2RSC-2020 Phase 2 Study Report

7/9/2021

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1.0 Summary

The RSC-2020-2 Resource Solicitation Cluster includes one (1) Generation Interconnection Request: 2RSC-2020-5.

2RSC-2020-5 is a 250MW net rated Solar Photovoltaic and Battery Energy Storage Hybrid Generating Facility requesting Energy Resource Interconnection Service. The requested Point of Interconnection is the Mirasol 230kV Substation.

The Phase 2 study did not identify any Network Upgrades on the PSCo system or the Affected Systems.

The 100MW grid charging capacity of 2RSC-2020-5 did not identify any impacts.

The total estimated cost of the transmission system improvements required to interconnect 2RSC-2020-5 is $6.95 Million (Tables 4 and 5).

The maximum allowable output of 2RSC-2020-5 is: 250MW (after required transmission system improvements in Tables 4 and 5).

The Energy Resource Interconnection Service allotted to 2RSC-2020-5 is: 250MW (after required transmission system improvements in Tables 4 and 5).

The output of the hybrid Generating Facility will be limited to 250MW at the Point of Interconnection using the power plant controller. Additional monitoring and control requirements will be added to the LGIA to ensure the Interconnection Service amount is not exceeded. The Generating Facility output will also be monitored by PSCo operations.

The Mirasol 230kV Substation is a new substation identified in the DISIS-2020-001. A CPCN is needed for the construction of the Mirasol 230kV Substation. The estimated time frame for regulatory activities and to site, design, procure and construct the interconnection facilities is approximately 36 months after authorization to proceed has been obtained. Any delays in obtaining the CPCN may delay the Commercial Operation Date of 2RSC-2020-5.

Note- 2RSC-2020 cluster is lower queued to DISIS-2020-001 which is under Phase 2 studies. The 2RSC-2020 studies may be revised depending on the DISIS-2020-001 Phase 2 study results.

Interconnection Service identified in this report in and of itself does not convey Transmission Service.

2.0 Introduction

Public Service Company of Colorado (PSCo) received one (1) Generation Interconnection Request (GIR) in the 2RSC-2020 which moved to Phase 2. The total Interconnection Service requested in the RSC is 250MW of Energy Resource Interconnection Service (ERIS)[1]. A summary of the request is given in Table 1 .

Table 1 – Summary of GIRs in the 2RSC-2020

Resource Cluster Queue Number	Date RSC Request Received	Generation Type	Service Type	Location County/State	Interconnection Point Station or Line	Net Plant Max MW Sum | Win	In-Service Date	Comments/Status/Reason Not Completed
2RSC-2020-5	07/15/2020	PV Solar + Battery	ERIS	Pueblo County, CO	Mirasol Switchyard on the Comanche-Midway 230kV Transmission Line	250 250	09/30/2022	-Affiliate Request.

3.0 Description of 2RSC-2020-5

The GIR configuration did not change from the Phase 1 study. The 2RSC-2020-5 is a 250MW net rated Solar Photovoltaic (PV) plus Battery Energy Storage (BES) Hybrid Generating Facility that will be located in Pueblo County, Colorado. This hybrid Generating Facility will consist of two distinct facility groups – 200MW Solar PV facility and 100MW BES facility. The 200MW Solar PV facility will consist of ninety-seven (97) GE LV5 2.3MVA, ±0.90PF inverters, each with its own 600V/34.5kV, 2.3MVA, Z=6.3% and X/R=7.5 pad-mounted step-up transformer. The 100MW BES facility will consist of fifty-seven (57) Parker 890-GTB2200 2.2MVA, ±0.95PF inverters, each with its own 480V/34.5kV, 2.2MVA, Z=5.75% and X/R=7.5 pad-mounted step-up transformer. The 34.5kV collector system of the PV and BES generators will connect to two (2) 34.5/13.8/230kV, 102/138/170MVA, Z=8.5%, X/R=40 wye-gnd/delta/wye-gnd main step-up transformers which in turn will connect to the Mirasol Substation via a 0.1mile generation tie-line. The Mirasol Substation is a new substation identified in the higher-queued DISIS-2020-001. The net output of 2RSC-2020-5 will not exceed 250MW at any time, which will be limited using the Plant Power Controller, and the PV and BES generators will be operated in back-feed voltage control mode.

[1] Energy Resource Interconnection Service shall mean an Interconnection Service that allows the Interconnection Customer to connect its Generating Facility to the Transmission Provider's Transmission System to be eligible to deliver the Generating Facility's electric output using the existing firm or non-firm capacity of the Transmission Provider's Transmission System on an as available basis. Energy Resource Interconnection Service in and of itself does not convey transmission service

The expected operating modes of 2RSC-2020-5 are:

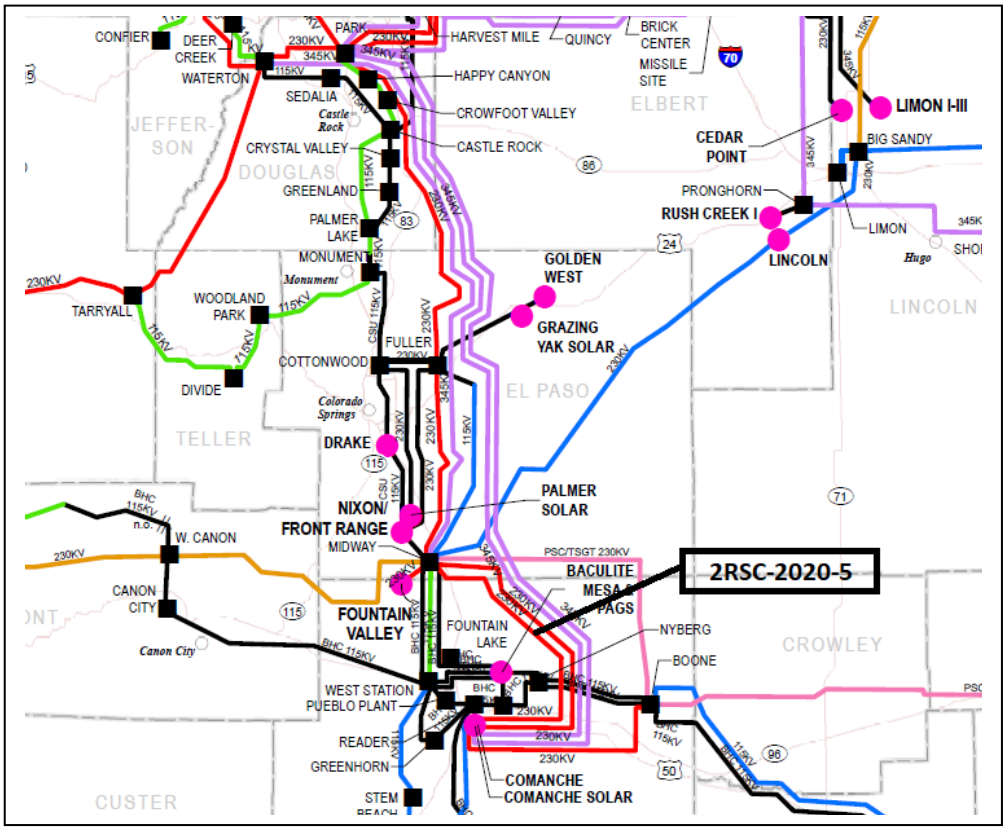
i. Generation mode - 250MW rated generation output at the POI via combination of PV and BES generators.

ii. Grid Charging mode - 50MW for a maximum of 4 hours when the PV output is 0MW. The BES facility will not charge from the grid during the first five (5) years and three (3) months of the COD, but it may charge from the grid after that period.

The proposed Commercial Operation Date (COD) of 2RSC-2020-5 is September 30, 2022. Accordingly, based on the standard interconnection practices, the back-feed date is assumed to be April 1, 2022, approximately six (6) months before the COD.

The approximate location of the 2RSC-2020-5 POI is shown in Figure 1 below.

Figure 1 – 2RSC-2020-5 Point of Interconnection



4.0 Study Scope

The purpose of the study is to determine the system impact of interconnecting 2RSC-2020-5 for Interconnection Service, as requested in Table 1. The scope of the study which is Phase 2 of the Definitive Interconnection System Impact Study (DISIS) process consists of:

a) An updated power flow/voltage analysis (if necessary),
b) stability analysis and short circuit analysis,
c) Non-binding cost estimates for the Transmission Provider's Interconnection Facilities, Station Network Upgrades and Network Upgrades required to reliability interconnect the GIR.
d) The report identifies total costs and each Interconnection Customer's estimated allocated costs.
e) The report also identifies the Contingent Facilities applicable to each GIR.

Since the RSC has only one GIR, all costs provided in this report are 100% assigned to 2RSC-2020-5.

Since there were no system modeling changes since the Phase 1 report and all GIRs in the Phase 1 study moved to Phase 2, the steady state analysis is not updated. This report focused on items 'b' thru 'e' listed above.

The stability analysis is performed using the study criteria in Section 4.2.2 and study methodology in Section 4.3.2.
Additionally, the study evaluated the impacts from the grid charging operation of the 100MW BES using the study criteria in Section 4.2.2 and study methodology in Section 4.3.2.

4.1 Study Pocket Determination

As described in the Phase 1 study report, the study analysis is based on the Southern Colorado study pocket analysis only.

4.2 Study Criteria

PSCo adheres to applicable NERC Reliability Standards and WECC Reliability Criteria, as well as its internal transmission planning criteria for studies. The following Criteria is used for the reliability analysis of the PSCo system and Neighboring Utility systems.
The transient voltage stability criteria are as follows:

a. Following fault clearing, the voltage shall recover to 80% of the pre-contingency voltage within 20 seconds of the initiating event for all P1 through P7 events for each applicable Bulk Electric System (BES) bus serving load.
b. Following fault clearing and voltage recovery above 80%, voltage at each applicable BES bus serving load shall neither dip below 70% of pre-contingency voltage for more than 30 cycles nor remain below 80% of pre-contingency voltage for more than two seconds, for all P1 through P7 events.
c. For Contingencies without a fault (P2.1 category event), voltage dips at each applicable BES bus serving load shall neither dip below 70% of pre-contingency voltage for more than 30 cycles nor remain below 80% of pre-contingency voltage for more than two seconds.

The transient angular stability criteria are as follows:

a. P1 – No generating unit shall pull out of synchronism. A generator being disconnected from the system by fault clearing action or by a special Protection System is not considered an angular instability.
b. P2-P7 – One or more generators may pull out of synchronism, provided the resulting apparent impedance swings shall not result in the tripping of any other generation facilities.
c. P1-P7 – The relative rotor angle (power) oscillations are characterized by positive damping (i.e. amplitude reduction of successive peaks) > 5% within 30 seconds.

The breaker duty analysis criterion is: Fault Current after GIR addition should not exceed 100% of the Breaker Duty rating.

4.3 Study Methodology

All generators in the Study Pocket should meet the Transient stability criteria. If any violations are found, the contributing GIR(s) will be identified for performance violations and mitigations will be attributed to the contributing generator(s).

The stability analysis is performed by running select single and multiple contingencies in the Study Pocket.

PSCo can only perform breaker duty analysis on the PSCo system. Before the GIR goes in-service the Affected Systems may choose to perform a breaker duty analysis to identify breaker duty violations on their system.

4.4 Study Area

The Study Area for Southern Colorado study pocket includes WECC designated zones 700, 710, 712, 751, 757, and 785. The neighboring utilities included in the analysis include Tri-State Generation and Transmission Inc. (TSGT), Black Hills Energy (BHE), Colorado Spring Utilities (CSU), Intermountain Rural Electric Association (IREA) and Western Area Power Administration (WAPA) systems in the study area.

5.0 Base Case Modeling Assumptions

The Phase 2 studies were performed using GE PSLF case, so a replica model of the Phase 1 PSSE case is created using the same modeling assumptions as the Phase 1 report. See Section 5.0 of the RSC Phase 1 report posted here for Base Case modeling details Base Case https://www.rmao.com/public/wtpp/Final_Studies/2RSC-2020-1%20Study%20Report-Phase%201_V2.pdf

6.0 Study Analysis

The 2RSC-2020-5 is studied in the Southern Colorado study pocket.

6.1 Study Case Modeling

The Study case is created from the Benchmark Case by modeling 2RSC-2020-5 at the Mirasol 230kV Substation. The 250 MW ERIS output from the generator is sunk to Pawnee.

6.2 Steady State Analysis

The Phase 1 report did not identify any single or multiple contingency overloads due to the addition of 2RSC-2020-5.

See Section 6.2.3 of the 2RSC-2020-1 Phase 1 report posted here for detailed results https://www.rmao.com/public/wtpp/Final_Studies/2RSC-2020-1%20Study%20Report-Phase%201_V2.pdf

6.3 Transient Stability Results

The 2RSC-2020-5 has two types of inverters as described above. Based on the previously completed Provisional Interconnection Service study for this GI (PI-2020-2), the PV and BES

Generating Facilities are individually capable of meeting the stability criteria. So this study only analyzed the stability impact from the combined 250MW output.

The following results were obtained for the disturbances analysis:

- ✓ No machines lost synchronism with the system
- ✓ No transient voltage drop violations were observed
- ✓ Machine rotor angles displayed positive damping

The results of the transient stability analysis are shown in Table 1. The transient stability plots are shown in Transient Stability Plotsto this report.

The following two faults did not result in satisfactory stability performance. It was identified that the stability issue exists in the pre-GI case. 2RSC-2020-5 is not considered to contribute to the stability issue based on the inverter settings which demonstrate full control capability for fault ride through and recovery.

- Three-phase fault at Comanche 345kV, P7 loss of Comanche-Daniels Park 345kV and Comanche-Tundra 345kV
- Three-phase fault at Daniels Park 345kV, loss of Daniels Park-Comanche 345kV and Daniels Park-Tundra 345kV

Table 1 - Transient Stability Analysis Results

Stability Scenarios						
#	Fault Location	Fault Type	Facility Tripped	Clearing Time (cycles)	Post-Fault Voltage Recovery	Angular Stability
1	Boone 230kV	3ph	Lamar – Boone 230kV line and all generation at Lamar	5.0	Stable	Stable
2a	Boone 230kV	3ph	Boone – GI-2020-3POI - Comanche 230kV	5.0	Stable	Stable
2b	GI-2020=3POI	3ph	GI-2020-3POI – Comanche 230kV	5.0	Stable	Stable
3	Boone 230kV	3ph	Boone – Midway 230kV	5.0	Stable	Stable
4	Comanche 345 kV	3ph	Comanche#3 generator	4.0	Stable	Stable
5	Lamar 230kV	3ph	Lamar – Boone 230kV line and all generation at Lamar	3.0	Stable	Stable
6	MidwayPS 230kV	3ph	All Fountain Valley gas units	5.0	Stable	Stable

7	MidwayPS 230kV	3ph	Lose MidwayPS-Fuller, Midway PS-Midway WA line, all Midway_WA 115kV and Midway_WA 230kV lines	12.0	Stable	Stable
8	MidwayPS 345kV	3ph	MidwayPS – Waterton 345kV line & Midway 230/345kV xfmr	4.0	Stable	Stable

There are no Affected Systems identified in the analysis.

6.4 Short Circuit Analysis Results

A breaker duty study on the PSCo transmission system did not identify any circuit breakers that became over-dutied"[2] as a result of adding 2RSC-2020-5.

The short-circuit fault current values and Thevenin equivalent impedances at the POI are shown in Tables 2.

Table 2 – Short Circuit Parameters at 2RSC-2020-5 POI, Mirasol 230kV Substation

	Before the Southern Colorado Cluster addition	**After Southern Colorado Cluster addition**
Three Phase		
Three Phase Current	19066A	19069A
Positive Sequence Impedance	0.00108+j0.01422 ohms	0.00108+j0.01422 ohms
Negative Sequence Impedance	0.00110+j0.01424 ohms	0.00110+j0.01424 ohms
Zero Sequence Impedance	0.00221+j0.01611 ohms	0.00149+j0.01278 ohms
Phase-to-Ground		
Single Line to Ground Current	17637A	19660A
Positive Sequence Impedance	0.00134+j0.01407 ohms	0.00134+j0.01407 ohms
Negative Sequence Impedance	0.00135+j0.01409 ohms	0.00135+j0.01409 ohms
Zero Sequence Impedance	0.00221+j0.01611 ohms	0.00149+j0.01278 ohms

[2] "Over-dutied" circuit breaker: A circuit breaker whose short circuit current (SCC) rating is less than the available SCC at the bus.

6.5 Grid Charging Analysis

The following results were obtained for the disturbances analysis:

- ✓ No machines lost synchronism with the system
- ✓ No transient voltage drop violations were observed
- ✓ Machine rotor angles displayed positive damping

The results of the transient stability analysis are shown in Table 3. The transient stability plots are shown in Transient Stability Plotsto this report.

Table 3 - Transient Stability Analysis Results

Stability Scenarios						
#	Fault Location	Fault Type	Facility Tripped	Clearing Time (cycles)	Post-Fault Voltage Recovery	Angular Stability
1	Boone 230kV	3ph	Lamar – Boone 230kV line and all generation at Lamar	5.0	Stable	Stable
2	Comanche 345 kV	3ph	Comanche#3 generator	4.0	Stable	Stable
3	MidwayPS 230kV	3ph	All Fountain Valley gas units	5.0	Stable	Stable
4	MidwayPS 230kV	3ph	Lose MidwayPS-Fuller, Midway PS-Midway WA line, all Midway_WA 115kV and Midway_WA 230kV lines	12.0	Stable	Stable

6.6 Summary of Analysis

The maximum permissible output of 2RSC-2020-5 is 250MW

The ERIS allotted to 2RSC-2020-5 is 250MW

The 100MW Grid Charging capacity of 2RSC-2020-5 did not identify any impacts.

There are no Affected Systems identified in the analysis.

7.0 Cost Estimates and Assumptions

Since 2RSC-2020-5 is the only GIR in the Cluster, all costs below are 100% allotted to 2RSC-2020-5.

The grid charging of the 100MW BES did not identify any additional Transmission Provider's Interconnection Facilities or Station Network Upgrade modifications.

The total cost of the required Upgrades for 2RSC-2020-5 to interconnect the 250MW hybrid Generating Facility for ERIS is **$3.008 Million.**

- **The cost of Transmission Provider's Interconnection Facilities is $1.347 Million (Table 4)**
- **The cost of Station Network Upgrades is $1.661 Million (Table 5)**

Figure 2 is a conceptual one-line of the 2RSC-2020-5 interconnection at the Mirasol 230kV Substation.

Table 4 – 2RSC-2020-5 Transmission Provider's Interconnection Facilities

Element	Description	Cost Est. (Millions)
PSCO's Mirasol Substation 230kV bus	Interconnect Customer to tap the Mirasol Substation 230kV bus. The new equipment includes: • Three (3) 230kV dead-end structures • Three (3) 230kV arresters • One (1) 230kV 3000A Switch • One set (of three) high side metering units • Fiber communication equipment • Station controls • Associated electrical equipment, bus, wiring and grounding • Associated foundations and structures • Associated transmission line communications, fiber, relaying and testing.	$1.272
	Transmission line tap into substation	$0.055
	Siting and Land Rights support for permitting and construction	$0.020
	Total Cost Estimate for Transmission Providers Interconnection Facilities	**$1.347**
Time Frame	**Site, design, procure and construct**	**18 Months**

Table 5 –Station Network Upgrades – Expansion of Mirasol Substation

Element	Description	Cost Est. (Millions)

PSCo's Mirasol 230kV Substation	Customer Interconnection to the Mirasol 230kV Substation. The new equipment includes: • One (1) 230kV, 3000A Circuit Breakers • Three (3) 230kV 3000A Switches • Station controls and wiring • Associated electrical equipment, bus, wiring and grounding • Associated foundations and structures	$1.641
	Siting and Land Rights support for substation site acquisition, permitting, and construction	$0.020
	Total Cost Estimate for Substation Network Upgrades for Interconnection	**$1.661**
Time Frame	**Site, design, procure and construct**	**18 Months**

8.0 Summary of Results:

The maximum allowable output of 2RSC-2020-5 is: 250MW (after required transmission system improvements in Tables 4 and 5).

The Energy Resource Interconnection Service allotted to 2RSC-2020-5 is: 250MW (after required transmission system improvements in Tables 4 and 5).

The total estimated cost of the transmission system improvements required to interconnect 2RSC-2020-5 is $6.95 Million (Tables 4 and 5).

The 100MW Grid Charging capacity of 2RSC-2020-5 did not identify any impacts.
The output of the hybrid Generating Facility will be limited to 250MW at the Point of Interconnection using the power plant controller. Additional monitoring and control requirements will be added to the LGIA to ensure the Interconnection Service amount is not exceeded. The Generating Facility output will also be monitored by PSCo operations.

The Mirasol 230kV Substation is a new substation identified in the DISIS-2020-001. A CPCN is needed for the construction of the Mirasol 230kV Substation. The estimated time frame for regulatory activities and to site, design, procure and construct the interconnection facilities is approximately 36 months after authorization to proceed has been obtained. Any delays in obtaining the CPCN may delay the Commercial Operation Date of 2RSC-2020-5.

Note- 2RSC-2020 cluster is lower queued to DISIS-2020-001 which is under Phase 2 studies. The 2RSC-2020 studies may be revised depending on the DISIS-2020-001 Phase 2 study results.

Interconnection Service identified in this report in and of itself does not convey Transmission Service.

9.0 Contingent Facilities

The following is the list of the unbuilt Interconnection Facilities and Network Upgrades upon which the costs, timing, and study findings of the 2RSC-2020-5 are dependent, and if delayed or not built, could cause a need for re-studies of the Interconnection Service or a reassessment of the Interconnection Facilities and/or Network Upgrades and/or costs and timing. The individual GIR's maximum allowable output may be decreased if these Contingent Facilities are not in-service.

The Contingent Facilities were identified by modeling each unbuilt facility noted below out of service and running a single contingency analysis. Since the 2RSC cluster has only one GIR, DFAX is not applicable, if the single contingency analysis resulted in overloads >1%, the unbuilt facility is assigned as a Contingent Facility.

1. The following Network Upgrades assigned to the higher-queued Generation Interconnection Requests:
    - Uprate Daniels Park – Prairie1 230kV line to 756MVA (identified in DISIS-2020-001)
    - Uprate Daniels Park – Prairie3 230kV line to 756MVA (identified in DISIS-2020-001)
2. The following unbuilt transmission projects/ planned facility rating uprates modeled in the Base case:
    - Monument – Flying Horse 115kV Series Reactor
    - Greenwood – Arapahoe - Denver Terminal 230kV line
    - Upgrade Allison – Soda Lakes 115kV line to 318MVA
    - Upgrade Buckley34 – Smoky Hill 230kV line to 506MVA
    - Upgrade Daniels Park – Priarie1 230kV line to 576MVA
    - Upgrade Greenwood – Priarie1 230kV line to 576MVA
    - Upgrade Daniels Park – Priarie3 230kV line to 576MVA
    - Upgrade Greenwood – Priarie3 230kV line to 576MVA
    - Upgrade Waterton – Martin2 tap 115kV line to 189MVA
    - Upgrade Daniels Park 345/230kV # T4 to 560MVA
    - Upgrade Leetsdale – Monaco 230kV line to 560MVA
    - Upgrade Greenwood – Monaco 230kV line to 560MVA
    - Upgrade Waterton – Martin1 tap 115kV line to 189MVA
    - Fuller – Vollmer – Black Squirrel 115 kV line modeled at 173 MVA – ISD 2022
    - Fuller 230/115kV, 100MVA #2 transformer – ISD 2023

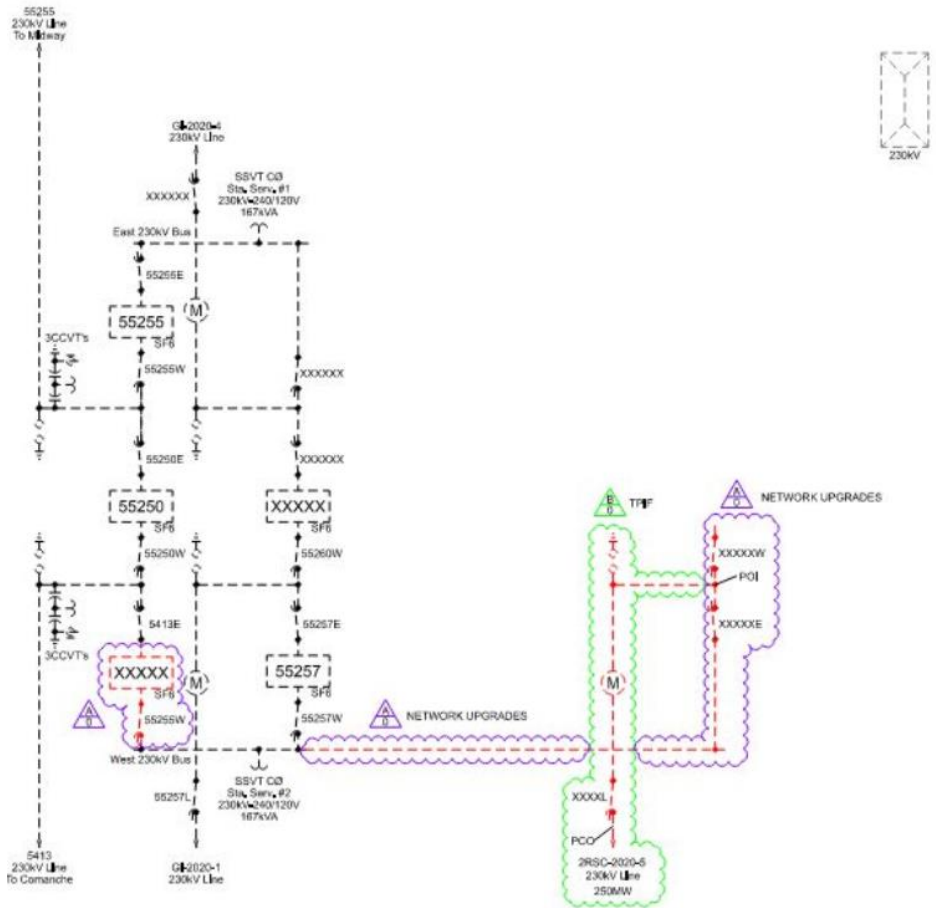
- Briargate S 115/230kV transformer with the high end tapping the Cottonwood – Fuller 230kV line – ISD 2023

3. Interconnection Facilities and Station Network Upgrades assigned to 2RSC-2020-5 (See Table 4 and 5)

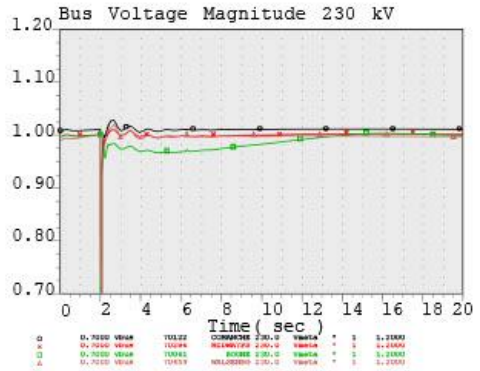
The following project has been completed since the Phase 1 report, hence not considered a contingent facility.

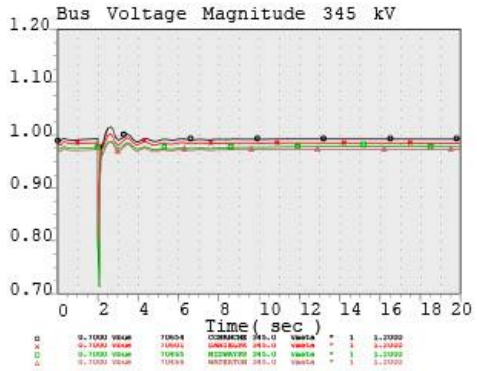
- Upgrade Midway 230kV bus tie to 576MVA – ISD 2023
- The Cottonwood – Tesla 34.5kV line is modeled open and Kettle Creek – Tesla 34.5kV line is modeled closed on the CSU system – ISD 2023

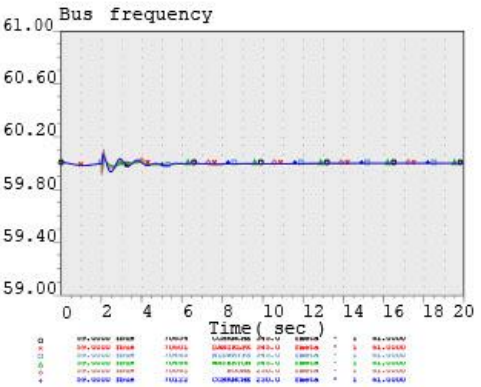
Figure 2 – Preliminary One-line of the 2RSC-2020-5 POI at the Mirasol 230kVSubstation

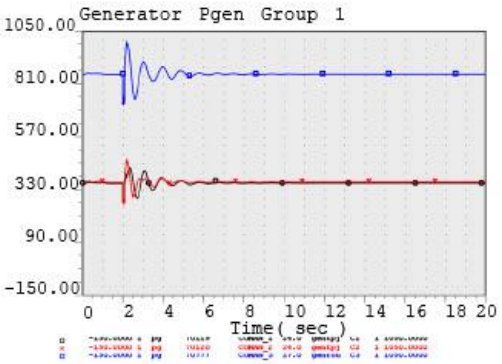


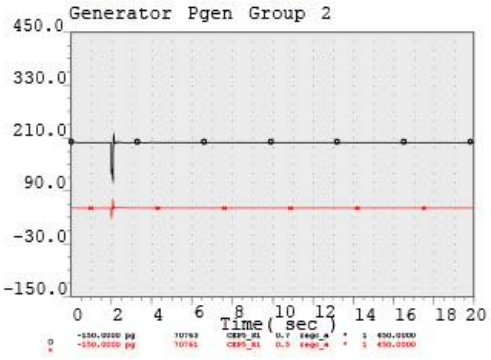
10.0 Transient Stability Plots

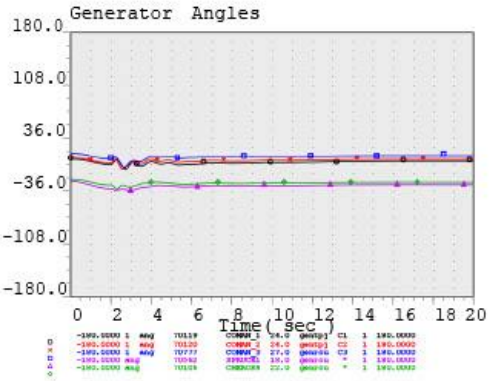




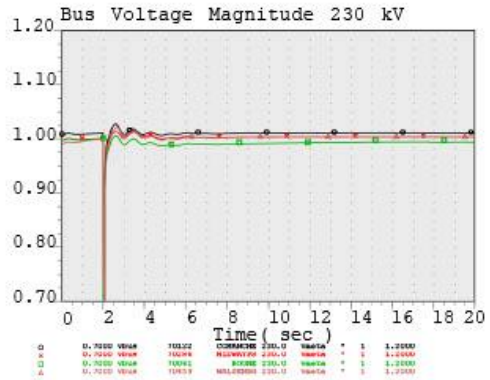


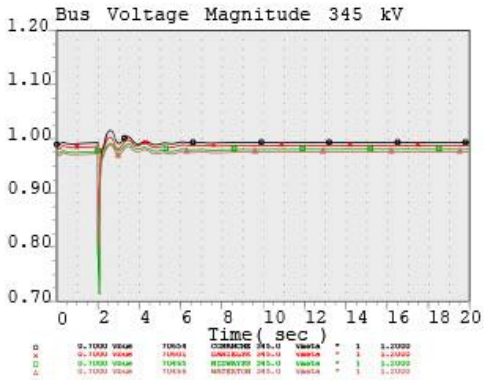


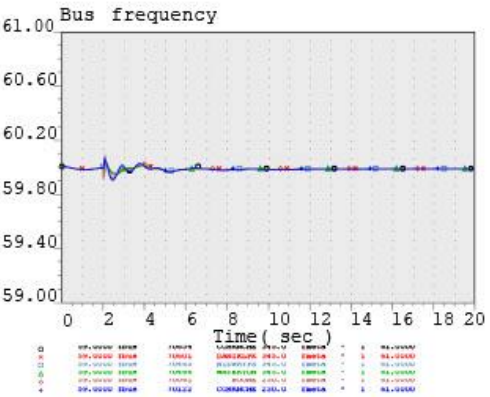


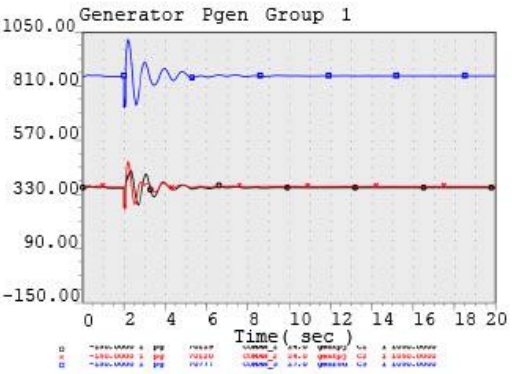


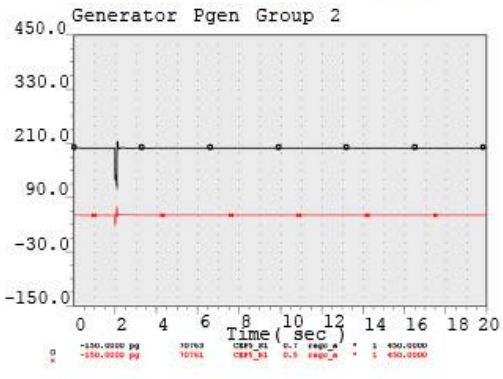
#2a Lose Boone-GI-2020-3POI-Comanche 345kV

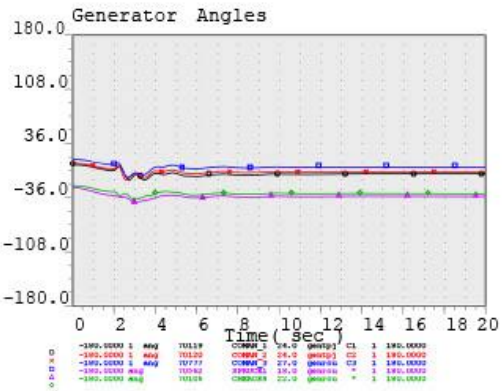




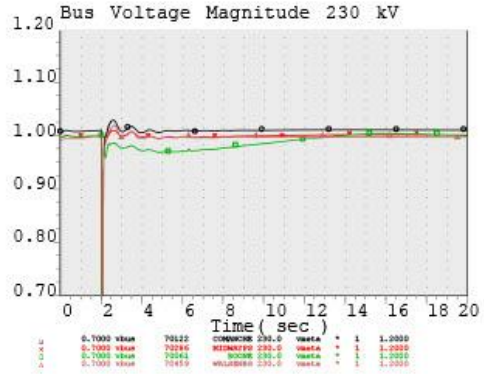


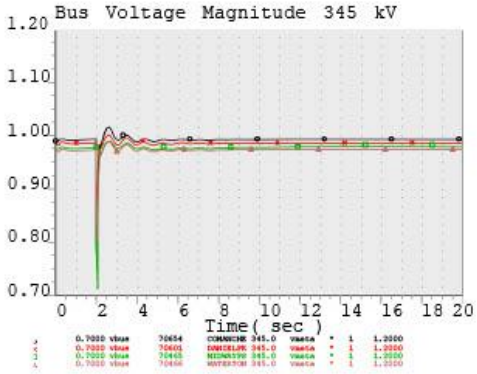


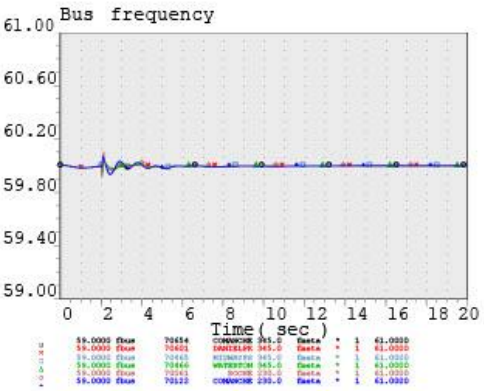


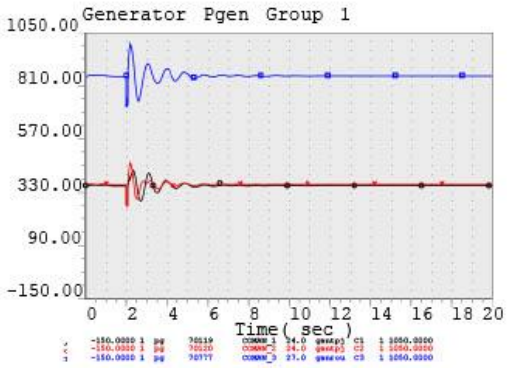


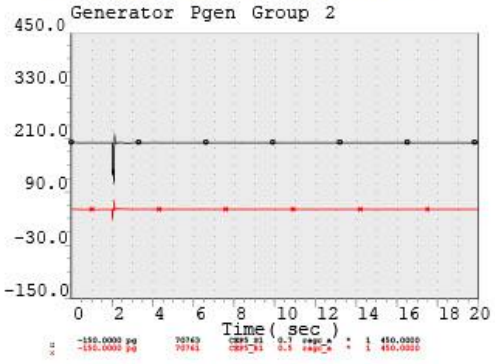
#1 Lose Boone-Lamar 230kV and Lamar Generator

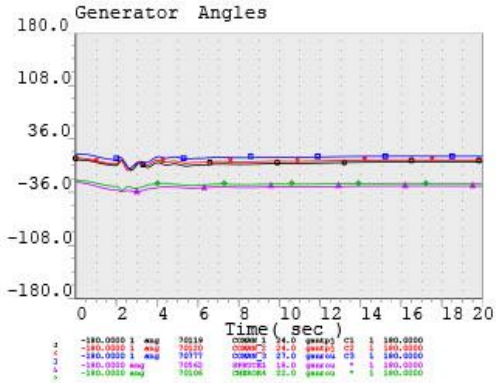




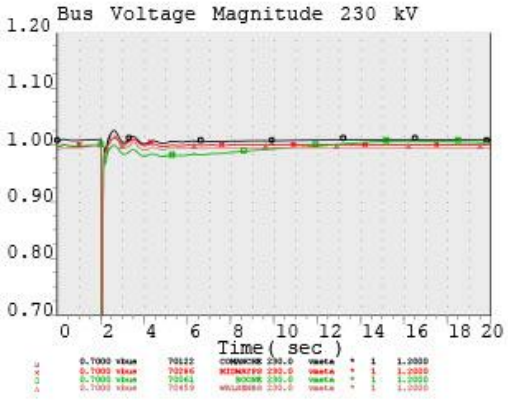


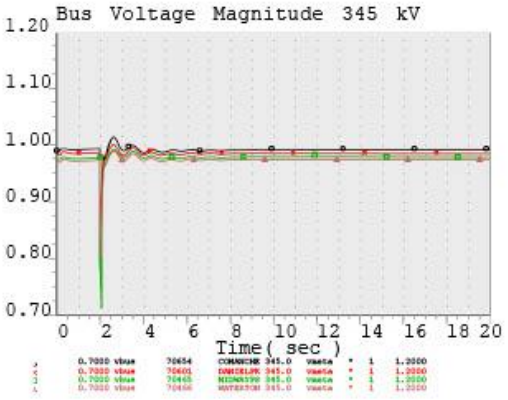


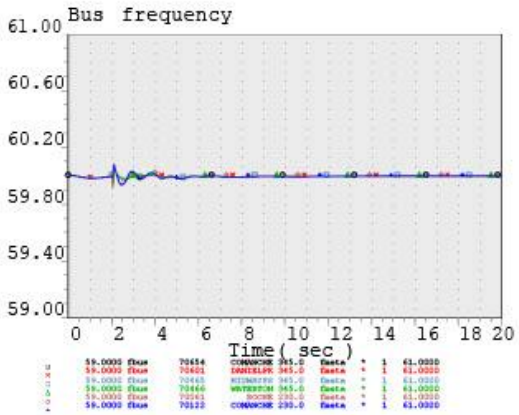


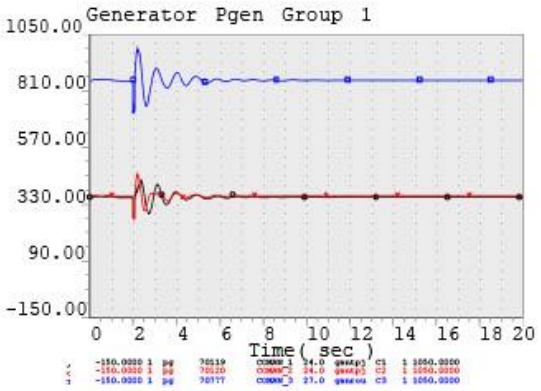


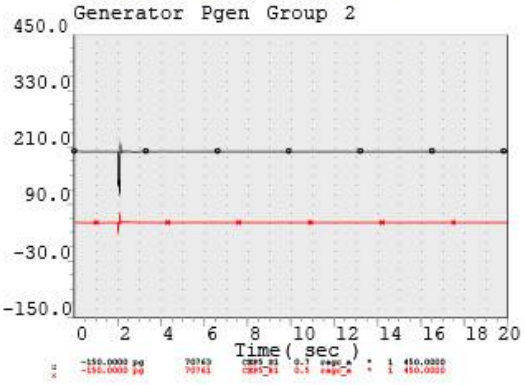
#2b lose_GI-2020-3POI-Comanche 230kV

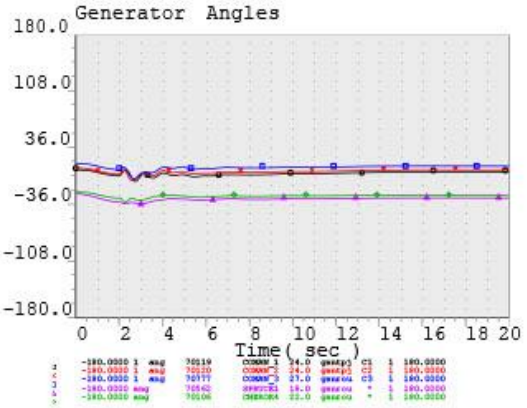




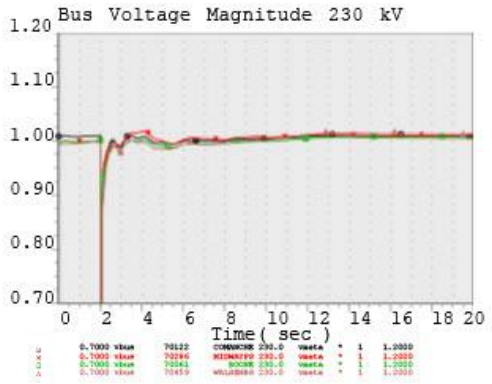


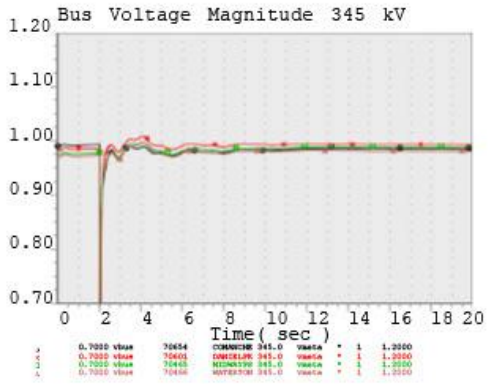


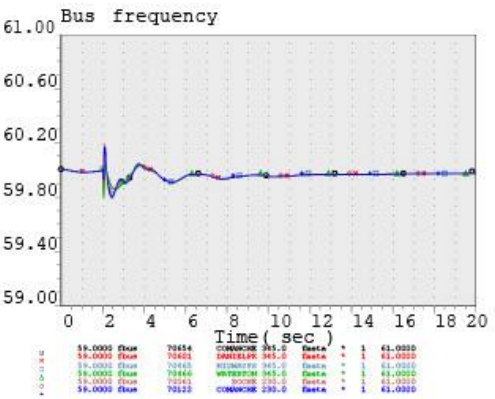


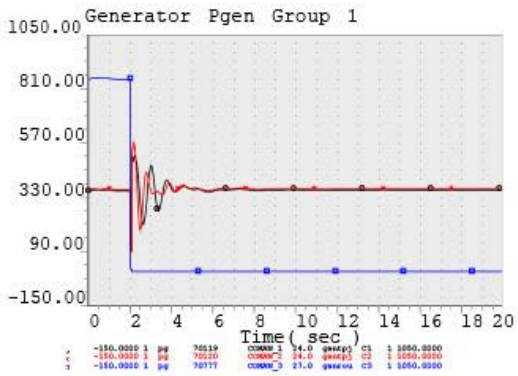


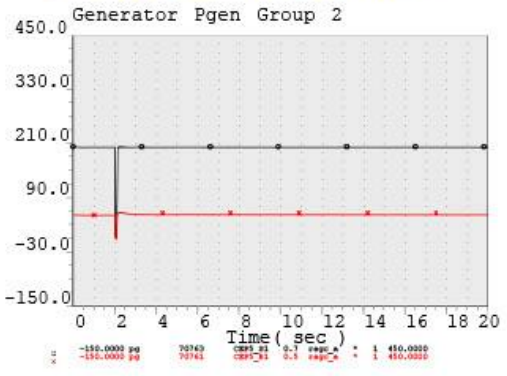
#3 lose_Boone-Midway_230kV

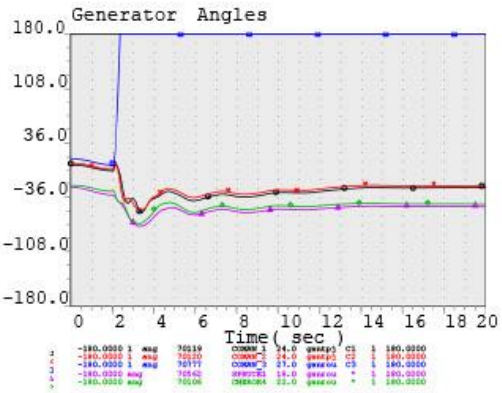

Bus Voltage Magnitude 230 kV
1.20
1.10
1.00
0.90
0.80
0.70
0 2 4 6 8 10 12 14 16 18 20
Time (sec)


Bus Voltage Magnitude 345 kV
1.20
1.10
1.00
0.90
0.80
0.70
0 2 4 6 8 10 12 14 16 18 20
Time (sec)

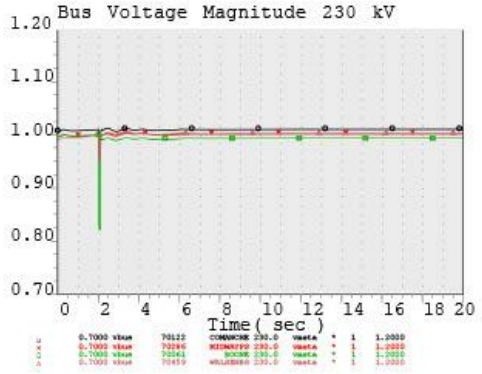

Bus frequency
61.00
60.60
60.20
59.80
59.40
59.00
0 2 4 6 8 10 12 14 16 18 20
Time (sec)

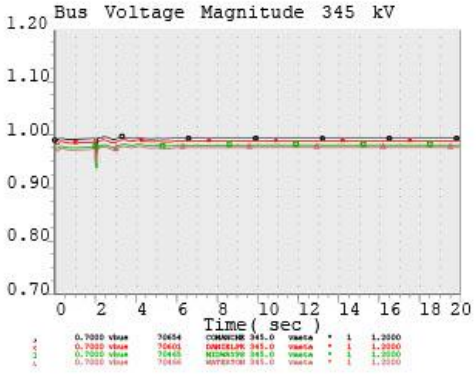

Generator Pgen Group 1
1050.00
810.00
570.00
330.00
90.00
-150.00
0 2 4 6 8 10 12 14 16 18 20
Time (sec)

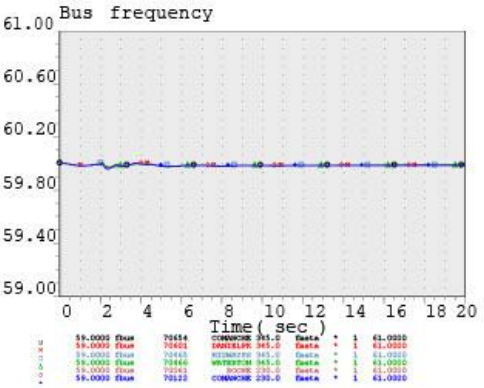

Generator Pgen Group 2
450.0
330.0
210.0
90.0
-30.0
-150.0
0 2 4 6 8 10 12 14 16 18 20
Time (sec)

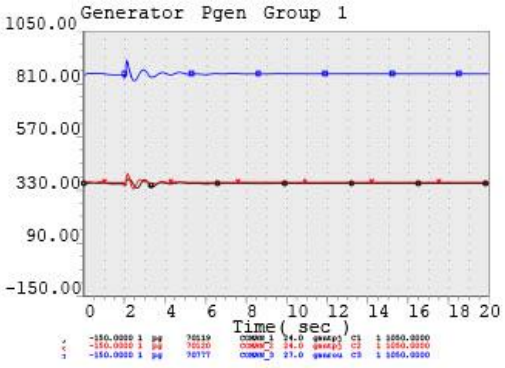

Generator Angles
180.0
108.0
36.0
-36.0
-108.0
-180.0
0 2 4 6 8 10 12 14 16 18 20
Time (sec)

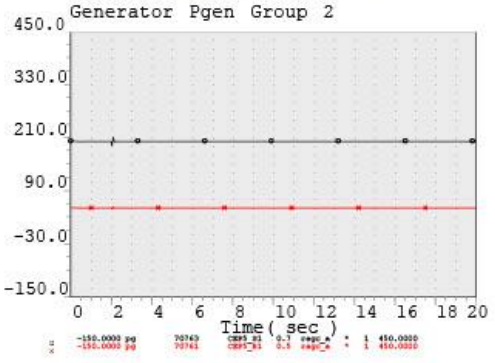
#4 Comanche_3

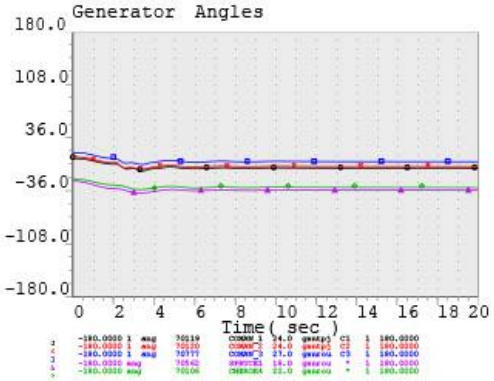




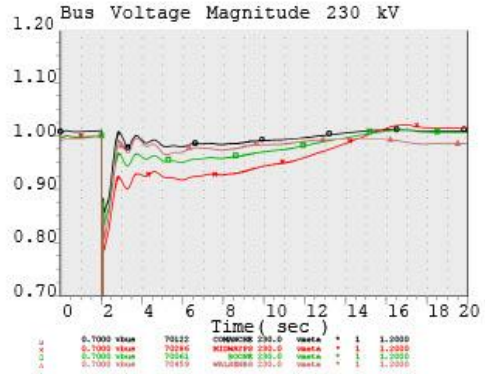


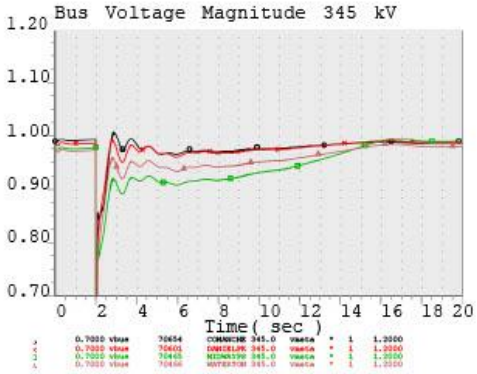


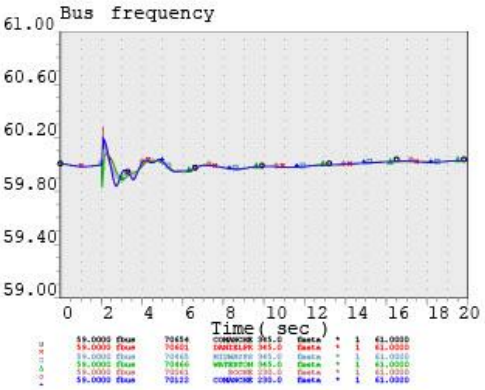


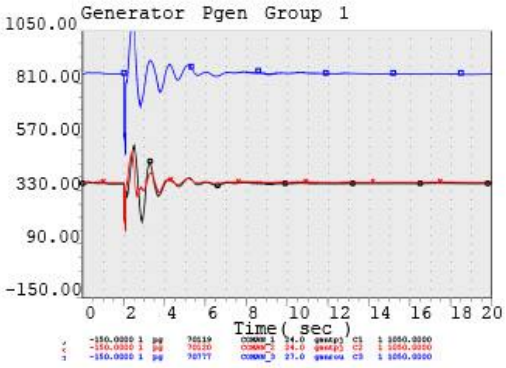


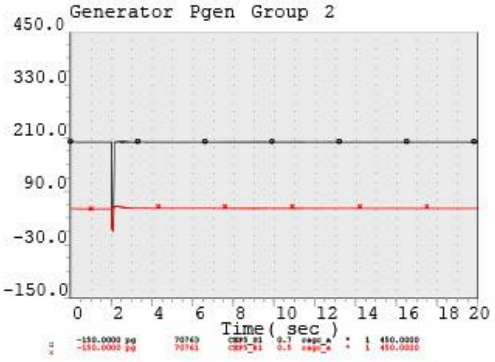
#5 lose_Lamar-Boone_230kV_and Lamar Gen

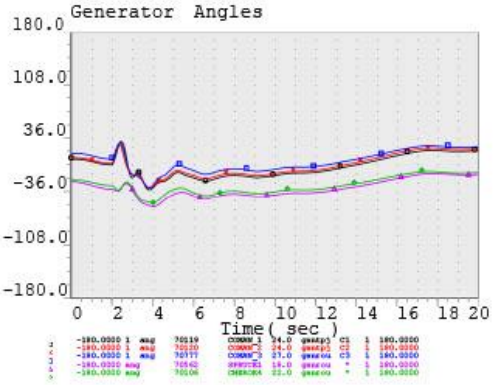




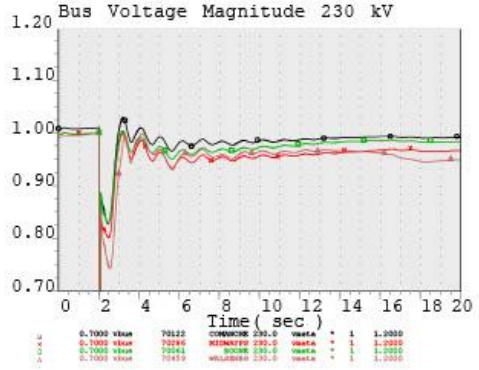


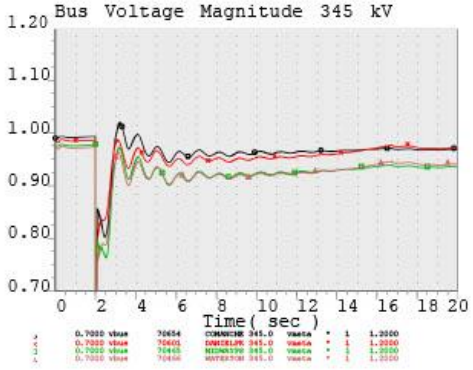


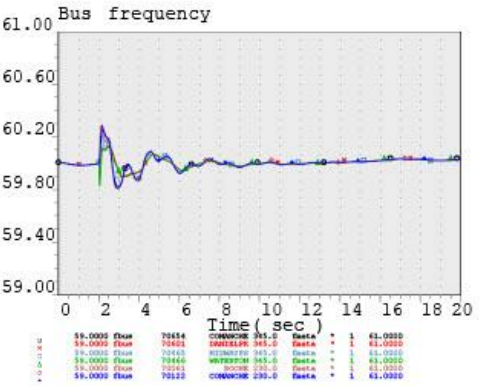


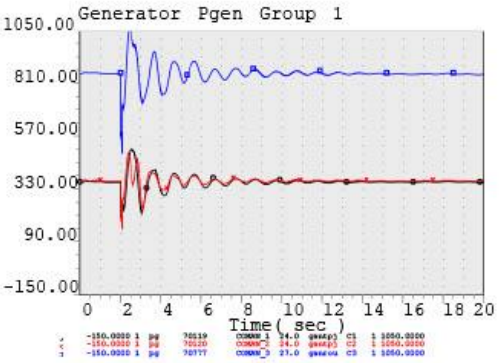


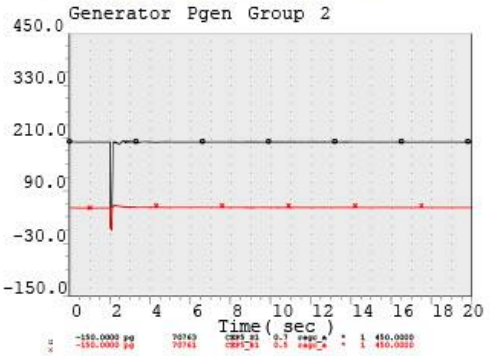
#6 lose_Fountain_Valley_gen

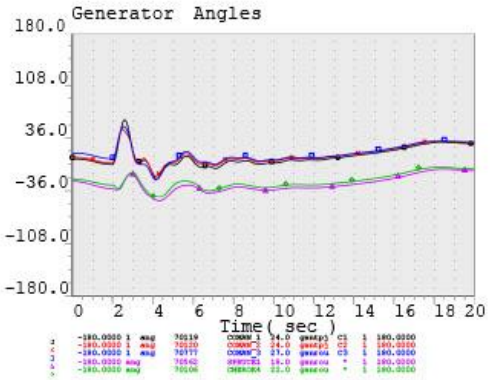




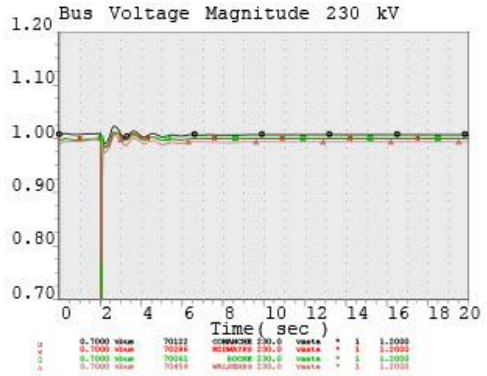


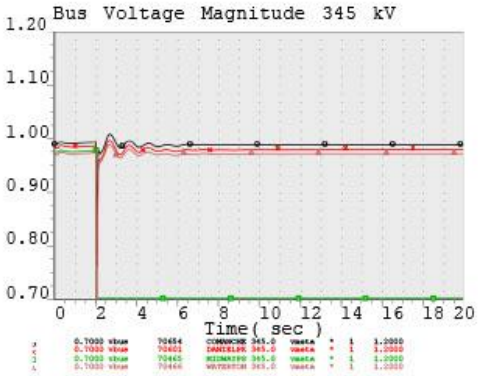


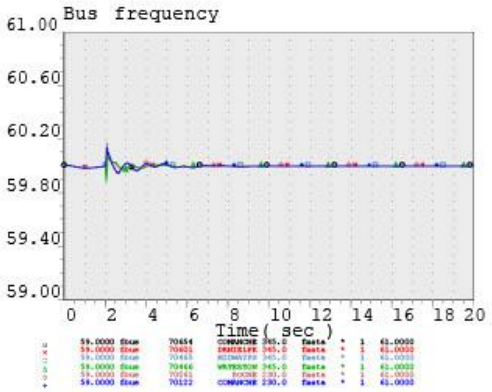


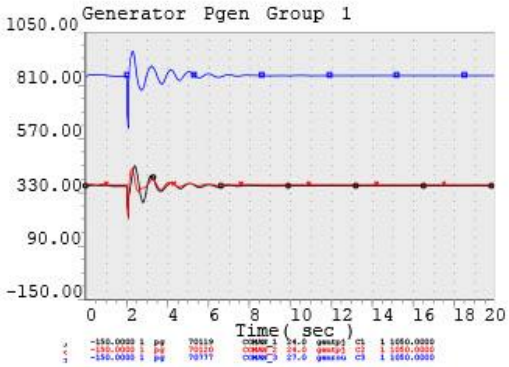


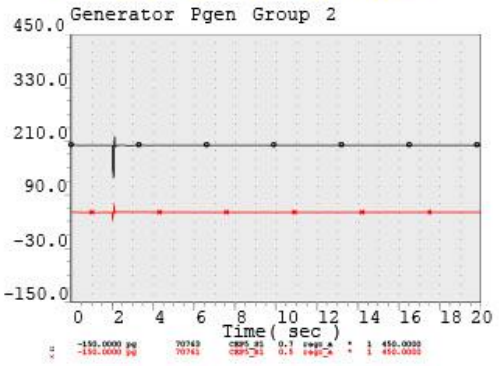
#7 Lose_MidwayPS-Fuller_230kV_Midway_115kV and 230kV Lines

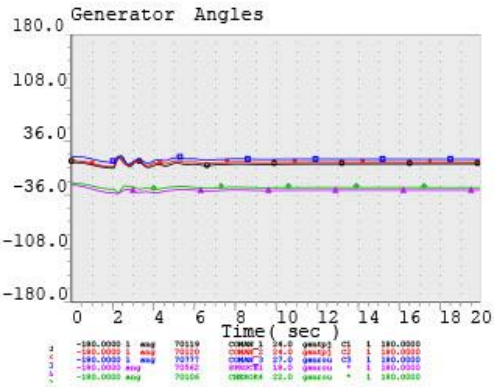












#8 lose_MidwayPS_345_230kV and MidwayPS-Waterton 345kV Line

li