S 8 (647906) 69.0 kV Transmission Circuit #z1
		b.14. S906 N 8 (647006) 69.0 kV to S916 8 (647916) 69.0 kV Transmission Circuit #1
		b.15. S906 N 8 (647006) 69.0 kV to S928 8 (647928) 69.0 kV Transmission Circuit #1
		b.16. S906 N 8 (647006) 69.0 kV to S938 8 (647938) 69.0 kV Transmission Circuit #1
		b.17. 6815TP38 (647016) 69.0 kV to S906 S 8 (647906) 69.0 kV Transmission Circuit #1
		b.18. S904 8 (647904) 69.0 kV to S906 S 8 (647906) 69.0 kV Transmission Circuit #1
		b.19. S906 S 8 (647906) 69.0 kV to SARPY 2G (645032) 13.8 kV Two Winding #1
		b.20. S906 S 8 (647906) 69.0 kV to S924 8 (647924) 69.0 kV Transmission Circuit #1
		b.21. S906 S 8 (647906) 69.0 kV to S938 8 (647938) 69.0 kV Transmission Circuit #1
		b.22. S3456 3 (645456) 345.0 kV to S1206 5 (646206) 161.0 kV to S3456T49 (648256) 13.8 kV Three Winding #1
		b.23. S1206 5 (646206) 161.0 kV to SARPY 4G (645034) 13.8 kV to SARPY 5G (645035) 13.8 kV Three Winding #1
		b.25. S1206 5 (646206) 161.0 kV to S906 N 8 (647006) 69.0 kV to S1206T29 (648306) 13.8 kV Three Winding #1
		b.26. S1206 5 (646206) 161.0 kV to S906 S 8 (647906) 69.0 kV to S1206T19 (648206) 13.8 kV Three Winding #1
G02_P4_Fault_172	P4	Single Phase Fault with Stuck Breaker on S3458 3 345.00 (645458) 345 kV Bus a. Apply Fault at the S3458 3 345.00 (645458) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HOLT 7 (541510) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1 b.2. COOPER 3 (640139) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1 b.3. S3456 3 (645456) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1 b.4. S3458 3 (645458) 345.0 kV to NEBCTY1G (645011) 18.0 kV Two Winding #1 b.5. S3458 3 (645458) 345.0 kV to NEBCTY2G (645012) 23.0 kV Two Winding #1 b.6. S3458 3 (645458) 345.0 kV to S3740 3 (645740) 345.0 kV Transmission Circuit #1 b.7. S3458 3 (645458) 345.0 kV to G20-094-TAP (764805) 345.0 kV Transmission Circuit #1 b.8. S1258 5 (646258) 161.0 kV to S1263 5 (646263) 161.0 kV Transmission Circuit #1 b.9. S1258 5 (646258) 161.0 kV to S1366 5 (646366) 161.0 kV Transmission Circuit #1 b.10. S1258 5 (646258) 161.0 kV to NC1HS 5 (648600) 161.0 kV Transmission Circuit #1 b.11. S1258 5 (646258) 161.0 kV to NC2HS 5 (648610) 161.0 kV Transmission Circuit #1
G02_P4_Fault_173	P4	Single Phase Fault with Stuck Breaker on S1209 5 161.00 (646209) 161 kV Bus a. Apply Fault at the S1209 5 161.00 (646209) 161 kV Bus

Fault ID	Planning Event	Fault Description
		b. Clear Fault after 16 cycles and trip the following elements:
		b.1. S3451 3 (645451) 345.0 kV to S3459 3 (645459) 345.0 kV Transmission Circuit #1
		b.2. S3456 3 (645456) 345.0 kV to S3459 3 (645459) 345.0 kV Transmission Circuit #1
		b.3. S1209 5 (646209) 161.0 kV to S1231 5 (646231) 161.0 kV Transmission Circuit #1
		b.4. S1209 5 (646209) 161.0 kV to S1231 5 (646231) 161.0 kV Transmission Circuit #2
		b.5. S1209 5 (646209) 161.0 kV to S1250 5 (646250) 161.0 kV Transmission Circuit #1
		b.6. S1209 5 (646209) 161.0 kV to S1250 5 (646250) 161.0 kV Transmission Circuit #2
		b.7. S1209 5 (646209) 161.0 kV to S1347 5 (646347) 161.0 kV Transmission Circuit #1
		b.8. S909 8 (647909) 69.0 kV to S918 8 (647918) 69.0 kV Transmission Circuit #1
		b.9. S909 8 (647909) 69.0 kV to S921 8 (647921) 69.0 kV Transmission Circuit #1
		b.10. S909 8 (647909) 69.0 kV to S937 8 (647937) 69.0 kV Transmission Circuit #1
		b.11. S909 8 (647909) 69.0 kV to S939 8 (647939) 69.0 kV Transmission Circuit #1
		b.12. S3459 3 (645459) 345.0 kV to S1209 5 (646209) 161.0 kV to S3459T39 (648259) 13.8 kV Three Winding #1
		b.13. S3459 3 (645459) 345.0 kV to S1209 5 (646209) 161.0 kV to S3459T69 (648359) 13.8 kV Three Winding #1
		b.16. S1209 5 (646209) 161.0 kV to S909 8 (647909) 69.0 kV to S1209T19 (648209) 13.8 kV Three Winding #1
G02_P4_Fault_174	P4	Single Phase Fault with Stuck Breaker on S3740 3 345.00 (645740) 345 kV Bus a. Apply Fault at the S3740 3 345.00 (645740) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3454 3 (645454) 345.0 kV to S3740 3 (645740) 345.0 kV Transmission Circuit #1 b.2. S3455 3 (645455) 345.0 kV to S3740 3 (645740) 345.0 kV Transmission Circuit #1 b.3. S3458 3 (645458) 345.0 kV to S3740 3 (645740) 345.0 kV Transmission Circuit #1 b.4. S3740 3 (645740) 345.0 kV to CASS 1G (645041) 15.0 kV Two Winding #1 b.5. S3740 3 (645740) 345.0 kV to CASS 2G (645042) 15.0 kV Two Winding #1 b.6. S3740 3 (645740) 345.0 kV to GEN-2018-033 (762691) 345.0 kV Transmission Circuit #1 b.7. S3740 3 (645740) 345.0 kV to GEN-2020-038 (764705) 345.0 kV Transmission Circuit #1 b.8. S3740 3 (645740) 345.0 kV to GEN-2021-108 (766250) 345.0 kV Transmission Circuit #1
G02_P4_Fault_177	P4	Single Phase Fault with Stuck Breaker on ATCHSN 3 345.00 (635017) 345 kV Bus a. Apply Fault at the ATCHSN 3 345.00 (635017) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. ATCHSN 3 (635017) 345.0 kV to WESTBORO 3 (635018) 345.0 kV Transmission Circuit #1
G02_P4_Fault_178	P4	Single Phase Fault with Stuck Breaker on WESTBORO 3 345.00 (635018) 345 kV Bus a. Apply Fault at the WESTBORO 3 345.00 (635018) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. WESTBORO 3 (635018) 345.0 kV to ORIENT 3 (635570) 345.0 kV Transmission Circuit #1
G02_P4_Fault_179	P4	Single Phase Fault with Stuck Breaker on BPS SUB7 115.00 (640088) 115 kV Bus a. Apply Fault at the BPS SUB7 115.00 (640088) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements:

Fault ID	Planning Event	Fault Description
		b.1. BPS SUB7 (640088) 115.0 kV to CLATONA7 (640111) 115.0 kV Transmission Circuit #1
G02_P4_Fault_180	P4	Single Phase Fault with Stuck Breaker on FIRTH 7 115.00 (640171) 115 kV Bus a. Apply Fault at the FIRTH 7 115.00 (640171) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. FIRTH 7 (640171) 115.0 kV to STERLNG7 (640362) 115.0 kV Transmission Circuit #1
G02_P4_Fault_181	P4	Single Phase Fault with Stuck Breaker on FIRTH 7 115.00 (640171) 115 kV Bus a. Apply Fault at the FIRTH 7 115.00 (640171) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. FIRTH 7 (640171) 115.0 kV to MONOLITH 7 (640591) 115.0 kV Transmission Circuit #1
G02_P4_Fault_182	P4	Single Phase Fault with Stuck Breaker on HUMBOLT7 115.00 (640235) 115 kV Bus a. Apply Fault at the HUMBOLT7 115.00 (640235) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HUMBOLT7 (640235) 115.0 kV to STEINER7 (640361) 115.0 kV Transmission Circuit #1
G02_P4_Fault_183	P4	Single Phase Fault with Stuck Breaker on SHELDON7 115.00 (640278) 115 kV Bus a. Apply Fault at the SHELDON7 115.00 (640278) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. SHELDON7 (640278) 115.0 kV to MONOLITH 7 (640591) 115.0 kV Transmission Circuit #2
G02_P4_Fault_187	P4	Single Phase Fault with Stuck Breaker on AXTELL 3 345.00 (640065) 345 kV Bus a. Apply Fault at the AXTELL 3 345.00 (640065) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. AXTELL 7 (640066) 115.0 kV to AXTELL 3 (640065) 345.0 kV to AXTELL 9B (999002) 13.8 kV Three Winding #2
G02_P4_Fault_188	P4	Single Phase Fault with Stuck Breaker on GENEVA 7 115.00 (640178) 115 kV Bus a. Apply Fault at the GENEVA 7 115.00 (640178) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. GENEVA 8 (640179) 69.0 kV to GENEVA 7 (640178) 115.0 kV to GENEVA T2 9 (643062) 13.8 kV Three Winding #1
G02_P4_Fault_189	P4	Single Phase Fault with Stuck Breaker on MCCOOL 7 115.00 (640272) 115 kV Bus a. Apply Fault at the MCCOOL 7 115.00 (640272) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. MCCOOL 8 (640273) 69.0 kV to MCCOOL 7 (640272) 115.0 kV to MCCOOL T1 9 (643171) 13.8 kV Three Winding #1
G02_P4_Fault_190	P4	Single Phase Fault with Stuck Breaker on PAULINE7 115.00 (640313) 115 kV Bus a. Apply Fault at the PAULINE7 115.00 (640313) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. PAULINE8 (640314) 69.0 kV to PAULINE7 (640313) 115.0 kV to PAULINE T2 9 (643121) 13.8 kV Three Winding #1
G02_P4_Fault_191	P4	Single Phase Fault with Stuck Breaker on MONOLITH 3 345.00 (640590) 345 kV Bus a. Apply Fault at the MONOLITH 3 345.00 (640590) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements:

Fault ID	Planning Event	Fault Description
		b.1. MONOLITH 7 (640591) 115.0 kV to MONOLITH 3 (640590) 345.0 kV to MONOLITHT1 9 (640596) 13.8 kV Three Winding #1
G02_P4_Fault_192	P4	Single Phase Fault with Stuck Breaker on STEINER7 115.00 (640361) 115 kV Bus a. Apply Fault at the STEINER7 115.00 (640361) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S966 8 (647966) 69.0 kV to STEINER7 (640361) 115.0 kV to STEINER T1 9 (643143) 13.8 kV Three Winding #1
G02_P4_Fault_193	P4	Single Phase Fault with Stuck Breaker on STEINER7 115.00 (640361) 115 kV Bus a. Apply Fault at the STEINER7 115.00 (640361) 115 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S966 8 (647966) 69.0 kV to STEINER7 (640361) 115.0 kV to STEINER T1 9 (643143) 13.8 kV Three Winding #1
G02_P4_Fault_194	P4	Single Phase Fault with Stuck Breaker on HASTING4 230.00 (640214) 230 kV Bus a. Apply Fault at the HASTING4 230.00 (640214) 230 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HASTING7 (640215) 115.0 kV to PAULINE7 (640313) 115.0 kV Transmission Circuit #1 b.2. HASTING7 (640215) 115.0 kV to PAULINE7 (640313) 115.0 kV Transmission Circuit #2 b.3. HASTING7 (640215) 115.0 kV to EGYCNTR7 (641087) 115.0 kV Transmission Circuit #1 b.4. HASTING7 (640215) 115.0 kV to HASTCTY7 (641088) 115.0 kV Transmission Circuit #z1 b.5. E7THST 7 (641085) 115.0 kV to HASTCTY7 (641088) 115.0 kV Transmission Circuit #1 b.6. EGYCNTR7 (641087) 115.0 kV to HASTCTY7 (641088) 115.0 kV Transmission Circuit #1 b.7. HASTING7 (640215) 115.0 kV to HASTING9 (640216) 34.5 kV to HASTINGS T19 (643076) 13.8 kV Three Winding #1 b.8. HASTING7 (640215) 115.0 kV to HASTING9 (640216) 34.5 kV to HASTINGS T29 (643077) 13.8 kV Three Winding #1 b.9. HASTCTY7 (641088) 115.0 kV to HASTING4 (640214) 230.0 kV to HASTINGS T39 (643075) 13.8 kV Three Winding #1
G02_P4_Fault_260	P4	Single Phase Fault with Stuck Breaker on S3454 3 345.00 (645454) 345 kV Bus a. Apply Fault at the S3454 3 345.00 (645454) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3451 3 (645451) 345.0 kV to S3454 3 (645454) 345.0 kV Transmission Circuit #1 b.2. S3454 3 (645454) 345.0 kV to WAGENER 3 (650185) 345.0 kV Transmission Circuit #1
G02_P4_Fault_261	P4	Single Phase Fault with Stuck Breaker on S3454 3 345.00 (645454) 345 kV Bus a. Apply Fault at the S3454 3 345.00 (645454) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3454 3 (645454) 345.0 kV to S3455 3 (645455) 345.0 kV Transmission Circuit #1 b.2. S3454 3 (645454) 345.0 kV to WAGENER 3 (650185) 345.0 kV Transmission Circuit #1
G02_P4_Fault_298	P4	Single Phase Fault with Stuck Breaker on S3455 3 345.00 (645455) 345 kV Bus a. Apply Fault at the S3455 3 345.00 (645455) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3455 3 (645455) 345.0 kV to S3456 3 (645456) 345.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
		b.2. S3455 3 (645455) 345.0 kV to S1255 5 (646255) 161.0 kV to S3455T19 (648255) 13.8 kV Three Winding #1
G02_P4_Fault_299	P4	Single Phase Fault with Stuck Breaker on S3456 3 345.00 (645456) 345 kV Bus a. Apply Fault at the S3456 3 345.00 (645456) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. CBLUFFS3 (635000) 345.0 kV to S3456 3 (645456) 345.0 kV Transmission Circuit #1 b.2. S3455 3 (645455) 345.0 kV to S3456 3 (645456) 345.0 kV Transmission Circuit #1
G02_P4_Fault_300	P4	Single Phase Fault with Stuck Breaker on S3456 3 345.00 (645456) 345 kV Bus a. Apply Fault at the S3456 3 345.00 (645456) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3456 3 (645456) 345.0 kV to S3459 3 (645459) 345.0 kV Transmission Circuit #1 b.2. S3456 3 (645456) 345.0 kV to S1206 5 (646206) 161.0 kV to S3456T49 (648256) 13.8 kV Three Winding #1
G02_P4_Fault_301	P4	Single Phase Fault with Stuck Breaker on S3456 3 345.00 (645456) 345 kV Bus a. Apply Fault at the S3456 3 345.00 (645456) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3456 3 (645456) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1 b.2. S3456 3 (645456) 345.0 kV to S1206 5 (646206) 161.0 kV to S3456T49 (648256) 13.8 kV Three Winding #1
G02_P4_Fault_302	P4	Single Phase Fault with Stuck Breaker on S3456 3 345.00 (645456) 345 kV Bus a. Apply Fault at the S3456 3 345.00 (645456) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. CBLUFFS3 (635000) 345.0 kV to S3456 3 (645456) 345.0 kV Transmission Circuit #1 b.2. S3456 3 (645456) 345.0 kV to S3458 3 (645458) 345.0 kV Transmission Circuit #1
G02_P4_Fault_303	P4	Single Phase Fault with Stuck Breaker on S3459 3 345.00 (645459) 345 kV Bus a. Apply Fault at the S3459 3 345.00 (645459) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3456 3 (645456) 345.0 kV to S3459 3 (645459) 345.0 kV Transmission Circuit #1 b.2. S3459 3 (645459) 345.0 kV to S1209 5 (646209) 161.0 kV to S3459T69 (648359) 13.8 kV Three Winding #1
G02_P4_Fault_304	P4	Single Phase Fault with Stuck Breaker on S3740 3 345.00 (645740) 345 kV Bus a. Apply Fault at the S3740 3 345.00 (645740) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S3455 3 (645455) 345.0 kV to S3740 3 (645740) 345.0 kV Transmission Circuit #1 b.2. S3740 3 (645740) 345.0 kV to CASS 2G (645042) 15.0 kV Two Winding #1
G02_P4_Fault_305	P4	Single Phase Fault with Stuck Breaker on S3456 3 345.00 (645456) 345 kV Bus a. Apply Fault at the S3456 3 345.00 (645456) 345 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S1206 5 (646206) 161.0 kV to S1216 5 (646216) 161.0 kV Transmission Circuit #1 b.2. S3456 3 (645456) 345.0 kV to S1206 5 (646206) 161.0 kV to S3456T49 (648256) 13.8 kV Three Winding #1

Fault ID	Planning Event	Fault Description
G02_P4_Fault_306	P4	Single Phase Fault with Stuck Breaker on S1263 5 161.00 (646263) 161 kV Bus a. Apply Fault at the S1263 5 161.00 (646263) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S1258 5 (646258) 161.0 kV to S1263 5 (646263) 161.0 kV Transmission Circuit #1 b.2. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to GEN-2019-009 (763505) 161.0 kV Transmission Circuit #1 b.4. W BROCK8 (647111) 69.0 kV to S963 8 (647963) 69.0 kV Transmission Circuit #1 b.5. W BROCK8 (647111) 69.0 kV to S967 8 (647967) 69.0 kV Transmission Circuit #1 b.6. S1263 5 (646263) 161.0 kV to W BROCK8 (647111) 69.0 kV to S1263T19 (648263) 13.8 kV Three Winding #1
G02_P4_Fault_307	P4	Single Phase Fault with Stuck Breaker on S1280 5 161.00 (646280) 161 kV Bus a. Apply Fault at the S1280 5 161.00 (646280) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1
G02_P4_Fault_309	P4	Single Phase Fault with Stuck Breaker on HUMBOLT5 161.00 (640234) 161 kV Bus a. Apply Fault at the HUMBOLT5 161.00 (640234) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HUMBOLT5 (640234) 161.0 kV to S1398 5 (646398) 161.0 kV Transmission Circuit #1 b.2. S1398 5 (646398) 161.0 kV to S1399 5 (646399) 161.0 kV Transmission Circuit #1 b.3. HUMBOLT5 (640234) 161.0 kV to HUMBOLT7 (640235) 115.0 kV to HUMBOLDT T29 (643087) 13.8 kV Three Winding #1
G02_P4_Fault_310	P4	Single Phase Fault with Stuck Breaker on HUMBOLT5 161.00 (640234) 161 kV Bus a. Apply Fault at the HUMBOLT5 161.00 (640234) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1398 5 (646398) 161.0 kV Transmission Circuit #1 b.3. S1398 5 (646398) 161.0 kV to S1399 5 (646399) 161.0 kV Transmission Circuit #1
G02_P4_Fault_311	P4	Single Phase Fault with Stuck Breaker on HUMBOLT5 161.00 (640234) 161 kV Bus a. Apply Fault at the HUMBOLT5 161.00 (640234) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S975 8 (647975) 69.0 kV to S975T4 9 (648275) 13.8 kV Three Winding #1
G02_P4_Fault_312	P4	Single Phase Fault with Stuck Breaker on HUMBOLT5 161.00 (640234) 161 kV Bus a. Apply Fault at the HUMBOLT5 161.00 (640234) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. HUMBOLT5 (640234) 161.0 kV to HUMBOLT7 (640235) 115.0 kV to HUMBOLDT T29 (643087) 13.8 kV Three Winding #1

Fault ID	Planning Event	Fault Description
		b.2. HUMBOLT5 (640234) 161.0 kV to S975 8 (647975) 69.0 kV to S975T4 9 (648275) 13.8 kV Three Winding #1
G02_P4_Fault_318	P4	Single Phase Fault with Stuck Breaker on NW 68th & Holdrege (650114) 345 kV Bus a. Apply Fault at the NW 68th & Holdrege (650114) 345 kV Bus b. Clear Fault after 3 cycles and trip the following elements: b.1. NW68HOLDRG7 (650214) 115.0 kV to NW68HOLDRG3 (650114) 345.0 kV to NW68HOL1 9 (650314) 13.8 kV Three Winding #1
G02_P4_Fault_319	P4	Single Phase Fault with Stuck Breaker on Wagener (650185) 345 kV Bus a. Apply Fault at the Wagener (650185) 345 kV Bus b. Clear Fault after 3 cycles and trip the following elements: b.1. WAGENER 7 (650285) 115.0 kV to WAGENER 3 (650185) 345.0 kV to WAGENER1 9 (650385) 13.8 kV Three Winding #1
G02_P4_Fault_320	P4	Single Phase Fault with Stuck Breaker on Rokeby (650290) 115 kV Bus a. Apply Fault at the Rokeby (650290) 115 kV Bus b. Clear Fault after 5 cycles and trip the following elements: b.1. ROKEBY 7 (650290) 115.0 kV to 27&PLR 7 (650229) 115.0 kV Transmission Circuit #1
G02_P4_Fault_321	P4	Single Phase Fault with Stuck Breaker on Rokeby (650290) 115 kV Bus a. Apply Fault at the Rokeby (650290) 115 kV Bus b. Clear Fault after 5 cycles and trip the following elements: b.1. ROKEBY 7 (650290) 115.0 kV to 27&PLR 7 (650229) 115.0 kV Transmission Circuit #1
G02_P4_Fault_322	P4	Single Phase Fault with Stuck Breaker on Rokeby (650290) 115 kV Bus a. Apply Fault at the Rokeby (650290) 115 kV Bus b. Clear Fault after 5 cycles and trip the following elements: b.1. ROKEBY 7 (650290) 115.0 kV to 27&PLR 7 (650229) 115.0 kV Transmission Circuit #1
G02_P4_Fault_323	P4	Single Phase Fault with Stuck Breaker on Rokeby (650290) 115 kV Bus a. Apply Fault at the Rokeby (650290) 115 kV Bus b. Clear Fault after 5 cycles and trip the following elements: b.1. ROKEBY 7 (650290) 115.0 kV to 27&PLR 7 (650229) 115.0 kV Transmission Circuit #1
G02_P4_Fault_324	P4	Single Phase Fault with Stuck Breaker on Rokeby (650290) 115 kV Bus a. Apply Fault at the Rokeby (650290) 115 kV Bus b. Clear Fault after 5 cycles and trip the following elements: b.1. ROKEBY 7 (650290) 115.0 kV to 27&PLR 7 (650229) 115.0 kV Transmission Circuit #1
G02_P4_Fault_325	P4	Single Phase Fault with Stuck Breaker on Rokeby (650290) 115 kV Bus a. Apply Fault at the Rokeby (650290) 115 kV Bus b. Clear Fault after 5 cycles and trip the following elements: b.1. ROKEBY 7 (650290) 115.0 kV to 27&PLR 7 (650229) 115.0 kV Transmission Circuit #1
G02_P4_Fault_326	P4	Single Phase Fault with Stuck Breaker on Rokeby (650290) 115 kV Bus a. Apply Fault at the Rokeby (650290) 115 kV Bus b. Clear Fault after 5 cycles and trip the following elements: b.1. ROKEBY 7 (650290) 115.0 kV to 27&PLR 7 (650229) 115.0 kV Transmission Circuit #1

Fault ID	Planning Event	Fault Description
G02_P4_Fault_327	P4	Single Phase Fault with Stuck Breaker on Rokeby (650290) 115 kV Bus a. Apply Fault at the Rokeby (650290) 115 kV Bus b. Clear Fault after 5 cycles and trip the following elements: b.1. ROKEBY 7 (650290) 115.0 kV to 27&PLR 7 (650229) 115.0 kV Transmission Circuit #1
G02_P4_Fault_328	P4	Single Phase Fault with Stuck Breaker on Rokeby (650290) 115 kV Bus a. Apply Fault at the Rokeby (650290) 115 kV Bus b. Clear Fault after 5 cycles and trip the following elements: b.1. ROKEBY 7 (650290) 115.0 kV to 27&PLR 7 (650229) 115.0 kV Transmission Circuit #1
G02_P4_Fault_329	P4	Single Phase Fault with Stuck Breaker on Rokeby (650290) 115 kV Bus a. Apply Fault at the Rokeby (650290) 115 kV Bus b. Clear Fault after 5 cycles and trip the following elements: b.1. ROKEBY 7 (650290) 115.0 kV to 27&PLR 7 (650229) 115.0 kV Transmission Circuit #1
G02_P4_Fault_354	P4	Single Phase Fault with Stuck Breaker on S1263 5 161.00 (646263) 161 kV Bus a. Apply Fault at the S1263 5 161.00 (646263) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. S1258 5 (646258) 161.0 kV to S1263 5 (646263) 161.0 kV Transmission Circuit #1 b.2. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to GEN-2019-009 (763505) 161.0 kV Transmission Circuit #1 b.4. S1263 5 (646263) 161.0 kV to W BROCK8 (647111) 69.0 kV to S1263T19 (648263) 13.8 kV Three Winding #1
G02_P4_Fault_355	P4	Single Phase Fault with Stuck Breaker on S1280 5 161.00 (646280) 161 kV Bus a. Apply Fault at the S1280 5 161.00 (646280) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1
G02_P4_Fault_356	P4	Single Phase Fault with Stuck Breaker on S1280 5 161.00 (646280) 161 kV Bus a. Apply Fault at the S1280 5 161.00 (646280) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1
G02_P4_Fault_357	P4	Single Phase Fault with Stuck Breaker on S1280 5 161.00 (646280) 161 kV Bus a. Apply Fault at the S1280 5 161.00 (646280) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1
G02_P4_Fault_358	P4	Single Phase Fault with Stuck Breaker on S1280 5 161.00 (646280) 161 kV Bus

Fault ID	Planning Event	Fault Description
		a. Apply Fault at the S1280 5 161.00 (646280) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1
G02_P4_Fault_359	P4	Single Phase Fault with Stuck Breaker on S1280 5 161.00 (646280) 161 kV Bus a. Apply Fault at the S1280 5 161.00 (646280) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1
G02_P4_Fault_360	P4	Single Phase Fault with Stuck Breaker on S1280 5 161.00 (646280) 161 kV Bus a. Apply Fault at the S1280 5 161.00 (646280) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1
G02_P4_Fault_361	P4	Single Phase Fault with Stuck Breaker on S1280 5 161.00 (646280) 161 kV Bus a. Apply Fault at the S1280 5 161.00 (646280) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1
G02_P4_Fault_362	P4	Single Phase Fault with Stuck Breaker on S1280 5 161.00 (646280) 161 kV Bus a. Apply Fault at the S1280 5 161.00 (646280) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1
G02_P4_Fault_363	P4	Single Phase Fault with Stuck Breaker on S1280 5 161.00 (646280) 161 kV Bus a. Apply Fault at the S1280 5 161.00 (646280) 161 kV Bus b. Clear Fault after 16 cycles and trip the following elements: b.1. COOPER 5 (640140) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.2. HUMBOLT5 (640234) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1 b.3. S1263 5 (646263) 161.0 kV to S1280 5 (646280) 161.0 kV Transmission Circuit #1

APPENDIX E: GEN-2013-002/019 DYNAMIC STABILITY RESULTS

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P1_Fault_001	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_002	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_003	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_004	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_005	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_006	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_007	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_008	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_009	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_010	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_011	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_012	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_013	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

[3] Scenario 1: GEN-2013-002/019 (643326, 643327) were dispatched at full GIA capacity (124.2 MW) and other requests at the POI dispatched at base with surplus requests offline.

[4] Scenario 2: GEN-2013-002/019 (643326, 643327), GEN-2024-SR10 and GEN-2025-SR5 dispatched at full (124.2 MW) and other requests at the POI dispatched at base.

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P1_Fault_014	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_015	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_016	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_017	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_018	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_019	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_020	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_021	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_022	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_023	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_024	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_025	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_026	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_027	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_028	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_029	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_030	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_031	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_032	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_033	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_034	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_035	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_036	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_037	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_038	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P1_Fault_039	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_040	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_041	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_042	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_043	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_044	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_045	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_046	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_047	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_048	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_049	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_050	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_051	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_052	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_053	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_054	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_055	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_056	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_057	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_058	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_059	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_060	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_061	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_062	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_063	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P1_Fault_064	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_065	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_066	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_067	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_068	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_069	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_070	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_071	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_072	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_073	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_074	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_075	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_076	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_077	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_078	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_079	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_080	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_081	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_082	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_083	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_084	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_085	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_086	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_087	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_088	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P1_Fault_089	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_090	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_091	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_092	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_093	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_094	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_095	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_096	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_097	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_098	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_099	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_100	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_101	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_102	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_103	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_104	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_105	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_106	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_107	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_108	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_109	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_110	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_111	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_112	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_113	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P1_Fault_114	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_115	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_116	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_117	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_118	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_119	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_120	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_121	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_122	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_125	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_126	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_127	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_128	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_129	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_130	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_131	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_132	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_133	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_134	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_135	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_136	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_137	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_138	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_139	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_140	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P1_Fault_141	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_143	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_144	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_145	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_146	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_148	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_152	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_161	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_163	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_164	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_165	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_166	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_167	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_168	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_169	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_170	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_171	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P1_Fault_172	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_001	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_002	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_003	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_004	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_005	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_006	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_007	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P4_Fault_008	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_009	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_010	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_011	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_012	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_013	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_014	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_015	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_016	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_017	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_018	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_019	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_020	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_021	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_022	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_023	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_024	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_025	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_026	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_027	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_028	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_029	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_030	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_031	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_032	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P4_Fault_033	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_034	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_035	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_036	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_037	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_038	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_039	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_040	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_041	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_042	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_043	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_044	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_045	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_046	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_047	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_048	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_049	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_050	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_051	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_052	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_053	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_054	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_055	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_056	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_057	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P4_Fault_058	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_059	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_060	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_061	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_062	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_063	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_064	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_065	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_066	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_067	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_068	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_069	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_070	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_071	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_072	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_073	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_074	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_075	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_076	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_077	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_078	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_079	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_080	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_081	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_082	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P4_Fault_083	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_084	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_085	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_086	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_087	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_088	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_089	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_090	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_091	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_092	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_093	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_094	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_095	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_096	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_097	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_098	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_099	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_100	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_101	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_102	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_104	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_105	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_106	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_107	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_108	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P4_Fault_109	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_110	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_111	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_112	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_113	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_114	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_115	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_116	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_117	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_118	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_119	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_120	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_121	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_122	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_123	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_124	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_125	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_126	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_127	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_128	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_129	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_130	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_131	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_132	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_133	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P4_Fault_134	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_135	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_136	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_137	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_138	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_139	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_140	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_141	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_142	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_143	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_144	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_145	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_146	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_147	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_148	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_149	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_150	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_151	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_152	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_153	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_154	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_155	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_156	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_157	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_158	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P4_Fault_159	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_160	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_161	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_162	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_163	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_164	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_165	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_166	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_167	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_168	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_169	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_170	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_171	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_172	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_173	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_174	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_177	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_178	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_179	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_180	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_181	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_182	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_183	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_187	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_188	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P4_Fault_189	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_190	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_191	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_192	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_193	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_194	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_260	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_261	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_298	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_299	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_300	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_301	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_302	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_303	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_304	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_305	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_306	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_307	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_309	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_310	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_311	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_312	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_318	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_319	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_320	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

Fault ID	Scenario 1[3] 25SP			Scenario 1[3] 25WP			Scenario 2[4] 25SP			Scenario 2[4] 25WP		
	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable	Volt Violation	Volt Recovery	Stable
GROUP2_P4_Fault_321	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_322	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_323	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_324	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_325	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_326	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_327	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_328	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_329	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_354	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_355	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_356	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_357	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_358	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_359	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_360	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_361	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_362	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable
GROUP2_P4_Fault_363	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable	Pass	Pass	Stable

APPENDIX F:
SIMULATION PLOTS

Available Upon Request