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LOS ANGELES DEPARTMENT OF WATER & POWER

BEACON SOLAR PROJECT

SYSTEM IMPACT STUDY

VOLUME I – MAIN REPORT

July 31, 2008

Power System Planning & Development
Transmission Planning

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VOLUME II – DYNAMIC STABILITY PLOTS

GLOSSARY

BRRTP	Barren Ridge Renewable Transmission Project
BSP	Beacon Solar Project
FPL	Florida Power & Light Energy, LLC
LADWP	Los Angeles Department of Water and Power
NERC	North American Electric Reliability Corporation
MORC	Minimum Operating Reliability Criteria
OG	Owens Gorge
OVES	Owens Valley Electric 34.5 kV System
POI	Point of Interconnection
SCE	Southern California Edison
SIS	System Impact Study
SOB	System Operating Bulletin
SPS	System Protection Scheme
SS	Switching Station
WECC	Western Electricity Coordinating Council

I. SUMMARY AND FINDINGS

The Los Angeles Department of Water and Power (LADWP) performed an Interconnection System Impact Study (SIS) of the Beacon Solar Project (BSP), as requested by FPL Energy, LLC through a letter transmitted on September 10, 2007.

The proposed BSP site is located approximately 1 mile to the north of LADWP's Barren Ridge 230kV Switching Station (SS) site and will consist of a 250MW steam turbine generator. The steam for the prime mover will be created by utilizing collected solar energy, through a heat-exchanger. The Project will interconnect to the LADWP-owned Barren Ridge SS as the primary point of interconnection (POI). An alternate POI is proposed to be at a location within the Project property line and adjacent to the LADWP 230kV Line, approximately 1 mile north of the primary POI. The planned commercial operation date is June 1, 2011.

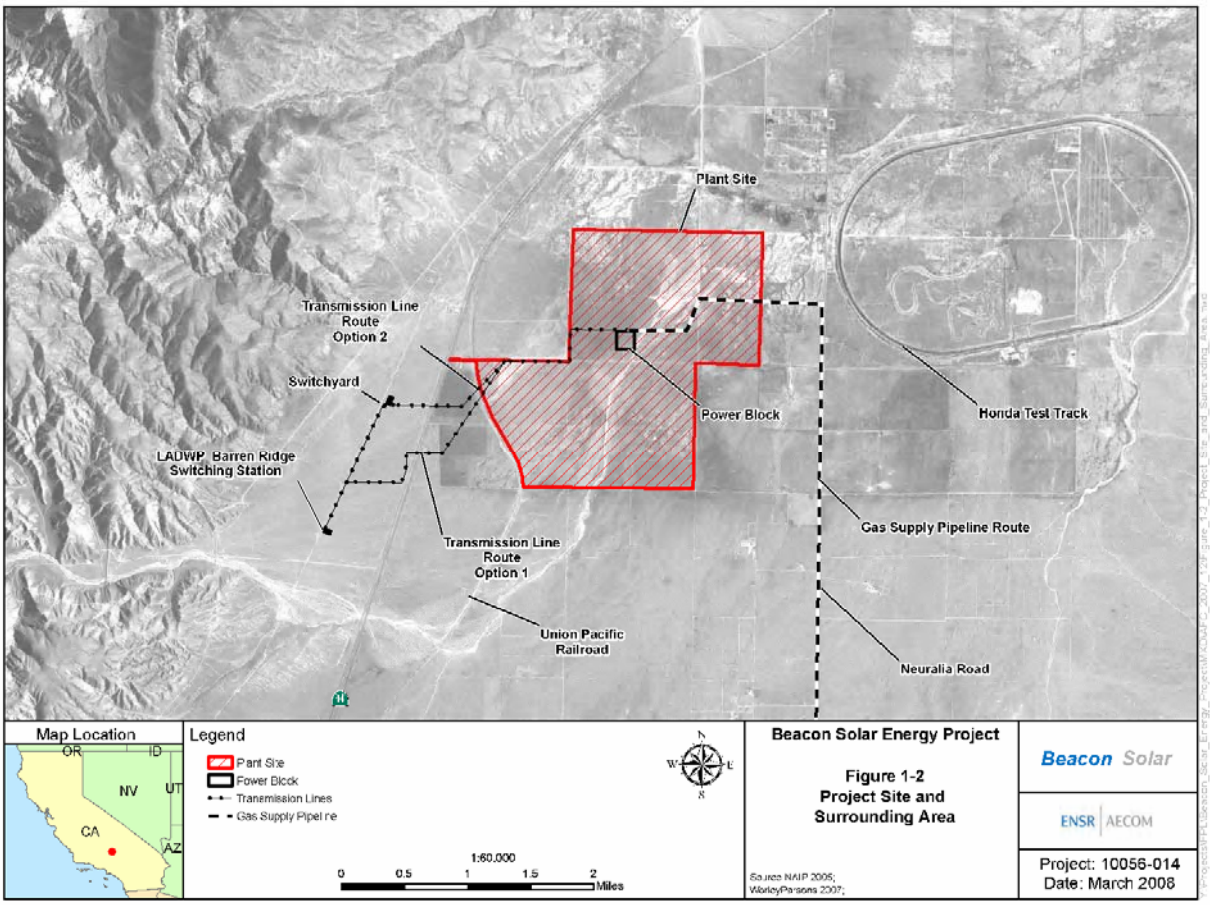

Figure 1. Interconnection Location of the BSP

Coincidentally, LADWP is proposing to upgrade and build a new transmission line from Barren Ridge SS to Castaic Power Plant near Santa Clarita. The Barren Ridge Renewable Transmission Project (BRRTP) will enable LADWP to interconnect potential wind, solar and other renewable resources from the Mojave Desert and Tehachapi Mountain areas.

The BRRTP includes:

(1). Construction of a 230kV line from Barren Ridge SS to Castaic Power Plant. The planned in-service date is 2011.

(2). Upgrading of the existing Owens Gorge-Rinaldi 230kV line between Barren Ridge SS and Rinaldi Substation. The planned in-service date is 2012.

(3). Construction of a new Haskell Switching Station to be located north of Santa Clarita, just south of the Angeles National Forest. The planned in-service date is 2013.

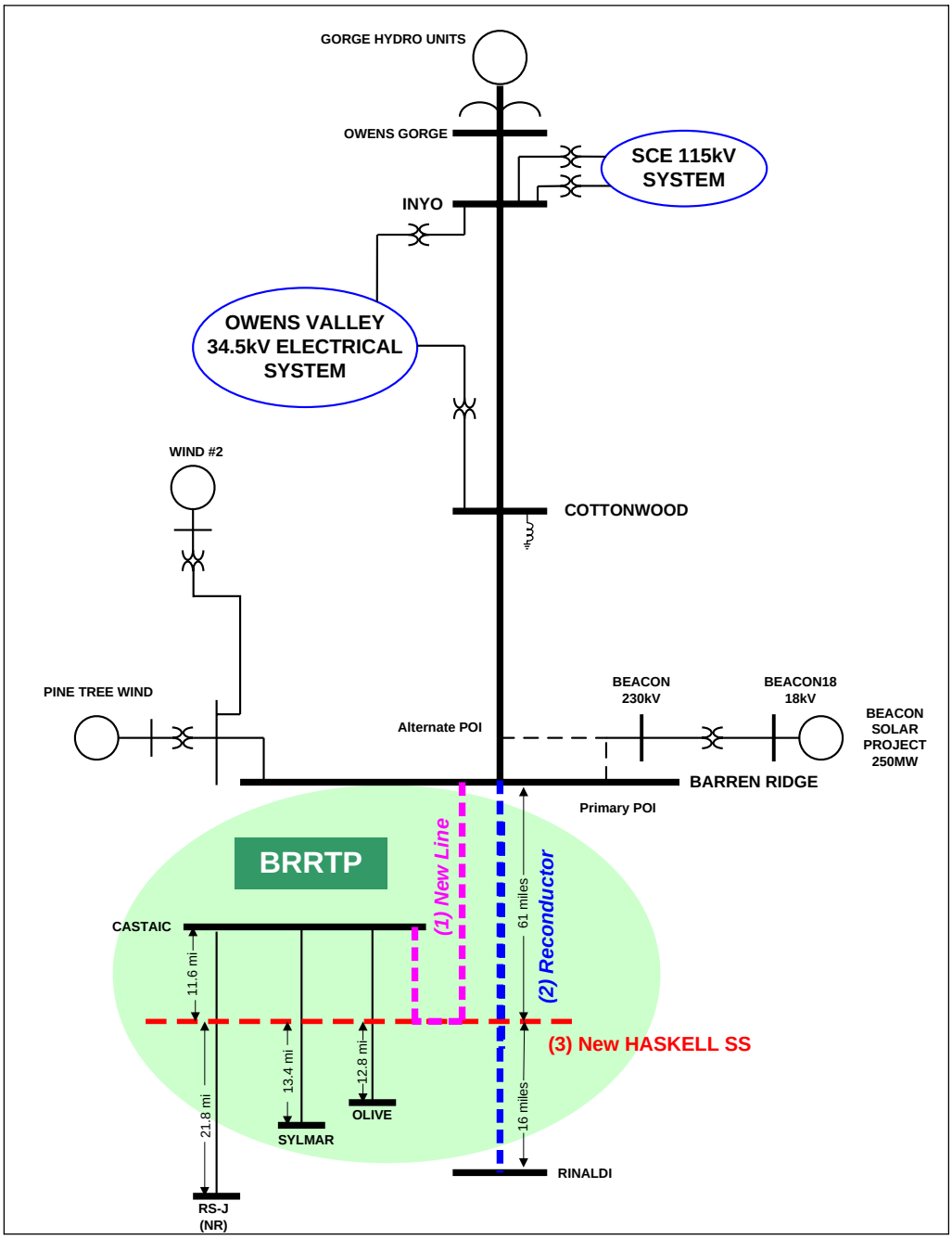

Figure 2. Barren Ridge Renewable Transmission Project

The purpose of this SIS is to evaluate the impact of BSP interconnection to the existing and planned transmission system and to identify preliminary system additions required to interconnect the BSP at the proposed POI.

This SIS does not determine LADWP's ability to provide transmission delivery service for the BSP. The basis of this study is to test system steady state, transient performance with the inclusion of BSP against the WECC/NERC Reliability Criteria (Criteria), and fault-duty analysis.

The final design and cost estimate of the system reinforcements required for interconnection will also be determined in the Facilities Study.

The study results are highly dependent on the steady state and dynamic modeling data of the BSP provided by FPL. Any changes or revisions to the models may invalidate the study results and thus may require a new study to be performed. LADWP does not endorse nor validate the accuracy of the models provided by FPL.

Base Case Development

One pre-project and six post-project basecases were developed for each of the Heavy Summer and the Light Autumn system conditions. Six post-project basecases for each season consisted of:

1. Primary POI configuration with the existing Barren Ridge-Rinaldi Section.
2. Primary POI configuration the existing Barren Ridge-Rinaldi Section and the new Barren Ridge-Castaic Line.
3. Primary POI configuration with the new Haskell SS, the upgraded Barren Ridge-Haskell-Rinaldi Section, and the new Barren Ridge-Haskell-Castaic Line.
4. Alternate POI configuration with the existing Barren Ridge-Rinaldi Section.
5. Alternate POI configuration with the existing Barren Ridge-Rinaldi Section and the new Barren Ridge-Castaic Line.
6. Alternative POI configuration with the new Haskell SS, the upgraded Barren Ridge-Haskell-Rinaldi Section, and the new Barren Ridge-Haskell-Castaic Line.

All cases have maximum Pine Tree and Wind #2 generation profiles as shown Figure 3

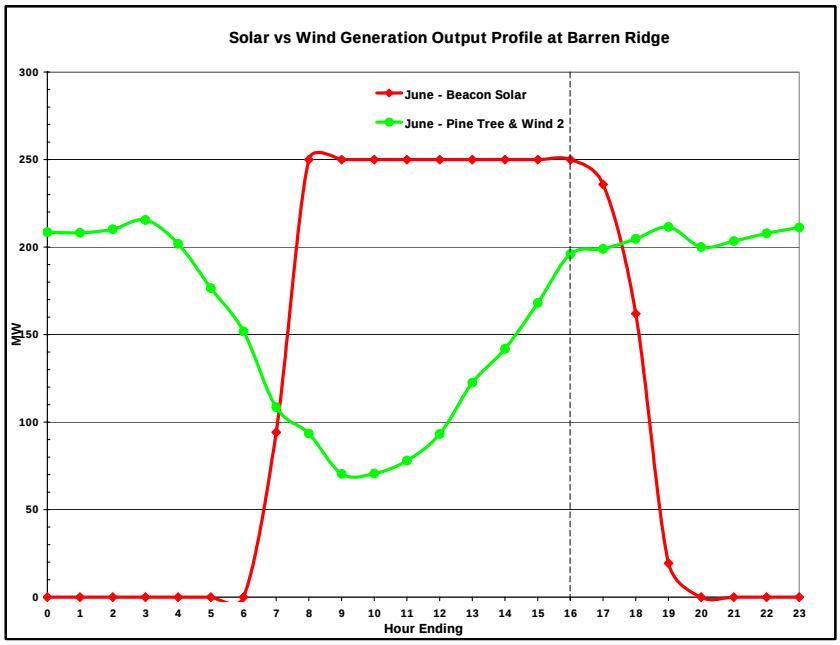

Figure 3. Maximum Solar and Wind Generation Output Profile

General Observation of Study Results

Study results reveal that system performances are constrained by post-fault transient stability. With the proper level of combined generation resources north of Barren Ridge SS and the appropriate Special Protection Scheme (SPS), system performances meet the Criteria for all primary POI cases. However, post-fault performances for alternate POI cases do not meet the Criteria under the same initial conditions. Likewise, short-circuit duties are significantly higher with the alternate POI configuration than with the primary POI configuration.

SPS are required for the following outages:

OUTAGE	Pre-BRRTP				Post-BRRTP				
	REQUIRED SPS				REQUIRED SPS				
	Trip Pine Tree Wind	Trip Wind #2	Trip Beacon Solar	Trip Cottonwood - BTAP or Trip Cottonwood - Barren Ridge	Trip Pine Tree Wind	Trip Hoffman Summit Wind	Trip Beacon Solar	Trip Cottonwood - BTAP or Trip Cottonwood - Barren Ridge	Trip OG Hydro if OG>45MW
BARREN RIDGE - RINALDI	√	√	√	√					√
COTTONWOOD - BARREN RIDGE									√
INYO - COTTONWOOD									√
PINE TREE - BARREN RIDGE	√	√			√	√			
HOFFMAN SUMMIT - PINE TREE		√				√			
BEACON - BARREN RIDGE for Primary POI BEACON TAP - BEACON for Alternate POI			√				√		

Table 1. Proposed SPS for Sectionalized Inyo-Rinaldi Outages

Post-Transient Stability Analysis

- **Pre-BRRTP system:**

  - *Heavy Summer Conditions:*

    - *Primary POI*

    a. With maximum wind generation profile of 190MW and BSP at 250MW, post-fault performances meet the Criteria when the Inyo phase shifter is set to 0MW flow and the Owens Gorge (OG) hydro units is limited to 45MW. (Appendix C, Table C2)

    b. Sensitivity cases were also studied with 2 scenarios:
       i. Maximum wind generation at 295MW, maximum BSP at 250MW, and OG hydro generation at 24.6MW. The total generation injected at the Barren Ridge SS is 551.40MW or 96.6% of the existing Barren Ridge – Rinaldi line capacity.

       ii. Maximum of OG hydro generation at 112.5MW, maximum BSP at 250MW, and wind generation at 209MW. The total generation injected at the Barren Ridge SS is 550.50MW or 96.4% of the existing Barren Ridge – Rinaldi line capacity.

    The loss of Barren Ridge -Rinaldi section resulted in voltage collapse for both cases. However, implementing additional SPS which includes the tripping all OG hydro units and the existing *SCE's Bishop Remedial Action Scheme* (or *System Operating Bulletin (SOB) N°. 214)*[1], the loss of Barren Ridge-Rinaldi section results in an acceptable post-transient voltage depression of -6.7% for scenario (b-i), and -6.2% for scenario (b-ii) at the SCE's Control 55kV load bus

    - *Alternate POI*

    Under the same operational conditions as in (a) case, the loss of Barren Ridge-Rinaldi section results in voltage collapse. However, implementing the existing *SCE's SOB 214* and the tripping of all OG hydro units, the loss of Barren Ridge-Rinaldi section results in an acceptable post-transient voltage depression of -6.5% at the SCE's Control 55kV load bus. (Appendix C, Table C4)

  - *Light Autumn Conditions:*

    - *Primary and Alternate POI*

    With and without the inclusion of BSP, post-transient voltage violations were found at 6 load buses in the Owens Valley 34. 5kV Electric System (OVES) following the loss of Cottonwood – Inyo Section (Appendix C, Table C6 C7, & C9). However, these violations would be cleared by the insertion of three additional shunt capacitors of 2.7MVAR each at three different locations. More detailed analysis will be addressed in the Facilities Study.

- **Post-BRRTP system:**

  - *Heavy Summer Conditions:*

[1] SOB 214 is designed to prevent system instability in the Bishop area under the loss of the Control-Inyokern 1 & 2 115kV lines, or loss of a single Control-Inyokern 115kV line with the SCE/LADWP Inyo tie. Under the outage conditions, SOB 214 initiates tripping of Bishop Creek units 2 through 6 and the Oxbow Qualified Facility.

♦ *Primary POI*

With maximum wind generation profile of 190MW and BSP at 250MW, post-fault performances meet the Criteria when the Inyo phase shifter is set to 0MW flow and the OG hydro units is at its maximum capacity of 110MW. However, the OG units are required to trip for the loss of Inyo-Cottonwood, or Cottonwood-Barren Ridge. (Appendix C, Table C3)

♦ *Alternate POI*

Post-fault performances of alternative POI cases do not meet the Criteria for the loss of Cottonwood-Beacon Tap or Beacon Tap-Barren Ridge. Post-transient voltage depression exceeds more than -5% at 13 OVES load buses. (Appendix C, Table C5)

- *Light Autumn Conditions:*

♦ *Primary POI*

With and without the inclusion of BSP, post-transient voltage violations were found at 14 load buses in the Owens Valley 34. 5kV Electric System (OVES) following the loss of Cottonwood – Inyo Section. These violations are pre-existing and will be addressed fully in the detailed Facilities Study. (Appendix C, Table C6 & C8)

♦ *Alternate POI*

Unacceptably high post-transient voltage occurs in the OVES under the Light Autumn conditions for the loss of Inyo-Cottonwood, or Cottonwood-BTAP, or Barren Ridge-Rinaldi Section. (Appendix C, Table C10)

Stability Analysis

- **Pre-BRRTP system:**

  - *Heavy Summer Conditions:*

♦ *Primary POI*

System swings are well damped and stable for all studied contingencies in all primary POI cases. No violations of WECC transient voltage dip and transient frequency criteria were found (Appendix C, Table C2)

♦ *Alternate POI*

System swings are well damped and stable for all studied contingencies. However, the dynamic voltage swings of six identified OVES load buses have dipped below 20% of its initial values and lasted for more than 20 cycles. This is in violation of the Minimum Operating Reliability Criteria 2 (MORC 2) (Appendix C, Table C4).

  - *Light Autumn Conditions:*

System swings for all *Primary and Alternate POI* cases are well damped and stable. No violations of WECC transient voltage dip and transient frequency criteria were found. (Appendix C, Table C7 & C9)

- **Post-BRRTP system:**

Under both *Heavy Summer and Light Autumn Conditions,* system swings for all *primary* and *alternate POI* cases are well damped and stable. No violations of WECC transient voltage dip and transient frequency criteria were found. (Appendix C, Table C3, C5, C8 & C10)

Power Flow Analysis

- *Heavy Summer Conditions:*

Steady-state analysis of both *primary* and *alternate POI cases* reveals no thermal overload in the **Pre- and Post-BRRTP system,** except for the loss of both Rinaldi-Tarzana lines, which results in the overload of the Northridge-Tarzana Line. However, this overload is resolved with partial load shed at Tarzana as an interim mitigation procedure. In addition, to address a long-term solution for this overload, LADWP is planning to upgrade the conductor of the impacted line with higher capacity.

- *Light Autumn Conditions:*

No steady-state violations and no thermal overloads were found for all contingencies in the **Pre- and Post-BRRTP system** with either the *primary* POI or the *alternate POI* configuration.

Short-Circuit Duty Analysis

With the primary POI configuration, the BSP interconnection increases the three-phase and single line-to-ground fault duties significantly at several stations along the Inyo-Rinaldi 230 kV Line but insignificantly at other stations in the LA Basin area. However, these increased duties do not exceed the existing/planned circuit breaker ratings of any station.

Compared to the primary POI, the alternate POI configuration increases the fault duties even more significantly at Cottonwood, Inyo, and Barren Ridge SS. Therefore, in regard to fault duty impact, the primary POI is more favorable that the alternate POI.

Conclusion:

Primary POI configuration has demonstrated acceptable system performance and met the Criteria with minimum impact on fault duties increase. Alternate POI configuration has failed transient and post-transient tests for certain critical contingencies and had higher fault duty impact.

Based on these results, system additions will be provided solely for the primary POI configuration in Section II.

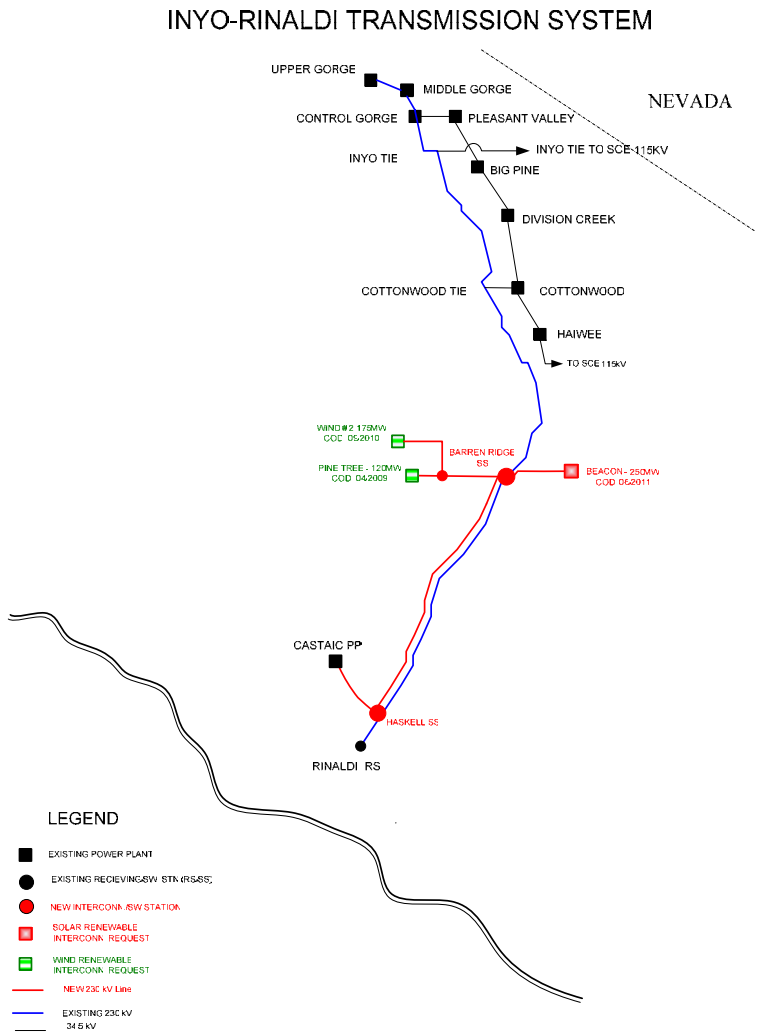

Figure 4. Inyo-Rinaldi Transmission System

II. REQUIRED SYSTEM ADDITIONS

The following is a summary of system additions needed for the interconnection of the BSP for primary POI configuration:

Add two circuit breakers and four disconnect switches at position E31 and E32 at Barren Ridge SS. The continuous rating of the new circuit breakers and disconnect switches should be 3000A at the 230kV nominal voltage. The interrupting duty of the breaker should be at the same planned level at the Barren Ridge SS of 15 kA. This report does not intend to identify an exhaustive list of equipment, e.g. tele-metering, instrumentation, protection, etc., that may be required to be installed to make this interconnection functional and meet applicable design standards.

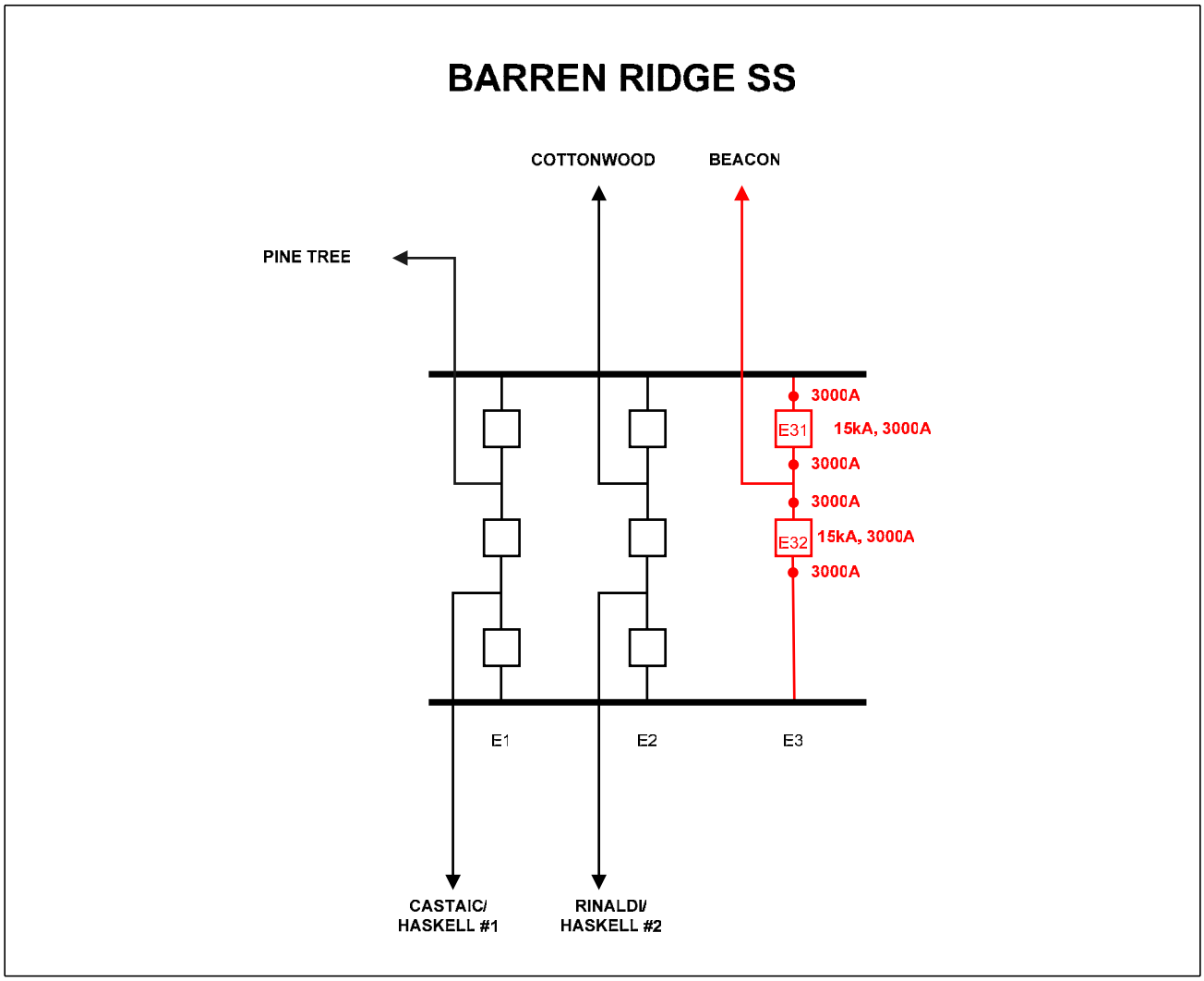

Figure 5. Barren Ridge SS Configuration

III. STUDY OBJECTIVES AND SCOPE

This study has three main objectives:

1. Assess transmission system impacts
2. Determine system additions
3. Address potential system upgrades or modifications

The original final study plan is included in Appendix A which provides information on the assumptions, methodology, criteria, list of studied contingencies, BSP Data, and BSP Substation layout. The Appendix B contains contingency analysis results and one-line diagrams. The Appendix C contains transient analysis, and post-transient analysis results. Stability plots are provided in Volume II due to the size. Appendix D summarizes the short-circuit duty results.

IV. STUDY RESULTS

1. *Development of Base Cases*

The approved WECC 2011 Heavy Summer and 2010 Light Autumn base cases were modified to include the interconnection requests ahead of the Project and to reflect the 2011 Heavy Summer Peak and 2010 Light Autumn in LADWP control area. These cases were utilized as the starting point to develop the following six scenarios:

(1) Pre-project with maximum wind generation profile at Pine Tree Substation, and maximum allowable Owens Gorge hydro generating output (Heavy Summer)

(2) Pre-project with minimum wind generation profile at Pine Tree Substation and minimum Owens Gorge hydro generating output (Light Autumn)

(3) Post-project @ primary POI with maximum wind generation profile at Pine Tree Substation and maximum allowable Owens Gorge hydro generating output (Heavy Summer)

(4) Post-project @ alternate POI with maximum wind generation profile at Pine Tree Substation and maximum allowable Owens Gorge hydro generating output (Heavy Summer)

(5) Post-project @ primary POI with minimum wind generation profile at Pine Tree Substation and minimum Owens Gorge hydro generating output (Light Autumn)

(6) Post-project @ alternate POI with minimum wind generation profile at Pine Tree Substation and minimum Owens Gorge hydro generating output (Light Autumn)

The scenarios include the WECC network representation, any expected operating conditions during the summer peak and light autumn conditions as well as different components of the BRRTP as described in Section 1. LADWP loads, generations, and major upgrades in two base cases are summarized in Table 2:

	Heavy Summer 2011	**Light Autumn 2010**
LA Load	6371 MW	3378 MW
LA Basin Generation	3096 MW	1945 MW
Owen Gorge Generation	110 MW	0 MW
Inyo Phase Shifter	0 MW	0 MW
Total Wind Generation @ Pine Tree Substation	190 MW	60 MW
RS-J / RS–E bypass	In-Service	In-Service
STS IPPDC Transfer Level	1844 MW	2400 MW

Table 2. Base Case Summary

2. *Power Flow Analysis*

Power flow studies were performed for the following contingencies in the proposed case scenarios (1) & (2):

Single Contingency

1. Adelanto-Rinaldi 500 kV line
2. Adelanto-Toluca 500 kV line
3. Victorville-Rinaldi 500 kV line
4. Adelanto-Victorville 500 kV line
5. McCullough-Victorville 500 kV line
6. Barren Ridge-Rinaldi 230 kV line with proposed Special Protection Scheme (SPS)[2]
7. Barren Ridge-Cottonwood 230 kV line with existing SPS[3]
8. Inyo-Cottonwood 230 kV line
9. Barren Ridge-Pine Tree 230 kV line with proposed SPS
10. Hoffman Summit-Pine Tree 230 kV line with proposed SPS
11. Barren Ridge-Castaic 230 kV line (*for Post-BRRTP only*)
12. Castaic-Northridge 230 kV line
13. Castaic-Sylmar 230 kV line
14. Castaic-Olive 230 kV line
15. Olive-Northridge 230 kV line
16. Rinaldi-Sylmar 230 kV line
17. Sylmar-Northridge 230 kV line
18. Rinaldi-Tarzana 230 kV line
19. Rinaldi-Glendale 230 kV line
20. Rinaldi-Valley 230 kV line
21. Toluca-Valley 230kV line

Double Contingency

1. Adelanto-Rinaldi and Victorville-Rinaldi 500 kV lines
2. Adelanto-Victorville 500kV lines 1 and 2
3. McCullough-Victorville 500 kV lines 1 and 2
4. Rinaldi-Tarzana 230 kV lines 1 and 2
5. Rinaldi-Glendale 230 kV lines 1 and 2
6. Rinaldi-Valley 230 kV lines 1 and 2
7. Valley-Toluca 230 kV lines 1 and 2

For scenarios (4) and (6), two additional single contingencies were studied along with the above list. These are:

- Cottonwood-Beacon Tap 230 kV with existing SPS
- Beacon Tap-Barren Ridge 230 kV with proposed SPS[4]

Primary POI & Alternate POI cases:

No steady-state violations and no thermal overloads were found for all the studied contingencies in all scenarios, except for the pre-existing Northridge-Tarzana line overload caused by the loss of two Rinaldi-Tarzana lines. Partial load shed at Tarzana was proposed as an interim mitigation plan to resolve this pre-existing condition. In addition, LADWP is planning to upgrade the impacted line as a long-term solution for this overload.

3. ***Transient Stability Analysis***

Transient stability studies were performed for the following contingencies

Single Contingency

1. Adelanto-Rinaldi 500 kV line
2. Adelanto-Toluca 500 kV line
3. Victorville-Rinaldi 500 kV line

[2] The proposed SPS includes direct trip of all generations connected at Pine Tree and North of Barren Ridge buses.
[3] The existing SPS includes direct trip of the Owens Control-Inyo 230 kV section.
[4] The proposed SPS includes direct trip of the Beacon Project

4. Adelanto-Victorville 500 KV line
5. McCullough-Victorville 500 kV line
6. Barren Ridge-Rinaldi 230 kV line with the proposed SPS
7. Barren Ridge-Cottonwood 230 kV line with SPS for scenarios (3) & (5)
8. Barren Ridge-Beacon 230 kV tie with the proposed SPS for scenarios (3) & (5)
9. Cottonwood-Beacon Tap 230 kV line with the proposed SPS for scenarios (4) & (6)
10. Beacon Tap-Barren Ridge 230 kV with SPS for scenarios (4) & (6)
11. Beacon Tap-Beacon 230 kV tie with the proposed SPS for scenarios (4) & (6)
12. Barren Ridge-Pine Tree 230 kV line with SPS
13. Hoffman Summit-Pine Tree 230 kV line with SPS

Double Contingency

1.Adelanto-Rinaldi and Victorville-Rinaldi 500 kV lines
2. Adelanto-Victorville 500kV lines 1 and 2
3. McCullough-Victorville 500 kV lines 1 and 2
4. Rinaldi-Tarzana 230 kV lines 1 and 2
5. Rinaldi-Glendale 230 kV lines 1 and 2
6. IPP Bipole with SPS

Primary POI cases:

- Stable and well damped performances were achieved for all studied contingencies in all scenarios
- No violations of WECC transient voltage dip criteria were found in all scenarios
- No violations of WECC transient frequency criteria were found in all scenarios.

Alternate POI cases:

- Stable and well damped performances were achieved for all studied contingencies in all scenario
- **Violations of WECC's MORC 2 were found at 6 OVES load buses in scenario (4) and pre-BRRTP system**.
- No violations of WECC transient frequency criteria were found in all scenarios

4. Post-Transient Stability Analysis (Study Criteria and Contingency List)

Post-transient stability studies were performed for the following contingencies

Single Contingency

1. Adelanto-Rinaldi 500 kV line
2. Adelanto-Toluca 500 kV line
3. Victorville-Rinaldi 500 kV line
4. Adelanto-Victorville 500 KV line
5. McCullough-Victorville 500 kV line
6. Barren Ridge-Rinaldi 230 kV line with the proposed SPS
7. Barren Ridge-Cottonwood 230 kV line with SPS for scenarios (3) & (5)
8. Barren Ridge-Beacon 230 kV tie with the proposed SPS for scenarios (3) & (5)
9. Cottonwood-Beacon Tap 230 kV line with the proposed SPS for scenarios (4) & (6)
10. Beacon Tap-Barren Ridge 230 kV with SPS for scenarios (4) & (6)
11. Beacon Tap-Beacon 230 kV tie with the proposed SPS for scenarios (4) & (6)
12. Barren Ridge-Pine Tree 230 kV line with SPS
13. Hoffman Summit-Pine Tree 230 kV line with SPS

Double Contingency

1.Adelanto-Rinaldi and Victorville-Rinaldi 500 kV lines
2. Adelanto-Victorville 500kV lines 1 and 2
3. McCullough-Victorville 500 kV lines 1 and 2
4. Rinaldi-Tarzana 230 kV lines 1 and 2
5. Rinaldi-Glendale 230 kV lines 1 and 2
6. IPP Bipole with SPS

Primary POI cases:

- No violations were identified based on voltage deviation for scenarios (3) in both pre and post-BRRTP systems.
- Post-transient voltage violations were found at 6 OVES load buses for scenarios (2) and (5) in the Pre-BRRTP system. These violations are pre-existing conditions. Proposed mitigation plan to clear this pre-existing violations, such as installing three additional shunt capacitor banks of 2.7 MVAR at DS154, DS156 and DS158 stations, will be further evaluated in the Facilities Study

Alternate POI cases:

- **Post-transient voltage deviation exceeds more than 5% (-6.5%) at SCE's Control 55 kV load bus for scenario 4 in the pre-BRRTP system**.
- **Post-transient voltage deviation exceeds more than 5% at 13 OVES 34.5 kV load bus for scenario 4 in the post-BRRTP system.**
- Post-transient voltage violations were found at 6 OVES load buses for scenarios (2) and (6) in the Pre-BRRTP system as in the Primary POI cases. These violations are pre-existing conditions and can be mitigated with the proposed shunt capacitor banks installation as mentioned above.
- **Unacceptably high post-transient voltages were found in the OVES for scenario (6) in the post-BRRTP system, as a result of the loss of Inyo-Cottonwood, or Cottonwood-Barren Ridge, or Barren Ridge-Rinaldi Section.**

5. Short-Circuit Analysis

Using Siemen's PTI version 29 program, LADWP performed short-circuit studies to determine the three-phase and single line-to-ground fault duties on existing facilities before and after the proposed BSP interconnection. Following is the summary of short-circuit study results:

Primary POI configuration- Pre-BRRTP:

- Three-phase duties (in Amps)

Stations	Pre-BSP	Post-BSP	Differential	% change
Barren Ridge	2971.92	4098.78	1126.86	37.92
Pine Tree	2710.37	3606.02	895.65	33.05
Hoffman Summit	2544.78	3260.46	715.68	28.12
Cottonwood	1972.95	2153.13	180.18	9.13
Inyo	2069.66	2150.61	80.95	3.91
Rinaldi	67333.46	67761.23	427.77	0.64
Sylmar	65037.32	65338.56	301.24	0.46
Northridge	34126.16	34191.57	65.41	0.19
Olive	20017.31	20035.16	17.85	0.09
Castaic	27123.39	27139.25	15.86	0.06
Beacon		4054.68		

Table 3. Three-Phase Fault Duties for Primary POI Configuration

- Single-phase duties (in Amps)

Stations	Pre-BSP	Post-BSP	Differential	% change
Barren Ridge	2220.33	3768.24	1547.91	69.72
Pine Tree	2018.84	3168.06	1149.22	56.92
Hoffman Summit	1884.65	2776.83	892.18	47.34
Cottonwood	1684.52	1860.92	176.40	10.47
Inyo	2278.71	2354.84	76.13	3.34
Rinaldi	71861.06	72267.93	406.87	0.57
Sylmar	65914.07	66138.24	224.17	0.34
Northridge	34728.96	34777.05	48.09	0.14
Olive	15703.49	15711.26	7.77	0.05
Castaic	29402.31	29415.44	13.13	0.04
Beacon		3749.55		

Table 4. Single-Phase Fault Duties for Primary POI Configuration

Alternate POI configuration – Pre-BRRTP:

- Three-phase duties (in Amps)

Stations	Pre-BSP	Post-BSP	Differential	% change
Barren Ridge	2971.92	4188.03	1216.11	40.920
Pine Tree	2710.37	3673.43	963.06	35.532
Hoffman Summit	2544.78	3314.85	770.07	30.261
Cottonwood	1972.95	2714.78	741.83	37.600
Inyo	2069.66	2359.14	289.48	13.987
Rinaldi	67333.46	67785.17	451.71	0.671
Sylmar	65037.32	65355.36	318.04	0.489
Northridge	34126.16	34195.14	68.98	0.202
Olive	20017.31	20036.21	18.90	0.094
Castaic	27123.39	27140.19	16.80	0.062
Beacon		4065.60		
BTAP		4121.36		

Table 5. Three-Phase Fault Duties for Alternate POI Configuration

- Single-phase duties (in Amps)

Stations	Pre-BSP	Post-BSP	Differential	% change
Barren Ridge	2220.33	3820.95	1600.62	72.089
Pine Tree	2018.84	3204.29	1185.45	58.719
Hoffman Summit	1884.65	2804.24	919.59	48.794
Cottonwood	1684.52	2327.54	643.02	38.172
Inyo	2278.71	2534.91	256.20	11.243
Rinaldi	71861.06	72285.15	424.09	0.590
Sylmar	65914.07	66149.06	234.99	0.357
Northridge	34728.96	34779.47	50.51	0.145
Olive	15703.49	15711.68	8.19	0.052
Castaic	29402.31	29416.07	13.76	0.047
Beacon		3785.88		
BTAP		3812.24		

Table 6. Single-Phase Fault Duties for Alternate POI Configuration

Primary POI configuration- Post-BRRTP:

- Three-phase duties (in Amps)

Stations	Pre-BSP	Post-BSP	Differential	% change
Barren Ridge	3441.38	4529.60	1088.22	31.62
Pine Tree	3096.56	3927.84	831.28	26.85
Hoffman Summit	2842.46	3518.13	675.67	23.77
Cottonwood	2058.32	2203.53	145.21	7.05
Inyo	2109.03	2171.82	62.79	2.98
Rinaldi	68333.37	68560.28	226.91	0.33
Sylmar	65521.05	65747.64	226.59	0.35
Northridge	35249.55	35382.80	133.25	0.38
Olive	22754.76	22845.06	90.30	0.40
Castaic	29993.04	30203.78	210.74	0.70
Beacon		4470.17		

Table 7. Three-Phase Fault Duties for Primary POI Configuration

- Single-phase duties (in Amps)

Stations	Pre-BSP	Post-BSP	Differential	% change
Barren Ridge	2528.40	4071.48	1543.08	61.03
Pine Tree	2274.83	3373.23	1098.4	48.28
Hoffman Summit	2079.74	2930.66	850.92	40.91
Cottonwood	1743.11	1889.16	146.05	8.38
Inyo	2312.42	2371.53	59.11	2.56
Rinaldi	73179.86	73367.60	187.74	0.26
Sylmar	66561.71	66733.70	171.99	0.26
Northridge	35783.9	35887.32	103.42	0.29
Olive	17849.48	17898.72	49.24	0.28
Castaic	32629.91	32826.47	196.56	0.60
Beacon		4042.5		

Table 8. Single-Phase Fault Duties for Primary POI Configuration

Alternate POI configuration - Post-BRRTP

- Three-phase duties (in Amps)

Stations	Pre-BSP	Post-BSP	Differential	% change
Barren Ridge	3441.38	4618.95	1177.57	34.22
Pine Tree	3096.56	3993.36	896.80	28.96
Hoffman Summit	2842.46	3570.00	727.54	25.60
Cottonwood	2058.32	2822.93	764.61	37.15
Inyo	2109.03	2393.27	284.24	13.48
Rinaldi	68333.37	68574.14	240.77	0.35
Sylmar	65521.05	65761.50	240.45	0.37
Northridge	35249.55	35390.88	141.33	0.40
Olive	22754.76	22850.63	95.87	0.42
Castaic	29993.04	30216.69	223.65	0.75
Beacon		4448.64		
BTAP		4522.25		

Table 9. Three-Phase Fault Duties for Alternate POI Configuration

- Single-phase duties (in Amps)

Stations	Pre-BSP	Post-BSP	Differential	% change
Barren Ridge	2528.40	4122.93	1594.53	63.06
Pine Tree	2274.83	3407.67	1132.84	49.80
Hoffman Summit	2079.74	2956.28	876.54	42.15
Cottonwood	1743.11	2388.23	645.12	37.01
Inyo	2312.42	2560.95	248.53	10.75
Rinaldi	73179.86	73377.47	197.61	0.27
Sylmar	66561.71	66742.62	180.91	0.27
Northridge	35783.90	35892.57	108.67	0.30
Olive	17849.48	17900.82	51.34	0.29
Castaic	32629.91	32836.13	206.22	0.63
Beacon		4055.94		
BTAP		4094.48		

Table 10. Single-Phase Fault Duties for Alternate POI Configuration

Conclusion:

Based on the provided BSP models and with the assumption of maximum steady generation at BSP, no adverse system impacts were found with the BSP interconnection at Barren Ridge SS in terms of transient and post-transient stability for **primary POI**. System performance meets all the applicable NERC/WECC reliability standards under normal, (N-1) and (N-2) contingency conditions with the proposed SPS for **primary POI**.

BSP interconnection increases both three-phase and single-phase duties at several stations along the Inyo-Rinaldi line. These increased duties do not exceed the planned interrupting duty of 15kA of all Barren Ridge SS circuit breakers.

At the point of the interconnection, two circuit breakers and four disconnect switches are required at the positions E31 and E32 of the Barren Ridge SS. The continuous rating of the new circuit breakers and disconnect switches should be 3000A at the 230 kV nominal voltage. The interruptible rating of the breakers should match with the existing level of 15kA.

These study results are highly reliant on the steady state and dynamic modeling data of the BSP. Any changes or revisions to the models may invalidate the study results and thus may require a new study to be performed. LADWP does not endorse nor validate the accuracy of the models provided by BSP.

V. DISCLAIMER

This SIS does not determine LADWP's ability to provide transmission delivery service for the BSP. The basis of this study is to test system steady state and transient performance with the inclusion of BSP against the WECC/NERC Reliability Criteria. The study accuracy and results are highly dependent on the steady state and dynamic modeling data provided by FPL

Not all technical issues relevant to LADWP's transmission system are covered in this study. Additional studies on voltage regulation of the OVES may be required during the design phase.

The final design and cost estimate of the system reinforcements required for interconnection will be carried out in a separate Facilities Study.

APPENDIX A

ORIGINAL SYSTEM IMPACT STUDY PLAN

5

LOS ANGELES DEPARTMENT OF WATER & POWER

SYSTEM IMPACT STUDY PLAN

PROJECT BEACON

Original

March 12, 2008

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Original

GLOSSARY

FPL	FPL Energy, LLC
LADWP	Los Angeles Department of Water and Power
NERC	North American Electric Reliability Corporation
POI	Point of Interconnection
SIS	System Impact Study
SPS	System Protection Scheme
SS	Switching Station
WECC	Western Electricity Coordinating Council

Original

I. INTRODUCTION

On September 10, 2007, FPL Energy, LLC ("FPL") submitted an Interconnection Request to Los Angeles Department of Water and Power ("LADWP") for their proposed Large Generating Facility, namely Project Beacon ("Project"), to be interconnected to the LADWP transmission system.

The proposed Project site is located approximately 1 mile to the north of LADWP's Barren Ridge Switching Station ("SS") site and will consist of a 250 MW steam turbine generator. The steam for the prime mover will be created by utilizing collected solar energy, through a heat-exchanger. The Project will interconnect to the LADWP owned Barren Ridge 230-kV Switching Station ("SS") as the primary point of interconnection ("POI"). The alternate POI is proposed to be at a location within the Project property line and adjacent to the LADWP 230 kV Line, approximately 1mile north of the primary POI. The planned commercial operation date is June 1, 2011.

LADWP Transmission Planning will perform the System Impact Study ("SIS") to assess the impact of the proposed Project on the reliability of the WECC system. This SIS will consider the critical base cases, which described in Section IV-1, along with identified network upgrades associated with higher queued interconnection requests.

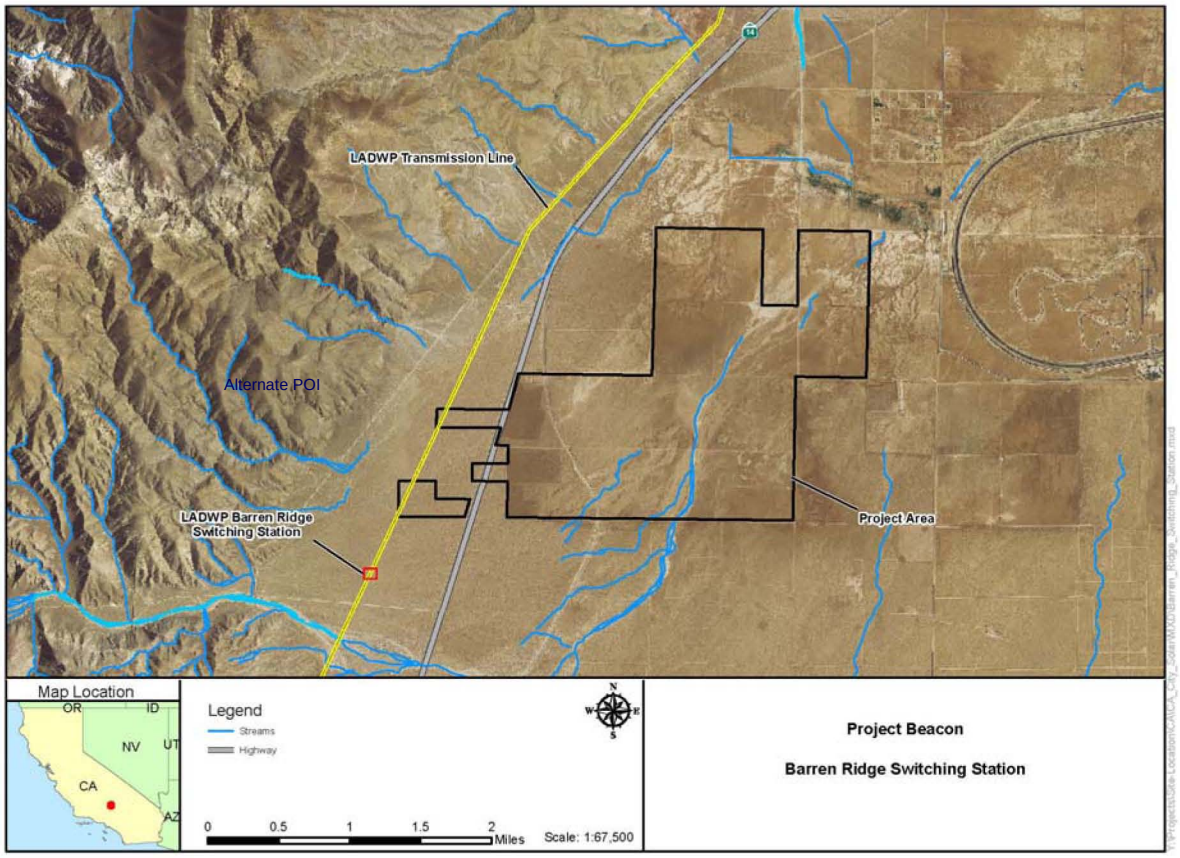


Figure 1 – Approximate proposed Project site and LADWP 230kV Line

II. OBJECTIVES

The proposed SIS will provide:

(1) An evaluation of the transmission system impacts.

(2) A list of system impacts, if any

(3) Potential system upgrades

III. STUDY SCOPE

Power flow, short-circuit, transient stability and post-transient studies of the entire WECC system will be conducted based on the heavy summer and light autumn conditions. This effort will consist of:

- Base Case Development
- Power Flow Analysis
- Short-Circuit Analysis
- Transient Stability Analysis
- Post-Transient Stability Analysis

IV. STUDY METHODOLOGY

The study will be performed according to the methodology as follows:

- The power flow base cases and dynamic stability data including the new WECC approved governor model will be developed in General Electric PSLF 16.1 format.
- The network topology and loads will reflect information provided to WECC by each respective area.
- The study will comply with the WECC/NERC planning standards.

1. Development of Base Cases

A base case system representation includes all the proposed upgrades in the LADWP area and any generator and transmission interconnection requests that are currently in LADWP's interconnection application queue ahead of the Project.

The approved WECC 2011 Heavy Summer and 2010 Light Autumn base cases will be modified to include the interconnection requests ahead of the Project and to reflect the 2011 Heavy Summer Peak and 2011 Light Autumn in LADWP control area. These cases will be utilized as the starting point to develop the following 6 scenarios:

(1) Pre-project with maximum wind generation profile at Pine Tree Substation, and maximum Owens Gorge hydro generating output (Heavy Summer)

Original

(2) Pre-project with minimum wind generation profile at Pine Tree Substation and minimum Owens Gorge hydro generating output (Light Autumn)

(3) Post-project @ primary POI with maximum wind generation profile at Pine Tree Substation and maximum Owens Gorge hydro generating output (Heavy Summer)

(4) Post-project @ alternate POI with maximum wind generation profile at Pine Tree Substation and maximum Owens Gorge hydro generating output (Heavy Summer)

(5) Post-project @ primary POI with minimum wind generation profile at Pine Tree Substation and minimum Owens Gorge hydro generating output (Light Autumn)

(6) Post-project @ alternate POI with maximum wind generation profile at Pine Tree Substation and maximum Owens Gorge hydro generating output (Light Autumn)

All base cases will include the WECC network representation, any expected operating conditions during the summer peak and light autumn conditions. LADWP loads, generations, and major upgrades in two base cases are summarized as below:

	Heavy Summer 2011	Light Autumn 2011
LA Load	6959 MW	3704 MW
LA Generation	5672 MW	4163 MW
Owen Gorge Generation	110 MW	0 MW
Inyo Phase Shifter	0- 50 MW	0- 50 MW
Pine Tree Wind Generation	190 MW	60 MW
RS-J/ RS–E bypass	In-Service	In-Service
STS IPPDC Transfer Level	2400 MW	2400 MW

2. Power Flow Analysis (Study Criteria and Contingency List)

Power flow studies will be performed under normal, and single and double contingency conditions to ensure the Project meets the planning standards.

(1) Study Criteria under normal conditions:

- Bus voltages must be maintained between 0.95p.u. and 1.05p.u. unless specific minimum operating voltage requirements exist.
- All line and transformer loadings must be below normal continuous ratings.
- ±10 MVAR flow to the primary POI or the alternate POI

(2) Study Criteria during contingency conditions:

Original

- No transmission element shall be loaded above its emergency rating as stated in the base case.
- Equipment emergency voltage limits (high or low) shall not be exceeded.
- Bus voltage deviations from the base case voltage shall not exceed established planning limits.
- No loss of load or no voltage collapse for single contingency. This does not apply to radially-fed load.

The following contingencies will be studied for proposed case scenarios (1) & (2)

Single Contingencies

1. Adelanto-Rinaldi 500 kV line
2. Adelanto-Toluca 500 kV line
3. Victorville-Rinaldi 500 kV line
4. Adelanto-Victorville 500 KV Line
5. McCullough-Victorville 500 kV line
6. Barren Ridge-Rinaldi 230 kV line with proposed Special Protection Scheme ("SPS")[1]
7. Barren Ridge-Cottonwood 230 kV line with existing SPS[2]
8. Barren Ridge-Pine Tree 230 kV line with proposed SPS
9. Hoffman Summit-Pine Tree 230 kV line with proposed SPS
10. Castaic-Northridge 230 kV line
11. Castaic-Sylmar 230 kV line
12. Castaic-Olive 230 kV line
13. Olive-Northridge 230 kV line
14. Rinaldi-Sylmar 230 kV line
15. Sylmar-Northridge 230 kV line
16. Rinaldi-Tarzana 230 kV line
17. Rinaldi-Glendale 230 kV line
18. Rinaldi-Valley 230 kV line
19. Toluca-Valley 230kV line

Double Contingency

1. Adelanto-Rinaldi and Victorville-Rinaldi 500 kV lines
2. Adelanto-Victorville 500kV lines 1 and 2
3. McCullough-Victorville 500 kV lines 1 and 2
4. Rinaldi-Tarzana 230 kV lines 1 and 2
5. Rinaldi-Glendale 230 kV lines 1 and 2
6. Rinaldi-Valley 230kV lines 1 and 2
7. Valley-Toluca 230kV lines 1 & 2

For scenarios (4) and (6), two more single contingencies will be studied along with the above list. These are:

- Cottonwood-Beacon Tap 230 kV with existing SPS
- Beacon Tap-Barren Ridge 230 kV with proposed SPS[3]

[1] The proposed SPS includes direct trip of all generations connected at Pine Tree and North of Barren Ridge buses as well as the DWP-SCE Tie at Inyo 230 kV bus.
[2] The existing SPS includes direct trip of the Owens Control-Inyo 230 kV section.
[3] The proposed SPS includes direct trip of the Beacon Project and the DWP-SCE Tie at Inyo 230 kV bus

Original

3. Transient Stability Analysis (Study Criteria and Contigency List)

Transient stability studies will be performed to ensure that the dynamic performance of the pre- and post-Project meets the WECC/NERC reliability criteria.

Study Criteria:

a. All machines in the system shall remain in synchronism as demonstrated by their relative rotor angles.

b. Induction motor will be modeled at 20% of the total load across the WECC region

c. System stability is evaluated based on the damping of the relative rotor angles and the damping of the voltage magnitude swings.

d. The transient voltage dip should be maintained above 0.80 p.u. at Adelanto and Sylmar.

e. Other transient voltage dips and duration requirements must meet the criteria of the WECC/NERC Planning Standards (refer to Appendix 2).

The following contingencies will be studied for post project base cases for transient stability:

Single Contingencies

1. Adelanto-Rinaldi 500 kV line
2. Adelanto-Toluca 500 kV line
3. Victorville-Rinaldi 500 kV line
4. Adelanto-Victorville 500 KV Line
5. McCullough-Victorville 500 kV line
6. Barren Ridge-Rinaldi 230 kV line with the proposed SPS
7. Barren Ridge-Cottonwood 230 kV line with SPS for scenarios and (3) and (5)
8. Barren Ridge-Beacon 230 kV tie with SPS for scenarios (3) and (5)
9. Cottonwood-Beacon Tap 230 kV line with the proposed SPS for scenarios (4) and (6)
10. Beacon Tap-Barren Ridge 230 kV with SPS for scenarios (4 and (6)
11. Beacon Tap-Beacon 230 kV tie with the SPS for scenarios (3) and (6)
12. Barren Ridge-Pine Tree 230 kV line with SPS
13. Hoffman Summit-Pine Tree 230 kV line with SPS

Double Contingencies

1.Adelanto-Rinaldi and Victorville-Rinaldi 500 kV lines
2. Adelanto-Victorville 500kV lines 1 and 2
3. McCullough-Victorville 500 kV lines 1 and 2
4. Rinaldi-Tarzana 230 kV lines 1 and 2
5. Rinaldi-Glendale 230 kV lines 1 and 2
6. IPP Bipole with SPS

4. Post-Transient Stability Analysis (Study Criteria and Contingency List)

Study Assumptions:

a. All loads will be modeled as constant MVA during the first few minutes following an outage or disturbance.

b. All voltages at distribution substations will be restored to normal values by the transformer tap changers and other voltage control devices.

Original

c. Generator MVAR limits will be modeled as a single value for each generator since the reactive power capability curve will not be modeled in the program output.

d. No manual operator intervention is allowed to increase the generator MVAR flow.

e. Remedial actions schemes such as generator dropping, load shedding and blocking of automatic generation control (AGC) will not be considered for single contingencies.

f. Shunt capacitors (132 MVARS) at Adelanto and Marketplace will be used if the post-transient voltage deviation exceeds 5% at those buses. Although modeled as shunt capacitors the actual devices are automatically controlled Static Var Compensators.

g. Other Assumptions:
   - Area Interchange: Disabled
   - Governor Blocking: baseload flag will be used per WECC practice
   - DC Line Transformer Tap Automatic Adjustment: Enabled
   - Generator Voltage Control set to local except for Palo Verde, and selected Northwest generation
   - Phase Shifter Control: Disabled
   - Switched Shunt Devices: Disabled

Study Criteria:

The post-transient voltage deviations should meet the WECC/NERC Planning Standards (refer to Appendix 2).

The following contingencies will be studied for post-project post-transient stability

Single Contingencies

1. Adelanto-Rinaldi 500 kV line
2. Adelanto-Toluca 500 kV line
3. Victorville-Rinaldi 500 kV line
4. Adelanto-Victorville 500 KV line
5. McCullough-Victorville 500 kV line
6. Barren Ridge-Rinaldi 230 kV line with SPS
7. Barren Ridge-Cottonwood 230 kV line with SPS
8. Barren Ridge-Pine Tree 230 kV line with SPS
9. Hoffman Summit-Pine Tree 230 kV line with SPS

Double Contingencies

1.Adelanto-Rinaldi and Victorville-Rinaldi 500 kV lines
2. Adelanto-Victorville 500kV lines 1 and 2
3. McCullough-Victorville 500 kV lines 1 and 2
4. Rinaldi-Tarzana 230 kV lines 1 and 2
5. Rinaldi-Glendale 230 kV lines 1 and 2
6. IPP Bipole with SPS

Original

5. Short-Circuit Analysis

Using Siemen's PTI version 29 program, LADWP will conduct short-circuit studies to determine the three-phase and single line-to-ground fault duties on existing facilities before and after the proposed Project addition with the following assumptions:

- All transmission components are in service
- All queued generation and transmission projects are represented and modelled

V. PROPOSED STUDY SCHEDULE

1.	Base Case Development	March 14, 2008
2.	Power Flow Study	March 28, 2008
3.	Transient and Post-Transient Stability Studies	April 15, 2008
4.	Short-Circuit Study	April 30, 2008
5.	Study Report	May 15, 2008

VI. DISCLAIMER

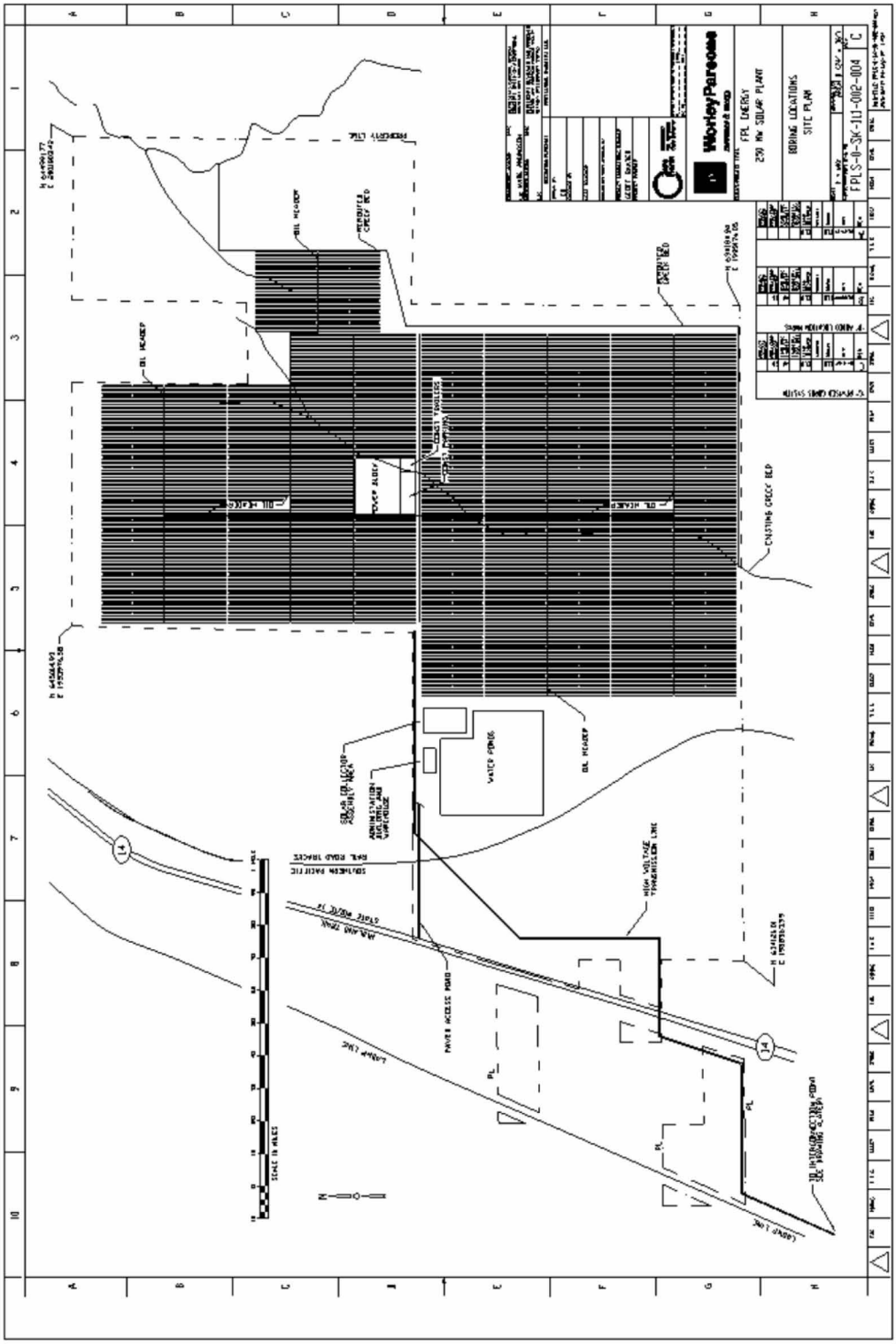
This SIS does not determine LADWP's ability to provide transmission delivery service for the Project. The basis of this study is to test system steady state and transient performance with the inclusion of Project against the WECC/NERC Reliability Criteria. The study accuracy and results are highly dependent on the steady state and dynamic modeling data provided by FPL

Not all technical issues relevant to LADWP's transmission system are covered in this study plan. Additional design studies on the Project integration may be required during the design phase. The final design and cost estimate of the system reinforcements required for interconnection will be carried out in a separate Facilities Study.

Original

Attachment 1- Beacon Project Substation

Original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FPL ENERGY
250 MW SOLAR PLANT
BORING LOCATIONS
SITE PLAN
FPL S-0-SK-111-002-004
C
PROPERTY LINE
PERMITTED CREEK BED
OIL HEADER
EXISTING CREEK BED
WATER PONDS
ADMINISTRATION AND MAINTENANCE WAREHOUSE
SOUTHERN PACIFIC RAIL ROAD TRACKS
HIGH VOLTAGE TRANSMISSION LINE
WATER ACCESS ROAD
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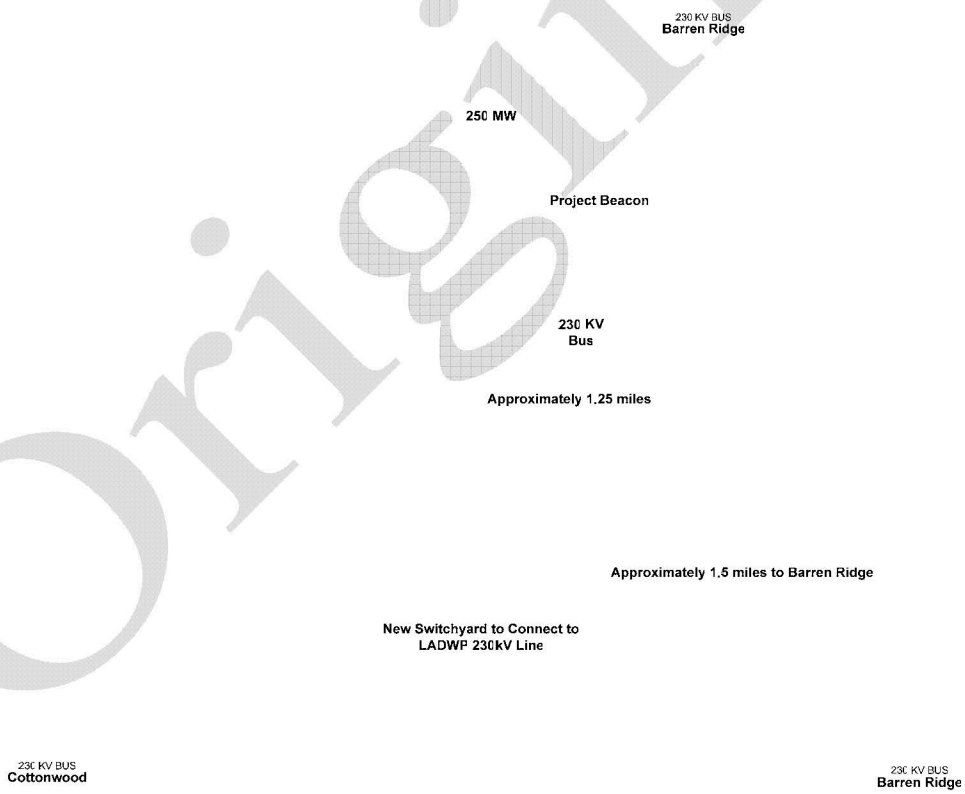
Attachment 2-Beacon Project Data Submittals

Original

Project Beacon
250 MW, Primary Point of
Interconnection
Conceptual One Line Diagram
10 - 29 - 2007



Project Beacon
250 MW, Alternate Point of
Interconnection
Conceptual One Line Diagram
10 - 29 - 2007

Original

1. Interconnection Transmission Line using 100 MVA

Table 1. Line Parameters

Line Name	R	X	B	X2	R0	X0	Length (miles)	Conductor Type
Beacon-Barren Ridge 230 kV (Primary POI #1)	0.00024	0.00148	0.002858	0.00148	0.000945	0.003956	1	954 ACSR
Beacon- Beacon Tap 230 kV (Alternate POI#2)	0.0003	0.00185	0.0035725	0.00185	0.00118	0.004945	1.25	954 ACSR

R, X, B = positive sequence
X2 = negative sequence
R0, X0 = zero sequence

2. Station Transformer using 100 MVA

Table 2. Transformer Parameters

Transformer Name	MVA Base	R	X	R0	X0	G	B
Beacon 230/18 kV	100		0.0398				

	Vnorm (from)	Vnorm (to)	Tap (from)	Tap (to)	Variable Tap	Tap (max)	Tap (min)	Tap Step size
Beacon 230/18 kV	18 kV	230 Kv	N/A	Nom Tap	N/A	235.75 kV	224.25 kV	+/-1.25%

R, X,G, B = positive sequence
R0, X0 = zero sequence

3. Equipment Ratings

Table 3. Equipment Ratings

Equipment	Normal Rating (MVA)	Long-Term Emergency Rating (MVA)	Short-Term Emergency Rating (MVA)
Beacon-Barren Ridge 230 kV (POI #1)	402	402	402
Beacon- Beacon Tap 230 kV (POI #2)	402	402	402
Beacon 230/18 kV	335	335	335

4. Generator Data

Table 4. Generator Information

Unit	Rate (MVA)	X''1 on 100 MVA Base (pu)	X"2 on 100 MVA Base (pu)	X"0 on 100 MVA Base (pu)	Pmax MW	Pmin MW	Qmax MVars	Qmin MVars	Regulated Bus
Beacon (ST)	293.5	0.2	0.17	0.115	270	25	160	-135	Beacon 18 kV

X"1 = Positive Sequence
X"2 = Negative Sequence
X'0 = Zero Sequence

5. Dynamic Data

Original

Generator Model:**GENROU**

Name		EPCL variable	Description
T'do	6.31	tpdo	D-axis transient rotor time constant
T"do	0.037	tppdo	D-axis subtransient rotor time constant
T'qo	0.507	tpqo	Q-axis transient rotor time constant
T"qo	0.073	tppqo	Q-axis subtransient rotor time constant
H	3.71	h	Inertia constant, in sec
D	0	d	Damping factor, in p.u.
Ld	1.772	ld	D-axis synchronous reactance
Lq	1.691	lq	Q-axis synchronous reactance
L'd	0.258	lpd	D-axis transient reactance
L'q	0.454	lpq	Q-axis transient reactance
L"d	0.2	lppd	D-axis subtransient reactance
L"q	0.2	lppq	Q-axis subtransient reactance
L1	0.151	L1	Stator leakage reactance, in p.u.
Se(1.0)	0.057	S1	Saturation factor at 1.0 p.u. flux
Se(1.2)	0.0462	S12	Saturation factor at 1.2 p.u. flux
Ra	0.0025	ra	Stator resistance, in p.u.
Rcomp	0	rcomp	Compounding resistance voltage control, in p.u.
Xcomp	0	xcomp	Compounding reactance voltage control, in p.u.

Exciter Model: **EXST4B**

Name		EPCL variable	Description
Tr	0	tr	Filter time constant, in sec
Kpr	3.99	kpr	Proportional gain, in p.u.
Kir	3.99	kir	Integral gain, in p.u.
Ta	0.01	ta	Time constant, in sec
Vrmax	1	vrmax	Maximum control element output, in p.u.
Vrmin	-0.87	vrmin	Minimum control element output, in p.u.
Kpm	1	kpm	Proportional gain of field voltage regulator, in p.u.
Kim	0	kim	Integral gain of field voltage regulator, in p.u.
Vmmax	1	vmmax	Maximum field voltage regulator output, in p.u.
Vmmin	-0.87	vmmin	Minimum field voltage regulator output, in p.u.
Kg	0	kg	Excitation limiter gain, in p.u.
Kp	5.01	kp	Potential source gain, in p.u.
Angp	0	angp	Phase angle of potential source, in degrees
Ki	0	Ki	Current source gain, in p.u.
Kc	0.08	Kc	Exciter regulation factor, in p.u.
Xl	0	xl	Main generator leakage reactance, in p.u.
Vbmax	6.27	vbmax	Maximum excitation voltage

Original

Turbine/governor model: **TGOV1**

Name		EPCL variable	Description
R	0.05	r	Permanent droop, in p.u.
T1	0.5	t1	Steam bowl time constant, in sec
Vmax	1	vmax	Maximum valve position, in p.u.
Vmin	0	vmin	Minimum valve position, in p.u.
T2	3	t2	Numerator time constant of t2, t3 block, in sec
T3	10	t3	Reheater time constant, in sec
Dt	0	dt	Turbine damping coefficient, in p.u.

Power System Stabilizer: **PSS2A**

Name		EPCL variable	Description
J1	1	j1	Input signal #1 code
K1		k1	Input signal #1 remote bus number
J2	3	j2	Input signal #2 code
K2		k2	Input signal #2 remote bus number
Tw1	2	tw1	First washout on signal #1, in sec
Tw2	2	tw2	Second washout on signal #1, in sec
Tw3	2	tw3	First washout on signal #2, in sec
Tw4	0	tw4	Second washout on signal #2, in sec
T6	0	t6	Time constant on signal #1, in sec
T7	2	t7	Time constant on signal #2, in sec
Ks2	0.35	ks2	Gain on signal #2
Ks3	1	ks3	Gain on signal #2
Ks4	1	ks4	Gain on signal #2
T8	0.5	t8	Lead of ramp tracking filter
T9	0.1	t9	Lag of ramp tracking filter
n	1	n	Order of ramp tracking filter
m	5	m	Order of ramp tracking filter
T1	0.25	t1	Lead/lag time constant, in sec
T2	0.04	t2	Lead/lag time constant, in sec
T3	0.2	t3	Lead/lag time constant, in sec
T4	0.03	t4	Lead/lag time constant, in sec
Ks1	10	ks1	Stabilizer gain
Vstmax	0.1	vstmax	Stabilizer output maximum limit, in p.u.
Vstmin	-0.1	vstmin	Stabilizer output minimum limit, in p.u.

Original

Attachment 3 – Project Beacon Generation Profile

Original

Renewable Energy Project Generation Profile

Estimate Average Net MWh per Hour for Each Month.

	Jan 31	Feb 28	Mar 31	April 30	May 31	June 30	July 31	Aug 31	Sep 30	Oct 31	Nov 30	Dec 31	Hourly Total MWh
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0.0	0.0	24.4	15.4	61.7	94.2	56.2	19.5	1.7	0.0	0.0	0.0	8353.7
8	20.0	20.0	127.7	123.3	206.6	250.0	219.5	219.2	137.4	14.0	11.7	0.3	41258.4
9	46.1	59.6	172.0	215.4	250.0	250.0	250.0	250.0	244.1	110.0	61.6	10.0	58536.0
10	57.5	73.8	164.3	234.6	250.0	250.0	250.0	250.0	250.0	159.1	69.1	10.0	61542.6
11	52.4	72.6	149.0	231.4	250.0	250.0	250.0	250.0	249.5	157.0	58.3	10.0	60375.0
12	43.1	69.5	132.8	210.9	250.0	250.0	250.0	250.0	250.0	141.8	49.8	10.0	58178.0
13	44.4	74.2	134.1	218.4	250.0	250.0	250.0	250.0	250.0	139.3	58.3	10.0	58791.1
14	57.9	79.8	141.0	206.9	250.0	250.0	250.0	250.0	250.0	148.9	77.2	10.0	60094.7
15	60.0	86.2	149.8	192.1	250.0	250.0	250.0	250.0	250.0	165.3	78.8	0.0	60418.5
16	20.0	39.5	115.4	172.9	250.0	250.0	226.9	246.1	250.0	165.4	10.0	0.0	53332.8
17	0.0	0.0	15.7	139.4	213.4	235.8	192.7	215.6	184.7	94.9	0.0	0.0	39495.6
18	0.0	0.0	0.0	42.5	119.3	162.0	122.4	100.3	38.5	12.6	0.0	0.0	18281.7
19	0.0	0.0	0.0	0.0	10.0	19.4	9.8	0.5	0.0	0.0	0.0	0.0	1211.3
20	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0
Monthly Total MWh	12441.873	16103.533	41112.269	60093.79	80940	82839.7	79904	79085.8	70675.1	40560.3	14243.5	1869.21	

Annual Estimated GWh Production 579.9

Original

Appendix 1

Minimum Bus Voltage Limits In Southern California

Bus	Pre-Outage Min. Volt (p.u.)	Post-Disturbance Min. Volt (p.u.)	
Adelanto 500 kV	Flag if < 1.025	0.95	
SCE 500 kV	Flag if < 0.9975	0.966	*[Doesn't allow 5% drop]*
Sylmar 230 kV	Flag if < 0.99	0.95	
LADWP	1.00	0.95	
SCE 230 kV	Flag if < 0.95	0.90	

Original

Appendix 2

WECC Transient Stability and Post-Transient Voltage Criteria

Performance Level	Disturbance	Transient Voltage Dip Criteria	Minimum Transient Frequency	Post-Transient Voltage Deviation
B	Generator One Circuit One Transformer PDCI	Max V Dip – 25% Max Duration of V Dip Exceeding 20% - 20 cycles Not to exceed 30% at non-load buses.	59.6 Hz for 6 cycles or more at a load bus.	Not to exceed 5% at any bus.*
C	Two Generators Two Circuits IPP DC	Max V Dip – 30% at any bus. Max Duration of V Dip Exceeding 20% - 40 cycles at load buses.	59.0 Hz for 6 cycles or more at a load bus.	Not to exceed 10% at any bus.

* SCE buses allowed to deviate 7%

Original

APPENDIX B

POWER FLOW RESULTS AND ONE-LINE DIAGRAMS

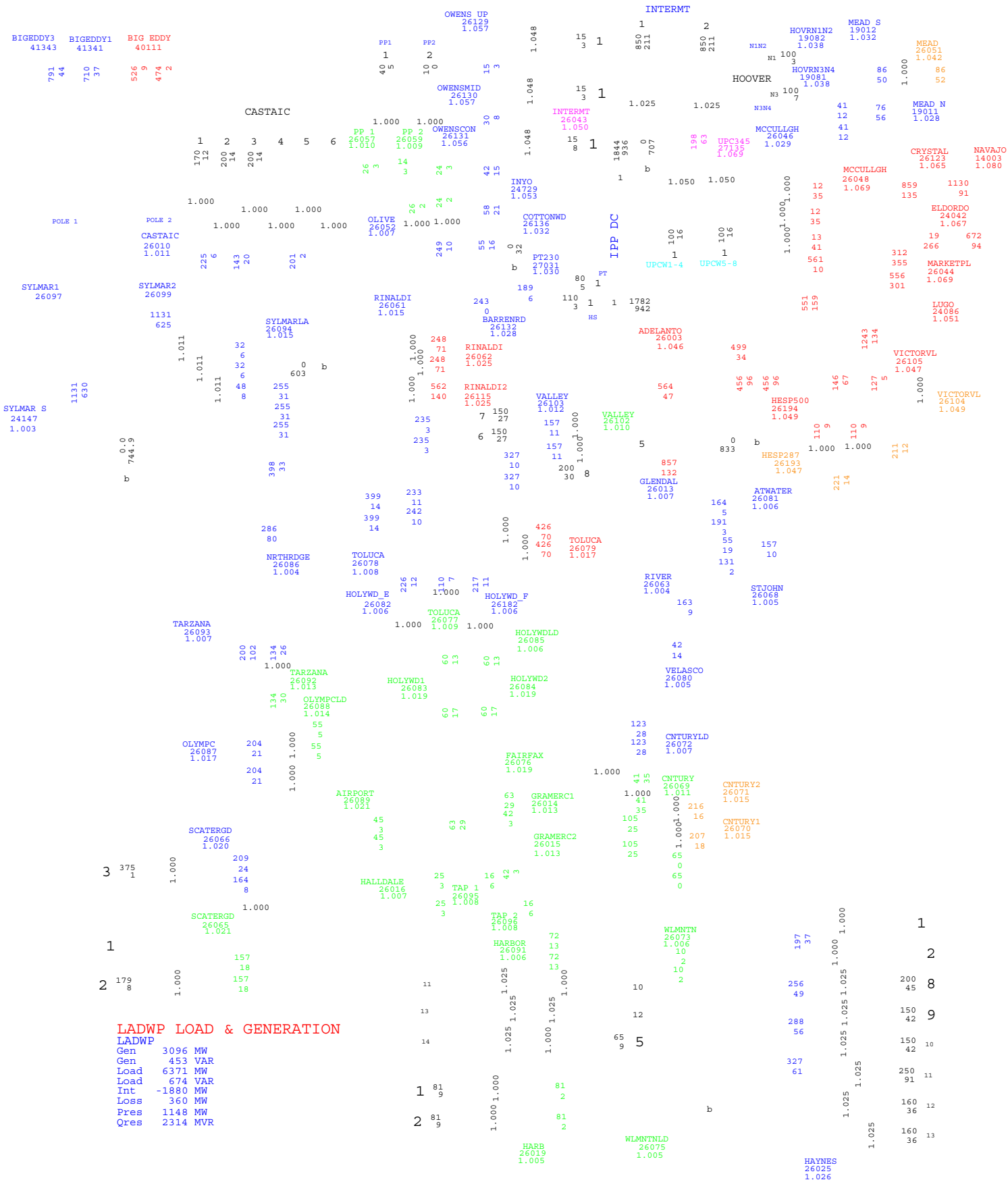
SUMMARY OF CONTINGENCY STUDY RESULTS - BEACON SOLAR PROJECT (HEAVY SUMMER)

CASE NO.	OUTAGE	PRE-PROJECT	POST-PROJECT					
			Primary POI *			Alternate POI **		
		IMPACTED ELEMENTS						
		Pre-Case	Alt1a	Alt1b	Alt1c	Alt2a	Alt2b	Alt2c
0	NO OUTAGE	None	RIN-TAR 1 & 2 , each @ 93% of normal rating	None	None	RIN-TAR 1 & 2 , each @ 93% of normal rating	None	None
(N-1) OUTAGE								
500kV Transmission Lines								
1	ADELANTO RINALDI2 1	None	None	None	None	None	None	None
2	ADELANTO TOLUCA 1	None	None	None	None	None	None	None
3	VICTORVL RINALDI 1	None	None	None	None	None	None	None
4	ADELANTO VICTORVL 1	None	None	None	None	None	None	None
5	MCCULLGH VICTORVL 1	None	None	None	None	None	None	None
230kV Transmission Lines								
6	BARREN RIDGE RINALDI 1	None	None	None		None	None	
7	BARREN RIDGE COTTONWOOD 1	None	None	None	None			
8	BARREN RIDGE PINE TREE 1	None	None	None	None	None	None	None
9	HOFFMAN SUMMIT PINE TREE 1	None	None	None	None	None	None	None
10	CASTAIC NORTHRIDGE 1	None	None	None		None	None	
11	CASTAIC SYLMARLA 1	None	None	None		None	None	
12	CASTAIC OLIVE 1	None	None	None		None	None	
13	OLIVE NORTHRIDGE 1	None	None	None	None	None	None	None
14	RINALDI SYLMARLA 1	None	None	None	None	None	None	None
15	SYLMARLA NORTHRIDGE 1	None	RIN-TAR 1 & 2, each @ 91% of emergency rating	None	None	RIN-TAR 1 & 2, each @ 91% of emergency rating	None	None
16	RINALDI TARZANA 1	None	RIN-TAR 2 @ 97% of emergency rating	RIN-TAR 2 @ 92% of emergency rating	None	RIN-TAR 2 @ 97% of emergency rating	RIN-TAR 2 @ 92% of emergency rating	None
17	RINALDI GLENDALE 1	None	None	None	None	None	None	None
18	RINALDI VALLEY 1	None	None	None	None	None	None	None
19	TOLUCA VALLEY 1	None	None	None	None	None	None	None
20	INYO COTTONWOOD 1	None	None	None	None	None	None	None
21	BARREN RIDGE CASTAIC 1			None			None	
22	BARREN RIDGE HASKELL 1				None			None
23	HASKELL RINALDI 1				None			None
24	CASTAIC HASKELL 1				None			None
25	HASKELL NORTHRIDGE 1				None			None
26	HASKELL SYLMARLA 1				None			None
27	HASKELL OLIVE 1				None			None
28	BARREN RIDGE BTAP					None	None	None
29	BTAP COTTONWOOD					None	None	None
(N-2) OUTAGE								
500kV Transmission Lines								
1	ADELANTO RINALDI2 1 VICTORVL RINALDI 1	None	None	None	None	None	None	None
2	ADELANTO VICTORVL 1 ADELANTO VICTORVL 2	None	None	None	None	None	None	None
3	MCCULLGH VICTORVL 1 MCCULLGH VICTORVL 2	None	None	None	None	None	None	None
230kV Transmission Lines								
4	RINALDI TARZANA 1 RINALDI TARZANA 2	NR-TAR 1 @ 117% overload SYL-NR 1 @ 90% of emer rating	NR-TAR 1 @ 115% overload SYL-NR 1 @ 100% of emergency rating	NR-TAR 1 @ 116% overload SYL-NR 1 @ 92% of emergency rating	NR-TAR 1 @ 120% overload SYL-NR 1 @ 77% of emergency rating	NR-TAR 1 @ 115% overload SYL-NR 1 @ 100% of emergency rating	NR-TAR 1 @ 116% overload SYL-NR 1 @ 92% of emergency rating	NR-TAR 1 @ 120% overload SYL-NR 1 @ 77% of emergency rating
5	RINALDI GLENDALE 1 RINALDI GLENDALE 2	None	None	None	None	None	None	None
6	RINALDI VALLEY 1 RINALDI VALLEY 2	None	None	None	None	None	None	None
7	TOLUCA VALLEY 1 TOLUCA VALLEY 2	None	None	None	None	None	None	None

* Primary POI : Point of Interconnection is at Barren Ridge
Alt1a: hsbspa1_0iy_ov_45og.sav
Alt1b: hsbspa1_0iy_ov_110og_cast.sav
Alt1c: hsbspa1_0iy_ov_110og_cast_hskll.sav

** Alternate POI : Point of Interconnection is 1.5 miles north of Barren Ridge along the Owens-Rinaldi line
Alt2a: hsbspa2_0iy_ov_45og.sav
Alt2b: hsbspa2_0iy_ov_110og_cast.sav
Alt2c: hsbspa2_0iy_ov_110og_cast_hskll.sav

Pre-Case: hsprebsp_ov_45og.sav



General Electric International, Inc. PSLF Program Fri May 23 10:04:49 2008 hsprebsp_ov_45og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2011 HS1B APPROVED BASE CASE

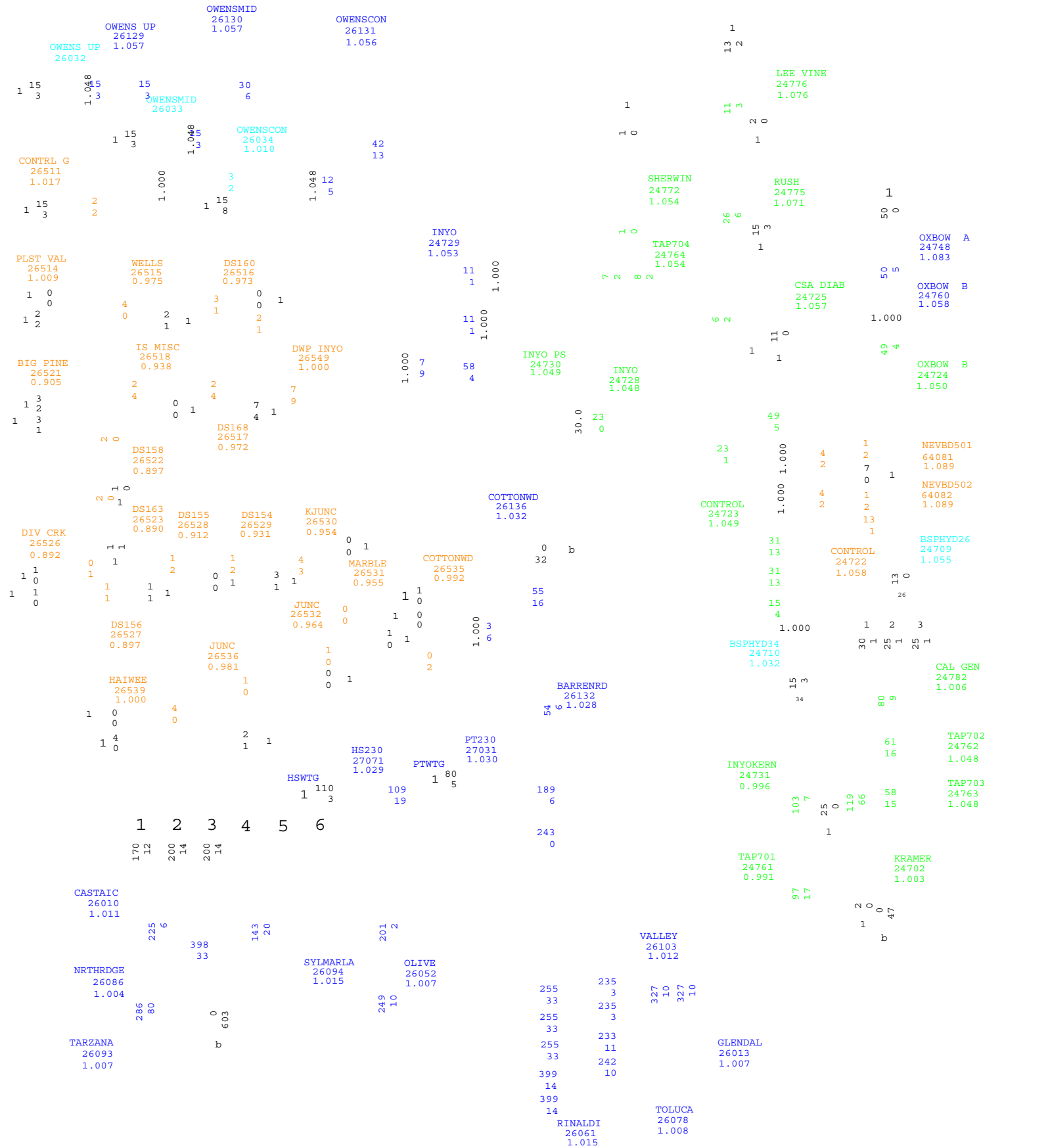
FEBRUARY 19, 2008

Pre-project w/ max wind/solar gen profile

MW/MVAR

hsprebsp_ov_45og.drw

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 10:07:32 2008 hsprebsp_ov_45og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2011 HS1B APPROVED BASE CASE

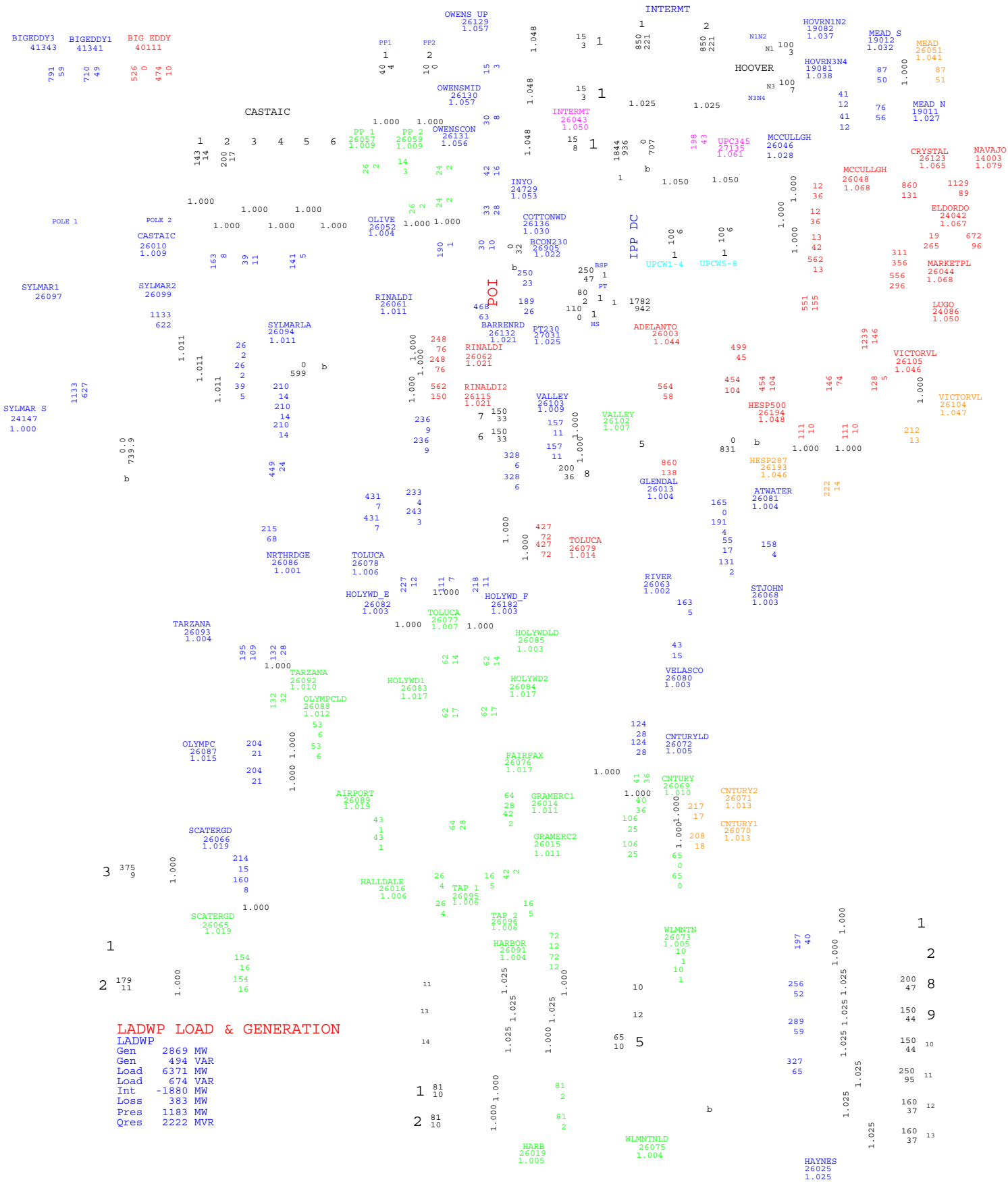
FEBRUARY 19, 2008

Pre-project w/ max wind/solar gen profile

MW/MVAR

detail_oves_hsprebsp_ov_

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 10:10:05 2008 hsbspa1_0iy_ov_45og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2011 HS1B APPROVED BASE CASE

FEBRUARY 21, 2008

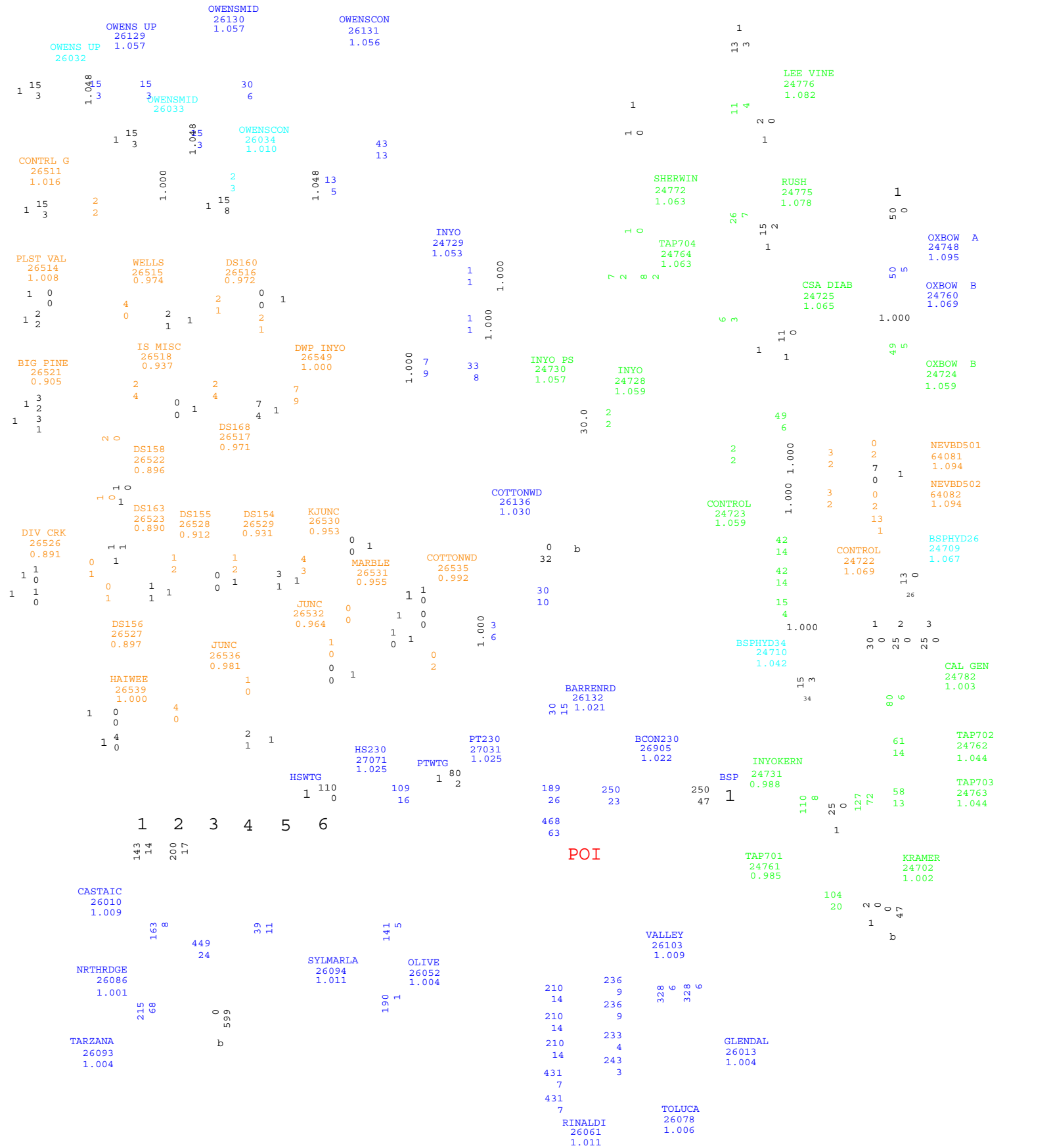
Post-project w/ max wind/solar gen profile

Primary POI 1

MW/MVAR

hsbspa1_0iy_ov_45og.drw

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 10:11:15 2008 hsbspa1_0iy_ov_45og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2011 HS1B APPROVED BASE CASE

FEBRUARY 21, 2008

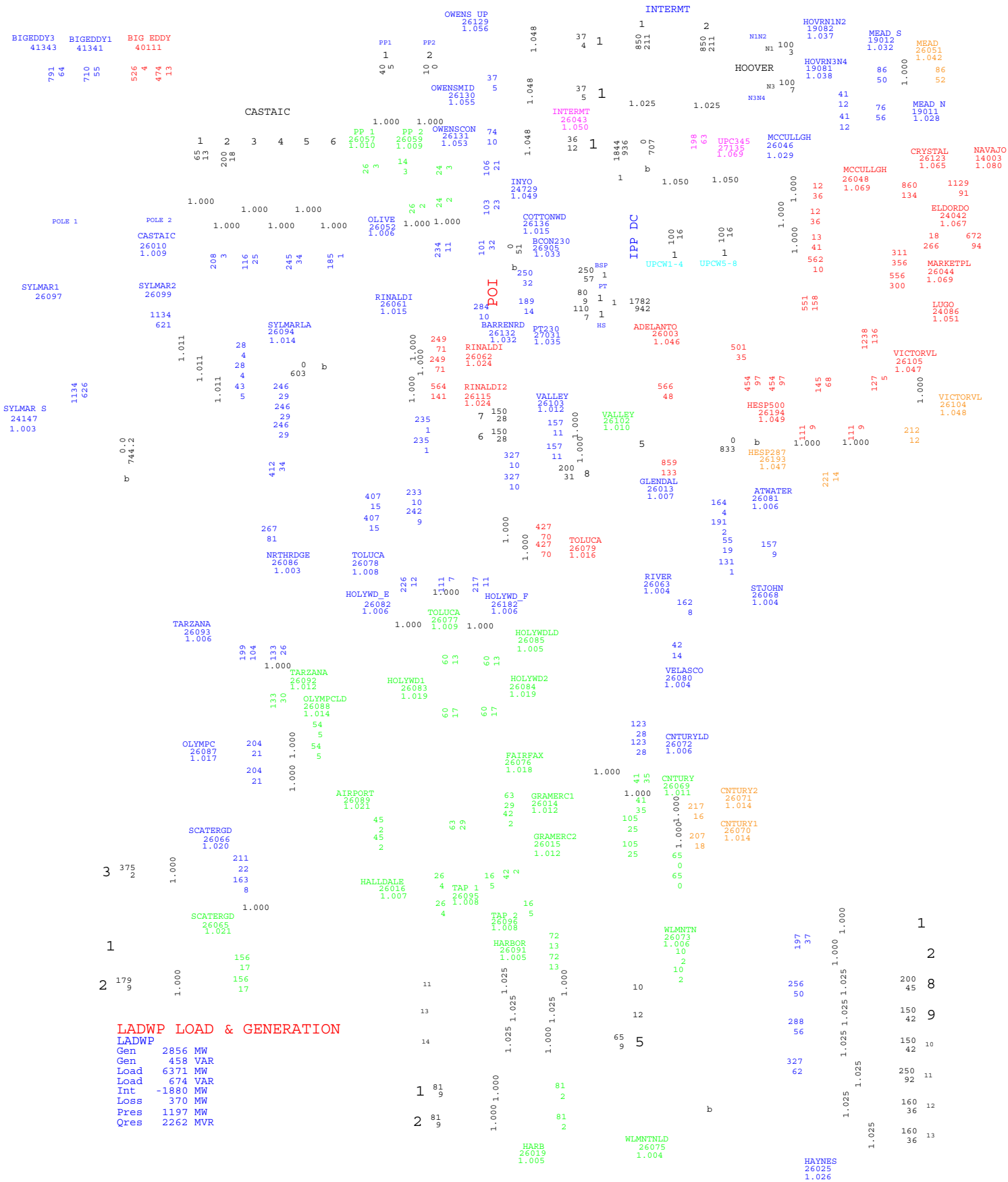
Post-project w/ max wind/solar gen profile

Primary POI 1

MW/MVAR

detail_oves_hsbspa1_0iy_

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 10:22:37 2008 hsbspa1_0iy_ov_110og_cast.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2011 HS1B APPROVED BASE CASE

FEBRUARY 21, 2008

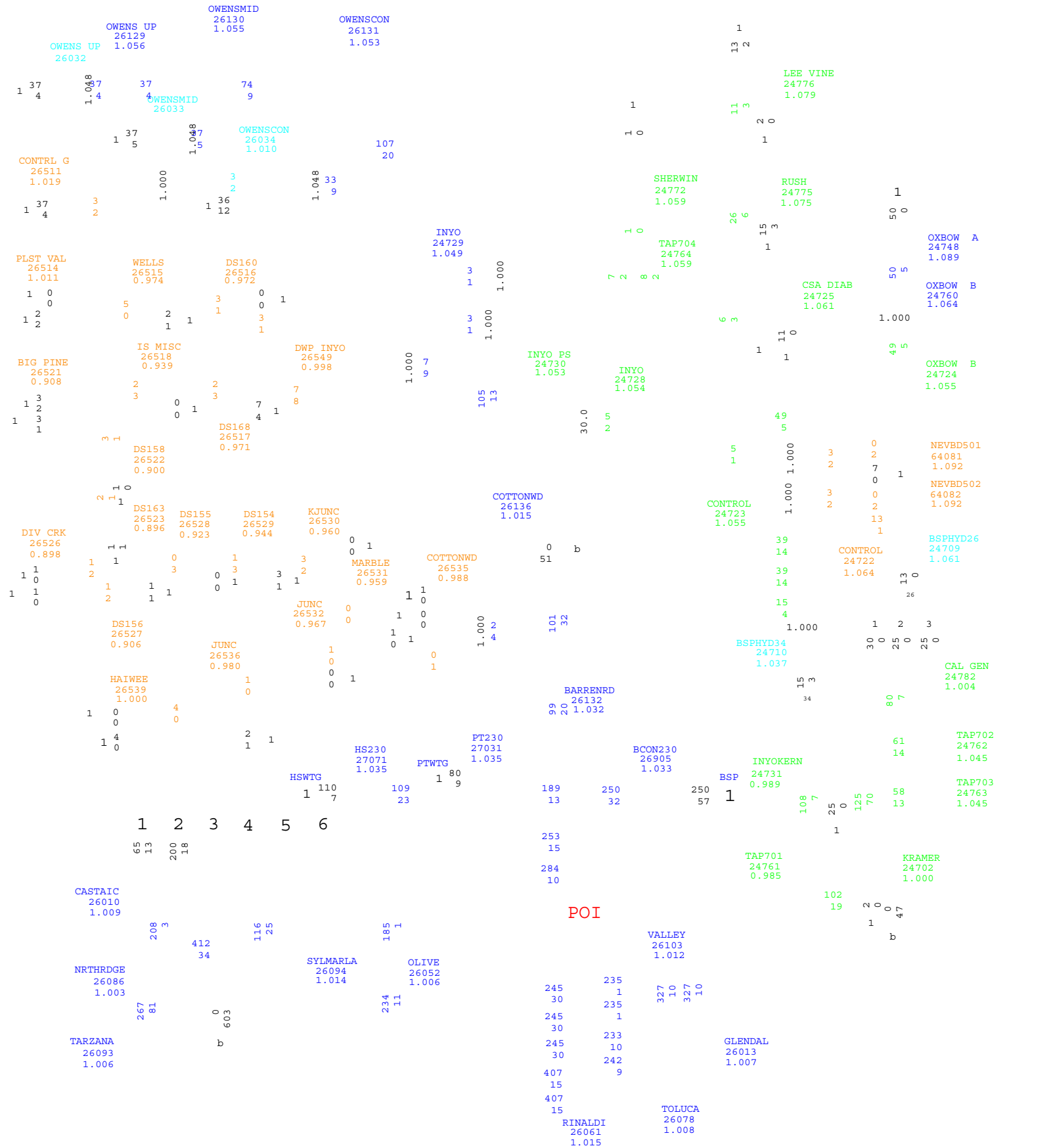
Post-project w/ max wind/solar gen profile

Primary POI 1

MW/MVAR

hsbspa1_0iy_ov_110og_cas

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 10:23:40 2008 hsbspa1_0iy_ov_110og_cast.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2011 HS1B APPROVED BASE CASE

FEBRUARY 21, 2008

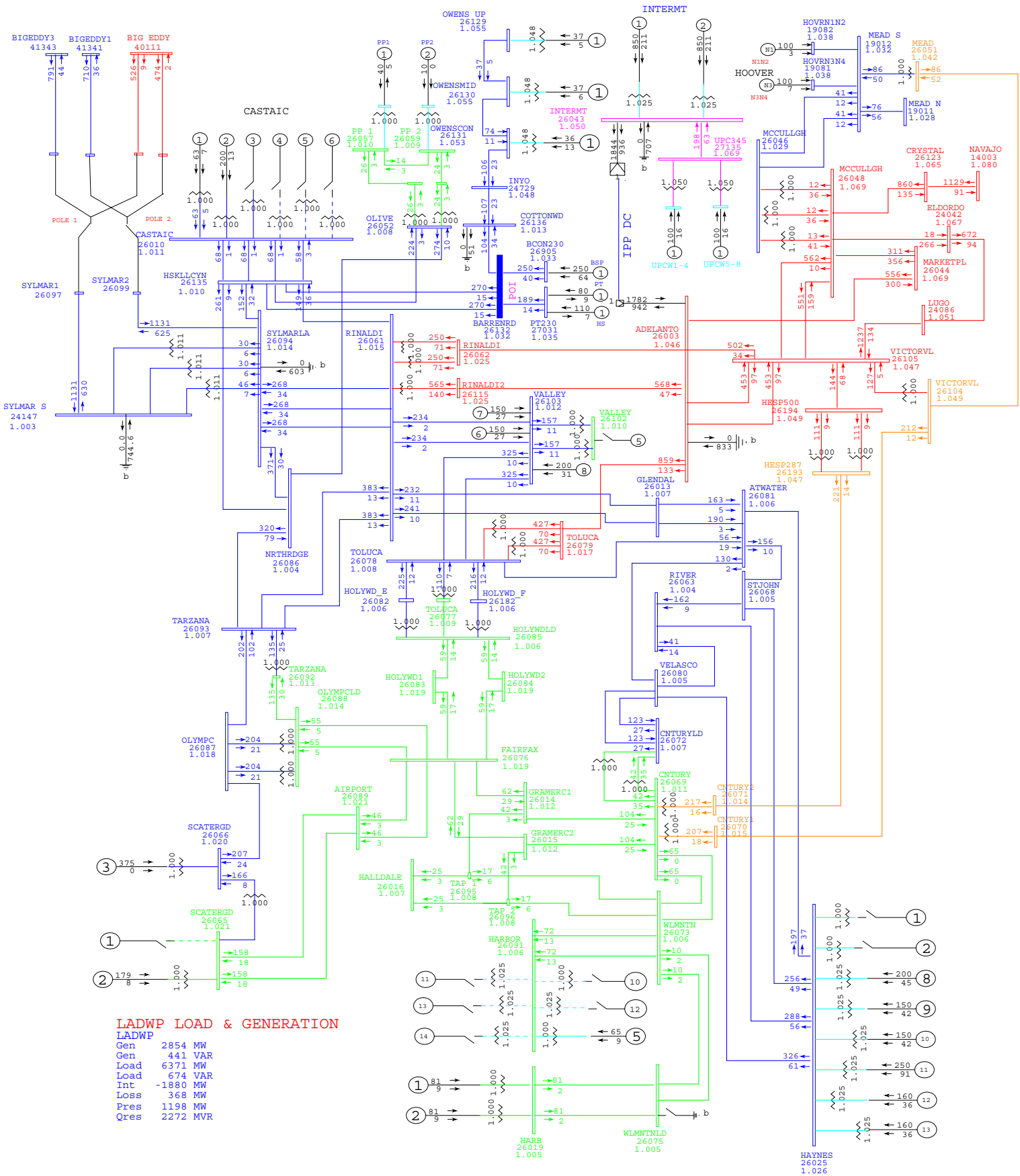
Post-project w/ max wind/solar gen profile

Primary POI 1

MW/MVAR

detail_oves_hsbspa1_0iy_

Rating = 1



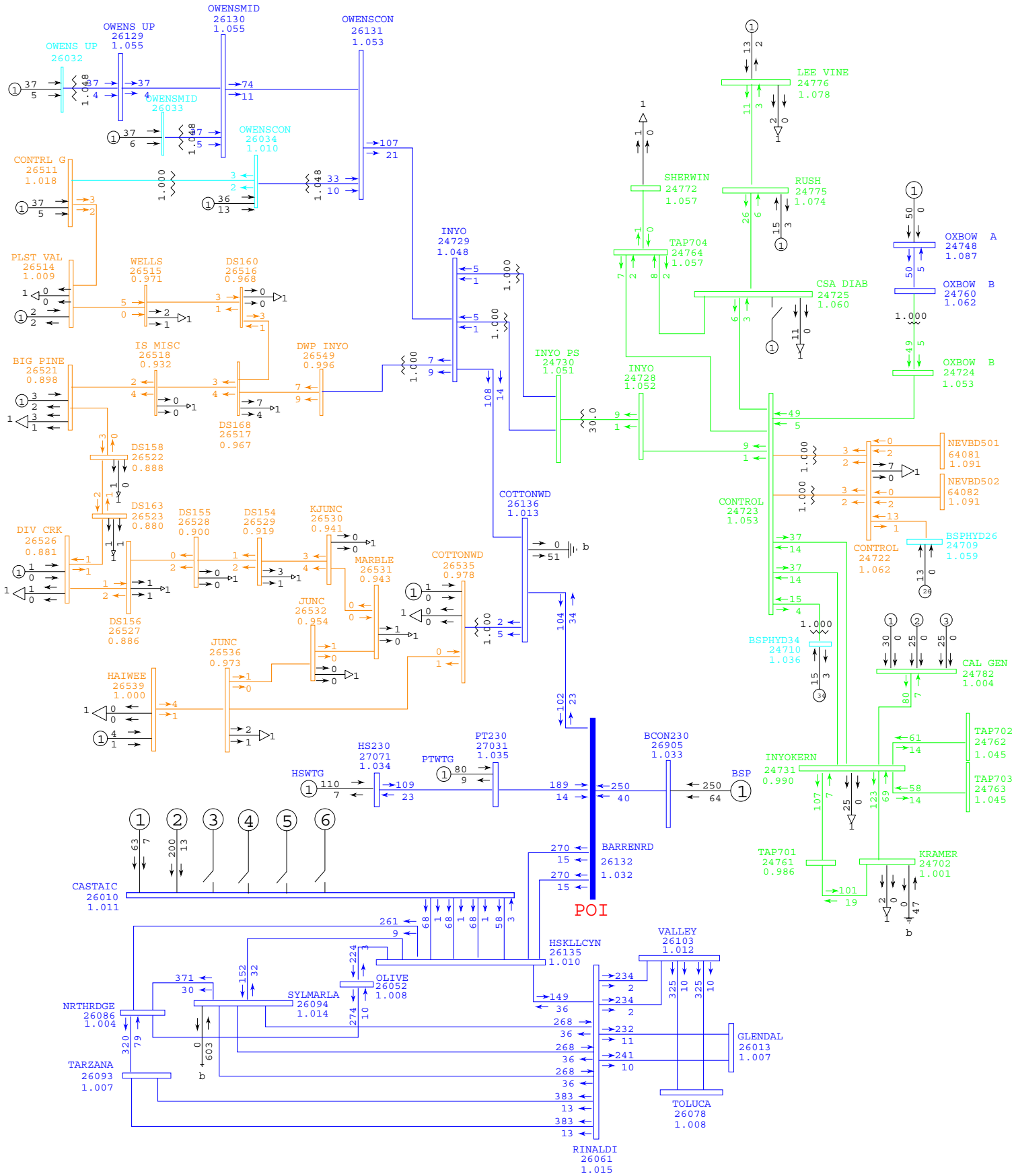
LADWP LOAD & GENERATION

LADWP

Gen	2854	MW
Gen	441	VAR
Load	6371	MW
Load	674	VAR
Int	-1880	MW
Loss	368	MW
Pres	1198	MW
Qres	2272	MVR

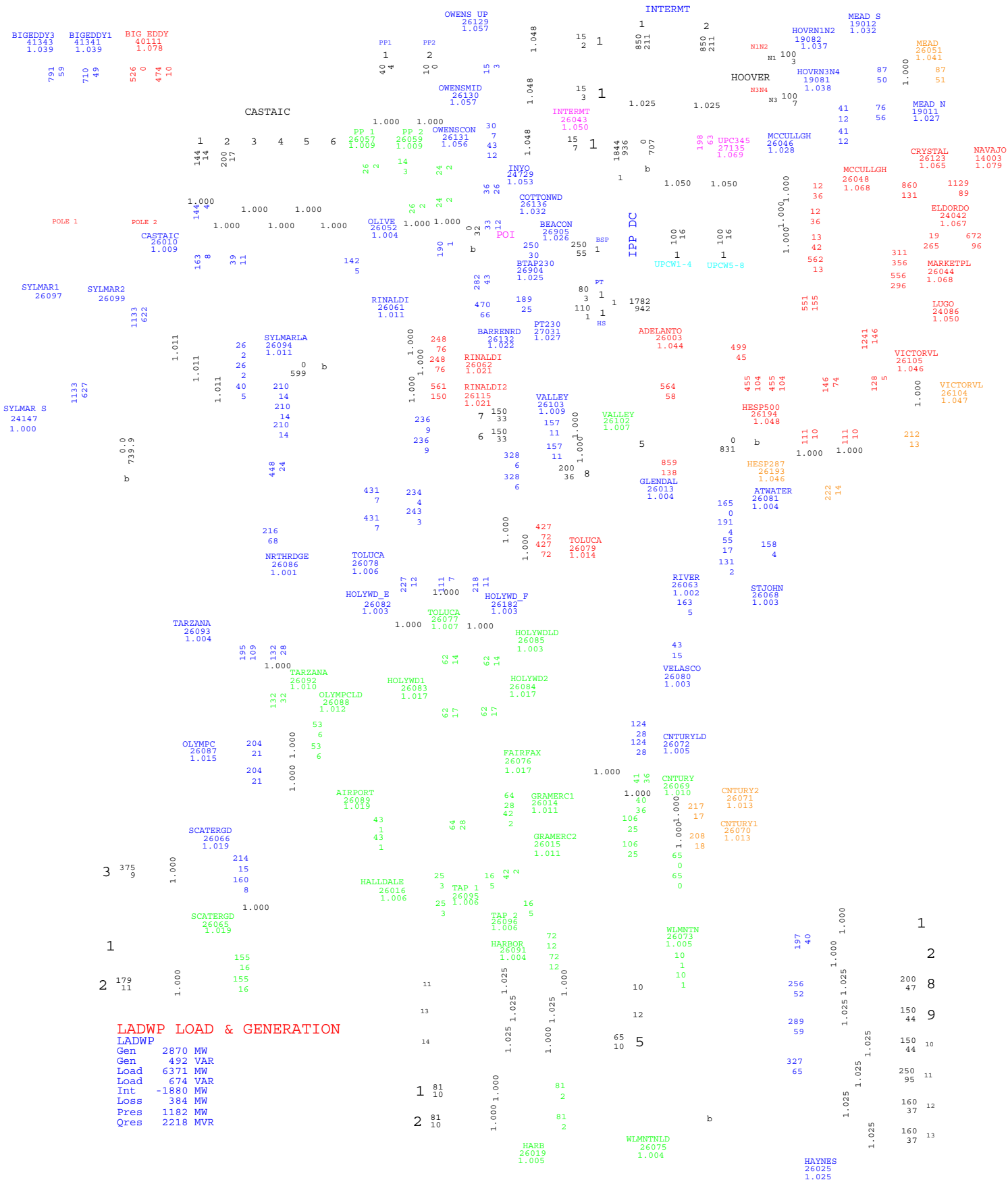
General Electric International, Inc. PSLF Program Mon Jun 02 14:09:19 2008 hsbspa1_0iy_ov_110og_cast_hskll.sav

	WESTERN ELECTRICITY COORDINATING COUNCIL 2011 HS1B APPROVED BASE CASE FEBRUARY 21, 2008	Post-project w/ max wind gen profile & max OG Primary POI 1	MW/MVAR hsbspa1_0iy_ov_110og_cas Rating = 1



General Electric International, Inc. PSLF Program Mon Jun 02 14:08:16 2008 hsbspa1_0iy_ov_110og_cast_hskll.sav

	WESTERN ELECTRICITY COORDINATING COUNCIL	Post-project w/ max wind gen profile & max OG	MW/MVAR
	2011 HS1B APPROVED BASE CASE	Primary POI 1	detail_oves_hsbspa1_0iy_
	FEBRUARY 21, 2008		Rating = 1



LADWP LOAD & GENERATION

LADWP

Gen	2870	MW
Gen	492	VAR
Load	6371	MW
Load	674	VAR
Int	-1880	MW
Loss	384	MW
Pres	1182	MW
Qres	2218	MVR

General Electric International, Inc. PSLF Program Fri May 23 10:37:27 2008 hsbspa2_0iy_ov_45og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2011 HS1B APPROVED BASE CASE

FEBRUARY 21, 2008

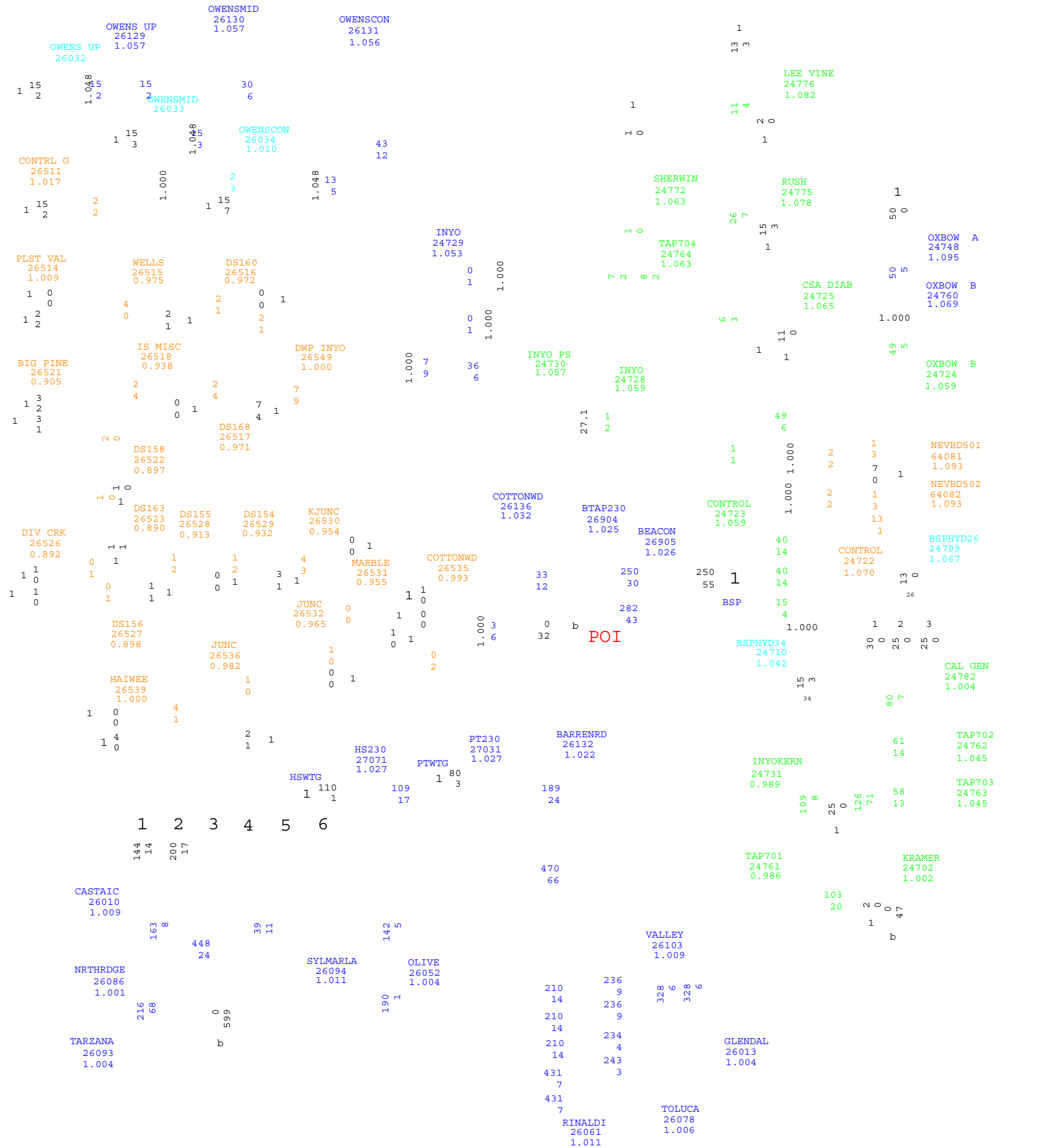
Pre-project w/ max wind gen profile & max OG

Alternate POI 2

MW/MVAR

hsbspa2_0iy_ov_45og.drw

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 10:38:18 2008 hsbspa2_0iy_ov_45og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2011 HS1B APPROVED BASE CASE

FEBRUARY 21, 2008

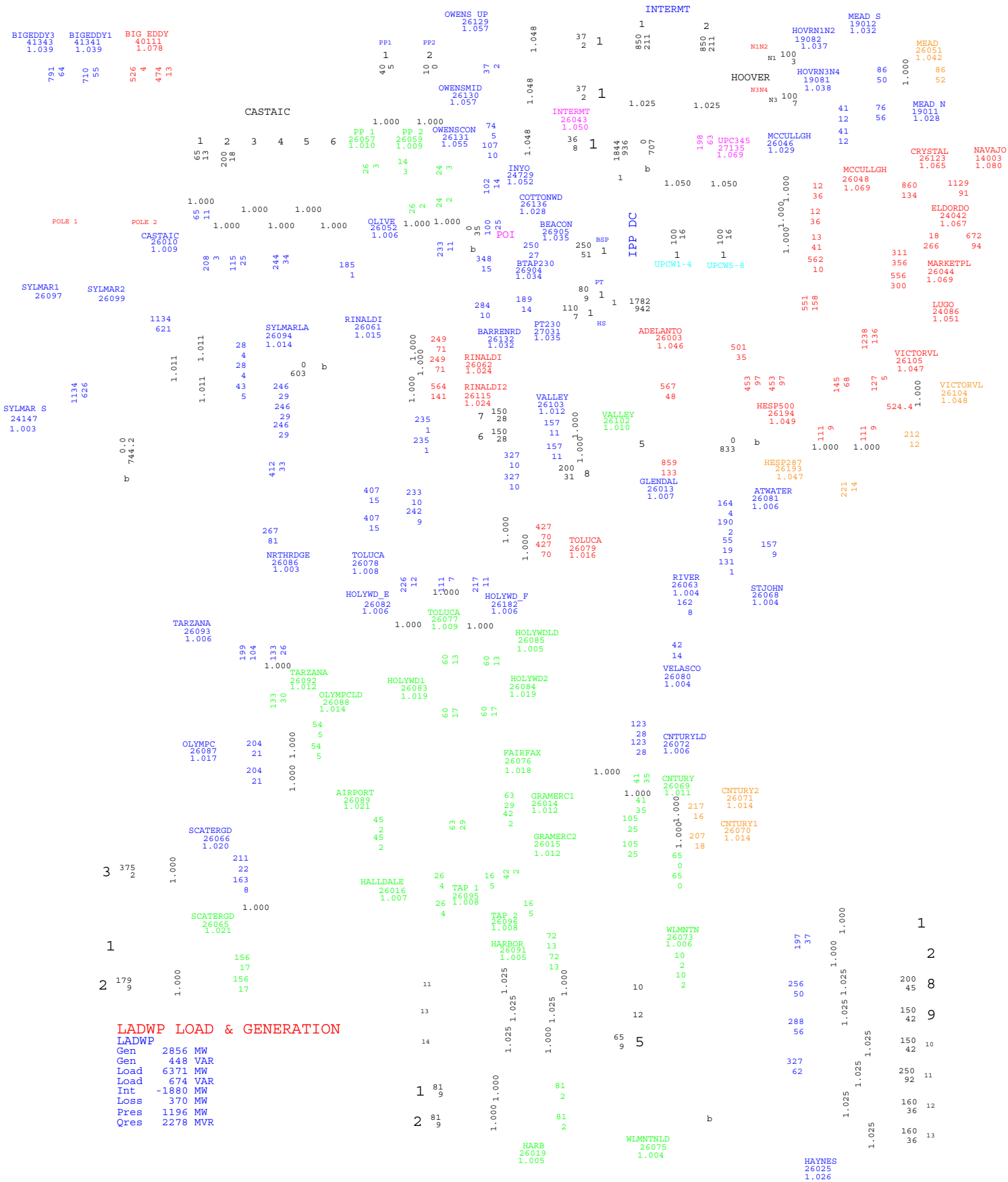
Pre-project w/ max wind gen profile & max OG

Alternate POI 2

MW/MVAR

detail_oves_hsbspa2_0iy_

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 10:41:34 2008 hsbspa2_0iy_ov_110og_cast.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2011 HS1B APPROVED BASE CASE

FEBRUARY 21, 2008

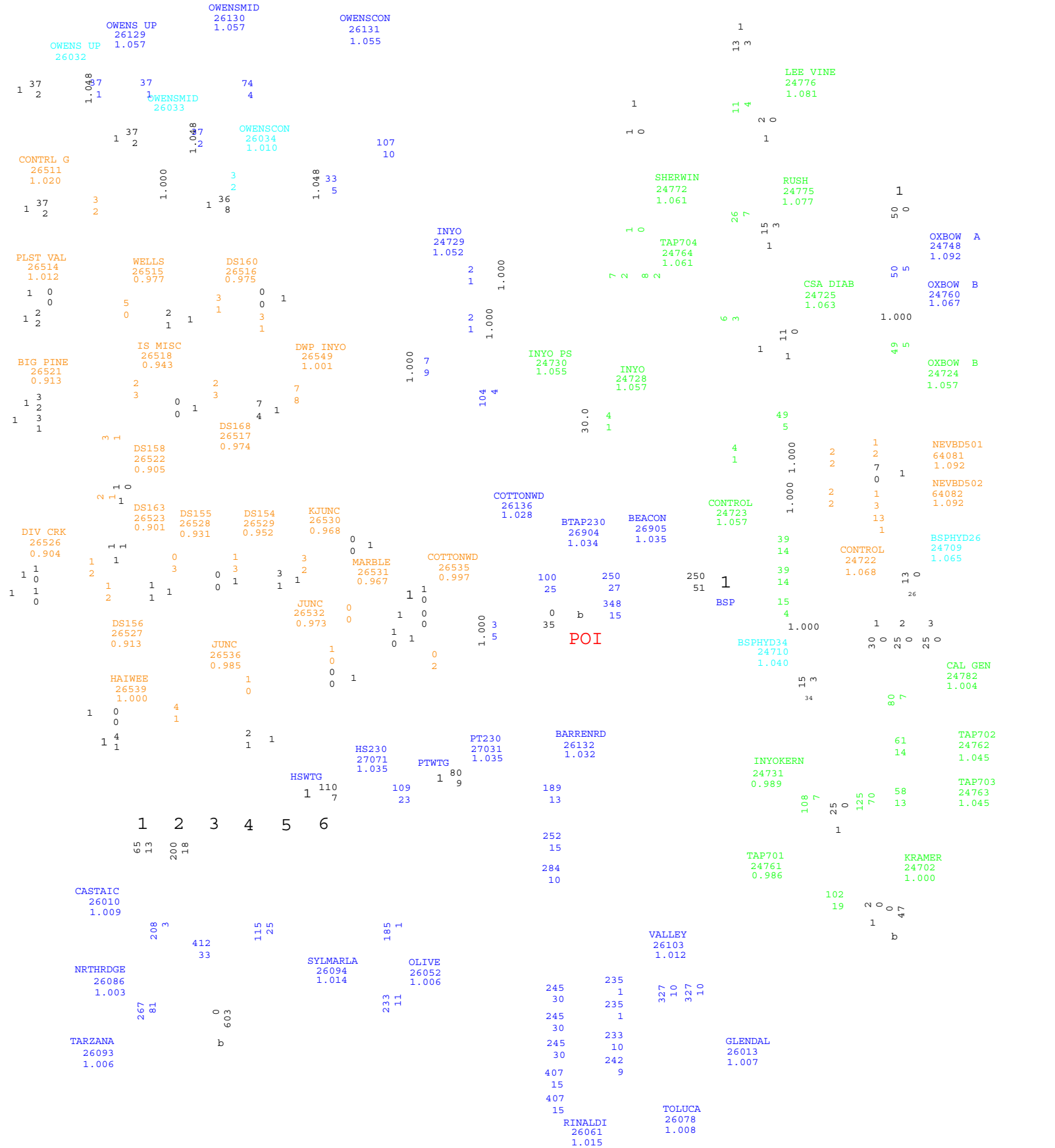
Post-project w/ max wind/solar gen profile

Alternate POI 2

MW/MVAR

hsbspa2_0iy_ov_110og_cas

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 10:42:28 2008 hsbspa2_0iy_ov_110og_cast.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2011 HS1B APPROVED BASE CASE

FEBRUARY 21, 2008

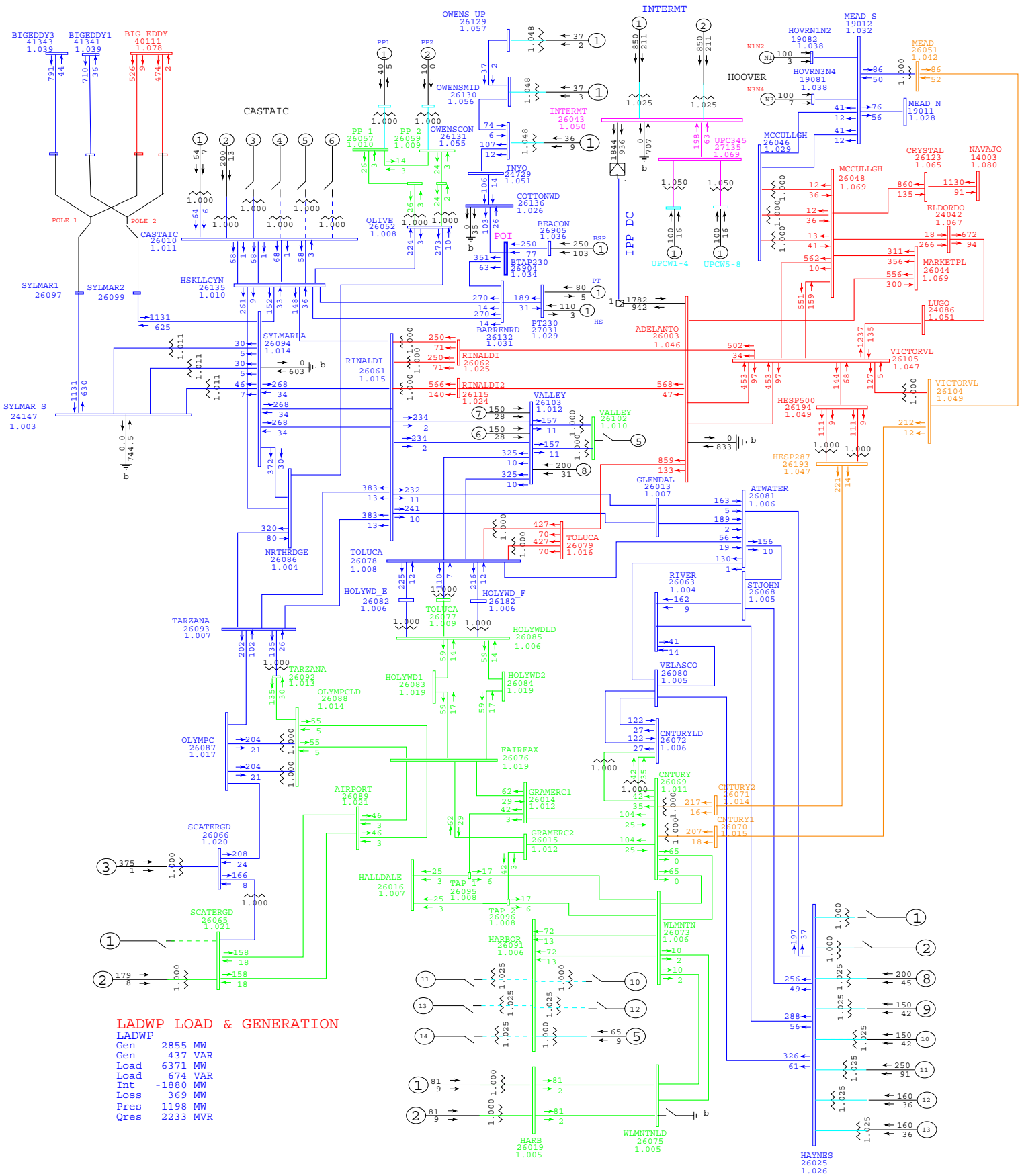
Post-project w/ max wind/solar gen profile

Alternate POI 2

MW/MVAR

detail_oves_hsbspa2_0iy_

Rating = 1



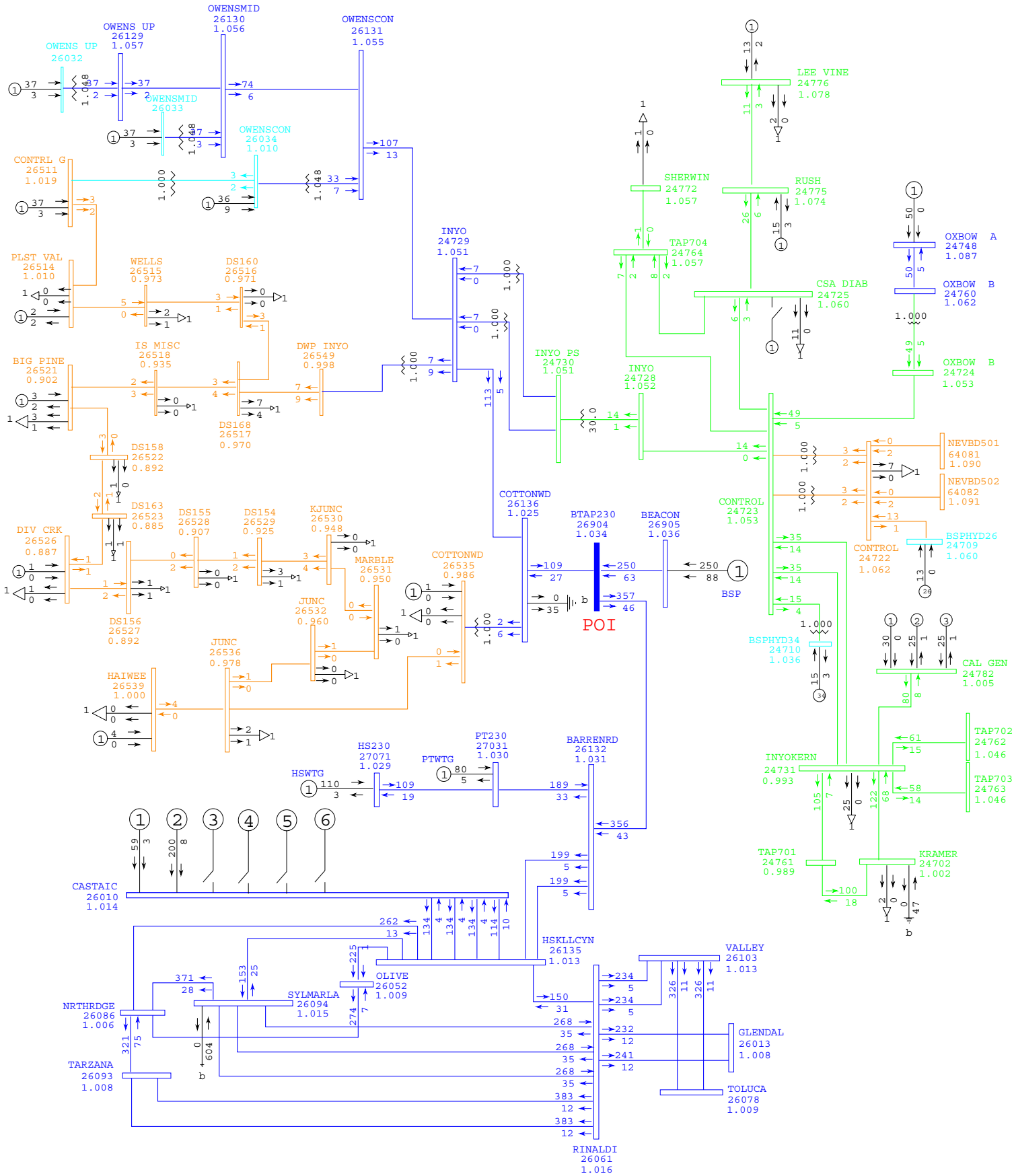
LADWP LOAD & GENERATION

LADWP

Gen	2855	MW
Gen	437	VAR
Load	6371	MW
Load	674	VAR
Int	-1880	MW
Loss	369	MW
Pres	1198	MW
Qres	2233	MVR

General Electric International, Inc. PSLF Program Wed Jun 04 08:44:49 2008 hsbspa2_0iy_ov_110og_cast_hskll.sav

	WESTERN ELECTRICITY COORDINATING COUNCIL	Pre-project w/ max wind gen profile & max OG	MW/MVAR
	2011 HS1B APPROVED BASE CASE	Alternate POI 2	hsbspa2_0iy_ov_110og_cas
	FEBRUARY 21, 2008		Rating = 1



General Electric International, Inc. PSLF Program Mon Jun 02 14:13:46 2008 hsbspa2_0iy_ov_110og_cast_hskll.sav

	WESTERN ELECTRICITY COORDINATING COUNCIL	Pre-project w/ max wind gen profile & max OG	MW/MVAR
	2011 HS1B APPROVED BASE CASE	Alternate POI 2	detail_oves_hsbspa2_0iy_
	FEBRUARY 21, 2008		Rating = 1

SUMMARY OF CONTINGENCY STUDY RESULTS - BEACON SOLAR PROJECT (LIGHT AUTUMN)

CASE NO.	OUTAGE			PRE-PROJECT	POST-PROJECT					
					Primary POI *			Alternate POI **		
				IMPACTED ELEMENTS						
				Pre-Case	Alt1a	Alt1b	Alt1c	Alt2a	Alt2b	Alt2c
0	NO OUTAGE			None	None	None	None	None	None	None
(N-1) OUTAGE										
500kV Transmission Lines										
1	ADELANTO	RINALDI2	1	None	None	None	None	None	None	None
2	ADELANTO	TOLUCA	1	None	None	None	None	None	None	None
3	VICTORVL	RINALDI	1	None	None	None	None	None	None	None
4	ADELANTO	VICTORVL	1	None	None	None	None	None	None	None
5	MCCULLGH	VICTORVL	1	None	None	None	None	None	None	None
230kV Transmission Lines										
6	BARREN RIDGE	RINALDI	1	None	None	None		None	None	
7	BARREN RIDGE	COTTONWOOD	1	None	None	None	None			
8	BARREN RIDGE	PINE TREE	1	None	None	None	None	None	None	None
9	HOFFMAN SUMMIT	PINE TREE	1	None	None	None	None	None	None	None
10	CASTAIC	NORTHRIDGE	1	None	None	None		None	None	
11	CASTAIC	SYLMARLA	1	None	None	None		None	None	
12	CASTAIC	OLIVE	1	None	None	None		None	None	
13	OLIVE	NORTHRIDGE	1	None	None	None	None	None	None	None
14	RINALDI	SYLMARLA	1	None	None	None	None	None	None	None
15	SYLMARLA	NORTHRIDGE	1	None	None	None	None	None	None	None
16	RINALDI	TARZANA	1	None	None	None	None	None	None	None
17	RINALDI	GLENDALE	1	None	None	None	None	None	None	None
18	RINALDI	VALLEY	1	None	None	None	None	None	None	None
19	TOLUCA	VALLEY	1	None	None	None	None	None	None	None
20	INYO	COTTONWOOD	1	None	None	None	None	None	None	None
21	BARREN RIDGE	CASTAIC	1			None			None	
22	BARREN RIDGE	HASKELL	1				None			None
23	HASKELL	RINALDI	1				None			None
24	CASTAIC	HASKELL	1				None			None
25	HASKELL	NORTHRIDGE	1				None			None
26	HASKELL	SYLMARLA	1				None			None
27	HASKELL	OLIVE	1				None			None
28	BARREN RIDGE	BTAP	1					None	None	None
29	BTAP	COTTONWOOD	1					None	None	None
(N-2) OUTAGE										
500kV Transmission Lines										
1	ADELANTO VICTORVL	RINALDI2 RINALDI	1 1	None	None	None	None	None	None	None
2	ADELANTO ADELANTO	VICTORVL VICTORVL	1 2	None	None	None	None	None	None	None
3	MCCULLGH MCCULLGH	VICTORVL VICTORVL	1 2	None	None	None	None	None	None	None
230kV Transmission Lines										
4	RINALDI RINALDI	TARZANA TARZANA	1 2	None	None	None	None	None	None	None
5	RINALDI RINALDI	GLENDALE GLENDALE	1 2	None	None	None	None	None	None	None
6	RINALDI RINALDI	VALLEY VALLEY	1 2	None	None	None	None	None	None	None
7	TOLUCA TOLUCA	VALLEY VALLEY	1 2	None	None	None	None	None	None	None

* Primary POI : Point of Interconnection is at Barren Ridge

** Alternate POI : Point of Interconnection is 1.5 miles north of Barren Ridge along the Owens-Rinaldi line

Alt1a: labsp1_50iy_ov_0og.sav

Alt1b: labsp1_50iy_ov_0og_cast.sav

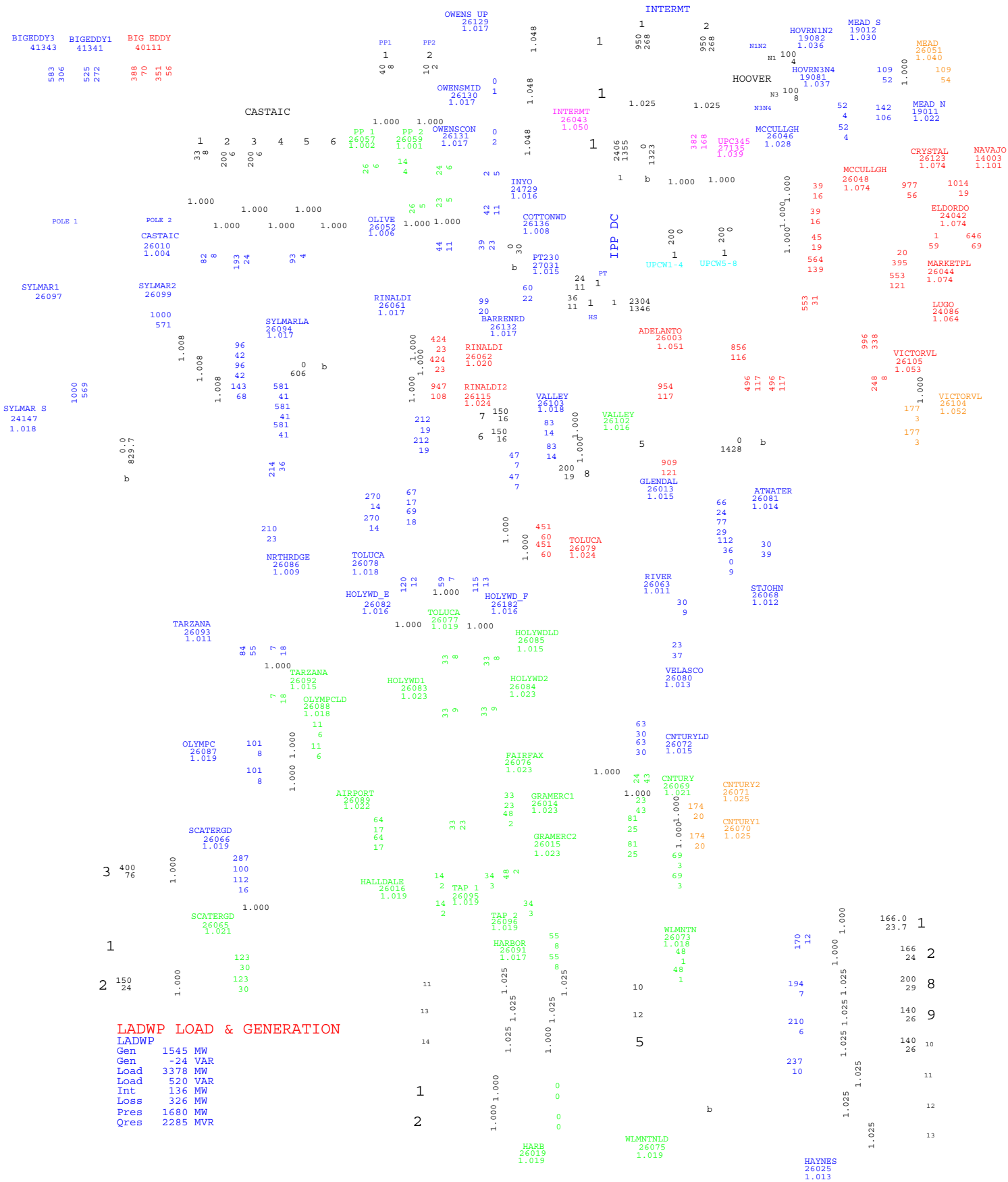
Alt1c: labsp1_50iy_ov_0og_cast_hskll.sav

Alt2a: labsp2_50iy_ov_0og.sav

Alt2b: labsp2_50iy_ov_0og_cast.sav

Alt2c: labsp2_50iy_ov_0og_cast_hskll.sav

Pre-Case: laprebsp_50iy_ov_0og.sav



LADWP LOAD & GENERATION

LADWP

Gen	1545	MW
Gen	-24	VAR
Load	3378	MW
Load	520	VAR
Int	136	MW
Loss	326	MW
Pres	1680	MW
Qres	2285	MVR

General Electric International, Inc. PSLF Program Fri May 23 10:53:45 2008 laprebsp_50iy_ov_0og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2010 LA1-SA APPROVED BASE CASE

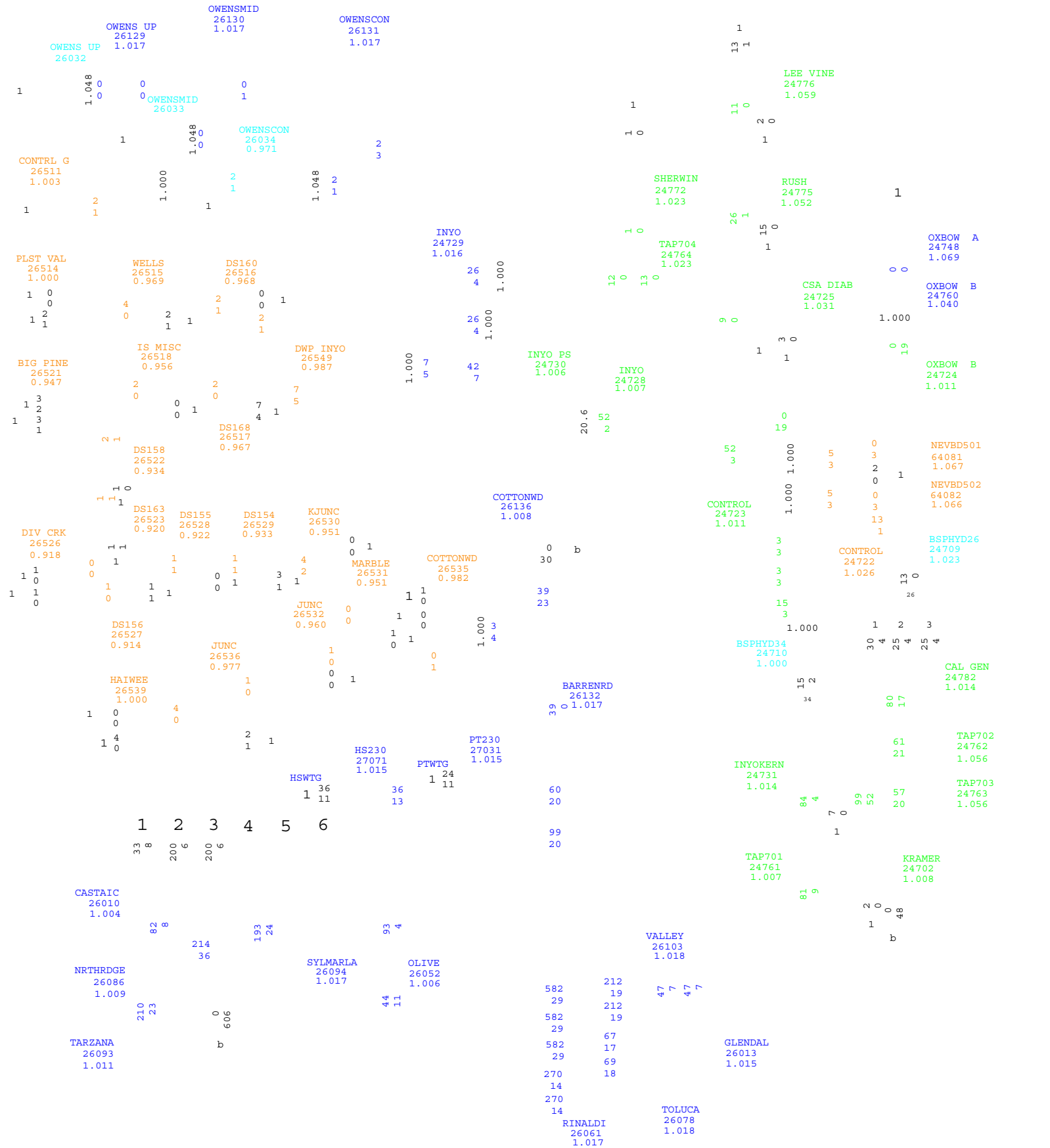
DECEMBER 22, 2006

Pre-project with OG off-line

MW/MVAR

laprebsp_50iy_ov_0og.drw

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 10:55:30 2008 laprebsp_50iy_ov_0og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2010 LA1-SA APPROVED BASE CASE

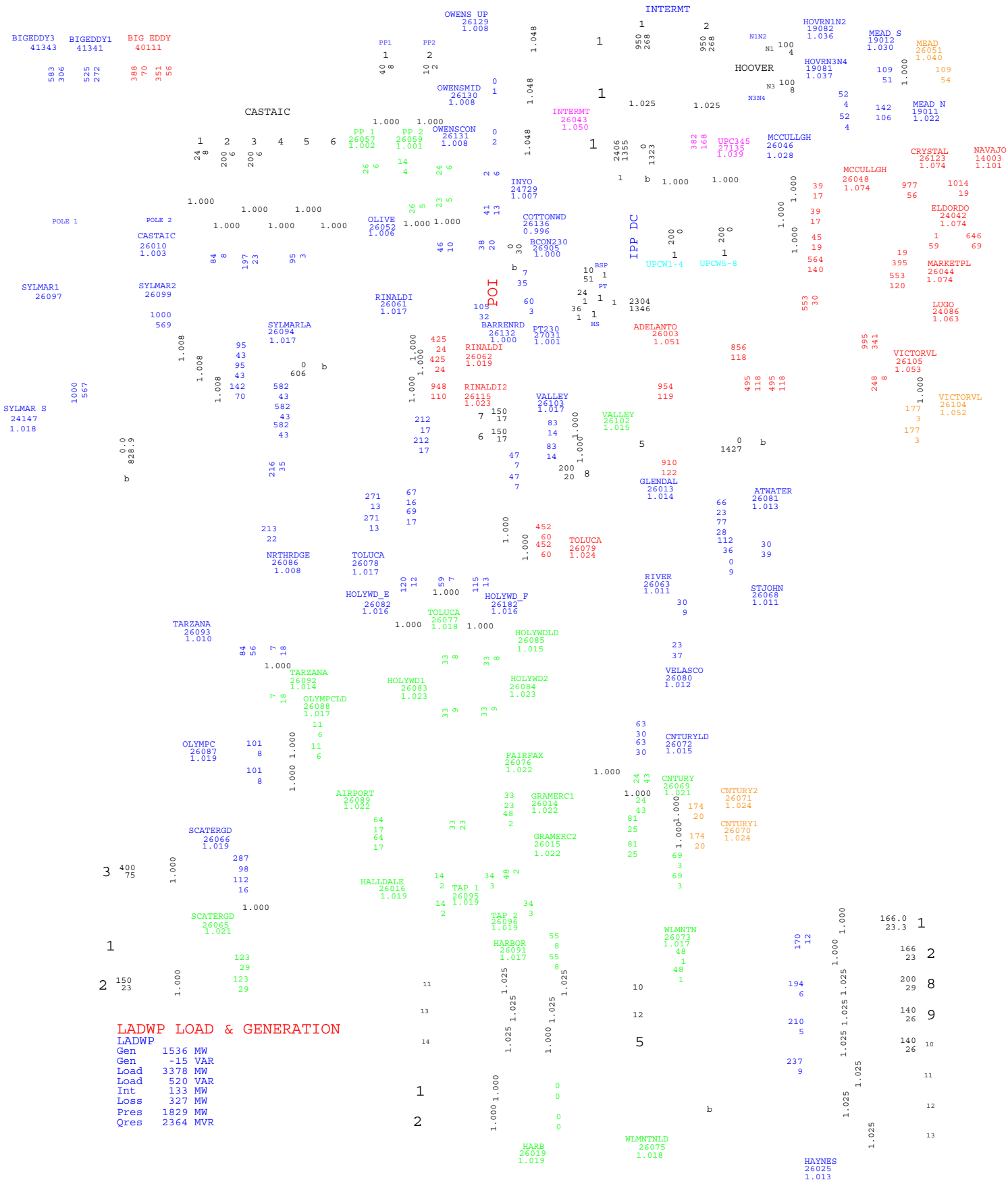
DECEMBER 22, 2006

Pre-project with OG off-line

MW/MVAR

detail_oves_hsprebsp_ov_

Rating = 1



LADWP LOAD & GENERATION

LADWP

Gen	1536	MW
Gen	-15	VAR
Load	3378	MW
Load	520	VAR
Int	133	MW
Loss	327	MW
Pres	1829	MW
Qres	2364	MVR

General Electric International, Inc. PSLF Program Fri May 23 10:59:40 2008 labsp1_50iy_ov_0og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2010 LA1-SA APPROVED BASE CASE

DECEMBER 22, 2006

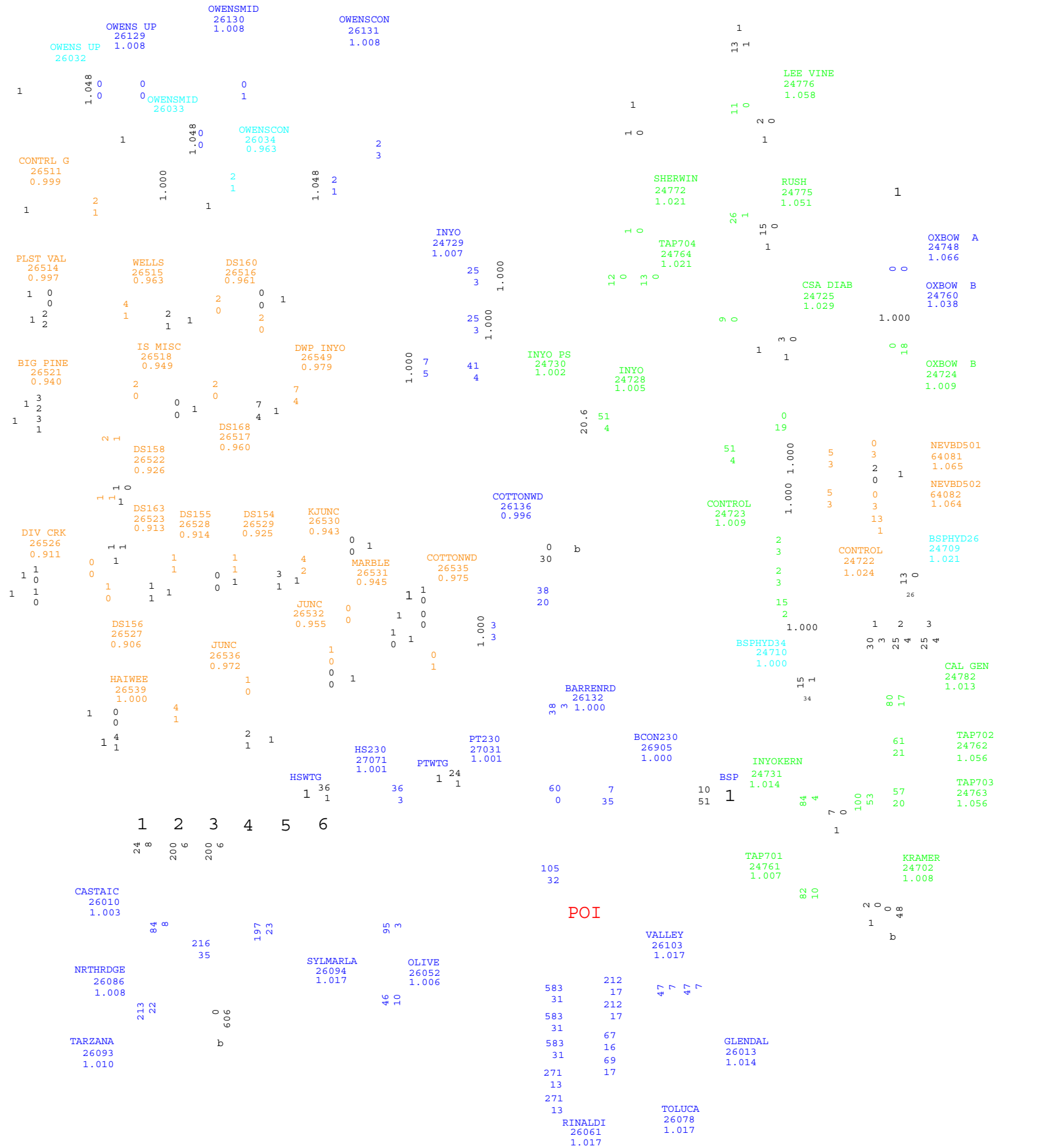
Post-project w/ OG off-line and min wind/solar gen profile

Primary POI 1

MW/MVAR

labsp1_50iy_ov_0og.drw

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 11:00:27 2008 labsp1_50iy_ov_0og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2010 LA1-SA APPROVED BASE CASE

DECEMBER 22, 2006

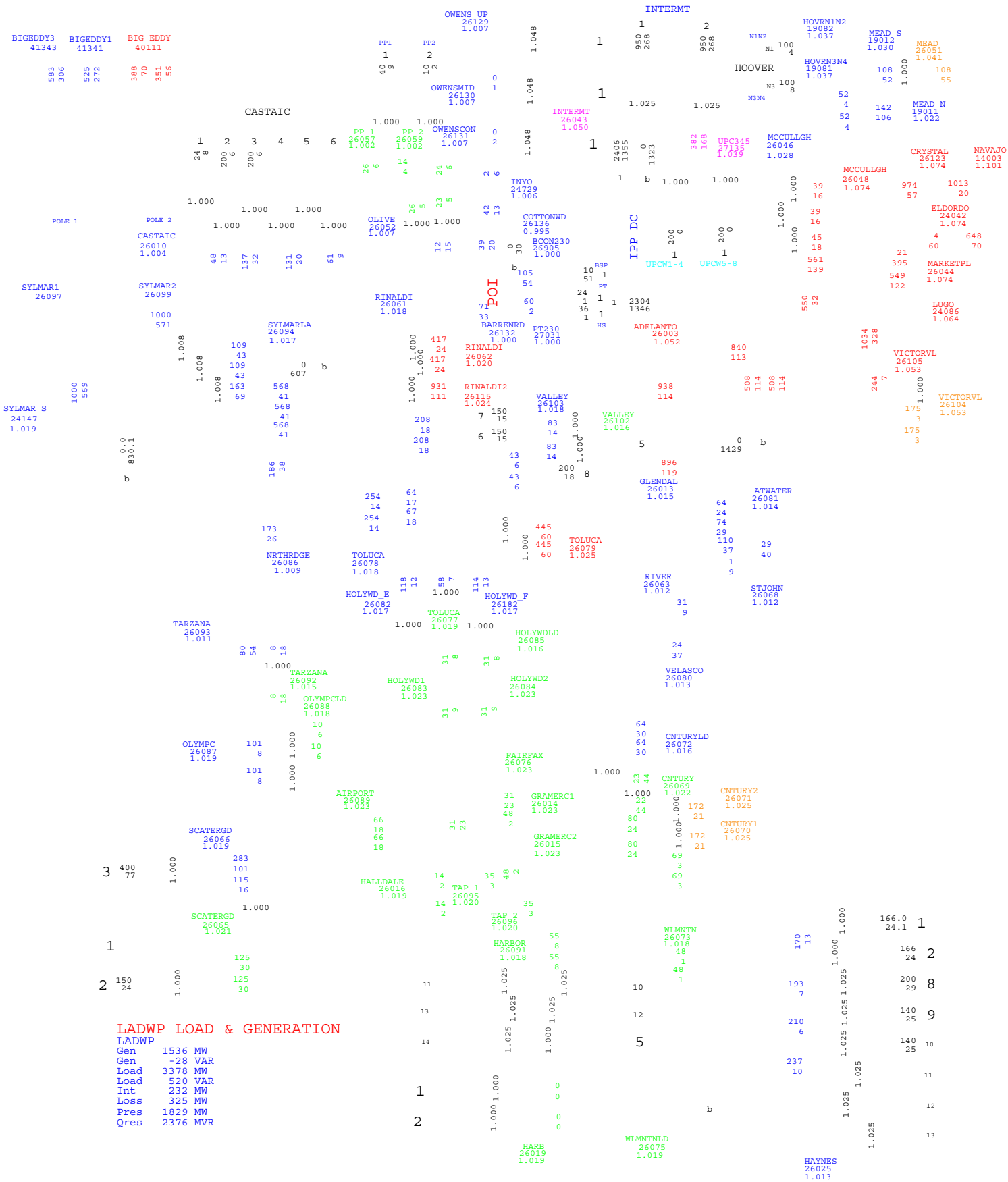
Post-project w/ OG off-line and min wind/solar gen profile

Primary POI 1

MW/MVAR

detail_oves_labsp1_50iy_

Rating = 1



LADWP LOAD & GENERATION

LADWP

Gen	1536	MW
Gen	-28	VAR
Load	3378	MW
Load	520	VAR
Int	232	MW
Loss	325	MW
Pres	1829	MW
Qres	2376	MVR

General Electric International, Inc. PSLF Program Fri May 23 11:04:31 2008 labsp1_50iy_ov_0og_cast.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2010 LA1-SA APPROVED BASE CASE

DECEMBER 22, 2006

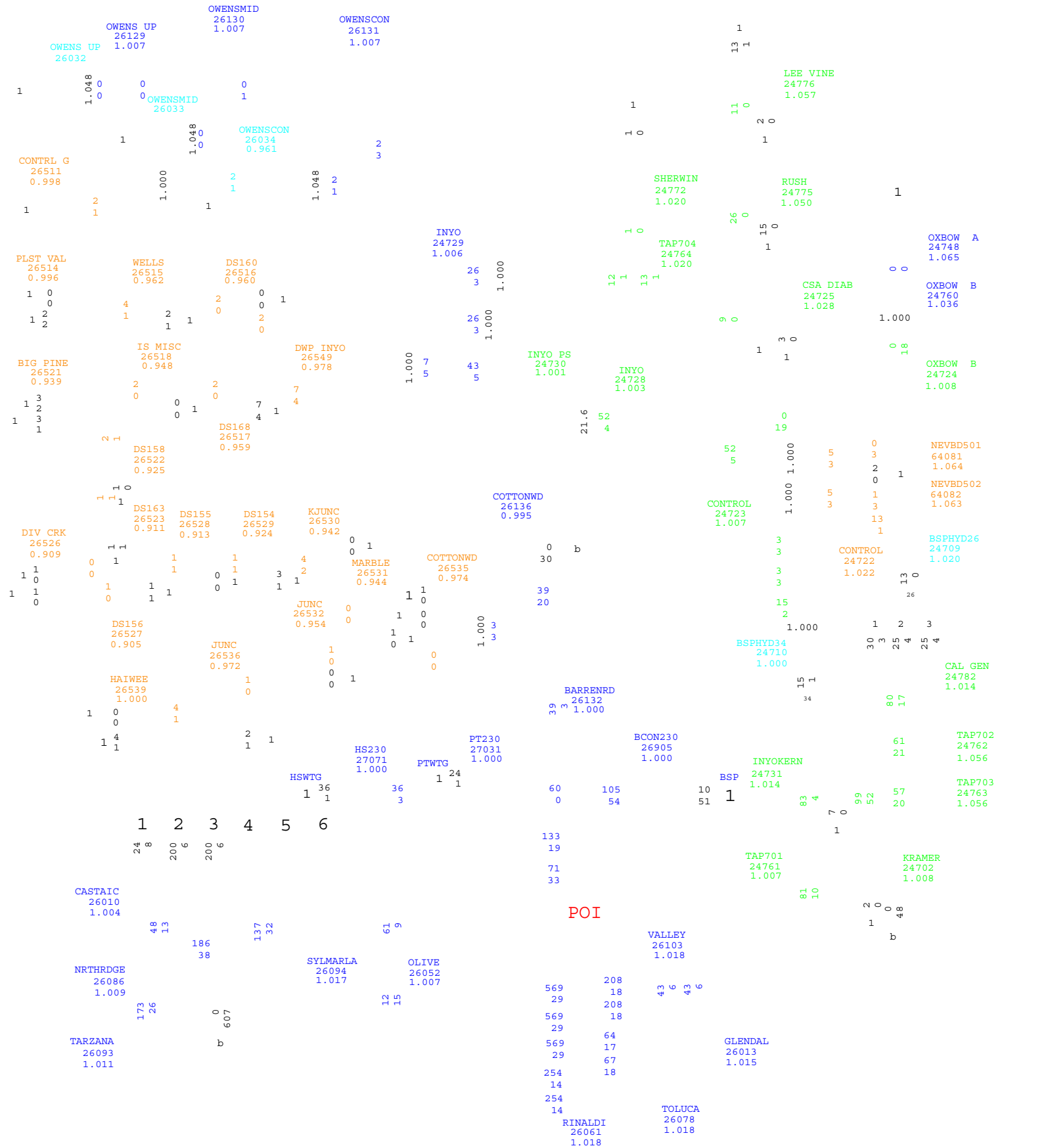
Post-project w/ OG off-line and min wind/solar gen profile

Primary POI 1

MW/MVAR

labsp1_50iy_ov_0og_cast.

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 11:05:20 2008 labsp1_50iy_ov_0og_cast.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2010 LA1-SA APPROVED BASE CASE

DECEMBER 22, 2006

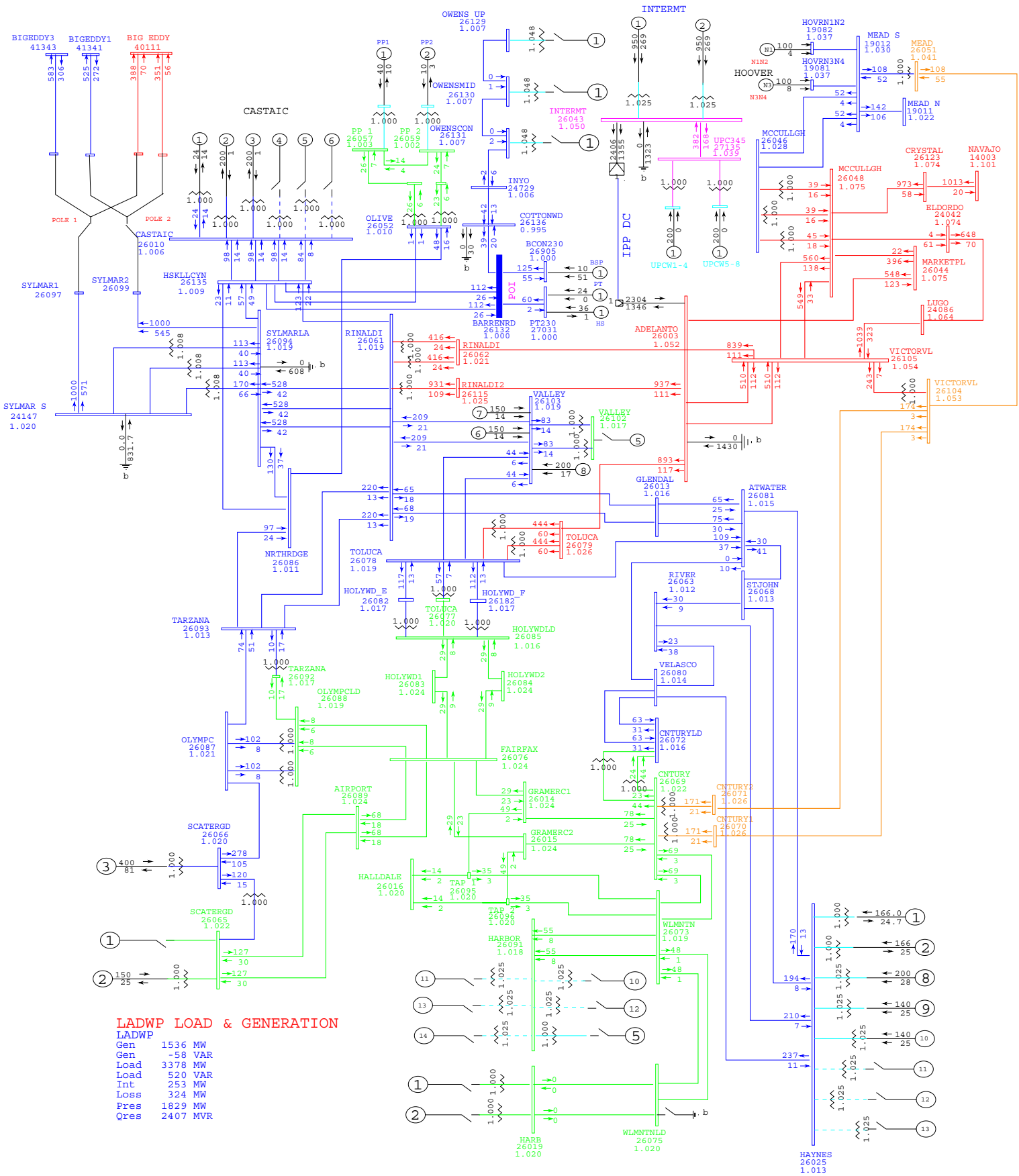
Post-project w/ OG off-line and min wind/solar gen profile

Primary POI 1

MW/MVAR

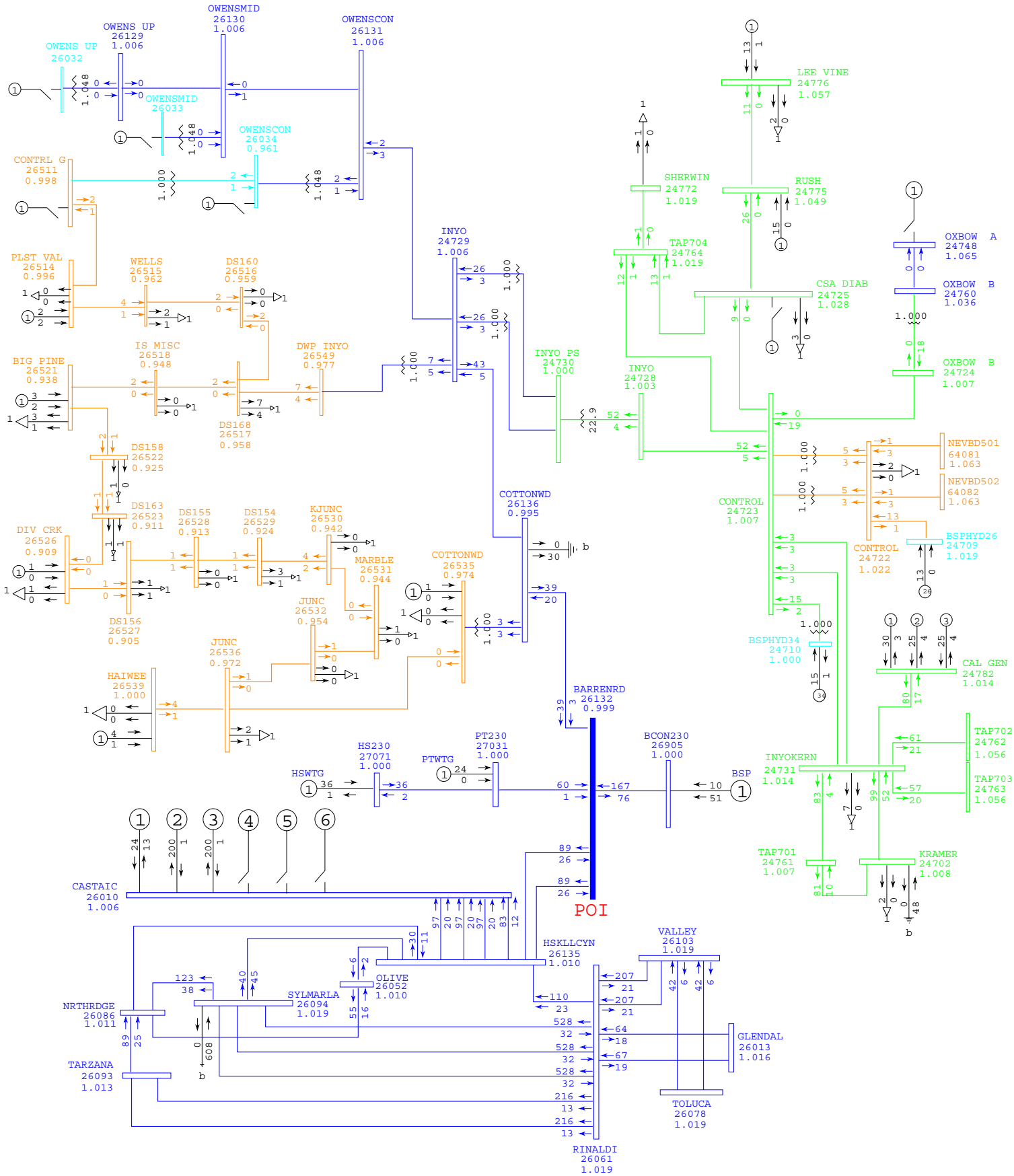
detail_oves_labsp1_50iy_

Rating = 1



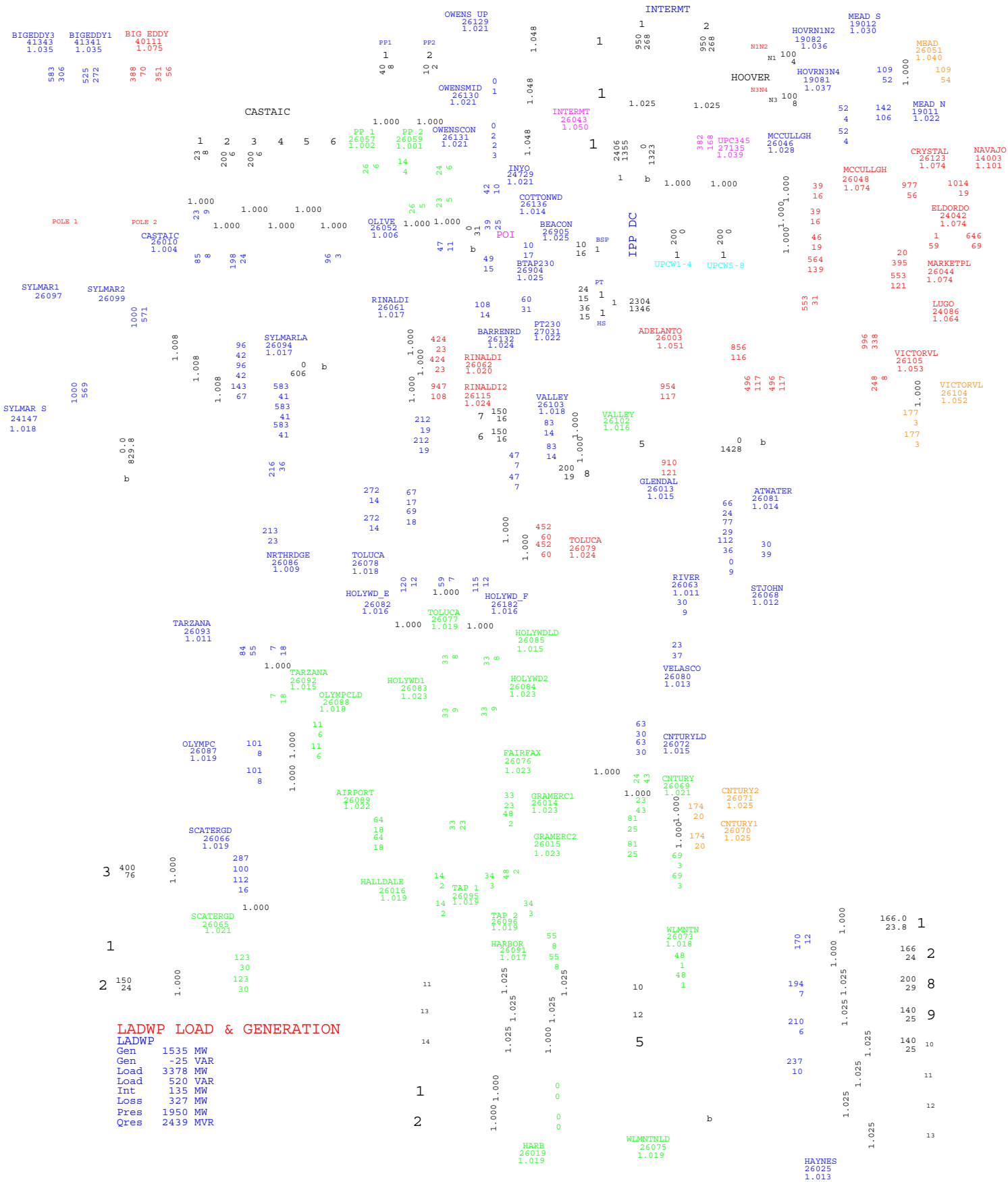
General Electric International, Inc. PSLF Program Wed Jun 04 07:37:37 2008 labsp1_50iy_ov_0og_cast_hskll.sav

	WESTERN ELECTRICITY COORDINATING COUNCIL 2010 LA1-SA APPROVED BASE CASE DECEMBER 22, 2006	Post-project w/ OG off-line and min wind/solar gen profile Primary POI 1	MW/MVAR labsp1_50iy_ov_0og_cast_ Rating = 1



General Electric International, Inc. PSLF Program Mon Jun 02 14:27:43 2008 labsp1_50iy_ov_0og_cast_hskll.sav

	WESTERN ELECTRICITY COORDINATING COUNCIL 2010 LA1-SA APPROVED BASE CASE DECEMBER 22, 2006	Post-project w/ OG off-line and min wind/solar gen profile Primary POI 1	MW/MVAR detail_oves_labsp1_50iy_ Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 11:11:22 2008 labsp2_50iy_ov_0og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2010 LA1-SA APPROVED BASE CASE

DECEMBER 22, 2006

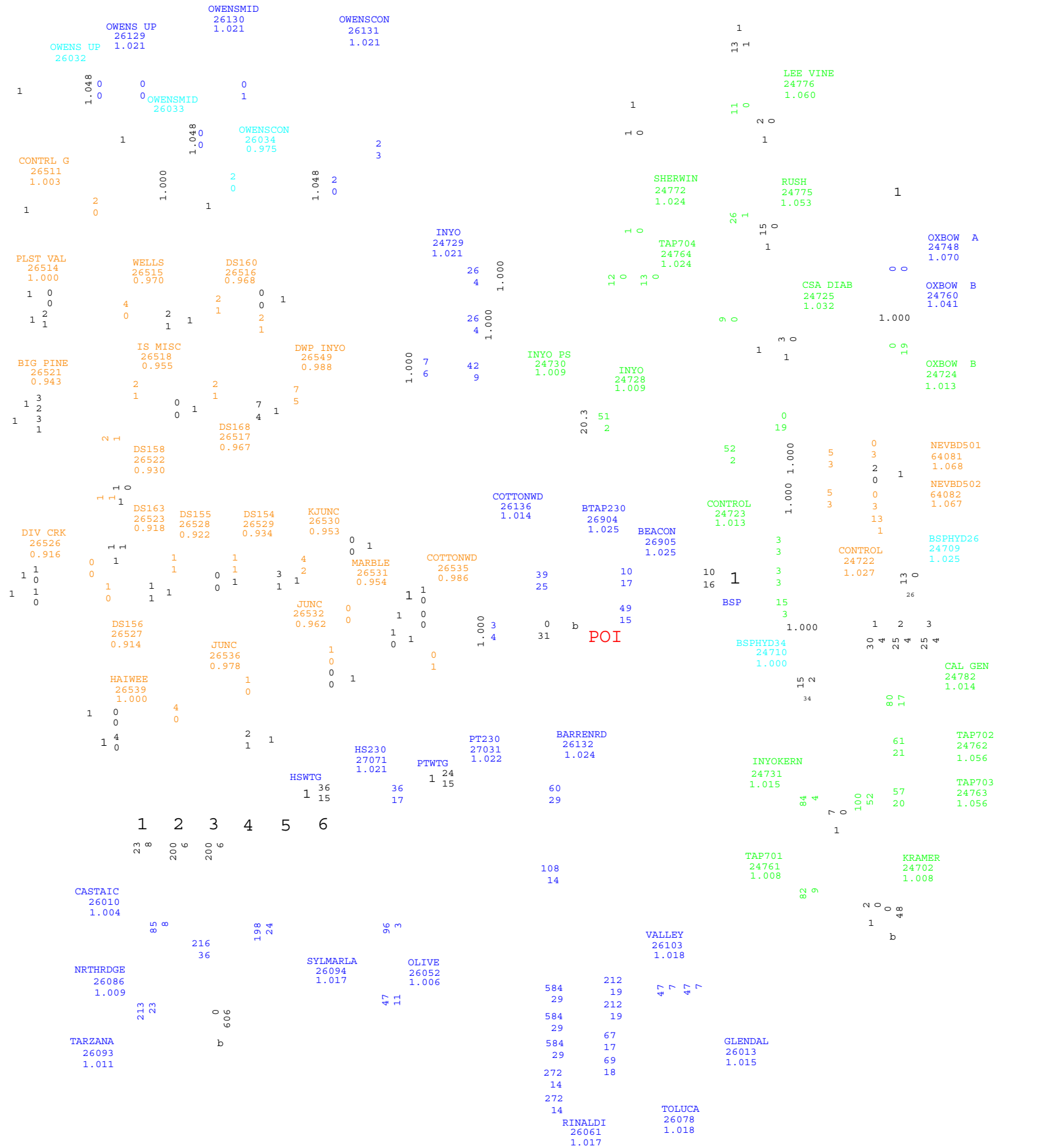
Post-project w/ OG off-line and min wind/solar gen profile

Alternative POI 2

MW/MVAR

labsp2_50iy_ov_0og.drw

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 11:12:34 2008 labsp2_50iy_ov_0og.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2010 LA1-SA APPROVED BASE CASE

DECEMBER 22, 2006

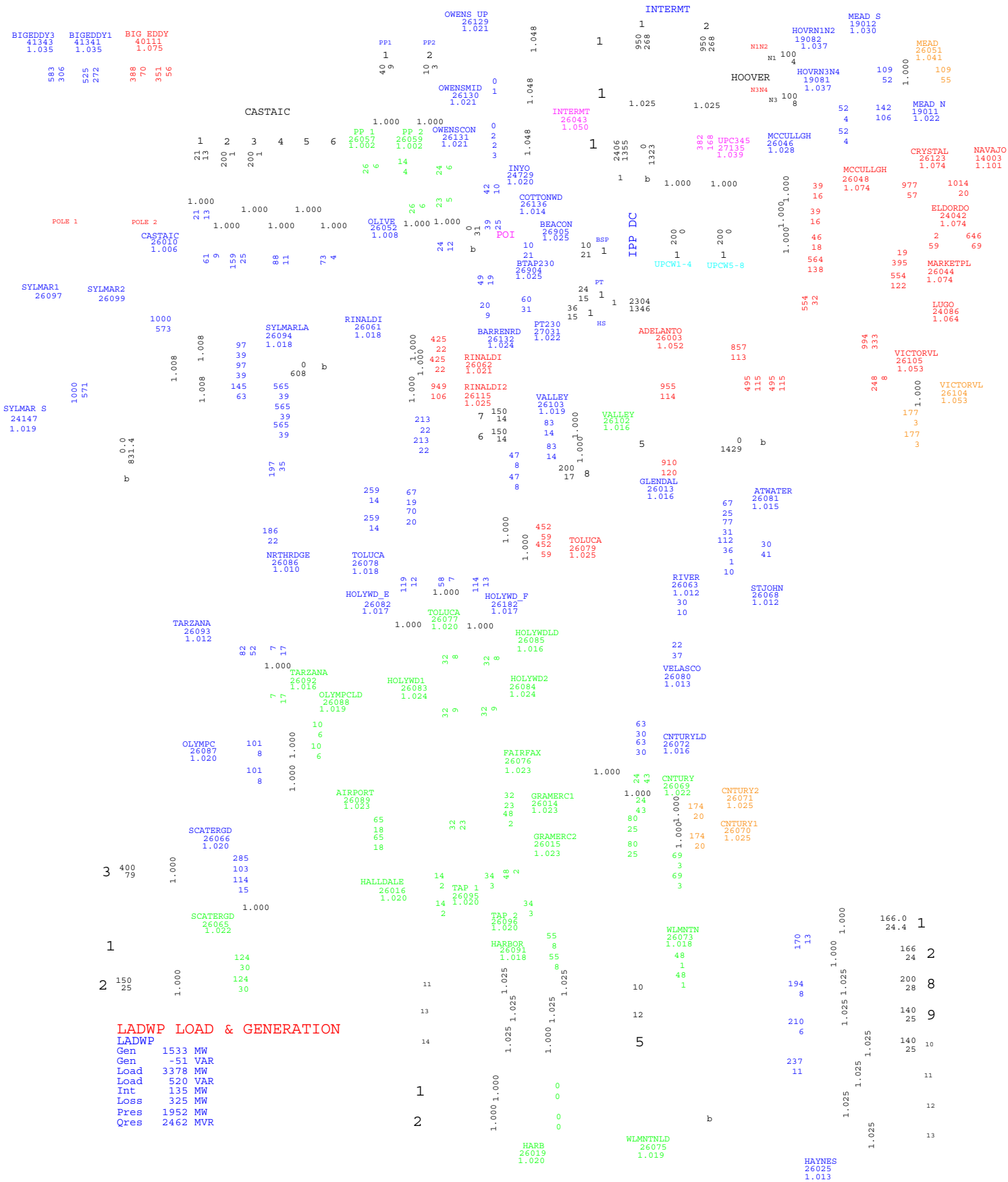
Post-project w/ OG off-line and min wind/solar gen profile

Alternative POI 2

MW/MVAR

detail_oves_labsp2_50iy_

Rating = 1



LADWP LOAD & GENERATION

LADWP

Gen	1533	MW
Gen	-51	VAR
Load	3378	MW
Load	520	VAR
Int	135	MW
Loss	325	MW
Pres	1952	MW
Qres	2462	MVR

General Electric International, Inc. PSLF Program Fri May 23 11:16:57 2008 labsp2_50iy_ov_0og_cast.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2010 LA1-SA APPROVED BASE CASE

DECEMBER 22, 2006

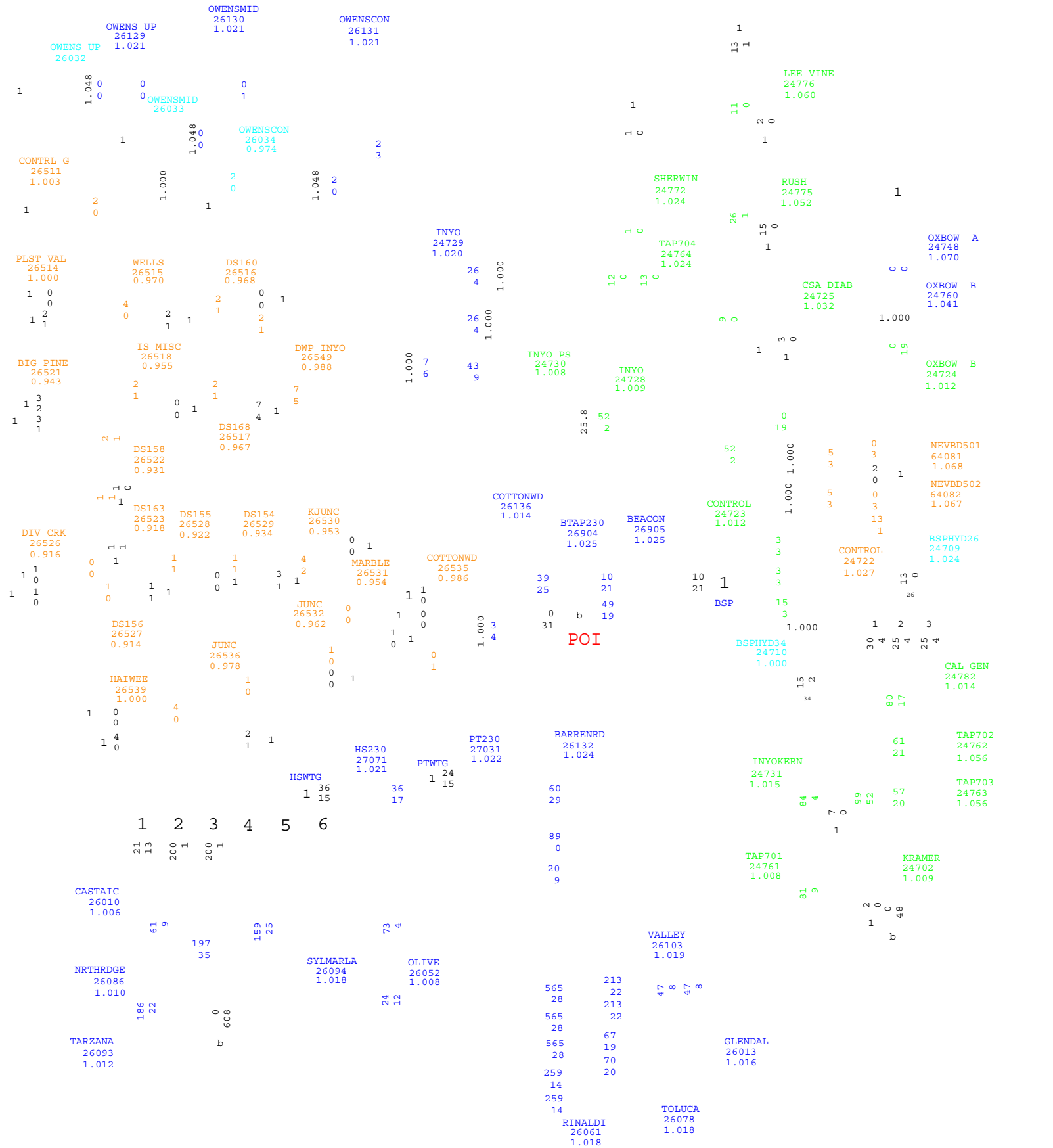
Post-project w/ OG off-line and min wind/solar gen profile

Alternative POI 2

MW/MVAR

labsp2_50iy_ov_0og_cast.

Rating = 1



General Electric International, Inc. PSLF Program Fri May 23 11:18:50 2008 labsp2_50iy_ov_0og_cast.sav

WESTERN ELECTRICITY COORDINATING COUNCIL

2010 LA1-SA APPROVED BASE CASE

DECEMBER 22, 2006

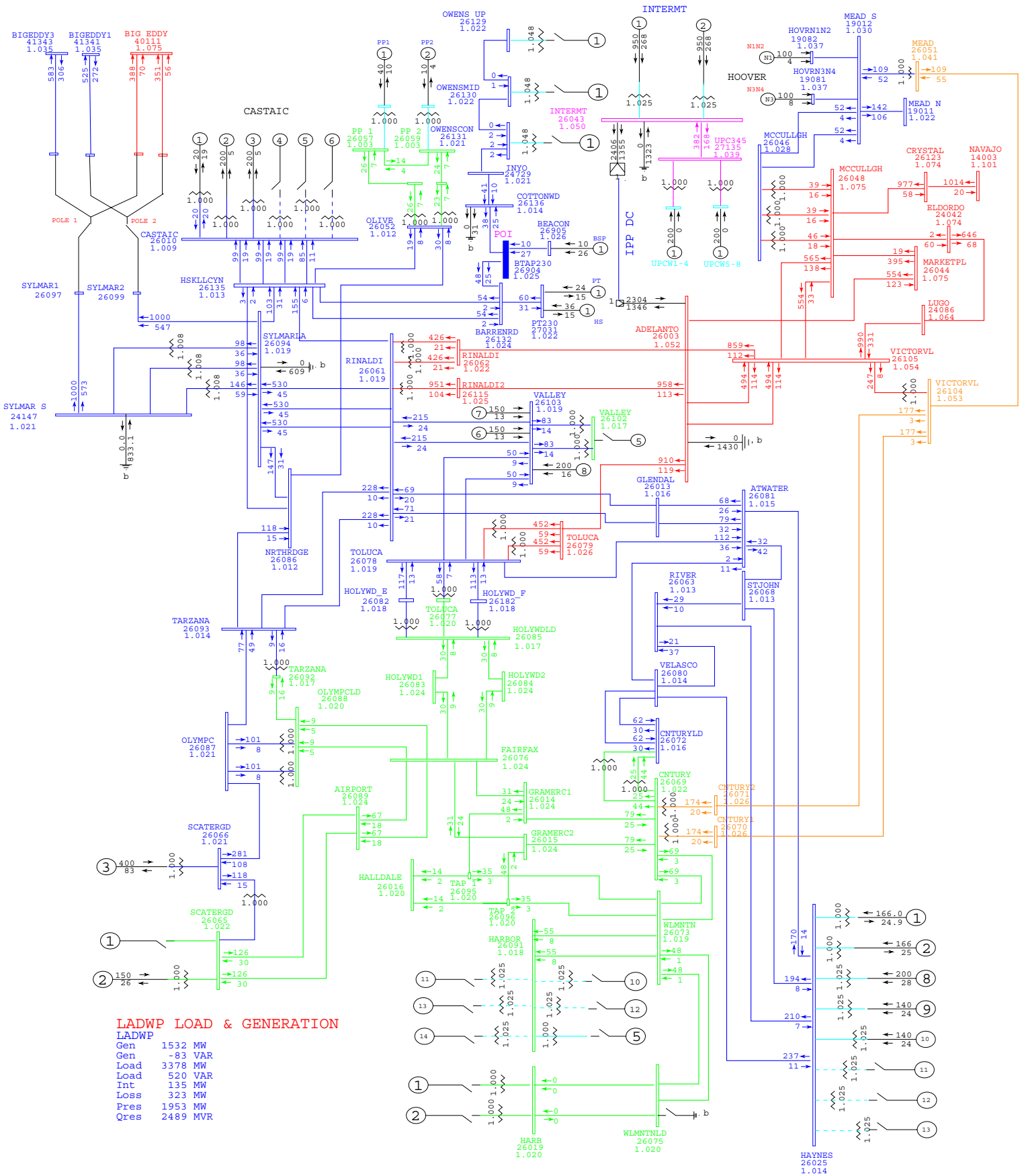
Post-project w/ OG off-line and min wind/solar gen profile

Alternative POI 2

MW/MVAR

detail_oves_labsp2_50iy_

Rating = 1



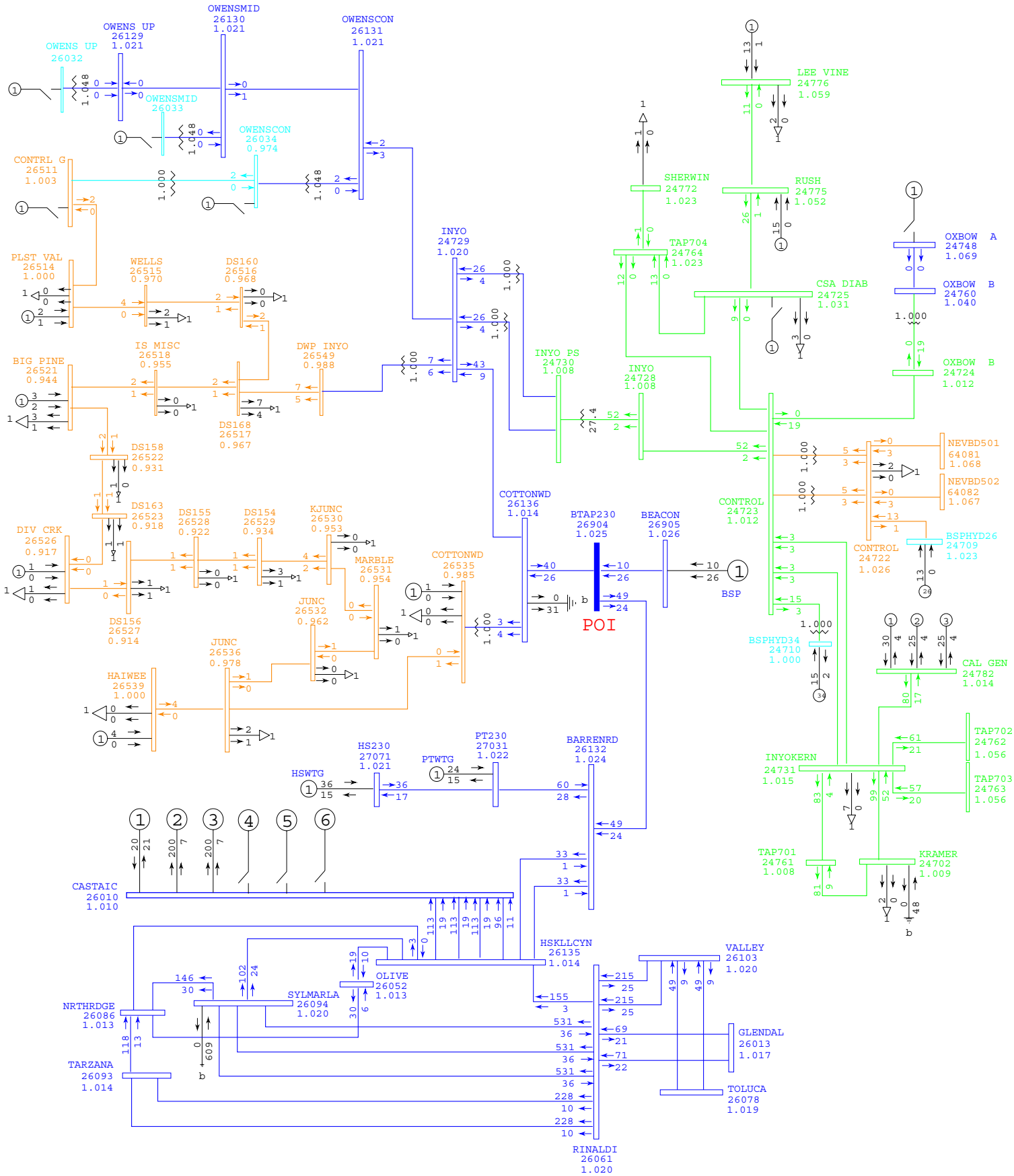
LADWP LOAD & GENERATION

LADWP

Gen	1532	MW
Gen	-83	VAR
Load	3378	MW
Load	520	VAR
Int	135	MW
Loss	323	MW
Pres	1953	MW
Qres	2489	MVR

General Electric International, Inc. PSLF Program Wed Jun 04 07:39:22 2008 labsp2_50iy_ov_0og_cast_hskll.sav

	WESTERN ELECTRICITY COORDINATING COUNCIL	Post-project w/ OG off-line and min wind/solar gen profile	MW/MVAR
	2010 LA1-SA APPROVED BASE CASE	Alternative POI 2	labsp2_50iy_ov_0og_cast_
	DECEMBER 22, 2006		Rating = 1



General Electric International, Inc. PSLF Program Mon Jun 02 15:35:48 2008 labsp2_50iy_ov_0og_cast_hskll.sav

	WESTERN ELECTRICITY COORDINATING COUNCIL 2010 LA1-SA APPROVED BASE CASE DECEMBER 22, 2006	Post-project w/ OG off-line and min wind/solar gen profile Alternative POI 2	MW/MVAR detail_oves_labsp2_50iy_ Rating = 1

APPENDIX C

TRANSIENT AND POST-TRANSIENT STABILITY RESULTS

HEAVY SUMMER

Table C1. Pre-BSP

Table C2. Post-BSP with Primary POI – Pre-BRRTP

Table C3. Post-BSP with Primary POI – Post-BRRTP

Table C4. Post-BSP with Alternate POI – Pre-BRRTP

Table C5. Post-BSP with Alternate POI – Post-BRRTP

LIGHT AUTUMN

Table C6. Pre-BSP

Table C7. Post-BSP with Primary POI – Pre-BRRTP

Table C8. Post-BSP with Primary POI – Post-BRRTP

Table C9. Post-BSP with Alternate POI – Pre-BRRTP

Table C10. Post-BSP with Alternate POI – Post-BRRTP

TABLE C1
HEAVY SUMMER
Transient and Post-Transient Stability Results

Pre-BSP

Cont. #	Outage	Stable	Possible Violations			Post Transient	
			MORC1	MORC2	FREQ Dip	ΔV > 5%	ΔV > 10%
1	Adel-Rinaldi-slo	Yes	None	None	None	None	
2	Adel-Toluca	Yes	None	None	None	None	
3	Vict-Rinaldi-slo	Yes	None	None	None	None	
4	Adel-Victorvl-slo	Yes	None	None	None	None	
5	McC-Vict-slo	Yes	None	None	None	None	
6	BR-Rinaldi-preRAS-wIY	Yes	None	None	None	None	
7	Cottonwd-BR-NoRAS	Yes	None	None	None	None	
8	Cottonwd-Inyo-preRAS	Yes	None	None	None	None	
9	Pinetree-BR-RAS	Yes	None	None	None	None	
10	HoffmanSummit-Pinetree-RAS	Yes	None	None	None	None	
11	Adel-Vict-Rinaldi-dlo	Yes	None	None	None		None
12	Adel-Victorvl-dlo	Yes	None	None	None		None
13	McCullgh-Victorvl-dlo	Yes	None	None	None		None
14	Rin-Tar-dlo	Yes	None	None	None		None
15	Rin-Glendl-dlo	Yes	None	None	None		None
16	IPP-bipolar-upc	Yes	None	None	None		None

TABLE C2
HEAVY SUMMER
Transient and Post-Transient Stability Results

Post-BSP with Primary POI - Pre-BRRTP

Cont. #	Outage	Stable	Possible Violations			Post Transient	
			MORC1	MORC2	FREQ Dip	ΔV > 5%	ΔV > 10%
1	Adel-Rinaldi-slo	Yes	None	None	None	None	
2	Adel-Toluca	Yes	None	None	None	None	
3	Vict-Rinaldi-slo	Yes	None	None	None	None	
4	Adel-Victorvl-slo	Yes	None	None	None	None	
5	McC-Vict-slo	Yes	None	None	None	None	
6	Beacon –BR-RAS	Yes	None	None	None	None	
7	BR-Rinaldi-preRAS-wIY	Yes	None	None	None	None	
8	Cottonwd-BR-NoRAS	Yes	None	None	None	None	
9	Cottonwd-Inyo-preRAS	Yes	None	None	None	None	
10	Pinetree-BR-RAS	Yes	None	None	None	None	
11	HoffmanSummit-Pinetree-RAS	Yes	None	None	None	None	
12	Adel-Vict-Rinaldi-dlo	Yes	None	None	None		None
13	Adel-Victorvl-dlo	Yes	None	None	None		None
14	McCullgh-Victorvl-dlo	Yes	None	None	None		None
15	Rin-Tar-dlo	Yes	None	None	None		None
16	Rin-Glendl-dlo	Yes	None	None	None		None
17	IPP-bipolar-upc	Yes	None	None	None		None

TABLE C3
HEAVY SUMMER
Transient and Post-Transient Stability Results

Post-BSP with Primary POI – Post-BRRTP

Cont. #	Outage	Stable	Possible Violations			Post Transient	
			MORC1	MORC2	FREQ Dip	ΔV > 5%	ΔV > 10%
1	Adel-Rinaldi-slo	Yes	None	None	None	None	
2	Adel-Toluca	Yes	None	None	None	None	
3	Vict-Rinaldi-slo	Yes	None	None	None	None	
4	Adel-Victorvl-slo	Yes	None	None	None	None	
5	McC-Vict-slo	Yes	None	None	None	None	
6	**BR-Rinaldi-no RAS**	Yes	None	None	None	None	
7	**Cottonwd-BR-OGtrip**	Yes	None	None	None	None	
8	Cottonwd-Inyo-preRAS	Yes	None	None	None	None	
9	Beacon –BR-RAS	Yes	None	None	None	None	
10	Pinetree-BR-RAS	Yes	None	None	None	None	
11	HoffmanSummit-Pinetree-RAS	Yes	None	None	None	None	
12	Adel-Vict-Rinaldi-dlo	Yes	None	None	None		None
13	Adel-Victorvl-dlo	Yes	None	None	None		None
14	McCullgh-Victorvl-dlo	Yes	None	None	None		None
15	Rin-Tar-dlo	Yes	None	None	None		None
16	Rin-Glendl-dlo	Yes	None	None	None		None
17	IPP-bipolar-upc	Yes	None	None	None		None

TABLE C4
HEAVY SUMMER
Transient and Post-Transient Stability Results

Post-BSP with Alternate POI - Pre-BRRTP

Cont. #	Outage	Stable	Possible Violations			Post Transient	
			MORC1	MORC2	FREQ Dip	ΔV > 5%	ΔV > 10%
1	Adel-Rinaldi-slo	Yes	None	None	None	None	
2	Adel-Toluca	Yes	None	None	None	None	
3	Vict-Rinaldi-slo	Yes	None	None	None	None	
4	Adel-Victorvl-slo	Yes	None	None	None	None	
5	McC-Vict-slo	Yes	None	None	None	None	
6	BR-Rinaldi-o2-RAS-wIY	Yes	None	6[1]	None	1[2]	
7	**Cottonwd-BTAP-o2-RAS**	Yes	None	None	None	None	
8	Cottonwd-Inyo-preRAS	Yes	None	None	None	None	
9	**BTAP-BR-preRAS**	Yes	None	None	None	None	
10	**Beacon-BTAP-RAS**	Yes	None	None	None	None	
11	Pinetree-BR-RAS	Yes	None	None	None	None	
12	HoffmanSummit-Pinetree-RAS	Yes	None	None	None	None	
13	Adel-Vict-Rinaldi-dlo	Yes	None	None	None		None
14	Adel-Victorvl-dlo	Yes	None	None	None		None
15	McCullgh-Victorvl-dlo	Yes	None	None	None		None
16	Rin-Tar-dlo	Yes	None	None	None		None
17	Rin-Glendl-dlo	Yes	None	None	None		None
18	IPP-bipolar-upc	Yes	None	None	None		None

[1] OVES's WELLS, DS160, DS168, IS MISC, JUNC, JUNCT 34.5 kV dynamic voltages dip to more than 23% of the pre-contingency level and last more than 117 cycles
[2] SCE's Control 55 kV voltage deviation is equal to -6.5%

TABLE C5
HEAVY SUMMER
Transient and Post-Transient Stability Results

Post-BSP with Alternate POI - Post-BRRTP

Cont. #	Outage	Stable	Possible Violations			Post Transient	
			MORC1	MORC2	FREQ Dip	ΔV > 5%	ΔV > 10%
1	Adel-Rinaldi-slo	Yes	None	None	None	None	
2	Adel-Toluca	Yes	None	None	None	None	
3	Vict-Rinaldi-slo	Yes	None	None	None	None	
4	Adel-Victorvl-slo	Yes	None	None	None	None	
5	McC-Vict-slo	Yes	None	None	None	None	
6	BR-Rinaldi-noRAS	Yes	None	None	None	None	
7	**BTAP-BR-RAS**	Yes	None	None	None	**13**[3]	
8	Beacon-BTAP-RAS	Yes	None	None	None	None	
9	Cottonwd-Inyo-preRAS	Yes	None	None	None	**13**[3]	
10	Cottonwd-BTAP-RAS	Yes	None	None	None	None	
11	Pinetree-BR-RAS	Yes	None	None	None	None	
12	HoffmanSummit-Pinetree-RAS	Yes	None	None	None	None	
13	Adel-Vict-Rinaldi-dlo	Yes	None	None	None		None
14	Adel-Victorvl-dlo	Yes	None	None	None		None
15	McCullgh-Victorvl-dlo	Yes	None	None	None		None
16	Rin-Tar-dlo	Yes	None	None	None		None
17	Rin-Glendl-dlo	Yes	None	None	None		None
18	IPP-bipolar-upc	Yes	None	None	None		None

[3] OVES's IS MISC, PLST VAL, DS156, WELLS, DS160, DS168, DS155, DS154, COTTONWD, KJUNC, MARBLE, JUNC, and JUNCT 34.5 kV voltage deviations > -5%

TABLE C6
LIGHT AUTUMN
Transient and Post-Transient Stability Results

Pre-BSP

Cont. #	Outage	Stable	Possible Violations			Post Transient	
			MORC1	MORC2	FREQ Dip	ΔV > 5%	ΔV > 10%
1	Adel-Rinaldi-slo	Yes	None	None	None	None	
2	Adel-Toluca	Yes	None	None	None	None	
3	Vict-Rinaldi-slo	Yes	None	None	None	None	
4	Adel-Victorvl-slo	Yes	None	None	None	None	
5	McC-Vict-slo	Yes	None	None	None	None	
6	BR-Rinaldi-preRAS-wIY	Yes	None	None	None	None	
7	Cottonwd-BR-NoRAS	Yes	None	None	None	None	
8	Cottonwd-Inyo-preRAS	Yes	None	None	None	6[4]	
8.1	Cottonwd-Inyo-newRAS					None[5]	
9	Pinetree-BR-RAS	Yes	None	None	None	None	
10	HoffmanSummit-Pinetree-RAS	Yes	None	None	None	None	
11	Adel-Vict-Rinaldi-dlo	Yes	None	None	None		None
12	Adel-Victorvl-dlo	Yes	None	None	None		None
13	McCullgh-Victorvl-dlo	Yes	None	None	None		None
14	Rin-Tar-dlo	Yes	None	None	None		None
15	Rin-Glendl-dlo	Yes	None	None	None		None
16	IPP-bipolar-upc	Yes	None	None	None		None

[4] OVES's DS158, DS156, DIV CRK, DS155, DS154, DS163 34.5 kV voltage deviations > -5%
[5] Insert additional 2.7 MVAR Caps at DS158, DS156,and DS154

TABLE C7
LIGHT AUTUMN
Transient and Post-Transient Stability Results

Post-BSP with Primary POI - Pre-BRRTP

Cont. #	Outage	Stable	Possible Violations			Post Transient	
			MORC1	MORC2	FREQ Dip	ΔV > 5%	ΔV > 10%
1	Adel-Rinaldi-slo	Yes	None	None	None	None	
2	Adel-Toluca	Yes	None	None	None	None	
3	Vict-Rinaldi-slo	Yes	None	None	None	None	
4	Adel-Victorvl-slo	Yes	None	None	None	None	
5	McC-Vict-slo	Yes	None	None	None	None	
6	Beacon –BR-RAS	Yes	None	None	None	None	
7	BR-Rinaldi-preRAS-wIY	Yes	None	None	None	None	
8	Cottonwd-BR-NoRAS	Yes	None	None	None	None	
9	Cottonwd-Inyo-preRAS	Yes	None	None	None	6[6]	
9.1	Cottonwd-Inyo-newRAS					None[7]	
10	Pinetree-BR-RAS	Yes	None	None	None	None	
11	HoffmanSummit-Pinetree-RAS	Yes	None	None	None	None	
12	Adel-Vict-Rinaldi-dlo	Yes	None	None	None		None
13	Adel-Victorvl-dlo	Yes	None	None	None		None
14	McCullgh-Victorvl-dlo	Yes	None	None	None		None
15	Rin-Tar-dlo	Yes	None	None	None		None
16	Rin-Glendl-dlo	Yes	None	None	None		None
17	IPP-bipolar-upc	Yes	None	None	None		None

[6] OVES's DS158, DS156, DIV CRK, DS155, DS154, DS163 34.5 kV voltage deviations > -5%
[7] Insert additional 2.7 MVAR Caps at DS158, DS156,and DS154

TABLE C8
LIGHT AUTUMN
Transient and Post-Transient Stability Results

Post-BSP with Primary POI – Post-BRRTP

Cont. #	Outage	Stable	Possible Violations			Post Transient	
			MORC1	MORC2	FREQ Dip	ΔV > 5%	ΔV > 10%
1	Adel-Rinaldi-slo	Yes	None	None	None	None	
2	Adel-Toluca	Yes	None	None	None	None	
3	Vict-Rinaldi-slo	Yes	None	None	None	None	
4	Adel-Victorvl-slo	Yes	None	None	None	None	
5	McC-Vict-slo	Yes	None	None	None	None	
6	Cottonwd-Inyo-preRAS	Yes	None	None	None	6[8]	
6.1	Cottonwd-Inyo-newRAS					None[9]	
7	Cottonwd-BR-OGtrip	Yes	None	None	None	None	
8	BR-Rinaldi-no RAS	Yes	None	None	None	None	
9	Beacon –BR-RAS	Yes	None	None	None	None	
10	Pinetree-BR-RAS	Yes	None	None	None	None	
11	HoffmanSummit-Pinetree-RAS	Yes	None	None	None	None	
12	Adel-Vict-Rinaldi-dlo	Yes	None	None	None		None
13	Adel-Victorvl-dlo	Yes	None	None	None		None
14	McCullgh-Victorvl-dlo	Yes	None	None	None		None
15	Rin-Tar-dlo	Yes	None	None	None		None
16	Rin-Glendl-dlo	Yes	None	None	None		None
17	IPP-bipolar-upc	Yes	None	None	None		None

[8] OVES's DS158, DS156, DIV CRK, DS155, DS154, DS163 34.5 kV voltage deviations > -5%
[9] Insert additional 2.7 MVAR Caps at DS158, DS156,and DS154

TABLE C9
LIGHT AUTUMN
Transient and Post-Transient Stability Results

Post-BSP with Alternate POI - Pre-BRRTP

Cont. #	Outage	Stable	Possible Violations			Post Transient	
			MORC1	MORC2	FREQ Dip	ΔV > 5%	ΔV > 10%
1	Adel-Rinaldi-slo	Yes	None	None	None	None	
2	Adel-Toluca	Yes	None	None	None	None	
3	Vict-Rinaldi-slo	Yes	None	None	None	None	
4	Adel-Victorvl-slo	Yes	None	None	None	None	
5	McC-Vict-slo	Yes	None	None	None	None	
6	BR-Rinaldi-o2-RAS-wIY	Yes	None	None	None	None	
7	Cottonwd-BTAP-o2-RAS	Yes	None	None	None	None	
8	Cottonwd-Inyo-preRAS	Yes	None	None	None	6[10]	
8.1	Cottonwd-Inyo-newRAS					None[11]	
9	BTAP-BR-preRAS	Yes	None	None	None	None	
10	Beacon-BTAP-RAS	Yes	None	None	None	None	
11	Pinetree-BR-RAS	Yes	None	None	None	None	
12	HoffmanSummit-Pinetree-RAS	Yes	None	None	None	None	
13	Adel-Vict-Rinaldi-dlo	Yes	None	None	None		None
14	Adel-Victorvl-dlo	Yes	None	None	None		None
15	McCullgh-Victorvl-dlo	Yes	None	None	None		None
16	Rin-Tar-dlo	Yes	None	None	None		None
17	Rin-Glendl-dlo	Yes	None	None	None		None
18	IPP-bipolar-upc	Yes	None	None	None		None

[10] OVES's DS158, DS156, DIV CRK, DS155, DS154, DS163 34.5 kV voltage deviations > -5%
[11] Insert additional 2.7 MVAR Caps at DS158, DS156,and DS154

TABLE C10
LIGHT AUTUMN
Transient and Post-Transient Stability Results

Post-BSP with Alternate POI - Post-BRRTP

Cont. #	Outage	Stable	Possible Violations			Post Transient	
			MORC1	MORC2	FREQ Dip	ΔV > 5%	ΔV > 10%
1	Adel-Rinaldi-slo	Yes	None	None	None	None	
2	Adel-Toluca	Yes	None	None	None	None	
3	Vict-Rinaldi-slo	Yes	None	None	None	None	
4	Adel-Victorvl-slo	Yes	None	None	None	None	
5	McC-Vict-slo	Yes	None	None	None	None	
6	Cottonwd-Inyo-preRAS	Yes	None	None	None	**Diverged**[12]	
7	Cottonwd-BTAP-RAS	Yes	None	None	None	**Diverged**[8]	
8	BTAP-BR-RAS	Yes	None	None	None	None	
9	Beacon-BTAP-RAS	Yes	None	None	None	None	
10	BR-Rinaldi-noRAS	Yes	None	None	None	**Diverged**[8]	
11	Pinetree-BR-RAS	Yes	None	None	None	None	
12	HoffmanSummit-Pinetree-RAS	Yes	None	None	None	None	
13	Adel-Vict-Rinaldi-dlo	Yes	None	None	None		None
14	Adel-Victorvl-dlo	Yes	None	None	None		None
15	McCullgh-Victorvl-dlo	Yes	None	None	None		None
16	Rin-Tar-dlo	Yes	None	None	None		None
17	Rin-Glendl-dlo	Yes	None	None	None		None
18	IPP-bipolar-upc	Yes	None	None	None		None

[12] OVES's post-disturbances voltages are extremely high, power flow solutions cannot be converged.

APPENDIX D

SWITCHING SEQUENCES

SWITCHING SEQUENCES

CONTINGENCY	SEQUENCE
Adelanto - Rinaldi 500kV Line	1
Adelanto - Toluca 500 kV Line	2
Victorville - Rinaldi 500 kV Line	3
Adelanto - Victorville 500 kV Line	4
McCullgh - Victorville 500 kV Line	5
Barren Ridge - Rinaldi 230 kV line with the proposed SPS	6
Barren Ridge - Cottonwood 230 kV line with SPS for scenarios (3) & (5)	7
Barren Ridge - Beacon 230 kV tie with the proposed SPS for scenarios (3) & (5)	8
Cottonwood - Beacon Tap 230 kV line with the proposed SPS for scenarios (4) & (6)	9
Beacon Tap - Barren Ridge 230 kV with SPS for scenarios (4) & (6)	10
Beacon Tap - Beacon 230 kV tie with the proposed SPS for scenarios (4) & (6)	11
Barren Ridge - Pine Tree 230 kV line with SPS	12
Hoffman Summit - Pine Tree 230 kV line with SPS	13
Adelanto - Rinaldi and Victorville-Rinadi 500kV Lines	14
Adelanto - Victorville 500 kV Lines 1 & 2	15
Rinaldi - Tarzana 230 kV Lines 1 & 2	16
Rinaldi - Glendale 230 kV Lines 1&2	17
IPP DC Bipole	18

Adelanto-Rinaldi 500kV Line 1

```
RUN
*   3 phase 4 cycle fault at Adelanto
*   Loss of Adelanto-Rinaldi 500kV line
*
*  CC cards for post-transient only
*
*   Fault bus at RINALDI 500 busses
FB   0.0 "RINALDI2" 500.
*
*  Temporary block all DC
*
DDC   0.0 "INT MT1R"  206. "ADELAN1I" 202.
DDC   0.0 "CELILO1 "  500. "SYLMAR1 " 230.
DDC   0.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*   Clear fault at Rinaldi
CFB  4.0 "RINALDI2" 500.
*
*   Trip Adelanto - Rinaldi  500kV line
*
DL   4.0 "ADELANTO" 500. "RINALDI2" 500. "1 "
*
*  Restart all DC
*
SDC   4.0 "INT MT1R"  206. "ADELAN1I" 202.
SDC   4.0 "CELILO1 "  500. "SYLMAR1 " 230.
SDC   4.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*  Readjust Northwest SVC's
CC  MSV  0.0 "KEEL-SVC" 230.0 "1 "  350. -300.
CC  MSV  0.0 "MV-SVC  " 230.0 "1 "  350. -300.
*
*  Add SVC's at Marketplace and Adelanto
*
CC MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
CC MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
*
```

Adelanto - Toluca 500 kV Line 2

```
RUN
*   3 phase 4 cycle fault at Adelanto
*   Loss of Adelanto-Toluca Line
*  CC cards for post-transient only
*
*   Fault bus at Adelanto
FB   0.0 "ADELANTO" 500.
*
*  Temporary block all DC
*
DDC   0.0 "INT MT1R"  206. "ADELAN1I" 202.
DDC   0.0 "CELILO1 "  500. "SYLMAR1 " 230.
DDC   0.0 "CELILO2 "  500. "SYLMAR2 " 230.
```

```
*   Clear fault at Adelanto
CFB  4.0 "ADELANTO" 500.
*
*   Trip Adelanto - Toluca 500kV line
*
DL   4.0 "ADELANTO" 500. "TOLUCA  " 500. "1 "
*
*  Restart all DC
*
SDC   4.0 "INT MT1R"  206. "ADELAN1I" 202.
SDC   4.0 "CELILO1 "  500. "SYLMAR1 " 230.
SDC   4.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*  Readjust Northwest SVC's
* CC  MSV  0.0 "KEEL-SVC" 230.0 "1 "  350. -300.
* CC  MSV  0.0 "MV-SVC  " 230.0 "1 "  350. -300.
*
*  Add SVC's at Marketplace and Adelanto
*
CC MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
CC MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
*
```

Victorville-Rinaldi 500 kV Line 3

```
RUN
*   3 phase 4 cycle fault at Adelanto
*   Loss of Victorville-Rinadi 500 kV Line
*  CC cards for post-transient only
*
*   Fault bus at RINALDI 500 busses
FB   0.0 "RINALDI " 500.
*
*  Temporary block all DC
*
DDC   0.0 "INT MT1R"  206. "ADELAN1I" 202.
DDC   0.0 "CELILO1 "  500. "SYLMAR1 " 230.
DDC   0.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*   Clear fault at Rinaldi
CFB  4.0 "RINALDI " 500.
*
*   Trip Adelanto - Rinaldi 500 kV Line
*
DL   4.0 "VICTORVL" 500. "RINALDI " 500. "1 "
*
*  Restart all DC
*
SDC   4.0 "INT MT1R"  206. "ADELAN1I" 202.
SDC   4.0 "CELILO1 "  500. "SYLMAR1 " 230.
SDC   4.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*  Readjust Northwest SVC's
*
CC  MSV  0.0 "KEEL-SVC" 230.0 "1 "  350. -300.
```

```
CC  MSV  0.0 "MV-SVC  " 230.0 "1 "  350. -300.
*
*  Add SVC's at Marketplace and Adelanto
*
CC  MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
CC  MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
*
```

Adelanto - Victorville 500 kV Line 4

```
RUN
*   3 phase 4 cycle fault at Victorville
*   Loss of Adelanto-Victorville one line
*  CC cards for post-transient only
*
*   Fault bus at Victorville
FB   0.0 "VICTORVL" 500.
*
*  Temporary block all DC
*
DDC   0.0 "INT MT1R"  206. "ADELAN1I" 202.
DDC   0.0 "CELILO1 "  500. "SYLMAR1 " 230.
DDC   0.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*   Clear fault at Victorville
CFB  4.0 "VICTORVL" 500.
*
*   Trip Adelanto - Victorville line 1
*
DL   4.0 "ADELANTO" 500. "VICTORVL" 500. "1 "
*
*  Restart all DC
*
SDC   4.0 "INT MT1R"  206. "ADELAN1I" 202.
SDC   0.0 "CELILO1 "  500. "SYLMAR1 " 230.
SDC   0.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*  Readjust Northwest SVC's
CC  MSV  0.0 "KEEL-SVC" 230.0 "1 "  350. -300.
CC  MSV  0.0 "MV-SVC  " 230.0 "1 "  350. -300.
*  Add SVC's at Marketplace and Adelanto
*
*  CC  MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
*  CC  MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
*
```

McCullgh-Victorville 500 kV Line 5

```
RUN
*   3 phase 4 cycle fault at Victorville
*   Loss of McCullgh-Victorville one line
*  CC cards for post-transient only
*
*   Fault bus at Victorville
```

```
FB   0.0 "VICTORVL" 500.
*
*  Temporary block all DC
*
DDC   0.0 "INT MT1R"  206. "ADELAN1I" 202.
DDC   0.0 "CELILO1 "  500. "SYLMAR1 " 230.
DDC   0.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*   Flash series capacitors in following 500 kV Lines
*
FC   0.0 "MARKETPL" 500. "ADELANTO" 500. "1 " 1
FC   0.0 "MOHAVE  " 500. "LUGO    " 500. "1 " 1
FC   0.0 "ELDORDO" 500.  "LUGO    " 500. "1 " 3
FC   0.0 "MCCULLGH" 500. "VICTORVL" 500. "1 " 3
FC   0.0 "MCCULLGH" 500. "VICTORVL" 500. "2 " 1
*
*   Clear fault at Victorville
CFB  4.0 "VICTORVL" 500.
*
*   Trip McCullough - Victorville lines
*
DL   4.0 "MCCULLGH" 500. "VICTORVL" 500. "1 "
*
*  Restart all DC
*
SDC   4.0 "INT MT1R"  206. "ADELAN1I" 202.
SDC   4.0 "CELILO1 "  500. "SYLMAR1 " 230.
SDC   4.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*   Reinsert series capacitors in following 500 kV Lines
*
RC   4.0 "MARKETPL" 500. "ADELANTO" 500. "1 " 1
RC   8.0 "MOHAVE  " 500. "LUGO    " 500. "1 " 1
RC   8.0 "ELDORDO" 500.  "LUGO    " 500. "1 " 3
RC   8.0 "MCCULLGH" 500. "VICTORVL" 500. "2 " 1
*
*  Readjust Northwest SVC's
CC  MSV  0.0 "KEEL-SVC" 230.0 "1 "  350. -300.
CC  MSV  0.0 "MV-SVC  " 230.0 "1 "  350. -300.
*
*  Add SVC's at Marketplace and Adelanto
*
CC  MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
CC  MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
*
```

Barren Ridge - Rinaldi 230 kV line with the proposed SPS 6

```
RUN
*   Barren Ridge - Rinaldi 230kV Line Out
*   W/ RAS
*   3-phase 4 cycle fault at Barren Ridge
*
* CC  DRP 110
*
*   Fault bus at Barren Ridge 230
```

```
FB  0.0  "BARRENRD" 230.
*
*

*   Clear fault bus at BARRENRD
CFB 4.0  "BARRENRD" 230.
*
*   Trip Barren Ridge - Rinaldi
DL  4.0  "BARRENRD" 230. "RINALDI" 230. "1 "
*
*
*
*   Trip PT, Hoffman and Beacon generating units
*
TG  4.0  "PTWTG   "  0.57 "**"
TG  4.0  "HSWTG   "  0.57 "**"
*
*
*   Trip Cottonwood - Baren Ridge 230 kV Line
*
DL 12.0  "BARRENRD" 230. "COTTONWD" 230. "1 "
*
```

Barren Ridge - Cottonwood 230 kV line with SPS for scenarios (3) & (5) 7

```
RUN
*   Cottonwood - Barren Ridge 230kV Line Out
*   W/O RAS
*   3-phase 4 cycle fault at Barren Ridge
*
* CC  DRP 110
*
*   Fault bus at Barren Ridge 230
FB  0.0  "BARRENRD" 230.
*
*
*   Clear fault bus at Barren Ridge
CFB 4.0  "BARRENRD" 230.
*
*   Trip Cottonwood - Barren Ridge
DL  4.0  "COTTONWD" 230. "BARRENRD" 230. "1 "
*
*
*
*   Trip OG Units
*
TG  8.0  "OWENS UP " 11.5  "1 "
TG  8.0  "OWENSMID " 11.5  "1 "
TG  8.0  "OWENSCON " 11.5. "1 "
*
*
```

Barren Ridge - Beacon 230 kV tie with the proposed SPS for scenarios (3) & (5) 8

```
RUN
*   Beacon - Barren Ridge 230kV Line Out
*   W/ RAS
*   3-phase 4 cycle fault at Barren Ridge
*
*   Fault bus at Barren Ridge 230
FB  0.0  "BARRENRD" 230.
*
*
*   Clear fault bus at Barren Ridge
CFB 4.0  "BARRENRD" 230.
*
*   Trip Beacon - Barren Ridge
DL  4.0  "BCON230 " 230. "BARRENRD" 230. "1 "
*
*
*   Trip Beacon generating unit
TG  4.0  "BCON18G " 18.0  "1 "
*
```

Cottonwood - Beacon Tap 230 kV line with the proposed SPS for scenarios (4)&(6) 9

```
RUN
*   Cottonwood - Beacon Tap 230kV Line Out
*   W/ RAS
*   3-phase 4 cycle fault at Beacon Tap
*
*   Fault bus at Beacon Tap 230
FB  0.0  "BTAP230 " 230.
*
*
*   Clear fault bus at Beacon Tap
CFB 4.0  "BTAP230 " 230.
*
*   Trip Cottonwood - BTAP 230
DL  4.0  "COTTONWD" 230. "BTAP230 " 230. "1 "
*
*
*   Trip OG Units
TG  12.0  "OWENS UP" 11.5  "**"
TG  12.0  "OWENSMID" 11.5  "**"
TG  12.0  "OWENSCON" 11.5. "**"
```

Beacon Tap - Barren Ridge 230 kV with SPS for scenarios (4) & (6) 10

```
RUN
*   Beacon Tap - Barren Ridge 230kV Line Out
*   W/ RAS
*   3-phase 4 cycle fault at Barren Ridge
*
*   Fault bus at Barren Ridge 230
FB  0.0  "BARRENRD" 230.
*
*   Clear fault bus at Barren Ridge 230
```

```
CFB 4.0  "BARRENRD" 230.
*
*   Trip Beacon Tap - Barren Ridge
DL  4.0  "BTAP230 " 230. "BARRENRD" 230. "1 "
DL  4.0  "BTAP230 " 230. "COTTONWD" 230. "1 "
*
*   Trip Beacon generating unit
TG  4.0  "BCON18G " 18.0  "1 "
*
*   Trip OG Units
TG  12.0  "OWENS UP" 11.5  "**"
TG  12.0  "OWENSMID" 11.5  "**"
TG  12.0  "OWENSCON" 11.5. "**"
```

Beacon Tap - Beacon 230 kV tie with the proposed SPS for scenarios (4) & (6) 11

```
RUN
*   Beacon - Beacon Tap 230kV Line Out
*   W/ RAS
*   3-phase 4 cycle fault at Beacon Tap
*
*   Fault bus at Beacon Tap 230
FB  0.0  "BTAP230 " 230.
*
*
*   Clear fault bus at Beacon Tap
CFB 4.0  "BTAP230 " 230.
*
*   Trip Cottonwood - BTAP 230
DL  4.0  "BEACON  " 230. "BTAP230 " 230. "1 "
*
*   Trip Beacon generating unit
*
TG  4.0  "BCON18G " 18.0  "1 "
*
```

Barren Ridge - Pine Tree 230 kV line with SPS 12

```
RUN
*   Pinetree - Barren Ridge 230kV Line Out
*   W/ RAS
*   3-phase 4 cycle fault at Barren Ridge
*
*
*   Fault bus at Barren Ridge 230
FB  0.0  "BARRENRD" 230.
*
*
*   Clear fault bus at Barren Ridge
CFB 4.0  "BARRENRD" 230.
*
*   Trip Pine Tree  - Barren Ridge
DL  4.0  "PT230   " 230. "BARRENRD" 230. "1 "
*
*
*   Trip PT and Hoffman Units
```

```
*
TG  4.0  "HSWTG   " 0.57  "**"
TG  4.0  "PTWTG   " 0.57  "**"
```

Hoffman Summit - Pine Tree 230 kV line with SPS 13

```
RUN
*   Hoffman Summit - Pinetree 230kV Line Out
*   W/ RAS
*   3-phase 4 cycle fault at Pinetree
*
*
*   Fault bus at Pinetree 230
FB  0.0  "PT230   " 230.
*
*
*   Clear fault bus at Pinetree
CFB 4.0  "PT230   " 230.
*
*   Trip Hoffman Summit - Pine Tree
DL  4.0  "HS230   " 230. "PT230   " 230. "1 "
*
*   Trip Hoffman Unit
*
TG  4.0  "HSWTG   " 0.57 "**"
```

Adelanto-Rinaldi and Victorville-Rinadi 500kV Lines 14

```
RUN
*   3 phase 4 cycle fault at Adelanto
*   Loss of Adelanto-Rinaldi and Victorville-Rinadi 500kV lines
*  CC cards for post-transient only
*
*   Fault bus at RINALDI 500 busses
FB   0.0 "RINALDI " 500.
FB   0.0 "RINALDI2" 500.
*
*
*  Temporary block all DC
*
DDC   0.0 "INT MT1R"  206. "ADELAN1I" 202.
DDC   0.0 "CELILO1 "  500. "SYLMAR1 " 230.
DDC   0.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*   Clear fault at Rinaldi
CFB  4.0 "RINALDI " 500.
CFB  4.0 "RINALDI2" 500.
*
*   Trip Adelanto - Rinaldi & Victorville-Rinaldi 500kV lines
*
DL   4.0 "ADELANTO" 500. "RINALDI2" 500. "1 "
DL   4.0 "VICTORVL" 500. "RINALDI " 500. "1 "
*
*  Restart all DC
*
```

```
SDC   4.0 "INT MT1R"  206. "ADELAN1I" 202.
SDC   4.0 "CELILO1 "  500. "SYLMAR1 " 230.
SDC   4.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*
*
*  Readjust Northwest SVC's
CC  MSV  0.0 "KEEL-SVC" 230.0 "1 "  350. -300.
CC  MSV  0.0 "MV-SVC  " 230.0 "1 "  350. -300.
*
*
*  Add SVC's at Marketplace and Adelanto
*
CC MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
CC MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
```

Adelanto-Victorville 500 kV Lines 1 & 2 15

```
RUN
*   3 phase 4 cycle fault at Victorville
*   Loss of Adelanto-Victorville two lines
*  CC cards for post-transient only
*
*   Fault bus at Victorville
FB   0.0 "VICTORVL" 500.
*
*  Temporary block all DC
*
DDC   0.0 "INT MT1R"  206. "ADELAN1I" 202.
DDC   0.0 "CELILO1 "  500. "SYLMAR1 " 230.
DDC   0.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*   Clear fault at Victorville
CFB  4.0 "VICTORVL" 500.
*
*   Trip Adelanto - Victorville lines
*
DL   4.0 "ADELANTO" 500. "VICTORVL" 500. "1 "
DL   4.0 "ADELANTO" 500. "VICTORVL" 500. "2 "
*
*  Restart all DC
*
SDC   4.0 "INT MT1R"  206. "ADELAN1I" 202.
SDC   0.0 "CELILO1 "  500. "SYLMAR1 " 230.
SDC   0.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*  Readjust Northwest SVC's
CC  MSV  0.0 "KEEL-SVC" 230.0 "1 "  350. -300.
CC  MSV  0.0 "MV-SVC  " 230.0 "1 "  350. -300.
*
*  Add SVC's at Marketplace and Adelanto
*
CC  MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
CC  MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
```

Rinaldi - Tarzana 230 kV Lines 1 & 2 16

```
RUN
*   Loss of Rinaldi-Tarzana two lines
*   Fault bus at Rinaldi 230
FB   0.0 "RINALDI" 230.
*
*  Temporary block all DC
*
DDC   0.0 "INT MT1R"  206. "ADELAN1I" 202.
DDC   0.0 "CELILO1 "  500. "SYLMAR1 " 230.
DDC   0.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*   Clear fault at Adelanto
CFB  4.0 "RINALDI" 230.
*
*  Restart all DC
*
SDC   4.0 "INT MT1R"  206. "ADELAN1I" 202.
SDC   4.0 "CELILO1 "  500. "SYLMAR1 " 230.
SDC   4.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*   Trip Rinaldi - Tarzana lines
*
DL   0.0 "RINALDI " 230. "TARZANA " 230. "1 "
DL   0.0 "RINALDI " 230. "TARZANA " 230. "2 "
```

Rinaldi-Glendale 230 kV Lines 1&2 17

```
RUN
*   Loss of Rinaldi-Glendale two lines
*   Fault bus at Rinaldi 230
FB   0.0 "RINALDI" 230.
*
*  Temporary block all DC
*
DDC   0.0 "INT MT1R"  206. "ADELAN1I" 202.
DDC   0.0 "CELILO1 "  500. "SYLMAR1 " 230.
DDC   0.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*   Clear fault at Adelanto
CFB  4.0 "RINALDI" 230.
*
*  Restart all DC
*
SDC   4.0 "INT MT1R"  206. "ADELAN1I" 202.
SDC   4.0 "CELILO1 "  500. "SYLMAR1 " 230.
SDC   4.0 "CELILO2 "  500. "SYLMAR2 " 230.
*
*   Trip Rinaldi - Tarzana lines
*
DL   0.0 "RINALDI " 230. "GLENDAL " 230. "1 "
DL   0.0 "RINALDI " 230. "GLENDAL " 230. "2 "
*
```

```
RUN
*     Loss of IPP Bipole with North-to-South flow
*
*  CC cards for post-transient only
*
CC  DRP 1900
*
*   Readjust Northwest SVC's
*
CC  MSV 0.0 "KEEL-SVC" 19.60 "1 "  350. -300.
CC  MSV 0.0 "MV-SVC  " 19.60 "1 "  350. -300.
*
*   Readjust SCE SVC's
*
MSV 0.0 "DEVRSVC1" 500.0 "1 "  400. -249.
*
*  Delete Intermountain and Adelanto buses
*
DDC  0.0 "INT MT1R"  206. "ADELAN1I" 202.
*
*  Drop filter bank capacitors at Intermountain
*
MBS  4.0 "INTERMT "  345.    "b "  "D"
*
*  Drop filter bank capacitors at Adelanto
*
MBS  4.0 "ADELANTO"  500.    "b "  "D"
*
*  Trip both units at Intermountain
*
TG  10.2 "INTERM1G "  26.0  "1 "
TG  10.2 "INTERM2G "  26.0  "2 "
*
*  Trip both units at UPC Wind
*
TG  10.2 "UPCW1-4  "  0.69  "1 "
TG  10.2 "UPCW5-8  "  0.69  "1 "
*
*   This routine will call the FACRI (Fort Rock and Malin MSC)
*      in In-Run EPCL (facri.p)
*   This will be done at 17.5 cycles
*
*   Insert Fort Rock series caps
CC  RC  12.6 "CAPTJACK" 500. "GRIZZLY " 500. "1 " 4
CC  RC  12.6 "GRIZZLY " 500. "MALIN   " 500. "2 " 4
CC  RC  12.6 "PONDROSA" 500. "SUMMER L" 500. "1 " 4
*
*   Switch on Shunt caps at malin as part of FACRI
CC  MBS  13.4 "MALIN   " 500. "c1" "R"
CC  MBS  13.4 "MALIN   " 500. "c2" "R"
CC  MSV  13.4 "MALIN   " 500. "s " 0.0 0.0
*
```

```
*
*   Remove reactors at Olinda Substation
*
CC  MLS 17.5 "OLINDA"   500. "MAXWELL" 500. "1 " 1 "D" "f "
CC  MLS 17.5 "CAPTJACK" 500. "OLINDA"  500. "1 " 3 "D" "f "
*
*   Insert capacitors at Olinda
*
MBS   17.5 "OLINDA"   500.    "c1"  "R"
*
*   Switch on Table Mountain Shunt cap
*   2 x 217 caps (91 Mvar reactor modeled separately)
CC  MBS  90. "TABLE MT" 500. "c1" "R"
CC  MBS  90. "TABLE MT" 500. "c2" "R"
*
*
*  Add SVC's at Marketplace and Adelanto
*
CC  MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
CC  MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
*
```

APPENDIX E

SHORT-CIRCUIT STUDY RESULTS

Short-Circuit Study Results – Pre-BRRTP

Primary POI

Stations	Pre-BSP		Post-BSP		Differential		% change	
	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)
Barren Ridge	2971.92	2220.33	4098.78	3768.24	1126.86	1547.91	37.92	69.72
Pinetree	2710.37	2018.84	3606.02	3168.06	895.65	1149.22	33.05	56.92
HoffmanSummit	2544.78	1884.65	3260.46	2776.83	715.68	892.18	28.12	47.34
Cottonwood	1972.95	1684.52	2153.13	1860.92	180.18	176.40	9.13	10.47
Inyo	2069.66	2278.71	2150.61	2354.84	80.95	76.13	3.91	3.34
Rinaldi	67333.46	71861.06	67761.23	72267.93	427.77	406.87	0.64	0.57
Sylmar	65037.32	65914.07	65338.56	66138.24	301.24	224.17	0.46	0.34
Northridge	34126.16	34728.96	34191.57	34777.05	65.41	48.09	0.19	0.14
Olive	20017.31	15703.49	20035.16	15711.26	17.85	7.77	0.09	0.05
Castaic	27123.39	29402.31	27139.25	29415.44	15.86	13.13	0.06	0.04
Beacon			4054.68	3749.55				

Alternate POI

Stations	Pre-BSP		Post-BSP		Differential		% change	
	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)
Barren Ridge	2971.92	2220.33	4188.03	3820.95	1216.11	1600.62	40.92	72.09
Pinetree	2710.37	2018.84	3673.43	3204.29	963.06	1185.45	35.53	58.72
HoffmanSummit	2544.78	1884.65	3314.85	2804.24	770.07	919.59	30.26	48.79
Cottonwood	1972.95	1684.52	2714.78	2327.54	741.83	643.02	37.60	38.17
Inyo	2069.66	2278.71	2359.14	2534.91	289.48	256.20	13.99	11.24
Rinaldi	67333.46	71861.06	67785.17	72285.15	451.71	424.09	0.67	0.59
Sylmar	65037.32	65914.07	65355.36	66149.06	318.04	234.99	0.49	0.36
Northridge	34126.16	34728.96	34195.14	34779.47	68.98	50.51	0.20	0.15
Olive	20017.31	15703.49	20036.21	15711.68	18.90	8.19	0.09	0.05
Castaic	27123.39	29402.31	27140.19	29416.07	16.80	13.76	0.06	0.05
Beacon			4065.60	3785.88				
BTAP			4121.36	3812.24				

Short-Circuit Study Results – Post-BRRTP

Primary POI

Stations	Pre-BSP		Post-BSP		Differential		% change	
	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)
Barren Ridge	3441.38	2528.40	4529.60	4071.48	1088.22	1543.08	31.62	61.03
Pinetree2	3096.56	2274.83	3927.84	3373.23	831.28	1098.4	26.85	48.28
HoffmanSummit	2842.46	2079.74	3518.13	2930.66	675.67	850.92	23.77	40.91
Cottonwood	2058.32	1743.11	2203.53	1889.16	145.21	146.05	7.05	8.38
Inyo	2109.03	2312.42	2171.82	2371.53	62.79	59.11	2.98	2.56
Rinaldi	68333.37	73179.86	68560.28	73367.60	226.91	187.74	0.33	0.26
Sylmar	65521.05	66561.71	65747.64	66733.70	226.59	171.99	0.35	0.26
Northridge	35249.55	35783.9	35382.80	35887.32	133.25	103.42	0.38	0.29
Olive	22754.76	17849.48	22845.06	17898.72	90.30	49.24	0.40	0.28
Castaic	29993.04	32629.91	30203.78	32826.47	210.74	196.56	0.70	0.60
Beacon			4470.17	4042.50				

Alternate POI

Stations	Pre-BSP		Post-BSP		Differential		% change	
	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)	3-ph (Amp)	SLG (Amp)
Barren Ridge	3441.38	2528.40	4618.95	4122.93	1177.57	1594.53	34.22	63.06
Pinetree	3096.56	2274.83	3993.36	3407.67	896.80	1132.84	28.96	49.80
HoffmanSummit	2842.46	2079.74	3570.00	2956.28	727.54	876.54	25.60	42.15
Cottonwood	2058.32	1743.11	2822.93	2388.23	764.61	645.12	37.15	37.01
Inyo	2109.03	2312.42	2393.27	2560.95	284.24	248.53	13.48	10.75
Rinaldi	68333.37	73179.86	68574.14	73377.47	240.77	197.61	0.35	0.27
Sylmar	65521.05	66561.71	65761.50	66742.62	240.45	180.91	0.37	0.27
Northridge	35249.55	35783.90	35390.88	35892.57	141.33	108.67	0.40	0.30
Olive	22754.76	17849.48	22850.63	17900.82	95.87	51.34	0.42	0.29
Castaic	29993.04	32629.91	30216.69	32836.13	223.65	206.22	0.75	0.63
Beacon			4448.64	4055.94				
BTAP			4522.25	4094.48				

5

LOS ANGELES DEPARTMENT OF WATER & POWER

DRAFT

BEACON SOLAR PROJECT

SYSTEM IMPACT STUDY

VOLUME II – STABILITY PLOTS

Transmission Planning

May 29, 2008

Study: BSP Case: hsprebsp_ov_45og

Figure 1 Bus-V:Owens Gorge/Rinaldi 230 kV

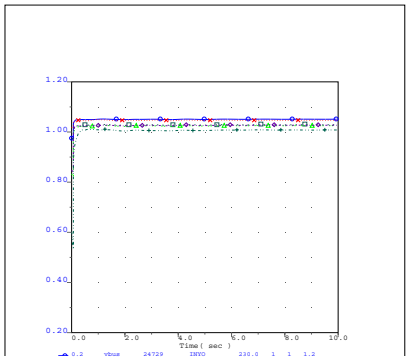


Figure 2 Bus-V:SCE North 115 kV

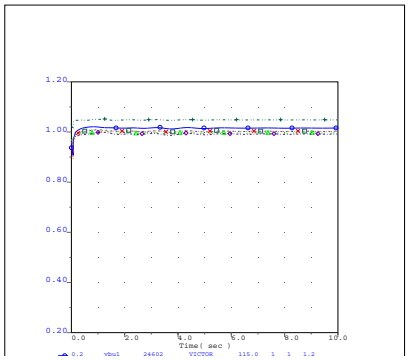


Figure 3 Bus-V:LA BASIN 230 & 138 kV

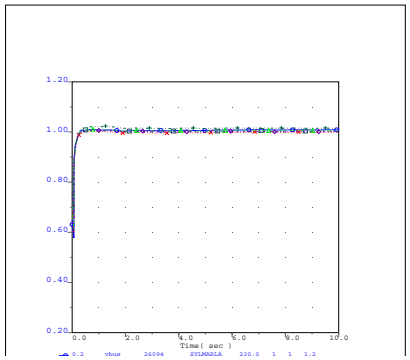


Figure 4 Bus-V:SCE 500 & 230 kV

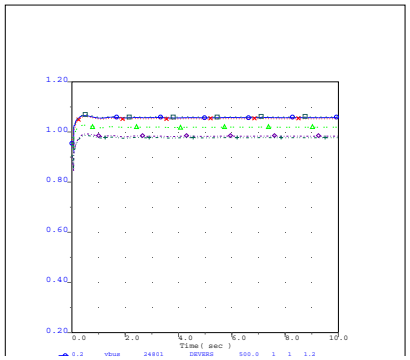


Figure 5 Bus-V: LADWP 500 kV:

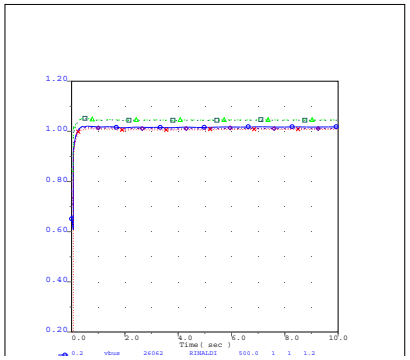


Figure 6 Bus-V:LADWP Load:

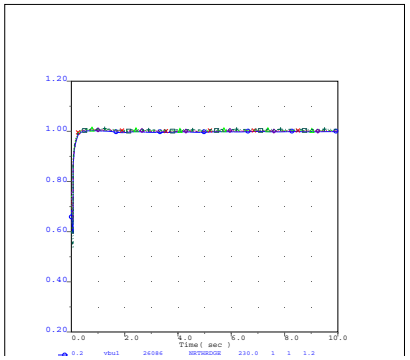


Figure 7 Bus-V: NW & S.CAL 500 kV

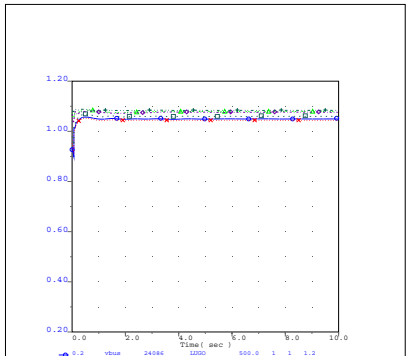


Figure 8 Bus-V: Others 500 kV

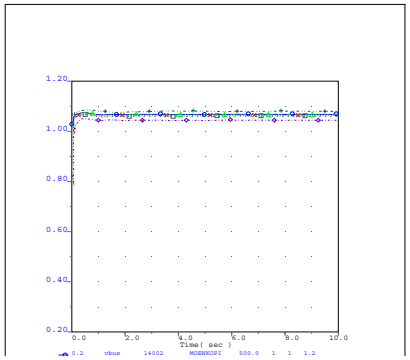


Figure 9 Bus-V: Others 230 kV

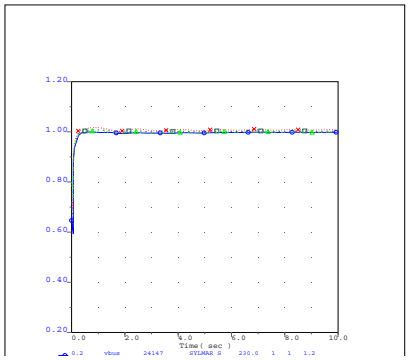


Figure 10 REL_RTR_ANG:S.Cal

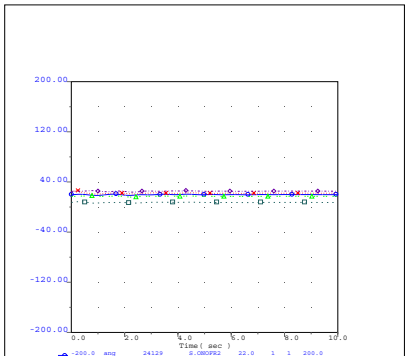


Figure 11 RELATIVE_ROTOR_ANGLE:S.Cal:

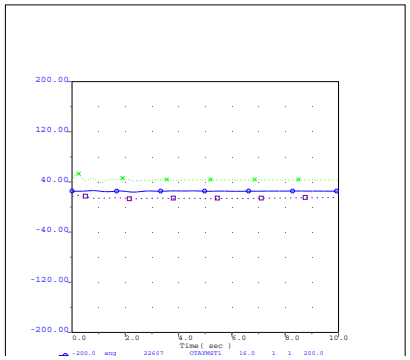
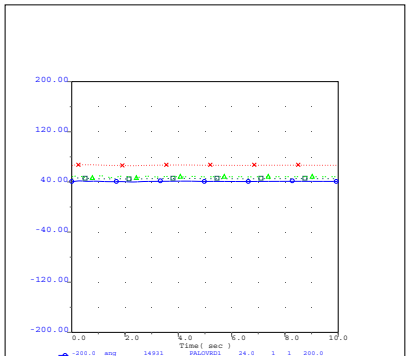


Figure 12 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: Adel-Rinaldi-slo

Possible Violations: MORC 1[1]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[1] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 13 Bus-V:Owens Gorge/Rinaldi 230 kV

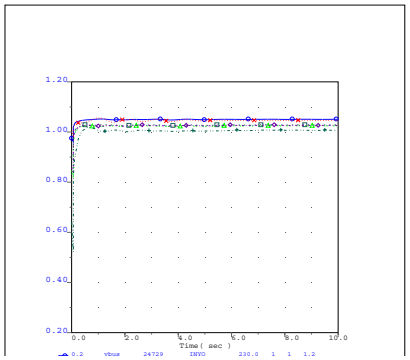


Figure 14 Bus-V:SCE North 115 kV

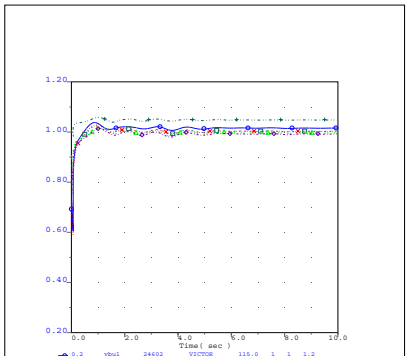


Figure 15 Bus-V:LA BASIN 230 & 138 kV

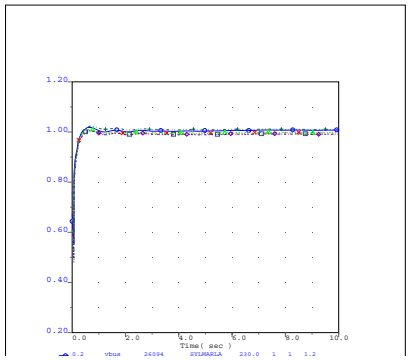


Figure 16 Bus-V:SCE 500 & 230 kV

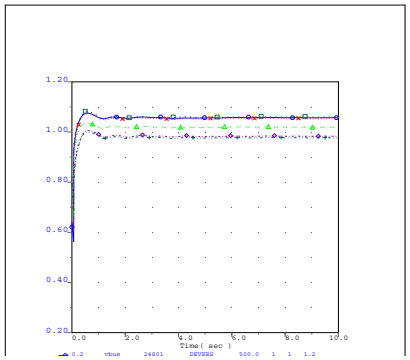


Figure 17 Bus-V: LADWP 500 kV:

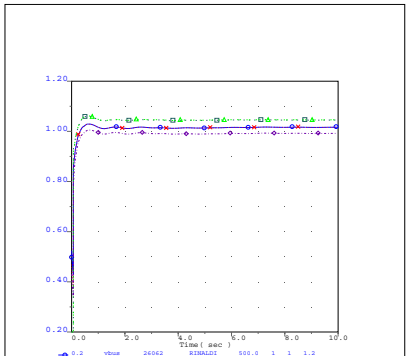


Figure 18 Bus-V:LADWP Load:

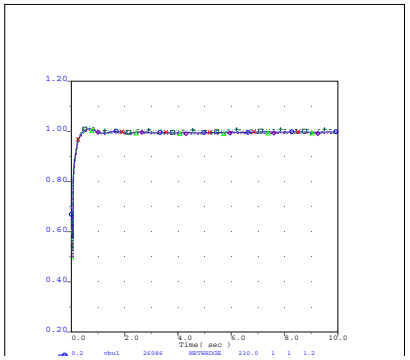


Figure 19 Bus-V: NW & S.CAL 500 kV

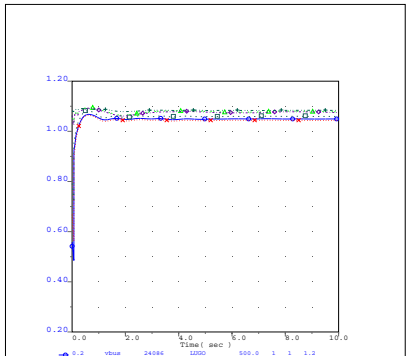


Figure 20 Bus-V: Others 500 kV

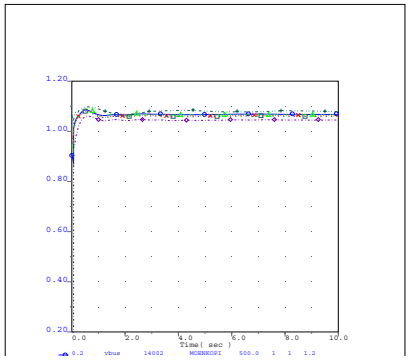


Figure 21 Bus-V: Others 230 kV

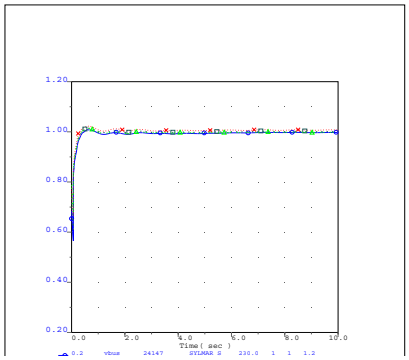


Figure 22 REL_RTR_ANG:S.Cal

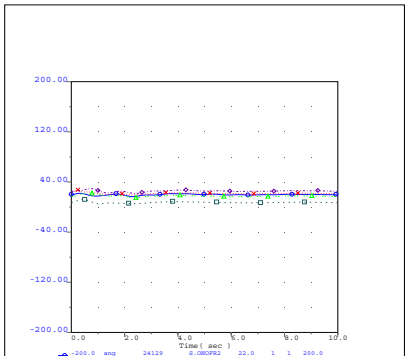


Figure 23 RELATIVE_ROTOR_ANGLE:S.Cal:

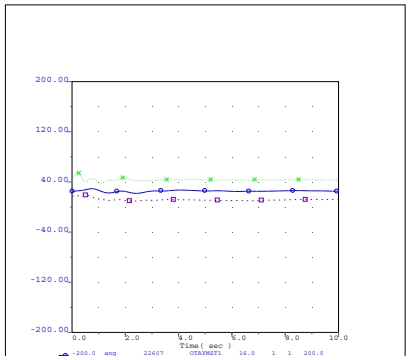
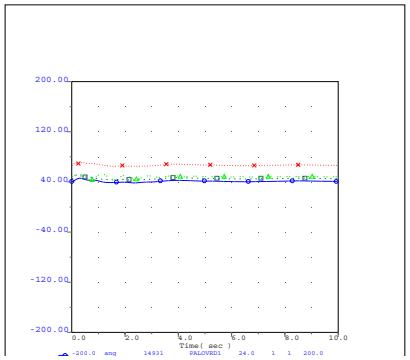


Figure 24 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: Adel-Toluca

Possible Violations: MORC 1[2]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[2] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 25 Bus-V:Owens Gorge/Rinaldi 230 kV

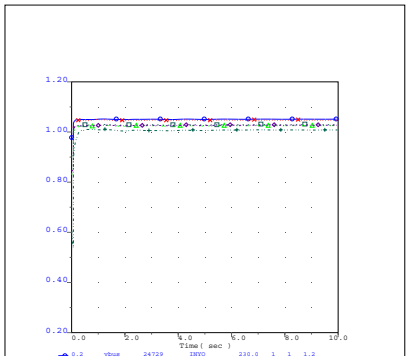


Figure 26 Bus-V:SCE North 115 kV

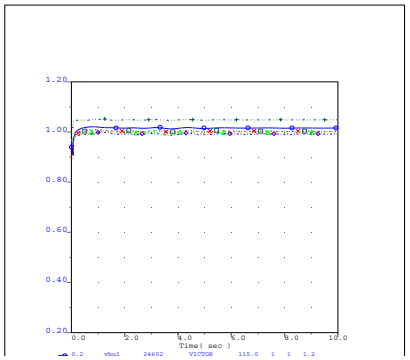


Figure 27 Bus-V:LA BASIN 230 & 138 kV

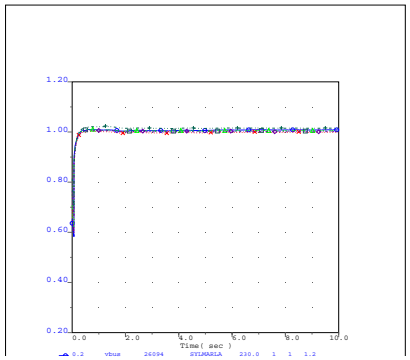


Figure 28 Bus-V:SCE 500 & 230 kV

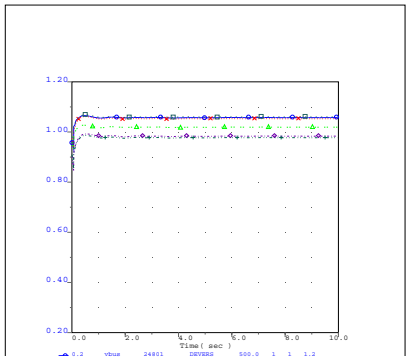


Figure 29 Bus-V: LADWP 500 kV:

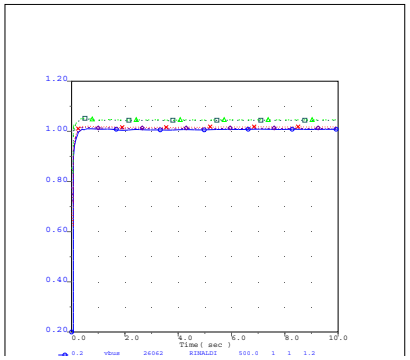


Figure 30 Bus-V:LADWP Load:

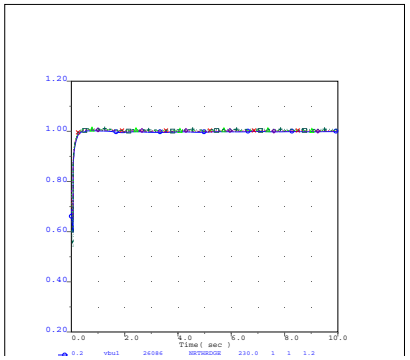


Figure 31 Bus-V: NW & S.CAL 500 kV

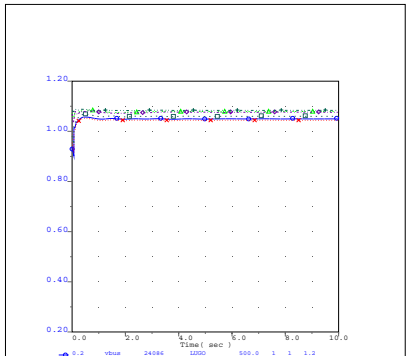


Figure 32 Bus-V: Others 500 kV

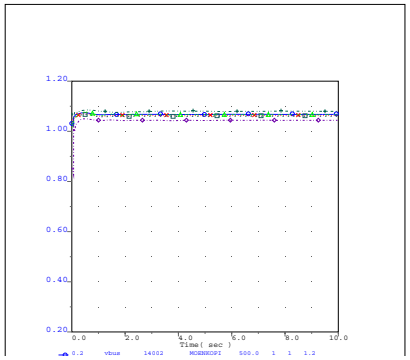


Figure 33 Bus-V: Others 230 kV

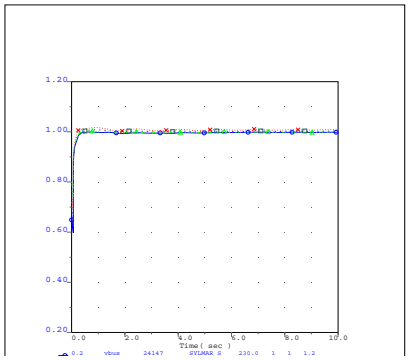


Figure 34 REL_RTR_ANG:S.Cal

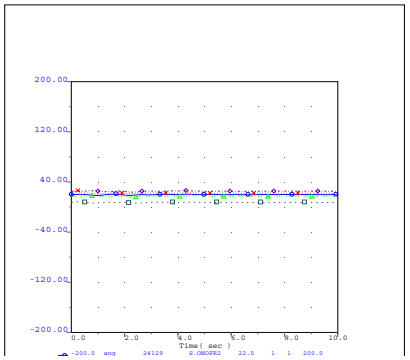


Figure 35 RELATIVE_ROTOR_ANGLE:S.Cal:

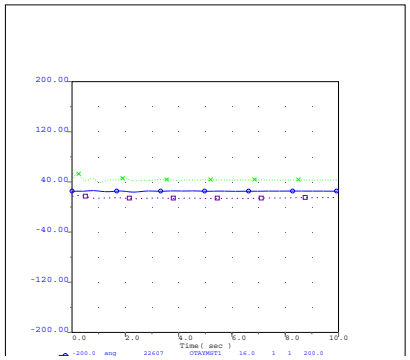
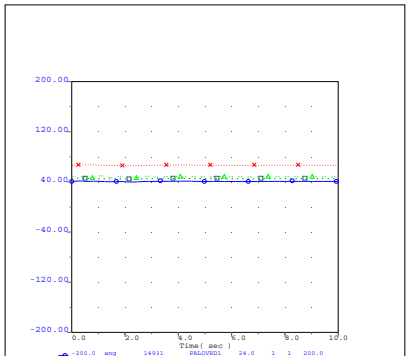


Figure 36 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: Vict-Rinaldi-slo

Possible Violations: MORC 1[3]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[3] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 37 Bus-V:Owens Gorge/Rinaldi 230 kV

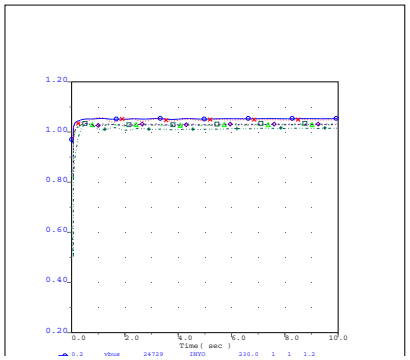


Figure 38 Bus-V:SCE North 115 kV

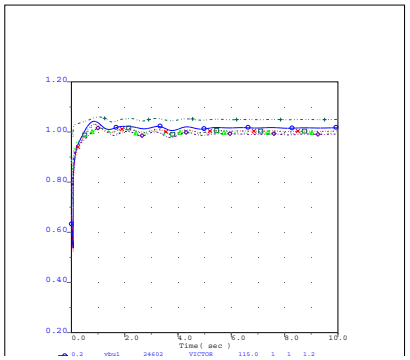


Figure 39 Bus-V:LA BASIN 230 & 138 kV

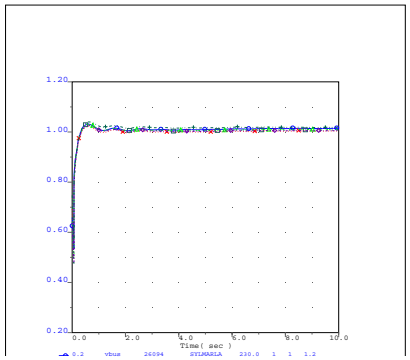


Figure 40 Bus-V:SCE 500 & 230 kV

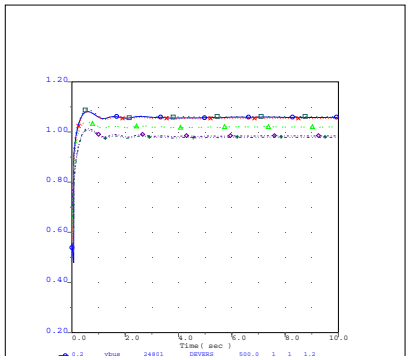


Figure 41 Bus-V: LADWP 500 kV:

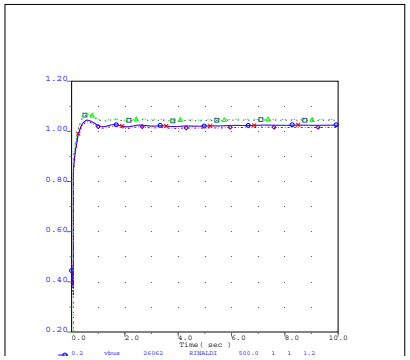


Figure 42 Bus-V:LADWP Load:

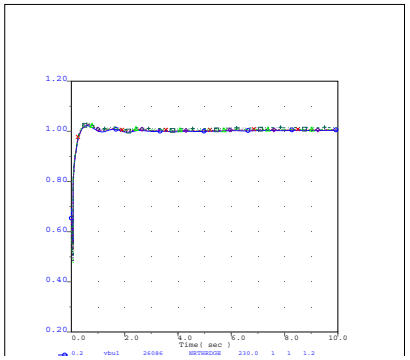


Figure 43 Bus-V: NW & S.CAL 500 kV

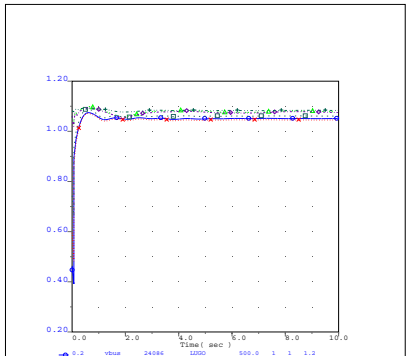


Figure 44 Bus-V: Others 500 kV

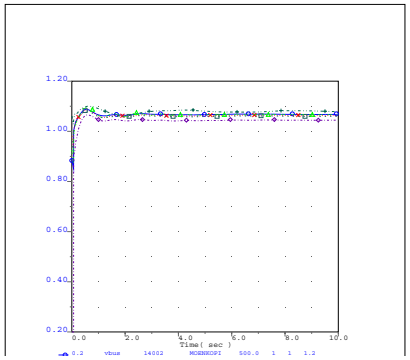


Figure 45 Bus-V: Others 230 kV

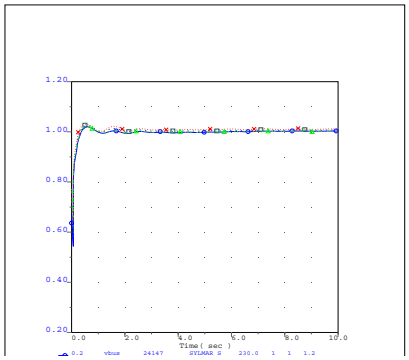


Figure 46 REL_RTR_ANG:S.Cal

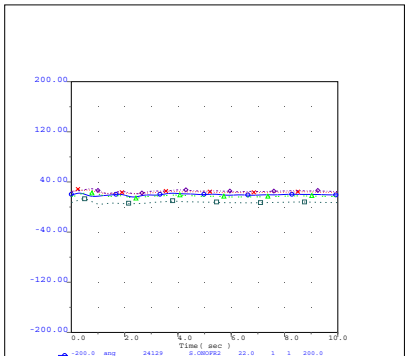


Figure 47 RELATIVE_ROTOR_ANGLE:S.Cal:

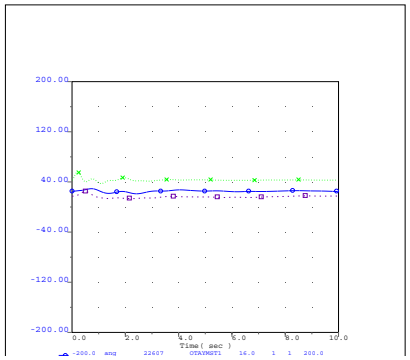
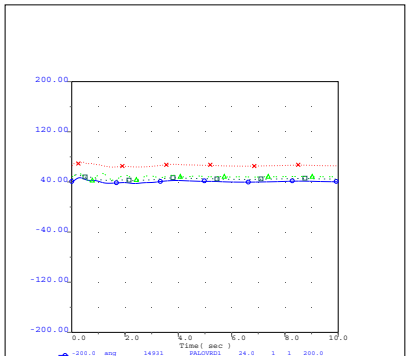


Figure 48 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: Adel-Victorvl-slo

Possible Violations: MORC 1[4]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[4] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 49 Bus-V:Owens Gorge/Rinaldi 230 kV

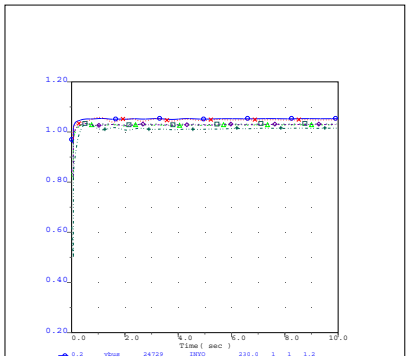


Figure 50 Bus-V:SCE North 115 kV

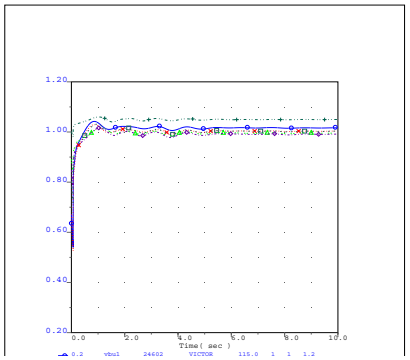


Figure 51 Bus-V:LA BASIN 230 & 138 kV

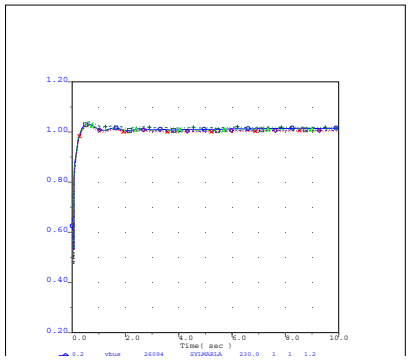


Figure 52 Bus-V:SCE 500 & 230 kV

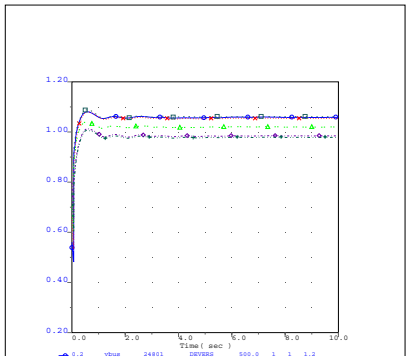


Figure 53 Bus-V: LADWP 500 kV:

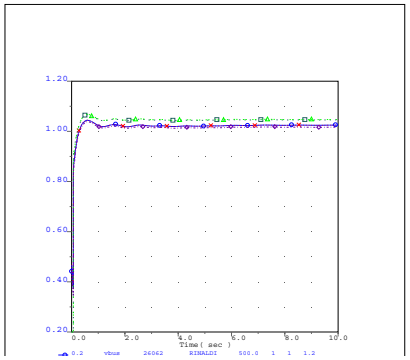


Figure 54 Bus-V:LADWP Load:

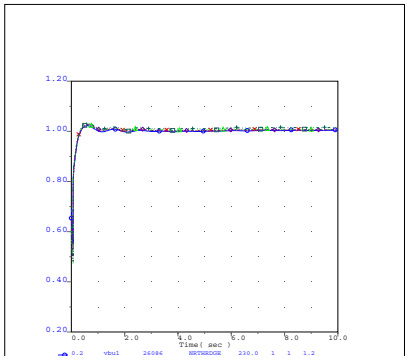


Figure 55 Bus-V: NW & S.CAL 500 kV

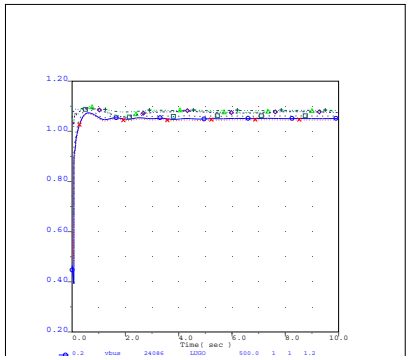


Figure 56 Bus-V: Others 500 kV

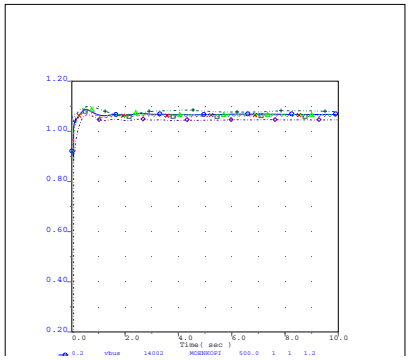


Figure 57 Bus-V: Others 230 kV

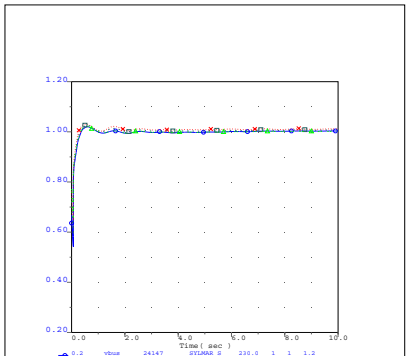


Figure 58 REL_RTR_ANG:S.Cal

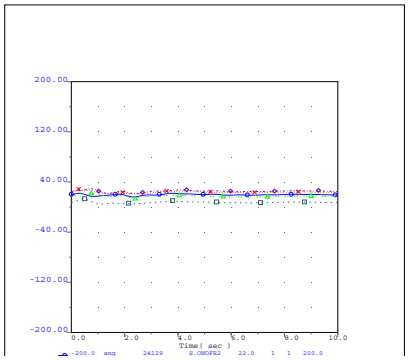


Figure 59 RELATIVE_ROTOR_ANGLE:S.Cal:

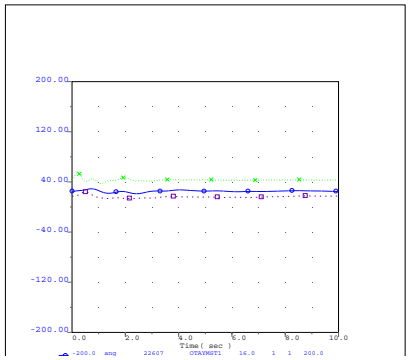
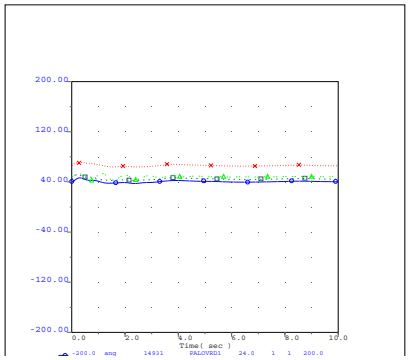


Figure 60 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: McC-Vict-slo

Possible Violations: MORC 1[5]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[5] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 61 Bus-V:Owens Gorge/Rinaldi 230 kV

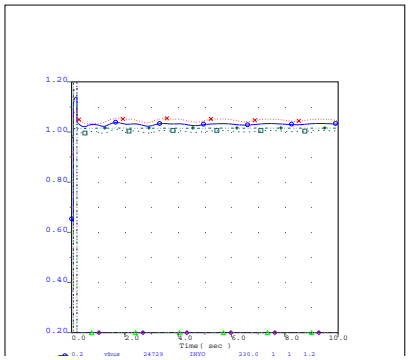


Figure 62 Bus-V:SCE North 115 kV

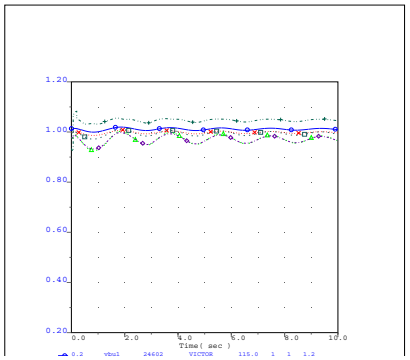


Figure 63 Bus-V:LA BASIN 230 & 138 kV

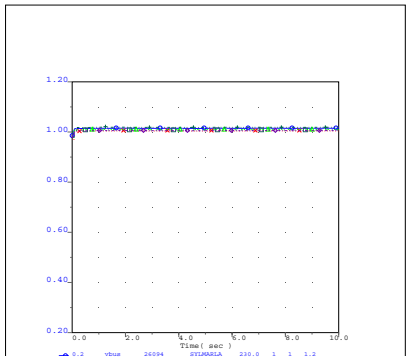


Figure 64 Bus-V:SCE 500 & 230 kV

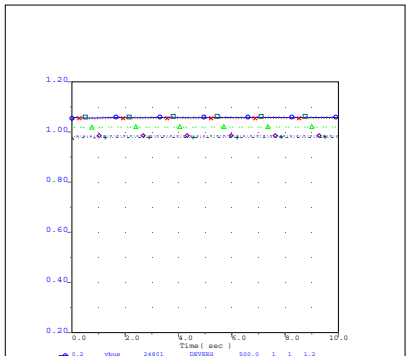


Figure 65 Bus-V: LADWP 500 kV:

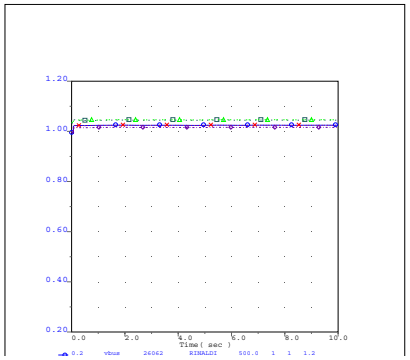


Figure 66 Bus-V:LADWP Load:

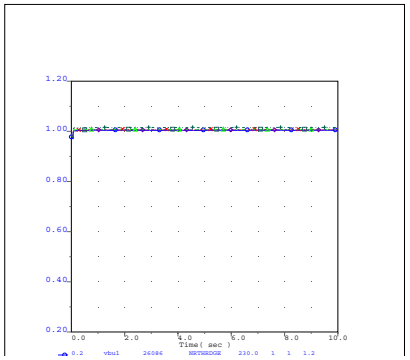


Figure 67 Bus-V: NW & S.CAL 500 kV

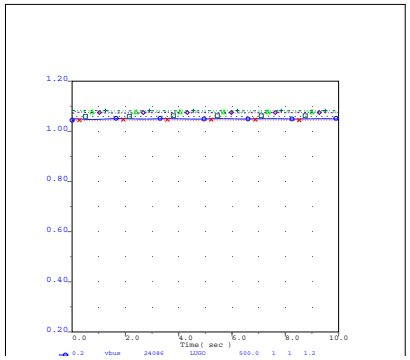


Figure 68 Bus-V: Others 500 kV

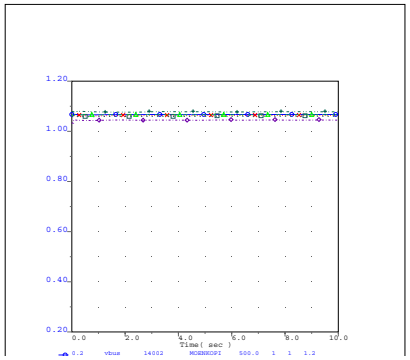


Figure 69 Bus-V: Others 230 kV

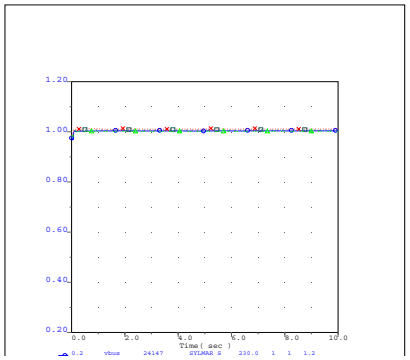


Figure 70 REL_RTR_ANG:S.Cal

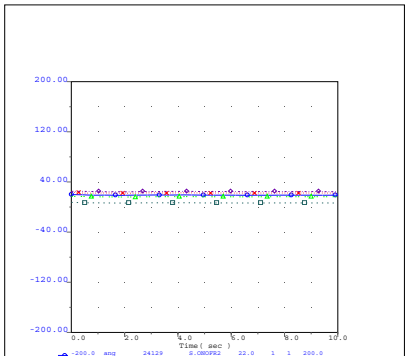


Figure 71 RELATIVE_ROTOR_ANGLE:S.Cal:

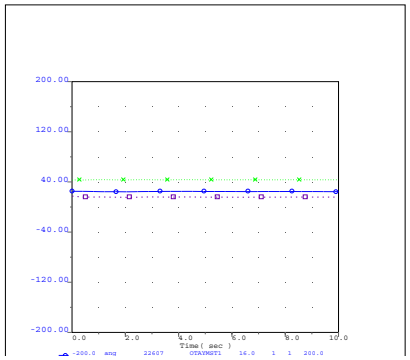
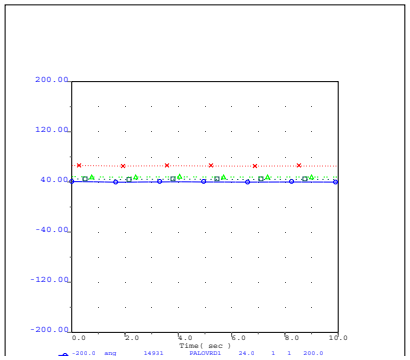


Figure 72 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: BR-Rinadi-preRAS-wIY

Possible Violations: MORC 1[6]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[6] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 73 Bus-V:Owens Gorge/Rinaldi 230 kV

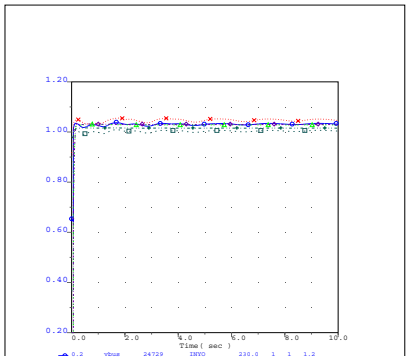


Figure 74 Bus-V:SCE North 115 kV

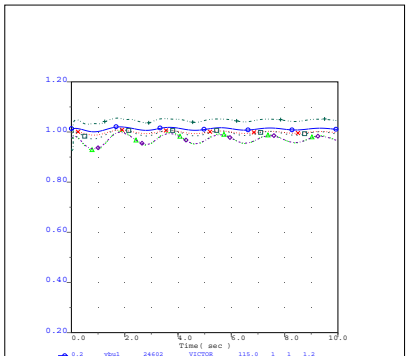


Figure 75 Bus-V:LA BASIN 230 & 138 kV

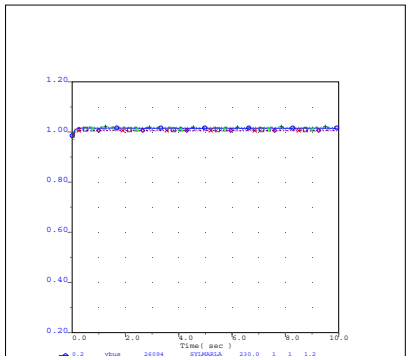


Figure 76 Bus-V:SCE 500 & 230 kV

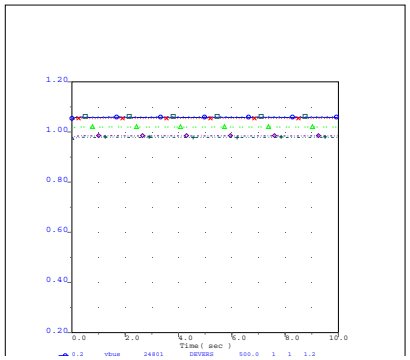


Figure 77 Bus-V: LADWP 500 kV:

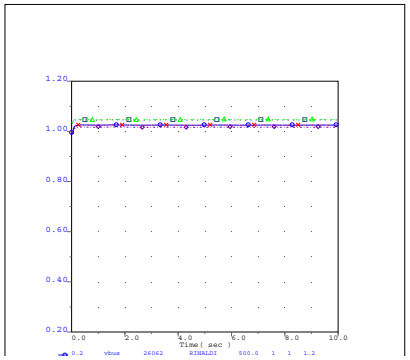


Figure 78 Bus-V:LADWP Load:

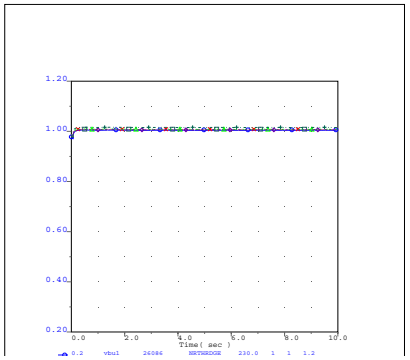


Figure 79 Bus-V: NW & S.CAL 500 kV

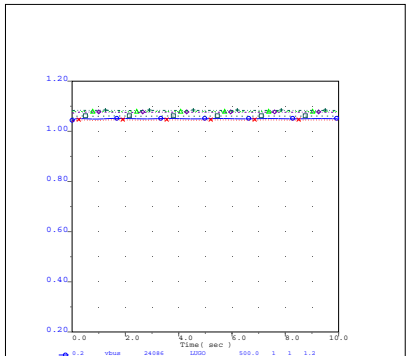


Figure 80 Bus-V: Others 500 kV

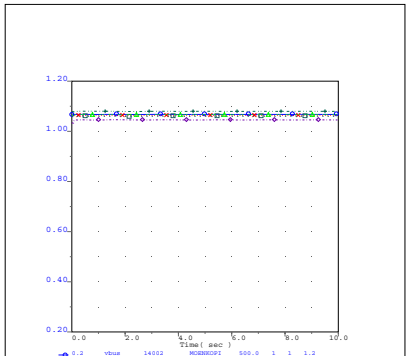


Figure 81 Bus-V: Others 230 kV

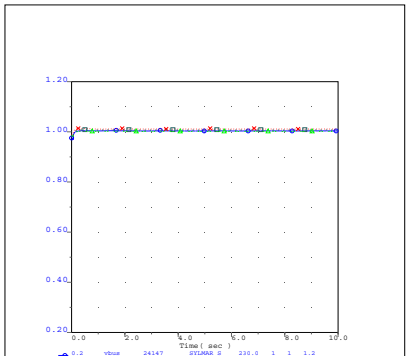


Figure 82 REL_RTR_ANG:S.Cal

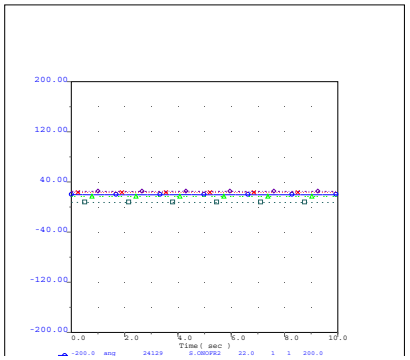


Figure 83 RELATIVE_ROTOR_ANGLE:S.Cal:

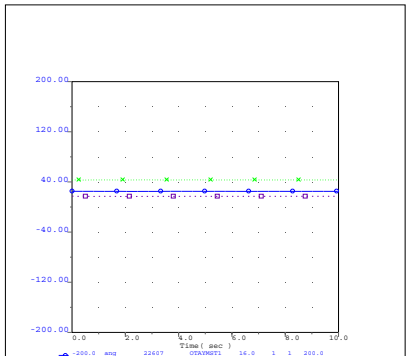
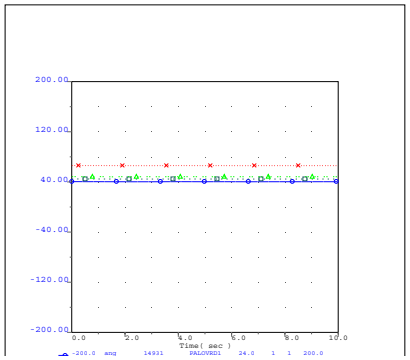


Figure 84 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: Cottonwd-BR-NoRAS

Possible Violations: MORC 1[7]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[7] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 85 Bus-V:Owens Gorge/Rinaldi 230 kV

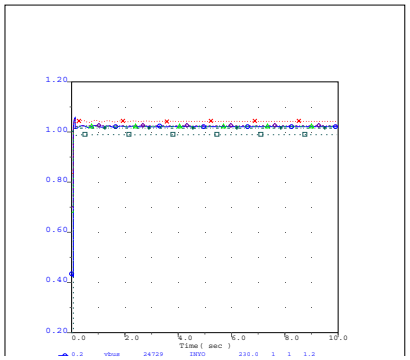


Figure 86 Bus-V:SCE North 115 kV

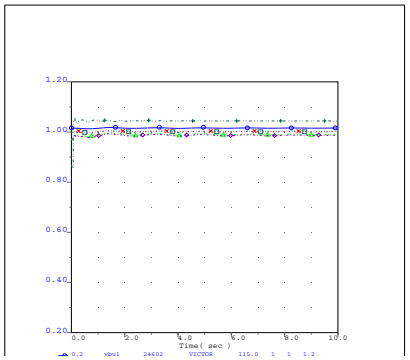


Figure 87 Bus-V:LA BASIN 230 & 138 kV

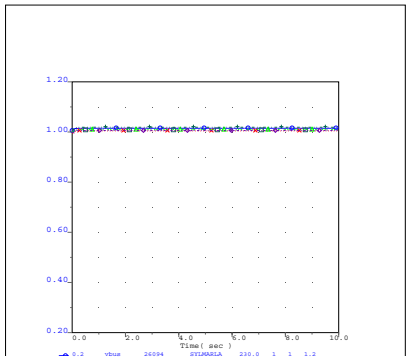


Figure 88 Bus-V:SCE 500 & 230 kV

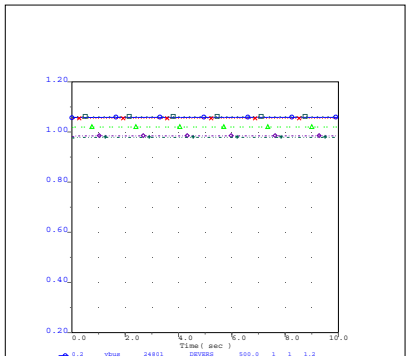


Figure 89 Bus-V: LADWP 500 kV:

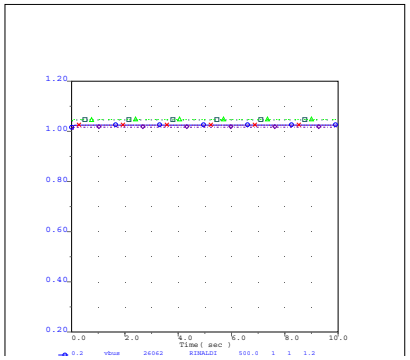


Figure 90 Bus-V:LADWP Load:

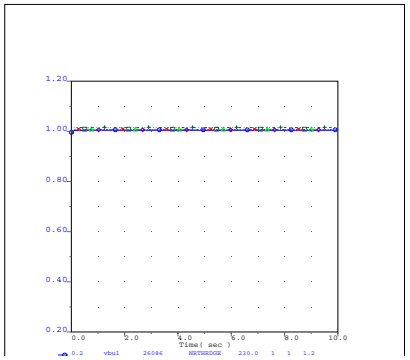


Figure 91 Bus-V: NW & S.CAL 500 kV

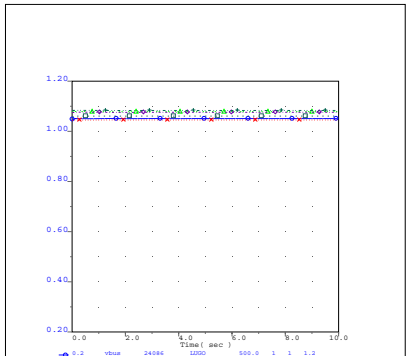


Figure 92 Bus-V: Others 500 kV

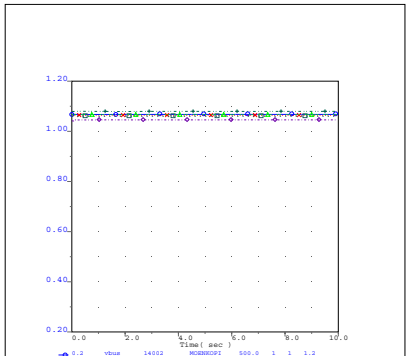


Figure 93 Bus-V: Others 230 kV

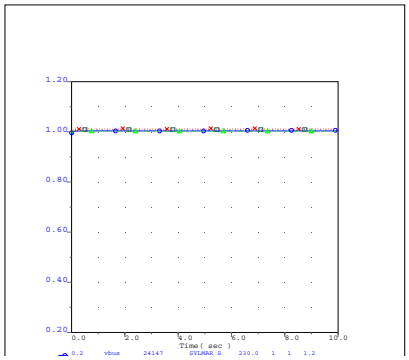


Figure 94 REL_RTR_ANG:S.Cal

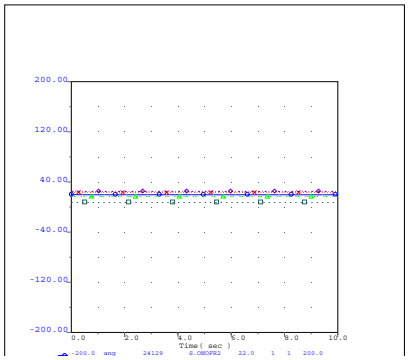


Figure 95 RELATIVE_ROTOR_ANGLE:S.Cal:

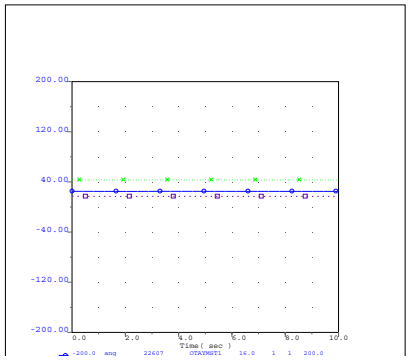
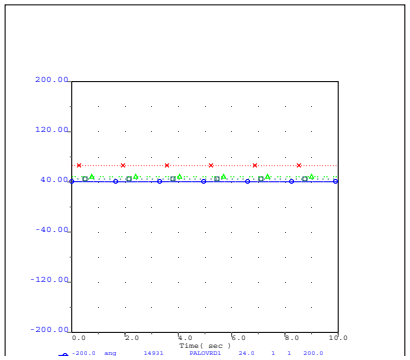


Figure 96 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: Cottonwd-Inyo-preRAS

Possible Violations: MORC 1[8]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[8] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 97 Bus-V:Owens Gorge/Rinaldi 230 kV

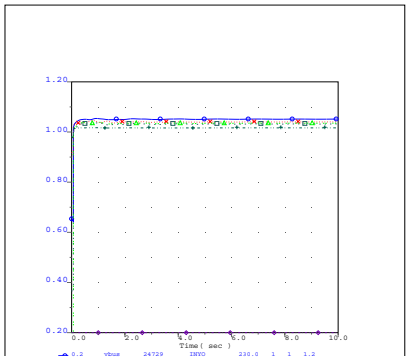


Figure 98 Bus-V:SCE North 115 kV

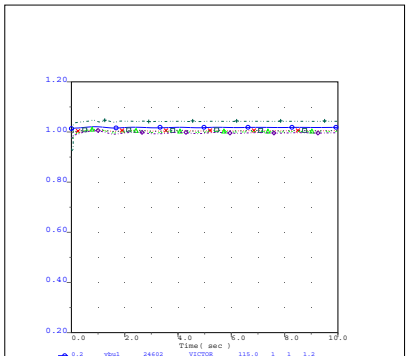


Figure 99 Bus-V:LA BASIN 230 & 138 kV

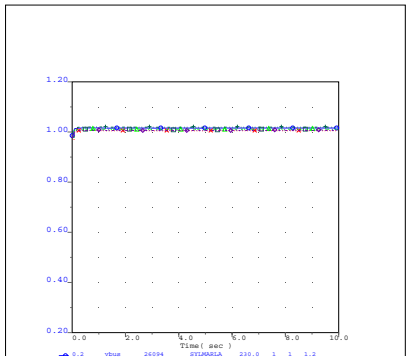


Figure 100 Bus-V:SCE 500 & 230 kV

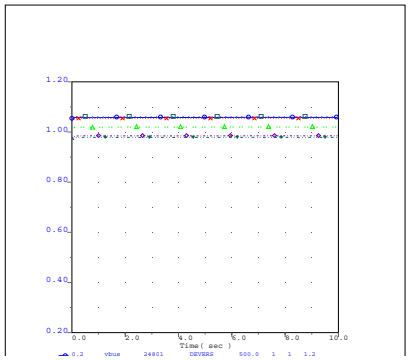


Figure 101 Bus-V: LADWP 500 kV:

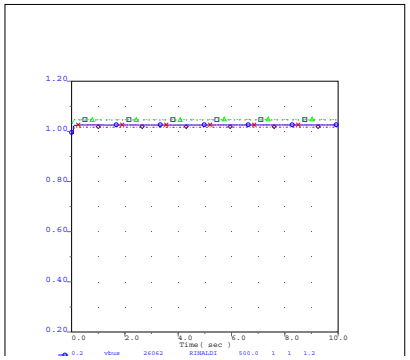


Figure 102 Bus-V:LADWP Load:

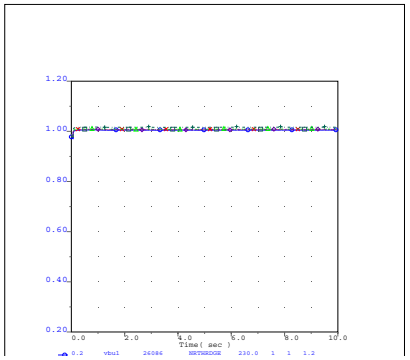


Figure 103 Bus-V: NW & S.CAL 500 kV

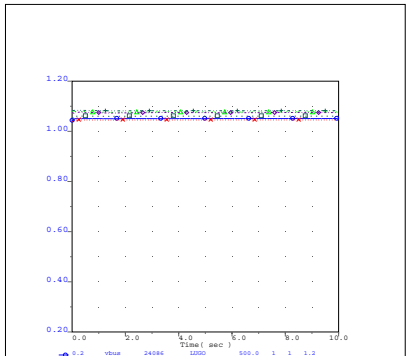


Figure 104 Bus-V: Others 500 kV

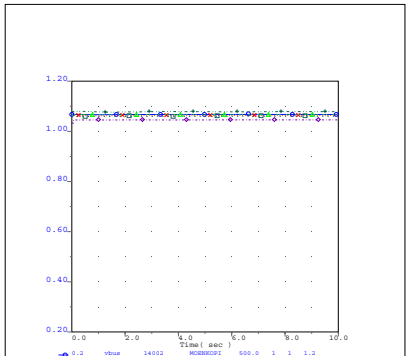


Figure 105 Bus-V: Others 230 kV

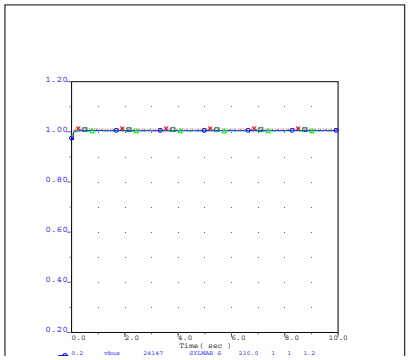


Figure 106 REL_RTR_ANG:S.Cal

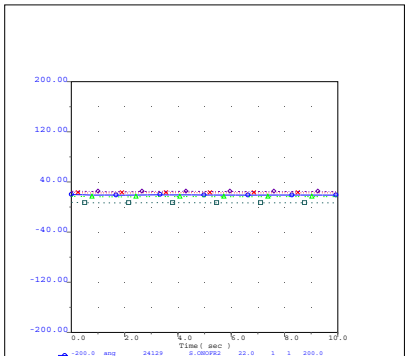


Figure 107 RELATIVE_ROTOR_ANGLE:S.Cal:

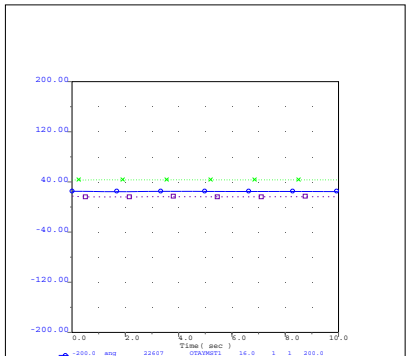
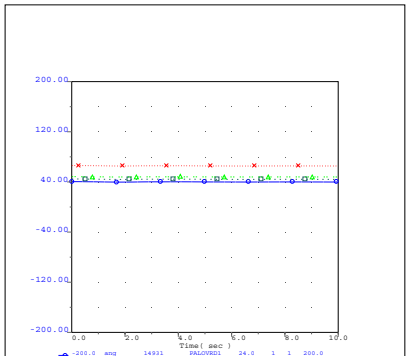


Figure 108 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: Pinetree-BR-RAS

Possible Violations: MORC 1[9]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[9] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 109 Bus-V:Owens Gorge/Rinaldi 230 kV

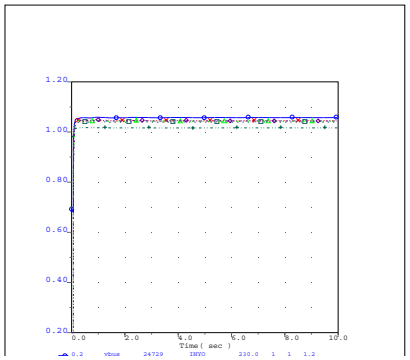


Figure 110 Bus-V:SCE North 115 kV

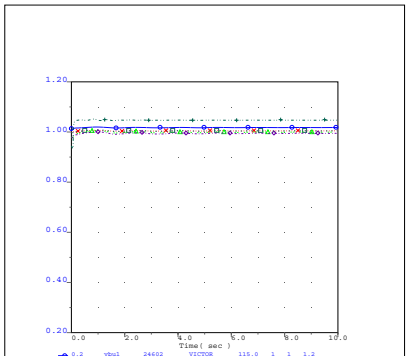


Figure 111 Bus-V:LA BASIN 230 & 138 kV

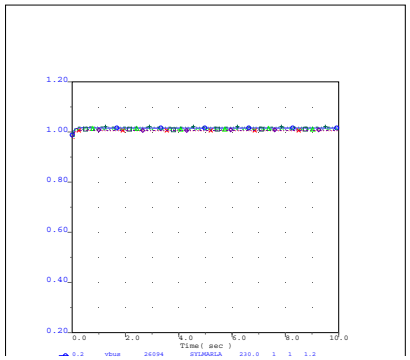


Figure 112 Bus-V:SCE 500 & 230 kV

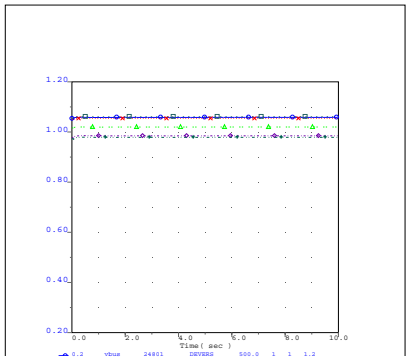


Figure 113 Bus-V: LADWP 500 kV:

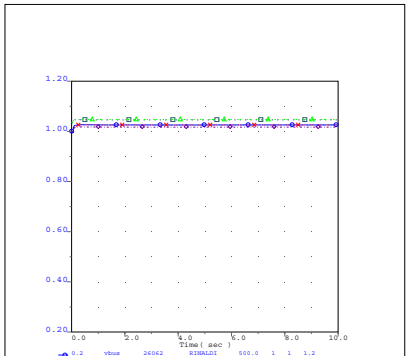


Figure 114 Bus-V:LADWP Load:

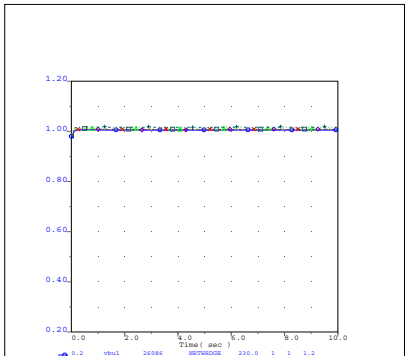


Figure 115 Bus-V: NW & S.CAL 500 kV

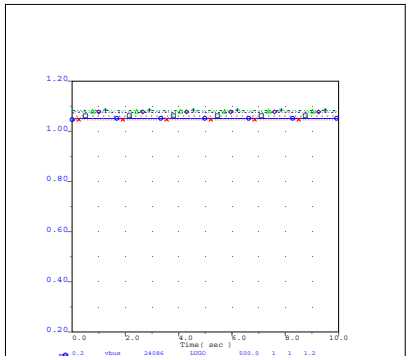


Figure 116 Bus-V: Others 500 kV

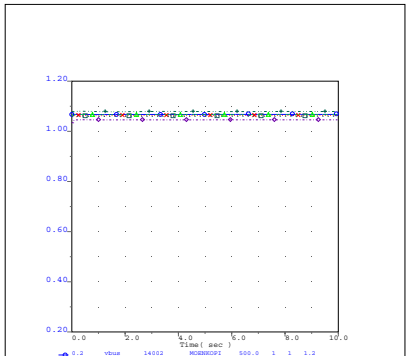


Figure 117 Bus-V: Others 230 kV

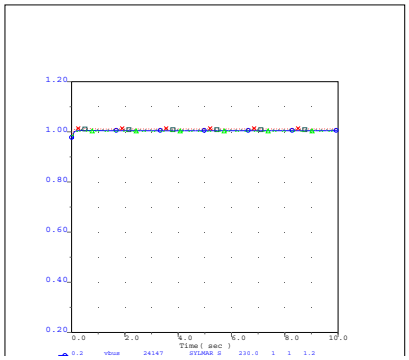


Figure 118 REL_RTR_ANG:S.Cal

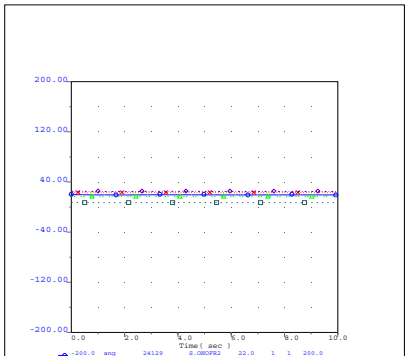


Figure 119 RELATIVE_ROTOR_ANGLE:S.Cal:

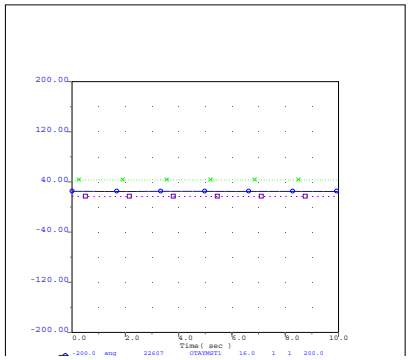
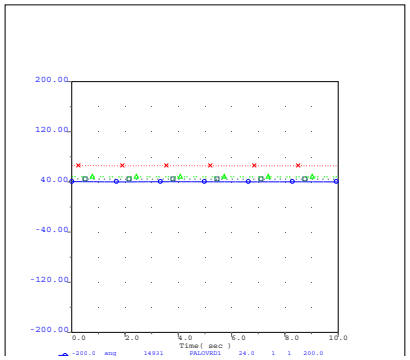


Figure 120 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: HoffmanSummit-Pinetree-RAS

Possible Violations: MORC 1[10]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[10] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 121 Bus-V:Owens Gorge/Rinaldi 230 kV

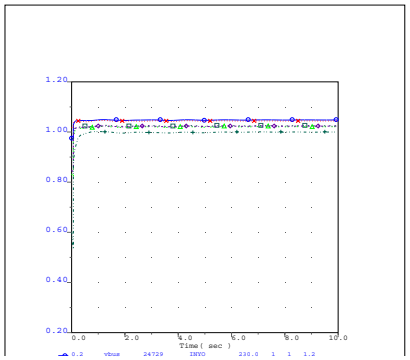


Figure 122 Bus-V:SCE North 115 kV

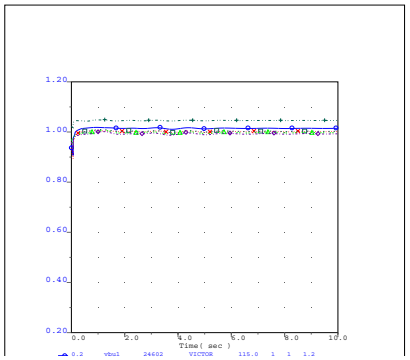


Figure 123 Bus-V:LA BASIN 230 & 138 kV

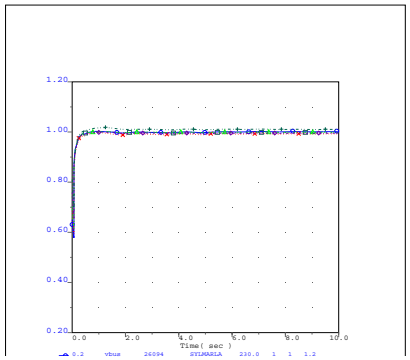


Figure 124 Bus-V:SCE 500 & 230 kV

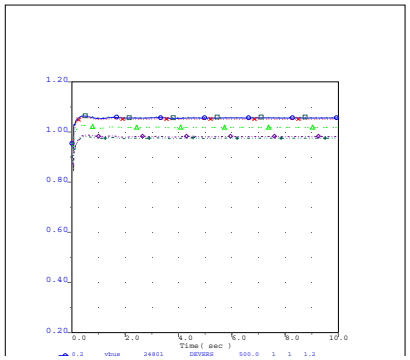


Figure 125 Bus-V: LADWP 500 kV:

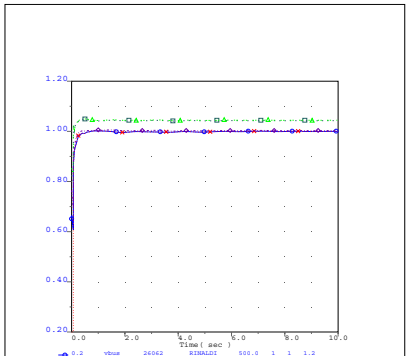


Figure 126 Bus-V:LADWP Load:

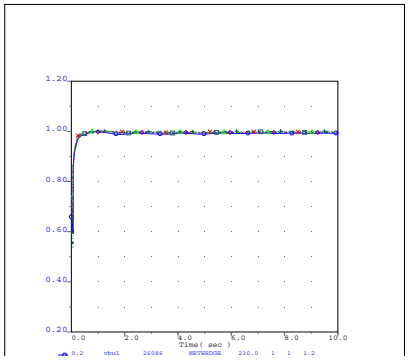


Figure 127 Bus-V: NW & S.CAL 500 kV

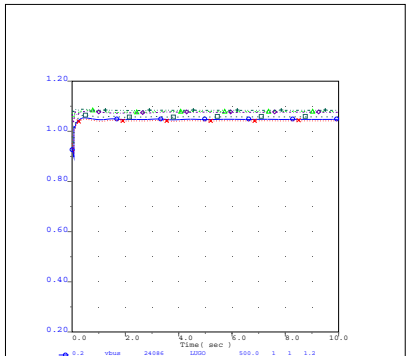


Figure 128 Bus-V: Others 500 kV

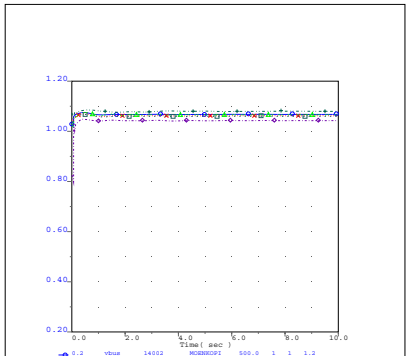


Figure 129 Bus-V: Others 230 kV

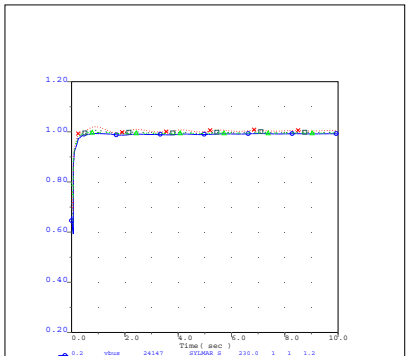


Figure 130 REL_RTR_ANG:S.Cal

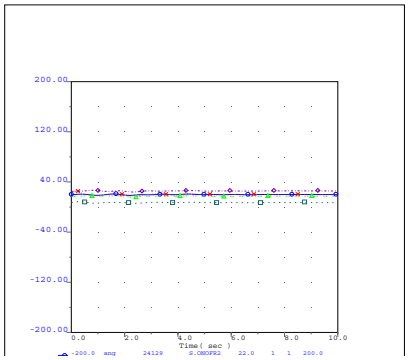


Figure 131 RELATIVE_ROTOR_ANGLE:S.Cal:

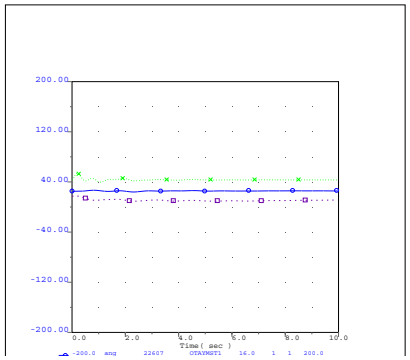
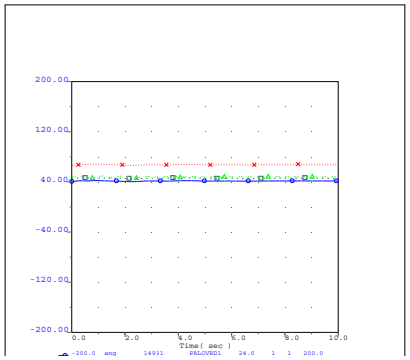


Figure 132 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: Adel-Vict-Rinaldi-dlo

Possible Violations: MORC 1[11]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[11] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 133 Bus-V:Owens Gorge/Rinaldi 230 kV

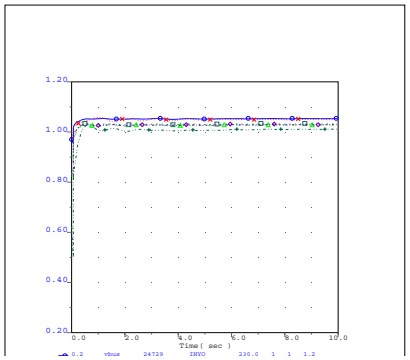


Figure 134 Bus-V:SCE North 115 kV

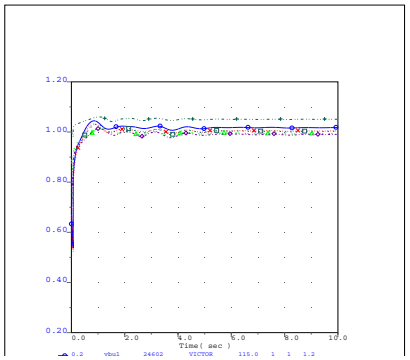


Figure 135 Bus-V:LA BASIN 230 & 138 kV

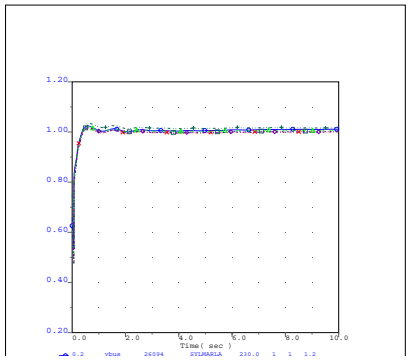


Figure 136 Bus-V:SCE 500 & 230 kV

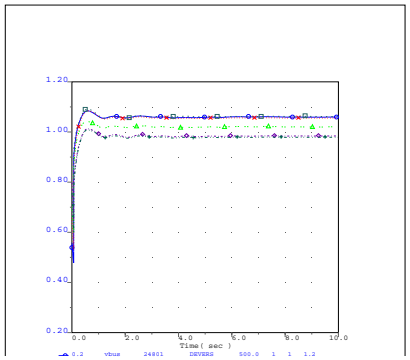


Figure 137 Bus-V: LADWP 500 kV:

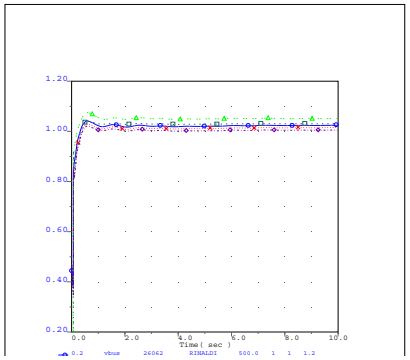


Figure 138 Bus-V:LADWP Load:

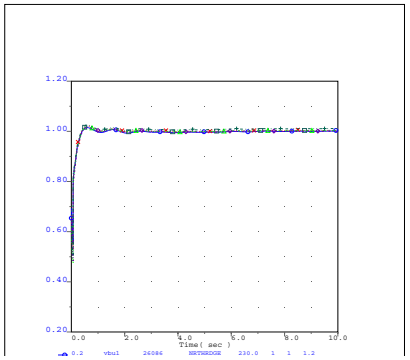


Figure 139 Bus-V: NW & S.CAL 500 kV

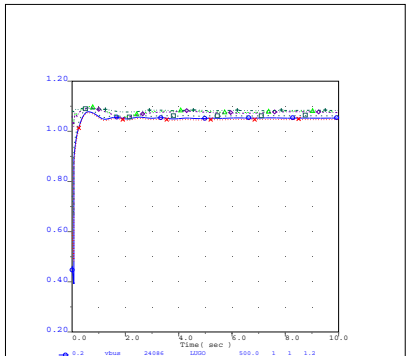


Figure 140 Bus-V: Others 500 kV

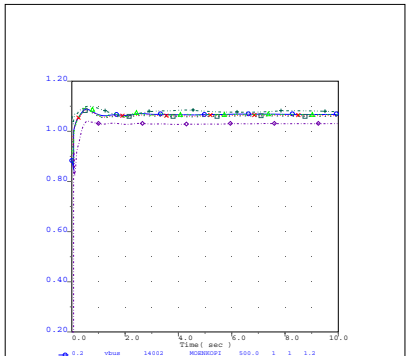


Figure 141 Bus-V: Others 230 kV

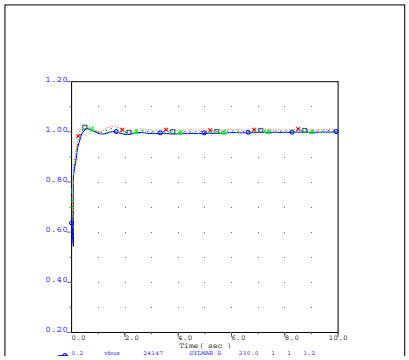


Figure 142 REL_RTR_ANG:S.Cal

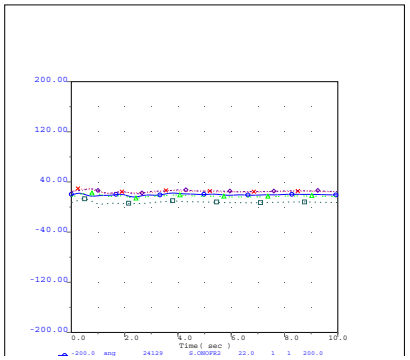


Figure 143 RELATIVE_ROTOR_ANGLE:S.Cal:

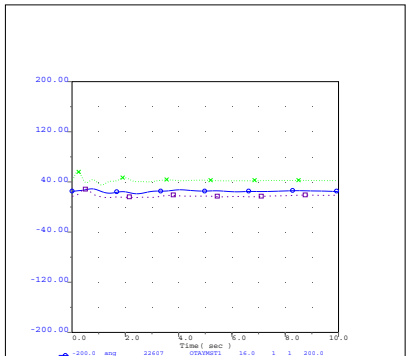
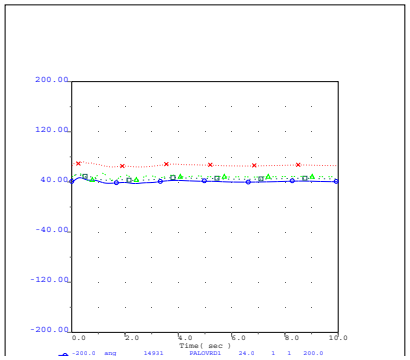


Figure 144 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: Adel-Victorvl-dlo

Possible Violations: MORC 1[12]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[12] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 145 Bus-V:Owens Gorge/Rinaldi 230 kV

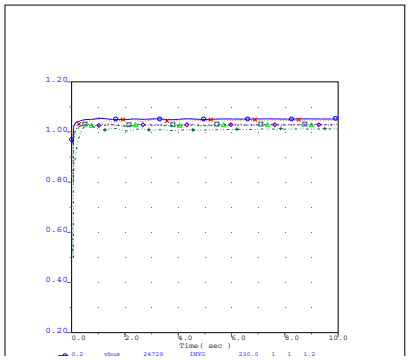


Figure 146 Bus-V:SCE North 115 kV

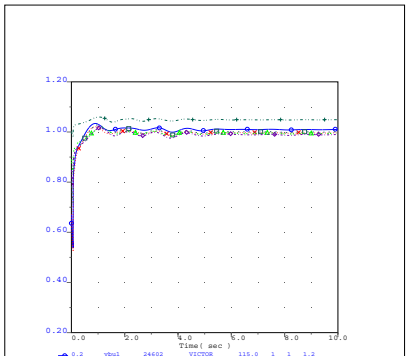


Figure 147 Bus-V:LA BASIN 230 & 138 kV

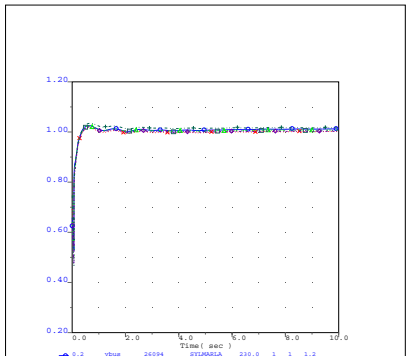


Figure 148 Bus-V:SCE 500 & 230 kV

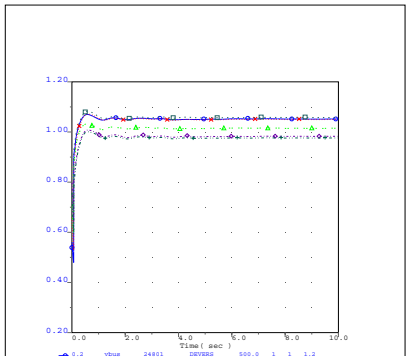


Figure 149 Bus-V: LADWP 500 kV:

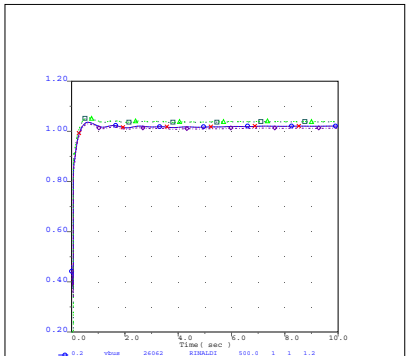


Figure 150 Bus-V:LADWP Load:

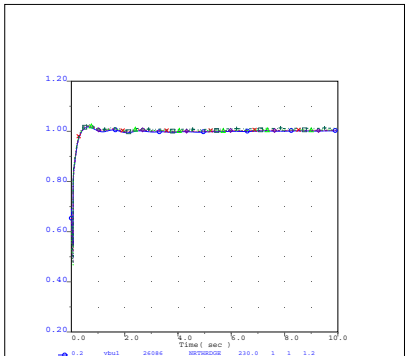


Figure 151 Bus-V: NW & S.CAL 500 kV

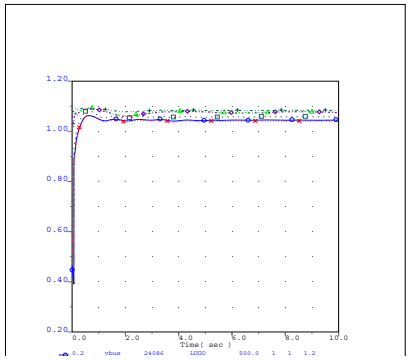


Figure 152 Bus-V: Others 500 kV

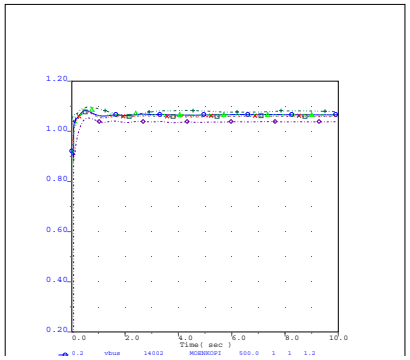


Figure 153 Bus-V: Others 230 kV

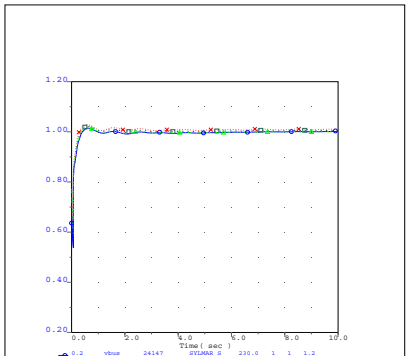


Figure 154 REL_RTR_ANG:S.Cal

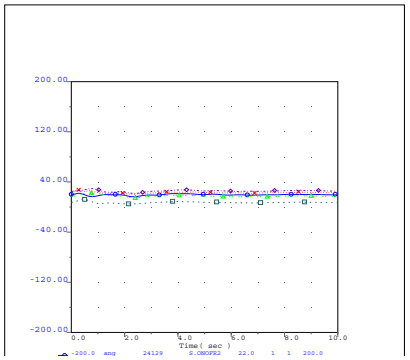


Figure 155 RELATIVE_ROTOR_ANGLE:S.Cal:

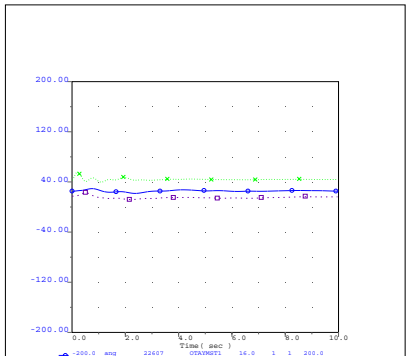
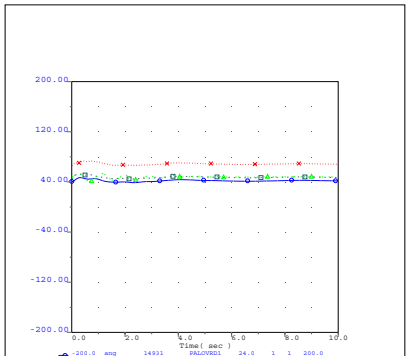


Figure 156 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: McCullgh-Victorvl-dlo

Possible Violations: MORC 1[13]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[13] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 157 Bus-V:Owens Gorge/Rinaldi 230 kV

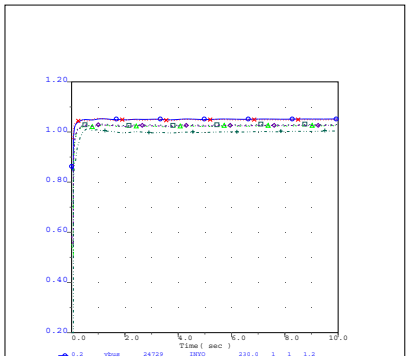


Figure 158 Bus-V:SCE North 115 kV

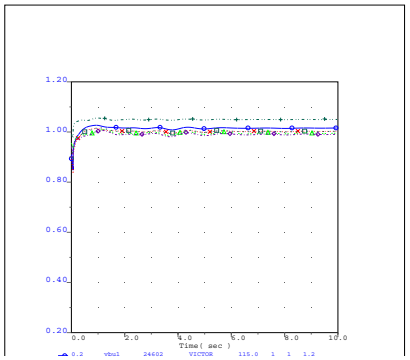


Figure 159 Bus-V:LA BASIN 230 & 138 kV

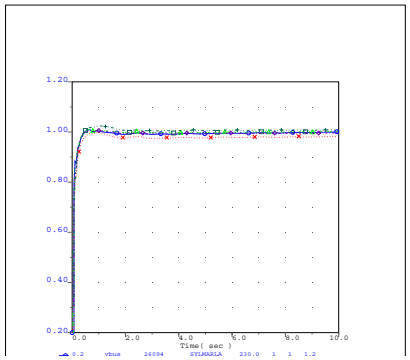


Figure 160 Bus-V:SCE 500 & 230 kV

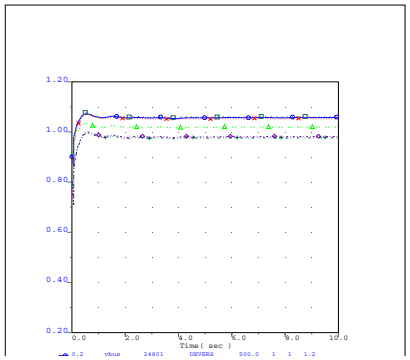


Figure 161 Bus-V: LADWP 500 kV:

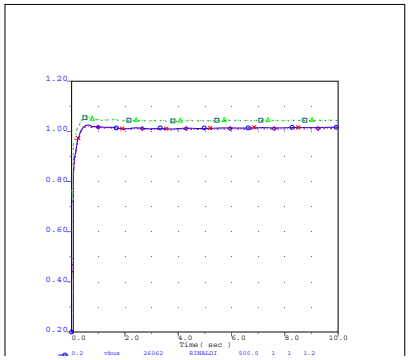


Figure 162 Bus-V:LADWP Load:

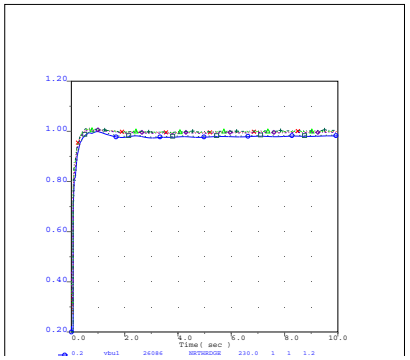


Figure 163 Bus-V: NW & S.CAL 500 kV

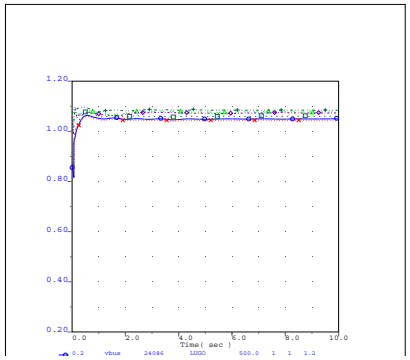


Figure 164 Bus-V: Others 500 kV

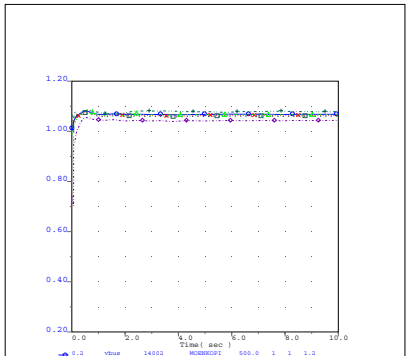


Figure 165 Bus-V: Others 230 kV

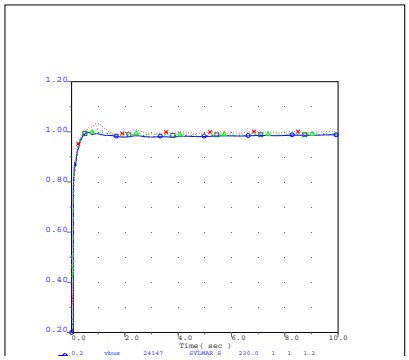


Figure 166 REL_RTR_ANG:S.Cal

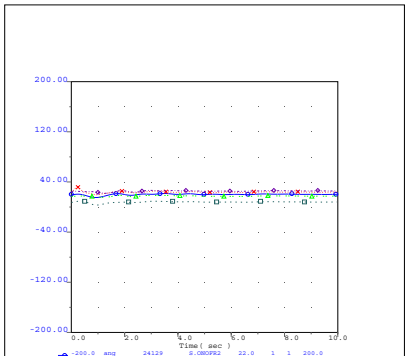


Figure 167 RELATIVE_ROTOR_ANGLE:S.Cal:

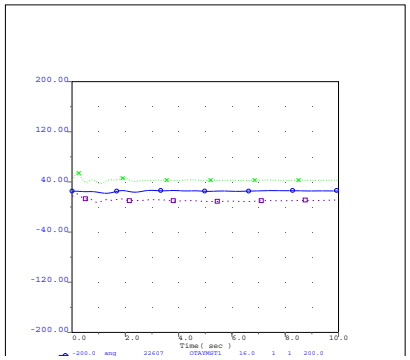
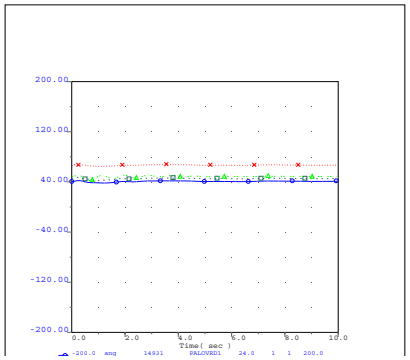


Figure 168 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: Rin-Tar-dlo

Possible Violations: MORC 1[14]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[14] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 169 Bus-V:Owens Gorge/Rinaldi 230 kV

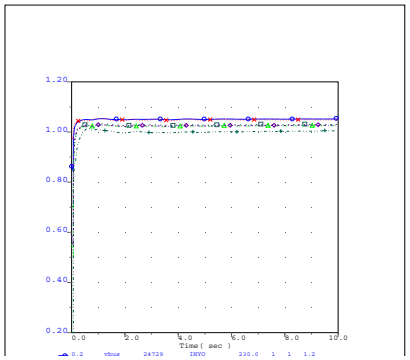


Figure 170 Bus-V:SCE North 115 kV

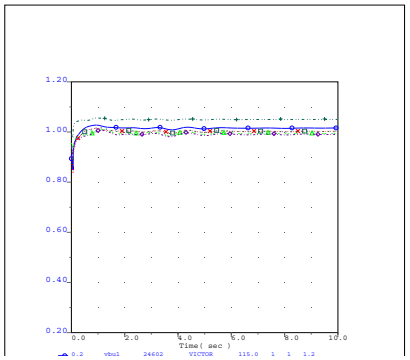


Figure 171 Bus-V:LA BASIN 230 & 138 kV

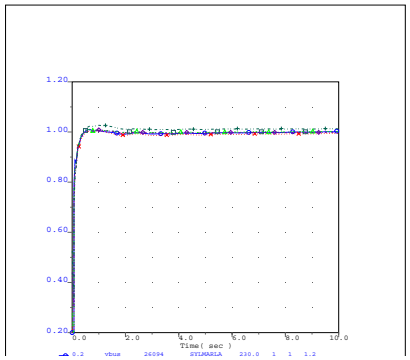


Figure 172 Bus-V:SCE 500 & 230 kV

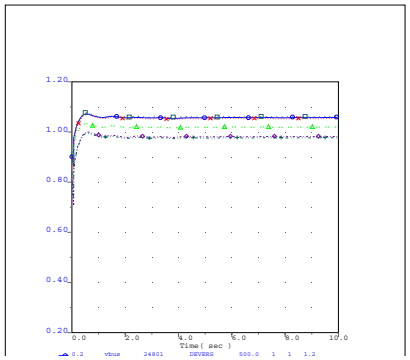


Figure 173 Bus-V: LADWP 500 kV:

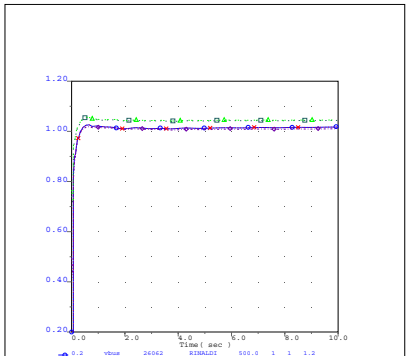


Figure 174 Bus-V:LADWP Load:

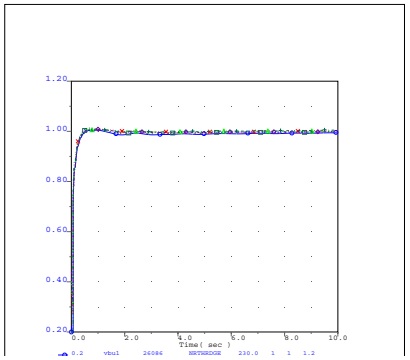


Figure 175 Bus-V: NW & S.CAL 500 kV

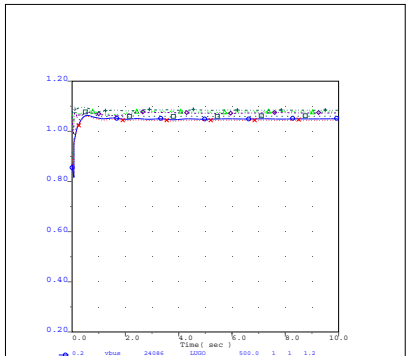


Figure 176 Bus-V: Others 500 kV

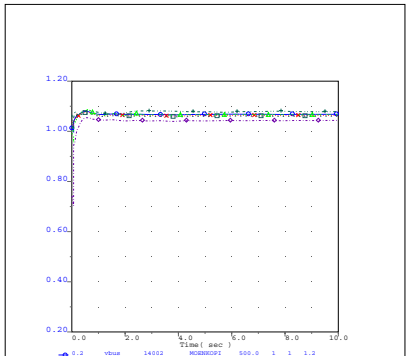


Figure 177 Bus-V: Others 230 kV

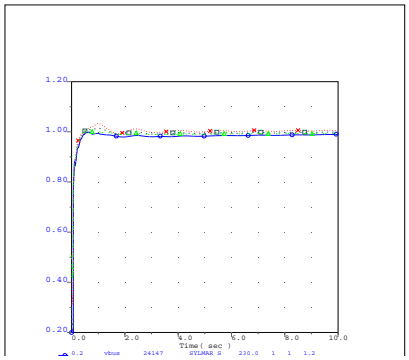


Figure 178 REL_RTR_ANG:S.Cal

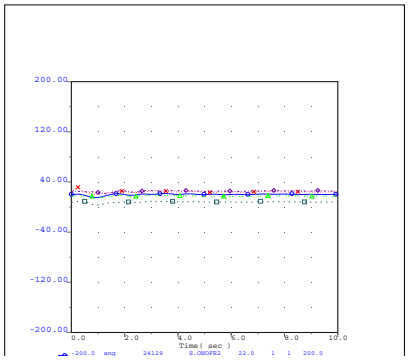


Figure 179 RELATIVE_ROTOR_ANGLE:S.Cal:

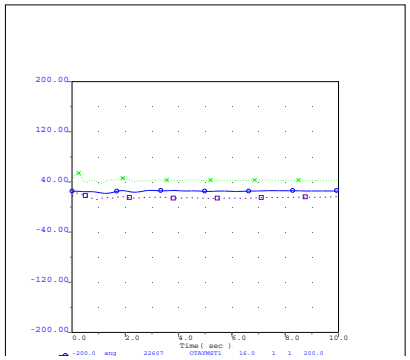
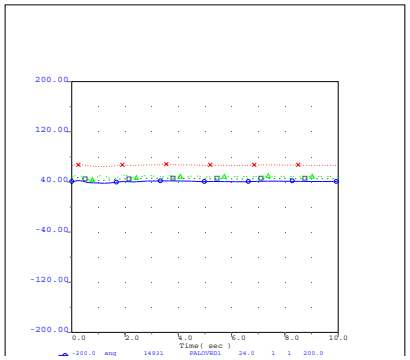


Figure 180 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: Rin-Glendl-dlo

Possible Violations: MORC 1[15]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[15] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 181 Bus-V:Owens Gorge/Rinaldi 230 kV

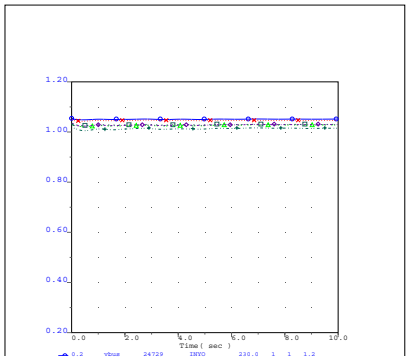


Figure 182 Bus-V:SCE North 115 kV

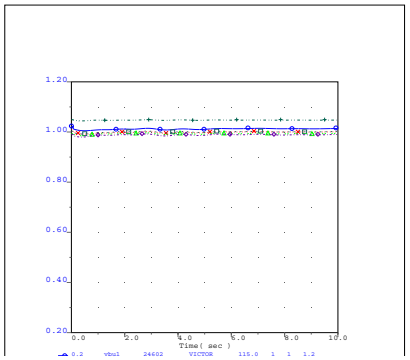


Figure 183 Bus-V:LA BASIN 230 & 138 kV

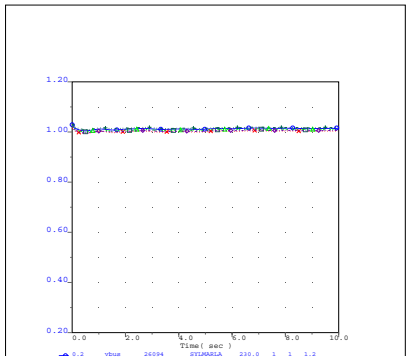


Figure 184 Bus-V:SCE 500 & 230 kV

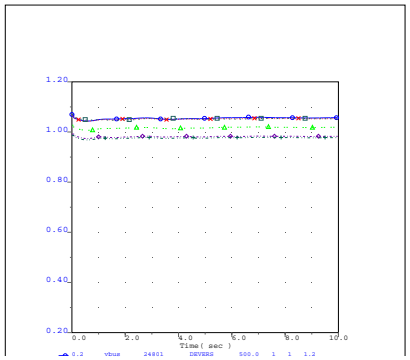


Figure 185 Bus-V: LADWP 500 kV:

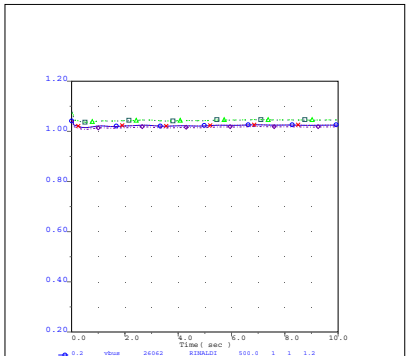


Figure 186 Bus-V:LADWP Load:

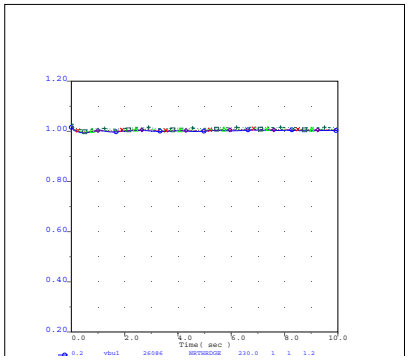


Figure 187 Bus-V: NW & S.CAL 500 kV

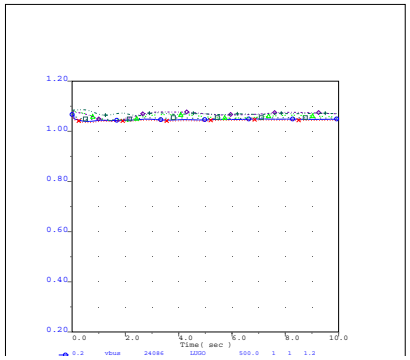


Figure 188 Bus-V: Others 500 kV

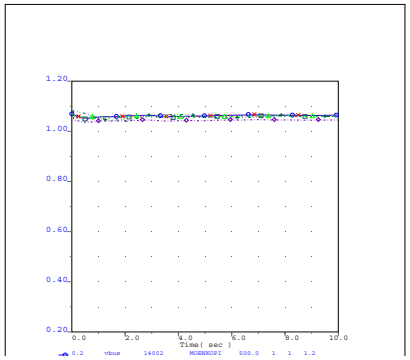


Figure 189 Bus-V: Others 230 kV

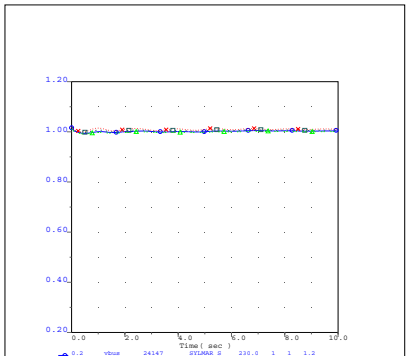


Figure 190 REL_RTR_ANG:S.Cal

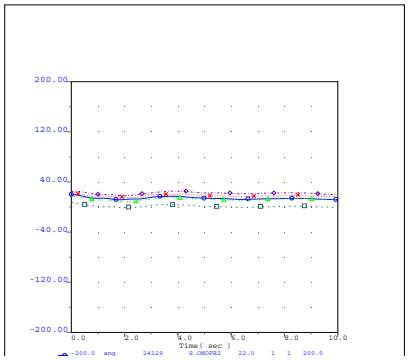


Figure 191 RELATIVE_ROTOR_ANGLE:S.Cal:

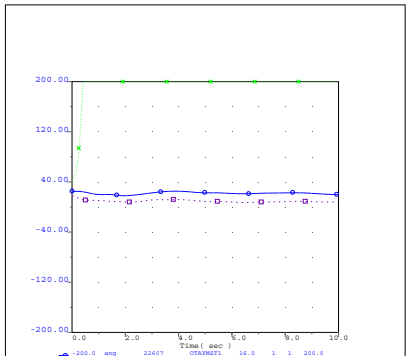
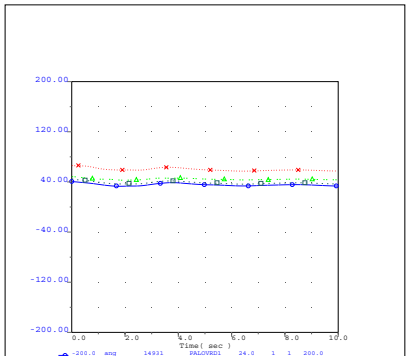


Figure 192 REL_RTR_ANG:Others



Study: BSP Case: hsprebsp_ov_45og Contingency: IPP-bipolar-upc

Possible Violations: MORC 1[16]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[16] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Study: BSP Case: hsbspa1_0iy_ov_45og

Figure 1 Bus-V:Owens Gorge/Rinaldi 230 kV

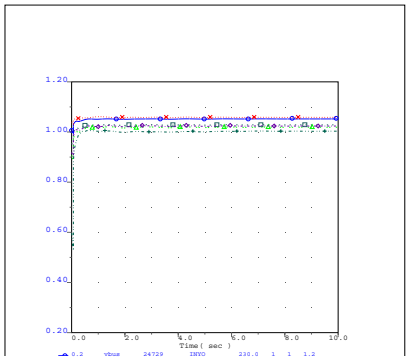


Figure 2 Bus-V:SCE North 115 kV

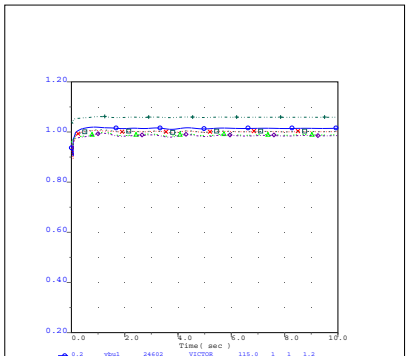


Figure 3 Bus-V:LA BASIN 230 & 138 kV

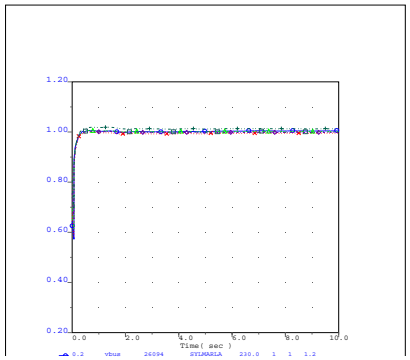


Figure 4 Bus-V:SCE 500 & 230 kV

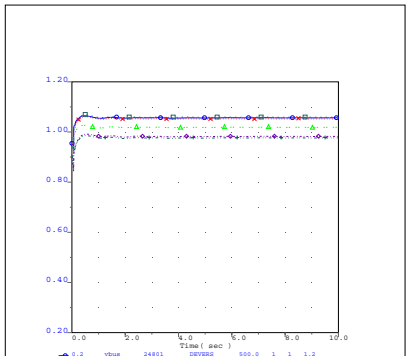


Figure 5 Bus-V: LADWP 500 kV:

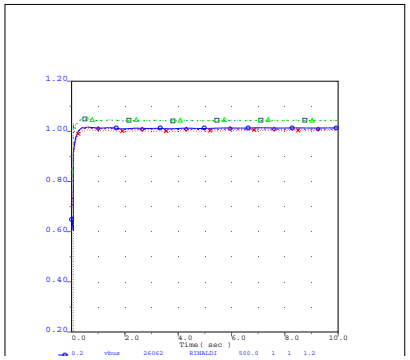


Figure 6 Bus-V:LADWP Load:

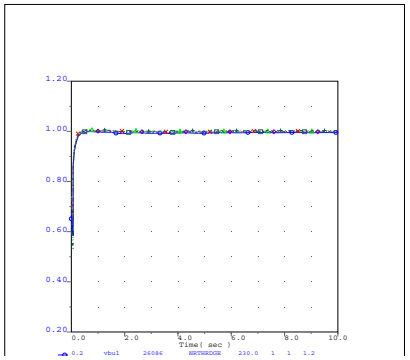


Figure 7 Bus-V: NW & S.CAL 500 kV

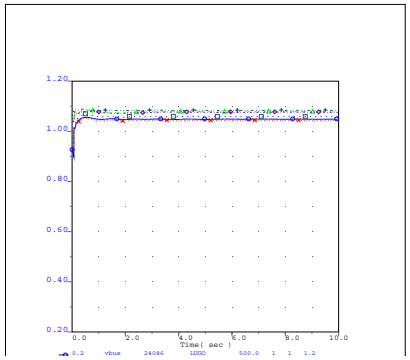


Figure 8 Bus-V: Others 500 kV

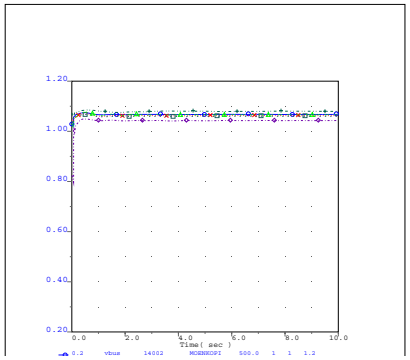


Figure 9 Bus-V: Others 230 kV

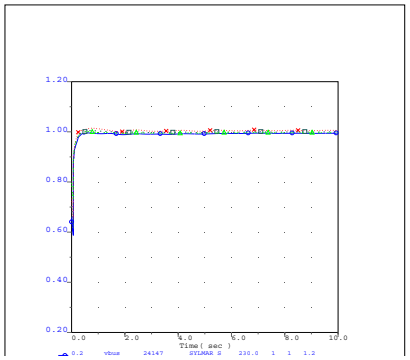


Figure 10 REL_RTR_ANG:S.Cal

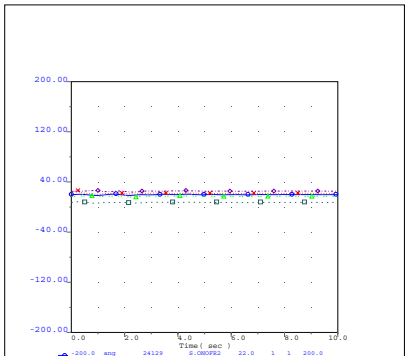


Figure 11 RELATIVE_ROTOR_ANGLE:S.Cal:

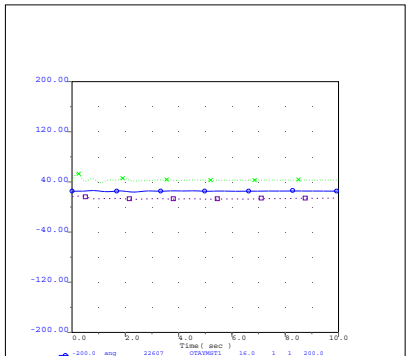
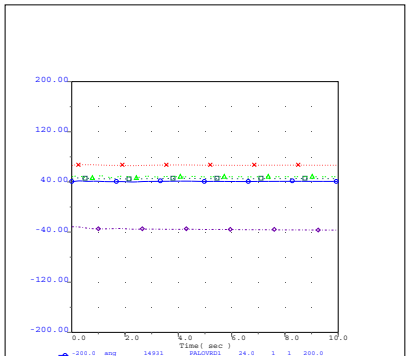


Figure 12 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Adel-Rinaldi-slo

Possible Violations: MORC 1[1]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[1] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 13 Bus-V:Owens Gorge/Rinaldi 230 kV

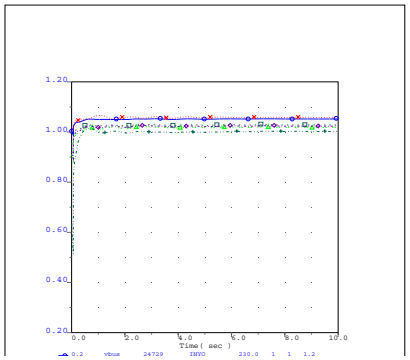


Figure 14 Bus-V:SCE North 115 kV

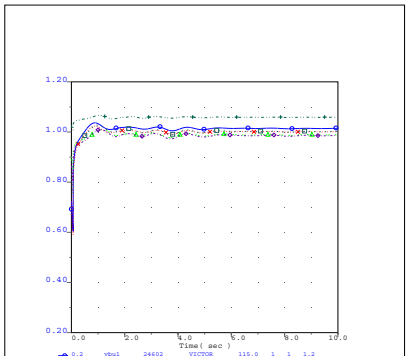


Figure 15 Bus-V:LA BASIN 230 & 138 kV

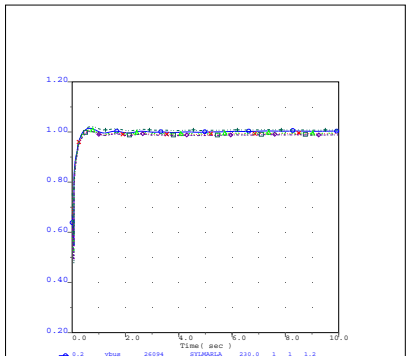


Figure 16 Bus-V:SCE 500 & 230 kV

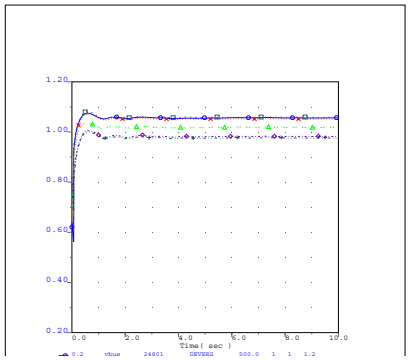


Figure 17 Bus-V: LADWP 500 kV:

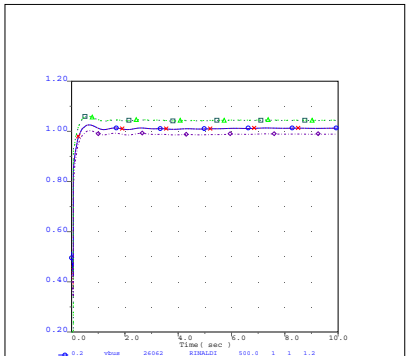


Figure 18 Bus-V:LADWP Load:

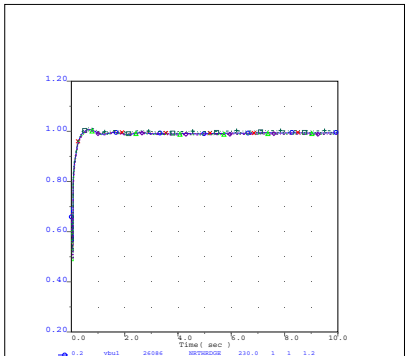


Figure 19 Bus-V: NW & S.CAL 500 kV

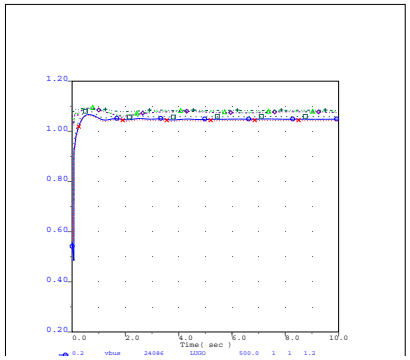


Figure 20 Bus-V: Others 500 kV

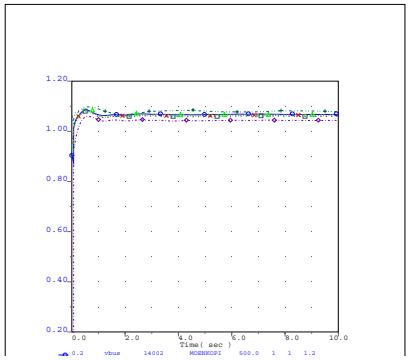


Figure 21 Bus-V: Others 230 kV

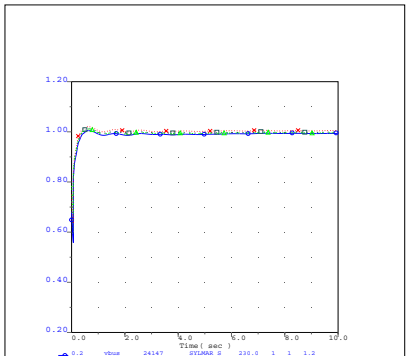


Figure 22 REL_RTR_ANG:S.Cal

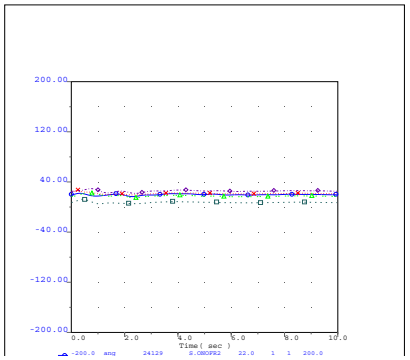


Figure 23 RELATIVE_ROTOR_ANGLE:S.Cal:

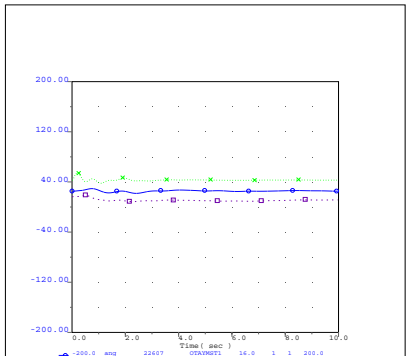
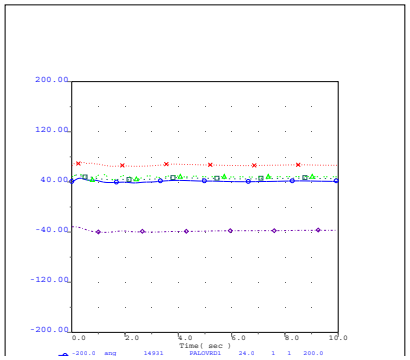


Figure 24 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Adel-Toluca

Possible Violations: MORC 1[2]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[2] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 25 Bus-V:Owens Gorge/Rinaldi 230 kV

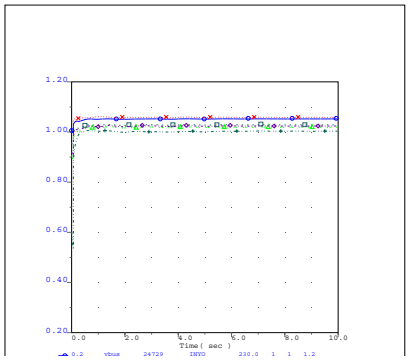


Figure 26 Bus-V:SCE North 115 kV

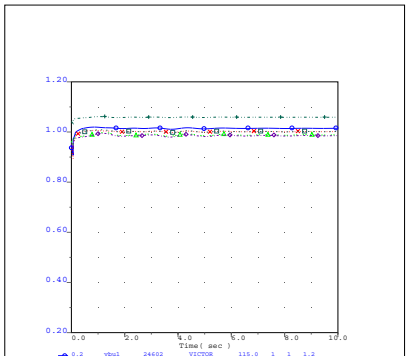


Figure 27 Bus-V:LA BASIN 230 & 138 kV

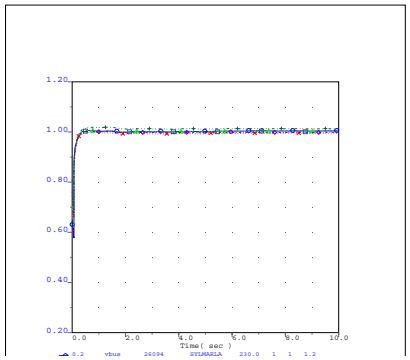


Figure 28 Bus-V:SCE 500 & 230 kV

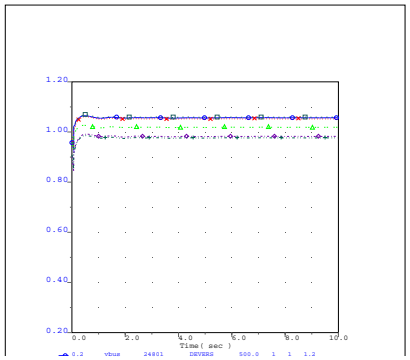


Figure 29 Bus-V: LADWP 500 kV:

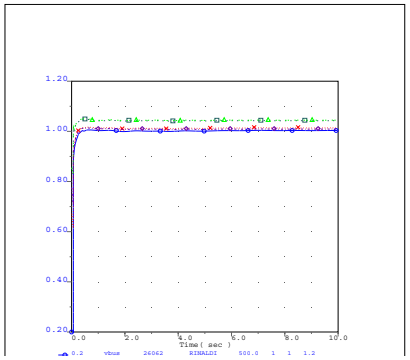


Figure 30 Bus-V:LADWP Load:

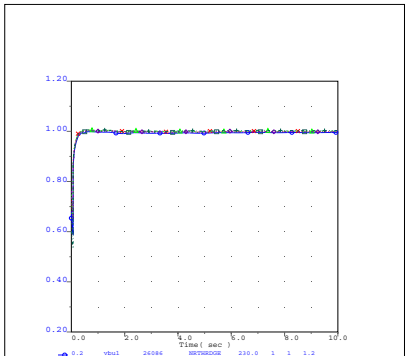


Figure 31 Bus-V: NW & S.CAL 500 kV

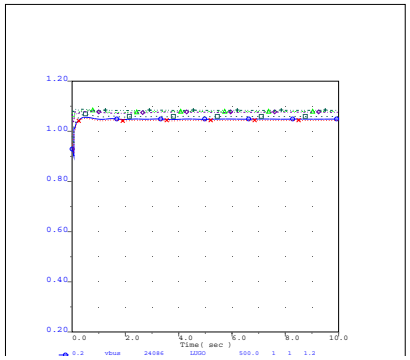


Figure 32 Bus-V: Others 500 kV

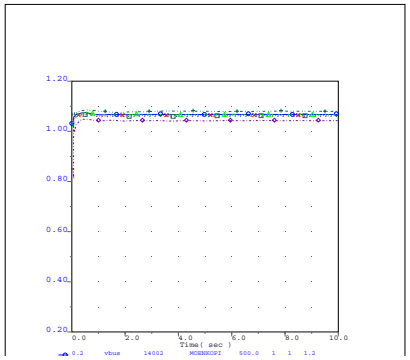


Figure 33 Bus-V: Others 230 kV

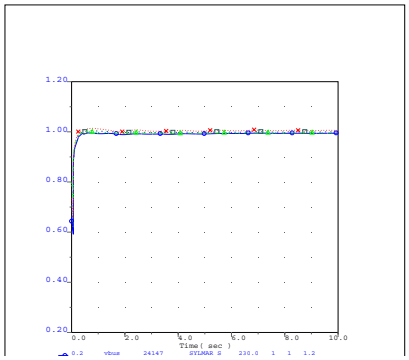


Figure 34 REL_RTR_ANG:S.Cal

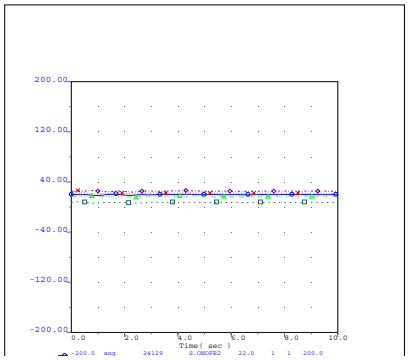


Figure 35 RELATIVE_ROTOR_ANGLE:S.Cal:

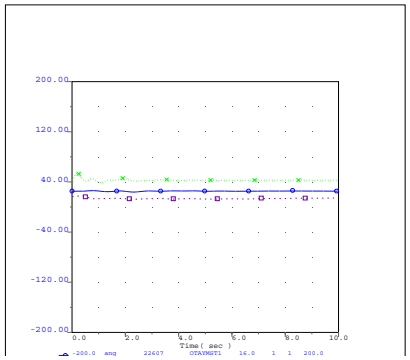
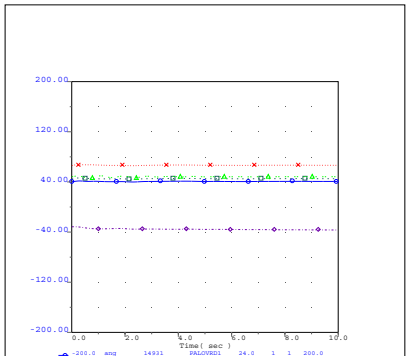


Figure 36 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Vict-Rinaldi-slo

Possible Violations: MORC 1[3]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[3] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 37 Bus-V:Owens Gorge/Rinaldi 230 kV

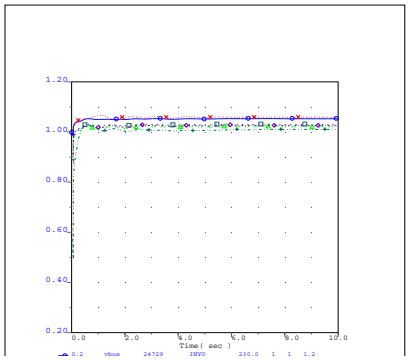


Figure 38 Bus-V:SCE North 115 kV

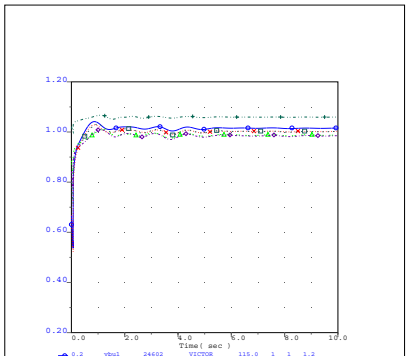


Figure 39 Bus-V:LA BASIN 230 & 138 kV

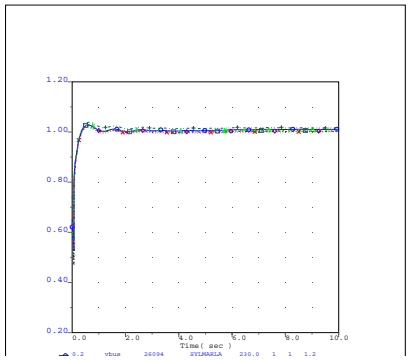


Figure 40 Bus-V:SCE 500 & 230 kV

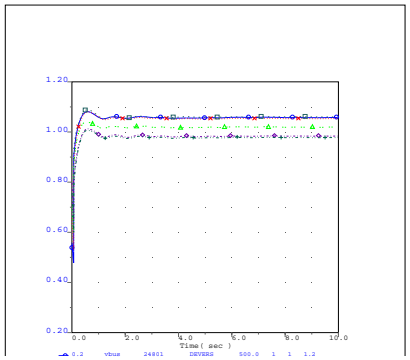


Figure 41 Bus-V: LADWP 500 kV:

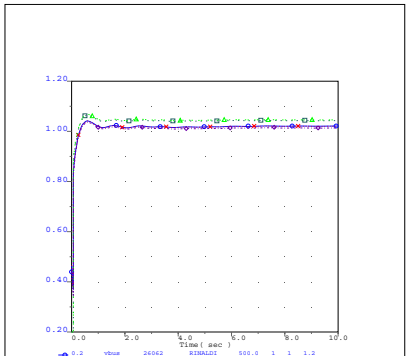


Figure 42 Bus-V:LADWP Load:

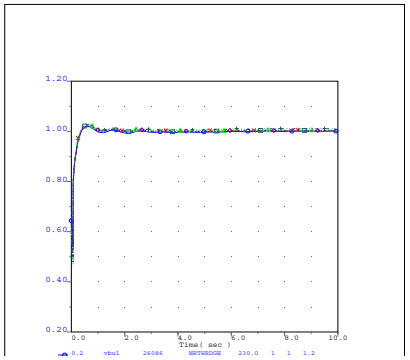


Figure 43 Bus-V: NW & S.CAL 500 kV

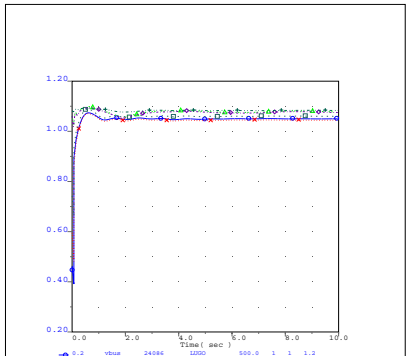


Figure 44 Bus-V: Others 500 kV

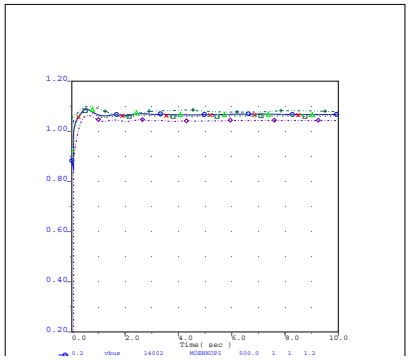


Figure 45 Bus-V: Others 230 kV

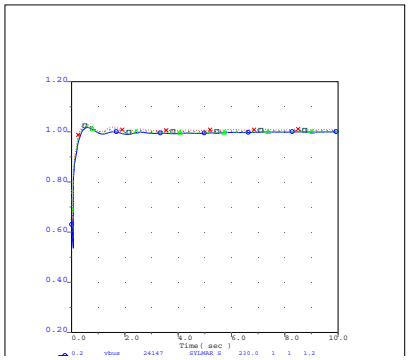


Figure 46 REL_RTR_ANG:S.Cal

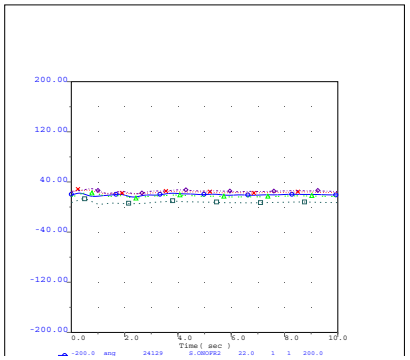


Figure 47 RELATIVE_ROTOR_ANGLE:S.Cal:

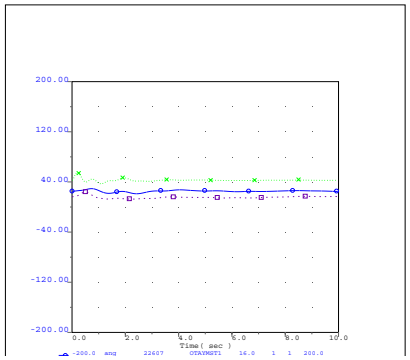
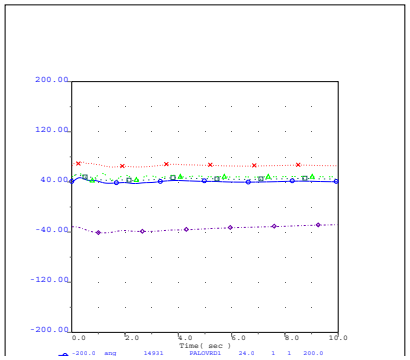


Figure 48 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Adel-Victorvl-slo

Possible Violations: MORC 1[4]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[4] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 49 Bus-V:Owens Gorge/Rinaldi 230 kV

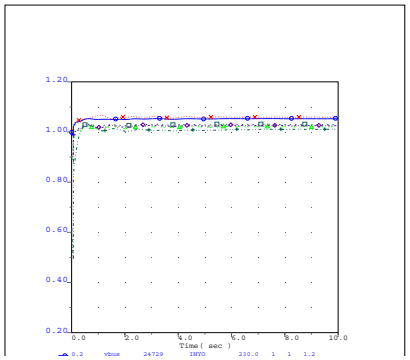


Figure 50 Bus-V:SCE North 115 kV

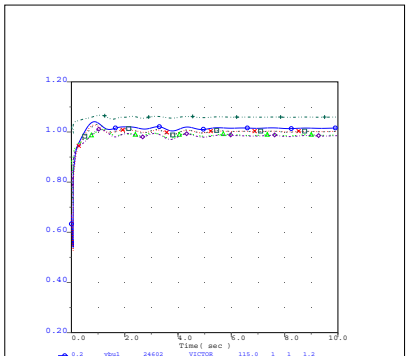


Figure 51 Bus-V:LA BASIN 230 & 138 kV

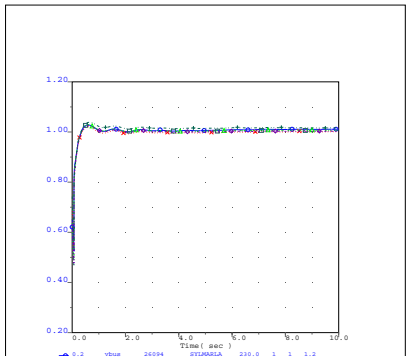


Figure 52 Bus-V:SCE 500 & 230 kV

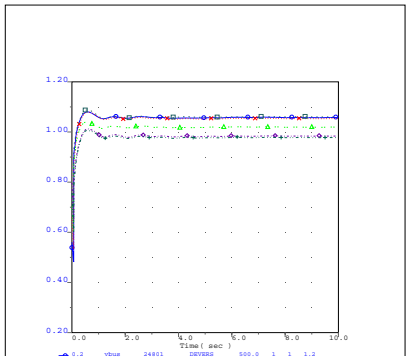


Figure 53 Bus-V: LADWP 500 kV:

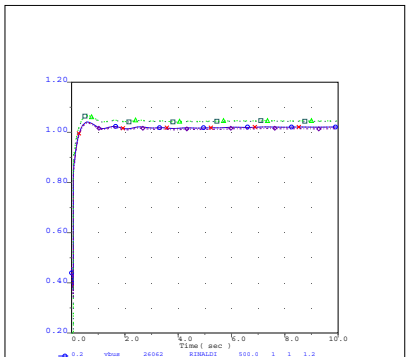


Figure 54 Bus-V:LADWP Load:

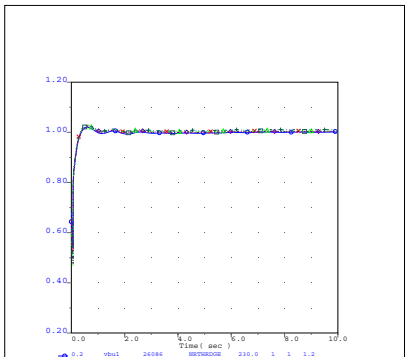


Figure 55 Bus-V: NW & S.CAL 500 kV

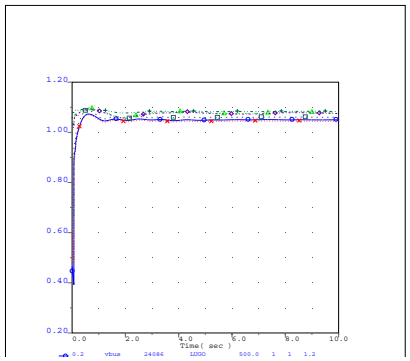


Figure 56 Bus-V: Others 500 kV

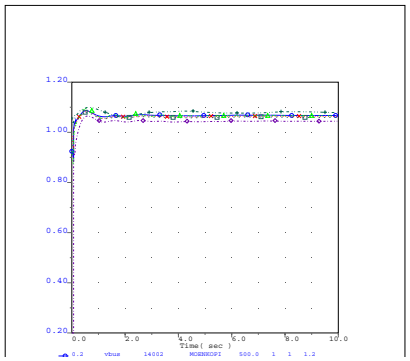


Figure 57 Bus-V: Others 230 kV

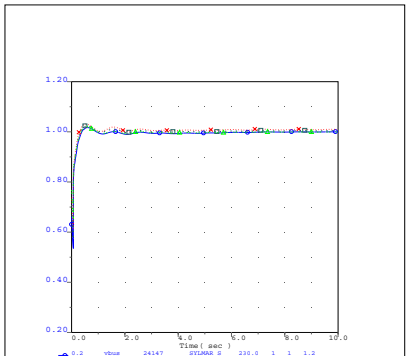


Figure 58 REL_RTR_ANG:S.Cal

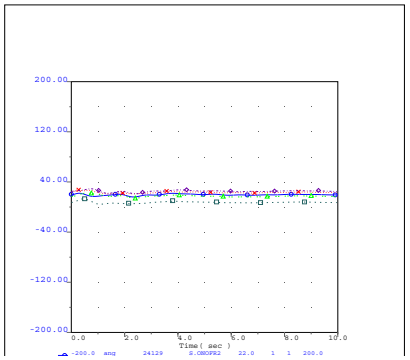


Figure 59 RELATIVE_ROTOR_ANGLE:S.Cal:

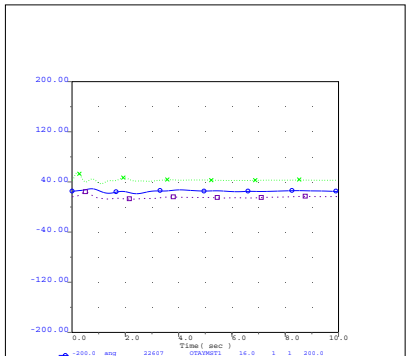
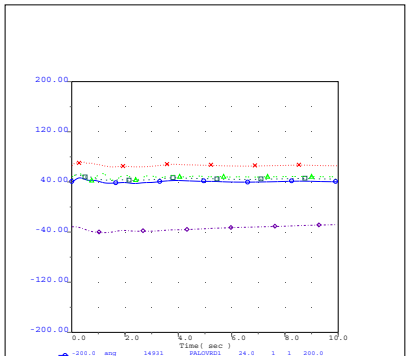


Figure 60 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: McC-Vict-slo

Possible Violations: MORC 1[5]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[5] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 61 Bus-V:Owens Gorge/Rinaldi 230 kV

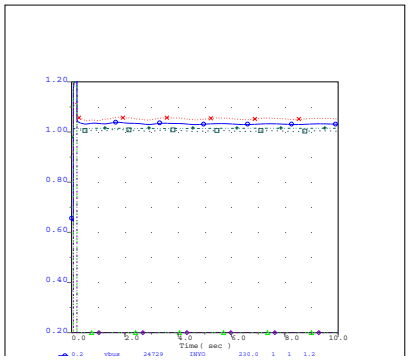


Figure 62 Bus-V:SCE North 115 kV

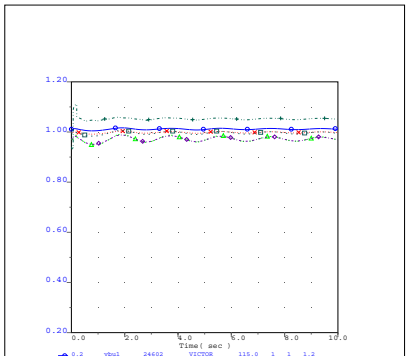


Figure 63 Bus-V:LA BASIN 230 & 138 kV

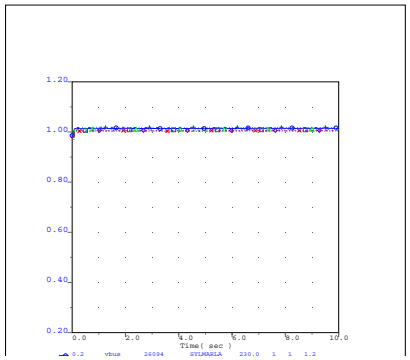


Figure 64 Bus-V:SCE 500 & 230 kV

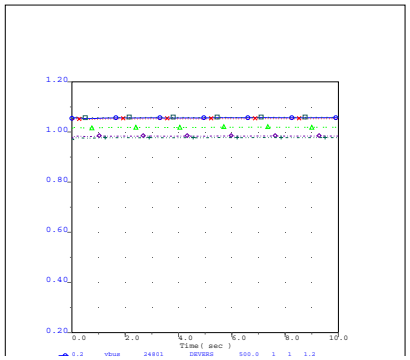


Figure 65 Bus-V: LADWP 500 kV:

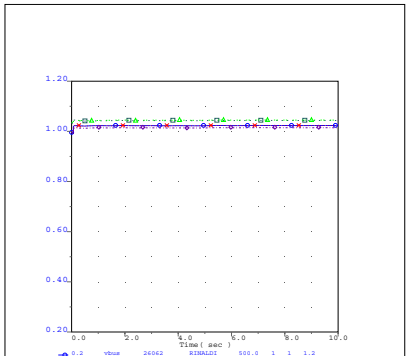


Figure 66 Bus-V:LADWP Load:

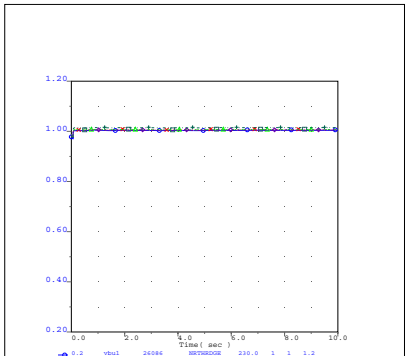


Figure 67 Bus-V: NW & S.CAL 500 kV

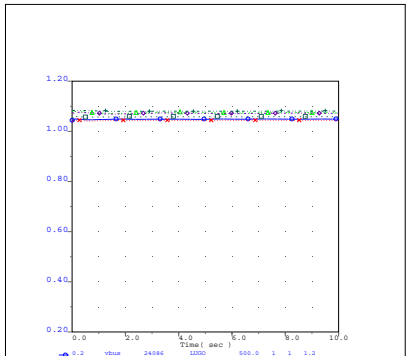


Figure 68 Bus-V: Others 500 kV

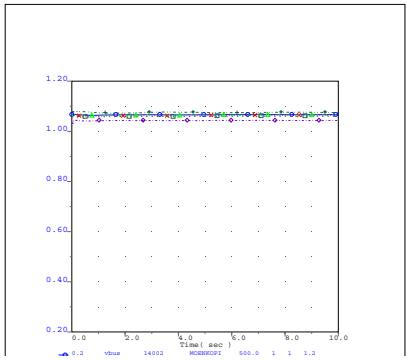


Figure 69 Bus-V: Others 230 kV

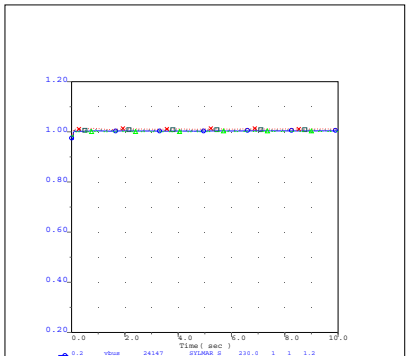


Figure 70 REL_RTR_ANG:S.Cal

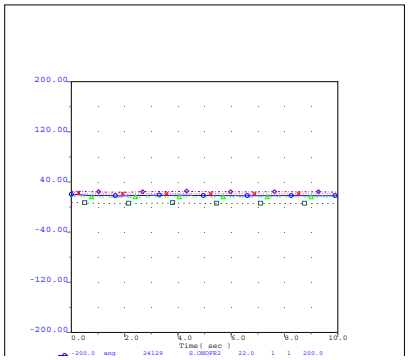


Figure 71 RELATIVE_ROTOR_ANGLE:S.Cal:

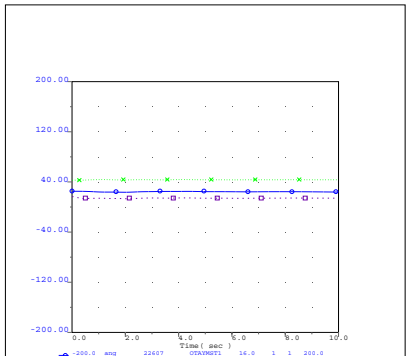
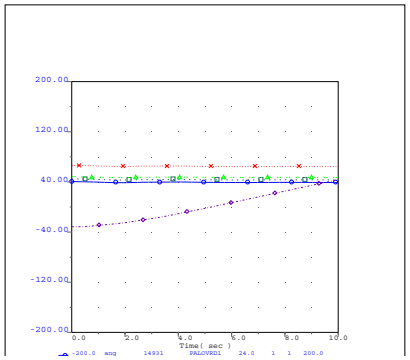


Figure 72 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: BR-Rinaldi-RAS-wIY

Possible Violations: MORC 1[6]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[6] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 73 Bus-V:Owens Gorge/Rinaldi 230 kV

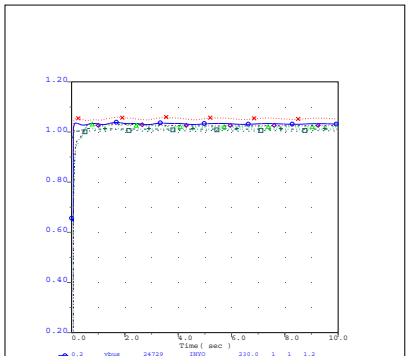


Figure 74 Bus-V:SCE North 115 kV

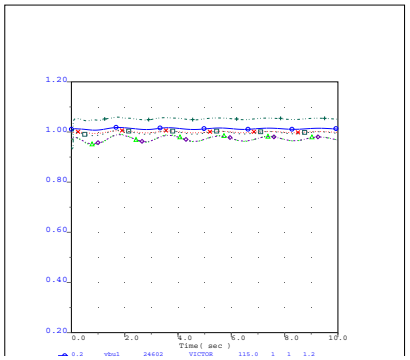


Figure 75 Bus-V:LA BASIN 230 & 138 kV

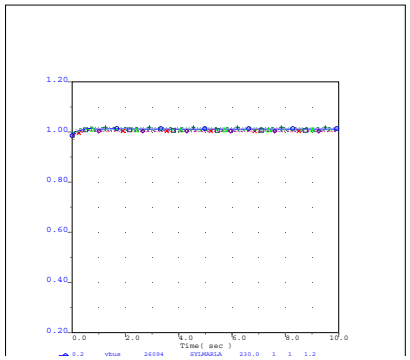


Figure 76 Bus-V:SCE 500 & 230 kV

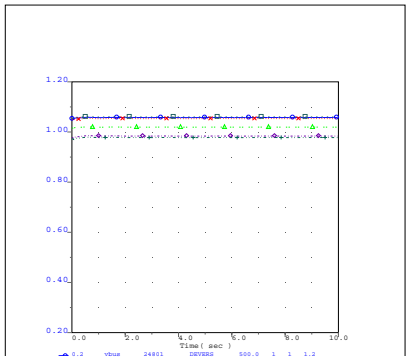


Figure 77 Bus-V: LADWP 500 kV:

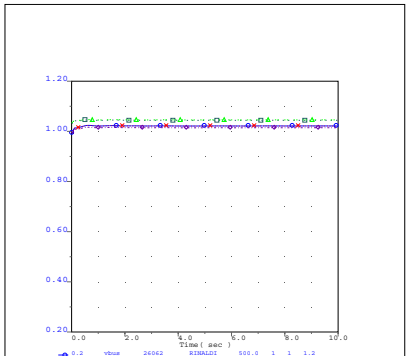


Figure 78 Bus-V:LADWP Load:

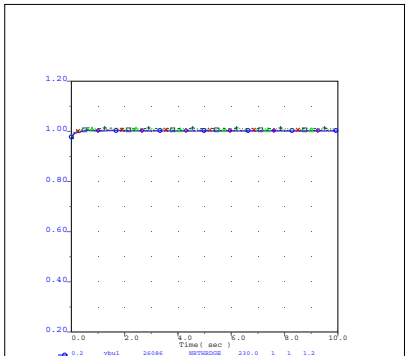


Figure 79 Bus-V: NW & S.CAL 500 kV

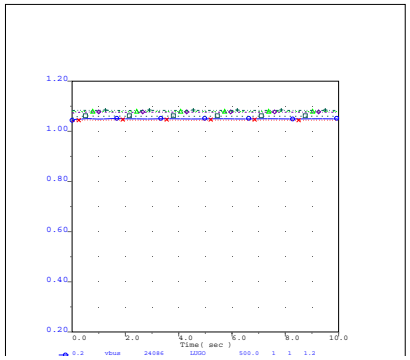


Figure 80 Bus-V: Others 500 kV

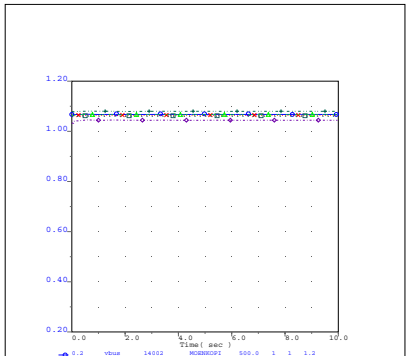


Figure 81 Bus-V: Others 230 kV

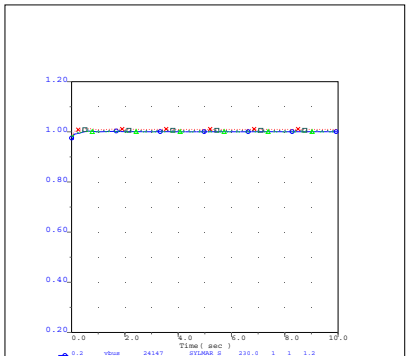


Figure 82 REL_RTR_ANG:S.Cal

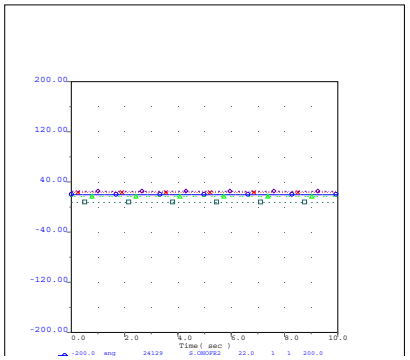


Figure 83 RELATIVE_ROTOR_ANGLE:S.Cal:

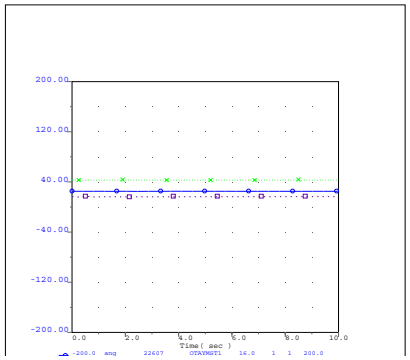
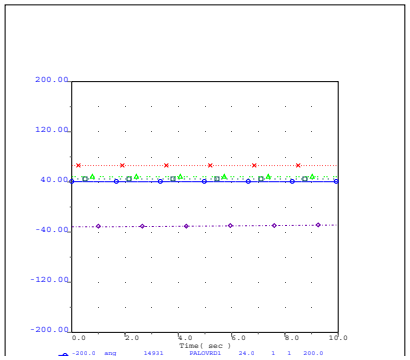


Figure 84 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Cottonwd-BR-NoRAS

Possible Violations: MORC 1[7]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[7] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 85 Bus-V:Owens Gorge/Rinaldi 230 kV

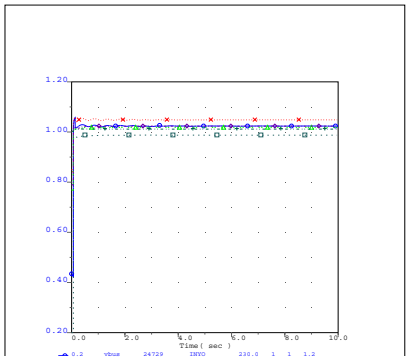


Figure 86 Bus-V:SCE North 115 kV

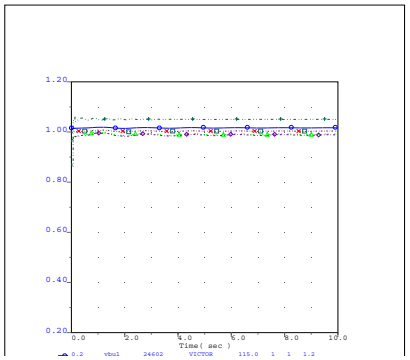


Figure 87 Bus-V:LA BASIN 230 & 138 kV

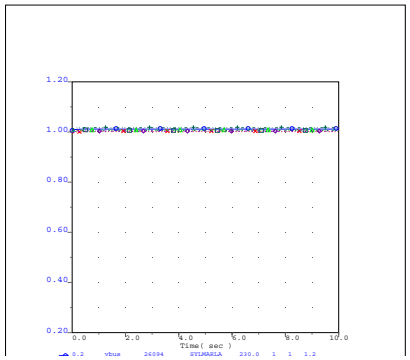


Figure 88 Bus-V:SCE 500 & 230 kV

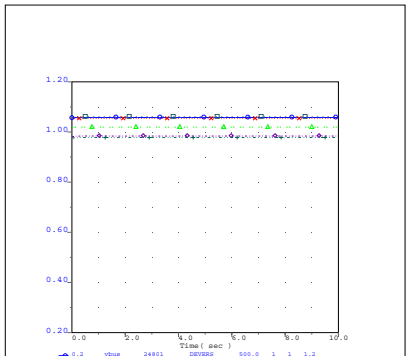


Figure 89 Bus-V: LADWP 500 kV:

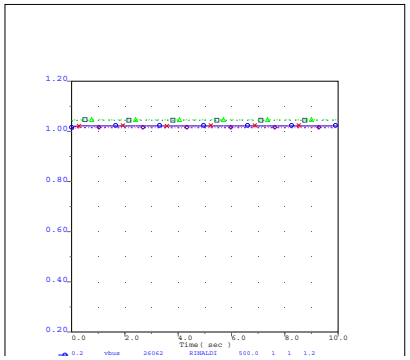


Figure 90 Bus-V:LADWP Load:

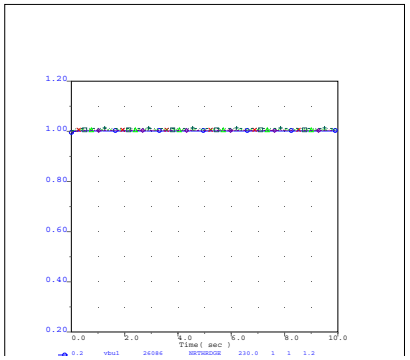


Figure 91 Bus-V: NW & S.CAL 500 kV

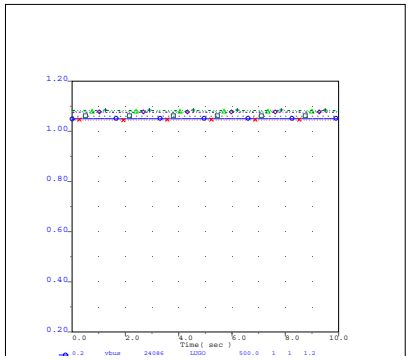


Figure 92 Bus-V: Others 500 kV

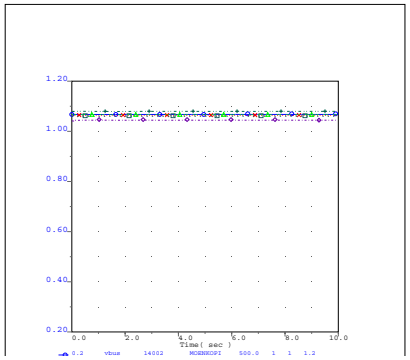


Figure 93 Bus-V: Others 230 kV

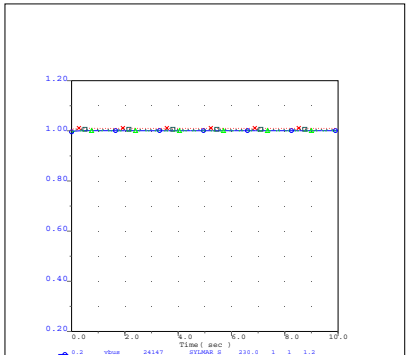


Figure 94 REL_RTR_ANG:S.Cal

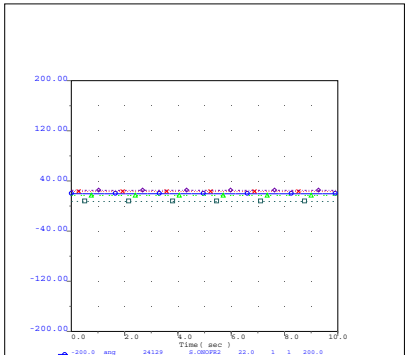


Figure 95 RELATIVE_ROTOR_ANGLE:S.Cal:

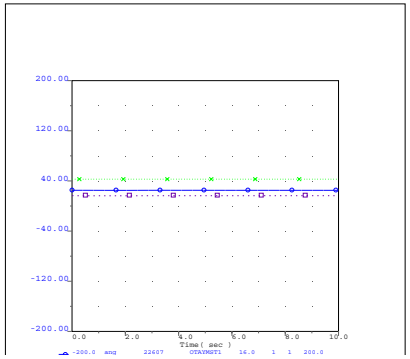
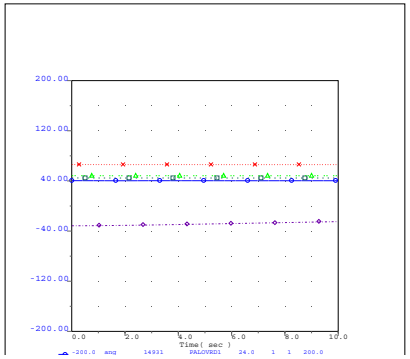


Figure 96 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Cottonwd-Inyo-preRAS

Possible Violations: MORC 1[8]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[8] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 97 Bus-V:Owens Gorge/Rinaldi 230 kV

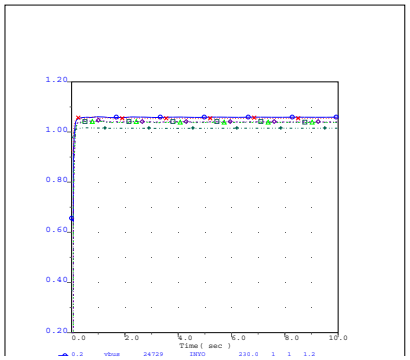


Figure 98 Bus-V:SCE North 115 kV

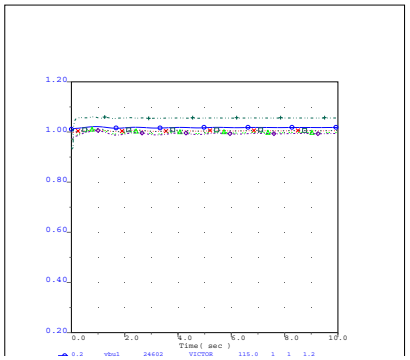


Figure 99 Bus-V:LA BASIN 230 & 138 kV

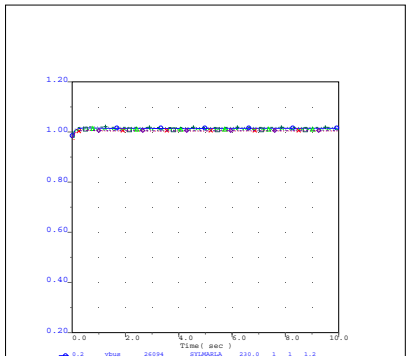


Figure 100 Bus-V:SCE 500 & 230 kV

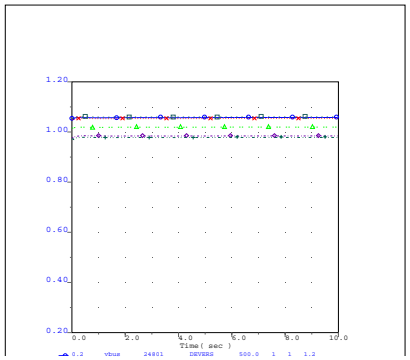


Figure 101 Bus-V: LADWP 500 kV:

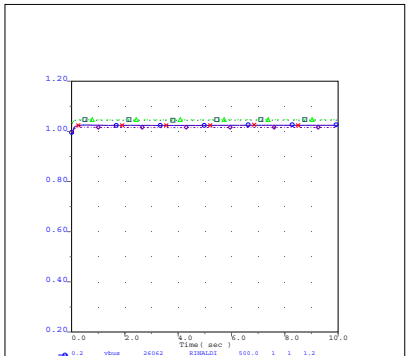


Figure 102 Bus-V:LADWP Load:

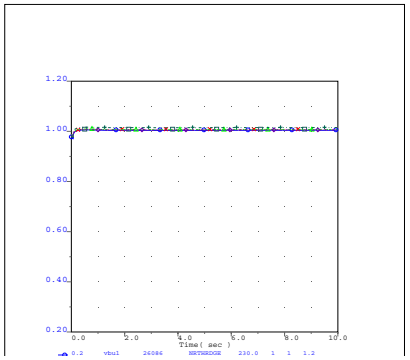


Figure 103 Bus-V: NW & S.CAL 500 kV

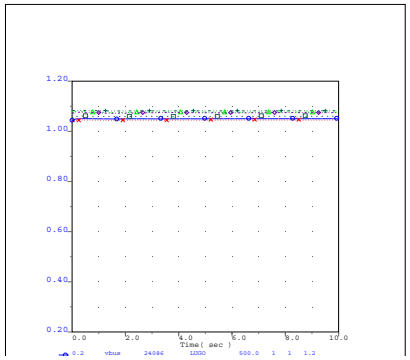


Figure 104 Bus-V: Others 500 kV

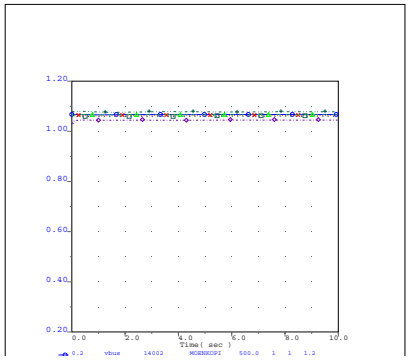


Figure 105 Bus-V: Others 230 kV

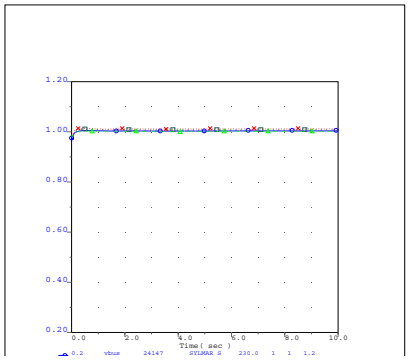


Figure 106 REL_RTR_ANG:S.Cal

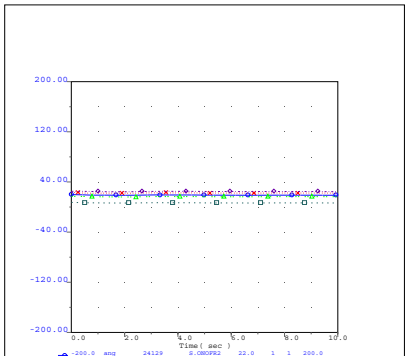


Figure 107 RELATIVE_ROTOR_ANGLE:S.Cal:

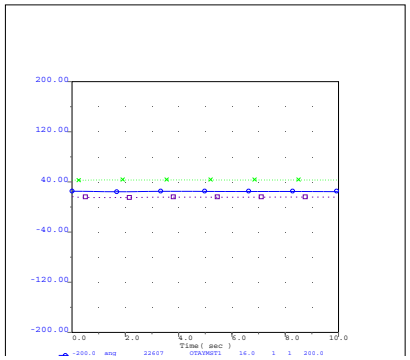
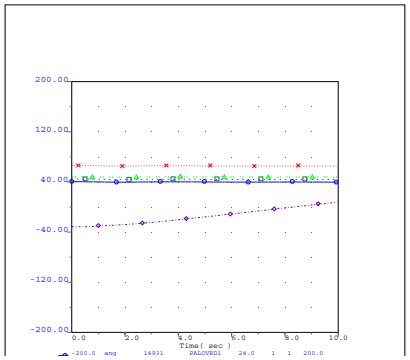


Figure 108 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Beacon-BR-RAS

Possible Violations: MORC 1[9]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[9] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 109 Bus-V:Owens Gorge/Rinaldi 230 kV

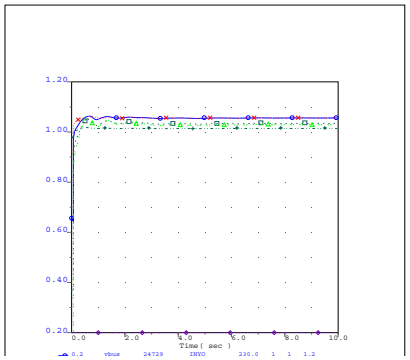


Figure 110 Bus-V:SCE North 115 kV

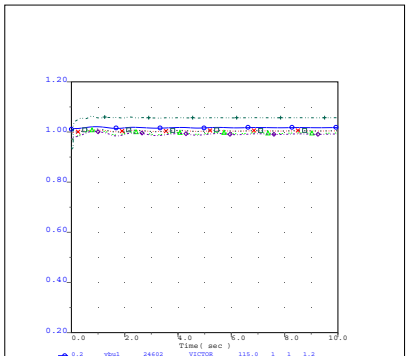


Figure 111 Bus-V:LA BASIN 230 & 138 kV

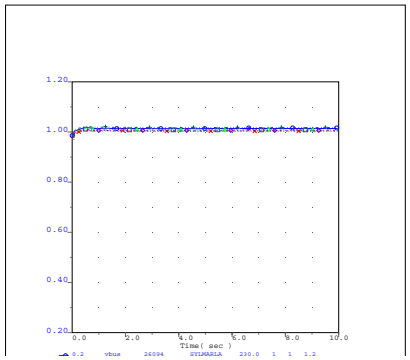


Figure 112 Bus-V:SCE 500 & 230 kV

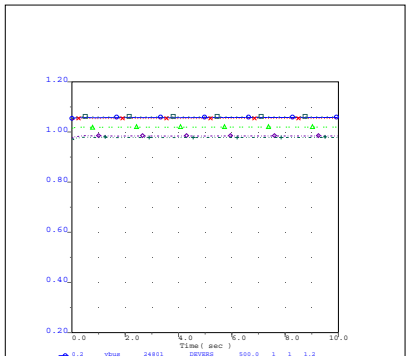


Figure 113 Bus-V: LADWP 500 kV:

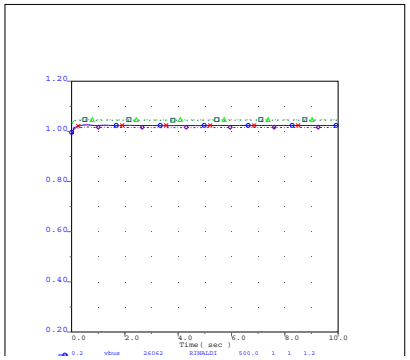


Figure 114 Bus-V:LADWP Load:

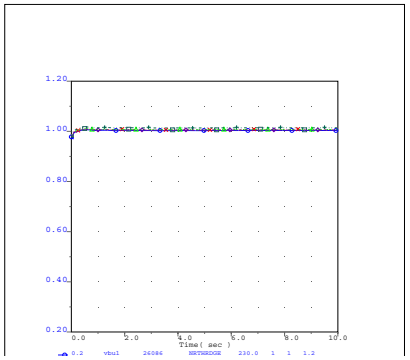


Figure 115 Bus-V: NW & S.CAL 500 kV

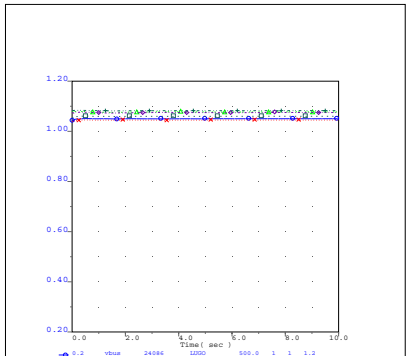


Figure 116 Bus-V: Others 500 kV

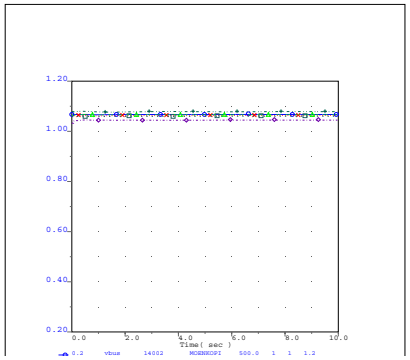


Figure 117 Bus-V: Others 230 kV

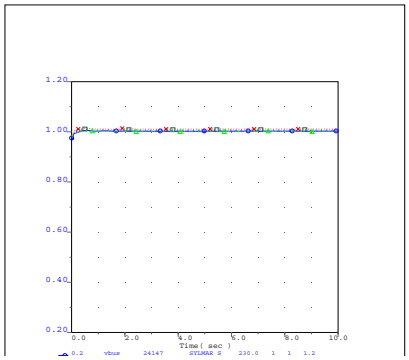


Figure 118 REL_RTR_ANG:S.Cal

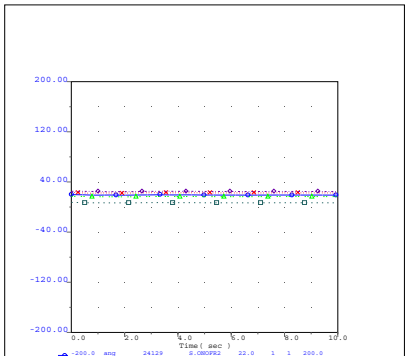


Figure 119 RELATIVE_ROTOR_ANGLE:S.Cal:

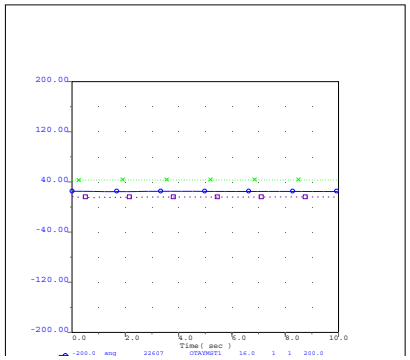
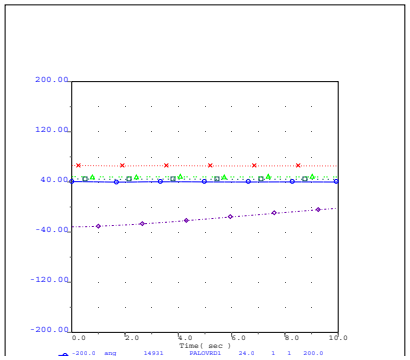


Figure 120 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Pinetree-BR-RAS

Possible Violations: MORC 1[10]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[10] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 121 Bus-V:Owens Gorge/Rinaldi 230 kV

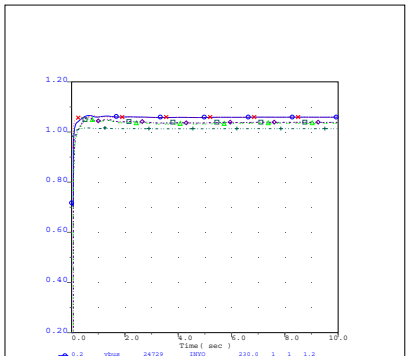


Figure 122 Bus-V:SCE North 115 kV

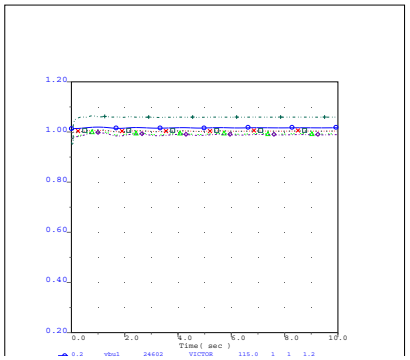


Figure 123 Bus-V:LA BASIN 230 & 138 kV

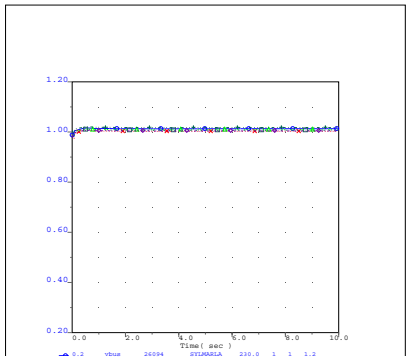


Figure 124 Bus-V:SCE 500 & 230 kV

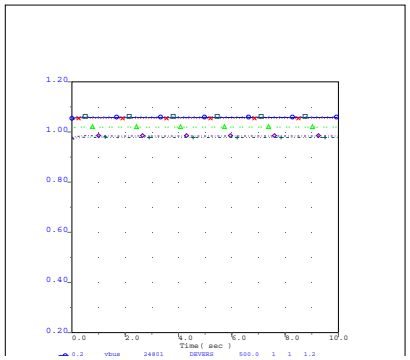


Figure 125 Bus-V: LADWP 500 kV:

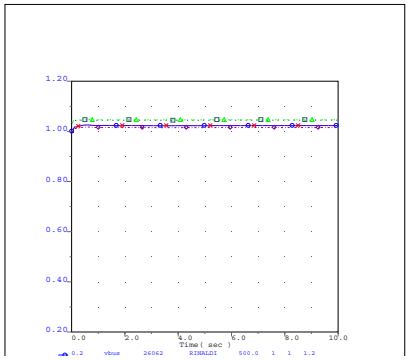


Figure 126 Bus-V:LADWP Load:

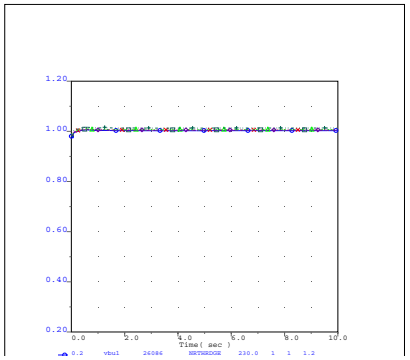


Figure 127 Bus-V: NW & S.CAL 500 kV

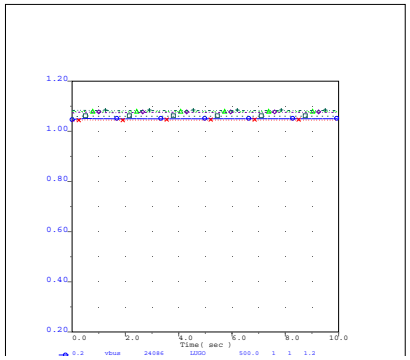


Figure 128 Bus-V: Others 500 kV

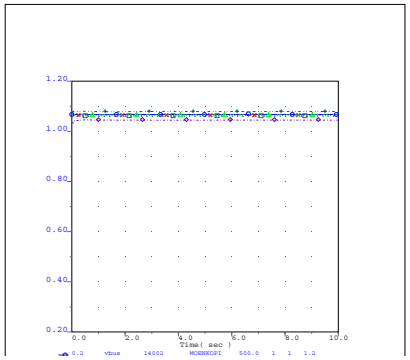


Figure 129 Bus-V: Others 230 kV

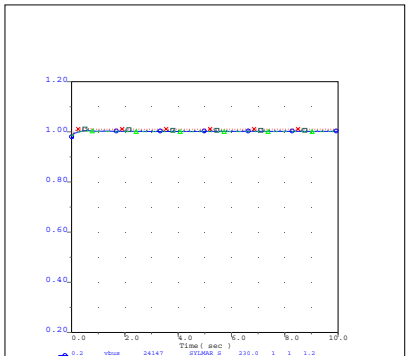


Figure 130 REL_RTR_ANG:S.Cal

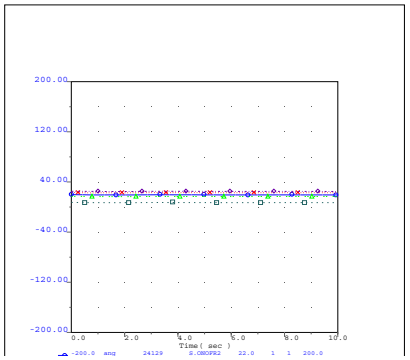


Figure 131 RELATIVE_ROTOR_ANGLE:S.Cal:

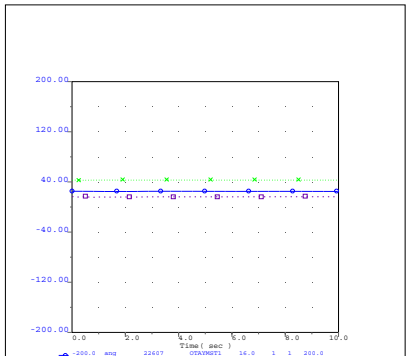
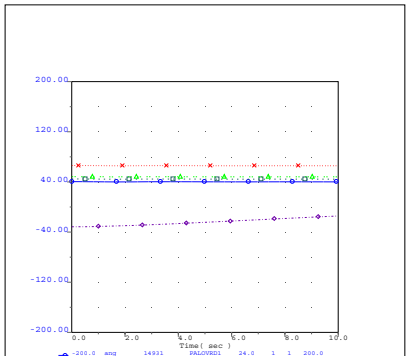


Figure 132 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: HoffmanSummit-Pinetree-RAS

Possible Violations: MORC 1[11]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[11] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 133 Bus-V:Owens Gorge/Rinaldi 230 kV

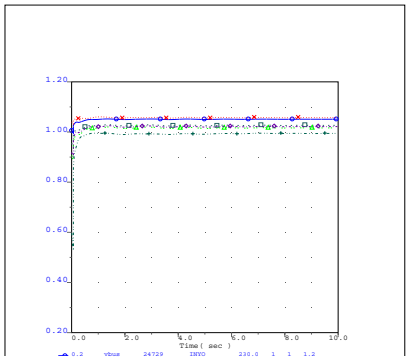


Figure 134 Bus-V:SCE North 115 kV

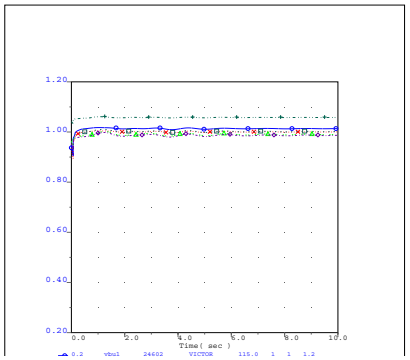


Figure 135 Bus-V:LA BASIN 230 & 138 kV

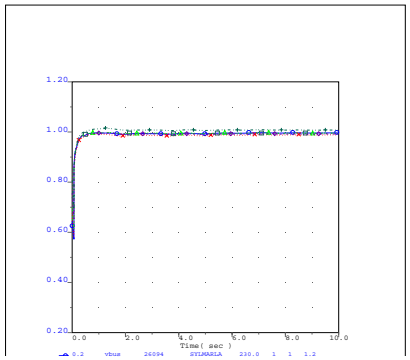


Figure 136 Bus-V:SCE 500 & 230 kV

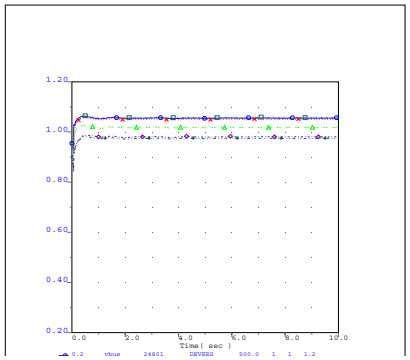


Figure 137 Bus-V: LADWP 500 kV:

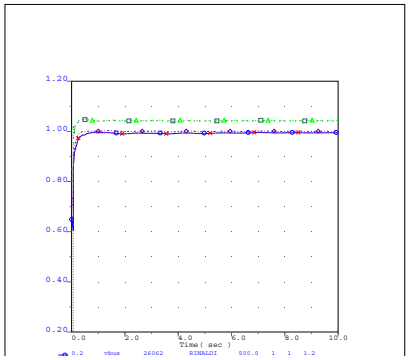


Figure 138 Bus-V:LADWP Load:

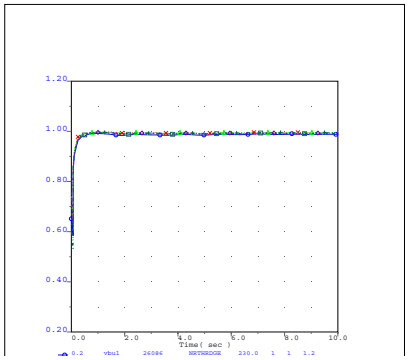


Figure 139 Bus-V: NW & S.CAL 500 kV

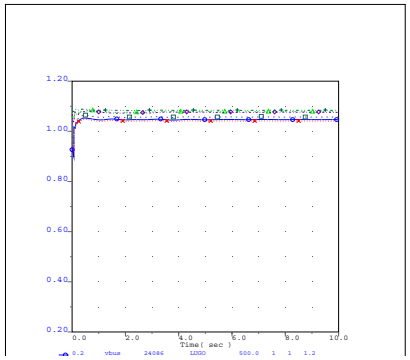


Figure 140 Bus-V: Others 500 kV

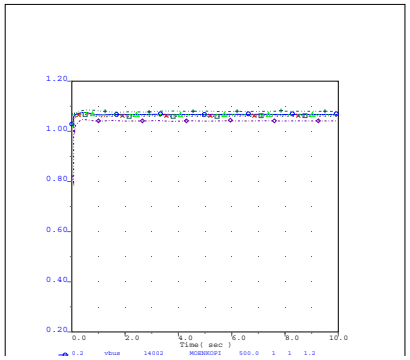


Figure 141 Bus-V: Others 230 kV

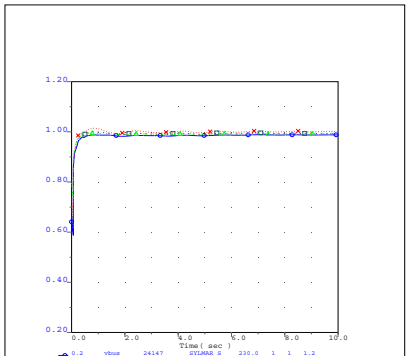


Figure 142 REL_RTR_ANG:S.Cal

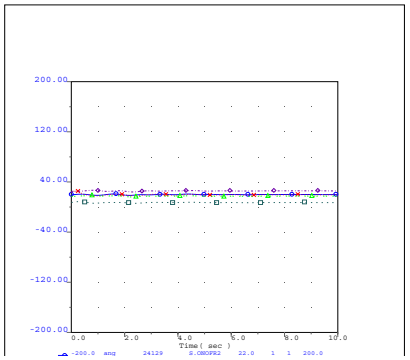


Figure 143 RELATIVE_ROTOR_ANGLE:S.Cal:

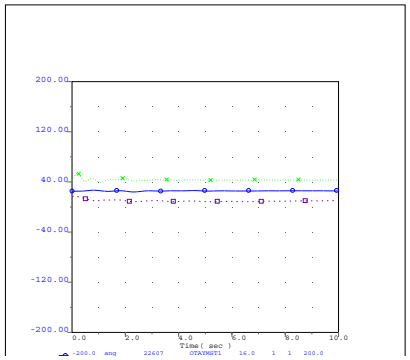
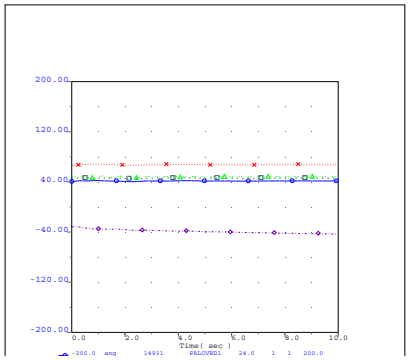


Figure 144 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Adel-Vict-Rinaldi-dlo

Possible Violations: MORC 1[12]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[12] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 145 Bus-V:Owens Gorge/Rinaldi 230 kV

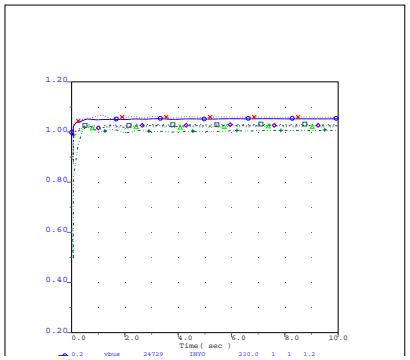


Figure 146 Bus-V:SCE North 115 kV

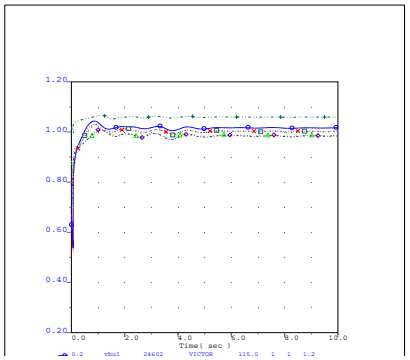


Figure 147 Bus-V:LA BASIN 230 & 138 kV

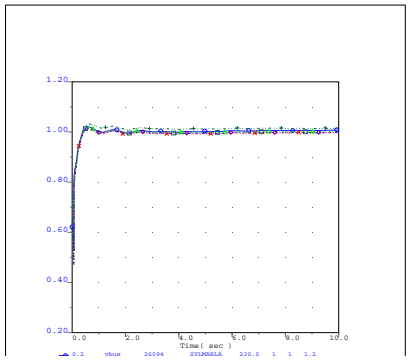


Figure 148 Bus-V:SCE 500 & 230 kV

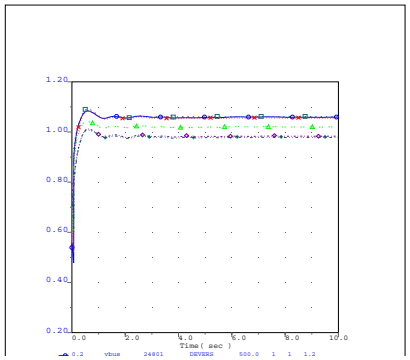


Figure 149 Bus-V: LADWP 500 kV:

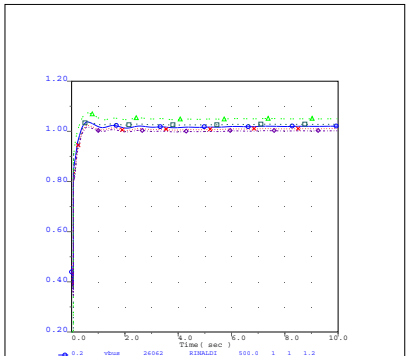


Figure 150 Bus-V:LADWP Load:

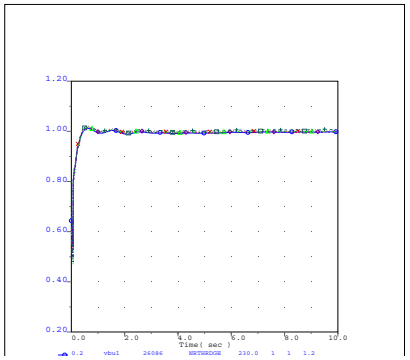


Figure 151 Bus-V: NW & S.CAL 500 kV

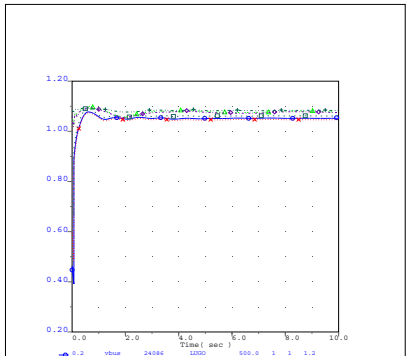


Figure 152 Bus-V: Others 500 kV

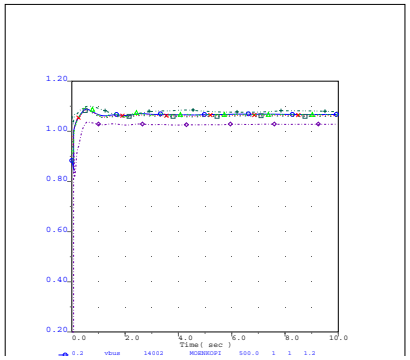


Figure 153 Bus-V: Others 230 kV

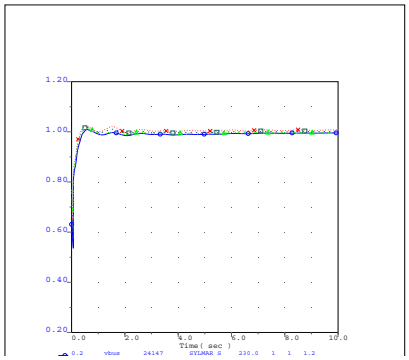


Figure 154 REL_RTR_ANG:S.Cal

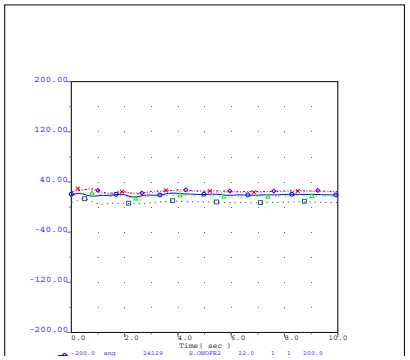


Figure 155 RELATIVE_ROTOR_ANGLE:S.Cal:

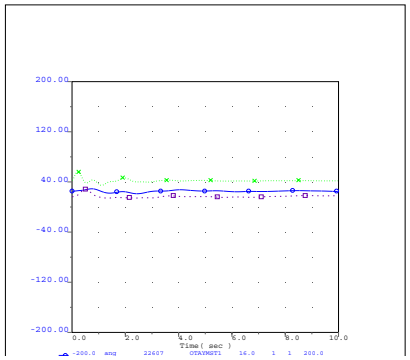
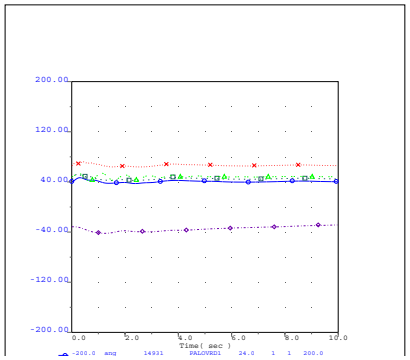


Figure 156 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Adel-Victorvl-dlo

Possible Violations: MORC 1[13]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[13] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 157 Bus-V:Owens Gorge/Rinaldi 230 kV

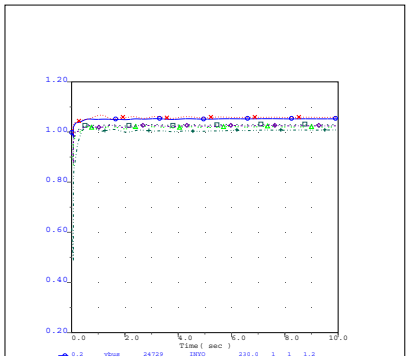


Figure 158 Bus-V:SCE North 115 kV

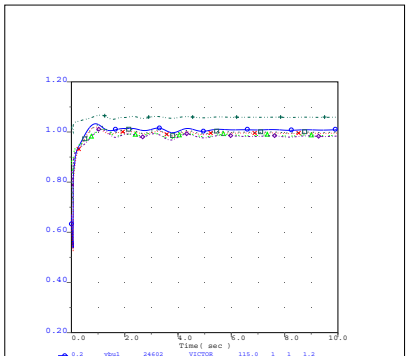


Figure 159 Bus-V:LA BASIN 230 & 138 kV

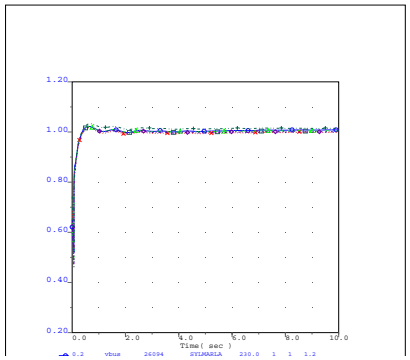


Figure 160 Bus-V:SCE 500 & 230 kV

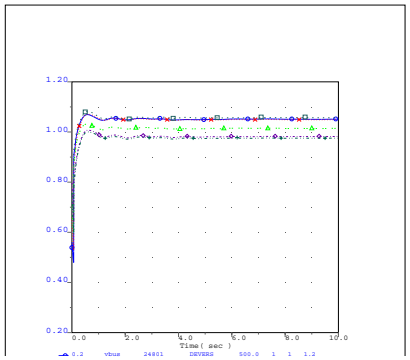


Figure 161 Bus-V: LADWP 500 kV:

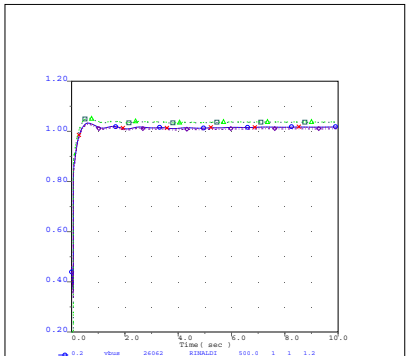


Figure 162 Bus-V:LADWP Load:

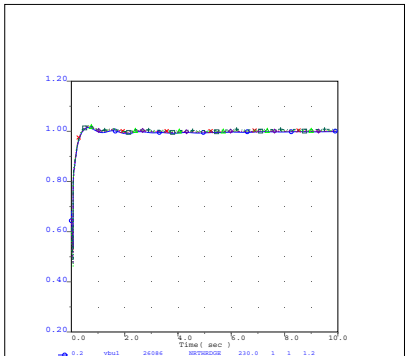


Figure 163 Bus-V: NW & S.CAL 500 kV

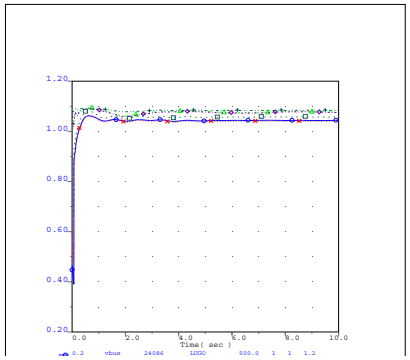


Figure 164 Bus-V: Others 500 kV

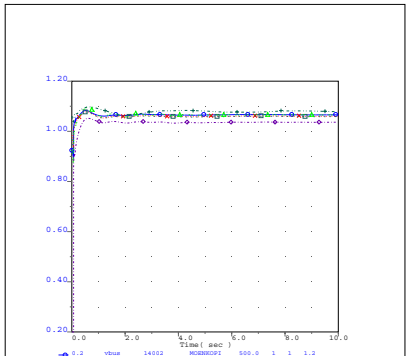


Figure 165 Bus-V: Others 230 kV

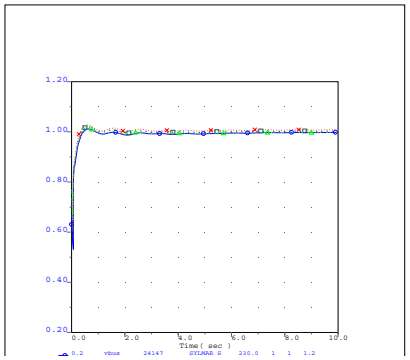


Figure 166 REL_RTR_ANG:S.Cal

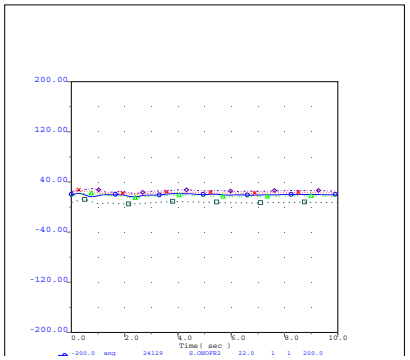


Figure 167 RELATIVE_ROTOR_ANGLE:S.Cal:

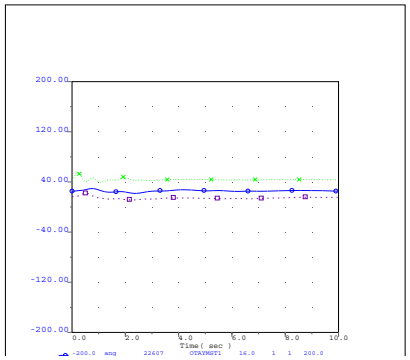
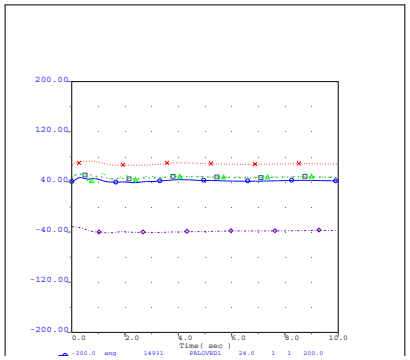


Figure 168 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: McCullgh-Victorvl-dlo

Possible Violations: MORC 1[14]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[14] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 169 Bus-V:Owens Gorge/Rinaldi 230 kV

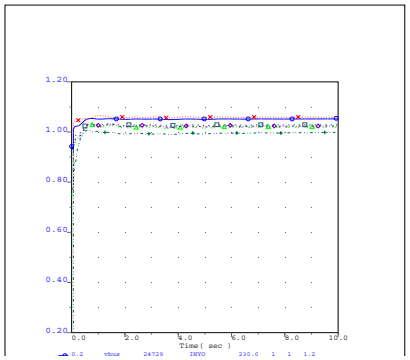


Figure 170 Bus-V:SCE North 115 kV

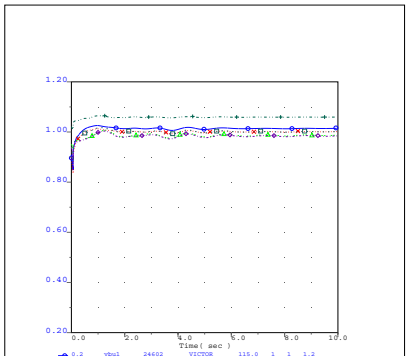


Figure 171 Bus-V:LA BASIN 230 & 138 kV

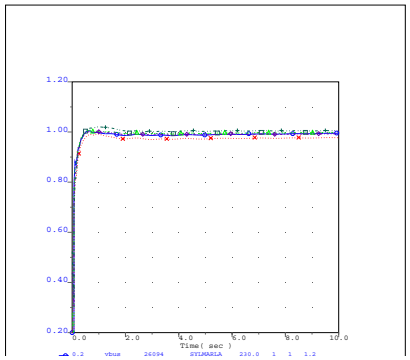


Figure 172 Bus-V:SCE 500 & 230 kV

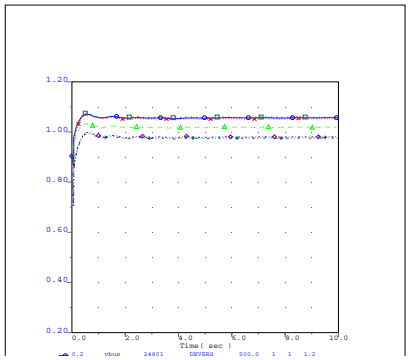


Figure 173 Bus-V: LADWP 500 kV:

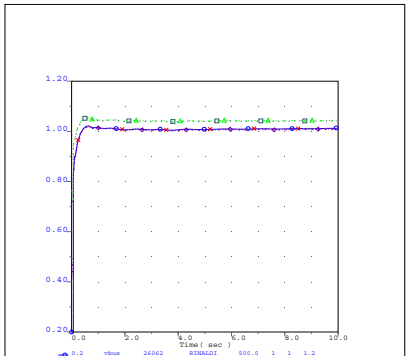


Figure 174 Bus-V:LADWP Load:

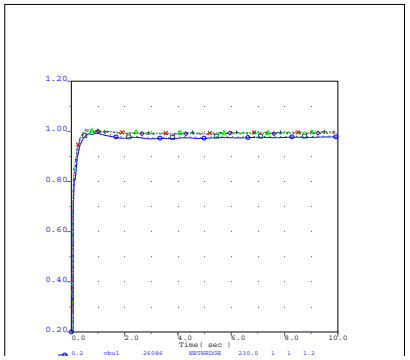


Figure 175 Bus-V: NW & S.CAL 500 kV

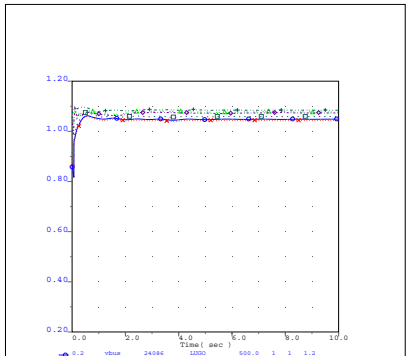


Figure 176 Bus-V: Others 500 kV

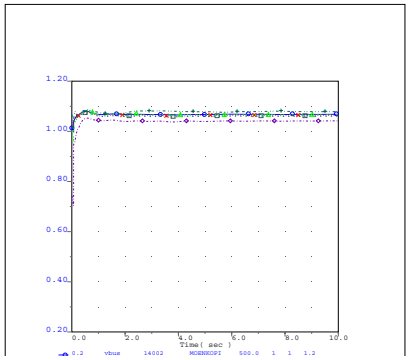


Figure 177 Bus-V: Others 230 kV

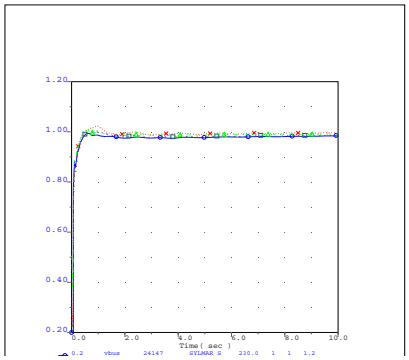


Figure 178 REL_RTR_ANG:S.Cal

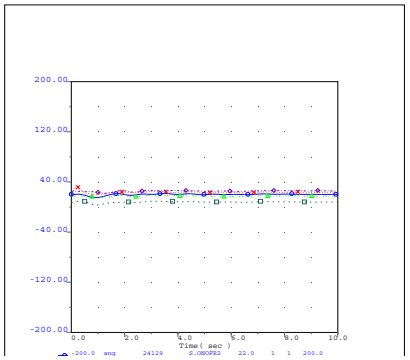


Figure 179 RELATIVE_ROTOR_ANGLE:S.Cal:

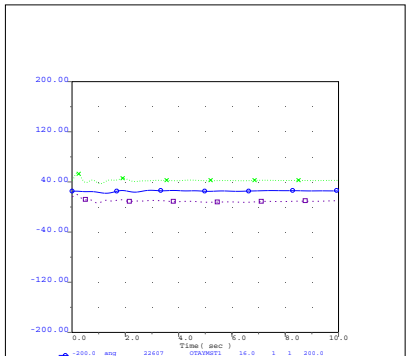
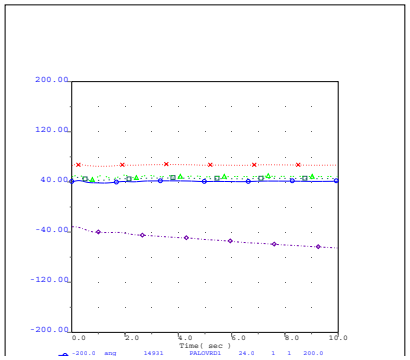


Figure 180 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Rin-Tar-dlo

Possible Violations: MORC 1[15]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[15] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 181 Bus-V:Owens Gorge/Rinaldi 230 kV

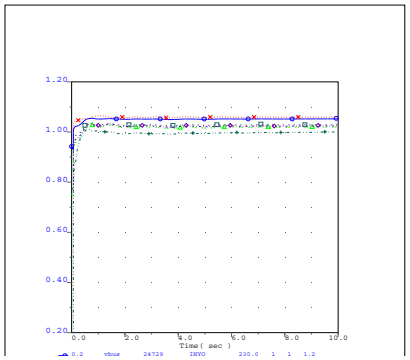


Figure 182 Bus-V:SCE North 115 kV

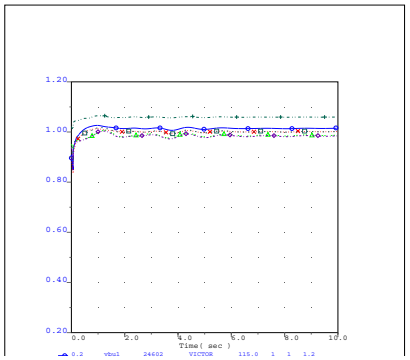


Figure 183 Bus-V:LA BASIN 230 & 138 kV

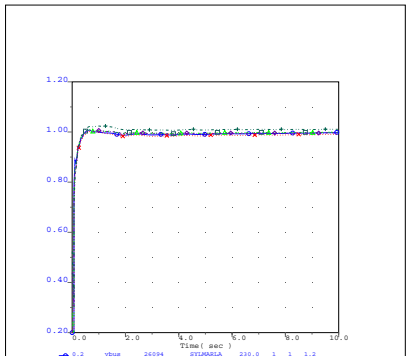


Figure 184 Bus-V:SCE 500 & 230 kV

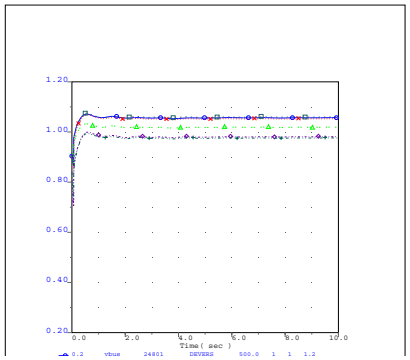


Figure 185 Bus-V: LADWP 500 kV:

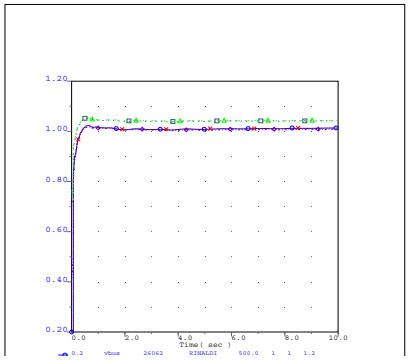


Figure 186 Bus-V:LADWP Load:

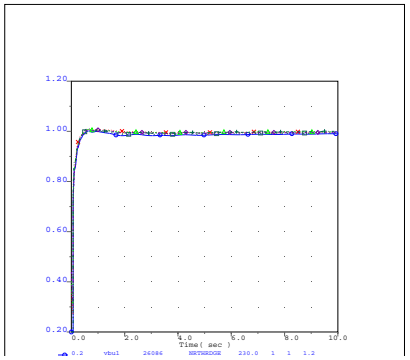


Figure 187 Bus-V: NW & S.CAL 500 kV

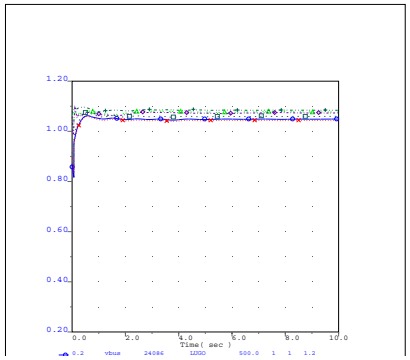


Figure 188 Bus-V: Others 500 kV

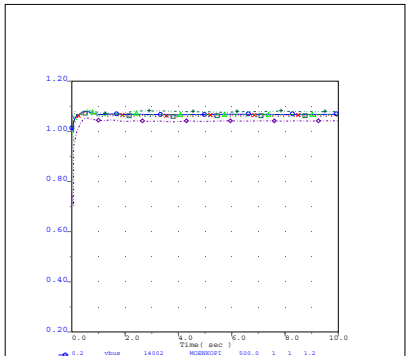


Figure 189 Bus-V: Others 230 kV

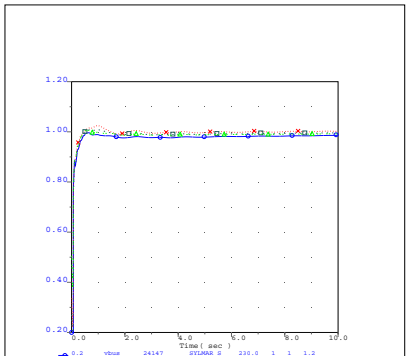


Figure 190 REL_RTR_ANG:S.Cal

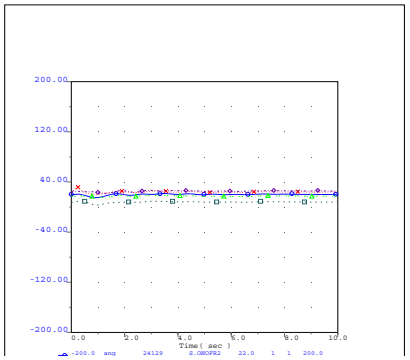


Figure 191 RELATIVE_ROTOR_ANGLE:S.Cal:

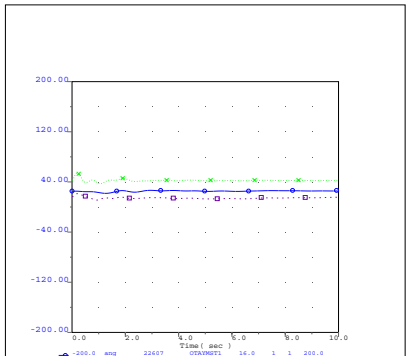
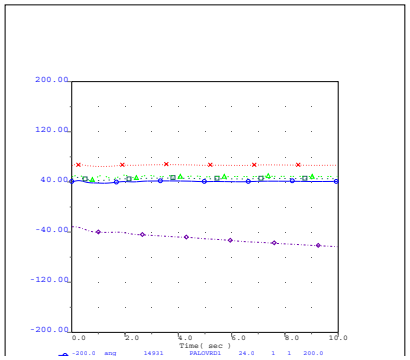


Figure 192 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: Rin-Glendl-dlo

Possible Violations: MORC 1[16]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[16] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 193 Bus-V:Owens Gorge/Rinaldi 230 kV

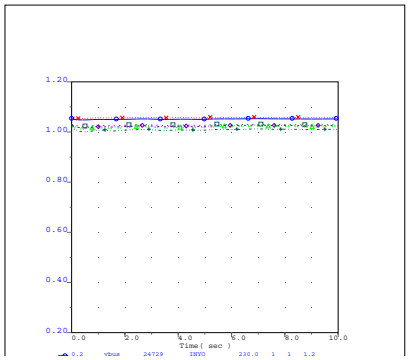


Figure 194 Bus-V:SCE North 115 kV

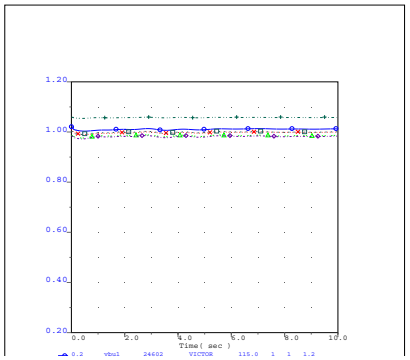


Figure 195 Bus-V:LA BASIN 230 & 138 kV

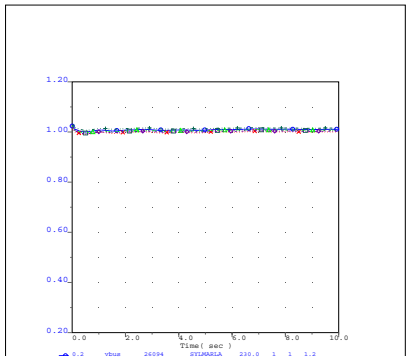


Figure 196 Bus-V:SCE 500 & 230 kV

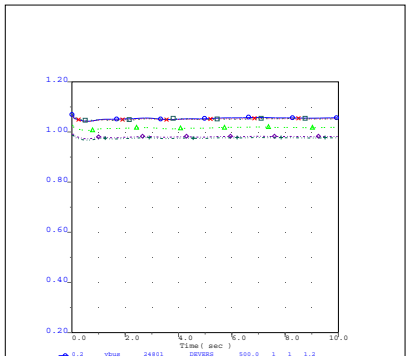


Figure 197 Bus-V: LADWP 500 kV:

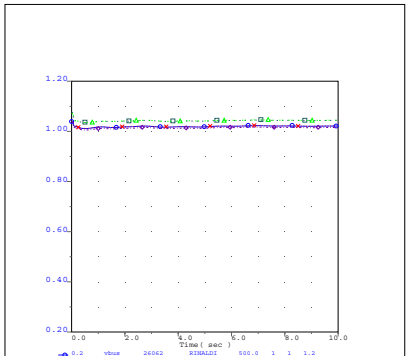


Figure 198 Bus-V:LADWP Load:

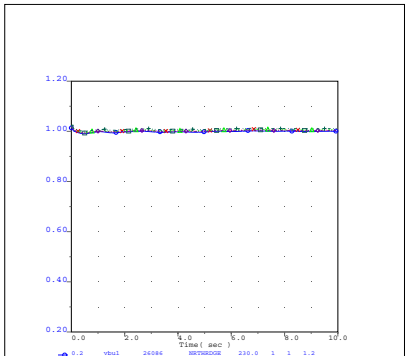


Figure 199 Bus-V: NW & S.CAL 500 kV

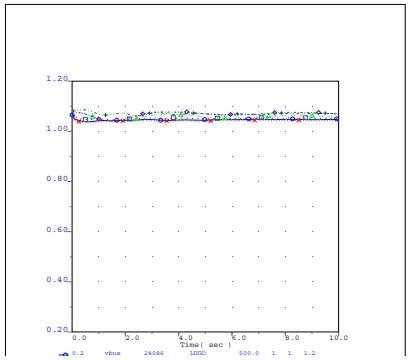


Figure 200 Bus-V: Others 500 kV

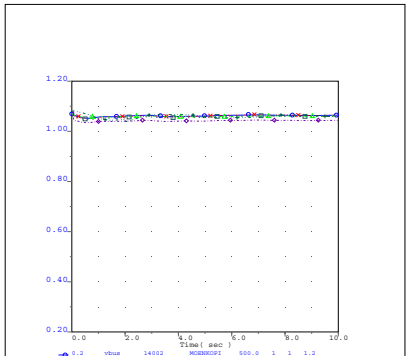


Figure 201 Bus-V: Others 230 kV

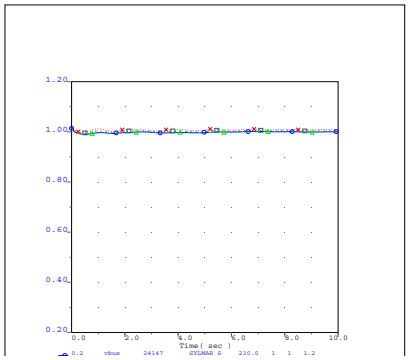


Figure 202 REL_RTR_ANG:S.Cal

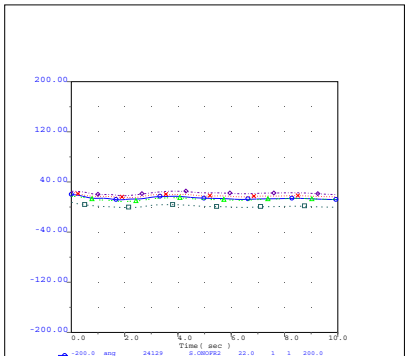


Figure 203 RELATIVE_ROTOR_ANGLE:S.Cal:

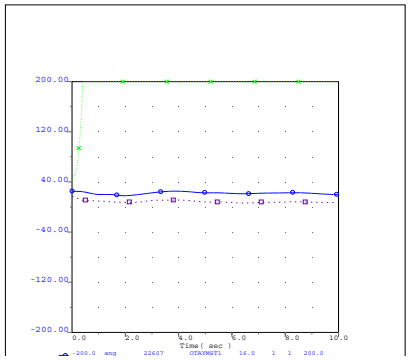
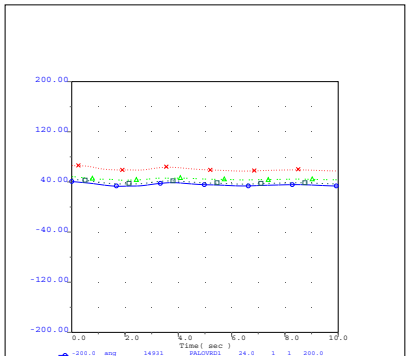


Figure 204 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_45og Contingency: IPP-bipolar-upc

Possible Violations: MORC 1[17]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[17] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Study: BSP Case: hsbspa1_0iy_ov_110og_cast

Figure 1 Bus-V:Owens Gorge/Rinaldi 230 kV

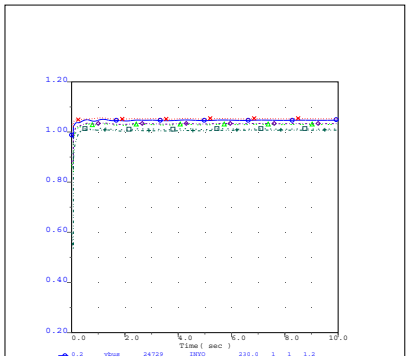


Figure 2 Bus-V:SCE North 115 kV

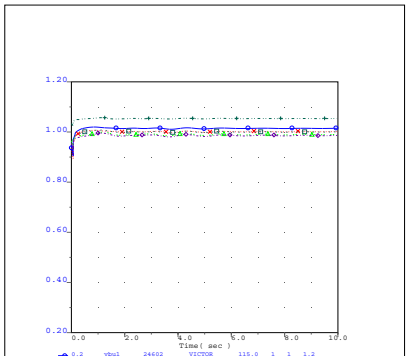


Figure 3 Bus-V:LA BASIN 230 & 138 kV

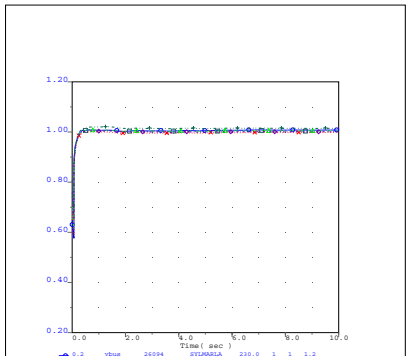


Figure 4 Bus-V:SCE 500 & 230 kV

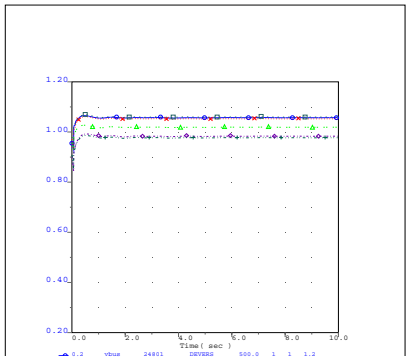


Figure 5 Bus-V: LADWP 500 kV:

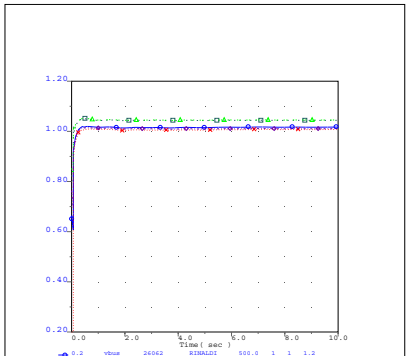


Figure 6 Bus-V:LADWP Load:

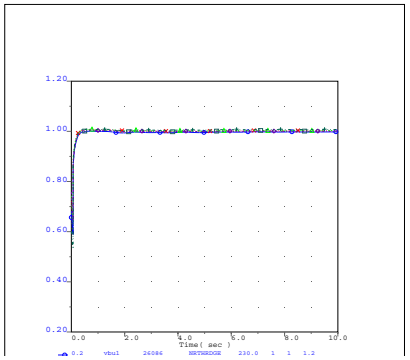


Figure 7 Bus-V: NW & S.CAL 500 kV

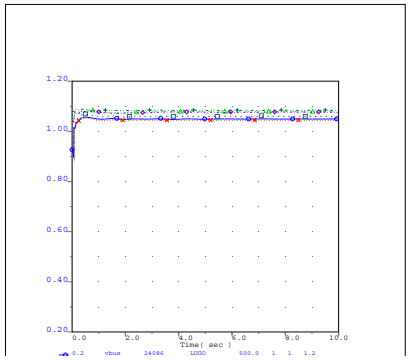


Figure 8 Bus-V: Others 500 kV

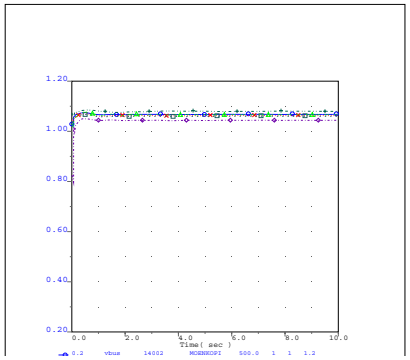


Figure 9 Bus-V: Others 230 kV

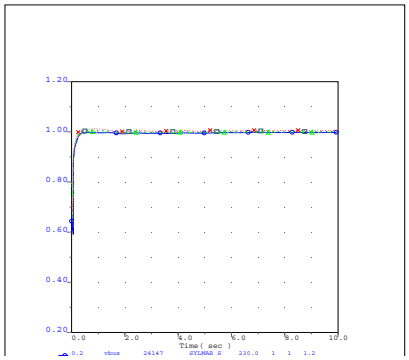


Figure 10 REL_RTR_ANG:S.Cal

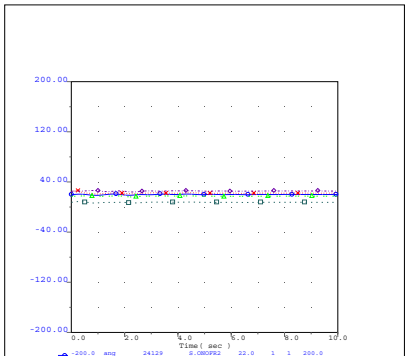


Figure 11 RELATIVE_ROTOR_ANGLE:S.Cal:

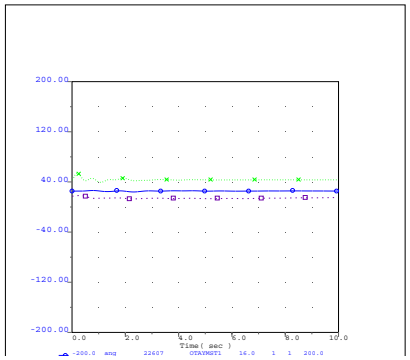
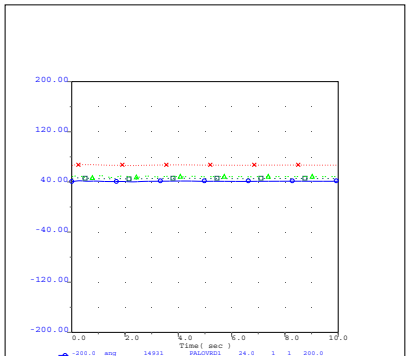


Figure 12 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Adel-Rinaldi-slo

Possible Violations: MORC 1[1]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[1] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 13 Bus-V:Owens Gorge/Rinaldi 230 kV

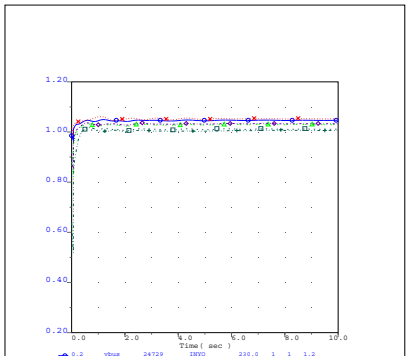


Figure 14 Bus-V:SCE North 115 kV

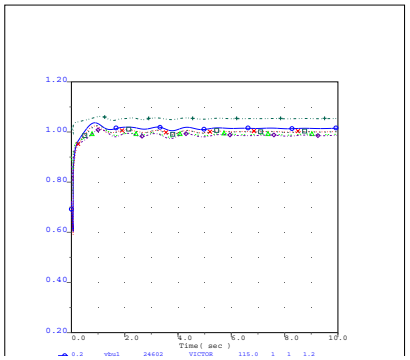


Figure 15 Bus-V:LA BASIN 230 & 138 kV

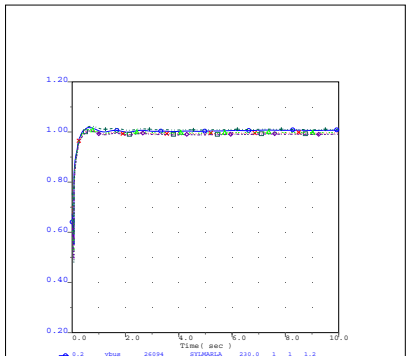


Figure 16 Bus-V:SCE 500 & 230 kV

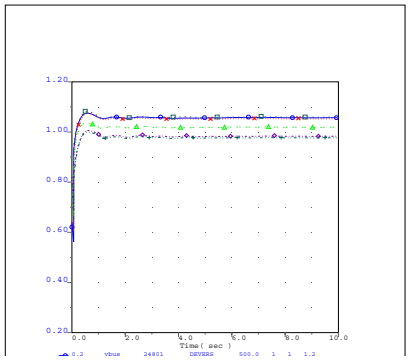


Figure 17 Bus-V: LADWP 500 kV:

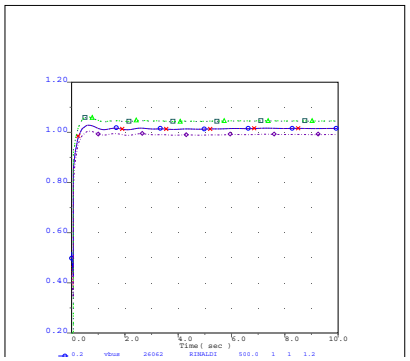


Figure 18 Bus-V:LADWP Load:

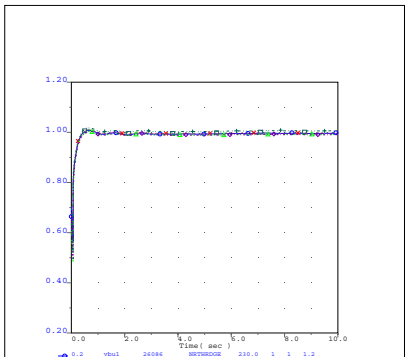


Figure 19 Bus-V: NW & S.CAL 500 kV

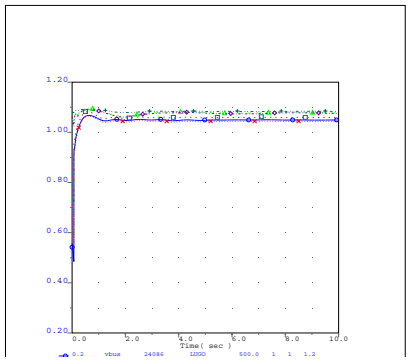


Figure 20 Bus-V: Others 500 kV

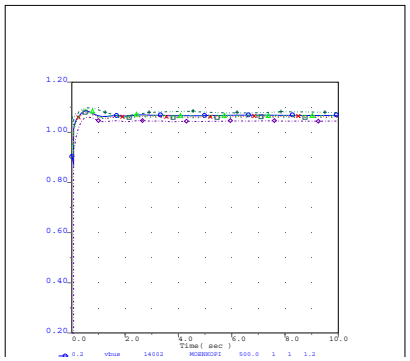


Figure 21 Bus-V: Others 230 kV

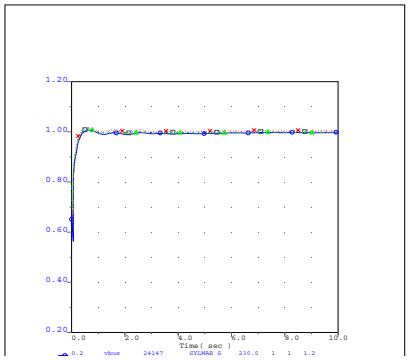


Figure 22 REL_RTR_ANG:S.Cal

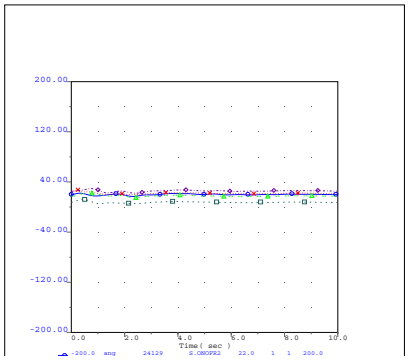


Figure 23 RELATIVE_ROTOR_ANGLE:S.Cal:

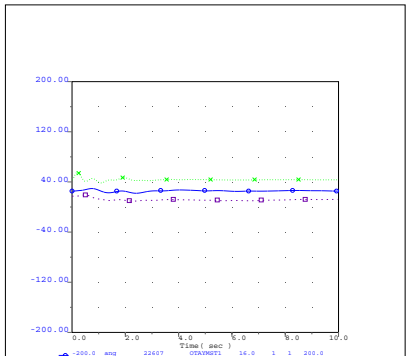
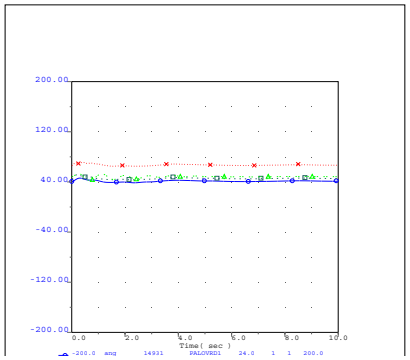


Figure 24 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Adel-Toluca

Possible Violations: MORC 1[2]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[2] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 25 Bus-V:Owens Gorge/Rinaldi 230 kV

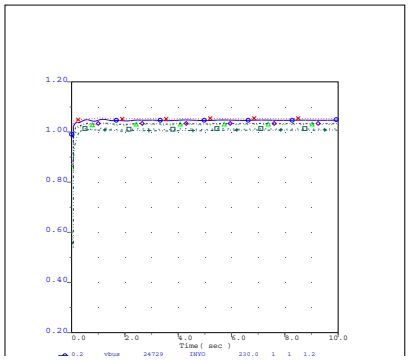


Figure 26 Bus-V:SCE North 115 kV

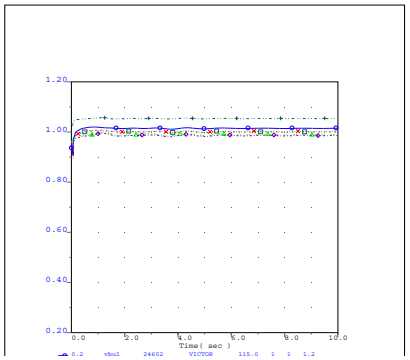


Figure 27 Bus-V:LA BASIN 230 & 138 kV

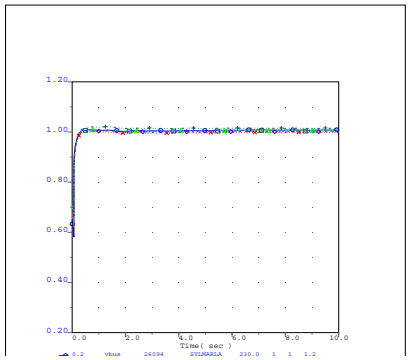


Figure 28 Bus-V:SCE 500 & 230 kV

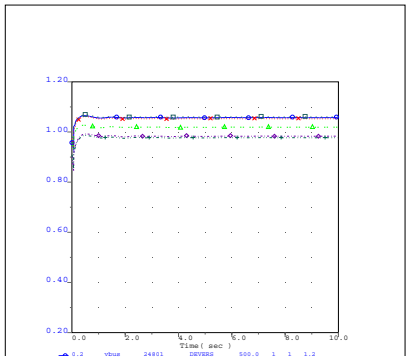


Figure 29 Bus-V: LADWP 500 kV:

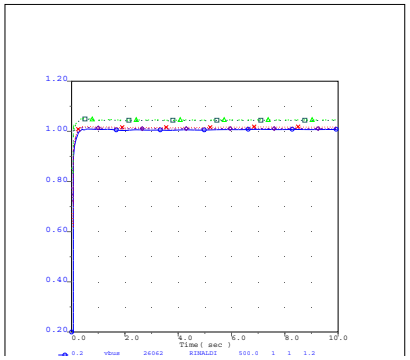


Figure 30 Bus-V:LADWP Load:

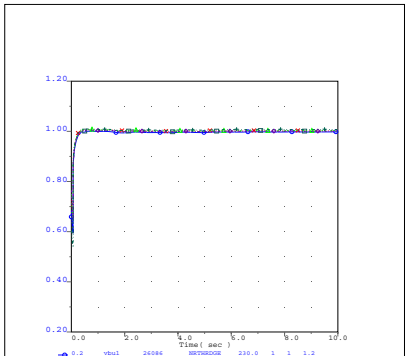


Figure 31 Bus-V: NW & S.CAL 500 kV

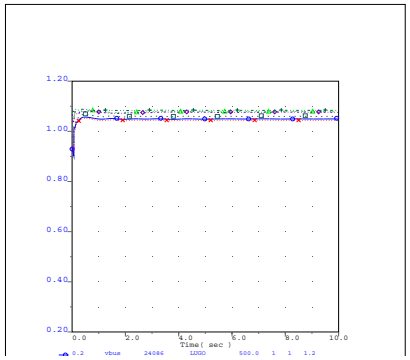


Figure 32 Bus-V: Others 500 kV

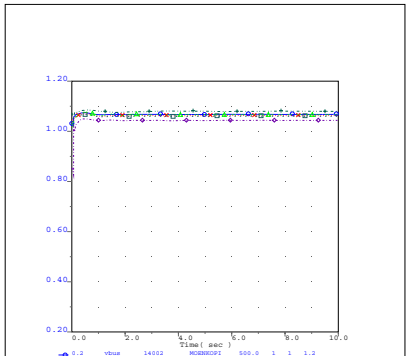


Figure 33 Bus-V: Others 230 kV

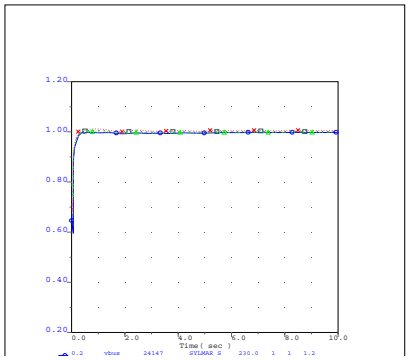


Figure 34 REL_RTR_ANG:S.Cal

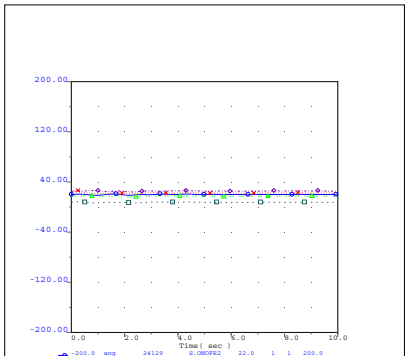


Figure 35 RELATIVE_ROTOR_ANGLE:S.Cal:

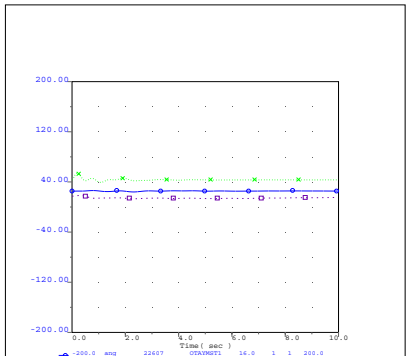
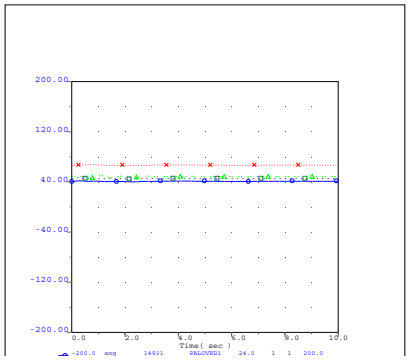


Figure 36 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Vict-Rinaldi-slo

Possible Violations: MORC 1[3]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[3] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 37 Bus-V:Owens Gorge/Rinaldi 230 kV

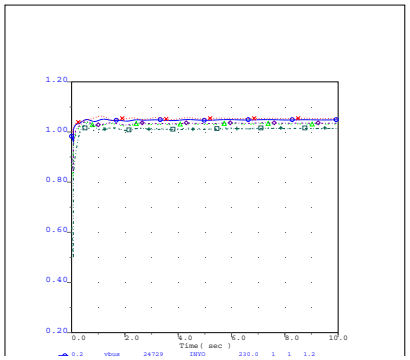


Figure 38 Bus-V:SCE North 115 kV

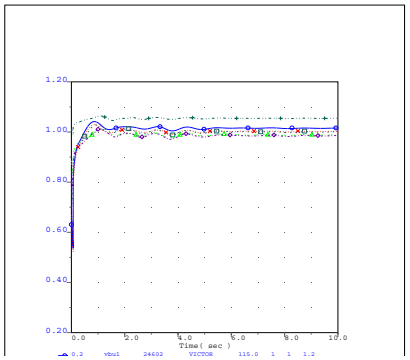


Figure 39 Bus-V:LA BASIN 230 & 138 kV

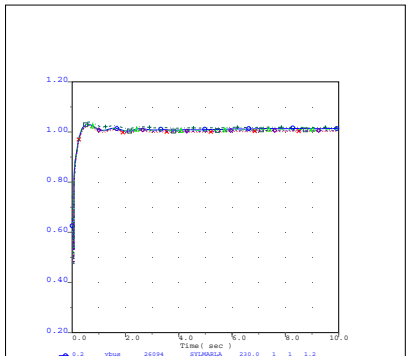


Figure 40 Bus-V:SCE 500 & 230 kV

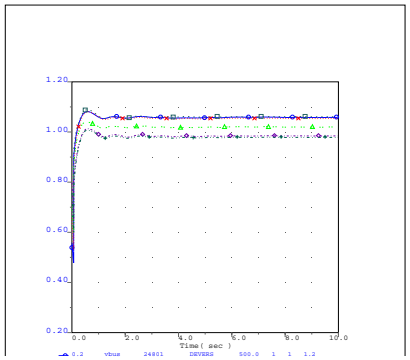


Figure 41 Bus-V: LADWP 500 kV:

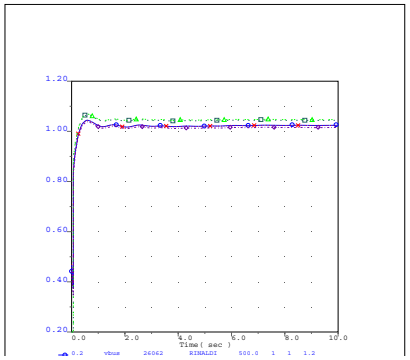


Figure 42 Bus-V:LADWP Load:

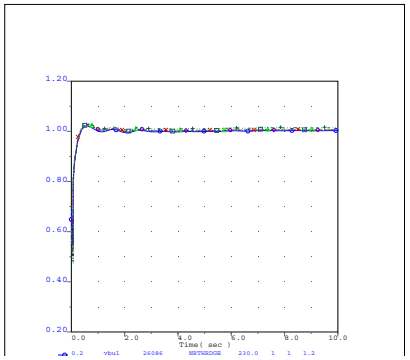


Figure 43 Bus-V: NW & S.CAL 500 kV

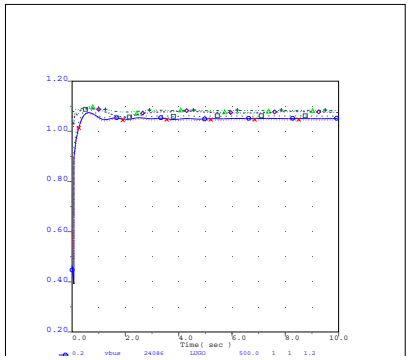


Figure 44 Bus-V: Others 500 kV

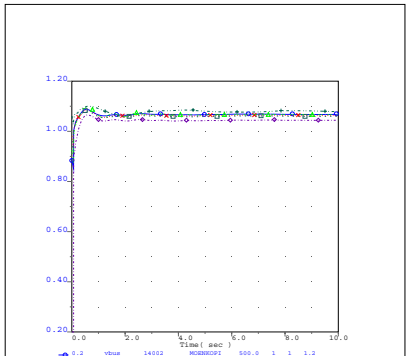


Figure 45 Bus-V: Others 230 kV

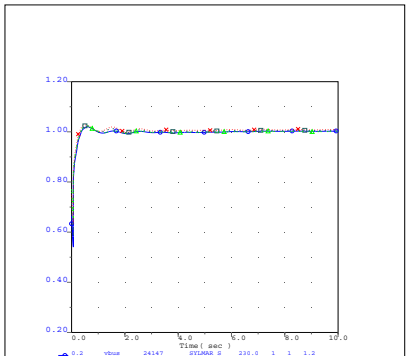


Figure 46 REL_RTR_ANG:S.Cal

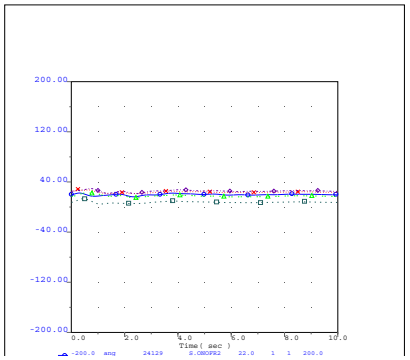


Figure 47 RELATIVE_ROTOR_ANGLE:S.Cal:

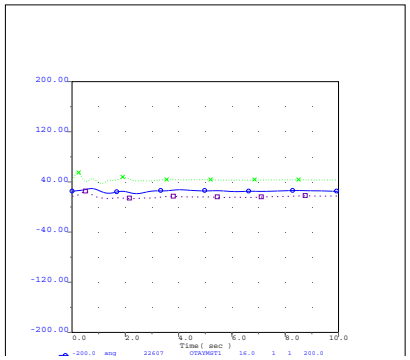
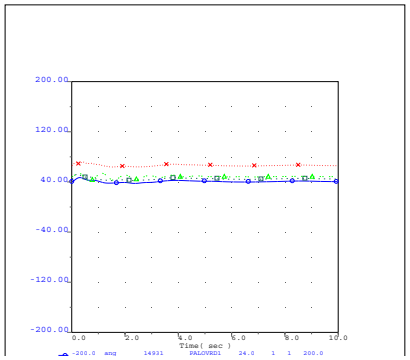


Figure 48 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Adel-Victorvl-slo

Possible Violations: MORC 1[4]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[4] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 49 Bus-V:Owens Gorge/Rinaldi 230 kV

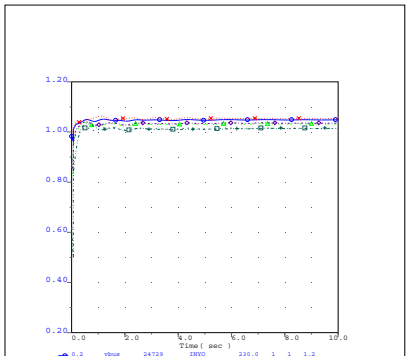


Figure 50 Bus-V:SCE North 115 kV

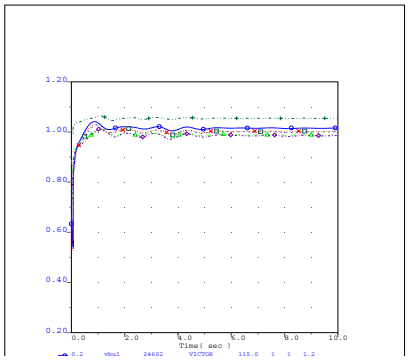


Figure 51 Bus-V:LA BASIN 230 & 138 kV

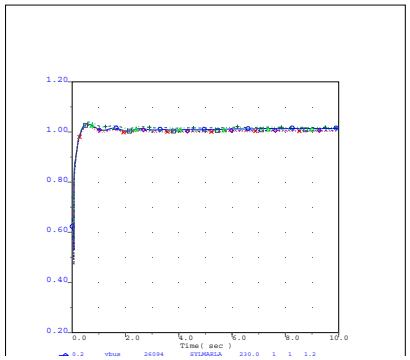


Figure 52 Bus-V:SCE 500 & 230 kV

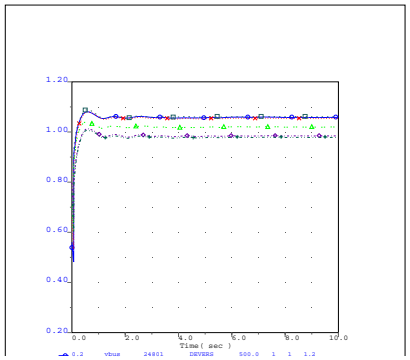


Figure 53 Bus-V: LADWP 500 kV:

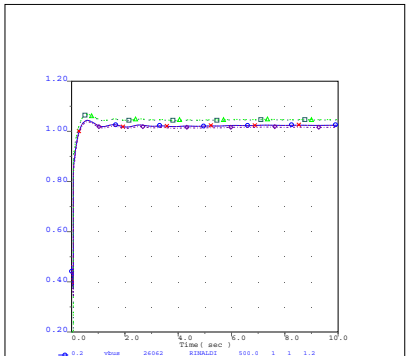


Figure 54 Bus-V:LADWP Load:

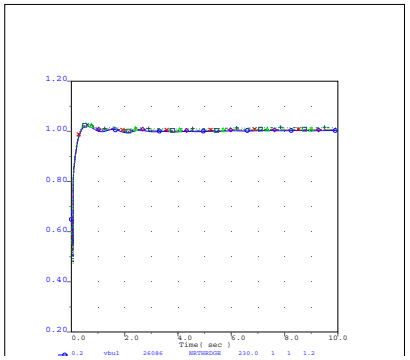


Figure 55 Bus-V: NW & S.CAL 500 kV

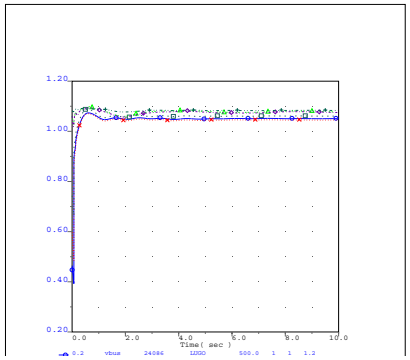


Figure 56 Bus-V: Others 500 kV

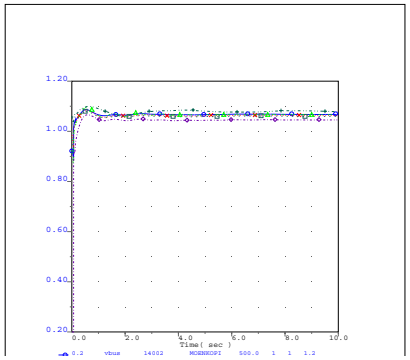


Figure 57 Bus-V: Others 230 kV

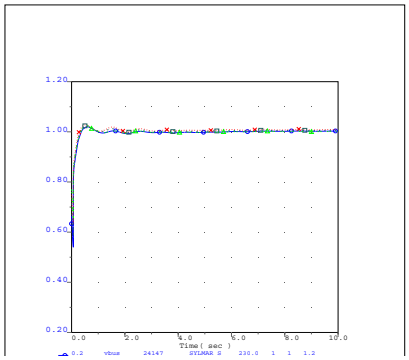


Figure 58 REL_RTR_ANG:S.Cal

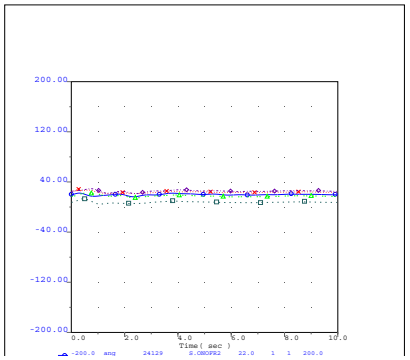


Figure 59 RELATIVE_ROTOR_ANGLE:S.Cal:

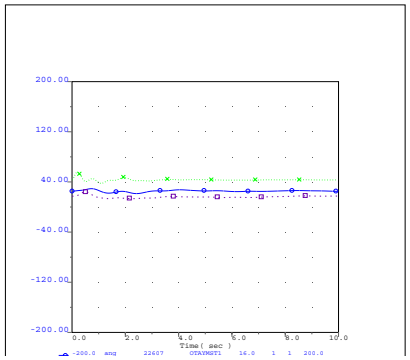
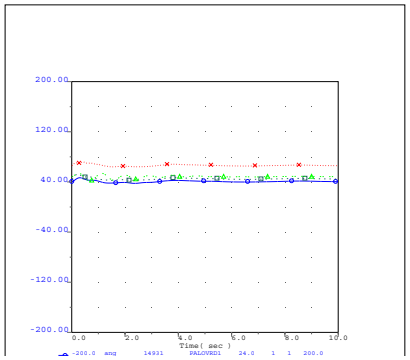


Figure 60 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: McC-Vict-slo

Possible Violations: MORC 1[5]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[5] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 61 Bus-V:Owens Gorge/Rinaldi 230 kV

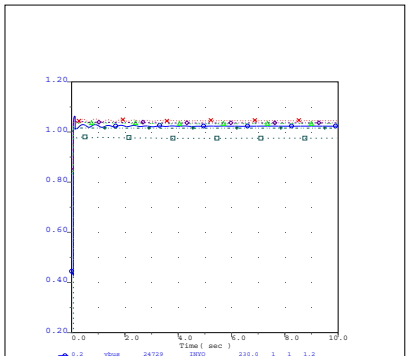


Figure 62 Bus-V:SCE North 115 kV

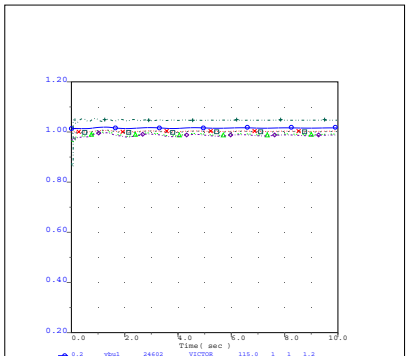


Figure 63 Bus-V:LA BASIN 230 & 138 kV

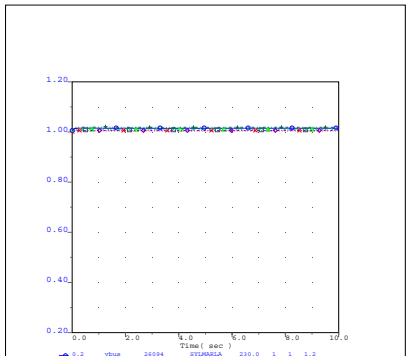


Figure 64 Bus-V:SCE 500 & 230 kV

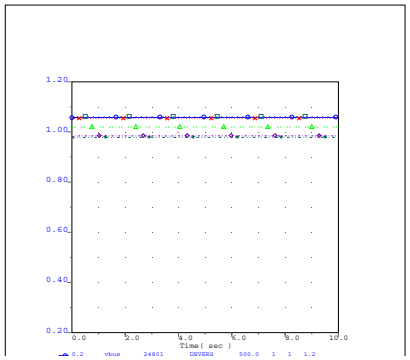


Figure 65 Bus-V: LADWP 500 kV:

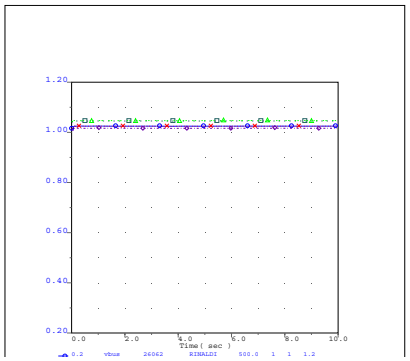


Figure 66 Bus-V:LADWP Load:

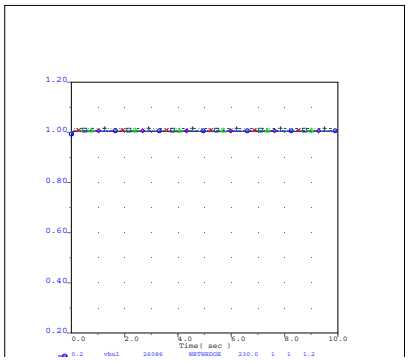


Figure 67 Bus-V: NW & S.CAL 500 kV

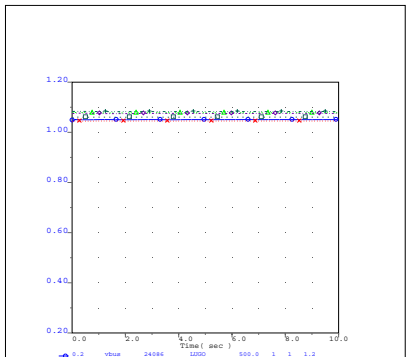


Figure 68 Bus-V: Others 500 kV

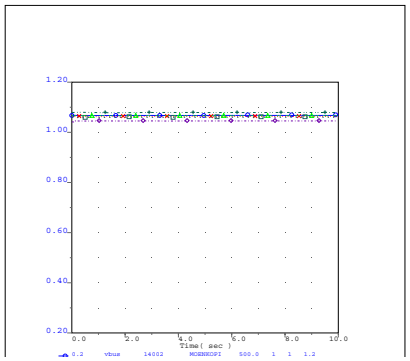


Figure 69 Bus-V: Others 230 kV

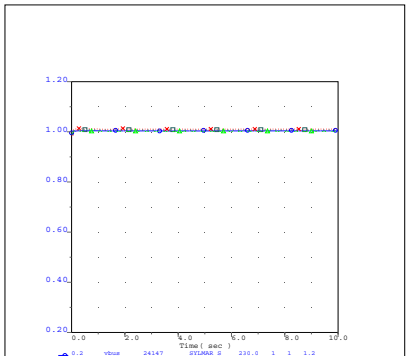


Figure 70 REL_RTR_ANG:S.Cal

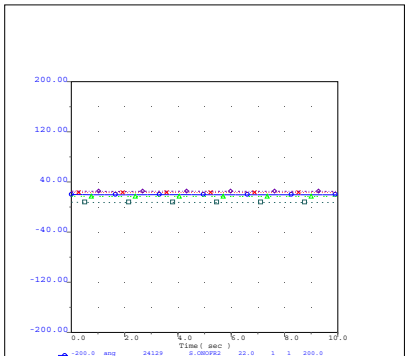


Figure 71 RELATIVE_ROTOR_ANGLE:S.Cal:

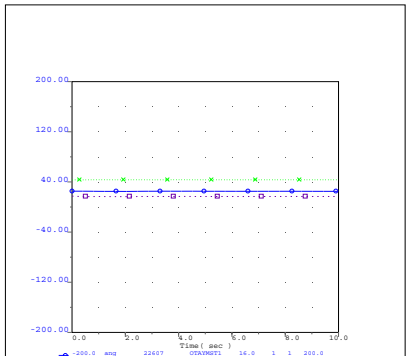
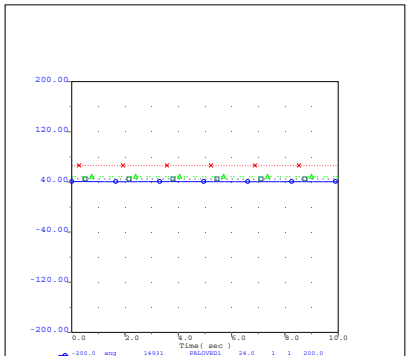


Figure 72 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Cottonwd-Inyo-preRAS

Possible Violations: MORC 1[6]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[6] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 73 Bus-V:Owens Gorge/Rinaldi 230 kV

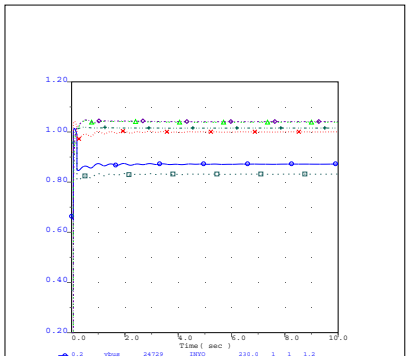


Figure 74 Bus-V:SCE North 115 kV

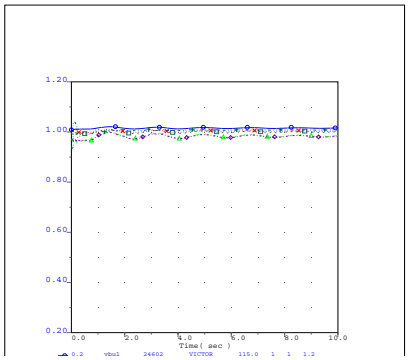


Figure 75 Bus-V:LA BASIN 230 & 138 kV

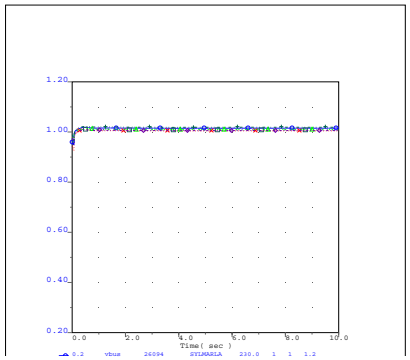


Figure 76 Bus-V:SCE 500 & 230 kV

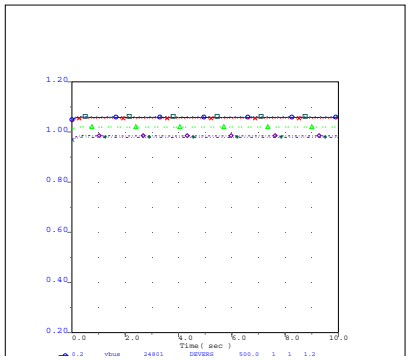


Figure 77 Bus-V: LADWP 500 kV:

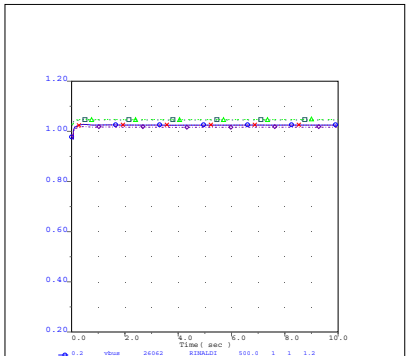


Figure 78 Bus-V:LADWP Load:

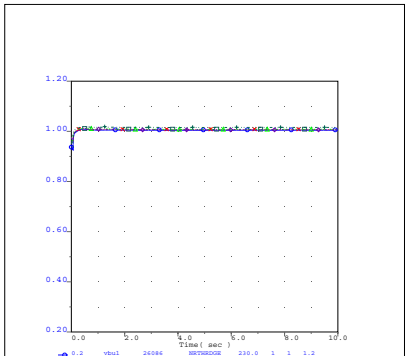


Figure 79 Bus-V: NW & S.CAL 500 kV

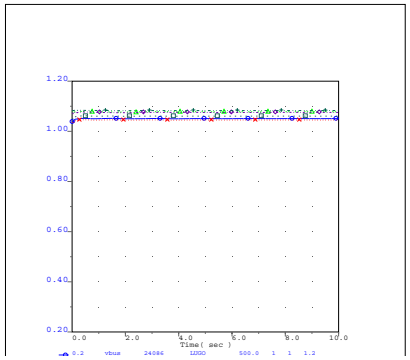


Figure 80 Bus-V: Others 500 kV

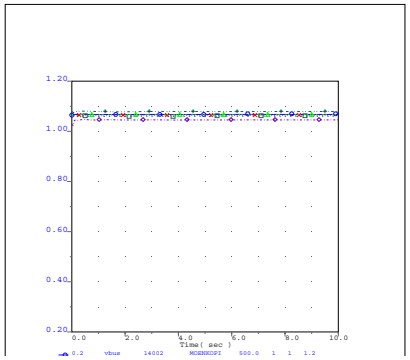


Figure 81 Bus-V: Others 230 kV

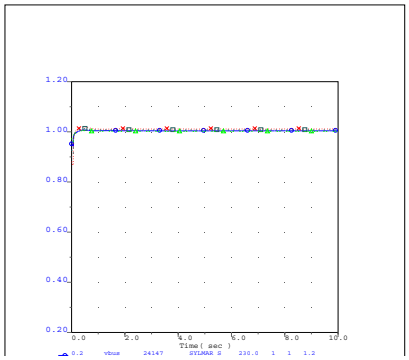


Figure 82 REL_RTR_ANG:S.Cal

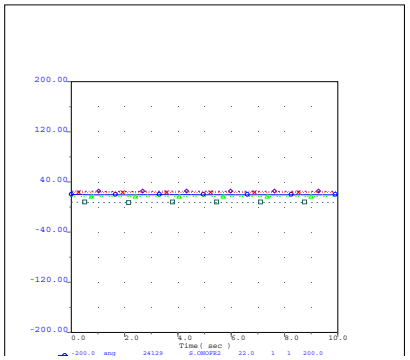


Figure 83 RELATIVE_ROTOR_ANGLE:S.Cal:

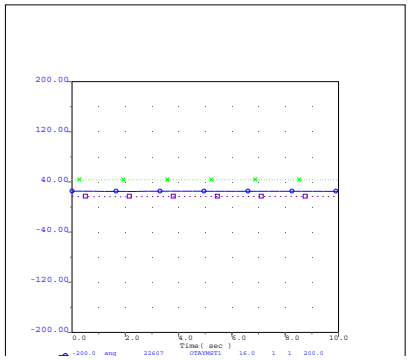
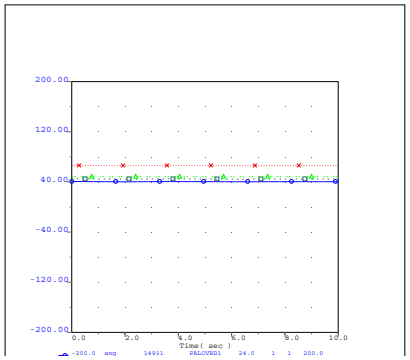


Figure 84 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Cottonwd-BR-OGtrip

Possible Violations: MORC 1[7]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[7] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 85 Bus-V:Owens Gorge/Rinaldi 230 kV

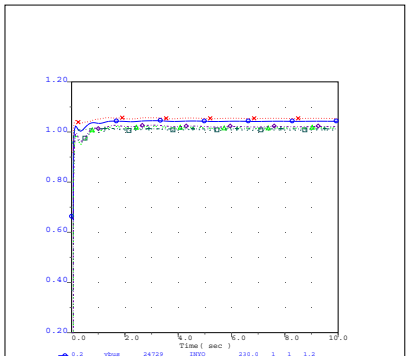


Figure 86 Bus-V:SCE North 115 kV

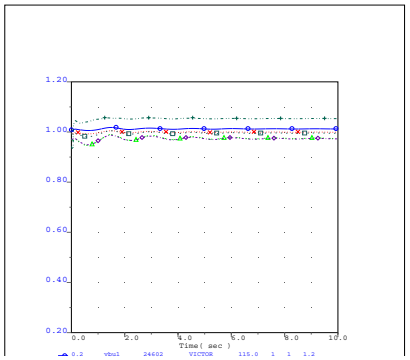


Figure 87 Bus-V:LA BASIN 230 & 138 kV

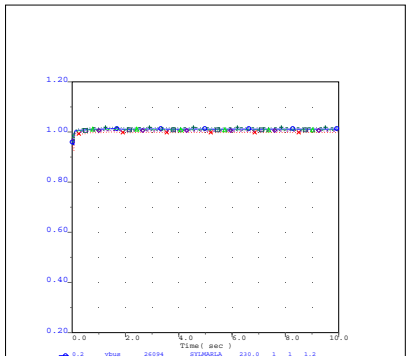


Figure 88 Bus-V:SCE 500 & 230 kV

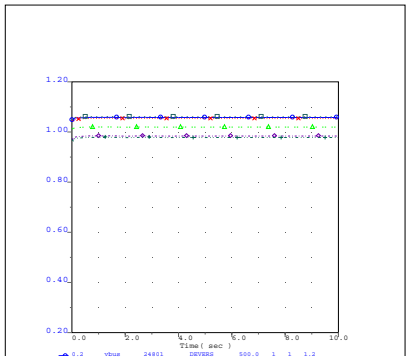


Figure 89 Bus-V: LADWP 500 kV:

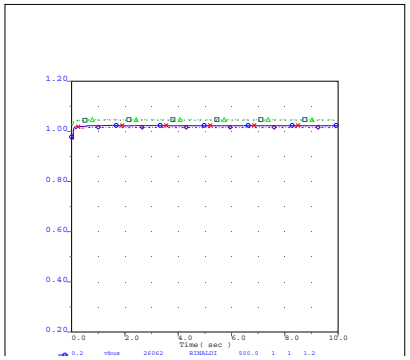


Figure 90 Bus-V:LADWP Load:

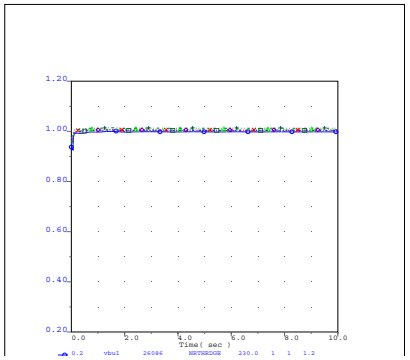


Figure 91 Bus-V: NW & S.CAL 500 kV

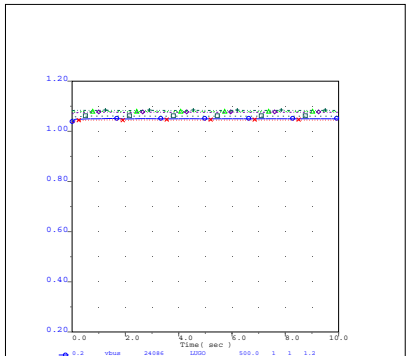


Figure 92 Bus-V: Others 500 kV

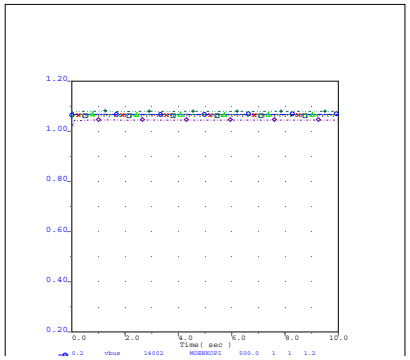


Figure 93 Bus-V: Others 230 kV

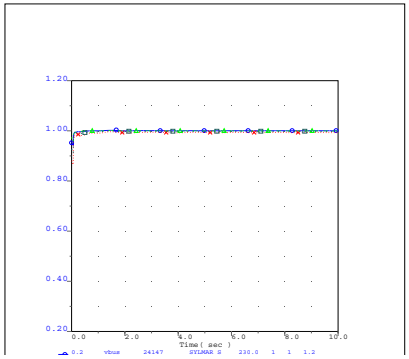


Figure 94 REL_RTR_ANG:S.Cal

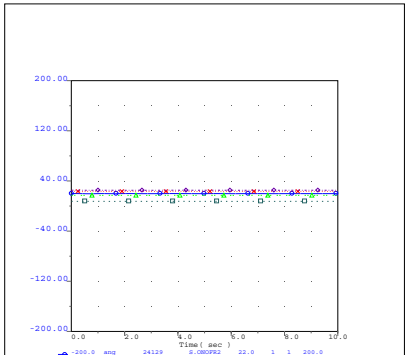


Figure 95 RELATIVE_ROTOR_ANGLE:S.Cal:

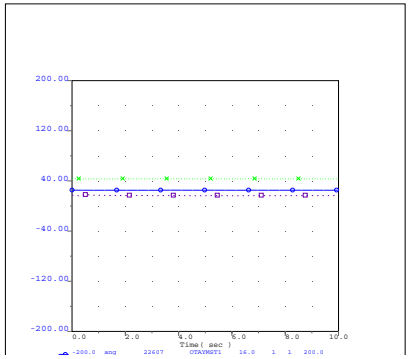
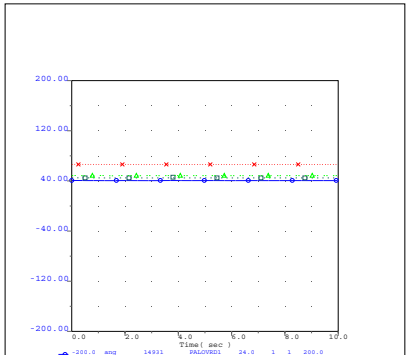


Figure 96 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: BR-Rinaldi-NoRAS

Possible Violations: MORC 1[8]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[8] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 97 Bus-V:Owens Gorge/Rinaldi 230 kV

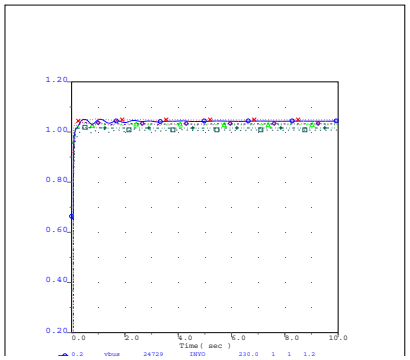


Figure 98 Bus-V:SCE North 115 kV

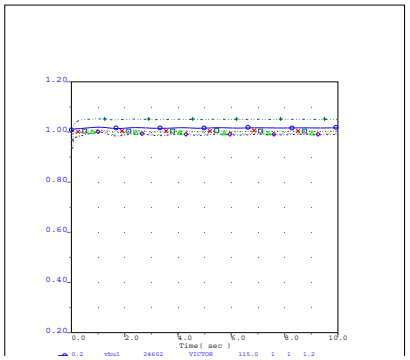


Figure 99 Bus-V:LA BASIN 230 & 138 kV

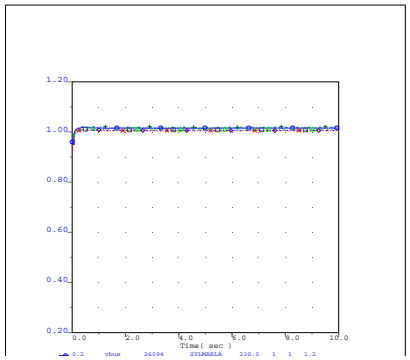


Figure 100 Bus-V:SCE 500 & 230 kV

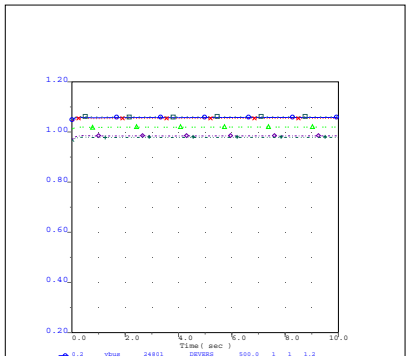


Figure 101 Bus-V: LADWP 500 kV:

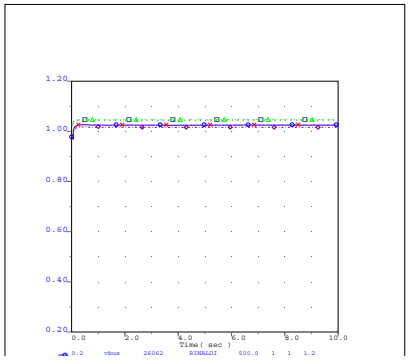


Figure 102 Bus-V:LADWP Load:

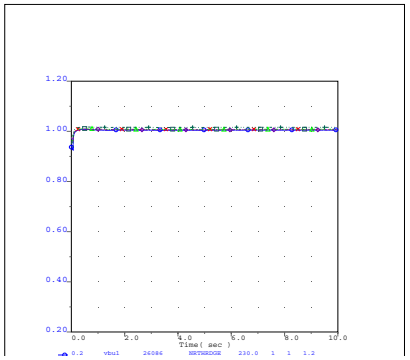


Figure 103 Bus-V: NW & S.CAL 500 kV

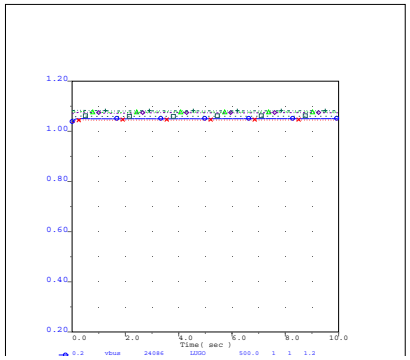


Figure 104 Bus-V: Others 500 kV

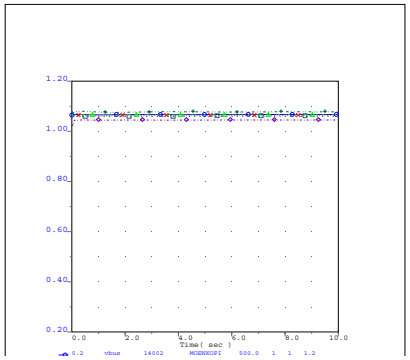


Figure 105 Bus-V: Others 230 kV

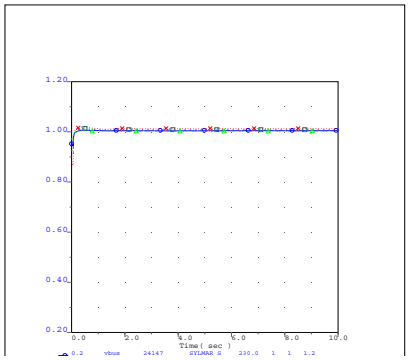


Figure 106 REL_RTR_ANG:S.Cal

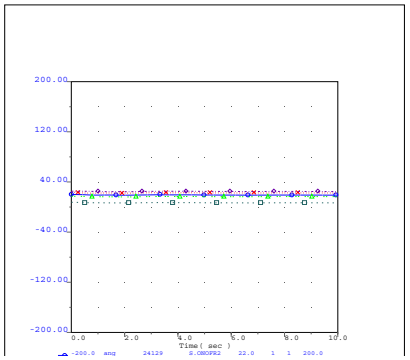


Figure 107 RELATIVE_ROTOR_ANGLE:S.Cal:

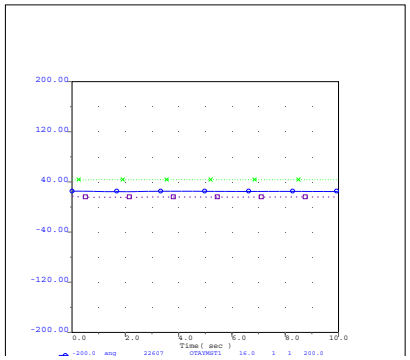
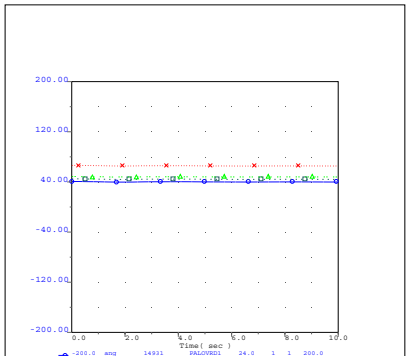


Figure 108 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Beacon-BR-RAS

Possible Violations: MORC 1[9]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[9] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 109 Bus-V:Owens Gorge/Rinaldi 230 kV

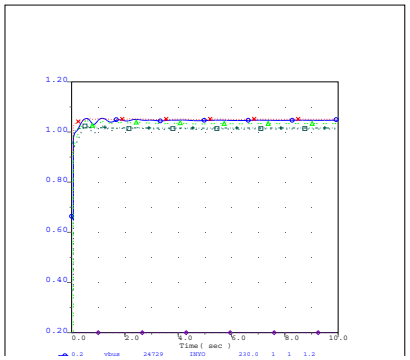


Figure 110 Bus-V:SCE North 115 kV

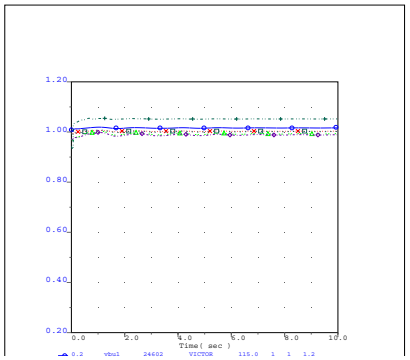


Figure 111 Bus-V:LA BASIN 230 & 138 kV

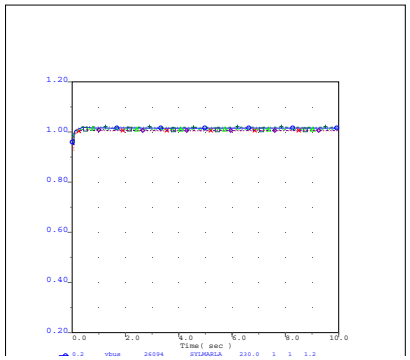


Figure 112 Bus-V:SCE 500 & 230 kV

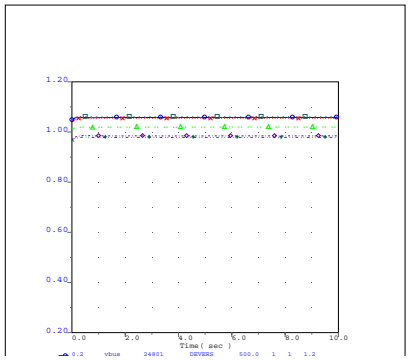


Figure 113 Bus-V: LADWP 500 kV:

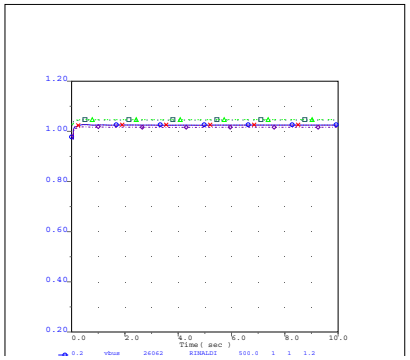


Figure 114 Bus-V:LADWP Load:

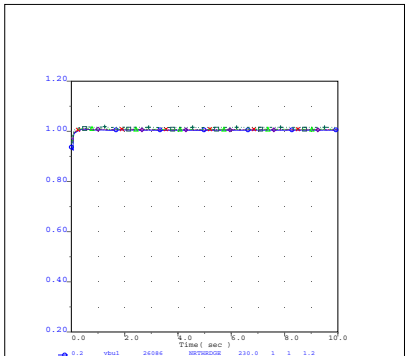


Figure 115 Bus-V: NW & S.CAL 500 kV

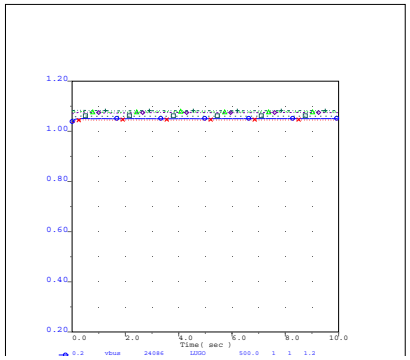


Figure 116 Bus-V: Others 500 kV

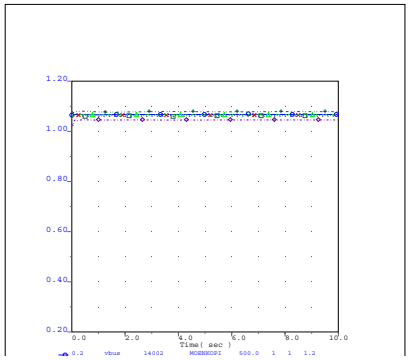


Figure 117 Bus-V: Others 230 kV

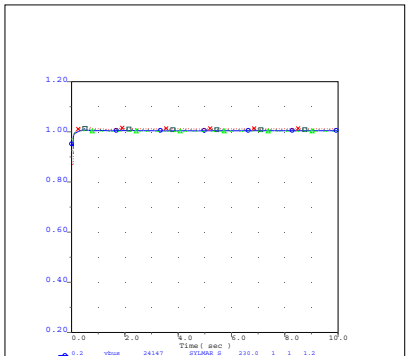


Figure 118 REL_RTR_ANG:S.Cal

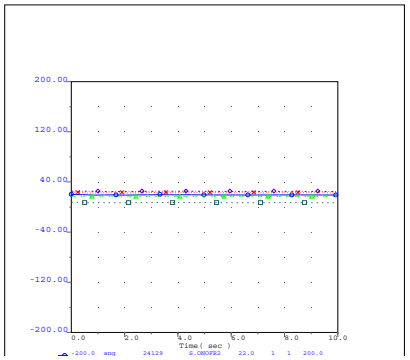


Figure 119 RELATIVE_ROTOR_ANGLE:S.Cal:

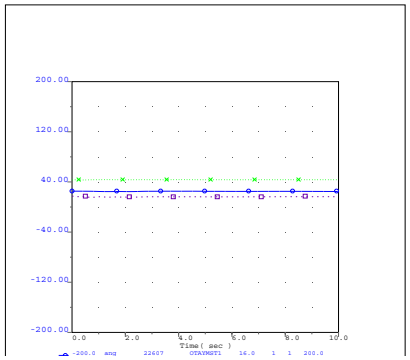
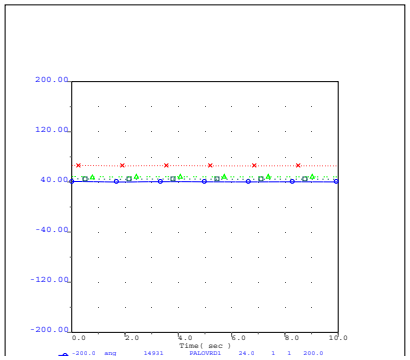


Figure 120 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Pinetree-BR-RAS

Possible Violations: MORC 1[10]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[10] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 121 Bus-V:Owens Gorge/Rinaldi 230 kV

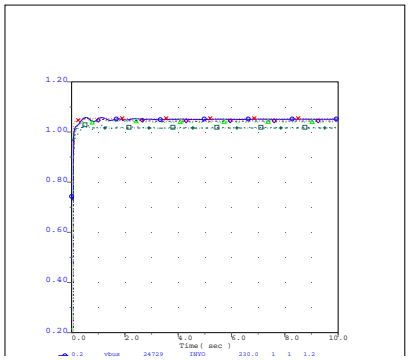


Figure 122 Bus-V:SCE North 115 kV

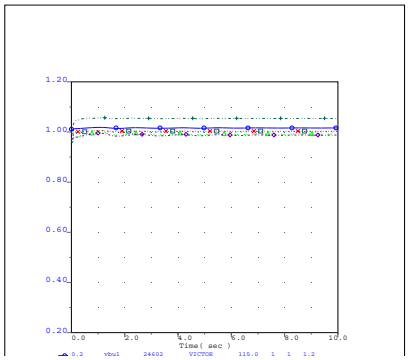


Figure 123 Bus-V:LA BASIN 230 & 138 kV

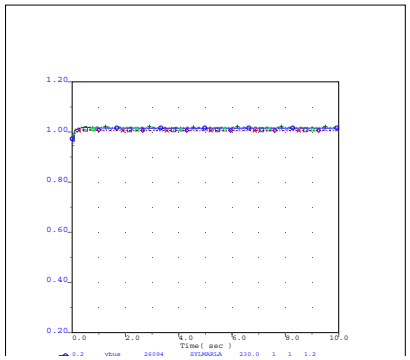


Figure 124 Bus-V:SCE 500 & 230 kV

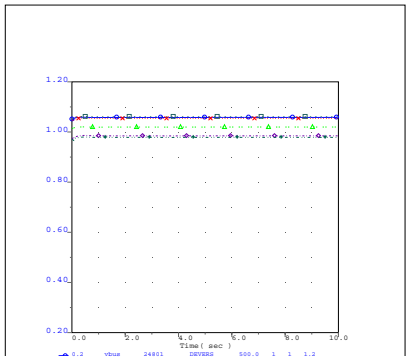


Figure 125 Bus-V: LADWP 500 kV:

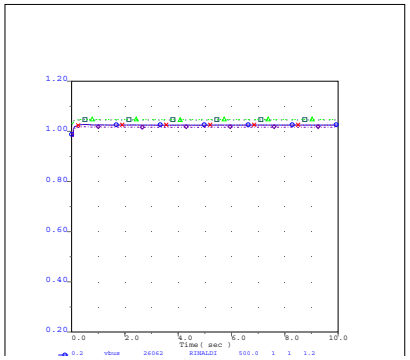


Figure 126 Bus-V:LADWP Load:

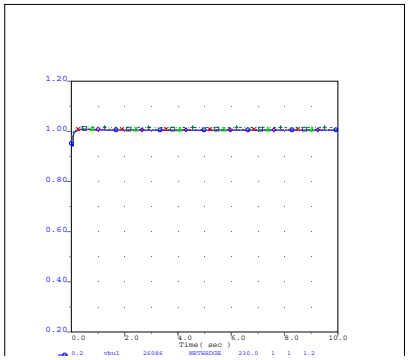


Figure 127 Bus-V: NW & S.CAL 500 kV

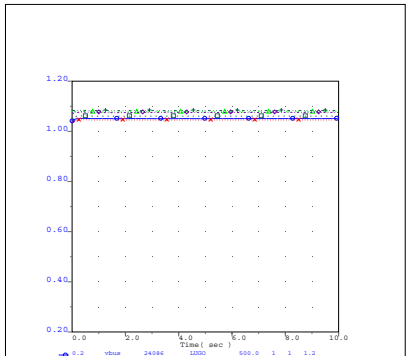


Figure 128 Bus-V: Others 500 kV

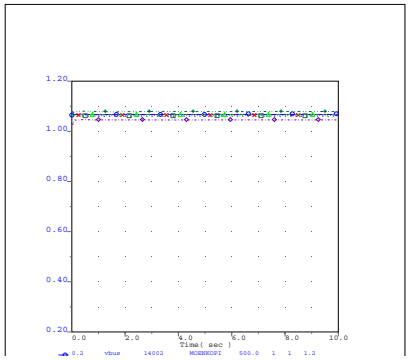


Figure 129 Bus-V: Others 230 kV

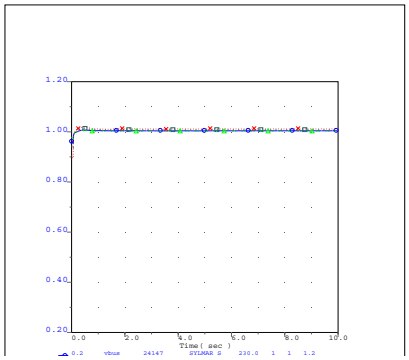


Figure 130 REL_RTR_ANG:S.Cal

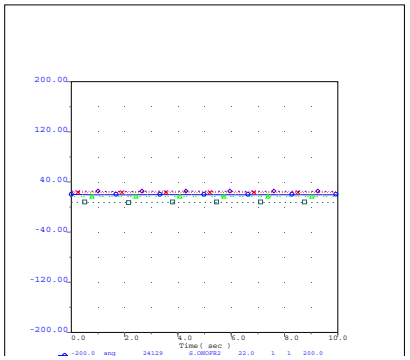


Figure 131 RELATIVE_ROTOR_ANGLE:S.Cal:

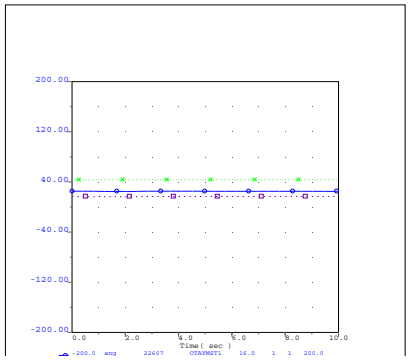
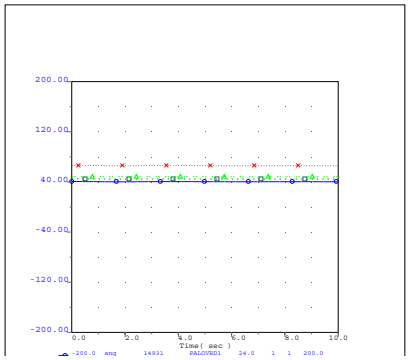


Figure 132 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: HoffmanSummit-Pinetree-RAS

Possible Violations: MORC 1[11]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[11] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 133 Bus-V:Owens Gorge/Rinaldi 230 kV

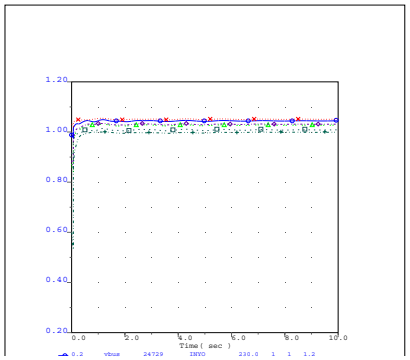


Figure 134 Bus-V:SCE North 115 kV

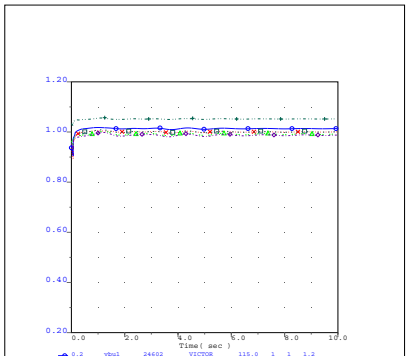


Figure 135 Bus-V:LA BASIN 230 & 138 kV

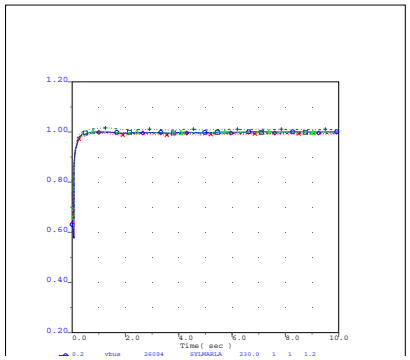


Figure 136 Bus-V:SCE 500 & 230 kV

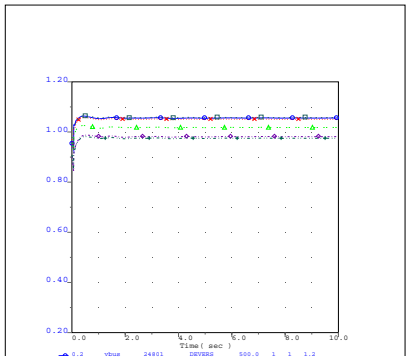


Figure 137 Bus-V: LADWP 500 kV:

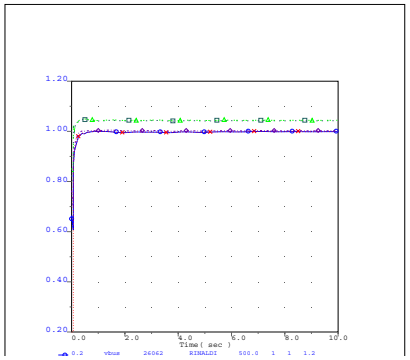


Figure 138 Bus-V:LADWP Load:

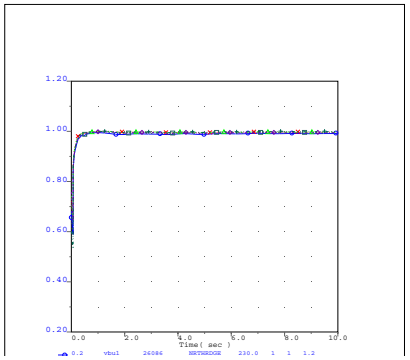


Figure 139 Bus-V: NW & S.CAL 500 kV

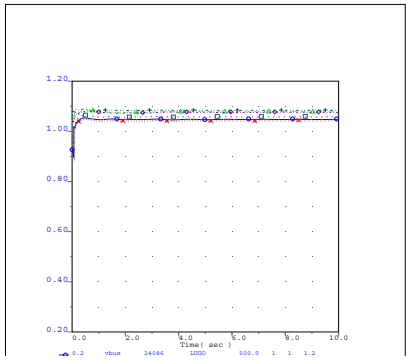


Figure 140 Bus-V: Others 500 kV

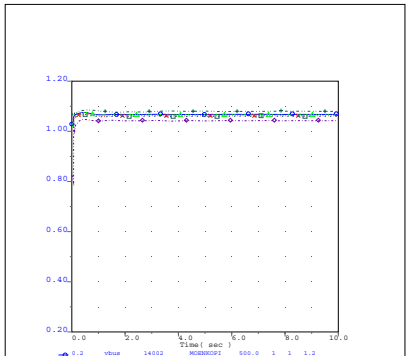


Figure 141 Bus-V: Others 230 kV

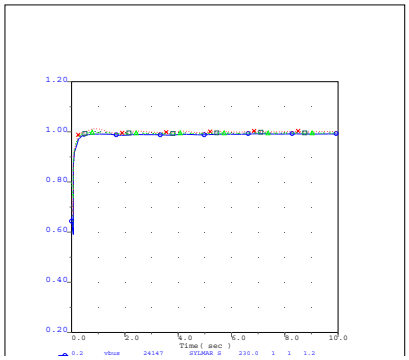


Figure 142 REL_RTR_ANG:S.Cal

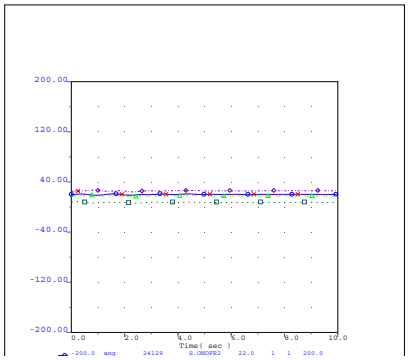


Figure 143 RELATIVE_ROTOR_ANGLE:S.Cal:

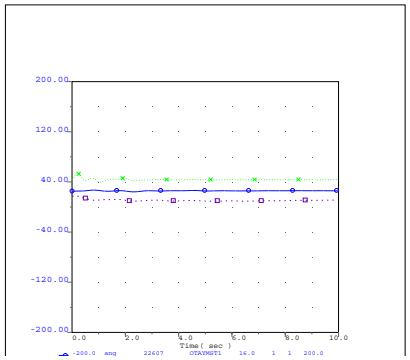
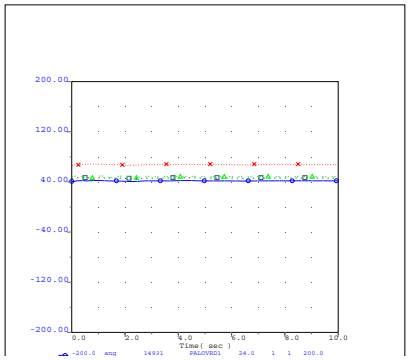


Figure 144 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Adel-Vict-Rinaldi-dlo

Possible Violations: MORC 1[12]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[12] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 145 Bus-V:Owens Gorge/Rinaldi 230 kV

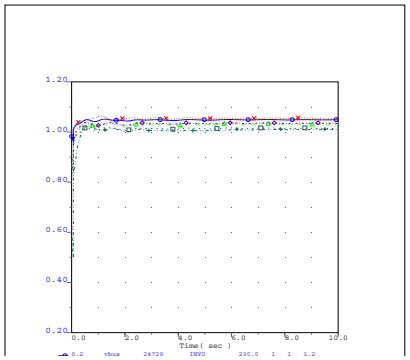


Figure 146 Bus-V:SCE North 115 kV

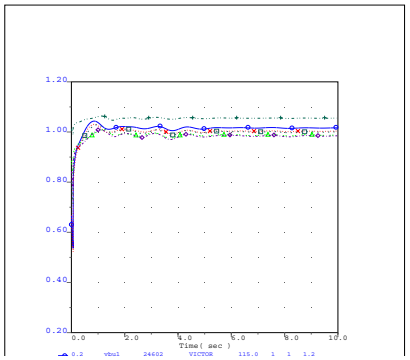


Figure 147 Bus-V:LA BASIN 230 & 138 kV

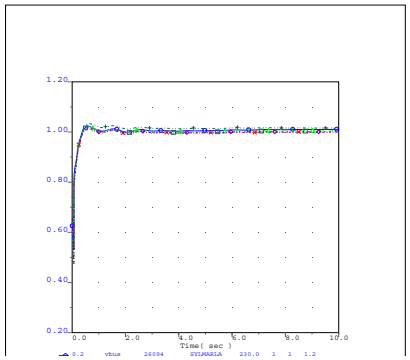


Figure 148 Bus-V:SCE 500 & 230 kV

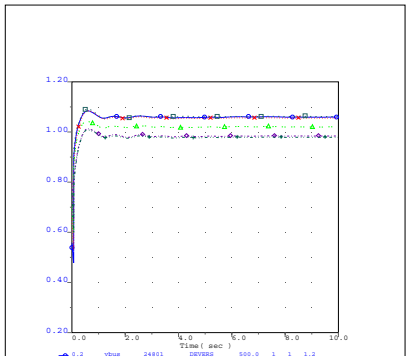


Figure 149 Bus-V: LADWP 500 kV:

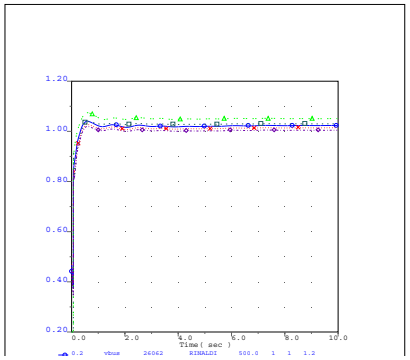


Figure 150 Bus-V:LADWP Load:

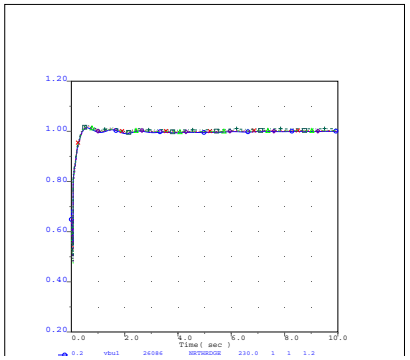


Figure 151 Bus-V: NW & S.CAL 500 kV

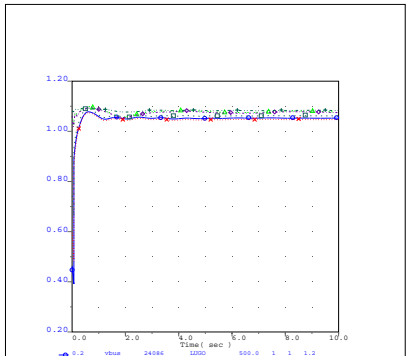


Figure 152 Bus-V: Others 500 kV

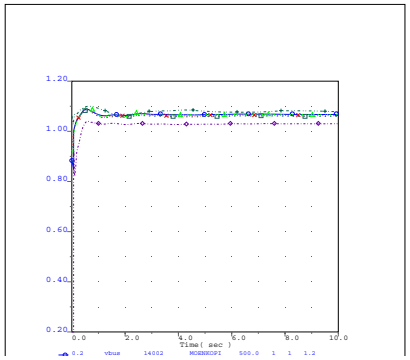


Figure 153 Bus-V: Others 230 kV

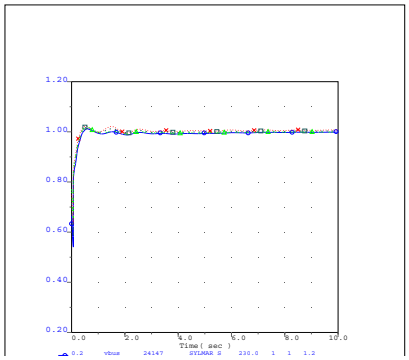


Figure 154 REL_RTR_ANG:S.Cal

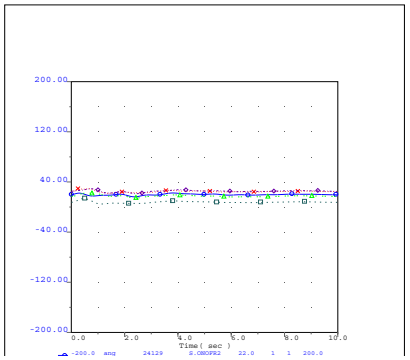


Figure 155 RELATIVE_ROTOR_ANGLE:S.Cal:

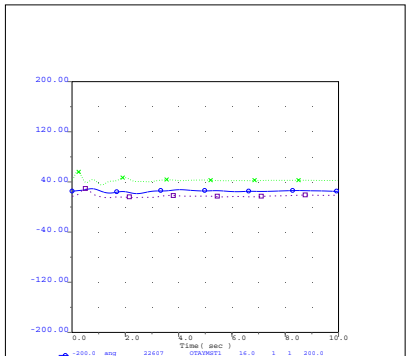
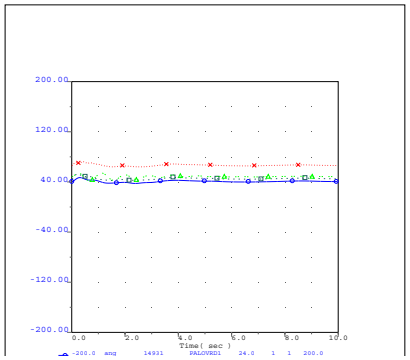


Figure 156 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Adel-Victorvl-dlo

Possible Violations: MORC 1[13]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[13] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 157 Bus-V:Owens Gorge/Rinaldi 230 kV

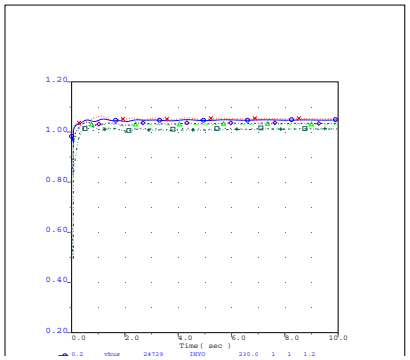


Figure 158 Bus-V:SCE North 115 kV

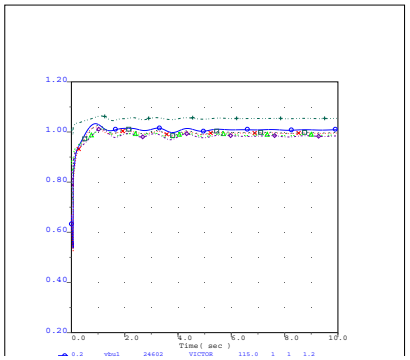


Figure 159 Bus-V:LA BASIN 230 & 138 kV

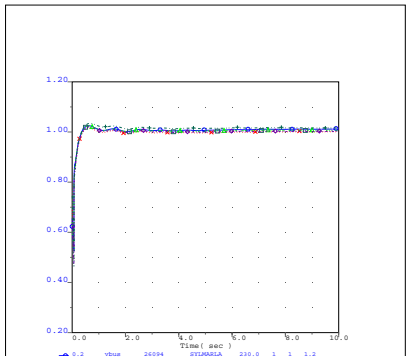


Figure 160 Bus-V:SCE 500 & 230 kV

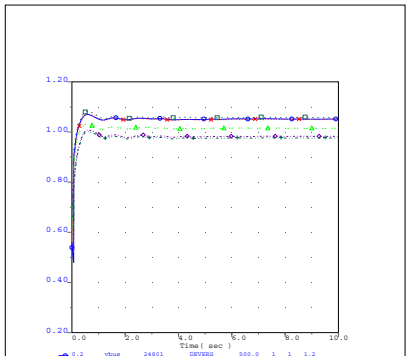


Figure 161 Bus-V: LADWP 500 kV:

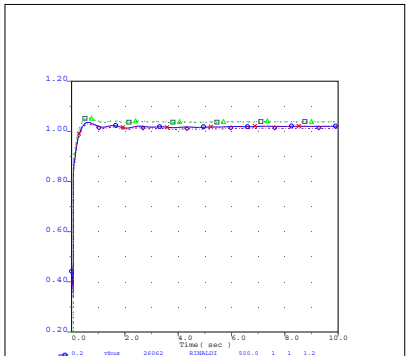


Figure 162 Bus-V:LADWP Load:

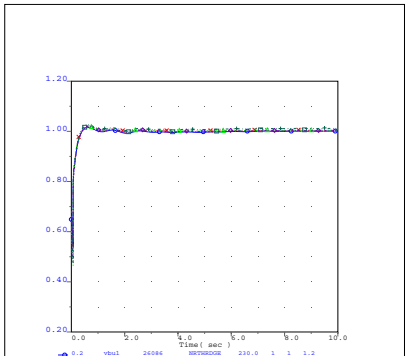


Figure 163 Bus-V: NW & S.CAL 500 kV

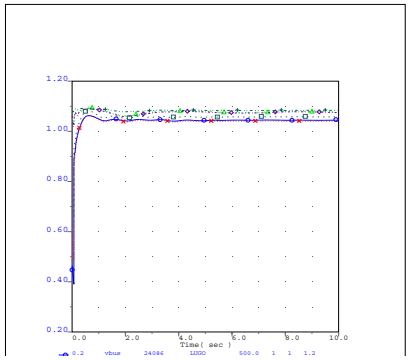


Figure 164 Bus-V: Others 500 kV

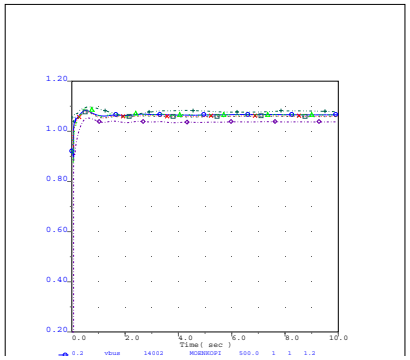


Figure 165 Bus-V: Others 230 kV

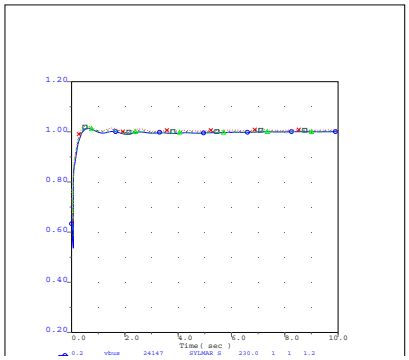


Figure 166 REL_RTR_ANG:S.Cal

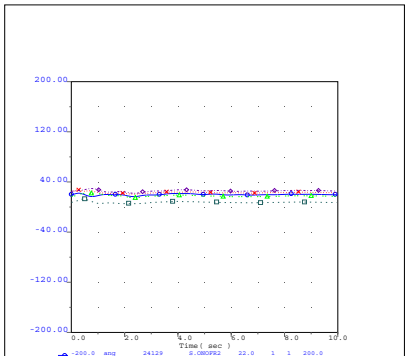


Figure 167 RELATIVE_ROTOR_ANGLE:S.Cal:

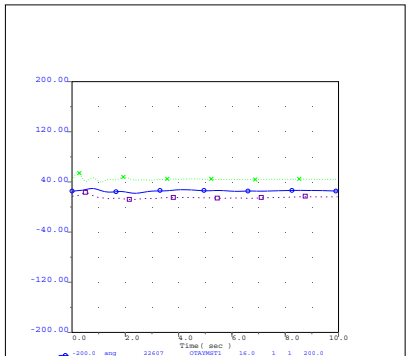
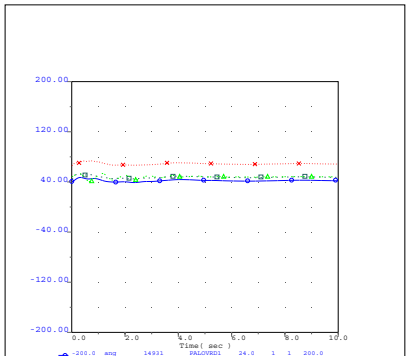


Figure 168 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: McCullgh-Victorvl-dlo

Possible Violations: MORC 1[14]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[14] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 169 Bus-V:Owens Gorge/Rinaldi 230 kV

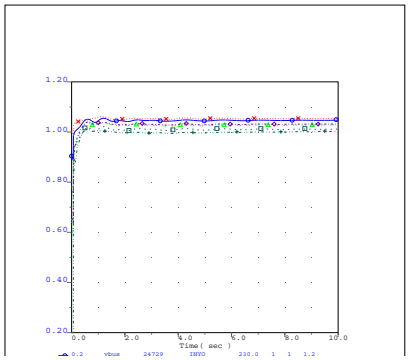


Figure 170 Bus-V:SCE North 115 kV

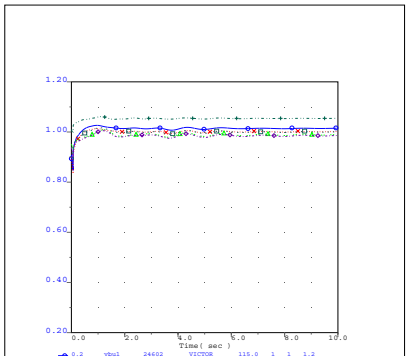


Figure 171 Bus-V:LA BASIN 230 & 138 kV

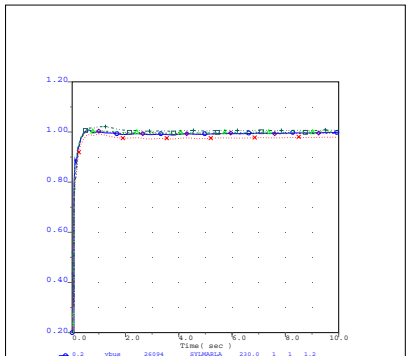


Figure 172 Bus-V:SCE 500 & 230 kV

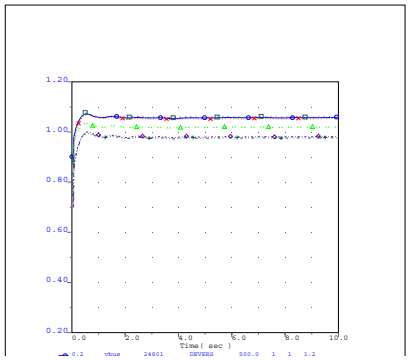


Figure 173 Bus-V: LADWP 500 kV:

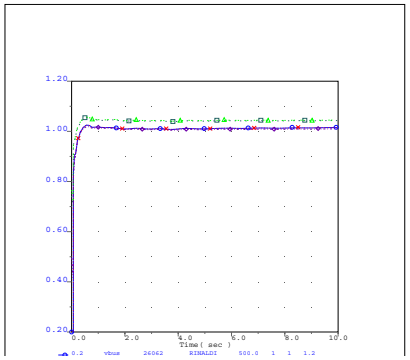


Figure 174 Bus-V:LADWP Load:

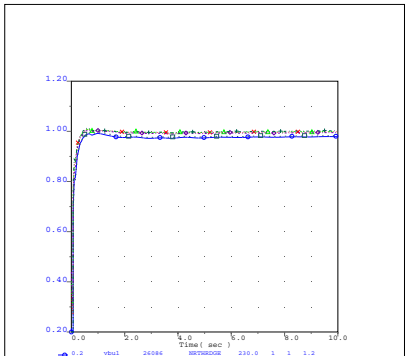


Figure 175 Bus-V: NW & S.CAL 500 kV

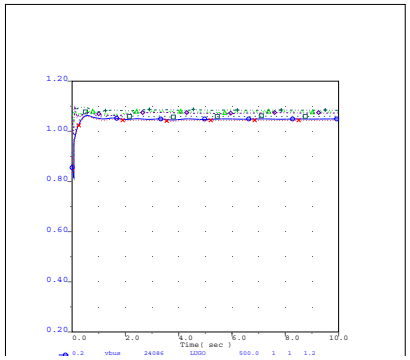


Figure 176 Bus-V: Others 500 kV

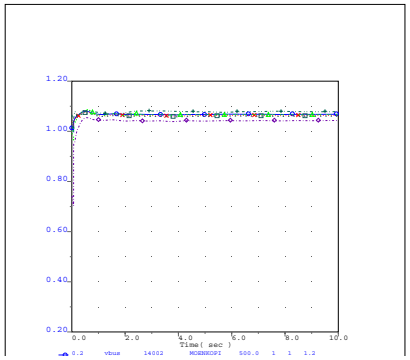


Figure 177 Bus-V: Others 230 kV

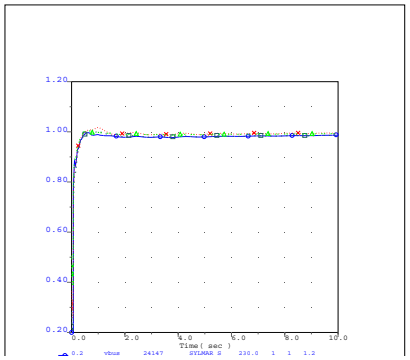


Figure 178 REL_RTR_ANG:S.Cal

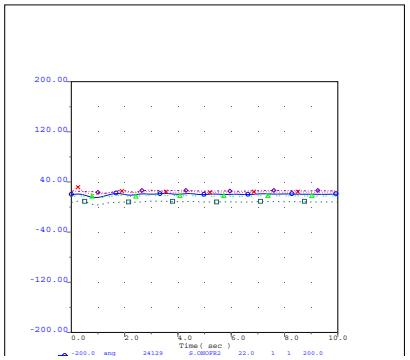


Figure 179 RELATIVE_ROTOR_ANGLE:S.Cal:

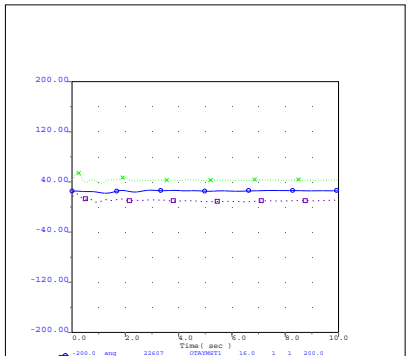
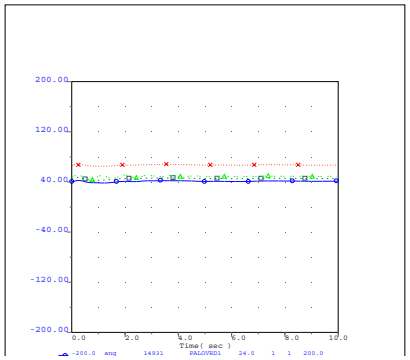


Figure 180 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Rin-Tar-dlo

Possible Violations: MORC 1[15]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[15] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 181 Bus-V:Owens Gorge/Rinaldi 230 kV

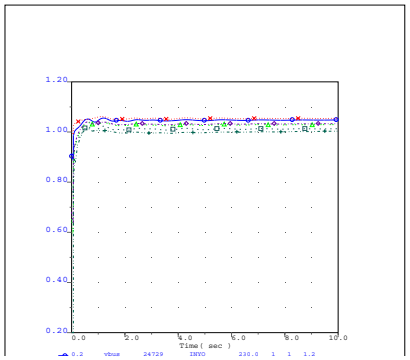


Figure 182 Bus-V:SCE North 115 kV

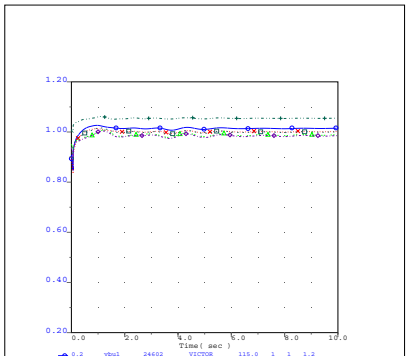


Figure 183 Bus-V:LA BASIN 230 & 138 kV

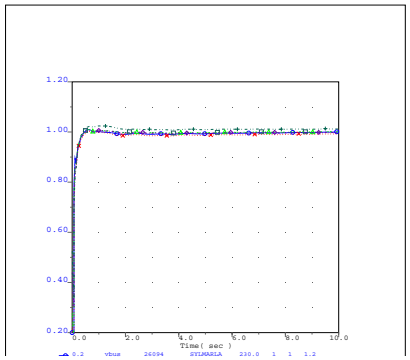


Figure 184 Bus-V:SCE 500 & 230 kV

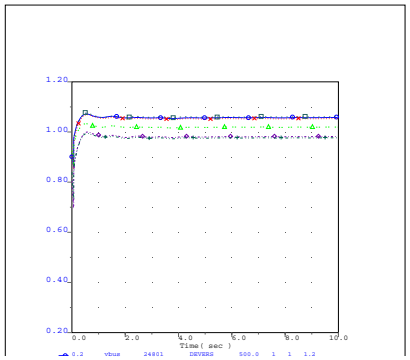


Figure 185 Bus-V: LADWP 500 kV:

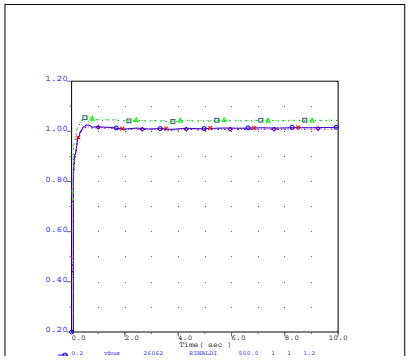


Figure 186 Bus-V:LADWP Load:

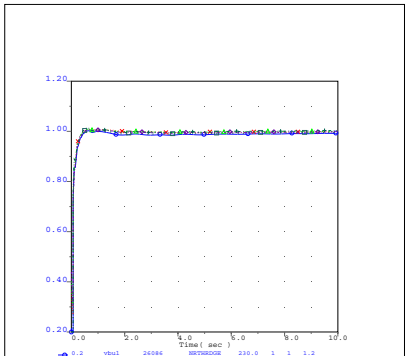


Figure 187 Bus-V: NW & S.CAL 500 kV

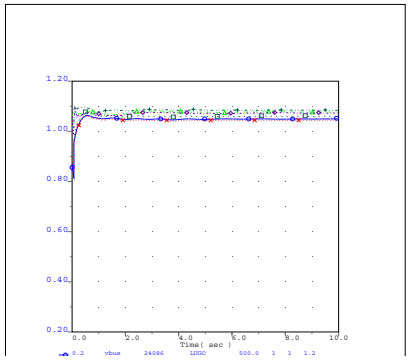


Figure 188 Bus-V: Others 500 kV

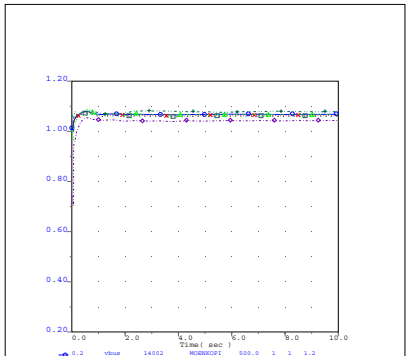


Figure 189 Bus-V: Others 230 kV

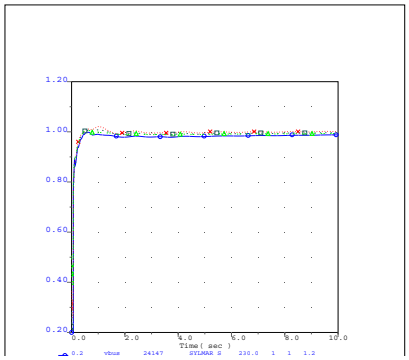


Figure 190 REL_RTR_ANG:S.Cal

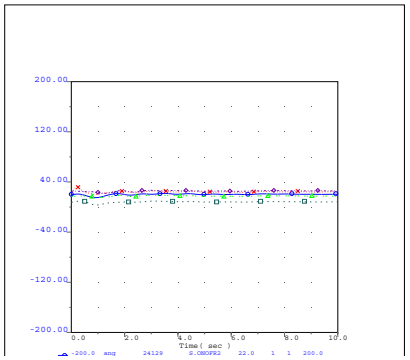


Figure 191 RELATIVE_ROTOR_ANGLE:S.Cal:

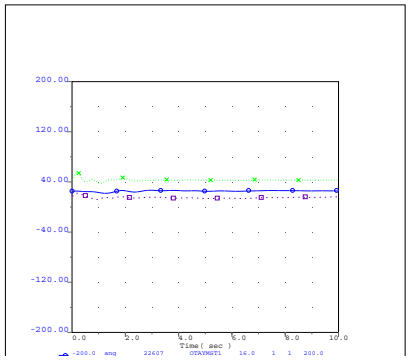
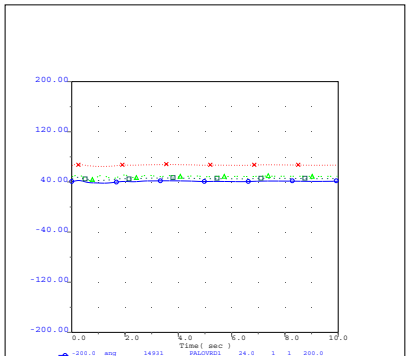


Figure 192 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: Rin-Glendl-dlo

Possible Violations: MORC 1[16]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[16] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 193 Bus-V:Owens Gorge/Rinaldi 230 kV

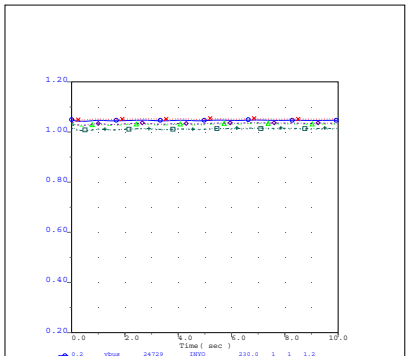


Figure 194 Bus-V:SCE North 115 kV

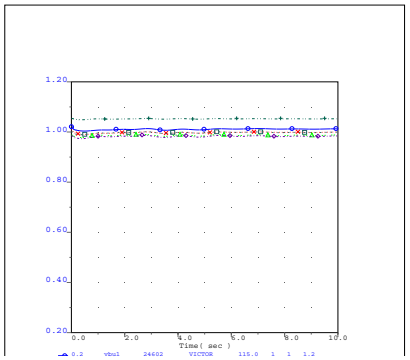


Figure 195 Bus-V:LA BASIN 230 & 138 kV

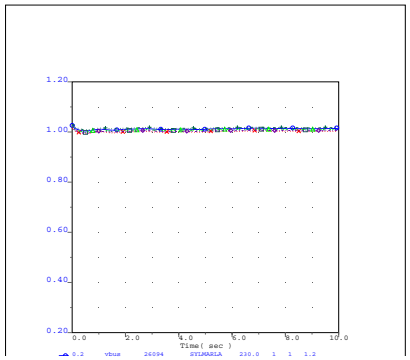


Figure 196 Bus-V:SCE 500 & 230 kV

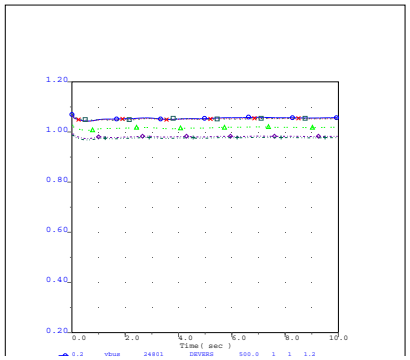


Figure 197 Bus-V: LADWP 500 kV:

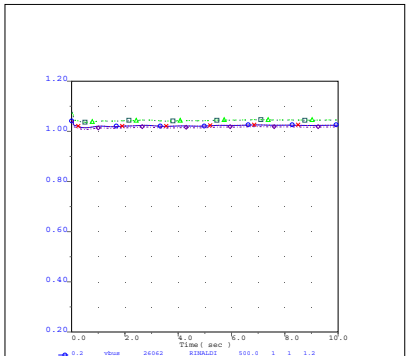


Figure 198 Bus-V:LADWP Load:

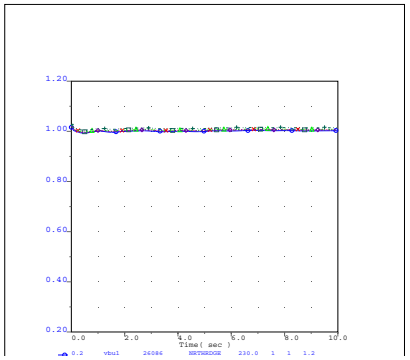


Figure 199 Bus-V: NW & S.CAL 500 kV

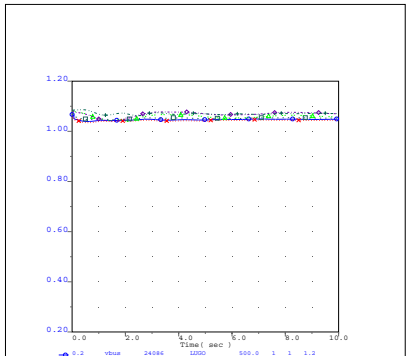


Figure 200 Bus-V: Others 500 kV

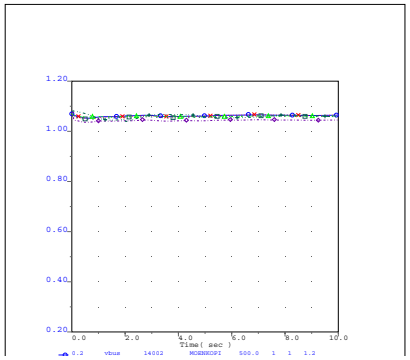


Figure 201 Bus-V: Others 230 kV

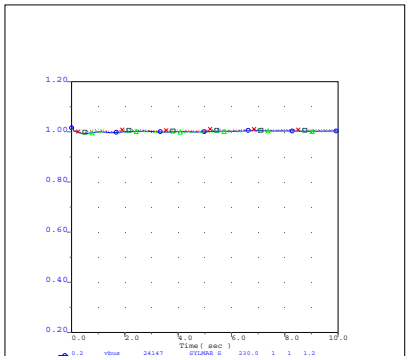


Figure 202 REL_RTR_ANG:S.Cal

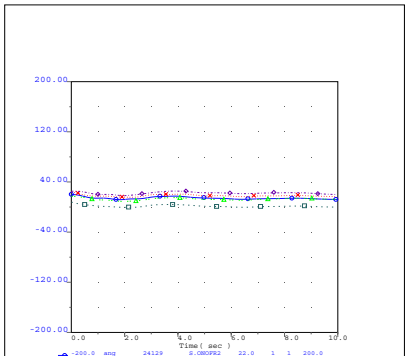


Figure 203 RELATIVE_ROTOR_ANGLE:S.Cal:

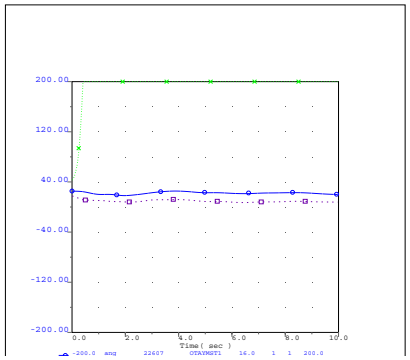
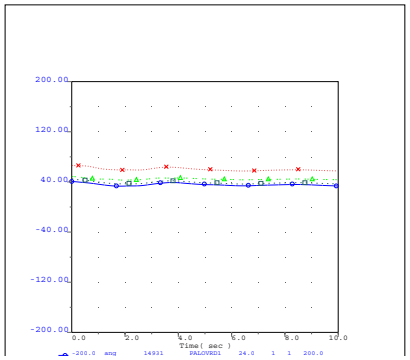


Figure 204 REL_RTR_ANG:Others



Study: BSP Case: hsbspa1_0iy_ov_110og_cast Contingency: IPP-bipolar-upc

Possible Violations: MORC 1[17]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[17] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Study: BSP Case: hsbspa2_0iy_ov_45og

Figure 1 Bus-V:Owens Gorge/Rinaldi 230 kV

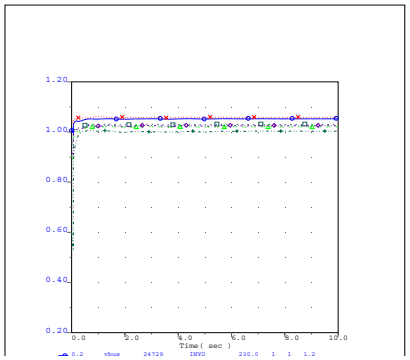


Figure 2 Bus-V:SCE North 115 kV

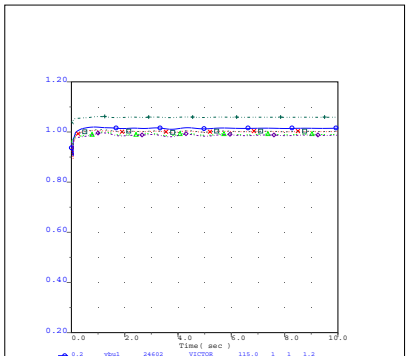


Figure 3 Bus-V:LA BASIN 230 & 138 kV

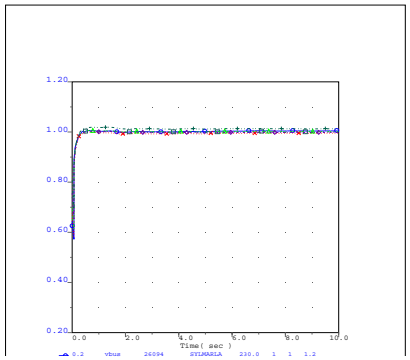


Figure 4 Bus-V:SCE 500 & 230 kV

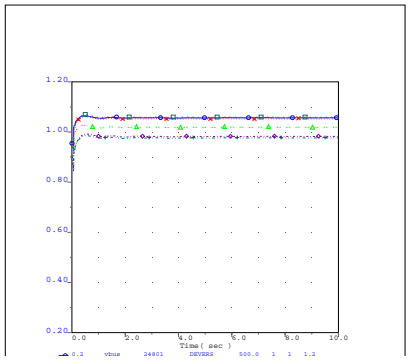


Figure 5 Bus-V: LADWP 500 kV:

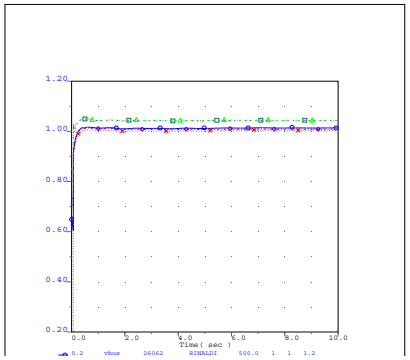


Figure 6 Bus-V:LADWP Load:

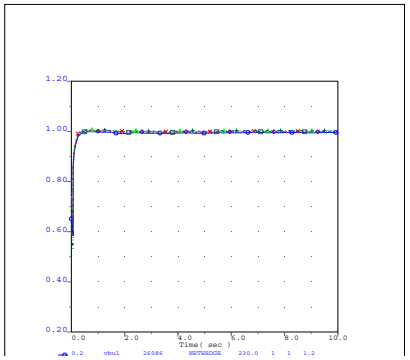


Figure 7 Bus-V: NW & S.CAL 500 kV

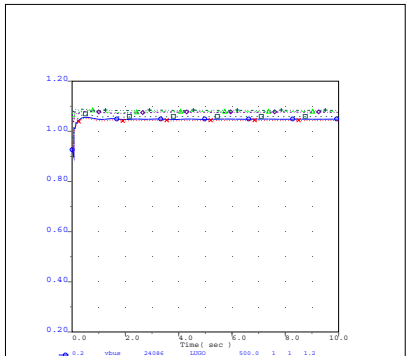


Figure 8 Bus-V: Others 500 kV

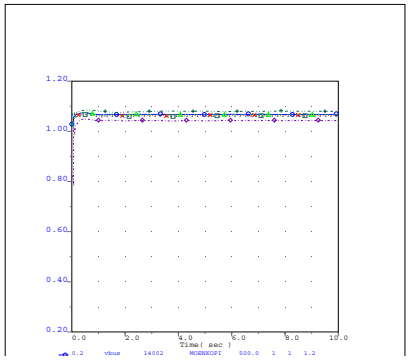


Figure 9 Bus-V: Others 230 kV

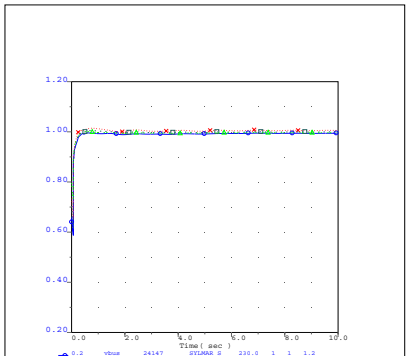


Figure 10 REL_RTR_ANG:S.Cal

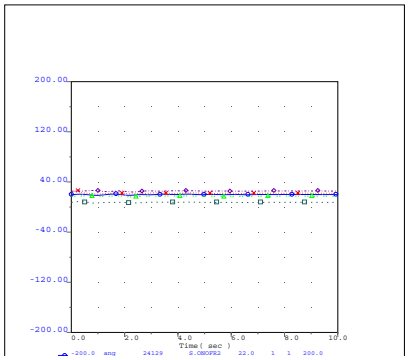


Figure 11 RELATIVE_ROTOR_ANGLE:S.Cal:

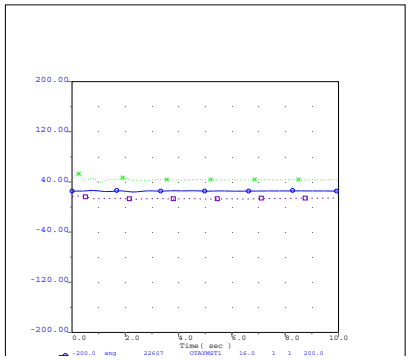
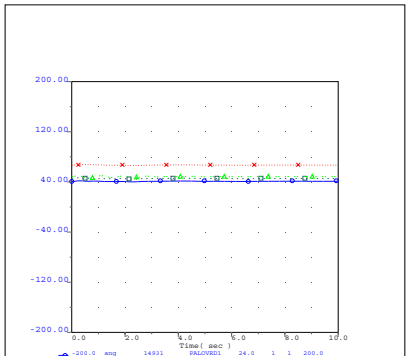


Figure 12 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Adel-Rinaldi-slo

Possible Violations: MORC 1[1]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[1] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 13 Bus-V:Owens Gorge/Rinaldi 230 kV

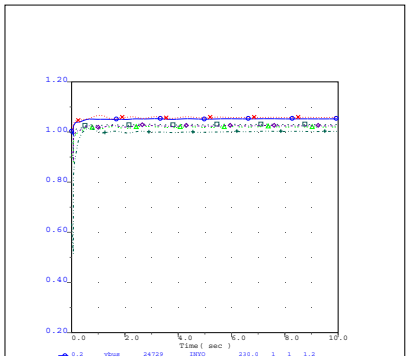


Figure 14 Bus-V:SCE North 115 kV

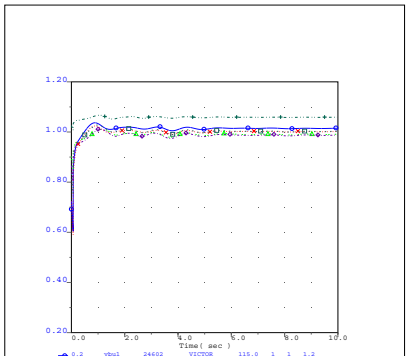


Figure 15 Bus-V:LA BASIN 230 & 138 kV

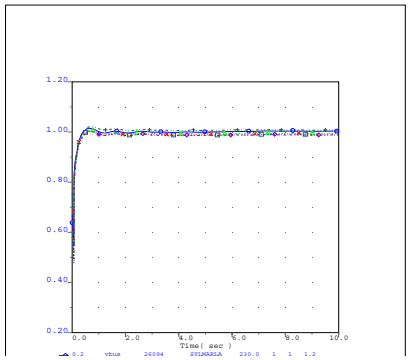


Figure 16 Bus-V:SCE 500 & 230 kV

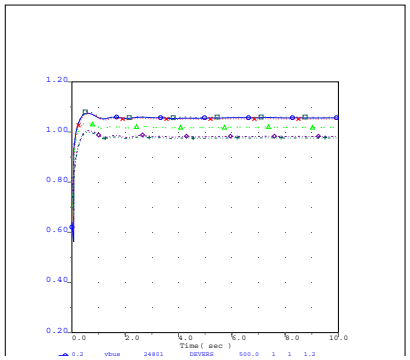


Figure 17 Bus-V: LADWP 500 kV:

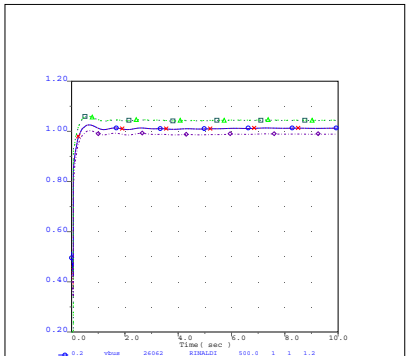


Figure 18 Bus-V:LADWP Load:

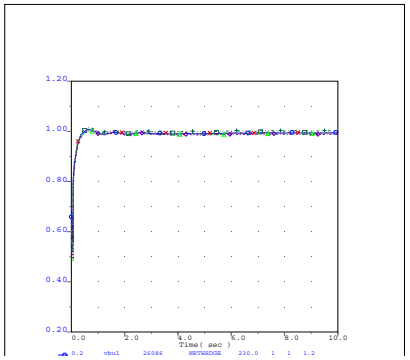


Figure 19 Bus-V: NW & S.CAL 500 kV

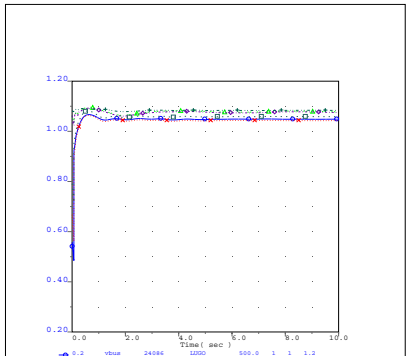


Figure 20 Bus-V: Others 500 kV

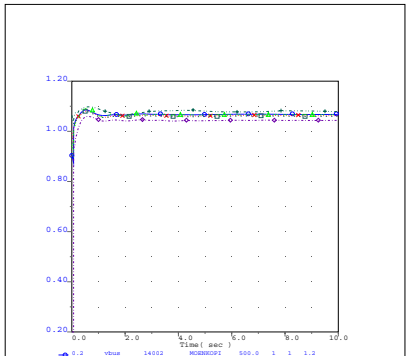


Figure 21 Bus-V: Others 230 kV

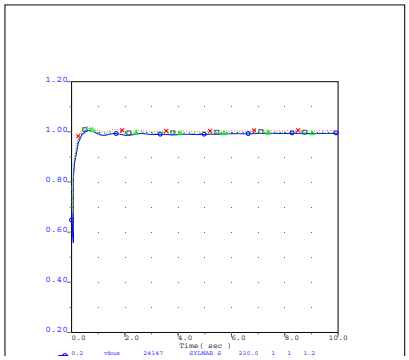


Figure 22 REL_RTR_ANG:S.Cal

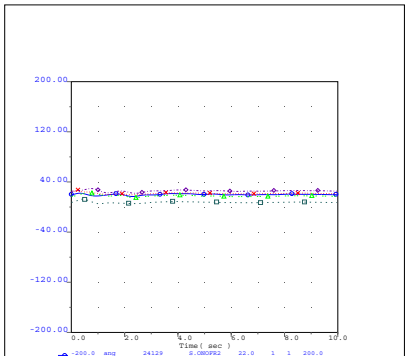


Figure 23 RELATIVE_ROTOR_ANGLE:S.Cal:

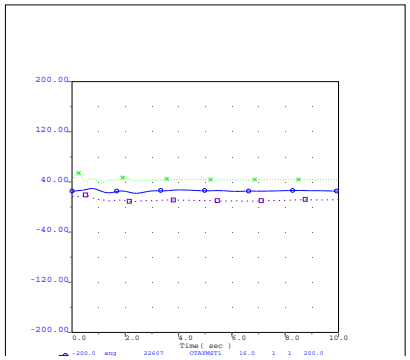
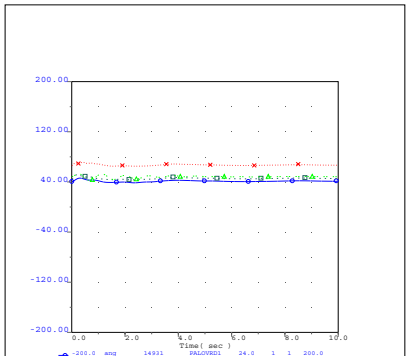


Figure 24 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Adel-Toluca

Possible Violations: MORC 1[2]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[2] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 25 Bus-V:Owens Gorge/Rinaldi 230 kV

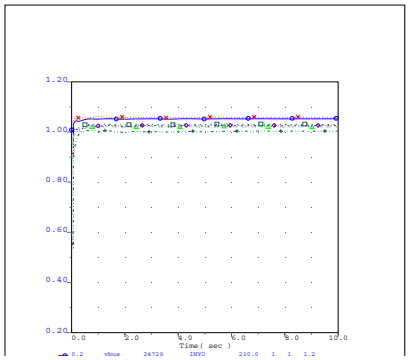


Figure 26 Bus-V:SCE North 115 kV

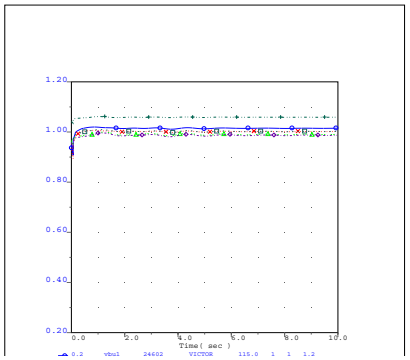


Figure 27 Bus-V:LA BASIN 230 & 138 kV

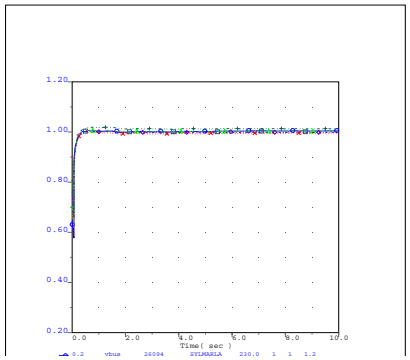


Figure 28 Bus-V:SCE 500 & 230 kV

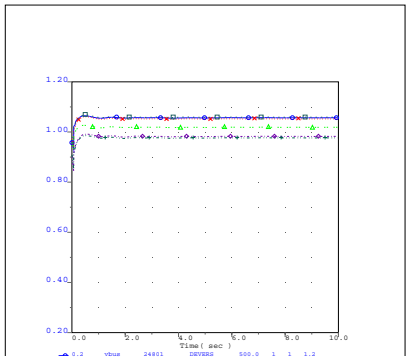


Figure 29 Bus-V: LADWP 500 kV:

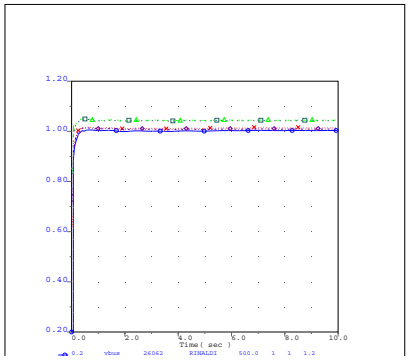


Figure 30 Bus-V:LADWP Load:

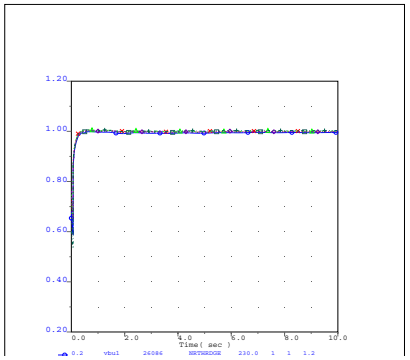


Figure 31 Bus-V: NW & S.CAL 500 kV

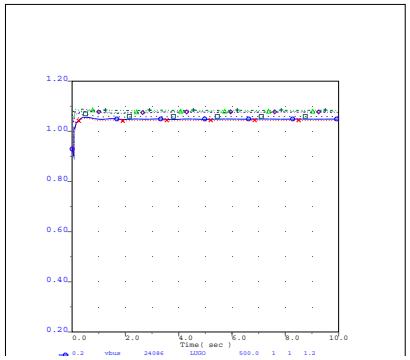


Figure 32 Bus-V: Others 500 kV

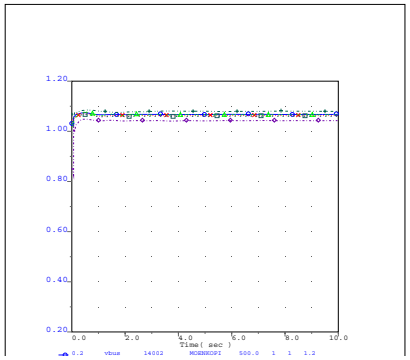


Figure 33 Bus-V: Others 230 kV

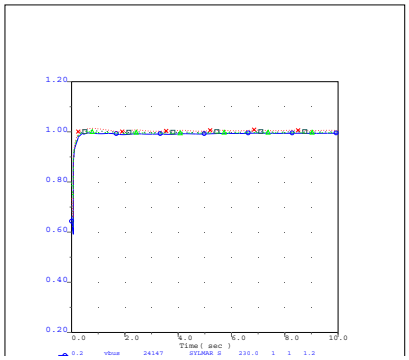


Figure 34 REL_RTR_ANG:S.Cal

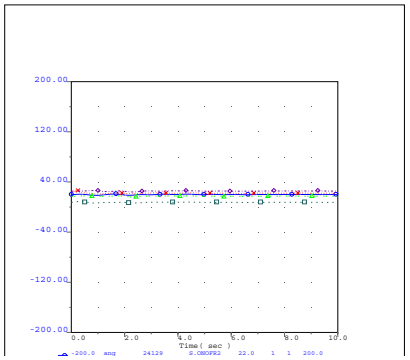


Figure 35 RELATIVE_ROTOR_ANGLE:S.Cal:

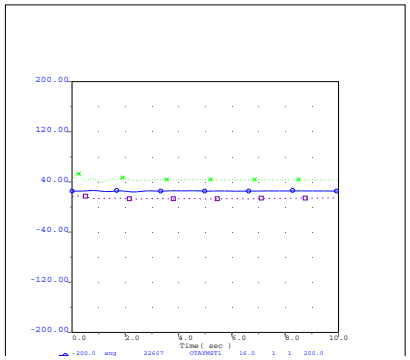
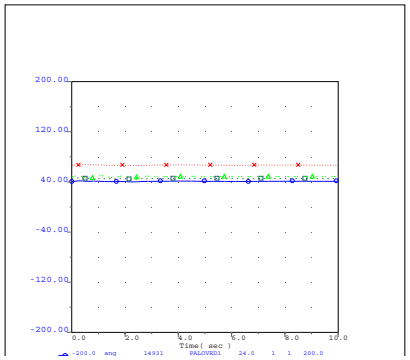


Figure 36 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Vict-Rinaldi-slo

Possible Violations: MORC 1[3]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[3] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 37 Bus-V:Owens Gorge/Rinaldi 230 kV

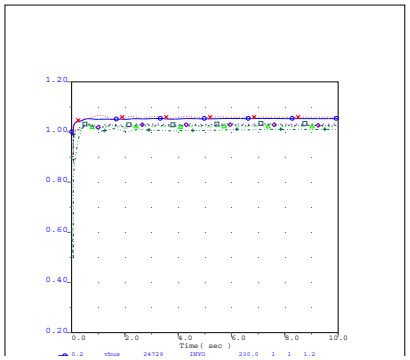


Figure 38 Bus-V:SCE North 115 kV

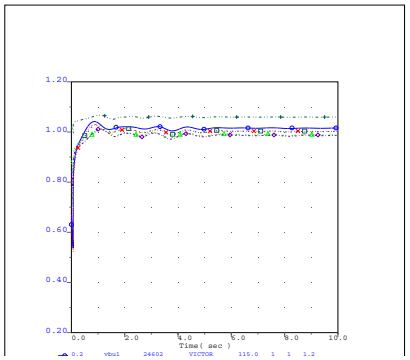


Figure 39 Bus-V:LA BASIN 230 & 138 kV

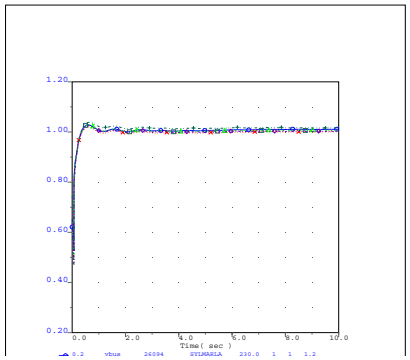


Figure 40 Bus-V:SCE 500 & 230 kV

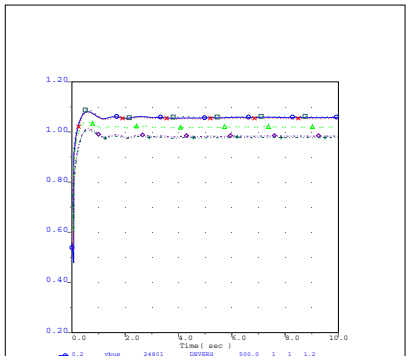


Figure 41 Bus-V: LADWP 500 kV:

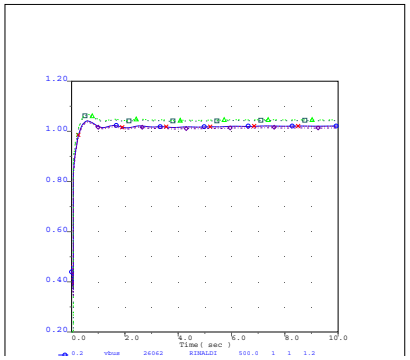


Figure 42 Bus-V:LADWP Load:

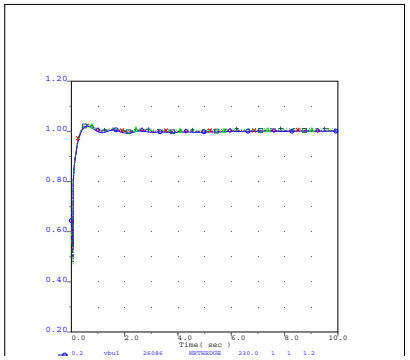


Figure 43 Bus-V: NW & S.CAL 500 kV

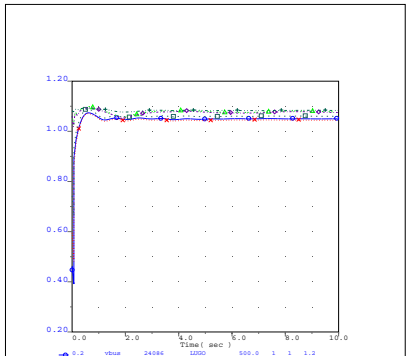


Figure 44 Bus-V: Others 500 kV

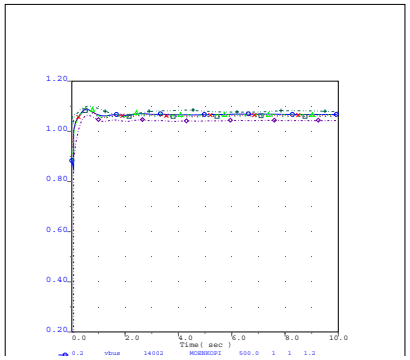


Figure 45 Bus-V: Others 230 kV

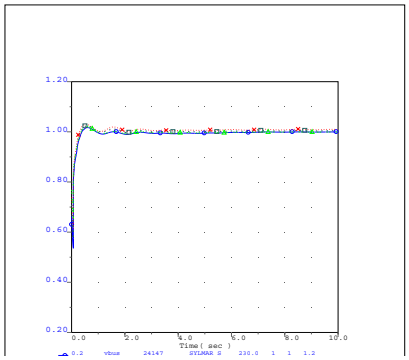


Figure 46 REL_RTR_ANG:S.Cal

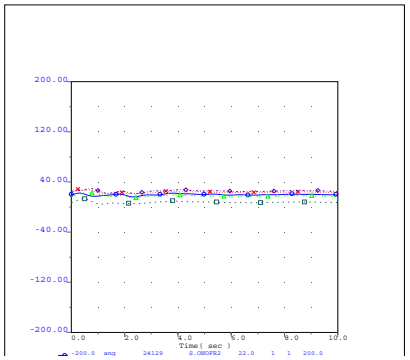


Figure 47 RELATIVE_ROTOR_ANGLE:S.Cal:

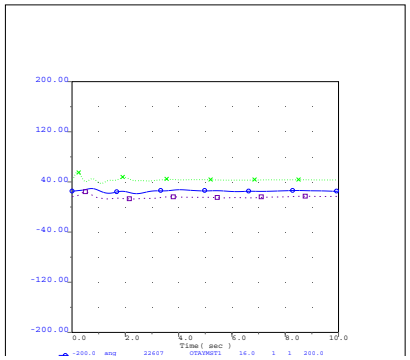
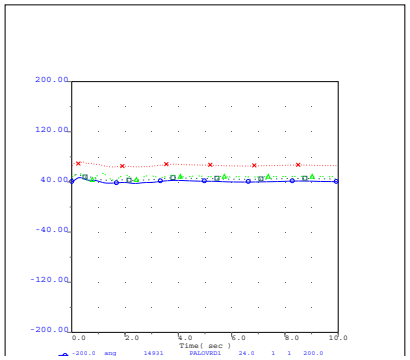


Figure 48 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Adel-Victorvl-slo

Possible Violations: MORC 1[4]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[4] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 49 Bus-V:Owens Gorge/Rinaldi 230 kV

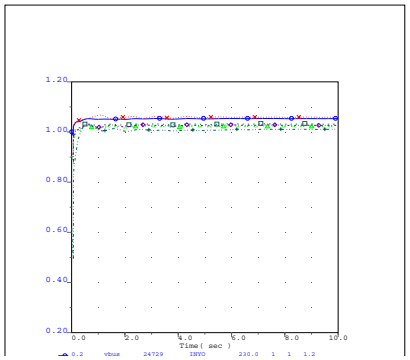


Figure 50 Bus-V:SCE North 115 kV

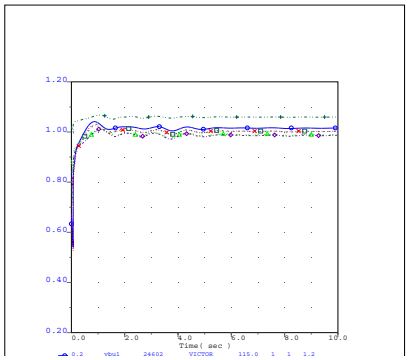


Figure 51 Bus-V:LA BASIN 230 & 138 kV

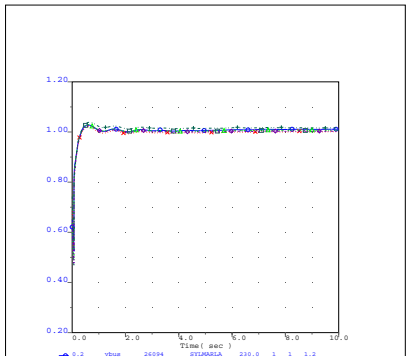


Figure 52 Bus-V:SCE 500 & 230 kV

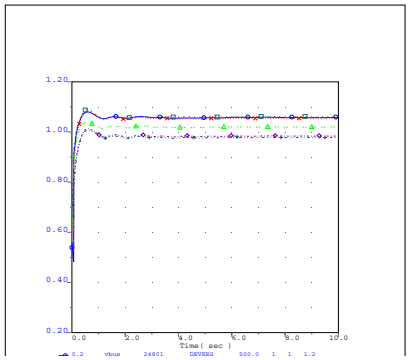


Figure 53 Bus-V: LADWP 500 kV:

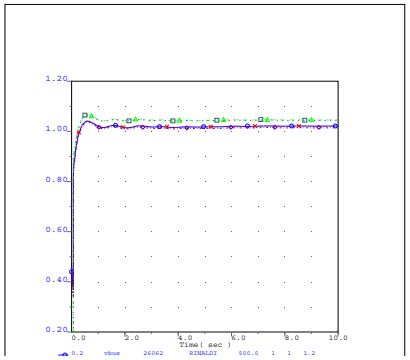


Figure 54 Bus-V:LADWP Load:

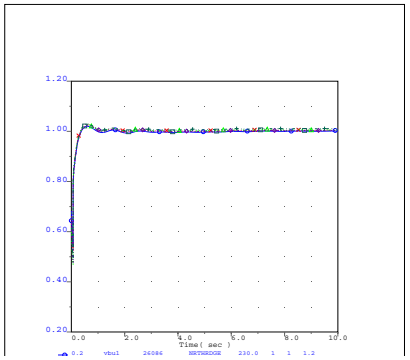


Figure 55 Bus-V: NW & S.CAL 500 kV

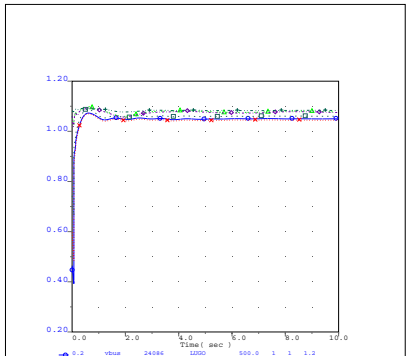


Figure 56 Bus-V: Others 500 kV

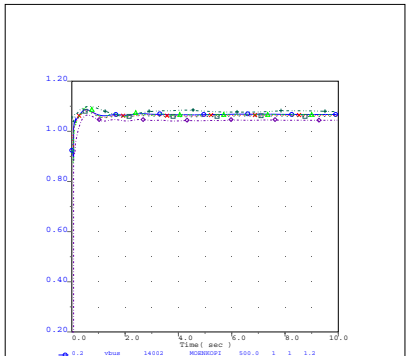


Figure 57 Bus-V: Others 230 kV

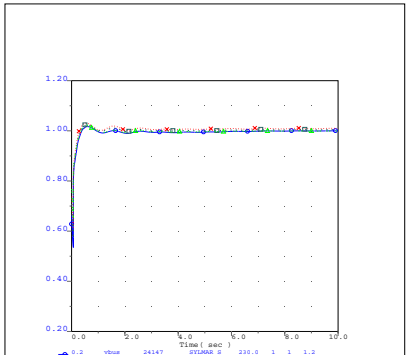


Figure 58 REL_RTR_ANG:S.Cal

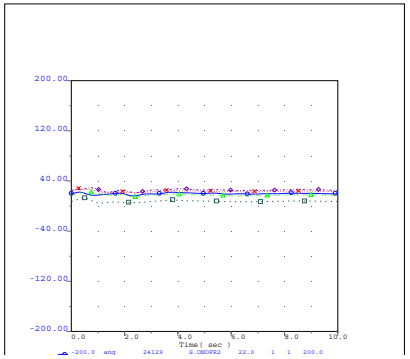


Figure 59 RELATIVE_ROTOR_ANGLE:S.Cal:

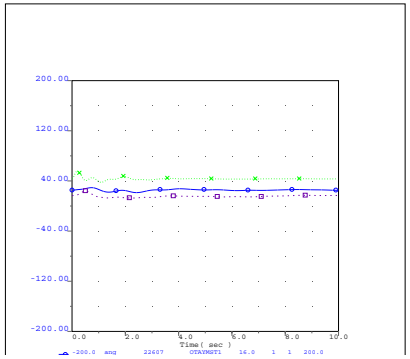
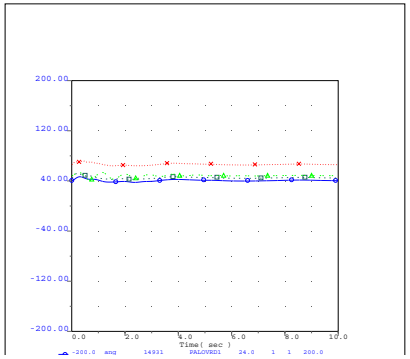


Figure 60 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: McC-Vict-slo

Possible Violations: MORC 1[5]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[5] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 61 Bus-V:Owens Gorge/Rinaldi 230 kV

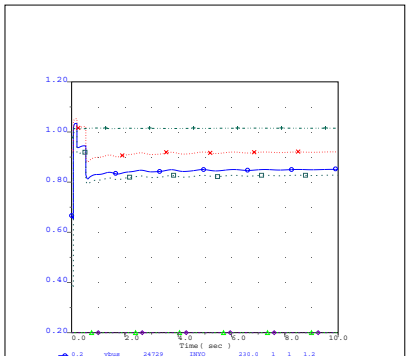


Figure 62 Bus-V:SCE North 115 kV

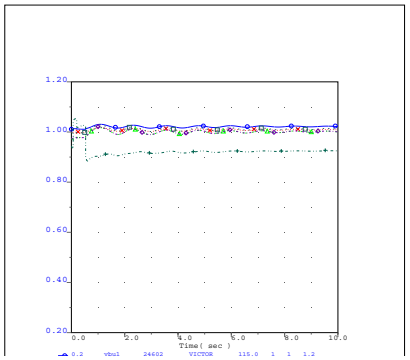


Figure 63 Bus-V:LA BASIN 230 & 138 kV

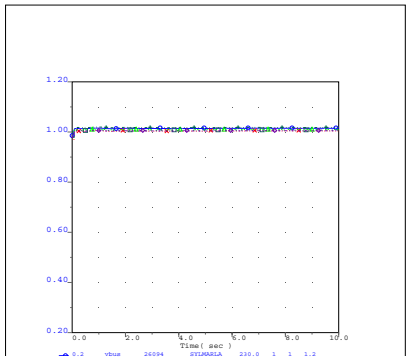


Figure 64 Bus-V:SCE 500 & 230 kV

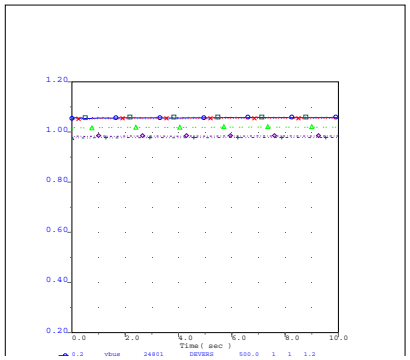


Figure 65 Bus-V: LADWP 500 kV:

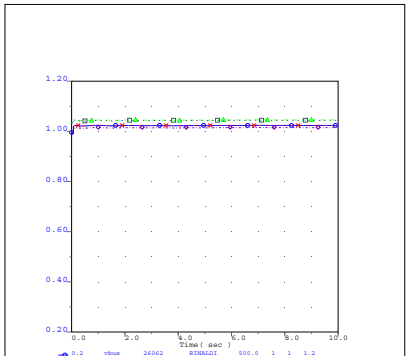


Figure 66 Bus-V:LADWP Load:

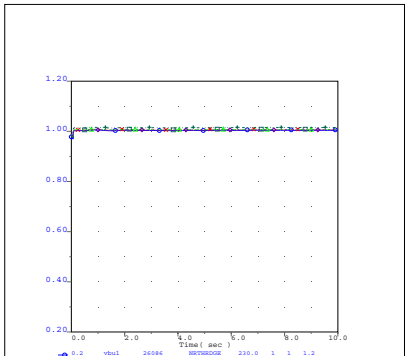


Figure 67 Bus-V: NW & S.CAL 500 kV

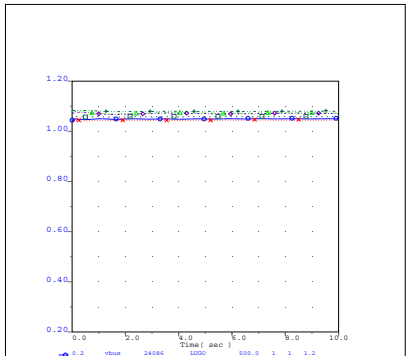


Figure 68 Bus-V: Others 500 kV

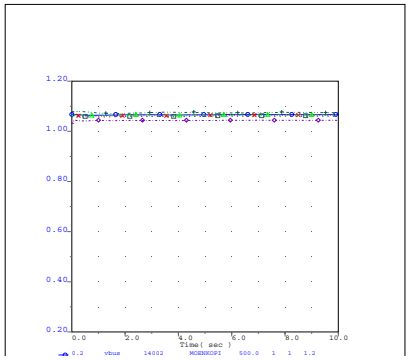


Figure 69 Bus-V: Others 230 kV

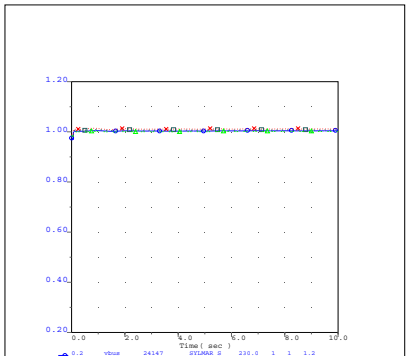


Figure 70 REL_RTR_ANG:S.Cal

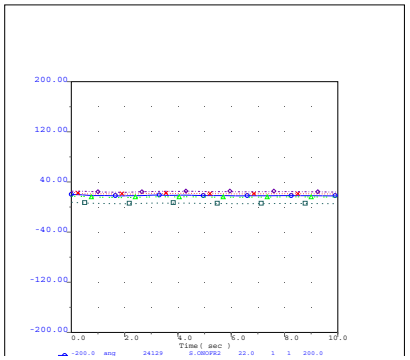


Figure 71 RELATIVE_ROTOR_ANGLE:S.Cal:

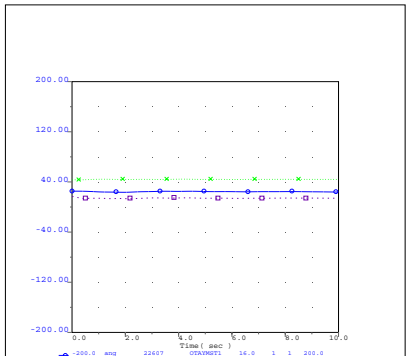
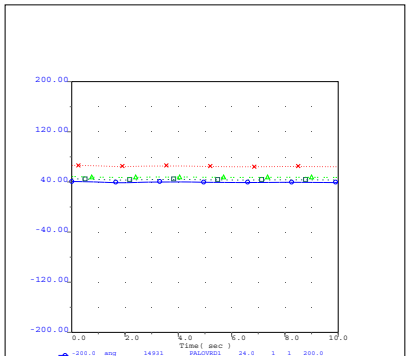


Figure 72 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: BR-Rinaldi-o2-RAS-wIY

Possible Violations: MORC 1[6]- None MORC 2- 6 FREQ Dip- None

Buses with post-tran changes >5%: 1, >10%: None

[6] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 73 Bus-V:Owens Gorge/Rinaldi 230 kV

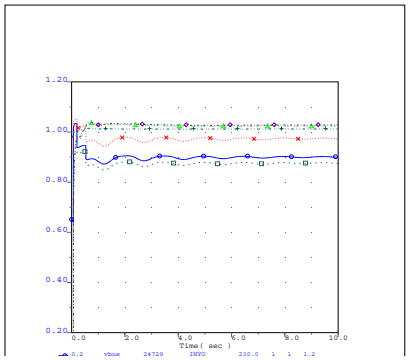


Figure 74 Bus-V:SCE North 115 kV

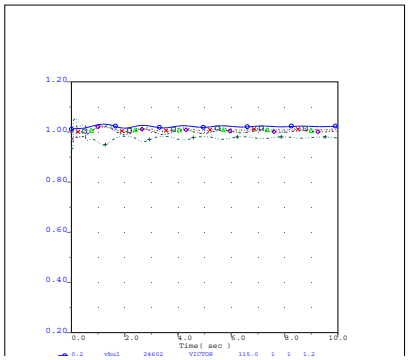


Figure 75 Bus-V:LA BASIN 230 & 138 kV

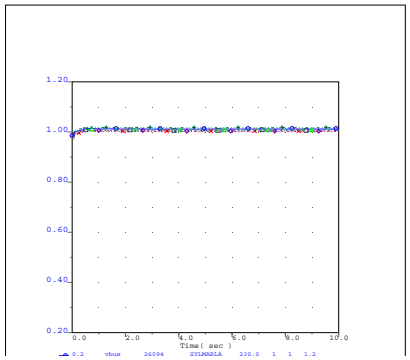


Figure 76 Bus-V:SCE 500 & 230 kV

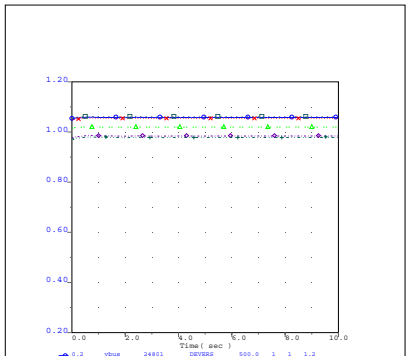


Figure 77 Bus-V: LADWP 500 kV:

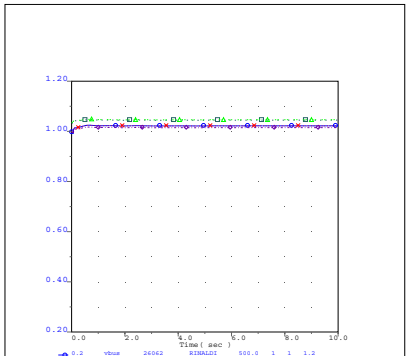


Figure 78 Bus-V:LADWP Load:

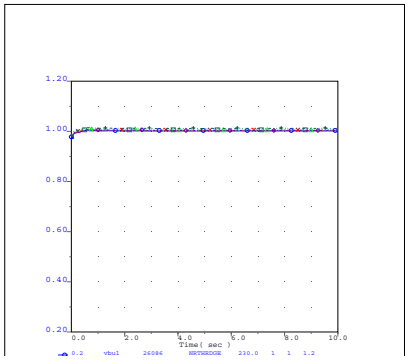


Figure 79 Bus-V: NW & S.CAL 500 kV

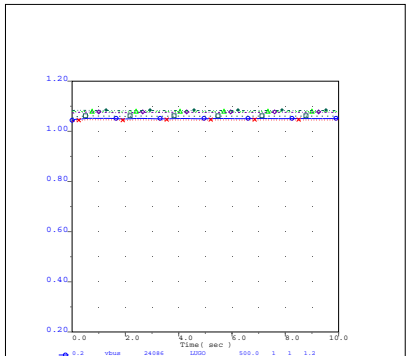


Figure 80 Bus-V: Others 500 kV

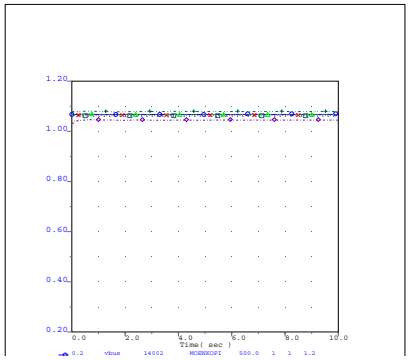


Figure 81 Bus-V: Others 230 kV

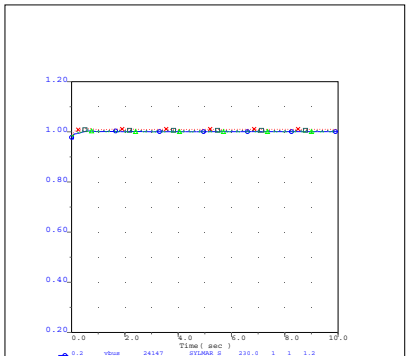


Figure 82 REL_RTR_ANG:S.Cal

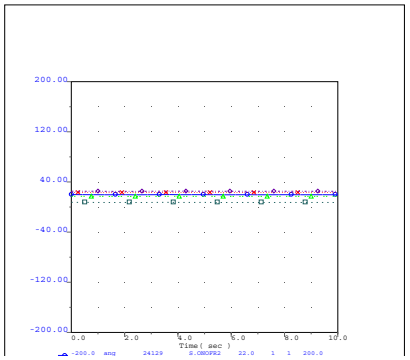


Figure 83 RELATIVE_ROTOR_ANGLE:S.Cal:

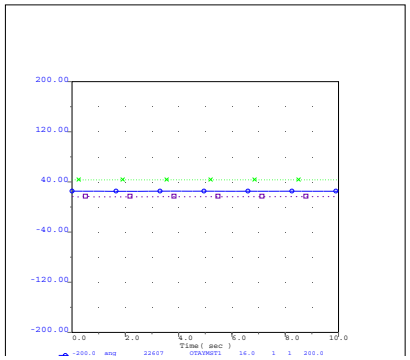
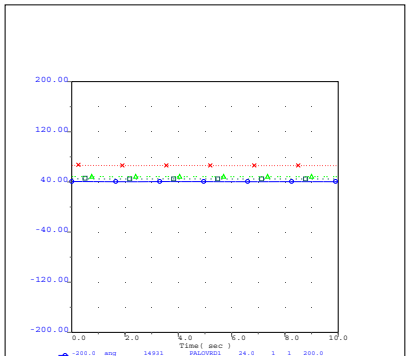


Figure 84 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Cottonwd-BTAP-o2-RAS

Possible Violations: MORC 1[7]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[7] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 85 Bus-V:Owens Gorge/Rinaldi 230 kV

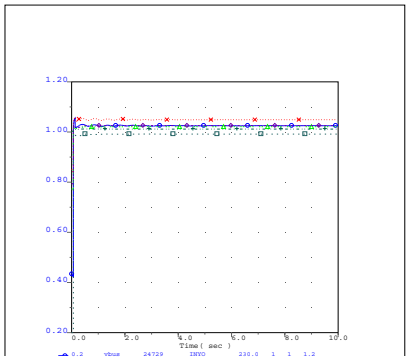


Figure 86 Bus-V:SCE North 115 kV

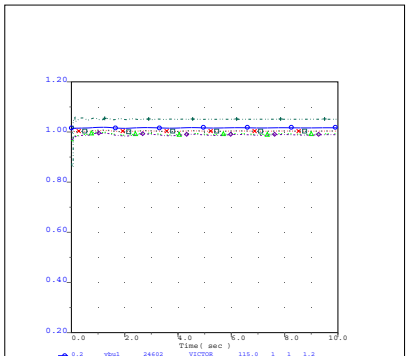


Figure 87 Bus-V:LA BASIN 230 & 138 kV

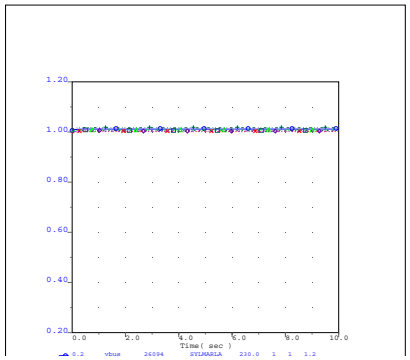


Figure 88 Bus-V:SCE 500 & 230 kV

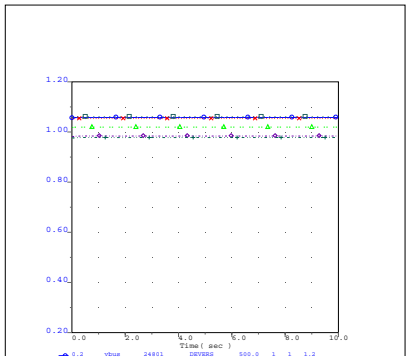


Figure 89 Bus-V: LADWP 500 kV:

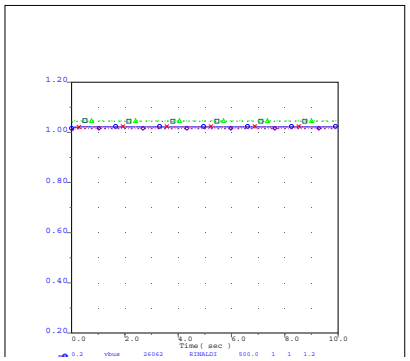


Figure 90 Bus-V:LADWP Load:

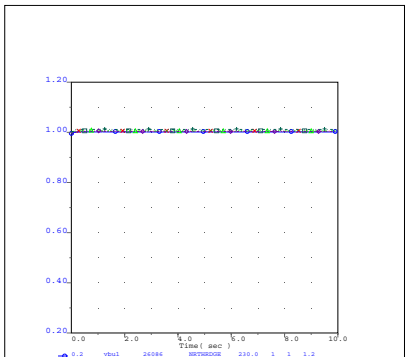


Figure 91 Bus-V: NW & S.CAL 500 kV

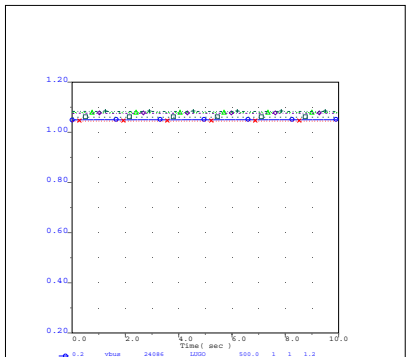


Figure 92 Bus-V: Others 500 kV

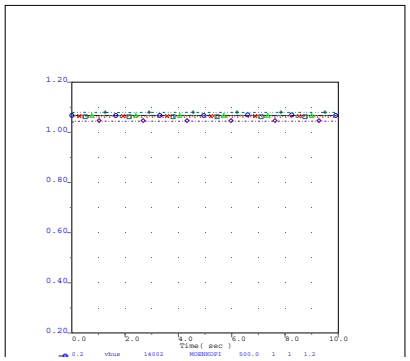


Figure 93 Bus-V: Others 230 kV

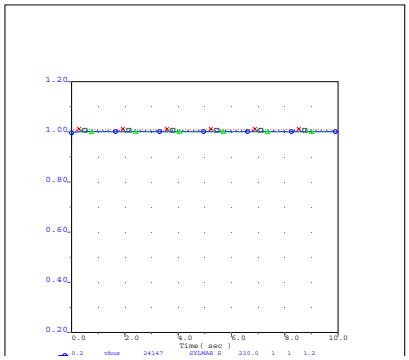


Figure 94 REL_RTR_ANG:S.Cal

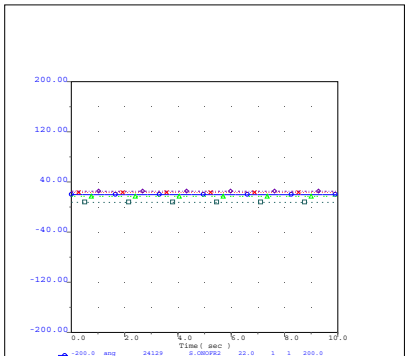


Figure 95 RELATIVE_ROTOR_ANGLE:S.Cal:

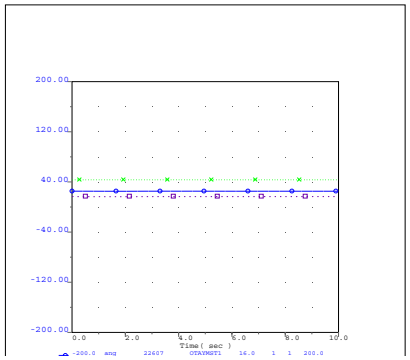
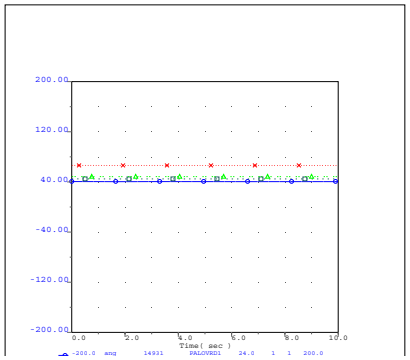


Figure 96 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Cottonwd-Inyo-preRAS

Possible Violations: MORC 1[8]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[8] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 97 Bus-V:Owens Gorge/Rinaldi 230 kV

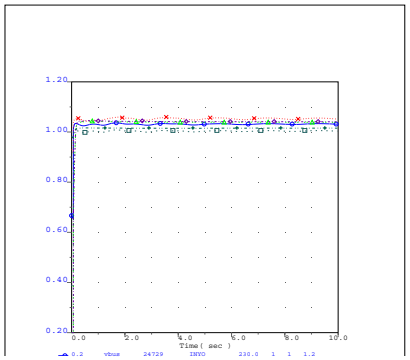


Figure 98 Bus-V:SCE North 115 kV

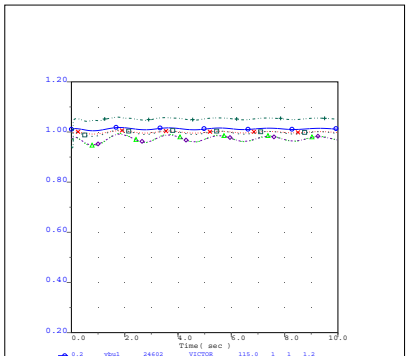


Figure 99 Bus-V:LA BASIN 230 & 138 kV

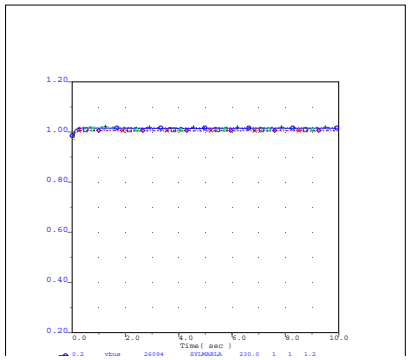


Figure 100 Bus-V:SCE 500 & 230 kV

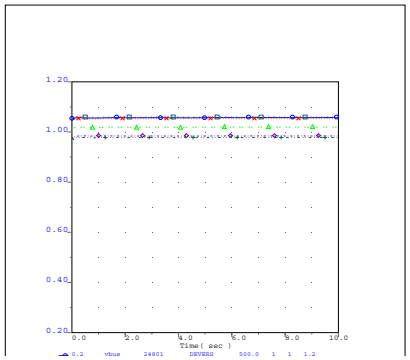


Figure 101 Bus-V: LADWP 500 kV:

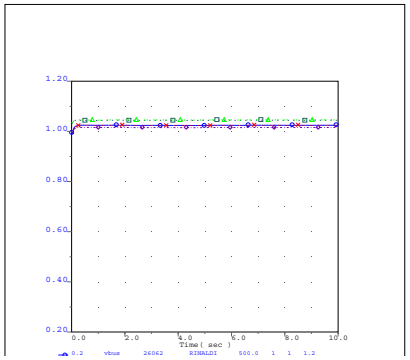


Figure 102 Bus-V:LADWP Load:

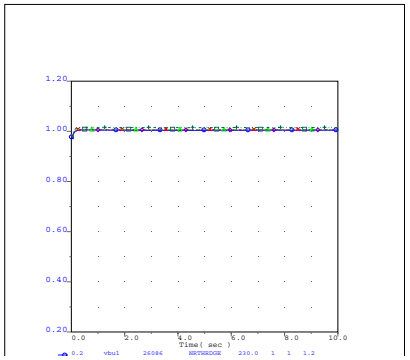


Figure 103 Bus-V: NW & S.CAL 500 kV

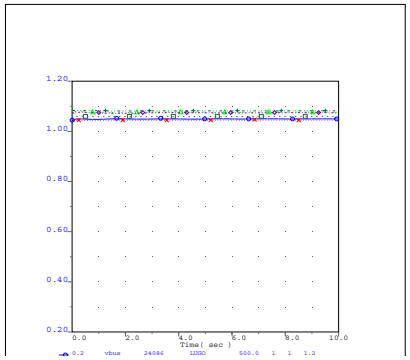


Figure 104 Bus-V: Others 500 kV

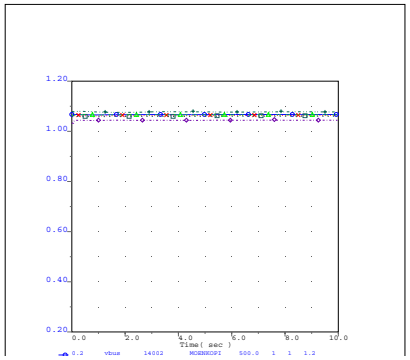


Figure 105 Bus-V: Others 230 kV

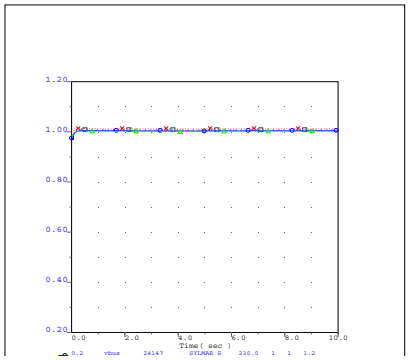


Figure 106 REL_RTR_ANG:S.Cal

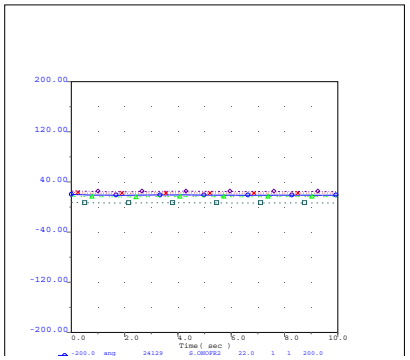


Figure 107 RELATIVE_ROTOR_ANGLE:S.Cal:

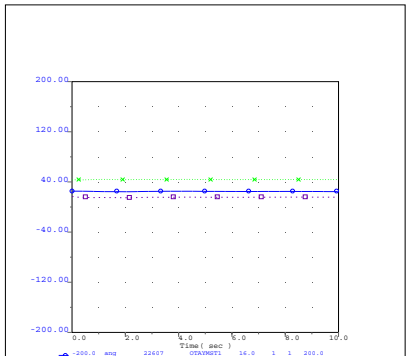
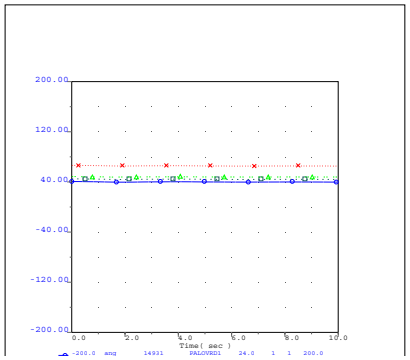


Figure 108 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: BTAP-BR-preRAS

Possible Violations: MORC 1[9]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[9] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 109 Bus-V:Owens Gorge/Rinaldi 230 kV

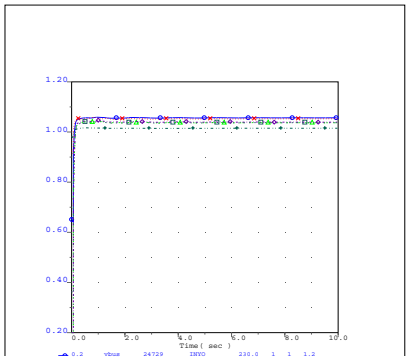


Figure 110 Bus-V:SCE North 115 kV

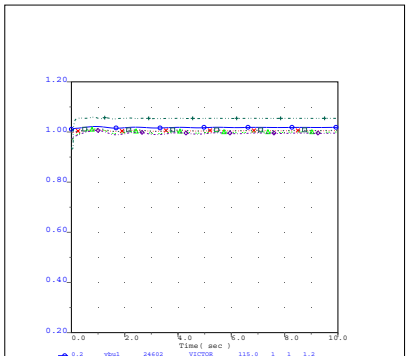


Figure 111 Bus-V:LA BASIN 230 & 138 kV

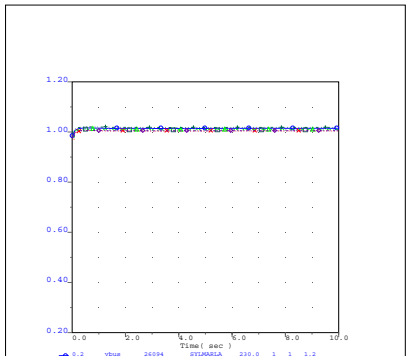


Figure 112 Bus-V:SCE 500 & 230 kV

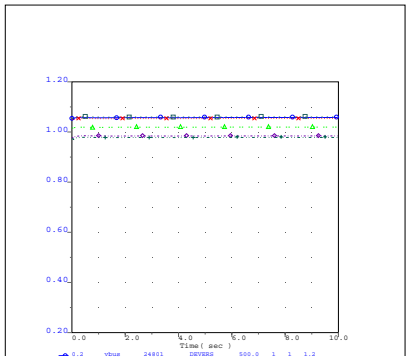


Figure 113 Bus-V: LADWP 500 kV:

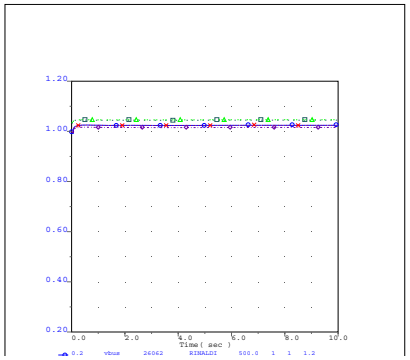


Figure 114 Bus-V:LADWP Load:

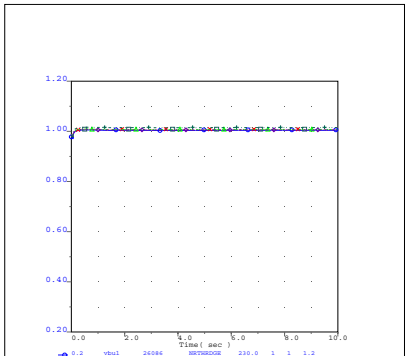


Figure 115 Bus-V: NW & S.CAL 500 kV

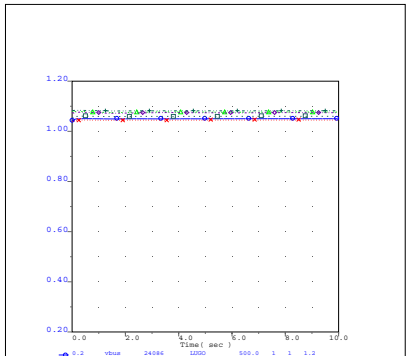


Figure 116 Bus-V: Others 500 kV

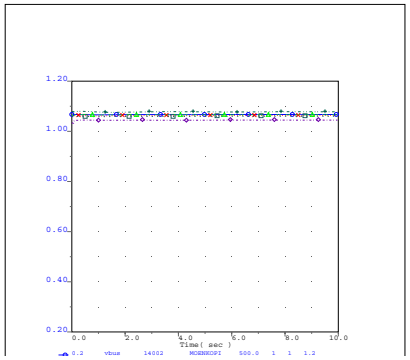


Figure 117 Bus-V: Others 230 kV

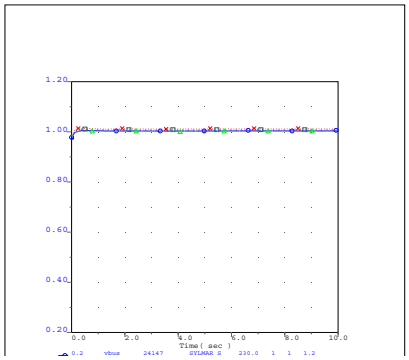


Figure 118 REL_RTR_ANG:S.Cal

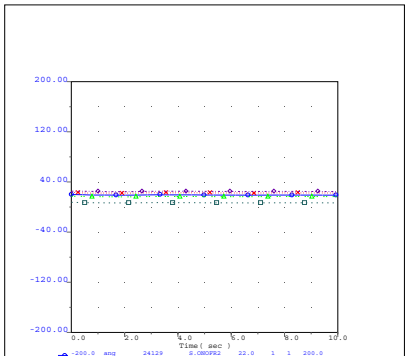


Figure 119 RELATIVE_ROTOR_ANGLE:S.Cal:

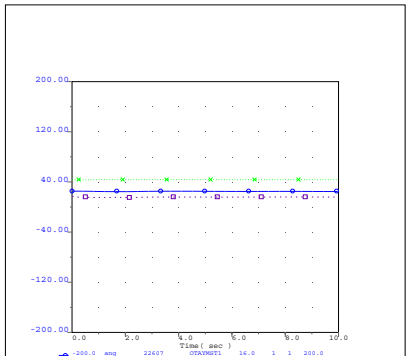
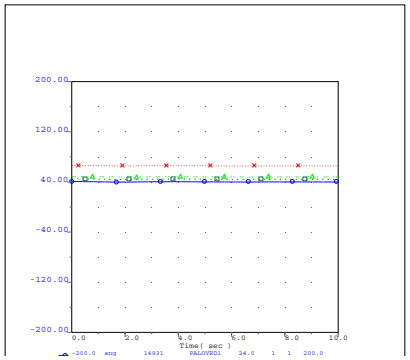


Figure 120 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Beacon-BTAP-RAS

Possible Violations: MORC 1[10]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[10] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 121 Bus-V:Owens Gorge/Rinaldi 230 kV

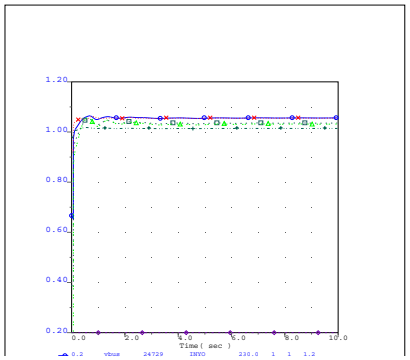


Figure 122 Bus-V:SCE North 115 kV

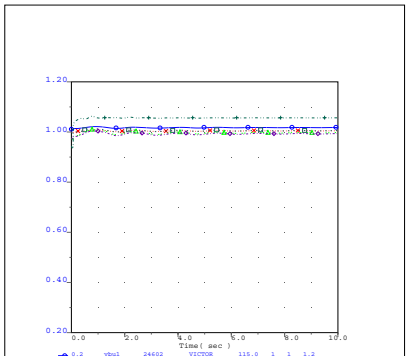


Figure 123 Bus-V:LA BASIN 230 & 138 kV

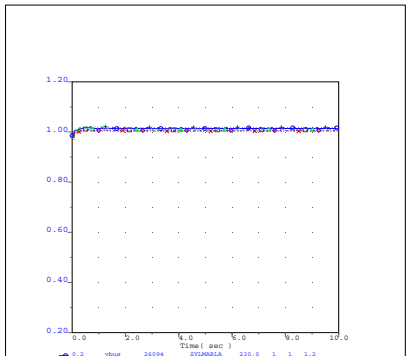


Figure 124 Bus-V:SCE 500 & 230 kV

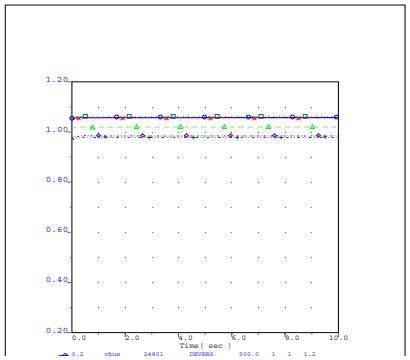


Figure 125 Bus-V: LADWP 500 kV:

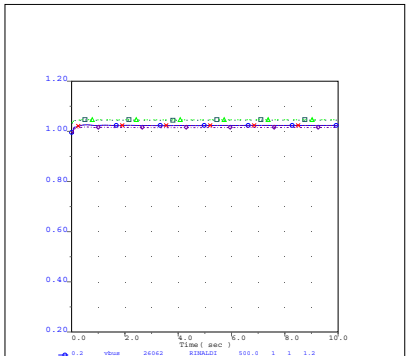


Figure 126 Bus-V:LADWP Load:

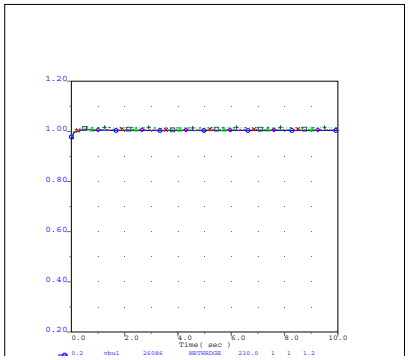


Figure 127 Bus-V: NW & S.CAL 500 kV

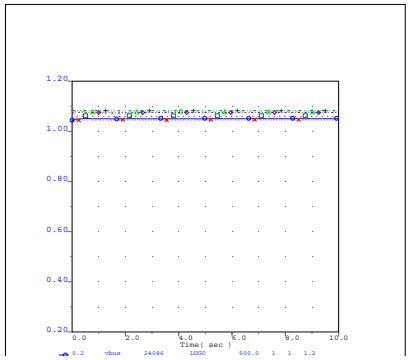


Figure 128 Bus-V: Others 500 kV

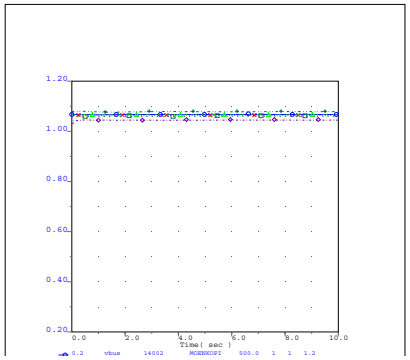


Figure 129 Bus-V: Others 230 kV

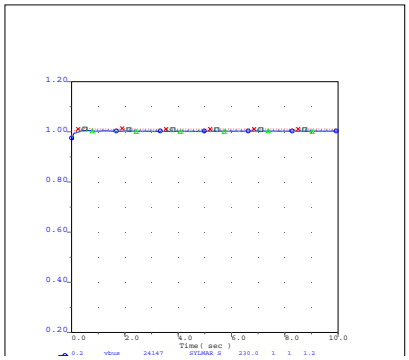


Figure 130 REL_RTR_ANG:S.Cal

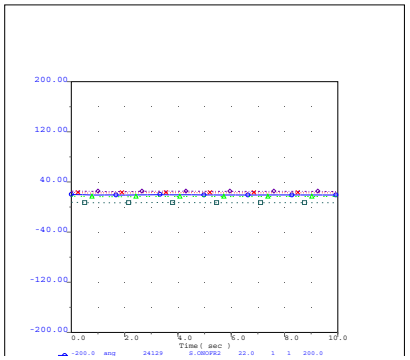


Figure 131 RELATIVE_ROTOR_ANGLE:S.Cal:

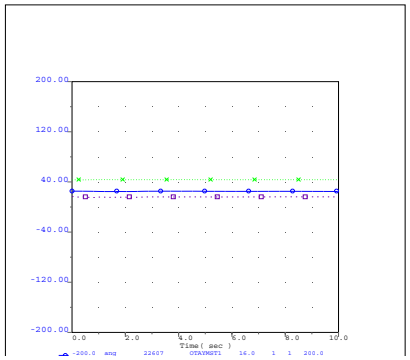
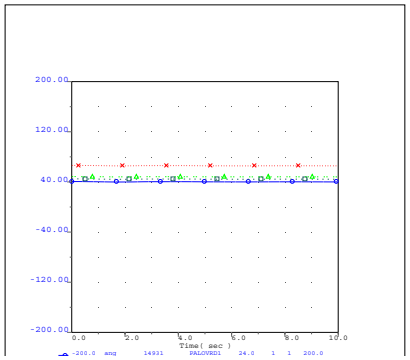


Figure 132 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Pinetree-BR-RAS

Possible Violations: MORC 1[11]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[11] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 133 Bus-V:Owens Gorge/Rinaldi 230 kV

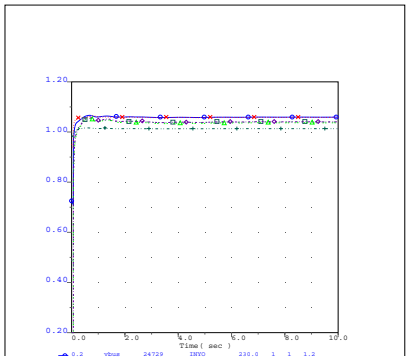


Figure 134 Bus-V:SCE North 115 kV

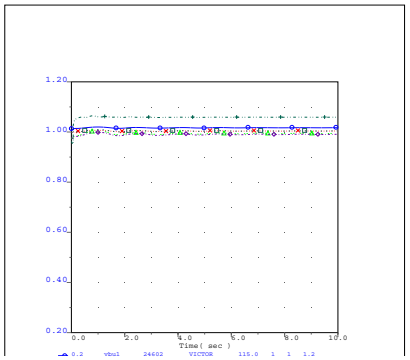


Figure 135 Bus-V:LA BASIN 230 & 138 kV

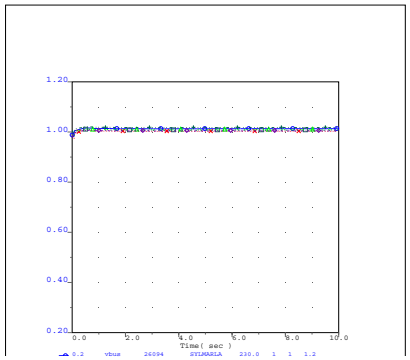


Figure 136 Bus-V:SCE 500 & 230 kV

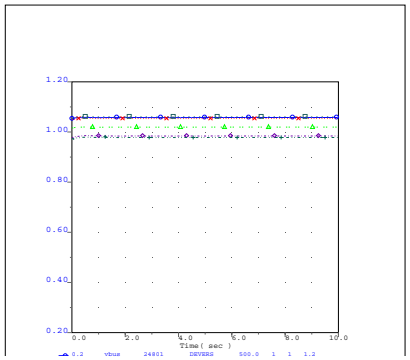


Figure 137 Bus-V: LADWP 500 kV:

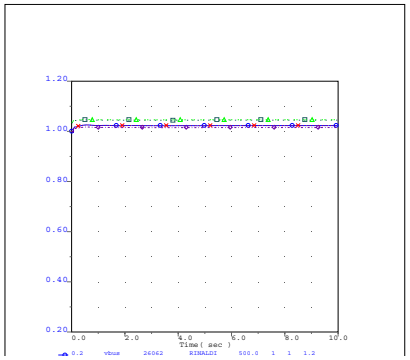


Figure 138 Bus-V:LADWP Load:

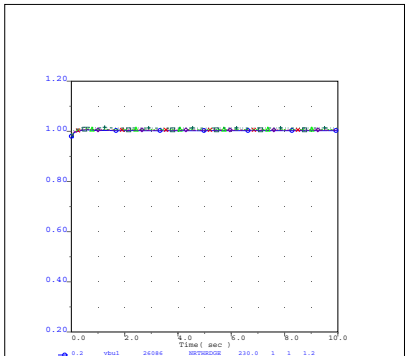


Figure 139 Bus-V: NW & S.CAL 500 kV

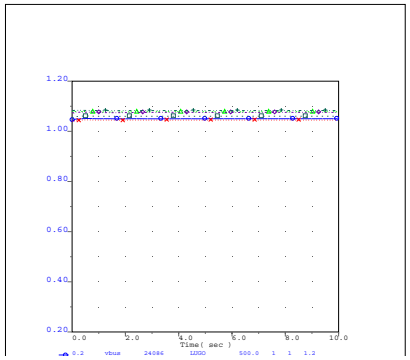


Figure 140 Bus-V: Others 500 kV

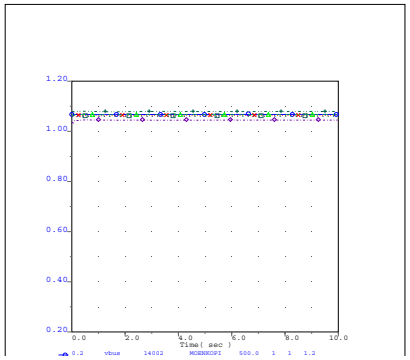


Figure 141 Bus-V: Others 230 kV

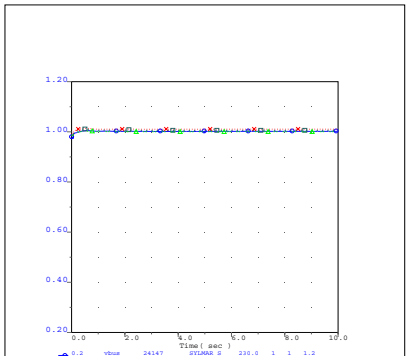


Figure 142 REL_RTR_ANG:S.Cal

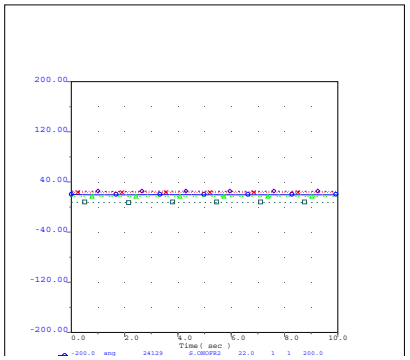


Figure 143 RELATIVE_ROTOR_ANGLE:S.Cal:

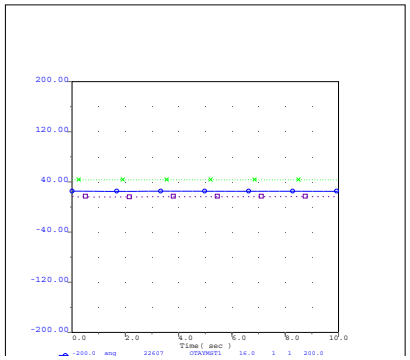
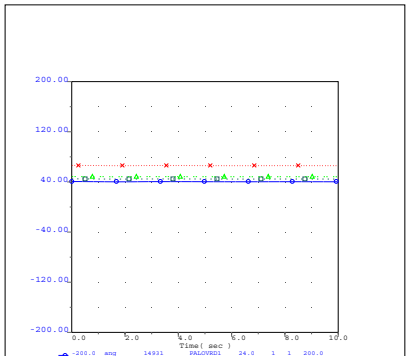


Figure 144 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: HoffmanSummit-Pinetree-RAS

Possible Violations: MORC 1[12]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[12] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 145 Bus-V:Owens Gorge/Rinaldi 230 kV

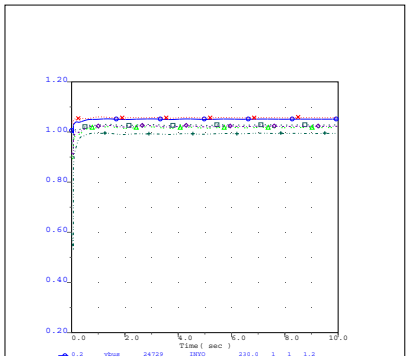


Figure 146 Bus-V:SCE North 115 kV

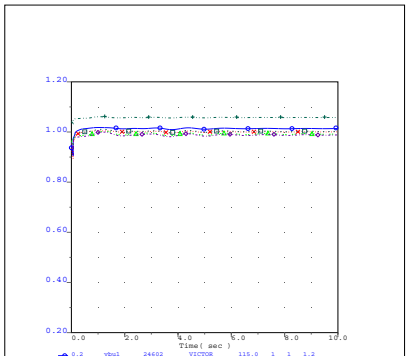


Figure 147 Bus-V:LA BASIN 230 & 138 kV

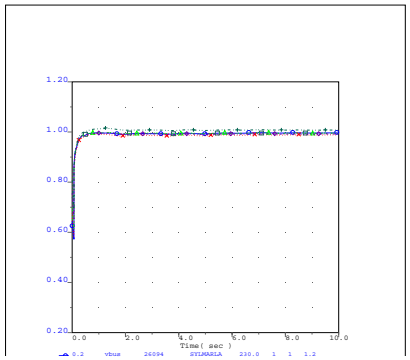


Figure 148 Bus-V:SCE 500 & 230 kV

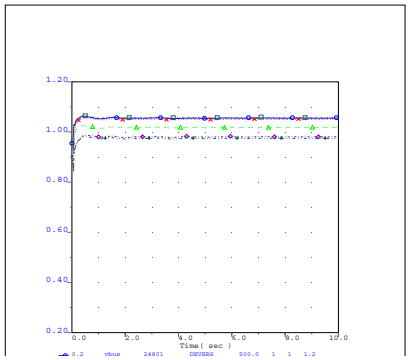


Figure 149 Bus-V: LADWP 500 kV:

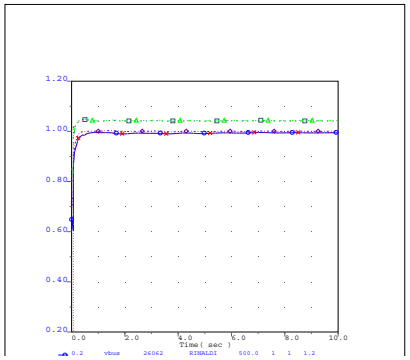


Figure 150 Bus-V:LADWP Load:

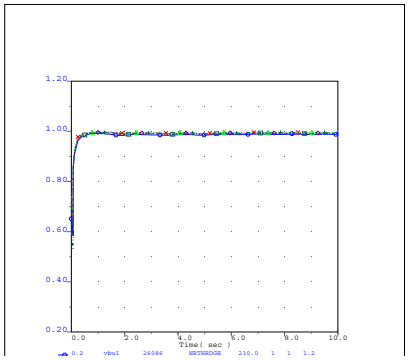


Figure 151 Bus-V: NW & S.CAL 500 kV

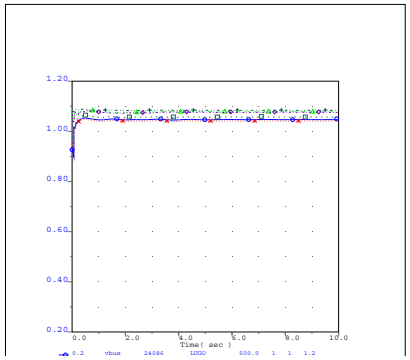


Figure 152 Bus-V: Others 500 kV

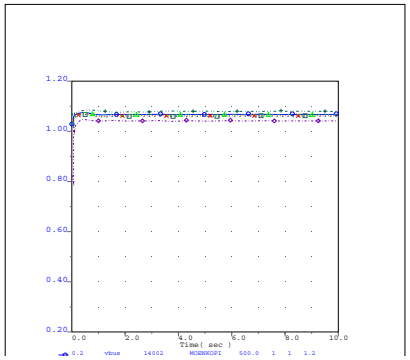


Figure 153 Bus-V: Others 230 kV

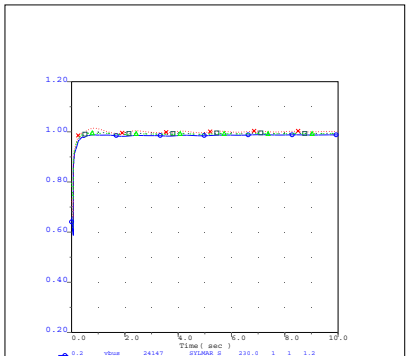


Figure 154 REL_RTR_ANG:S.Cal

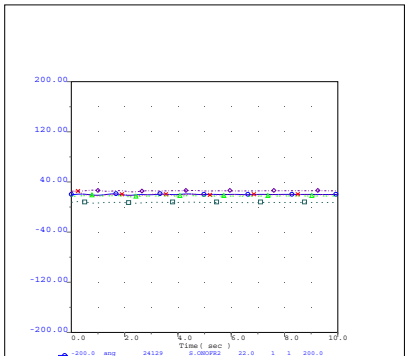


Figure 155 RELATIVE_ROTOR_ANGLE:S.Cal:

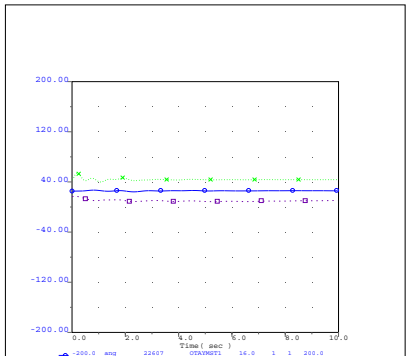
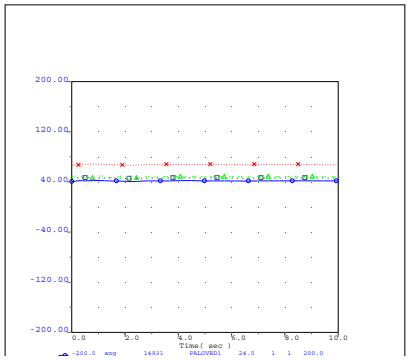


Figure 156 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Adel-Vict-Rinaldi-dlo

Possible Violations: MORC 1[13]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[13] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 157 Bus-V:Owens Gorge/Rinaldi 230 kV

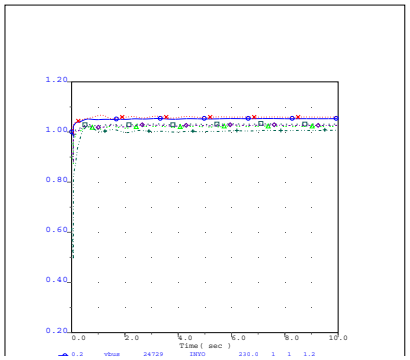


Figure 158 Bus-V:SCE North 115 kV

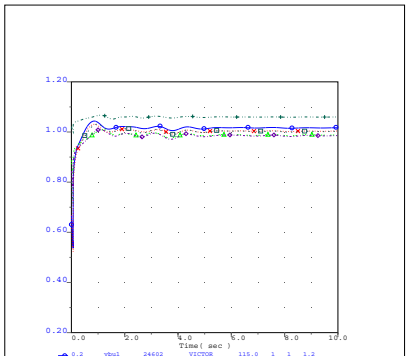


Figure 159 Bus-V:LA BASIN 230 & 138 kV

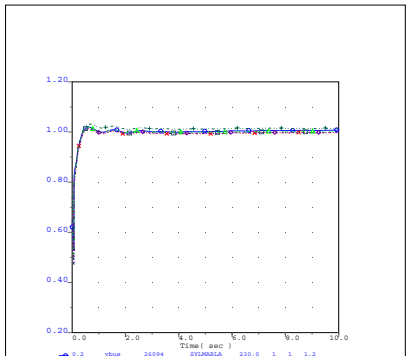


Figure 160 Bus-V:SCE 500 & 230 kV

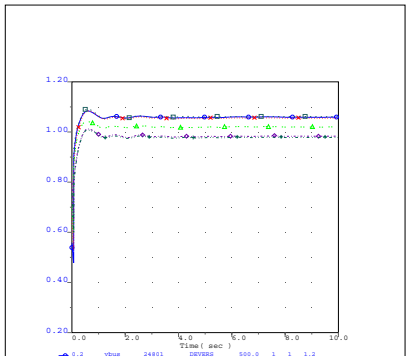


Figure 161 Bus-V: LADWP 500 kV:

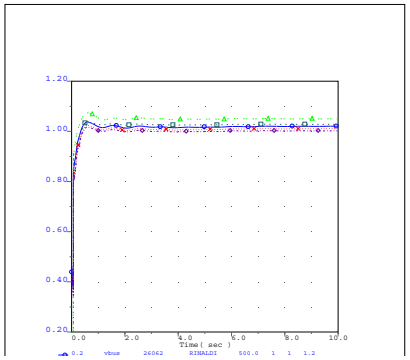


Figure 162 Bus-V:LADWP Load:

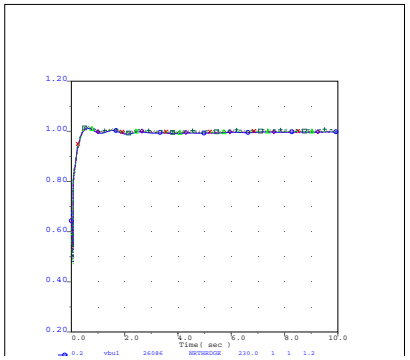


Figure 163 Bus-V: NW & S.CAL 500 kV

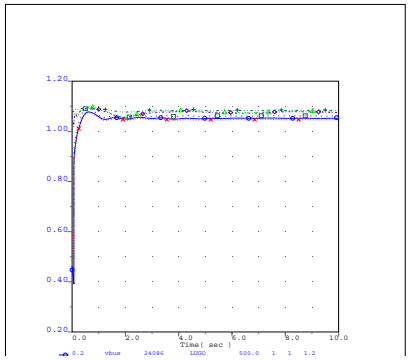


Figure 164 Bus-V: Others 500 kV

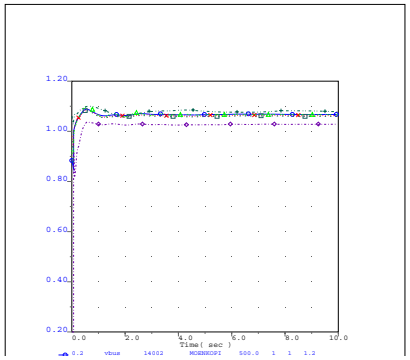


Figure 165 Bus-V: Others 230 kV

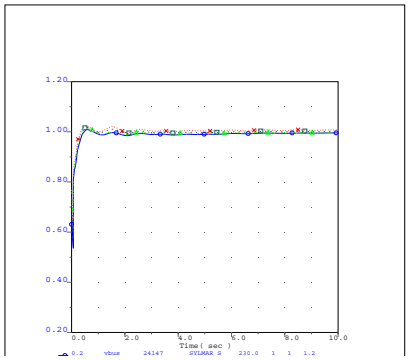


Figure 166 REL_RTR_ANG:S.Cal

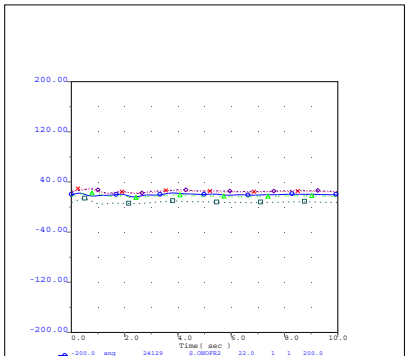


Figure 167 RELATIVE_ROTOR_ANGLE:S.Cal:

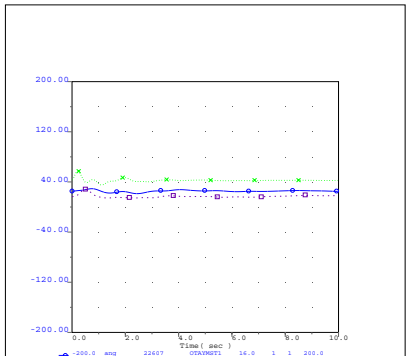
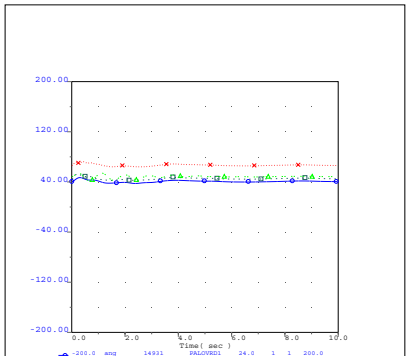


Figure 168 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Adel-Victorvl-dlo

Possible Violations: MORC 1[14]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[14] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 169 Bus-V:Owens Gorge/Rinaldi 230 kV

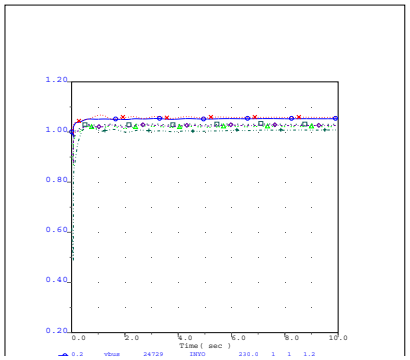


Figure 170 Bus-V:SCE North 115 kV

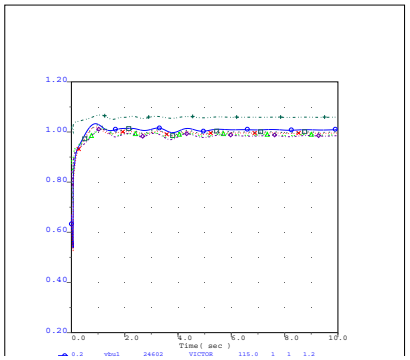


Figure 171 Bus-V:LA BASIN 230 & 138 kV

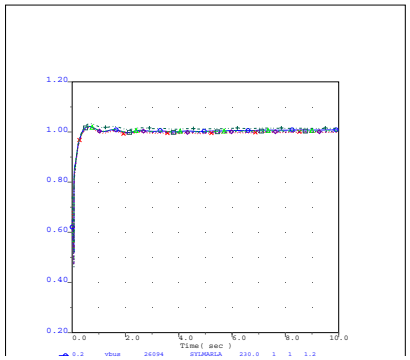


Figure 172 Bus-V:SCE 500 & 230 kV

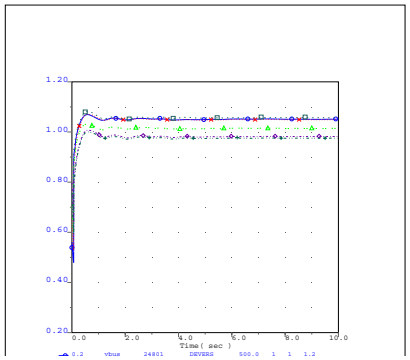


Figure 173 Bus-V: LADWP 500 kV:

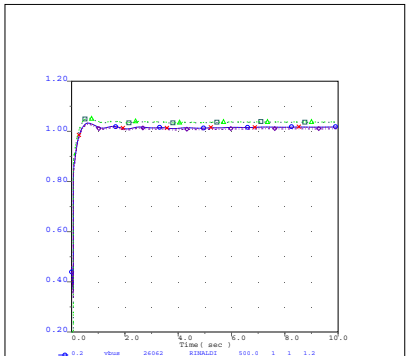


Figure 174 Bus-V:LADWP Load:

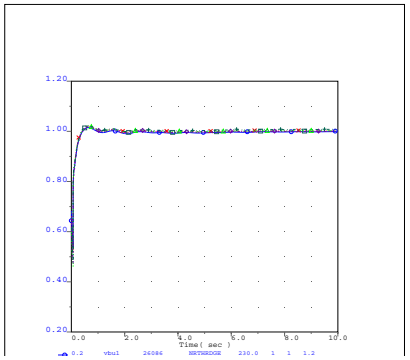


Figure 175 Bus-V: NW & S.CAL 500 kV

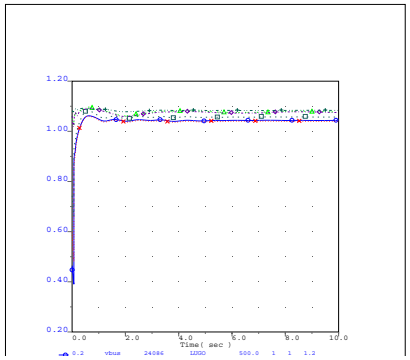


Figure 176 Bus-V: Others 500 kV

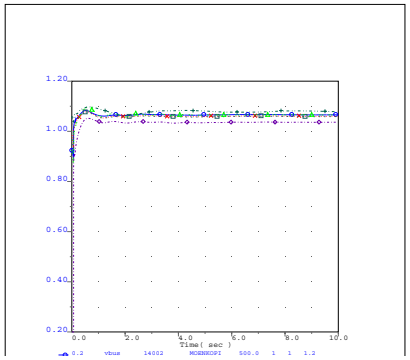


Figure 177 Bus-V: Others 230 kV

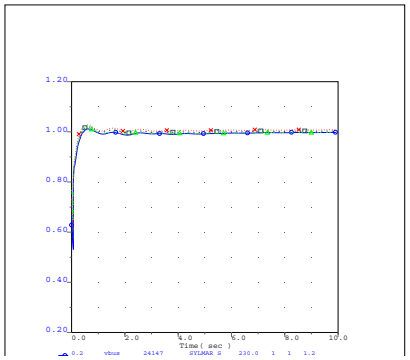


Figure 178 REL_RTR_ANG:S.Cal

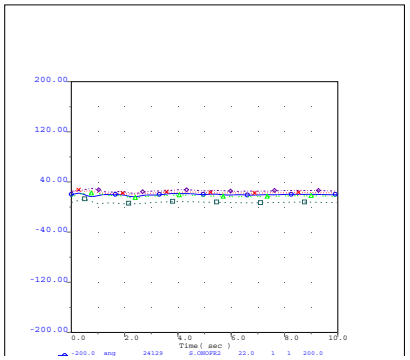


Figure 179 RELATIVE_ROTOR_ANGLE:S.Cal:

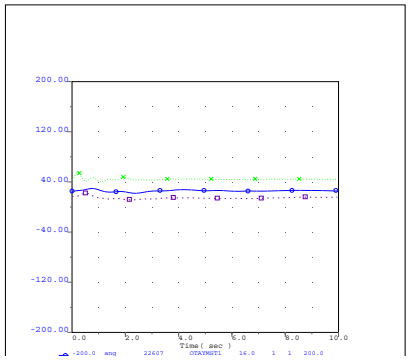
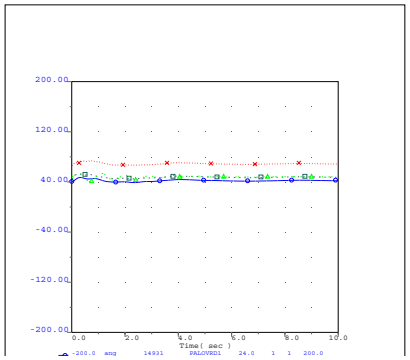


Figure 180 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: McCullgh-Victorvl-dlo

Possible Violations: MORC 1[15]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[15] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 181 Bus-V:Owens Gorge/Rinaldi 230 kV

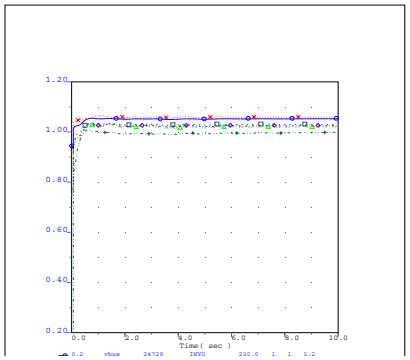


Figure 182 Bus-V:SCE North 115 kV

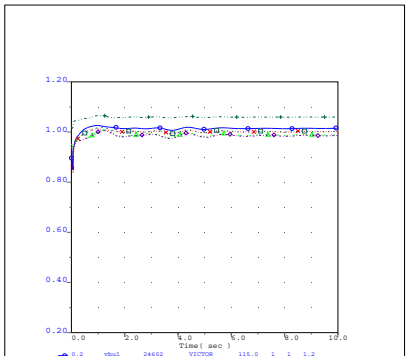


Figure 183 Bus-V:LA BASIN 230 & 138 kV

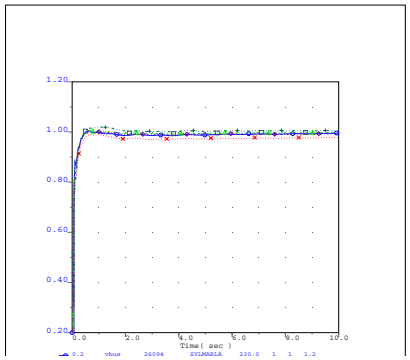


Figure 184 Bus-V:SCE 500 & 230 kV

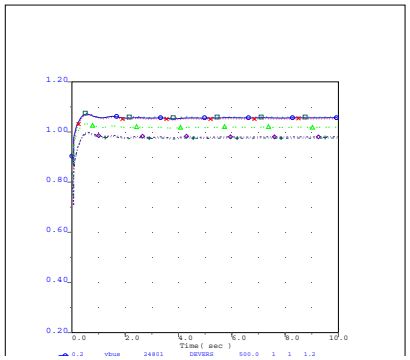


Figure 185 Bus-V: LADWP 500 kV:

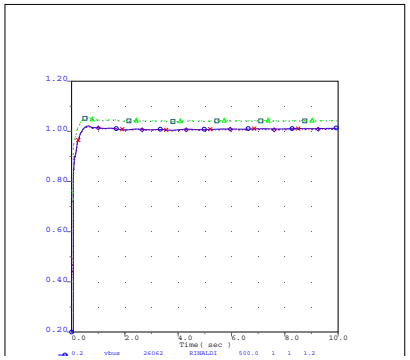


Figure 186 Bus-V:LADWP Load:

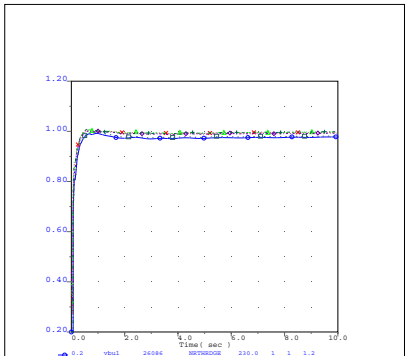


Figure 187 Bus-V: NW & S.CAL 500 kV

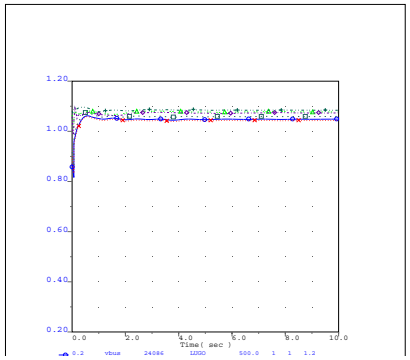


Figure 188 Bus-V: Others 500 kV

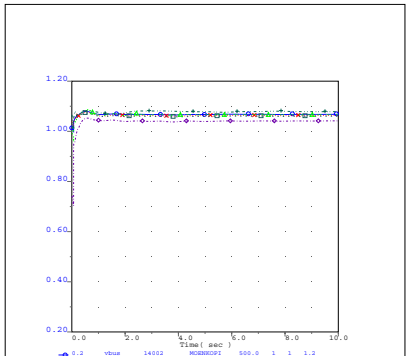


Figure 189 Bus-V: Others 230 kV

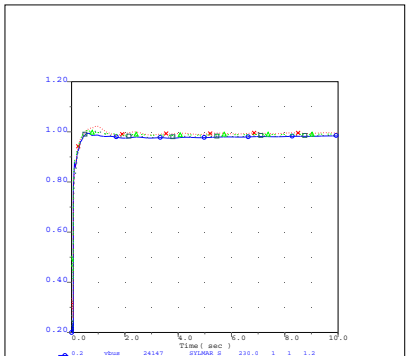


Figure 190 REL_RTR_ANG:S.Cal

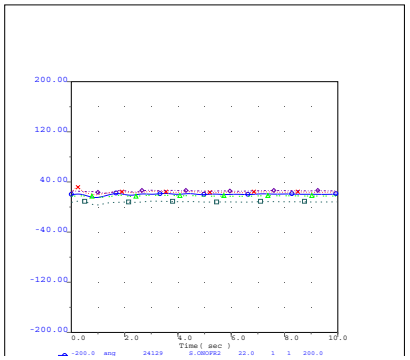


Figure 191 RELATIVE_ROTOR_ANGLE:S.Cal:

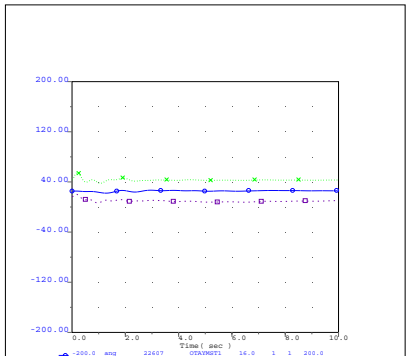
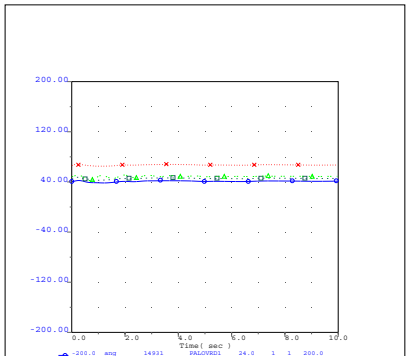


Figure 192 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Rin-Tar-dlo

Possible Violations: MORC 1[16]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[16] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 193 Bus-V:Owens Gorge/Rinaldi 230 kV

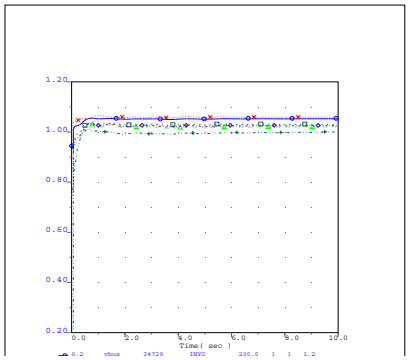


Figure 194 Bus-V:SCE North 115 kV

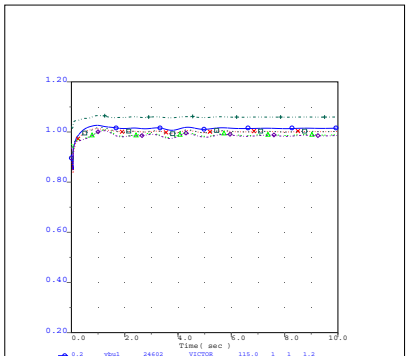


Figure 195 Bus-V:LA BASIN 230 & 138 kV

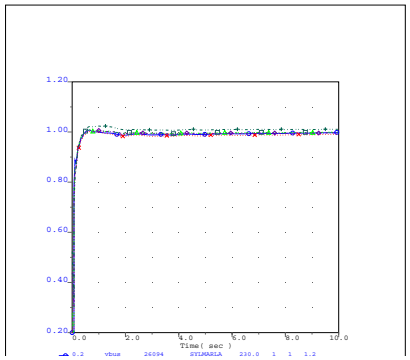


Figure 196 Bus-V:SCE 500 & 230 kV

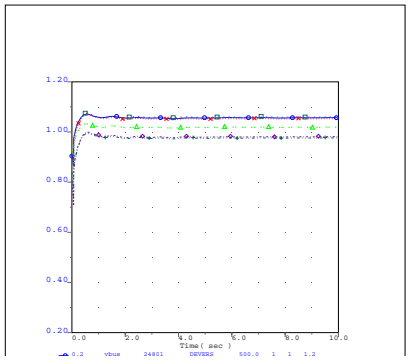


Figure 197 Bus-V: LADWP 500 kV:

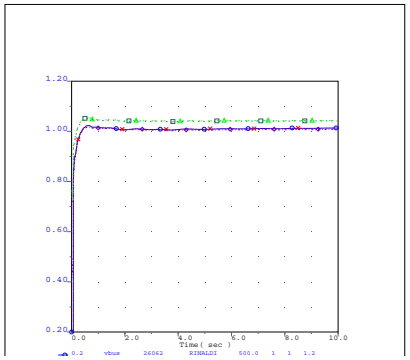


Figure 198 Bus-V:LADWP Load:

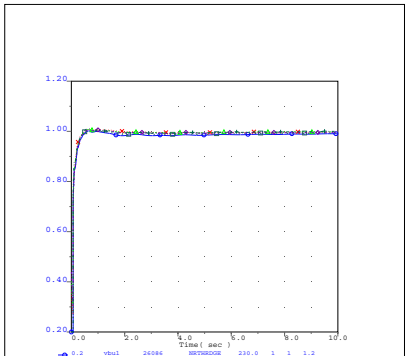


Figure 199 Bus-V: NW & S.CAL 500 kV

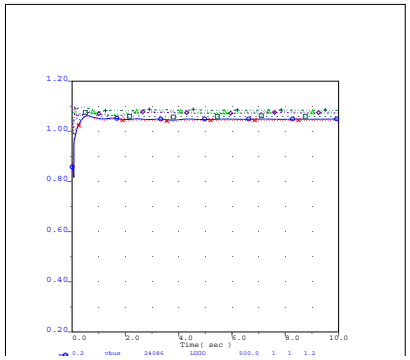


Figure 200 Bus-V: Others 500 kV

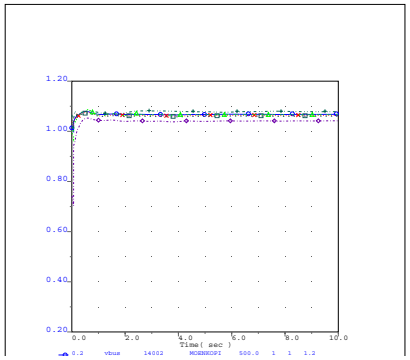


Figure 201 Bus-V: Others 230 kV

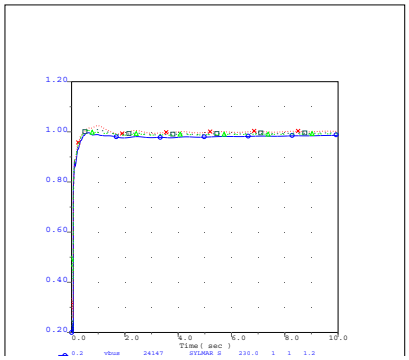


Figure 202 REL_RTR_ANG:S.Cal

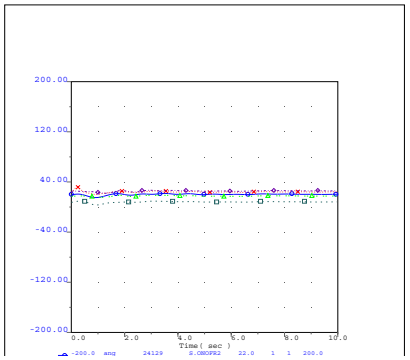


Figure 203 RELATIVE_ROTOR_ANGLE:S.Cal:

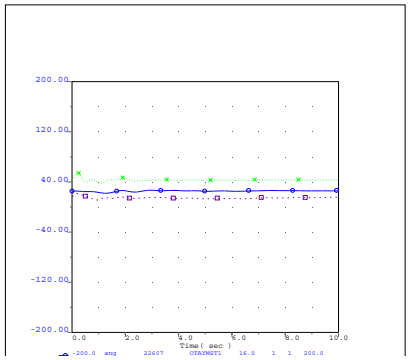
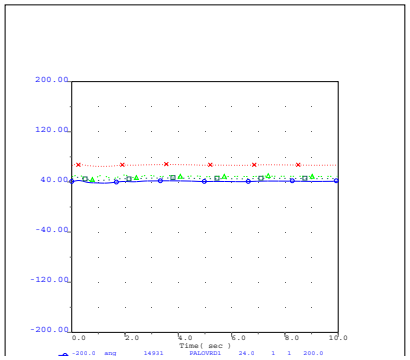


Figure 204 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: Rin-Glendl-dlo

Possible Violations: MORC 1[17]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[17] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 205 Bus-V:Owens Gorge/Rinaldi 230 kV

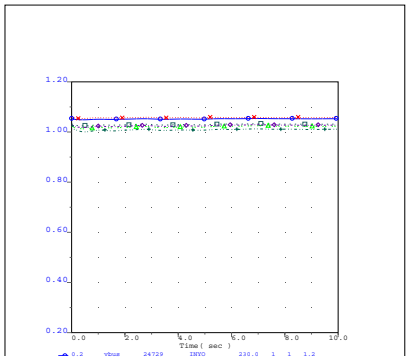


Figure 206 Bus-V:SCE North 115 kV

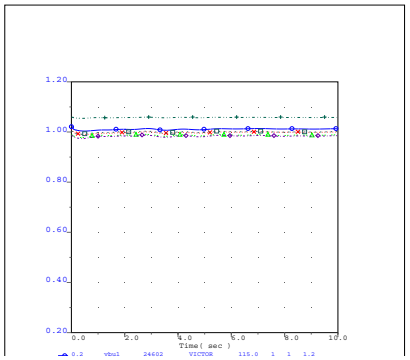


Figure 207 Bus-V:LA BASIN 230 & 138 kV

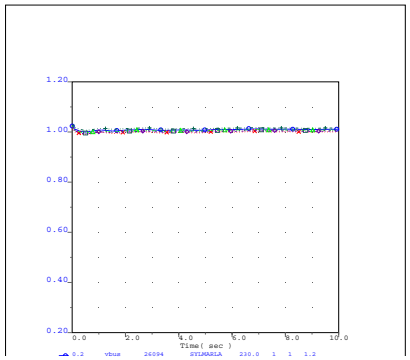


Figure 208 Bus-V:SCE 500 & 230 kV

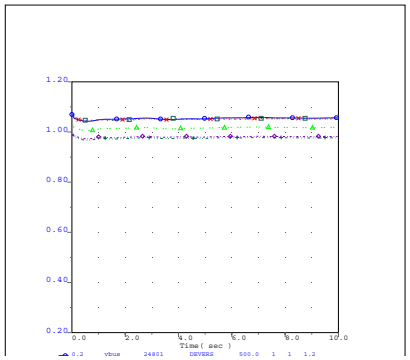


Figure 209 Bus-V: LADWP 500 kV:

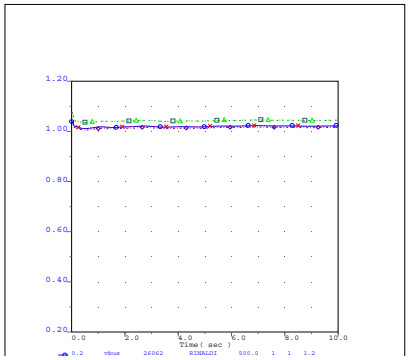


Figure 210 Bus-V:LADWP Load:

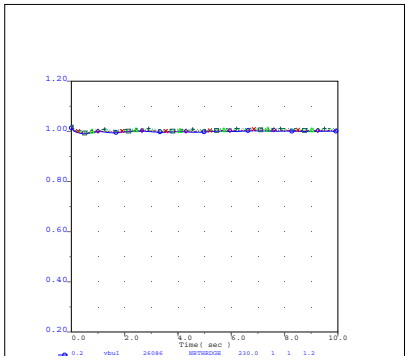


Figure 211 Bus-V: NW & S.CAL 500 kV

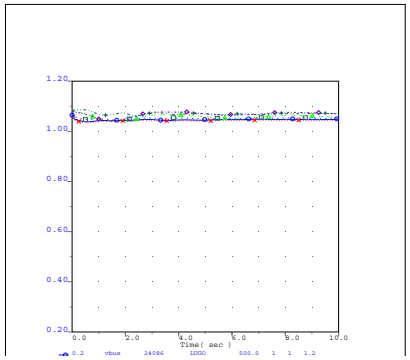


Figure 212 Bus-V: Others 500 kV

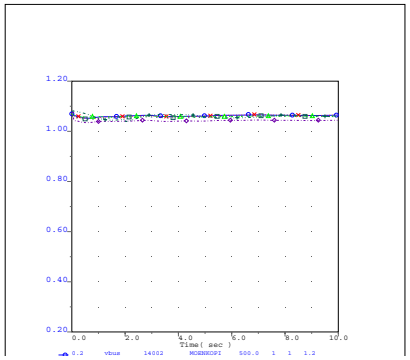


Figure 213 Bus-V: Others 230 kV

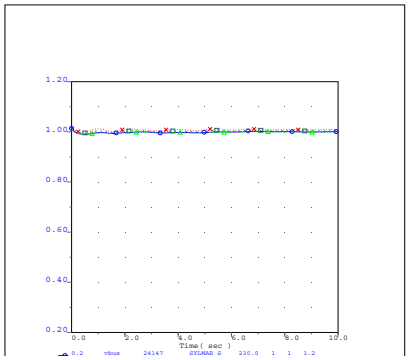


Figure 214 REL_RTR_ANG:S.Cal

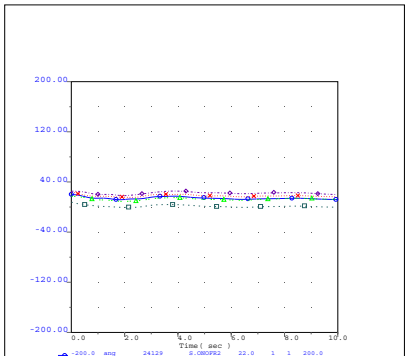


Figure 215 RELATIVE_ROTOR_ANGLE:S.Cal:

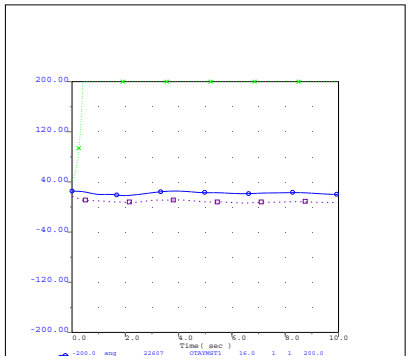
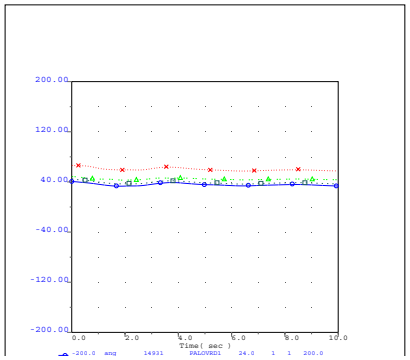


Figure 216 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_45og Contingency: IPP-bipolar-upc

Possible Violations: MORC 1[18]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[18] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Study: BSP Case: hsbspa2_0iy_ov_110og_cast

Figure 1 Bus-V:Owens Gorge/Rinaldi 230 kV

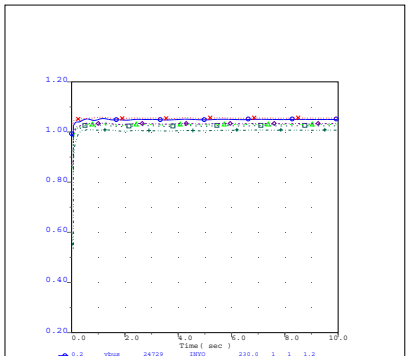


Figure 2 Bus-V:SCE North 115 kV

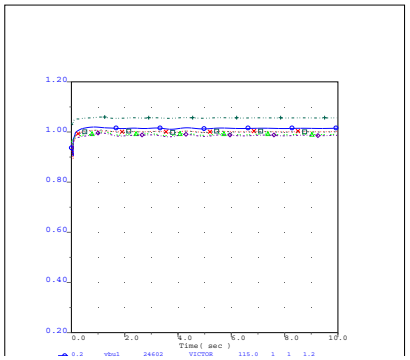


Figure 3 Bus-V:LA BASIN 230 & 138 kV

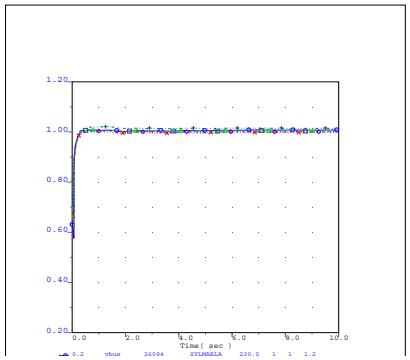


Figure 4 Bus-V:SCE 500 & 230 kV

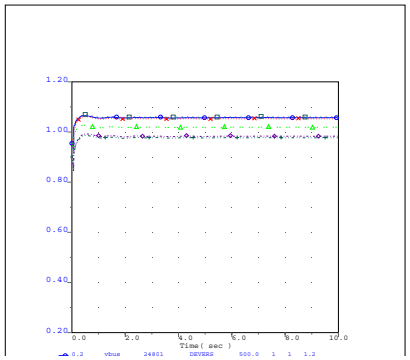


Figure 5 Bus-V: LADWP 500 kV:

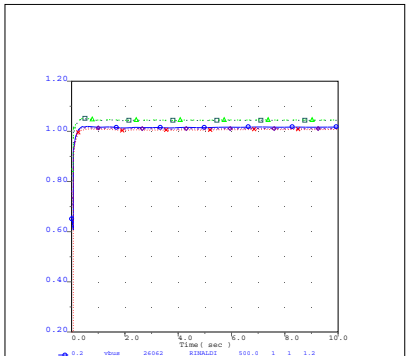


Figure 6 Bus-V:LADWP Load:

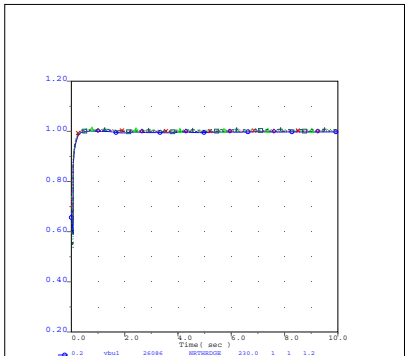


Figure 7 Bus-V: NW & S.CAL 500 kV

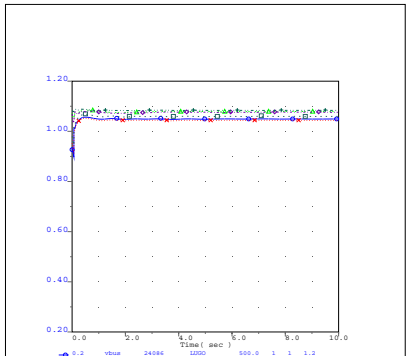


Figure 8 Bus-V: Others 500 kV

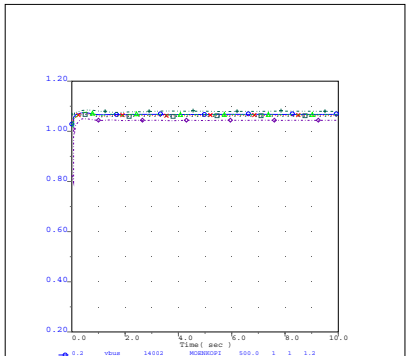


Figure 9 Bus-V: Others 230 kV

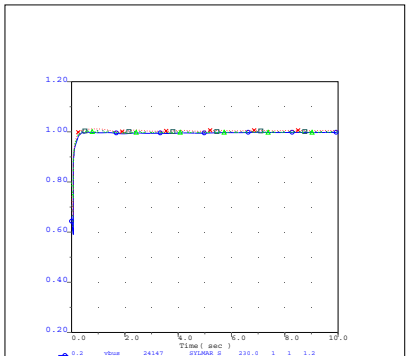


Figure 10 REL_RTR_ANG:S.Cal

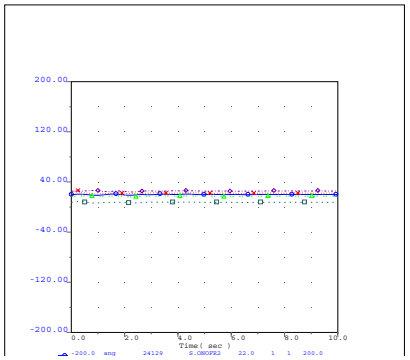


Figure 11 RELATIVE_ROTOR_ANGLE:S.Cal:

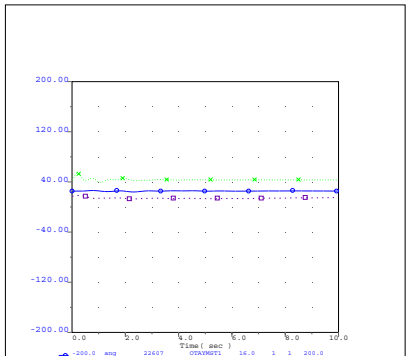
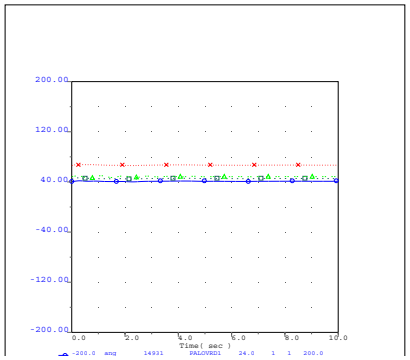


Figure 12 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Adel-Rinaldi-slo

Possible Violations: MORC 1[1]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[1] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 13 Bus-V:Owens Gorge/Rinaldi 230 kV

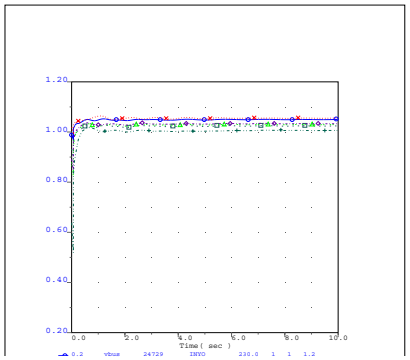


Figure 14 Bus-V:SCE North 115 kV

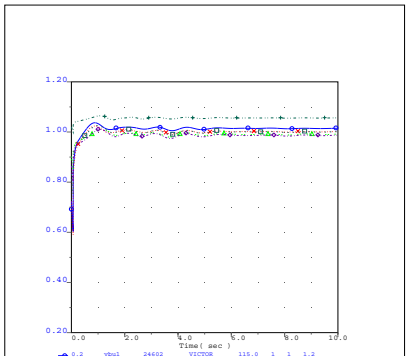


Figure 15 Bus-V:LA BASIN 230 & 138 kV

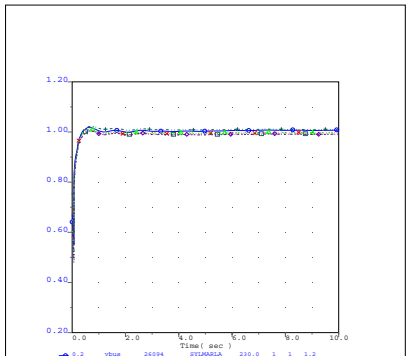


Figure 16 Bus-V:SCE 500 & 230 kV

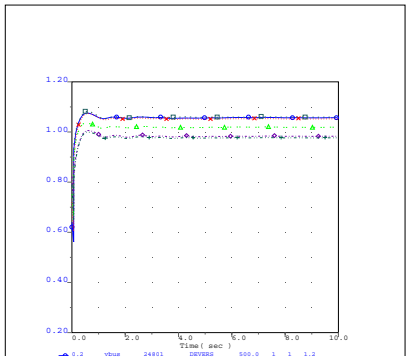


Figure 17 Bus-V: LADWP 500 kV:

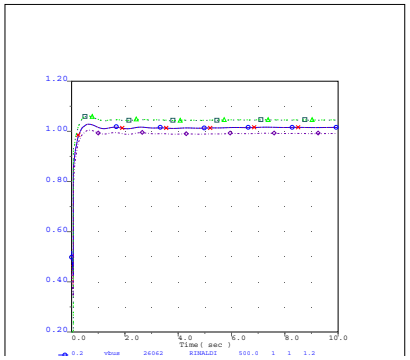


Figure 18 Bus-V:LADWP Load:

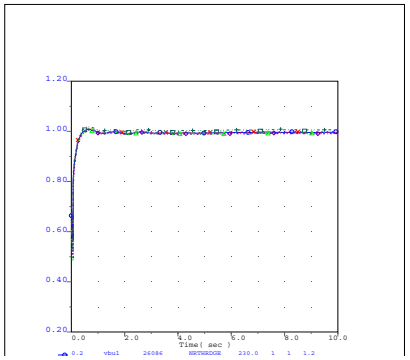


Figure 19 Bus-V: NW & S.CAL 500 kV

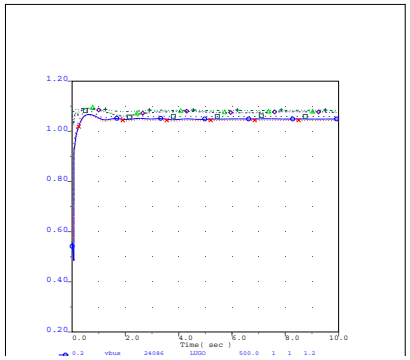


Figure 20 Bus-V: Others 500 kV

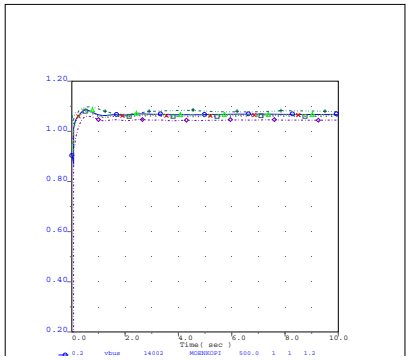


Figure 21 Bus-V: Others 230 kV

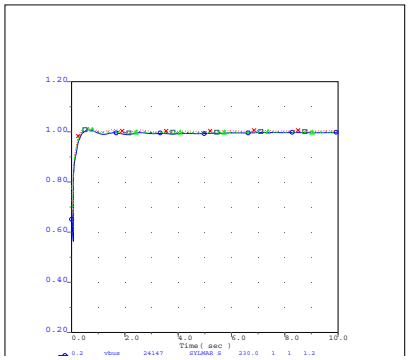


Figure 22 REL_RTR_ANG:S.Cal

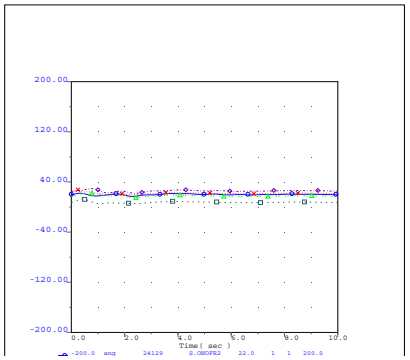


Figure 23 RELATIVE_ROTOR_ANGLE:S.Cal:

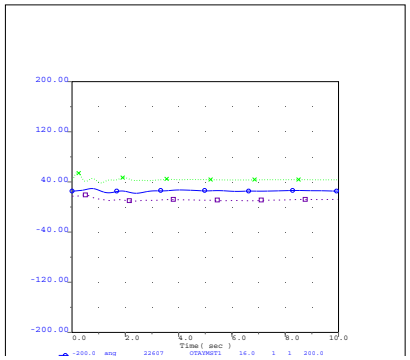
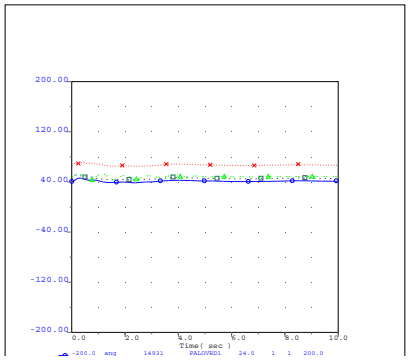


Figure 24 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Adel-Toluca

Possible Violations: MORC 1[2]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[2] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 25 Bus-V:Owens Gorge/Rinaldi 230 kV

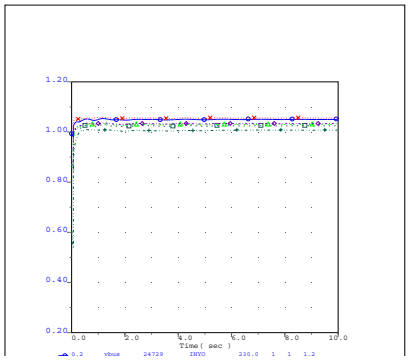


Figure 26 Bus-V:SCE North 115 kV

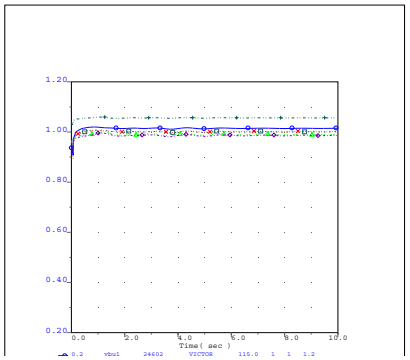


Figure 27 Bus-V:LA BASIN 230 & 138 kV

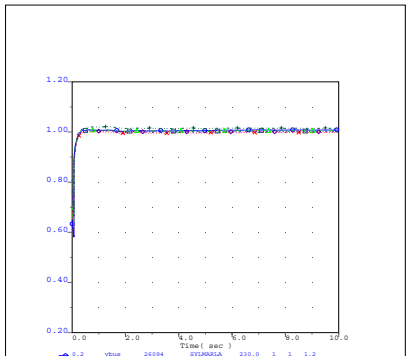


Figure 28 Bus-V:SCE 500 & 230 kV

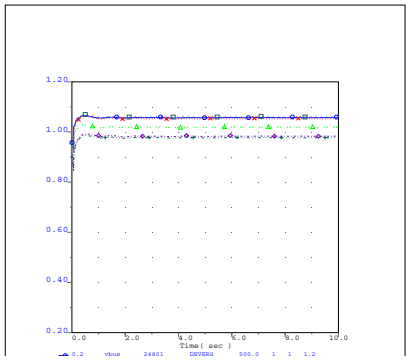


Figure 29 Bus-V: LADWP 500 kV:

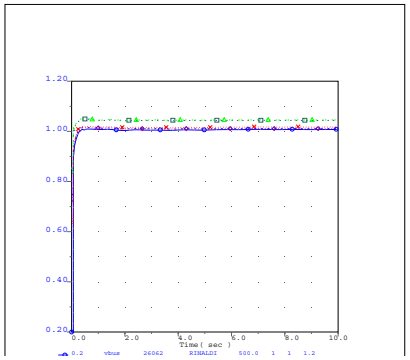


Figure 30 Bus-V:LADWP Load:

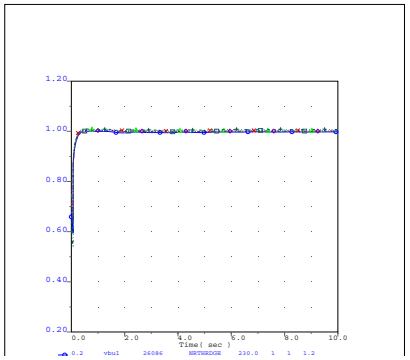


Figure 31 Bus-V: NW & S.CAL 500 kV

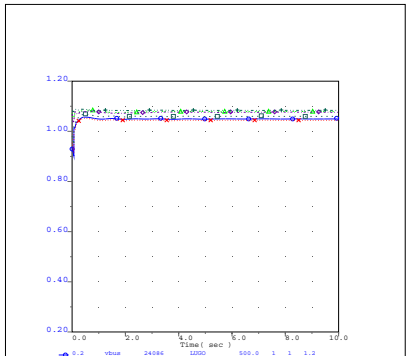


Figure 32 Bus-V: Others 500 kV

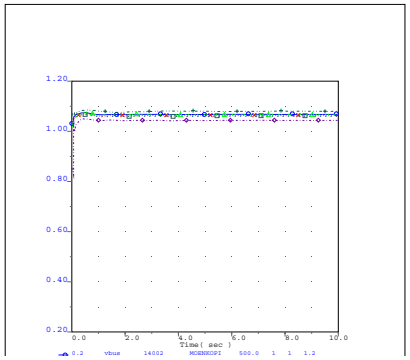


Figure 33 Bus-V: Others 230 kV

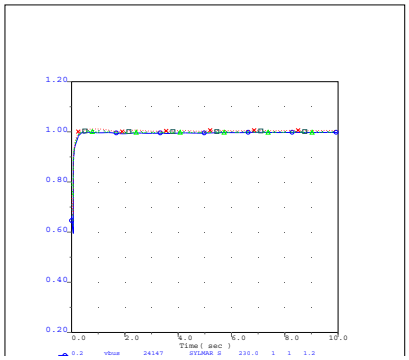


Figure 34 REL_RTR_ANG:S.Cal

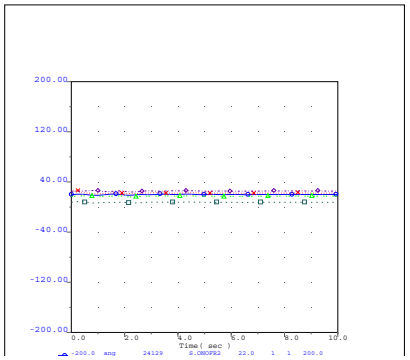


Figure 35 RELATIVE_ROTOR_ANGLE:S.Cal:

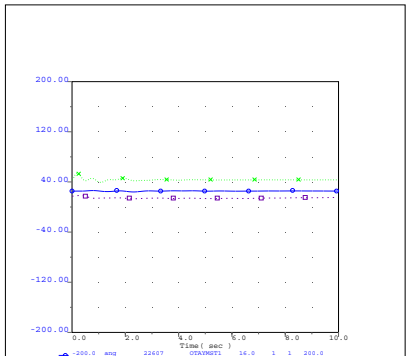
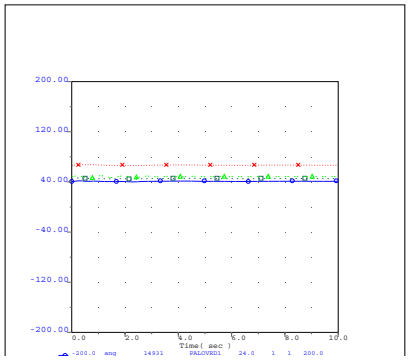


Figure 36 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Vict-Rinaldi-slo

Possible Violations: MORC 1[3]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[3] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 37 Bus-V:Owens Gorge/Rinaldi 230 kV

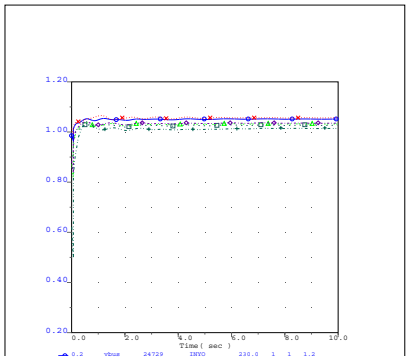


Figure 38 Bus-V:SCE North 115 kV

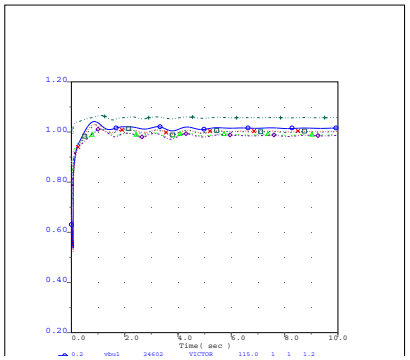


Figure 39 Bus-V:LA BASIN 230 & 138 kV

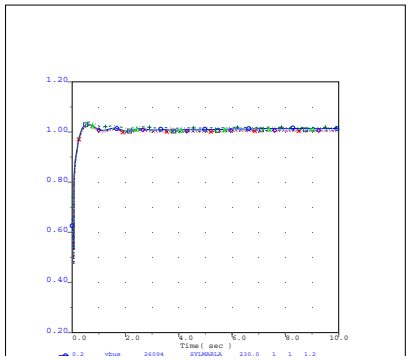


Figure 40 Bus-V:SCE 500 & 230 kV

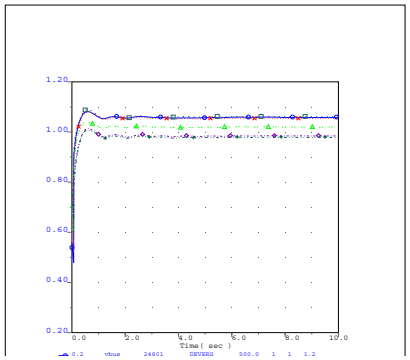


Figure 41 Bus-V: LADWP 500 kV:

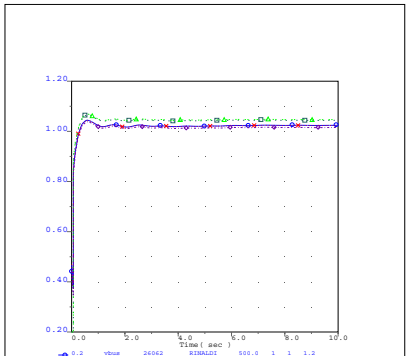


Figure 42 Bus-V:LADWP Load:

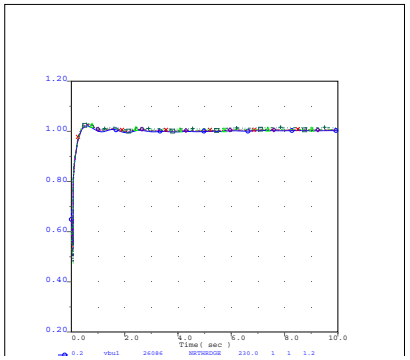


Figure 43 Bus-V: NW & S.CAL 500 kV

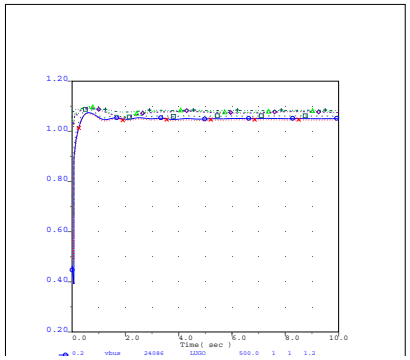


Figure 44 Bus-V: Others 500 kV

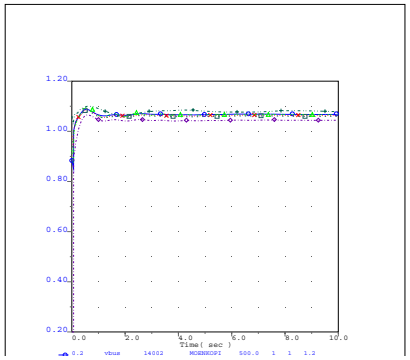


Figure 45 Bus-V: Others 230 kV

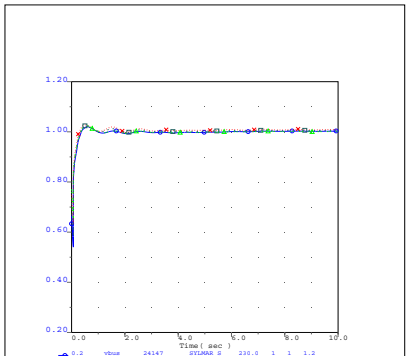


Figure 46 REL_RTR_ANG:S.Cal

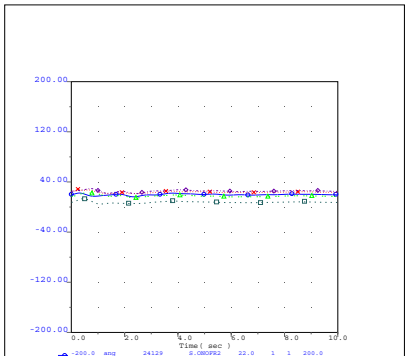


Figure 47 RELATIVE_ROTOR_ANGLE:S.Cal:

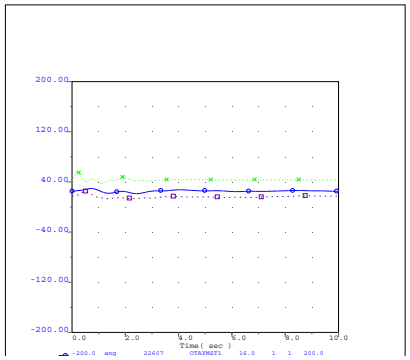
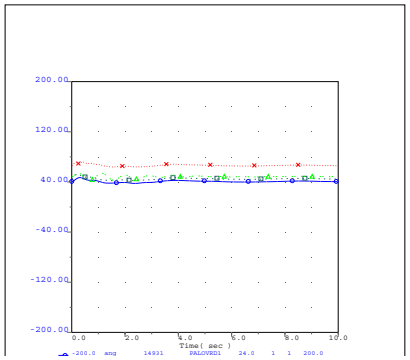


Figure 48 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Adel-Victorvl-slo

Possible Violations: MORC 1[4]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[4] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 49 Bus-V:Owens Gorge/Rinaldi 230 kV

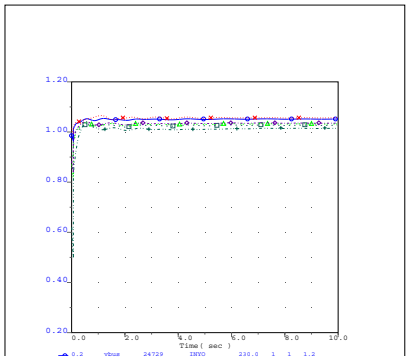


Figure 50 Bus-V:SCE North 115 kV

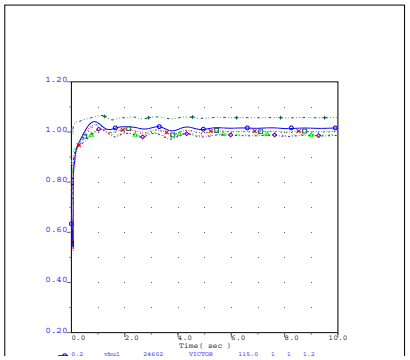


Figure 51 Bus-V:LA BASIN 230 & 138 kV

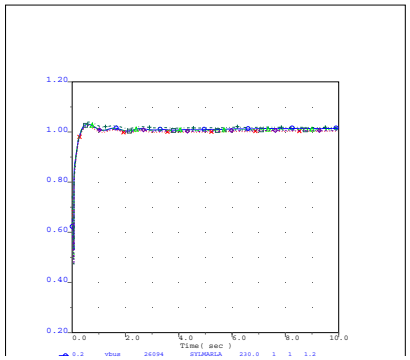


Figure 52 Bus-V:SCE 500 & 230 kV

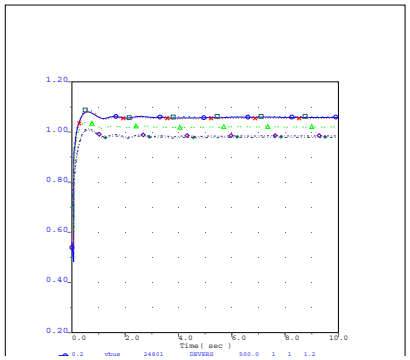


Figure 53 Bus-V: LADWP 500 kV:

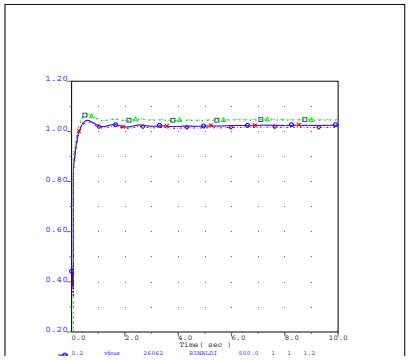


Figure 54 Bus-V:LADWP Load:

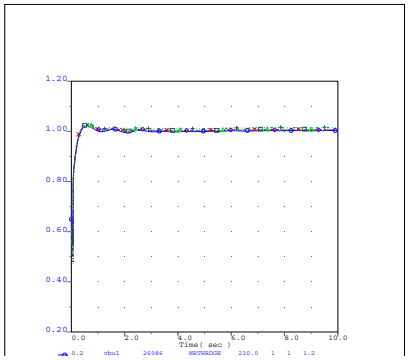


Figure 55 Bus-V: NW & S.CAL 500 kV

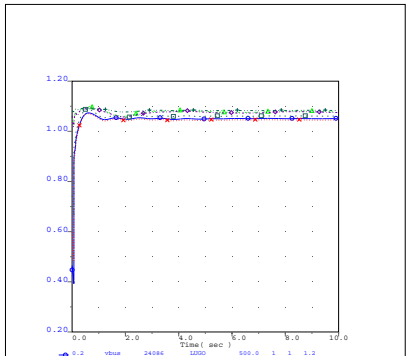


Figure 56 Bus-V: Others 500 kV

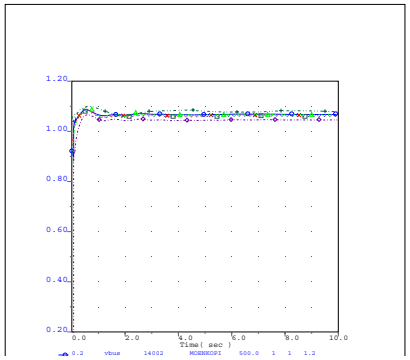


Figure 57 Bus-V: Others 230 kV

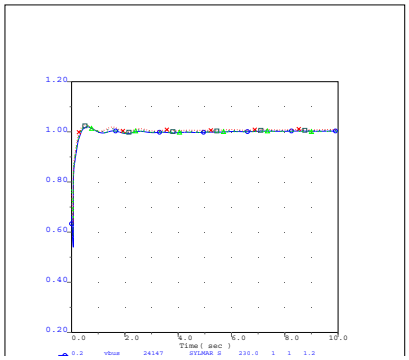


Figure 58 REL_RTR_ANG:S.Cal

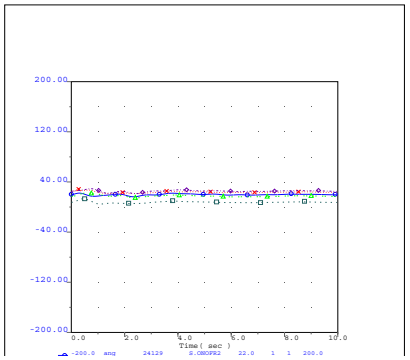


Figure 59 RELATIVE_ROTOR_ANGLE:S.Cal:

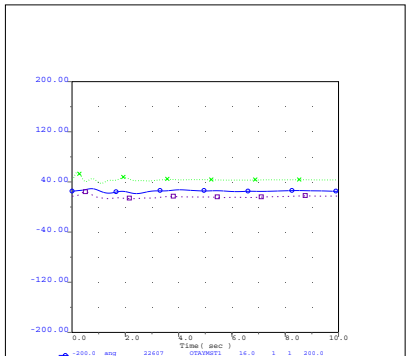
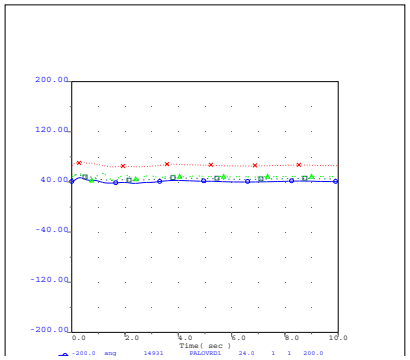


Figure 60 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: McC-Vict-slo

Possible Violations: MORC 1[5]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[5] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 61 Bus-V:Owens Gorge/Rinaldi 230 kV

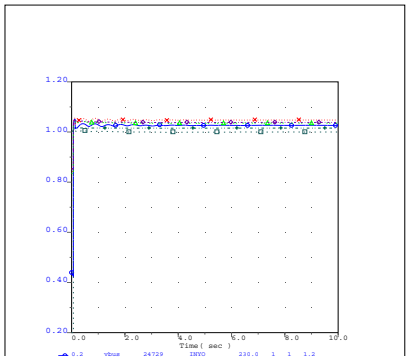


Figure 62 Bus-V:SCE North 115 kV

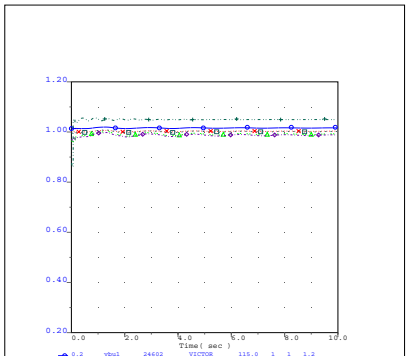


Figure 63 Bus-V:LA BASIN 230 & 138 kV

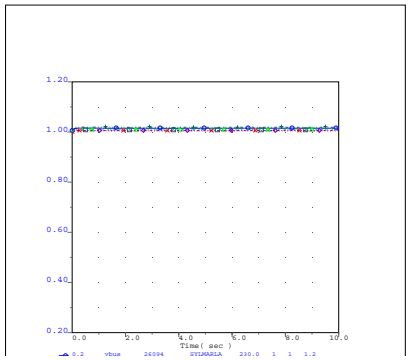


Figure 64 Bus-V:SCE 500 & 230 kV

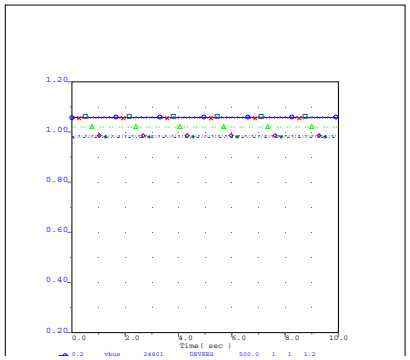


Figure 65 Bus-V: LADWP 500 kV:

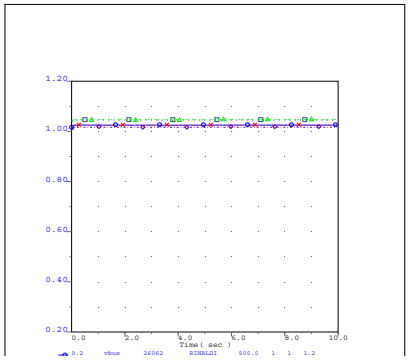


Figure 66 Bus-V:LADWP Load:

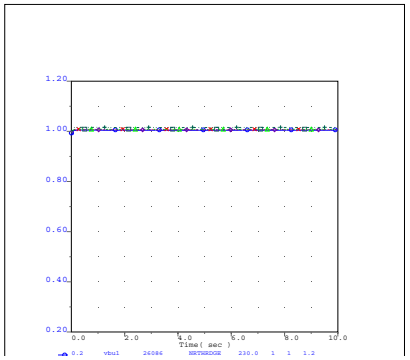


Figure 67 Bus-V: NW & S.CAL 500 kV

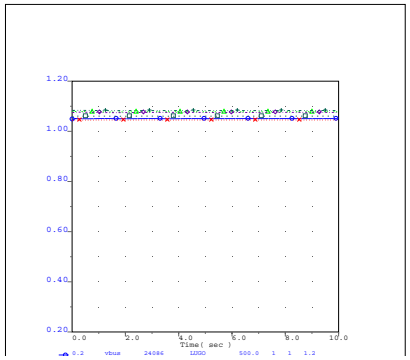


Figure 68 Bus-V: Others 500 kV

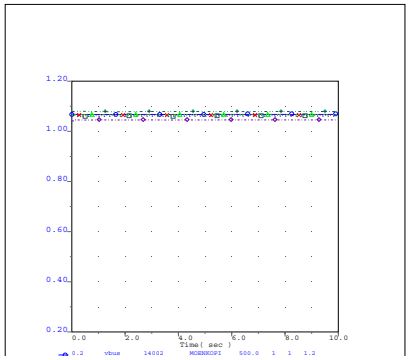


Figure 69 Bus-V: Others 230 kV

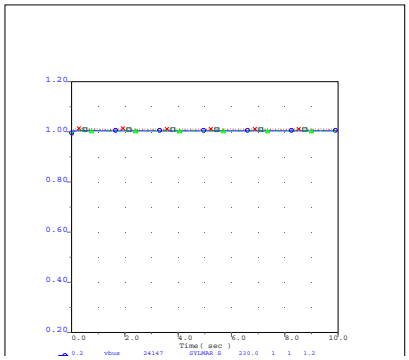


Figure 70 REL_RTR_ANG:S.Cal

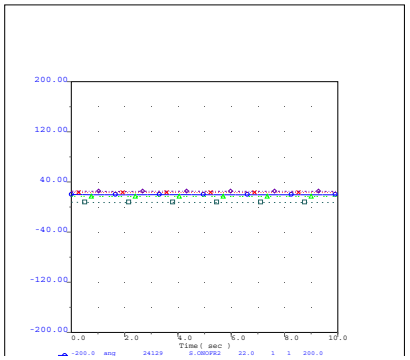


Figure 71 RELATIVE_ROTOR_ANGLE:S.Cal:

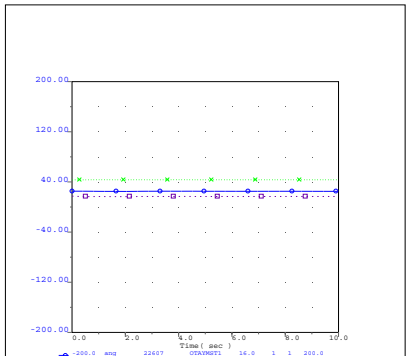
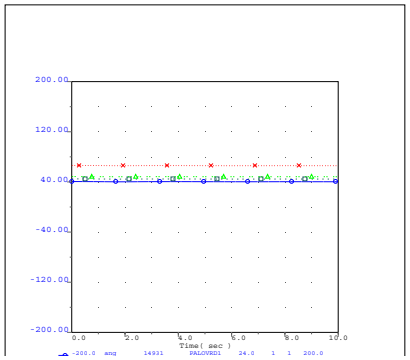


Figure 72 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Cottonwd-Inyo-preRAS

Possible Violations: MORC 1[6]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[6] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 73 Bus-V:Owens Gorge/Rinaldi 230 kV

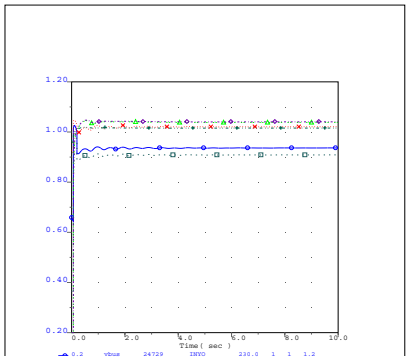


Figure 74 Bus-V:SCE North 115 kV

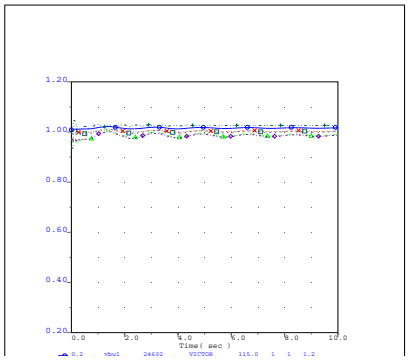


Figure 75 Bus-V:LA BASIN 230 & 138 kV

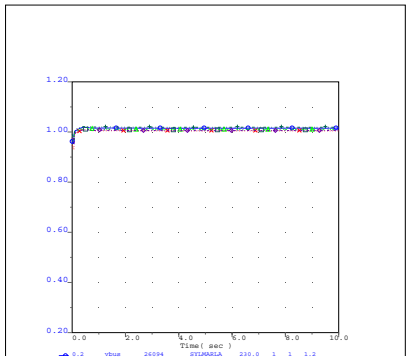


Figure 76 Bus-V:SCE 500 & 230 kV

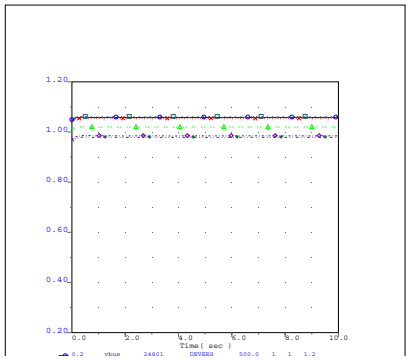


Figure 77 Bus-V: LADWP 500 kV:

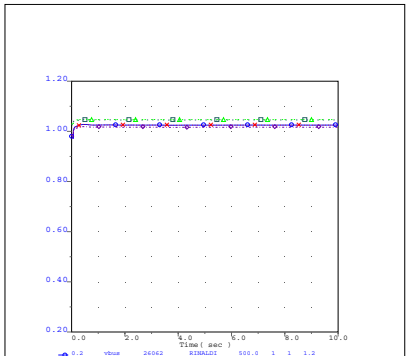


Figure 78 Bus-V:LADWP Load:

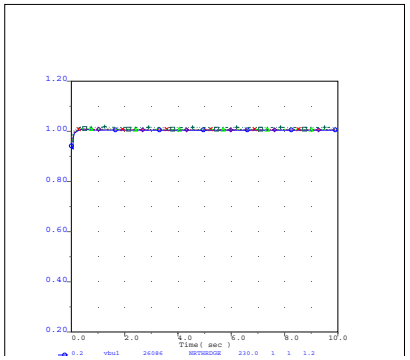


Figure 79 Bus-V: NW & S.CAL 500 kV

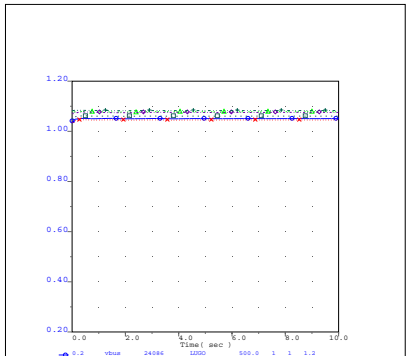


Figure 80 Bus-V: Others 500 kV

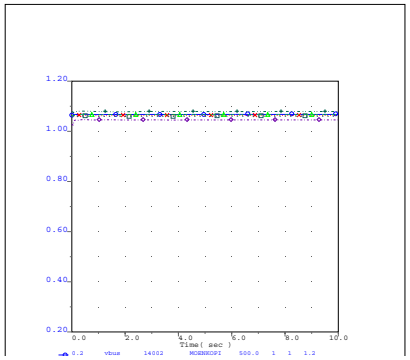


Figure 81 Bus-V: Others 230 kV

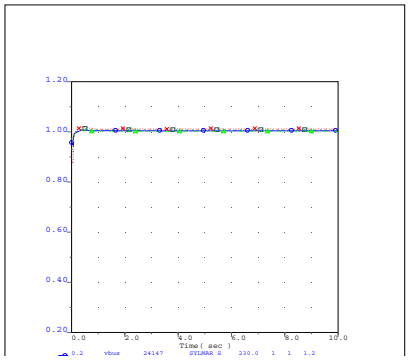


Figure 82 REL_RTR_ANG:S.Cal

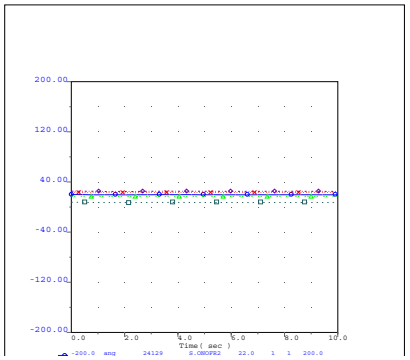


Figure 83 RELATIVE_ROTOR_ANGLE:S.Cal:

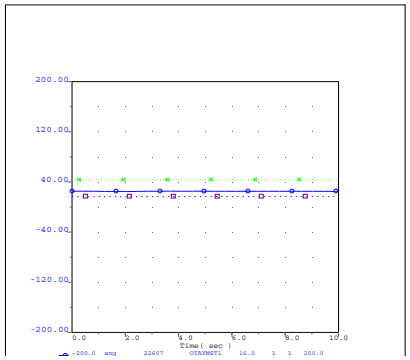
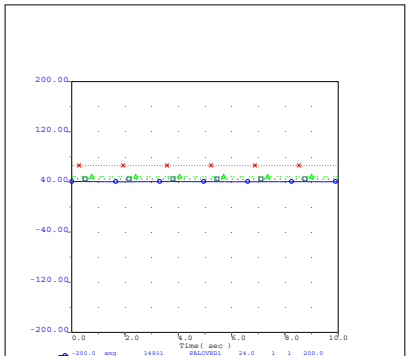


Figure 84 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Cottonwd-BTAP-RAS

Possible Violations: MORC 1[7]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: 13, >10%: None

[7] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 85 Bus-V:Owens Gorge/Rinaldi 230 kV

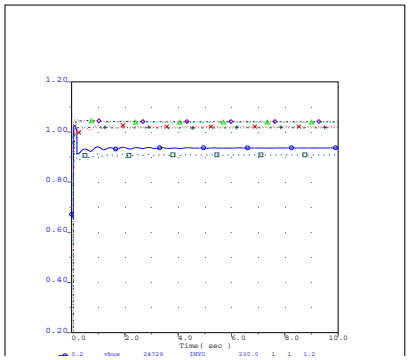


Figure 86 Bus-V:SCE North 115 kV

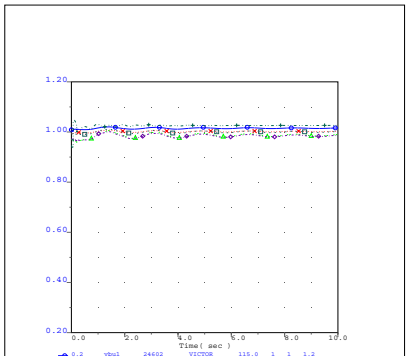


Figure 87 Bus-V:LA BASIN 230 & 138 kV

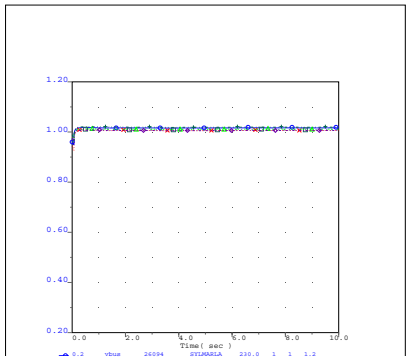


Figure 88 Bus-V:SCE 500 & 230 kV

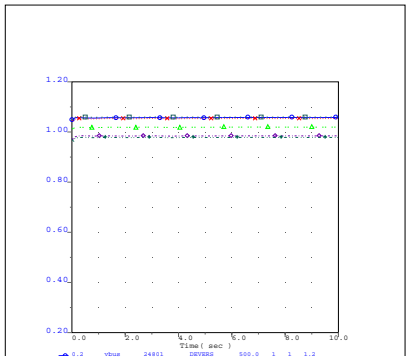


Figure 89 Bus-V: LADWP 500 kV:

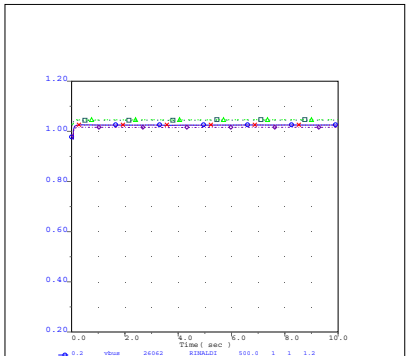


Figure 90 Bus-V:LADWP Load:

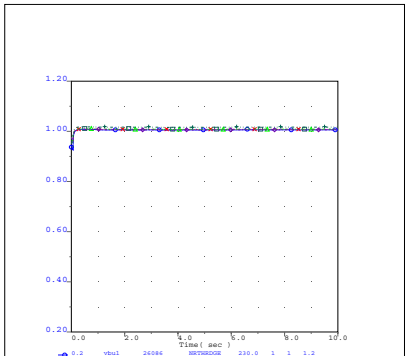


Figure 91 Bus-V: NW & S.CAL 500 kV

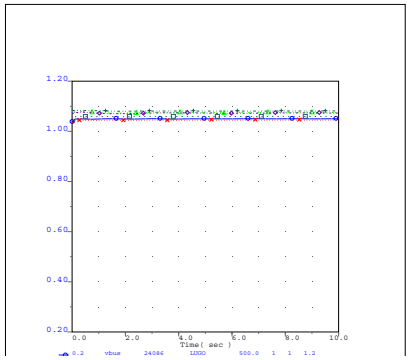


Figure 92 Bus-V: Others 500 kV

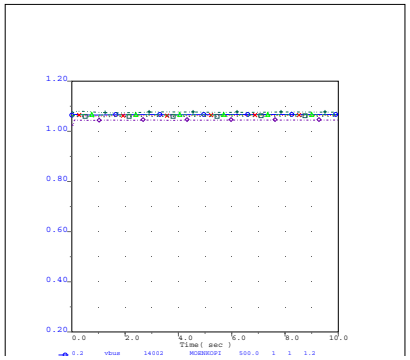


Figure 93 Bus-V: Others 230 kV

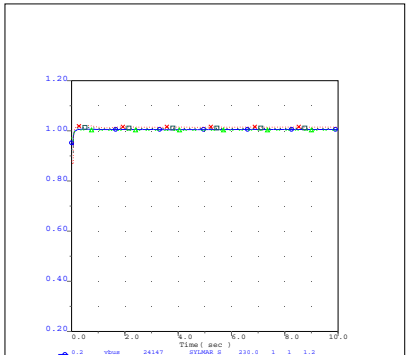


Figure 94 REL_RTR_ANG:S.Cal

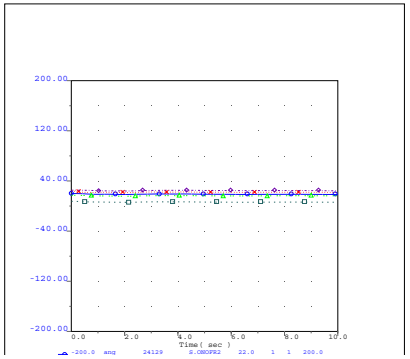


Figure 95 RELATIVE_ROTOR_ANGLE:S.Cal:

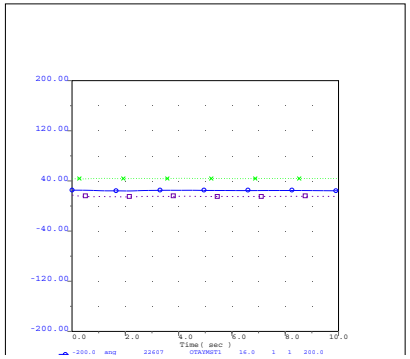
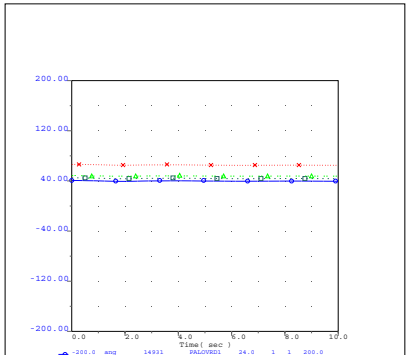


Figure 96 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: BTAP-BR-RAS

Possible Violations: MORC 1[8]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: 13, >10%: None

[8] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 97 Bus-V:Owens Gorge/Rinaldi 230 kV

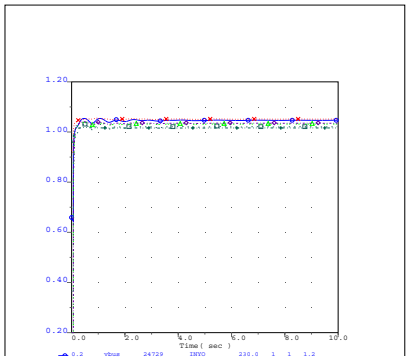


Figure 98 Bus-V:SCE North 115 kV

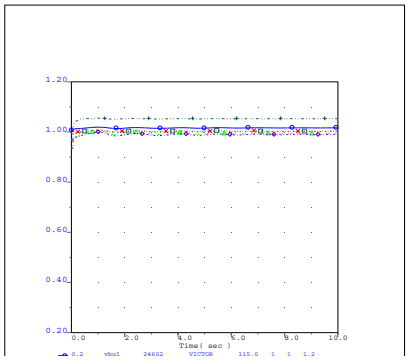


Figure 99 Bus-V:LA BASIN 230 & 138 kV

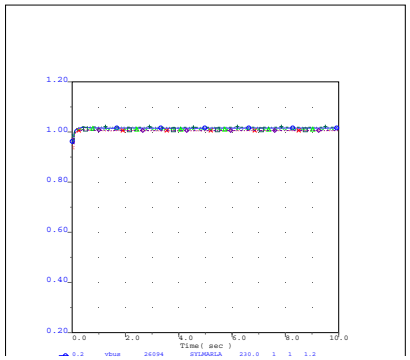


Figure 100 Bus-V:SCE 500 & 230 kV

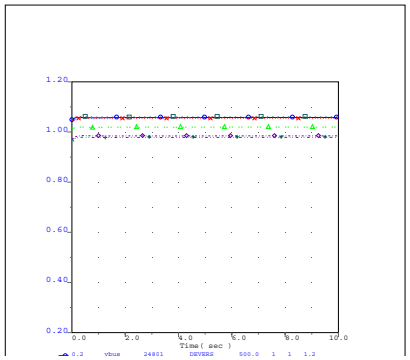


Figure 101 Bus-V: LADWP 500 kV:

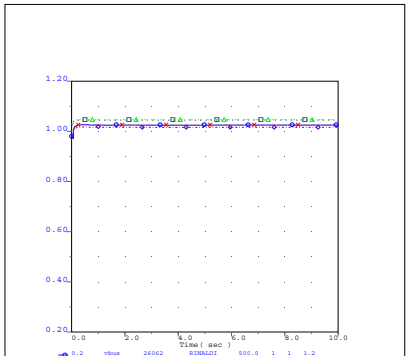


Figure 102 Bus-V:LADWP Load:

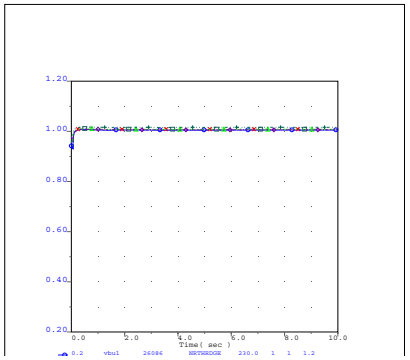


Figure 103 Bus-V: NW & S.CAL 500 kV

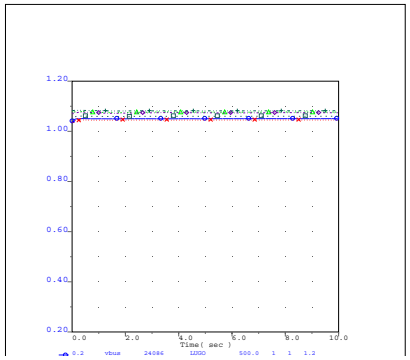


Figure 104 Bus-V: Others 500 kV

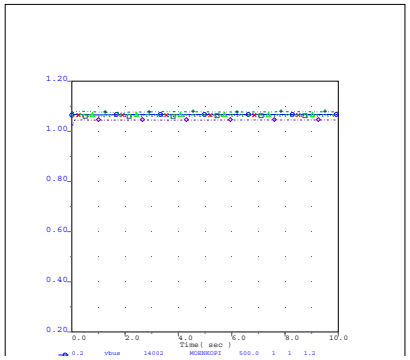


Figure 105 Bus-V: Others 230 kV

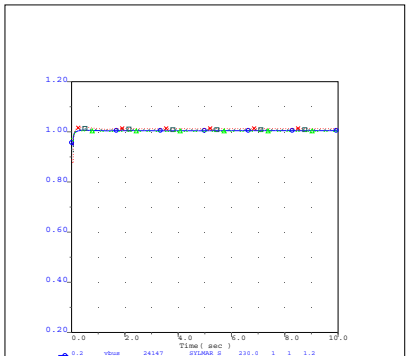


Figure 106 REL_RTR_ANG:S.Cal

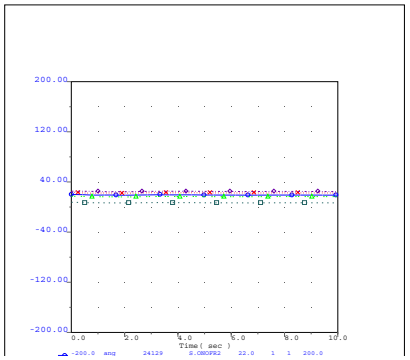


Figure 107 RELATIVE_ROTOR_ANGLE:S.Cal:

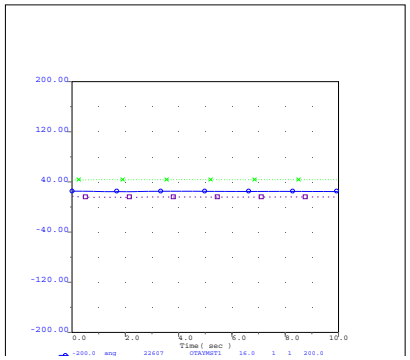
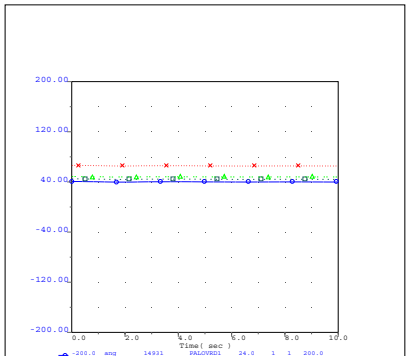


Figure 108 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Beacon-BTAP-RAS

Possible Violations: MORC 1[9]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[9] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 109 Bus-V:Owens Gorge/Rinaldi 230 kV

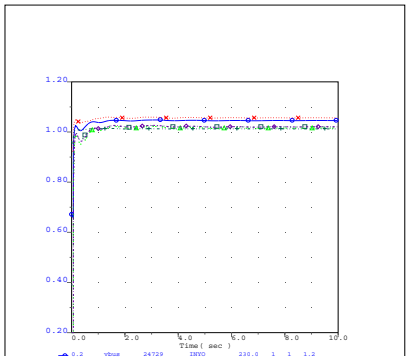


Figure 110 Bus-V:SCE North 115 kV

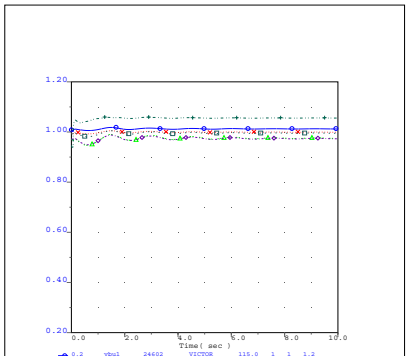


Figure 111 Bus-V:LA BASIN 230 & 138 kV

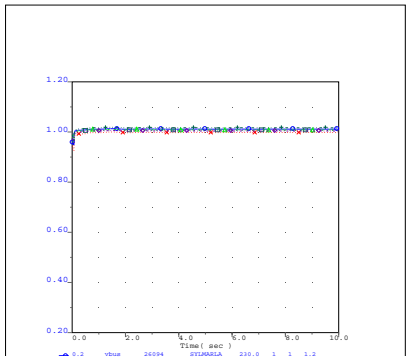


Figure 112 Bus-V:SCE 500 & 230 kV

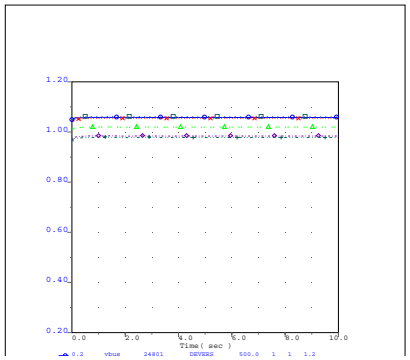


Figure 113 Bus-V: LADWP 500 kV:

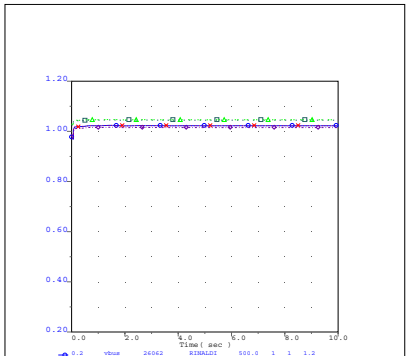


Figure 114 Bus-V:LADWP Load:

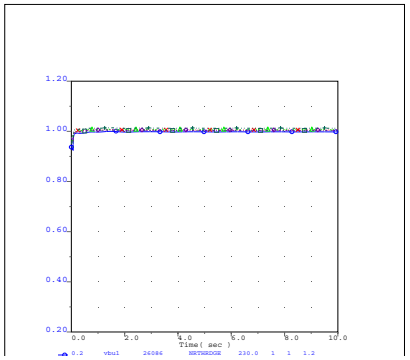


Figure 115 Bus-V: NW & S.CAL 500 kV

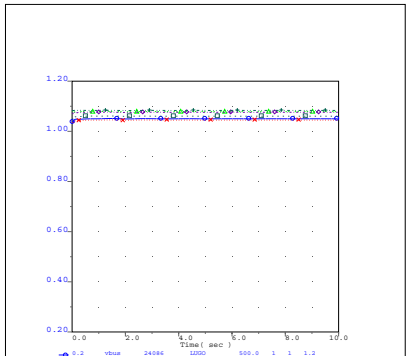


Figure 116 Bus-V: Others 500 kV

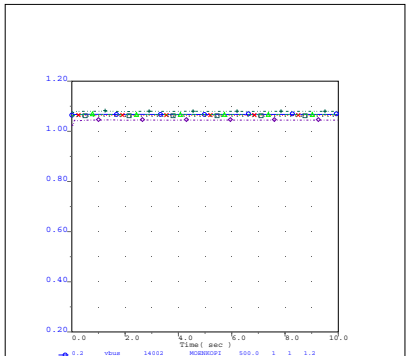


Figure 117 Bus-V: Others 230 kV

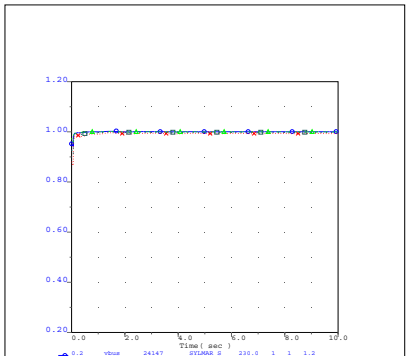


Figure 118 REL_RTR_ANG:S.Cal

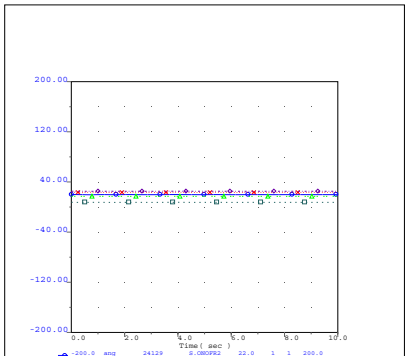


Figure 119 RELATIVE_ROTOR_ANGLE:S.Cal:

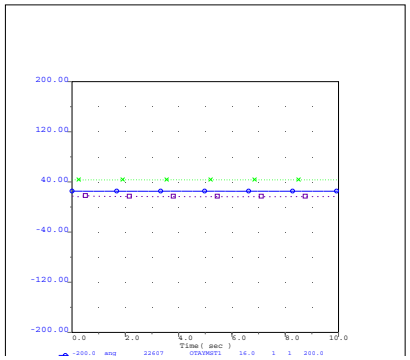
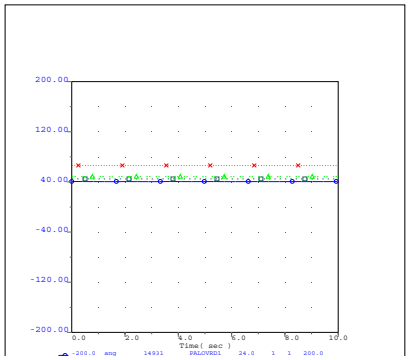


Figure 120 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: BR-Rinaldi-NoRAS

Possible Violations: MORC 1[10]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[10] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 121 Bus-V:Owens Gorge/Rinaldi 230 kV

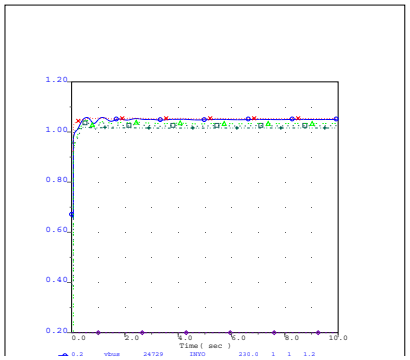


Figure 122 Bus-V:SCE North 115 kV

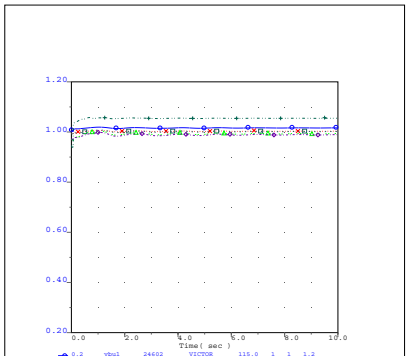


Figure 123 Bus-V:LA BASIN 230 & 138 kV

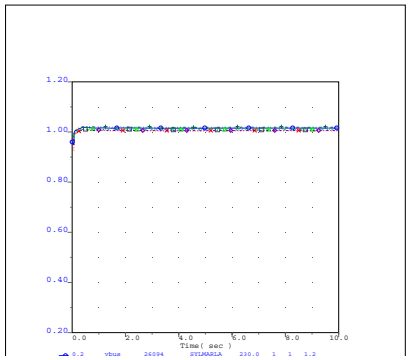


Figure 124 Bus-V:SCE 500 & 230 kV

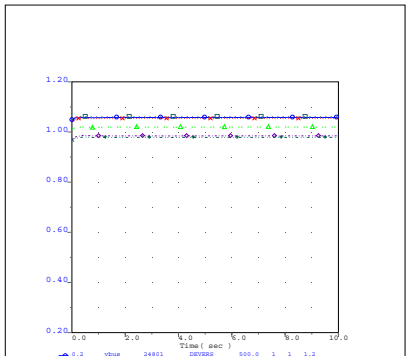


Figure 125 Bus-V: LADWP 500 kV:

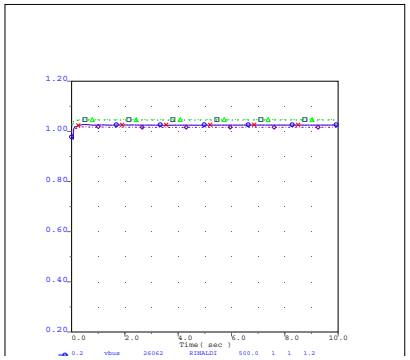


Figure 126 Bus-V:LADWP Load:

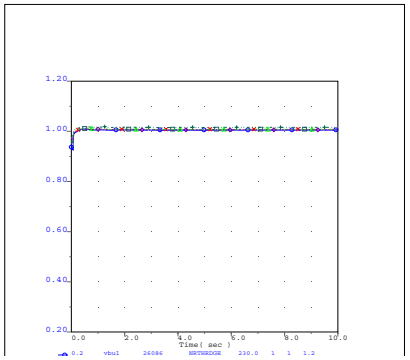


Figure 127 Bus-V: NW & S.CAL 500 kV

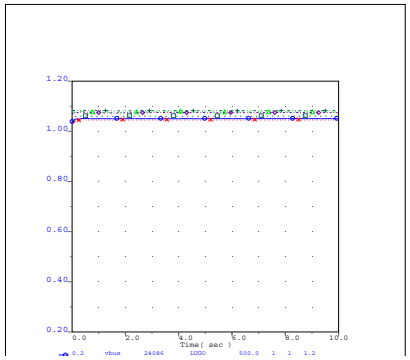


Figure 128 Bus-V: Others 500 kV

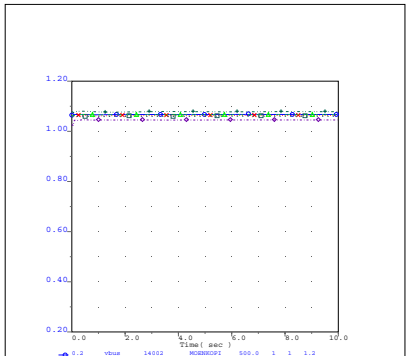


Figure 129 Bus-V: Others 230 kV

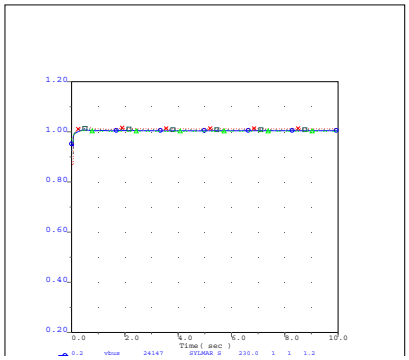


Figure 130 REL_RTR_ANG:S.Cal

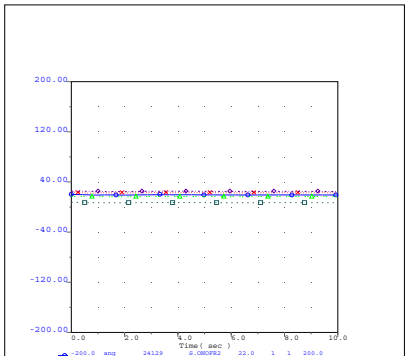


Figure 131 RELATIVE_ROTOR_ANGLE:S.Cal:

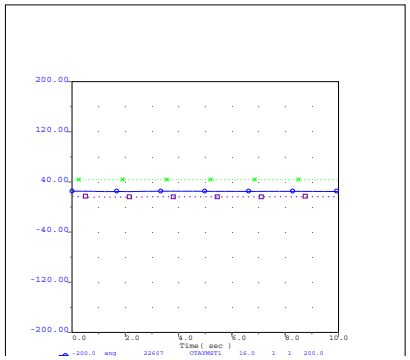
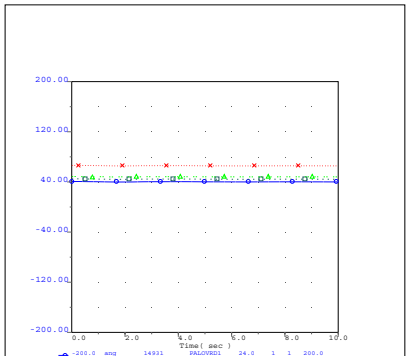


Figure 132 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Pinetree-BR-RAS

Possible Violations: MORC 1[11]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[11] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 133 Bus-V:Owens Gorge/Rinaldi 230 kV

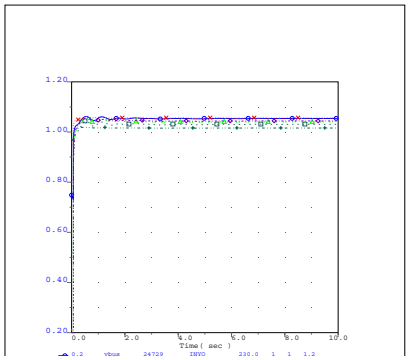


Figure 134 Bus-V:SCE North 115 kV

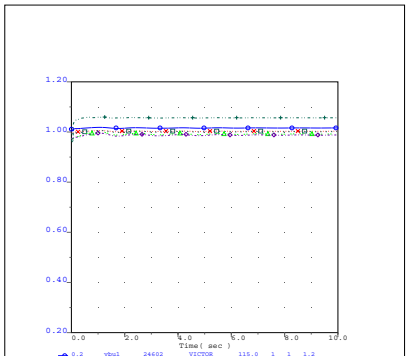


Figure 135 Bus-V:LA BASIN 230 & 138 kV

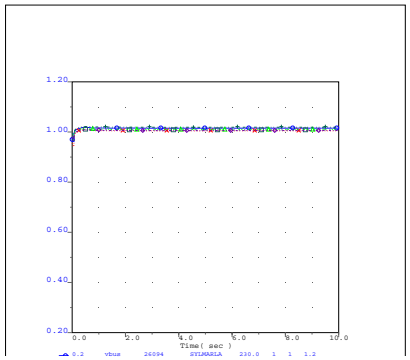


Figure 136 Bus-V:SCE 500 & 230 kV

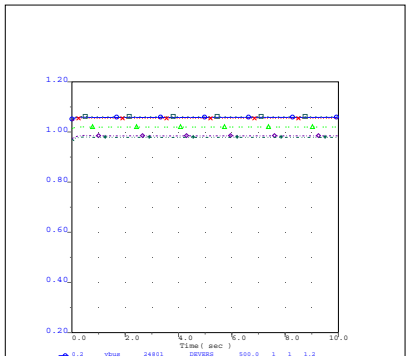


Figure 137 Bus-V: LADWP 500 kV:

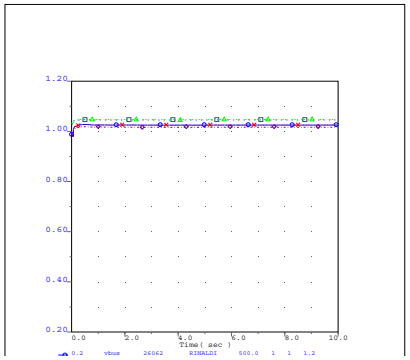


Figure 138 Bus-V:LADWP Load:

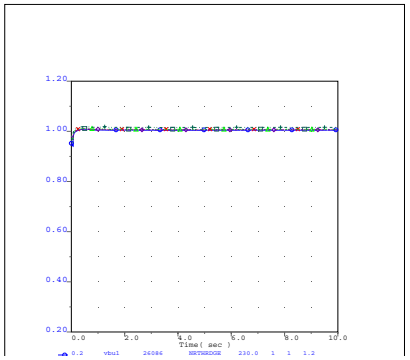


Figure 139 Bus-V: NW & S.CAL 500 kV

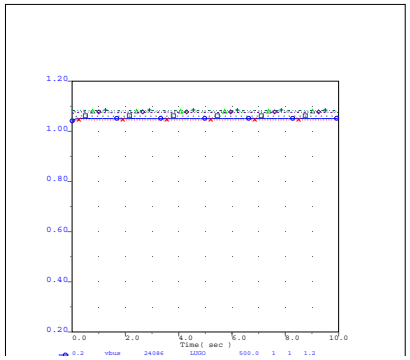


Figure 140 Bus-V: Others 500 kV

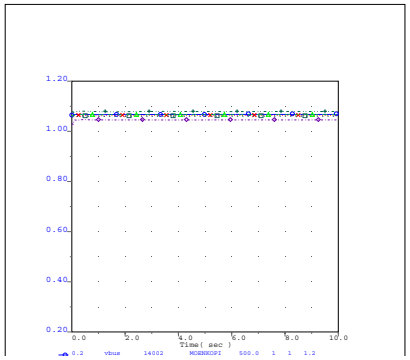


Figure 141 Bus-V: Others 230 kV

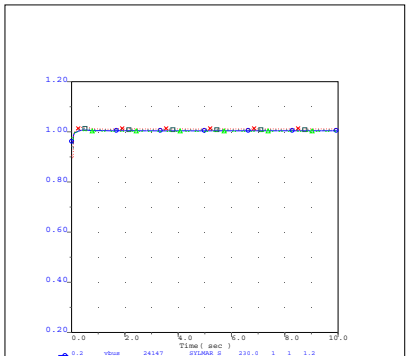


Figure 142 REL_RTR_ANG:S.Cal

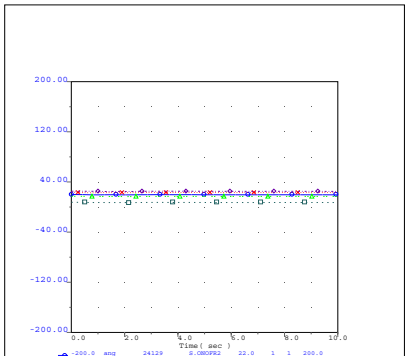


Figure 143 RELATIVE_ROTOR_ANGLE:S.Cal:

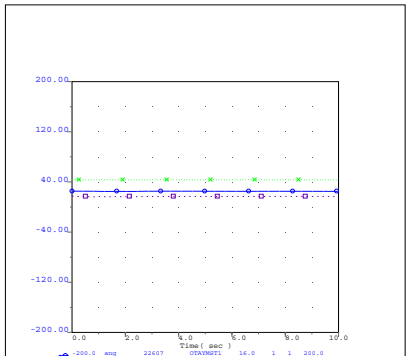
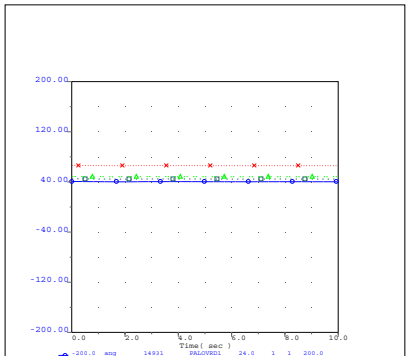


Figure 144 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: HoffmanSummit-Pinetree-RAS

Possible Violations: MORC 1[12]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[12] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 145 Bus-V:Owens Gorge/Rinaldi 230 kV

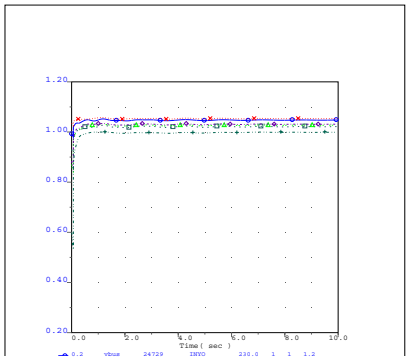


Figure 146 Bus-V:SCE North 115 kV

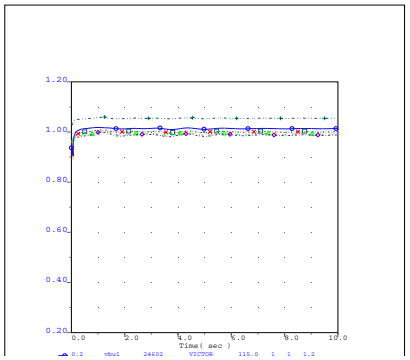


Figure 147 Bus-V:LA BASIN 230 & 138 kV

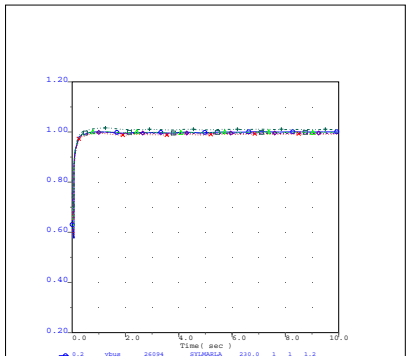


Figure 148 Bus-V:SCE 500 & 230 kV

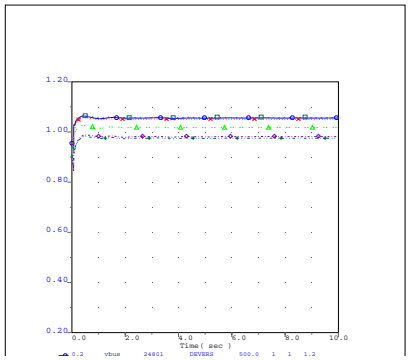


Figure 149 Bus-V: LADWP 500 kV:

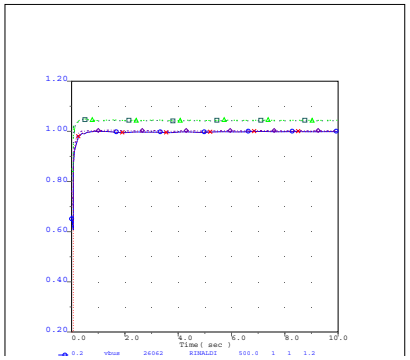


Figure 150 Bus-V:LADWP Load:

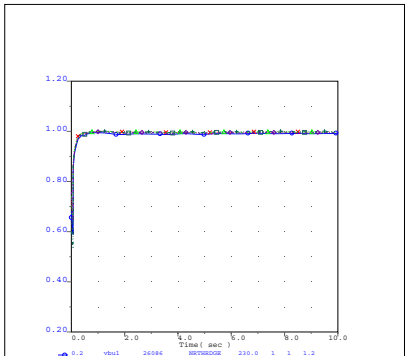


Figure 151 Bus-V: NW & S.CAL 500 kV

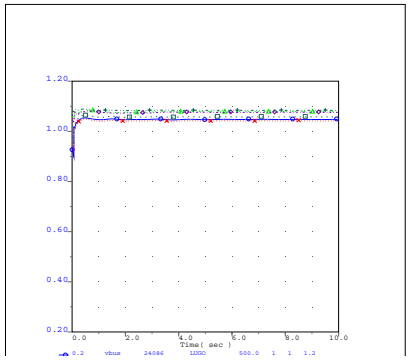


Figure 152 Bus-V: Others 500 kV

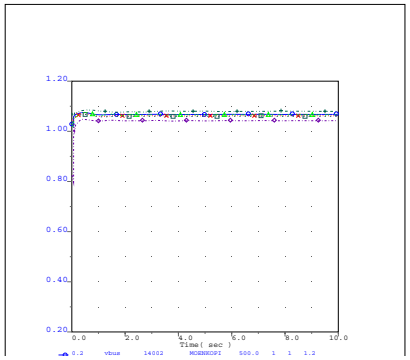


Figure 153 Bus-V: Others 230 kV

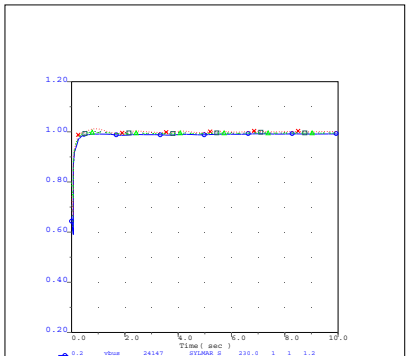


Figure 154 REL_RTR_ANG:S.Cal

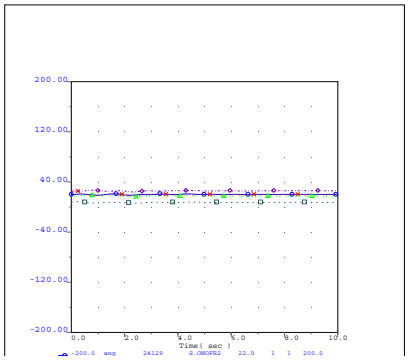


Figure 155 RELATIVE_ROTOR_ANGLE:S.Cal:

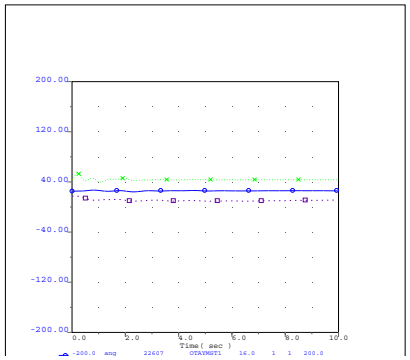
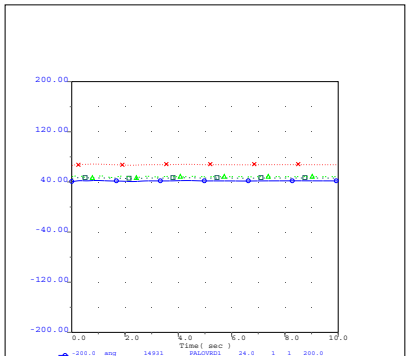


Figure 156 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Adel-Vict-Rinaldi-dlo

Possible Violations: MORC 1[13]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[13] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 157 Bus-V:Owens Gorge/Rinaldi 230 kV

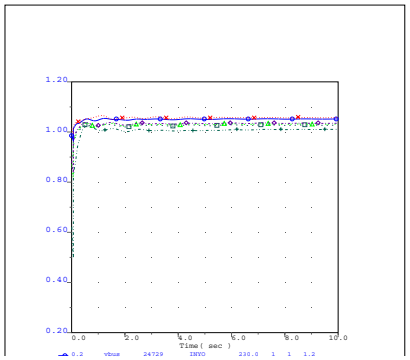


Figure 158 Bus-V:SCE North 115 kV

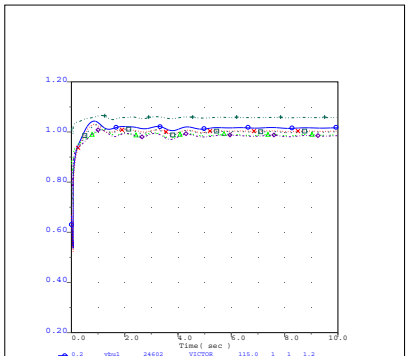


Figure 159 Bus-V:LA BASIN 230 & 138 kV

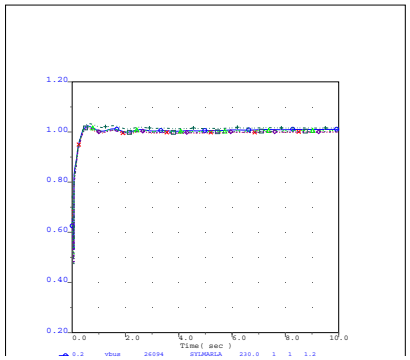


Figure 160 Bus-V:SCE 500 & 230 kV

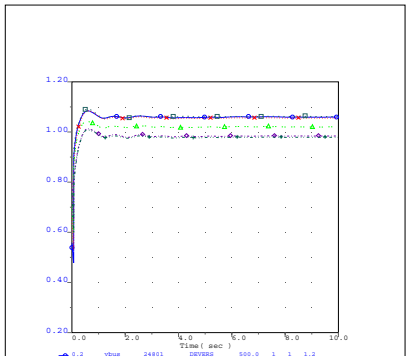


Figure 161 Bus-V: LADWP 500 kV:

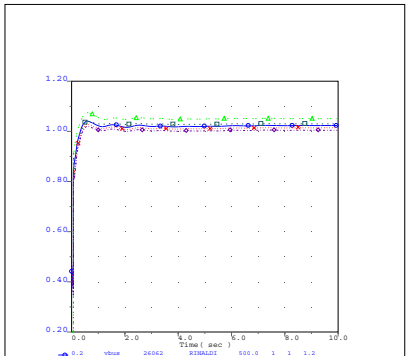


Figure 162 Bus-V:LADWP Load:

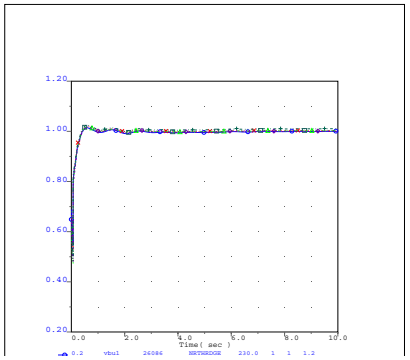


Figure 163 Bus-V: NW & S.CAL 500 kV

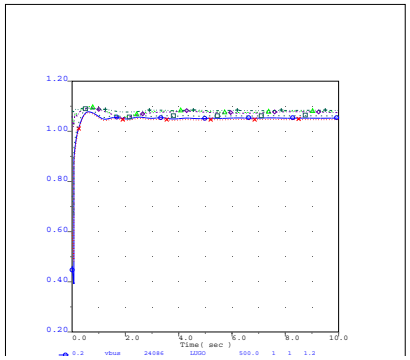


Figure 164 Bus-V: Others 500 kV

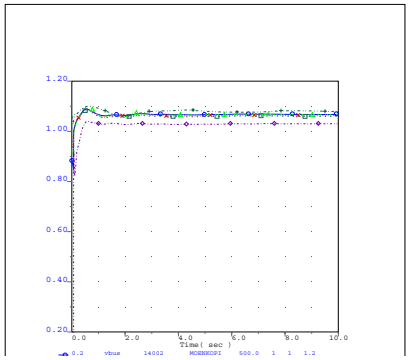


Figure 165 Bus-V: Others 230 kV

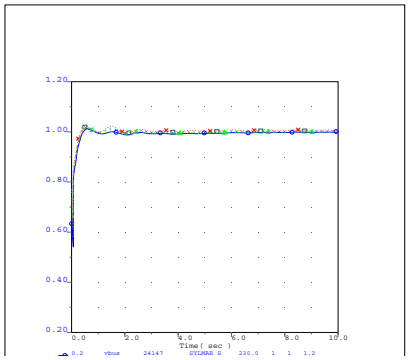


Figure 166 REL_RTR_ANG:S.Cal

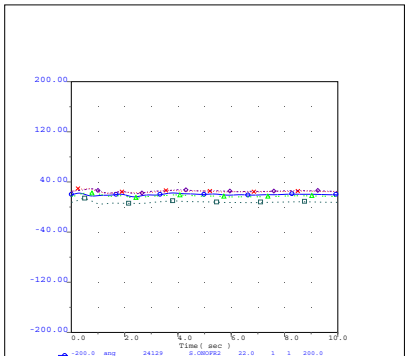


Figure 167 RELATIVE_ROTOR_ANGLE:S.Cal:

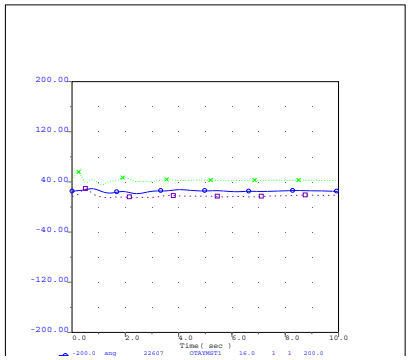
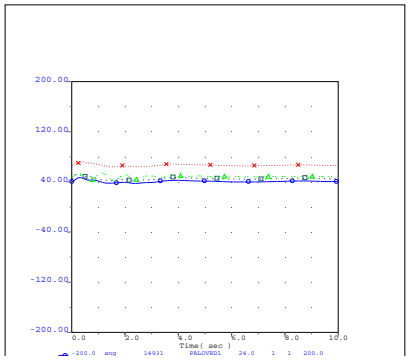


Figure 168 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Adel-Victorvl-dlo

Possible Violations: MORC 1[14]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[14] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 169 Bus-V:Owens Gorge/Rinaldi 230 kV

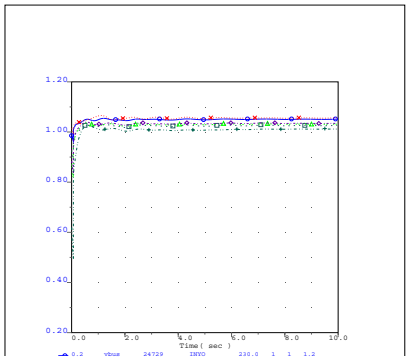


Figure 170 Bus-V:SCE North 115 kV

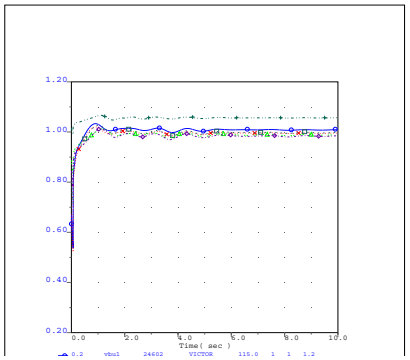


Figure 171 Bus-V:LA BASIN 230 & 138 kV

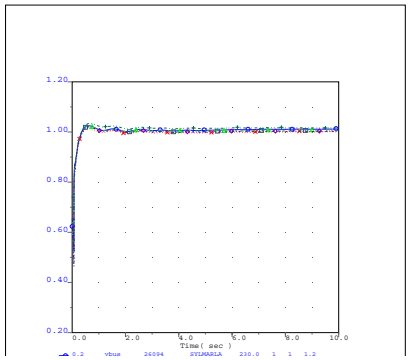


Figure 172 Bus-V:SCE 500 & 230 kV

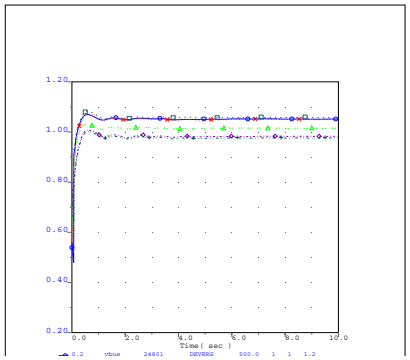


Figure 173 Bus-V: LADWP 500 kV:

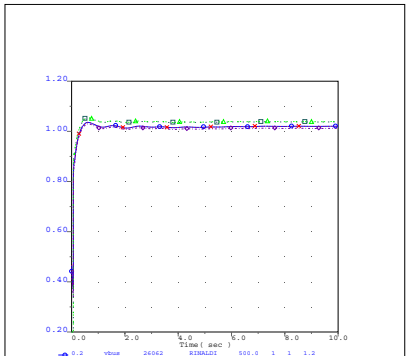


Figure 174 Bus-V:LADWP Load:

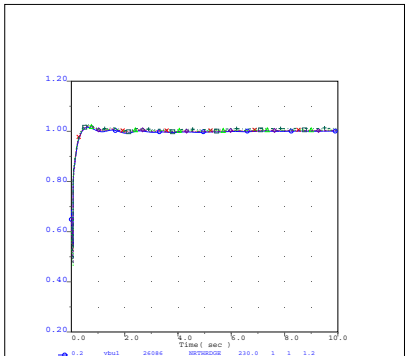


Figure 175 Bus-V: NW & S.CAL 500 kV

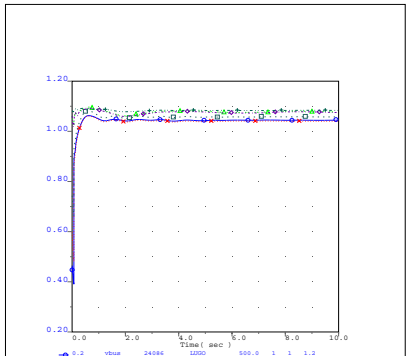


Figure 176 Bus-V: Others 500 kV

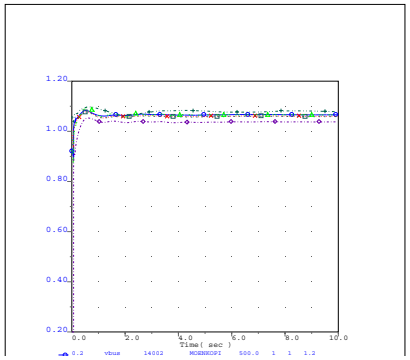


Figure 177 Bus-V: Others 230 kV

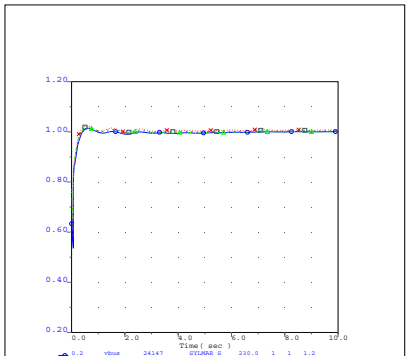


Figure 178 REL_RTR_ANG:S.Cal

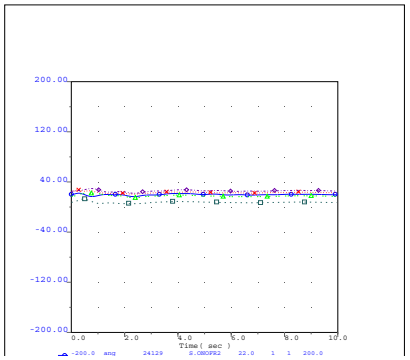


Figure 179 RELATIVE_ROTOR_ANGLE:S.Cal:

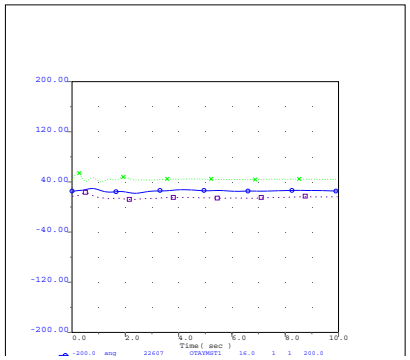
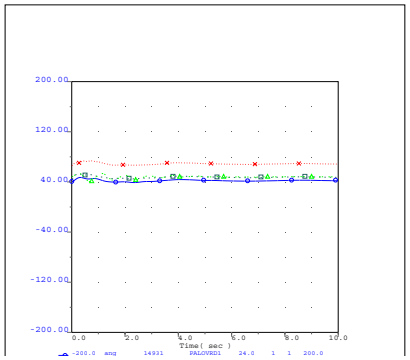


Figure 180 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: McCullgh-Victorvl-dlo

Possible Violations: MORC 1[15]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[15] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 181 Bus-V:Owens Gorge/Rinaldi 230 kV

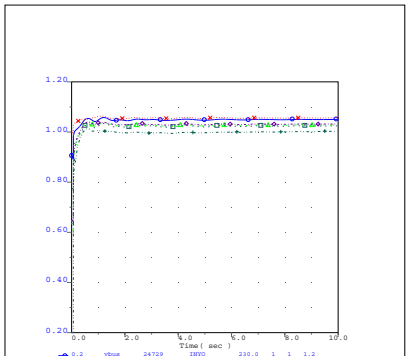


Figure 182 Bus-V:SCE North 115 kV

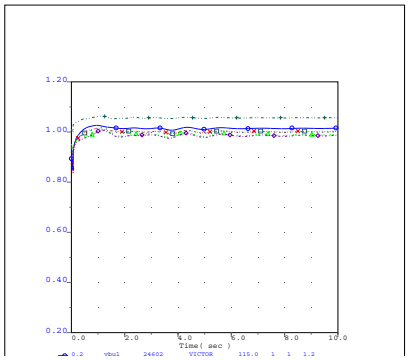


Figure 183 Bus-V:LA BASIN 230 & 138 kV

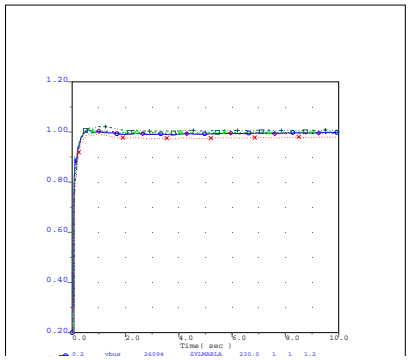


Figure 184 Bus-V:SCE 500 & 230 kV

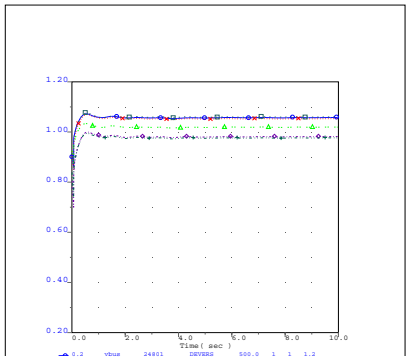


Figure 185 Bus-V: LADWP 500 kV:

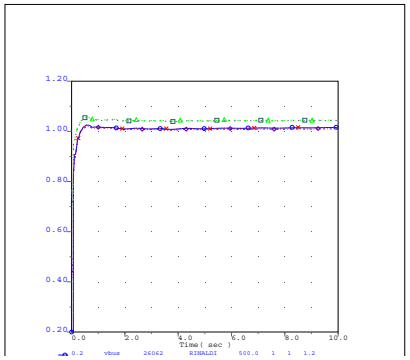


Figure 186 Bus-V:LADWP Load:

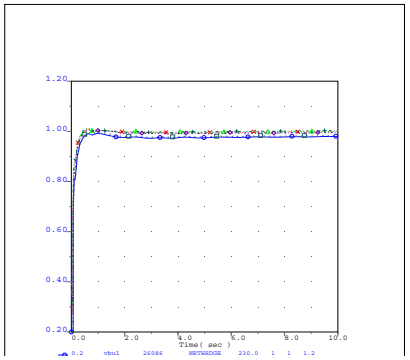


Figure 187 Bus-V: NW & S.CAL 500 kV

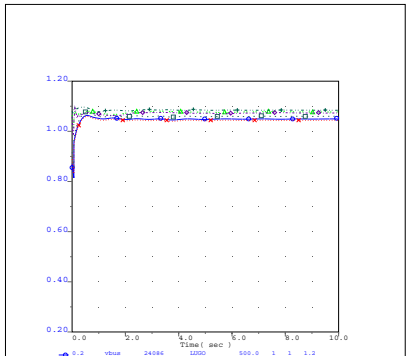


Figure 188 Bus-V: Others 500 kV

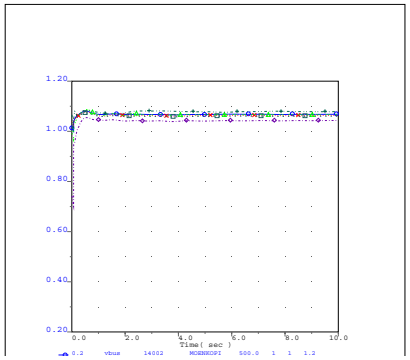


Figure 189 Bus-V: Others 230 kV

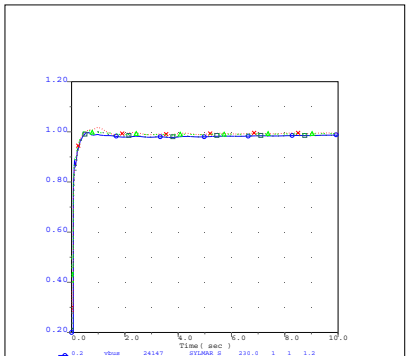


Figure 190 REL_RTR_ANG:S.Cal

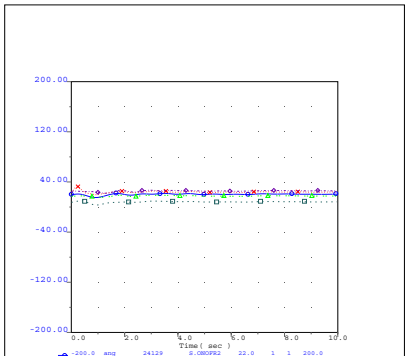


Figure 191 RELATIVE_ROTOR_ANGLE:S.Cal:

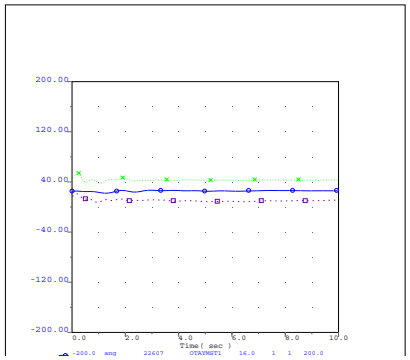
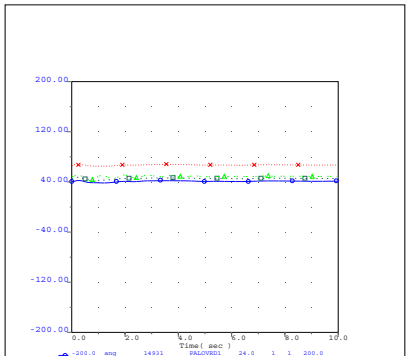


Figure 192 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Rin-Tar-dlo

Possible Violations: MORC 1[16]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[16] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 193 Bus-V:Owens Gorge/Rinaldi 230 kV

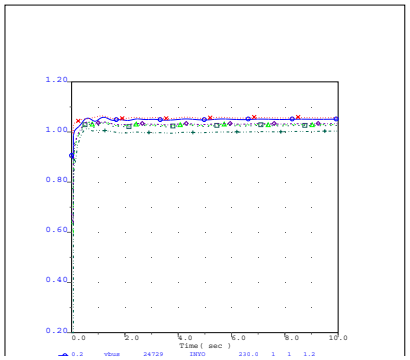


Figure 194 Bus-V:SCE North 115 kV

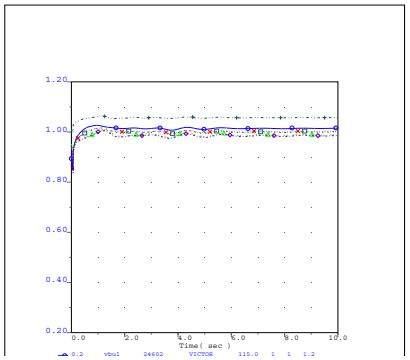


Figure 195 Bus-V:LA BASIN 230 & 138 kV

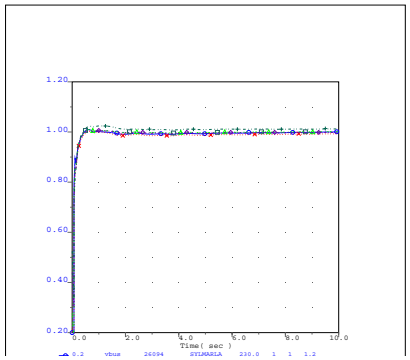


Figure 196 Bus-V:SCE 500 & 230 kV

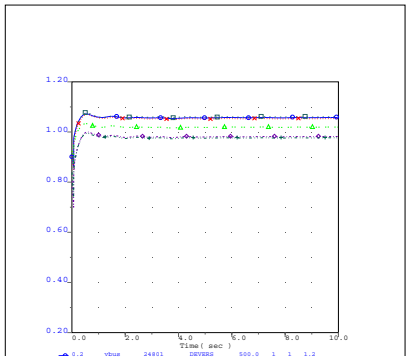


Figure 197 Bus-V: LADWP 500 kV:

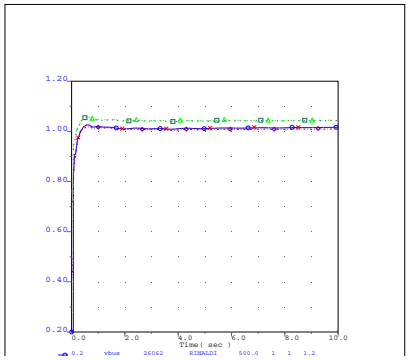


Figure 198 Bus-V:LADWP Load:

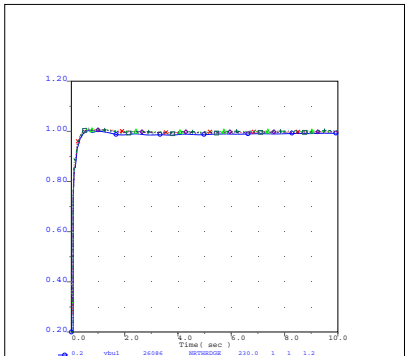


Figure 199 Bus-V: NW & S.CAL 500 kV

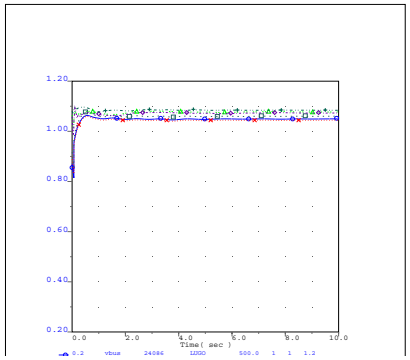


Figure 200 Bus-V: Others 500 kV

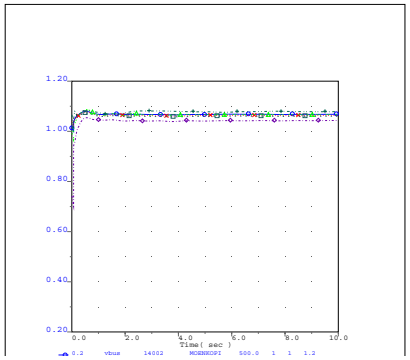


Figure 201 Bus-V: Others 230 kV

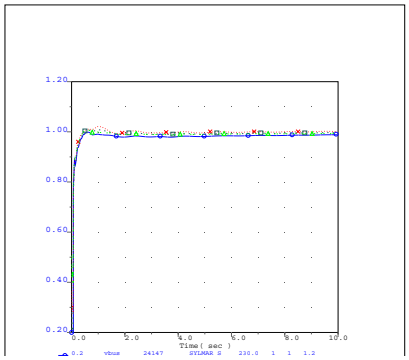


Figure 202 REL_RTR_ANG:S.Cal

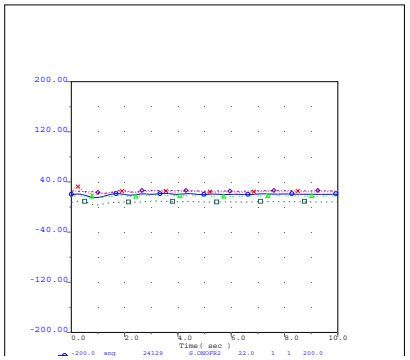


Figure 203 RELATIVE_ROTOR_ANGLE:S.Cal:

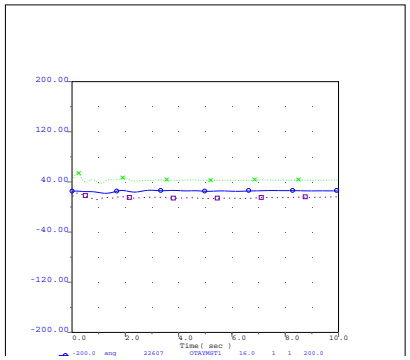
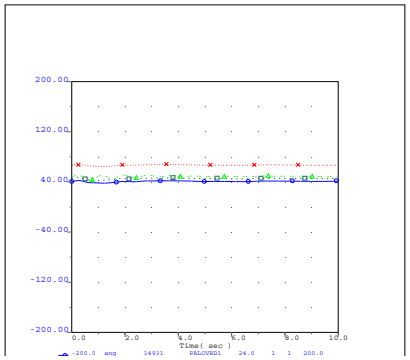


Figure 204 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: Rin-Glendl-dlo

Possible Violations: MORC 1[17]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[17] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 205 Bus-V:Owens Gorge/Rinaldi 230 kV

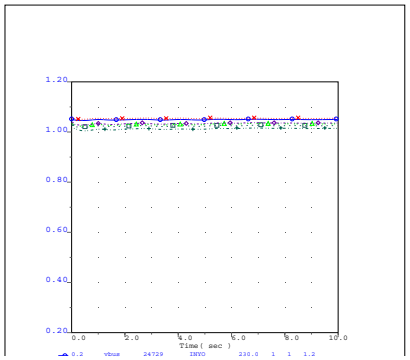


Figure 206 Bus-V:SCE North 115 kV

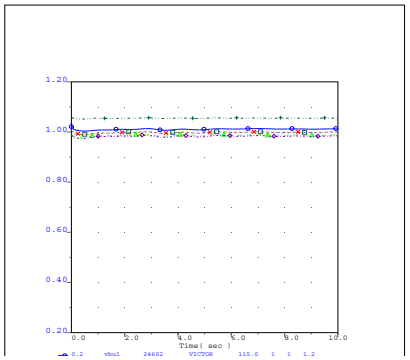


Figure 207 Bus-V:LA BASIN 230 & 138 kV

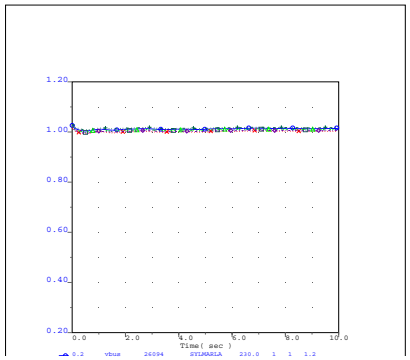


Figure 208 Bus-V:SCE 500 & 230 kV

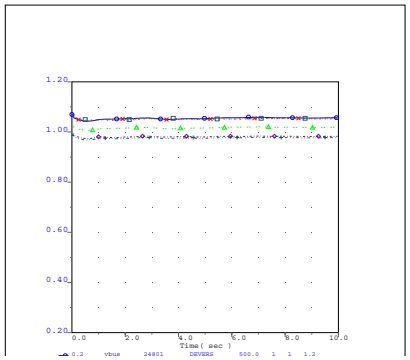


Figure 209 Bus-V: LADWP 500 kV:

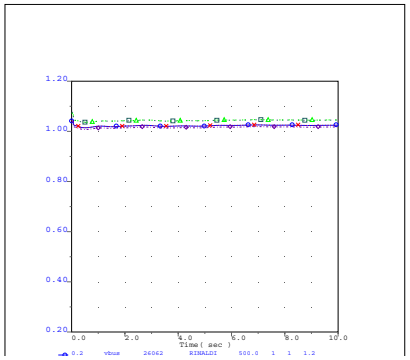


Figure 210 Bus-V:LADWP Load:

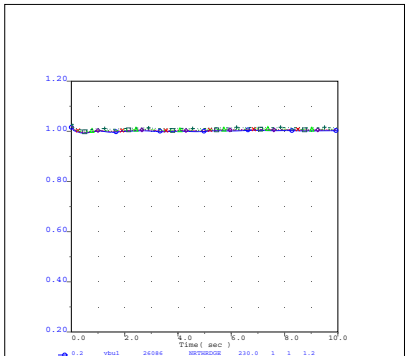


Figure 211 Bus-V: NW & S.CAL 500 kV

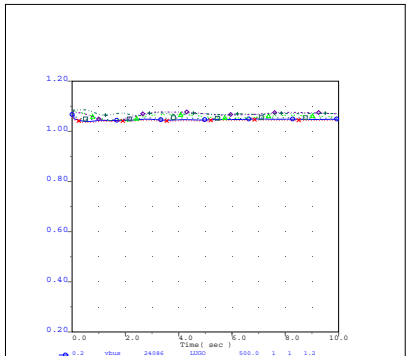


Figure 212 Bus-V: Others 500 kV

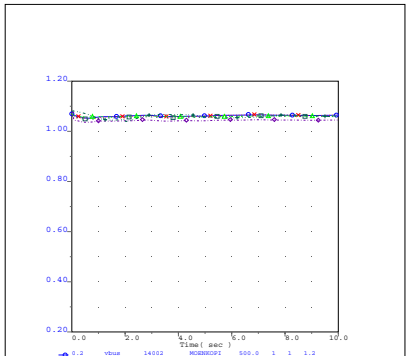


Figure 213 Bus-V: Others 230 kV

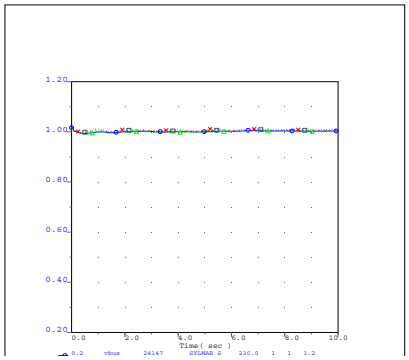


Figure 214 REL_RTR_ANG:S.Cal

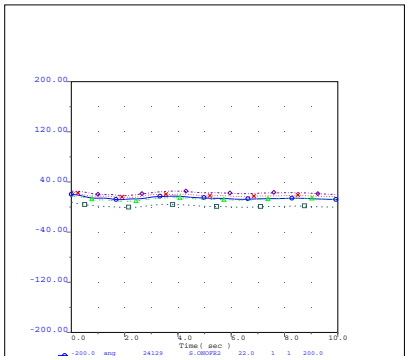


Figure 215 RELATIVE_ROTOR_ANGLE:S.Cal:

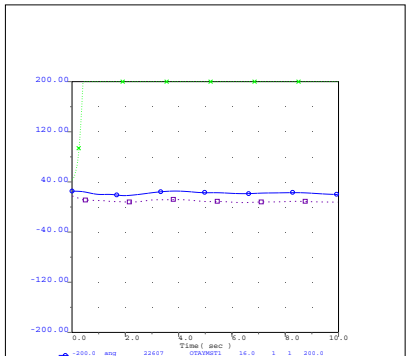
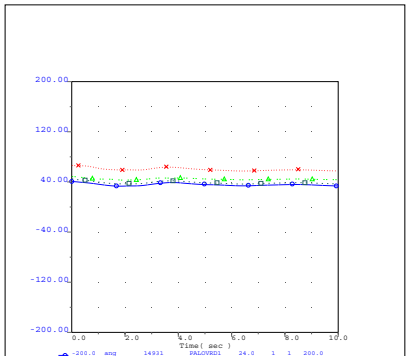


Figure 216 REL_RTR_ANG:Others



Study: BSP Case: hsbspa2_0iy_ov_110og_cast Contingency: IPP-bipolar-upc

Possible Violations: MORC 1[18]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[18] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Study: BSP Case: laprebsp_50iy_ov_0og

Figure 1 Bus-V:Owens Gorge/Rinaldi 230 kV

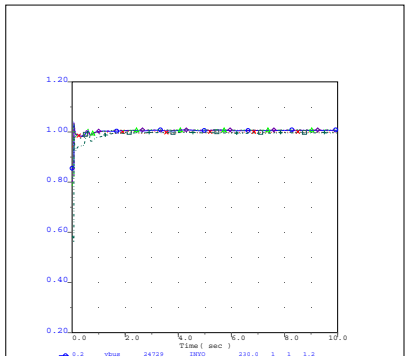


Figure 2 Bus-V:SCE North 115 kV

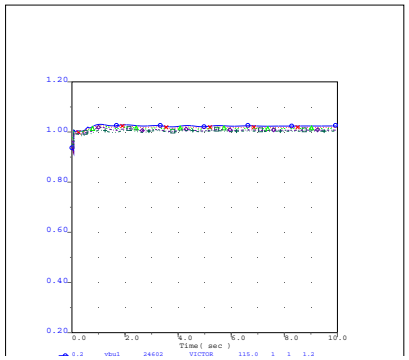


Figure 3 Bus-V:LA BASIN 230 & 138 kV

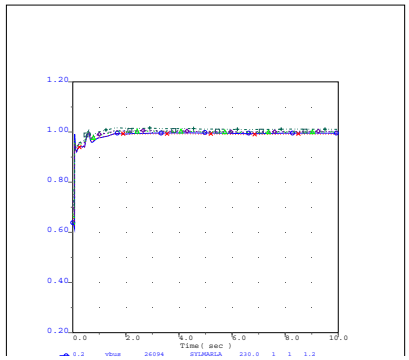


Figure 4 Bus-V:SCE 500 & 230 kV

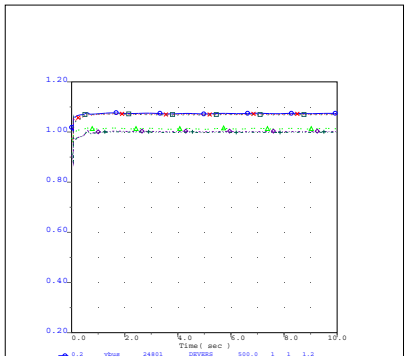


Figure 5 Bus-V: LADWP 500 kV:

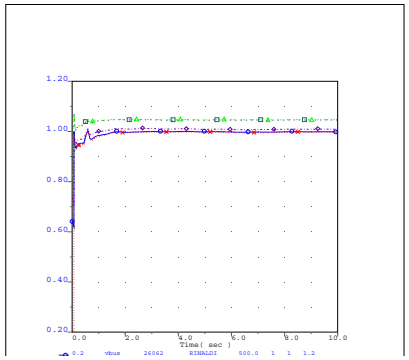


Figure 6 Bus-V:LADWP Load:

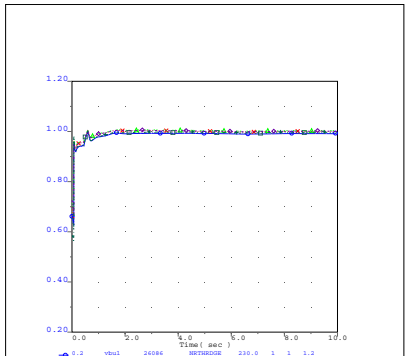


Figure 7 Bus-V: NW & S.CAL 500 kV

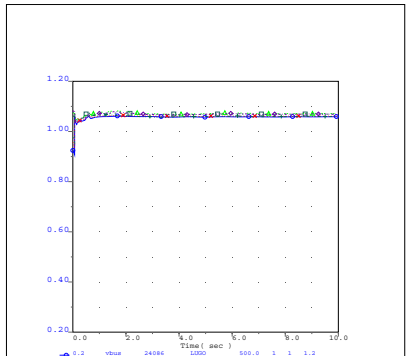


Figure 8 Bus-V: Others 500 kV

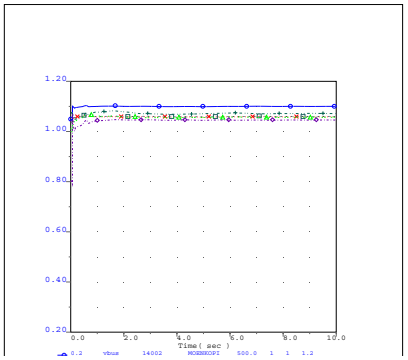


Figure 9 Bus-V: Others 230 kV

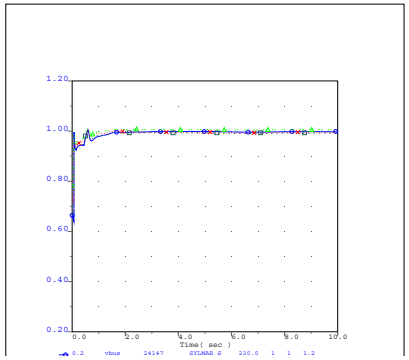


Figure 10 REL_RTR_ANG:S.Cal

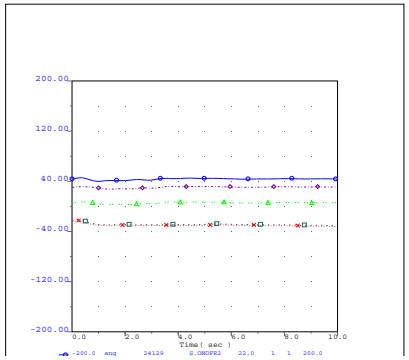


Figure 11 RELATIVE_ROTOR_ANGLE:S.Cal:

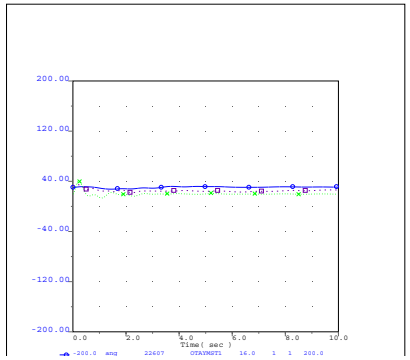
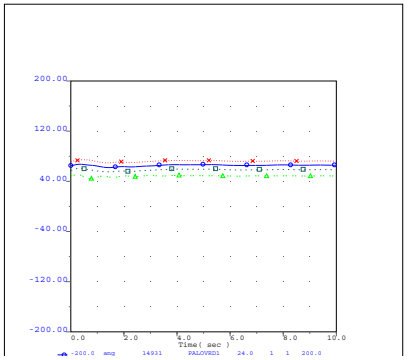


Figure 12 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: Adel-Rinaldi-slo

Possible Violations: MORC 1[1]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[1] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 13 Bus-V:Owens Gorge/Rinaldi 230 kV

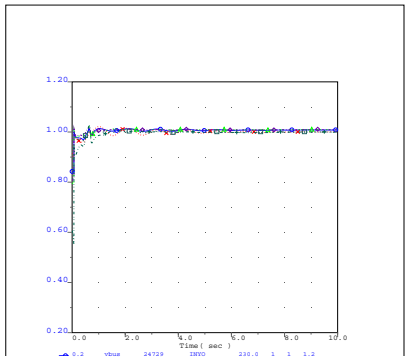


Figure 14 Bus-V:SCE North 115 kV

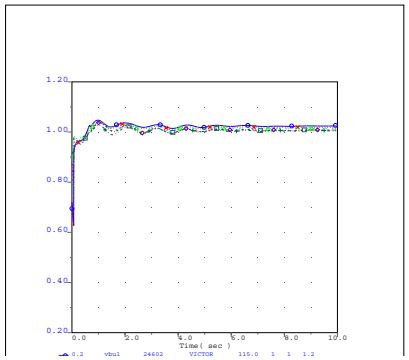


Figure 15 Bus-V:LA BASIN 230 & 138 kV

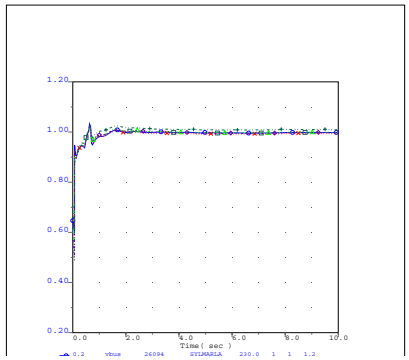


Figure 16 Bus-V:SCE 500 & 230 kV

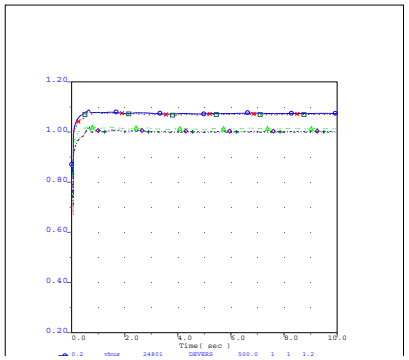


Figure 17 Bus-V: LADWP 500 kV:

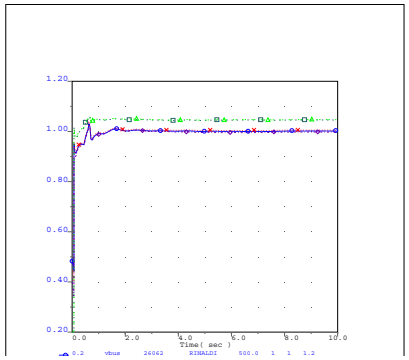


Figure 18 Bus-V:LADWP Load:

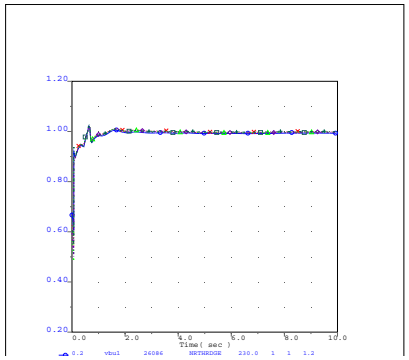


Figure 19 Bus-V: NW & S.CAL 500 kV

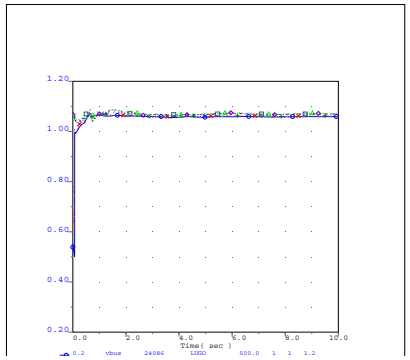


Figure 20 Bus-V: Others 500 kV

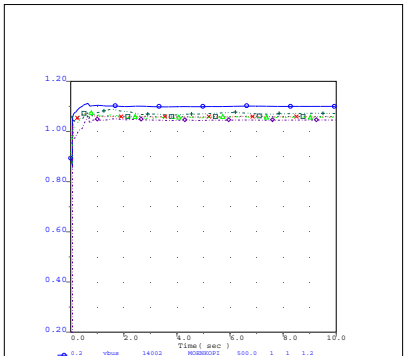


Figure 21 Bus-V: Others 230 kV

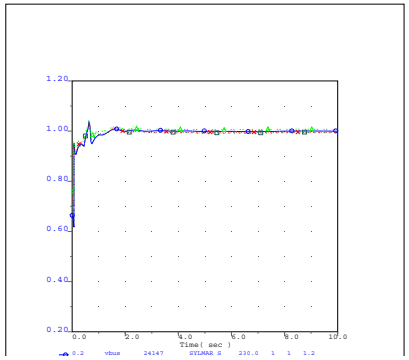


Figure 22 REL_RTR_ANG:S.Cal

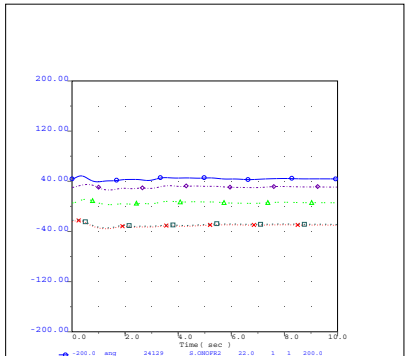


Figure 23 RELATIVE_ROTOR_ANGLE:S.Cal:

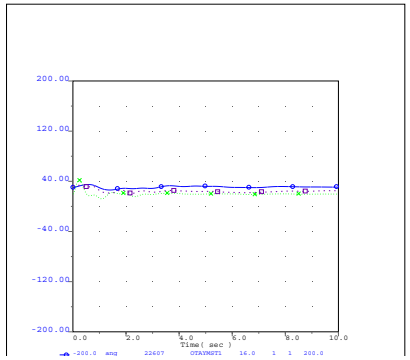
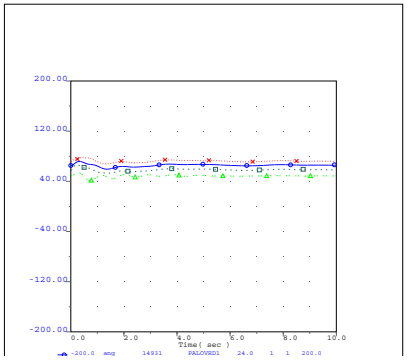


Figure 24 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: Adel-Toluca

Possible Violations: MORC 1[2]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[2] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 25 Bus-V:Owens Gorge/Rinaldi 230 kV

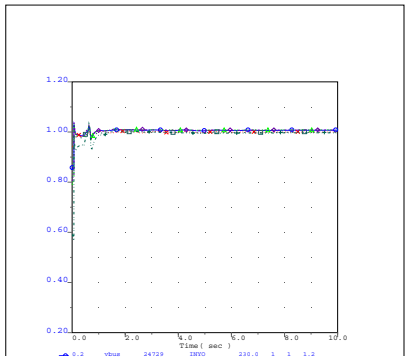


Figure 26 Bus-V:SCE North 115 kV

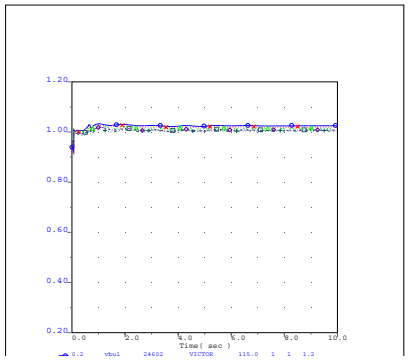


Figure 27 Bus-V:LA BASIN 230 & 138 kV

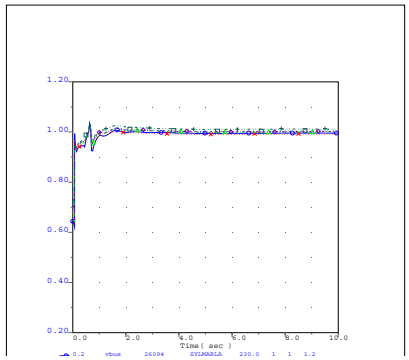


Figure 28 Bus-V:SCE 500 & 230 kV

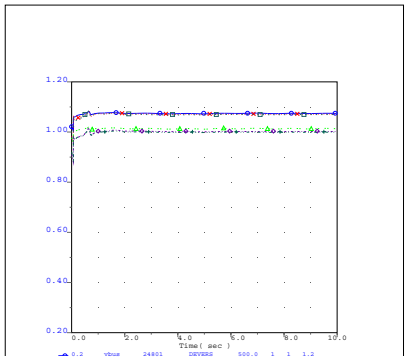


Figure 29 Bus-V: LADWP 500 kV:

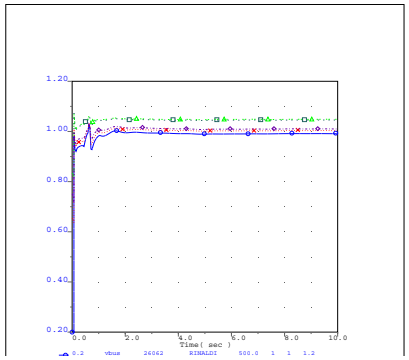


Figure 30 Bus-V:LADWP Load:

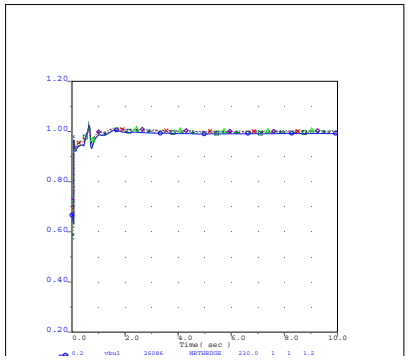


Figure 31 Bus-V: NW & S.CAL 500 kV

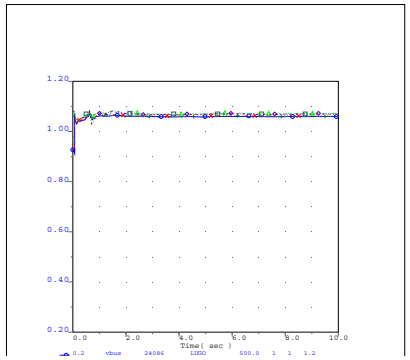


Figure 32 Bus-V: Others 500 kV

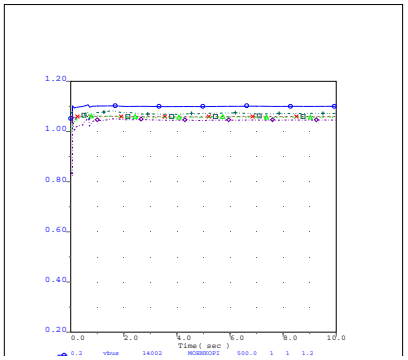


Figure 33 Bus-V: Others 230 kV

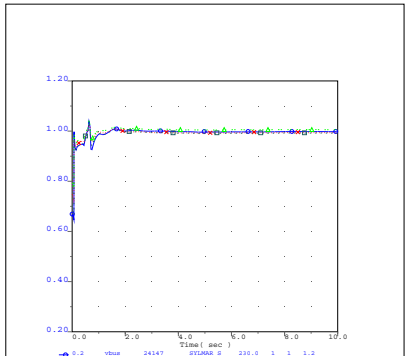


Figure 34 REL_RTR_ANG:S.Cal

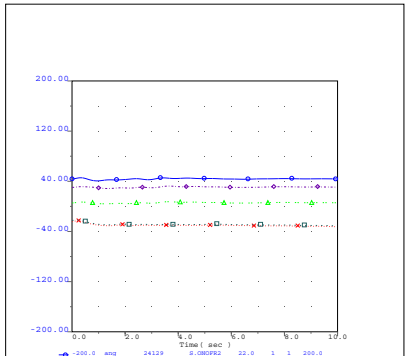


Figure 35 RELATIVE_ROTOR_ANGLE:S.Cal:

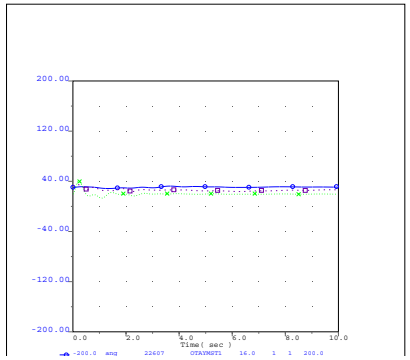
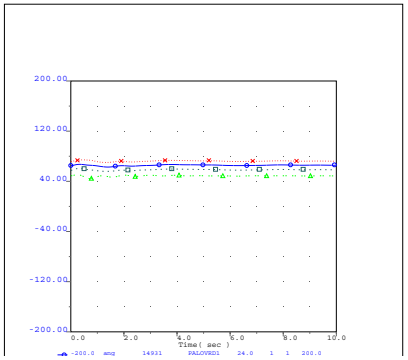


Figure 36 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: Vict-Rinaldi-slo

Possible Violations: MORC 1[3]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[3] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 37 Bus-V:Owens Gorge/Rinaldi 230 kV

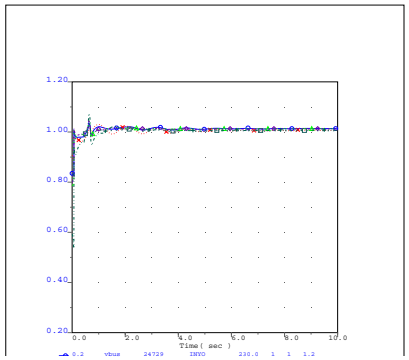


Figure 38 Bus-V:SCE North 115 kV

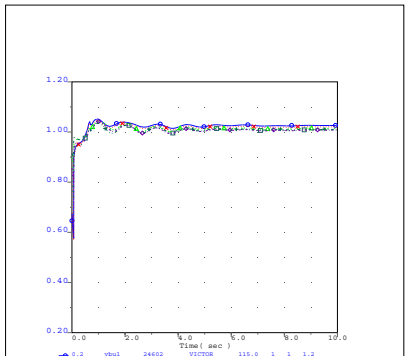


Figure 39 Bus-V:LA BASIN 230 & 138 kV

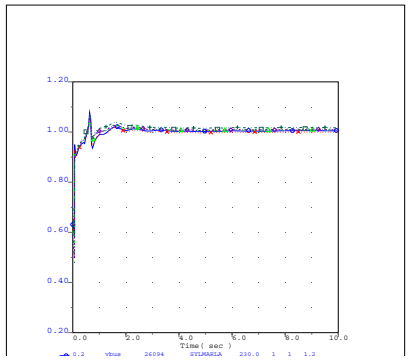


Figure 40 Bus-V:SCE 500 & 230 kV

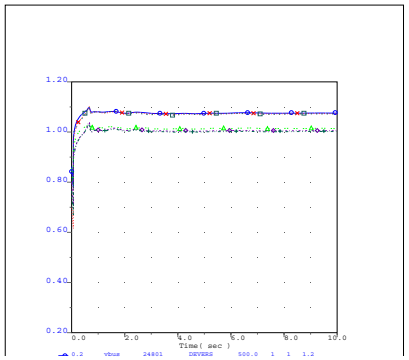


Figure 41 Bus-V: LADWP 500 kV:

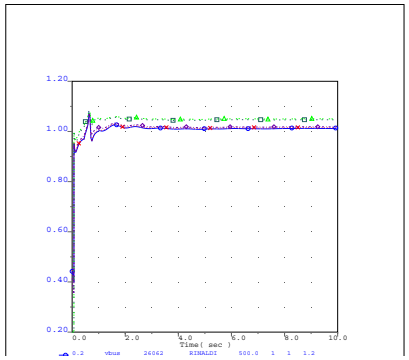


Figure 42 Bus-V:LADWP Load:

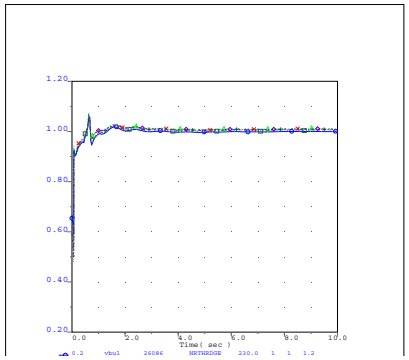


Figure 43 Bus-V: NW & S.CAL 500 kV

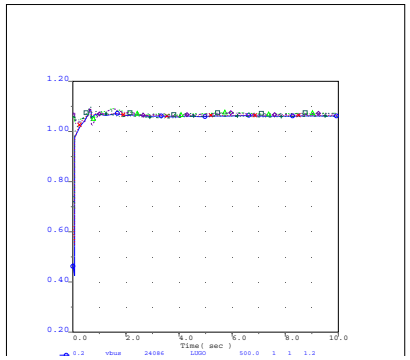


Figure 44 Bus-V: Others 500 kV

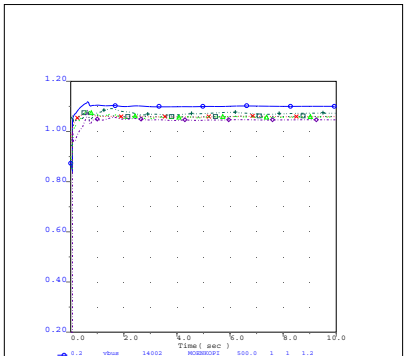


Figure 45 Bus-V: Others 230 kV

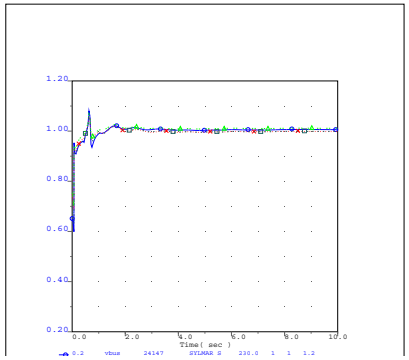


Figure 46 REL_RTR_ANG:S.Cal

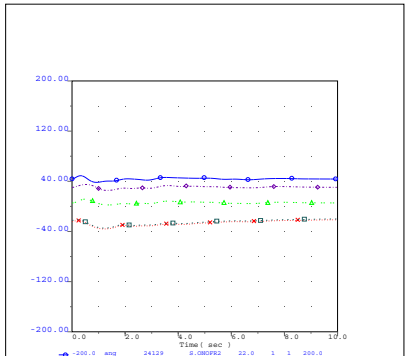


Figure 47 RELATIVE_ROTOR_ANGLE:S.Cal:

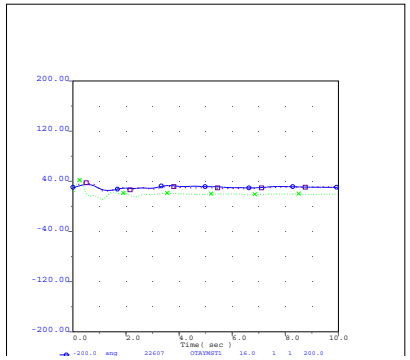
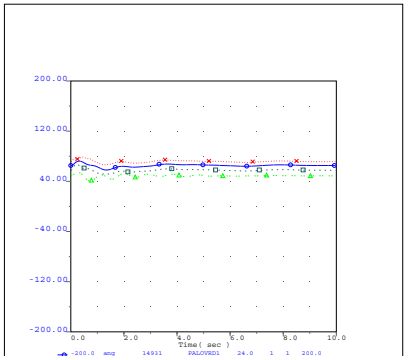


Figure 48 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: Adel-Victorvl-slo

Possible Violations: MORC 1[4]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[4] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 49 Bus-V:Owens Gorge/Rinaldi 230 kV

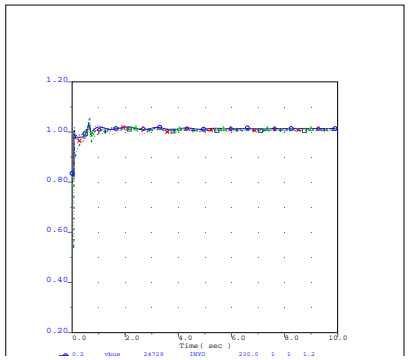


Figure 50 Bus-V:SCE North 115 kV

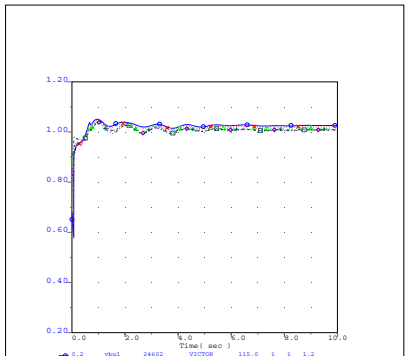


Figure 51 Bus-V:LA BASIN 230 & 138 kV

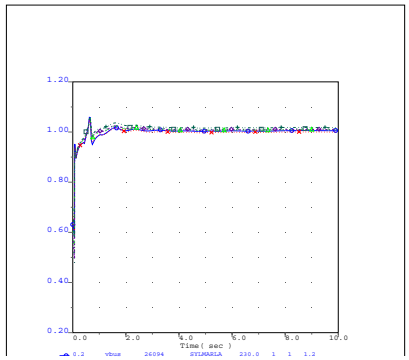


Figure 52 Bus-V:SCE 500 & 230 kV

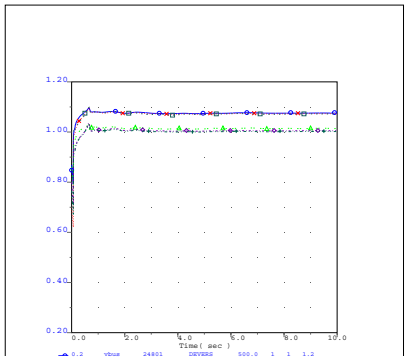


Figure 53 Bus-V: LADWP 500 kV:

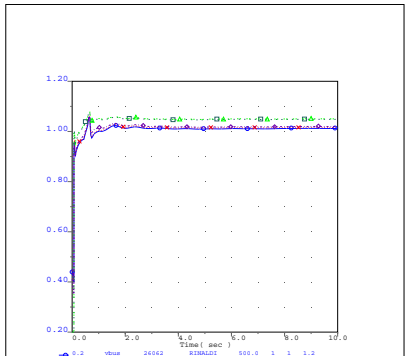


Figure 54 Bus-V:LADWP Load:

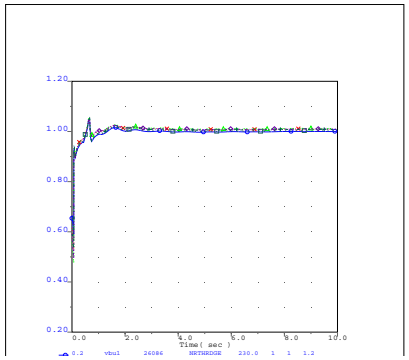


Figure 55 Bus-V: NW & S.CAL 500 kV

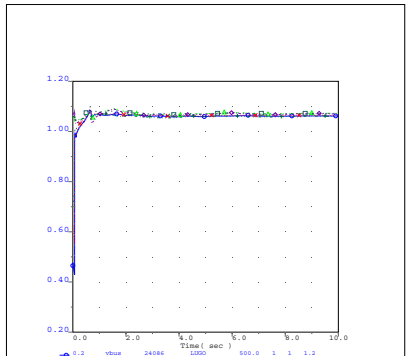


Figure 56 Bus-V: Others 500 kV

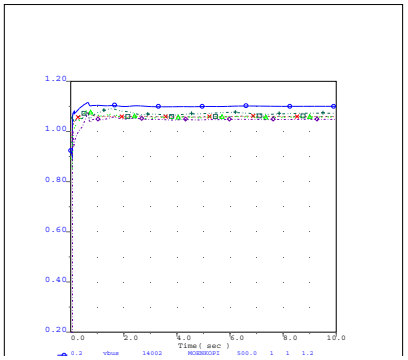


Figure 57 Bus-V: Others 230 kV

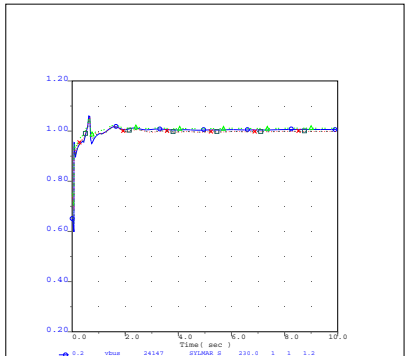


Figure 58 REL_RTR_ANG:S.Cal

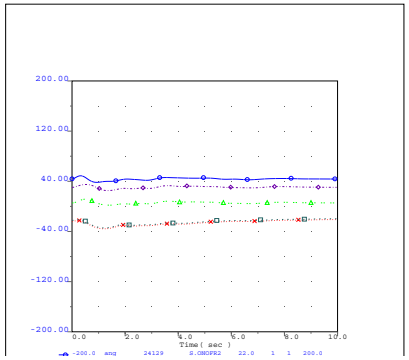


Figure 59 RELATIVE_ROTOR_ANGLE:S.Cal:

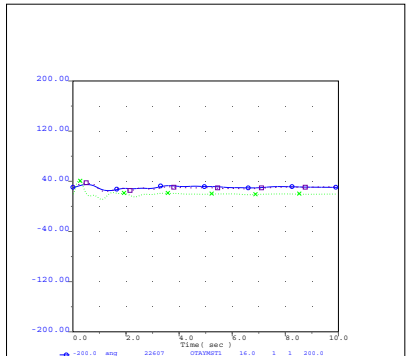
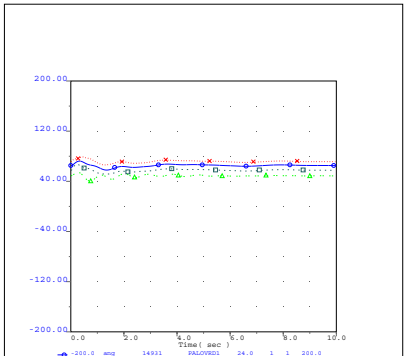


Figure 60 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: McC-Vict-slo

Possible Violations: MORC 1[5]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[5] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 61 Bus-V:Owens Gorge/Rinaldi 230 kV

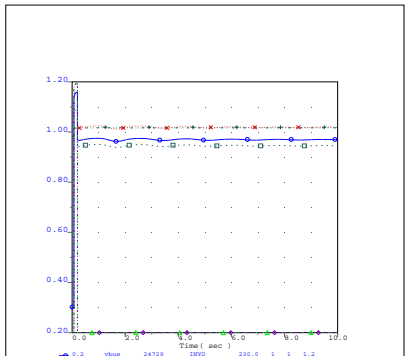


Figure 62 Bus-V:SCE North 115 kV

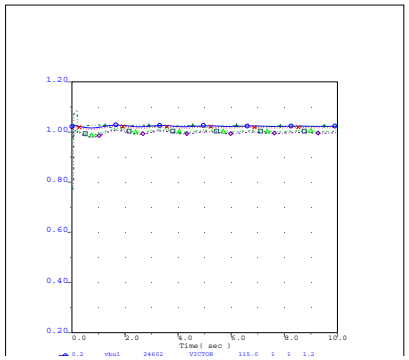


Figure 63 Bus-V:LA BASIN 230 & 138 kV

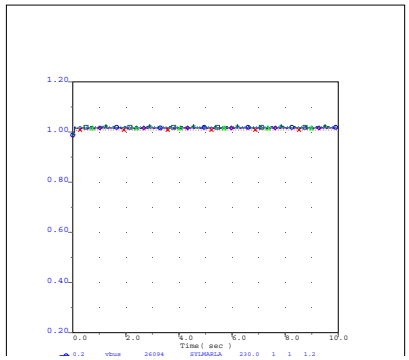


Figure 64 Bus-V:SCE 500 & 230 kV

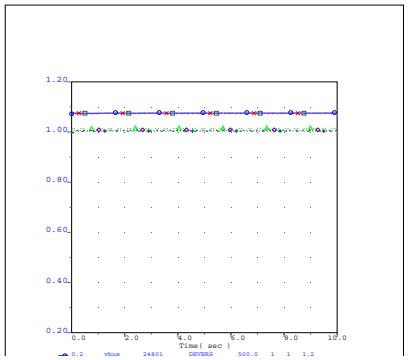


Figure 65 Bus-V: LADWP 500 kV:

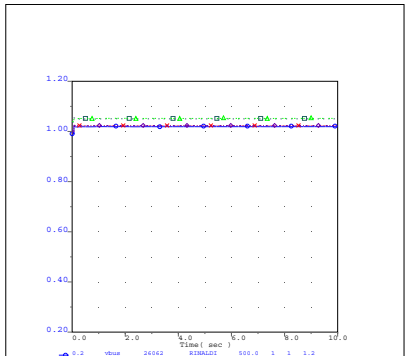


Figure 66 Bus-V:LADWP Load:

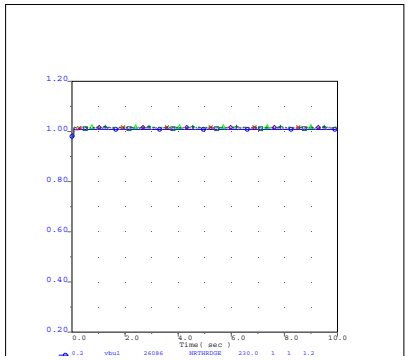


Figure 67 Bus-V: NW & S.CAL 500 kV

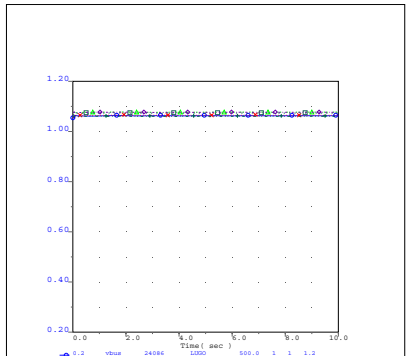


Figure 68 Bus-V: Others 500 kV

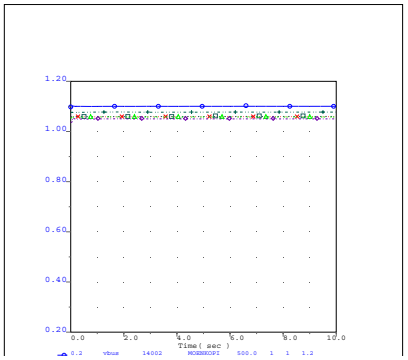


Figure 69 Bus-V: Others 230 kV

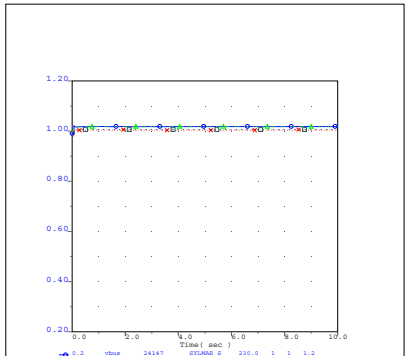


Figure 70 REL_RTR_ANG:S.Cal

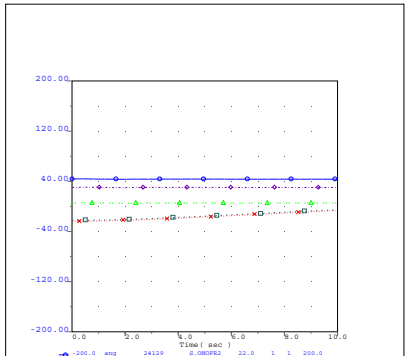


Figure 71 RELATIVE_ROTOR_ANGLE:S.Cal:

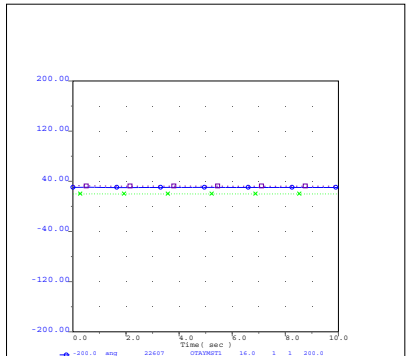
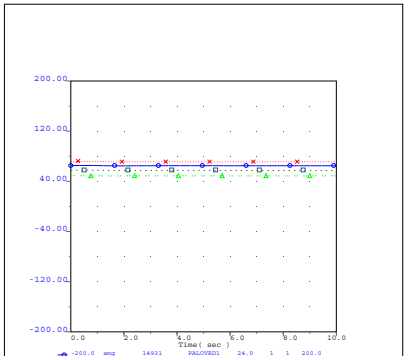


Figure 72 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: BR-Rinadi-preRAS-wIY

Possible Violations: MORC 1[6]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[6] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 73 Bus-V:Owens Gorge/Rinaldi 230 kV

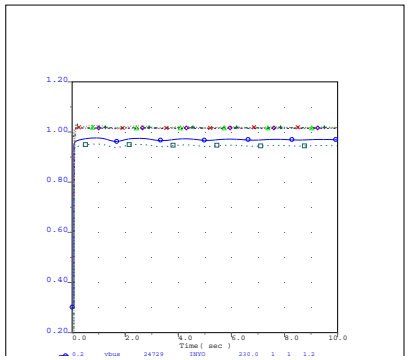


Figure 74 Bus-V:SCE North 115 kV

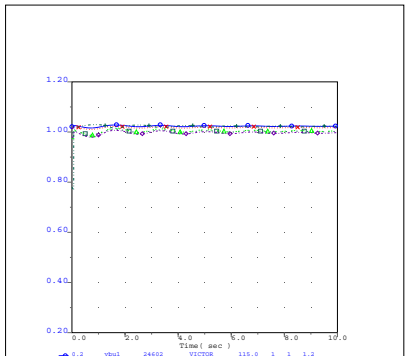


Figure 75 Bus-V:LA BASIN 230 & 138 kV

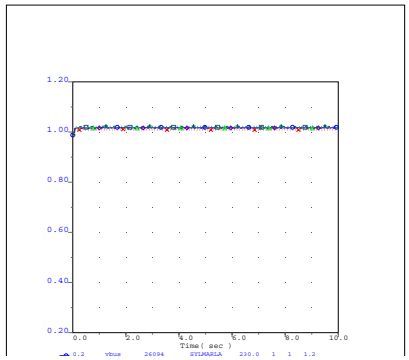


Figure 76 Bus-V:SCE 500 & 230 kV

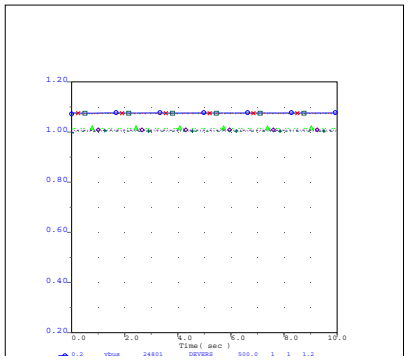


Figure 77 Bus-V: LADWP 500 kV:

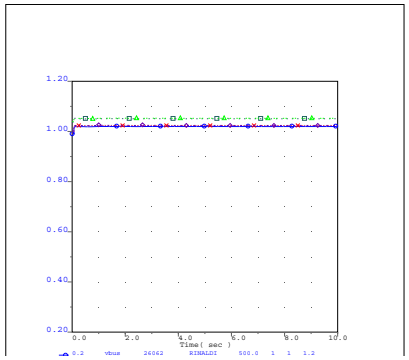


Figure 78 Bus-V:LADWP Load:

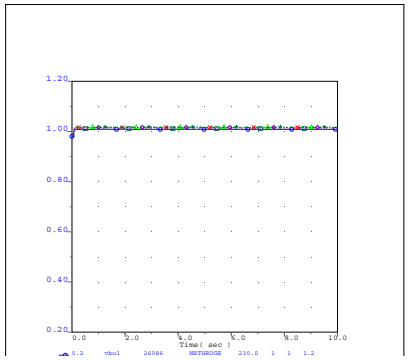


Figure 79 Bus-V: NW & S.CAL 500 kV

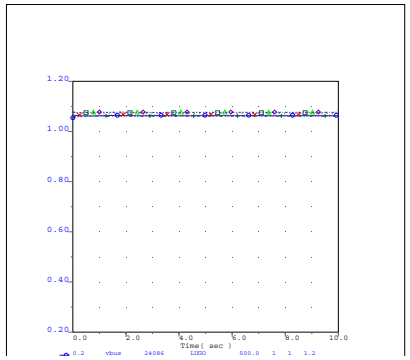


Figure 80 Bus-V: Others 500 kV

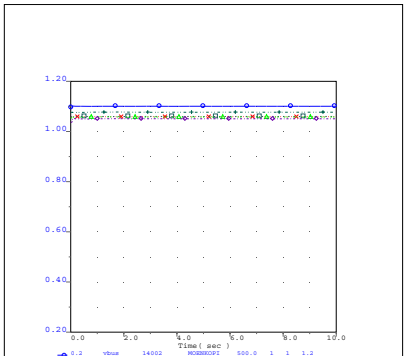


Figure 81 Bus-V: Others 230 kV

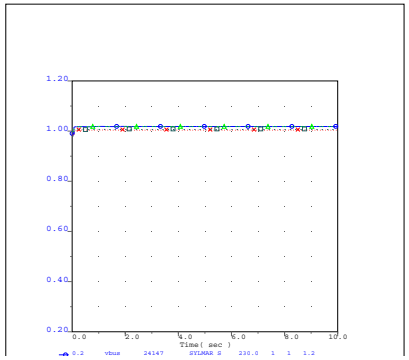


Figure 82 REL_RTR_ANG:S.Cal

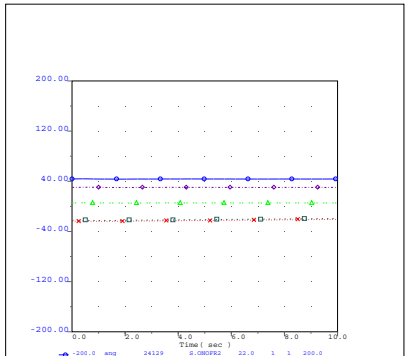


Figure 83 RELATIVE_ROTOR_ANGLE:S.Cal:

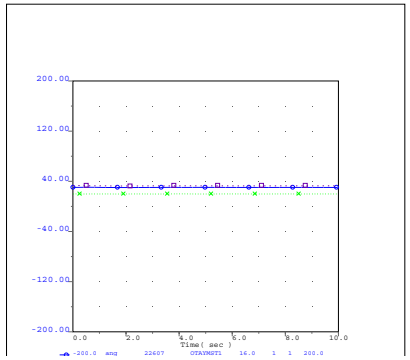
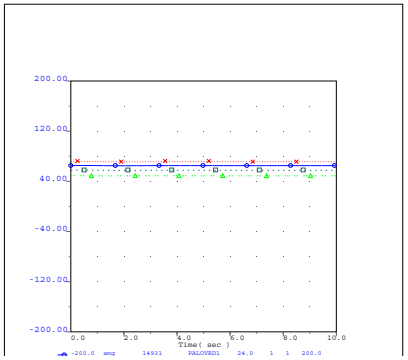


Figure 84 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: Cottonwd-BR-NoRAS

Possible Violations: MORC 1[7]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[7] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 85 Bus-V:Owens Gorge/Rinaldi 230 kV

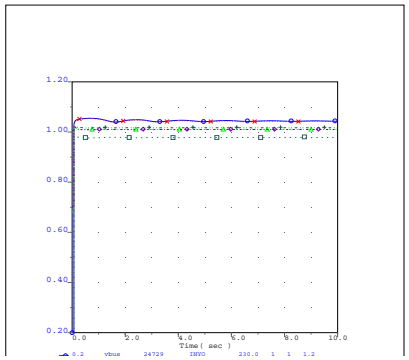


Figure 86 Bus-V:SCE North 115 kV

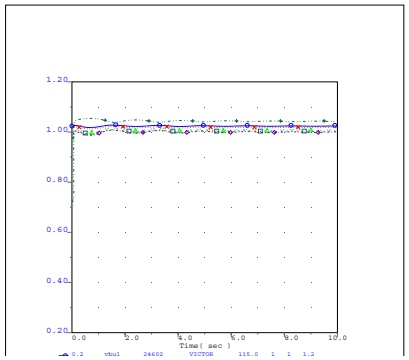


Figure 87 Bus-V:LA BASIN 230 & 138 kV

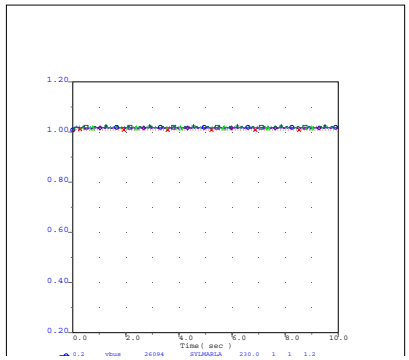


Figure 88 Bus-V:SCE 500 & 230 kV

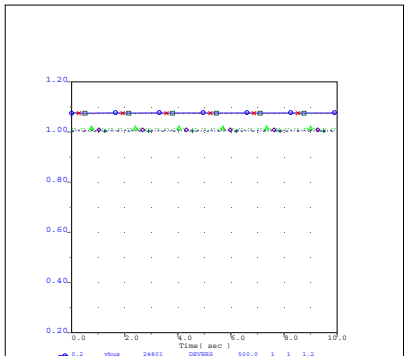


Figure 89 Bus-V: LADWP 500 kV:

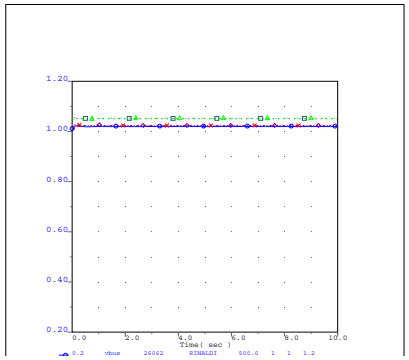


Figure 90 Bus-V:LADWP Load:

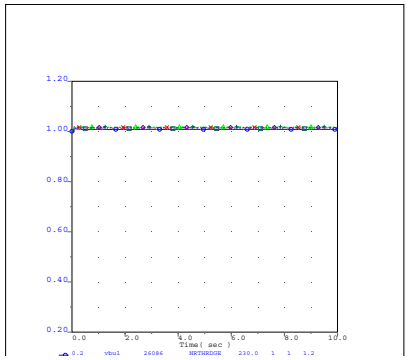


Figure 91 Bus-V: NW & S.CAL 500 kV

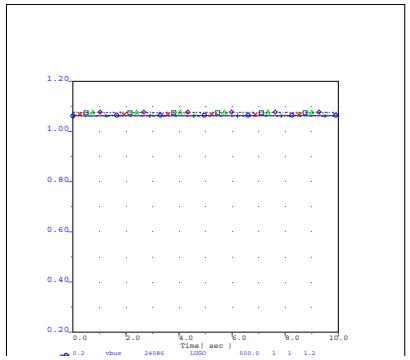


Figure 92 Bus-V: Others 500 kV

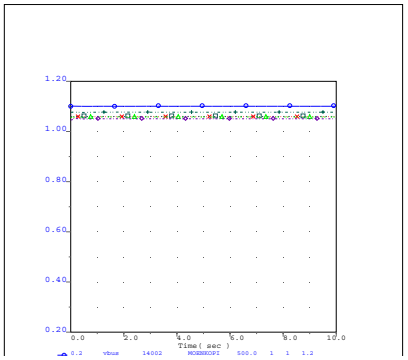


Figure 93 Bus-V: Others 230 kV

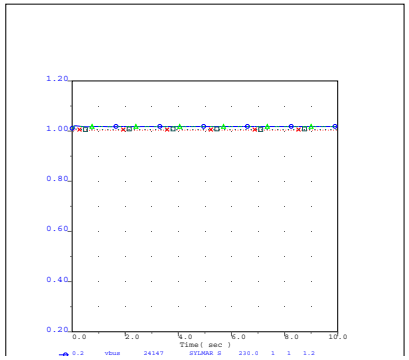


Figure 94 REL_RTR_ANG:S.Cal

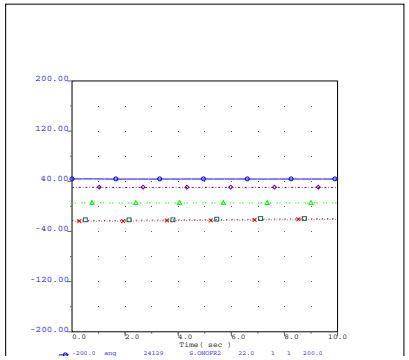


Figure 95 RELATIVE_ROTOR_ANGLE:S.Cal:

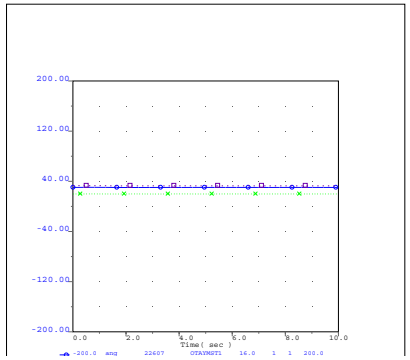
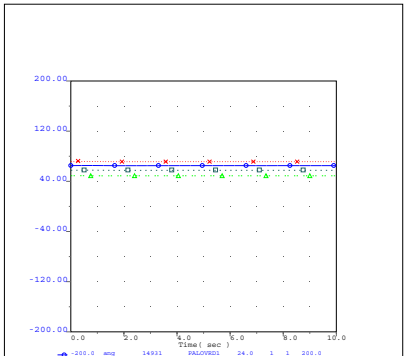


Figure 96 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: Cottonwd-Inyo-preRAS

Possible Violations: MORC 1[8]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: 14, >10%: 13

[8] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 97 Bus-V:Owens Gorge/Rinaldi 230 kV

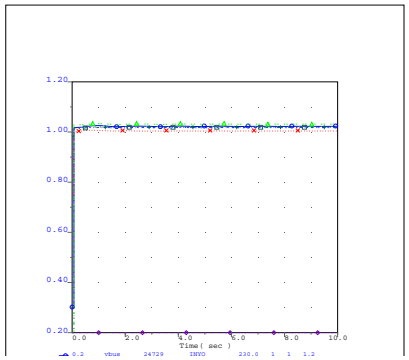


Figure 98 Bus-V:SCE North 115 kV

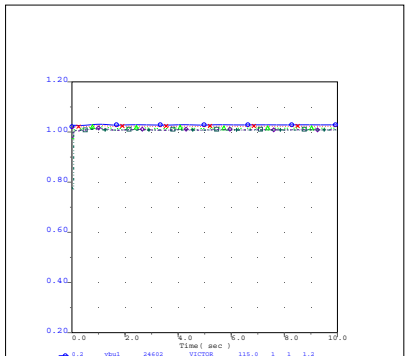


Figure 99 Bus-V:LA BASIN 230 & 138 kV

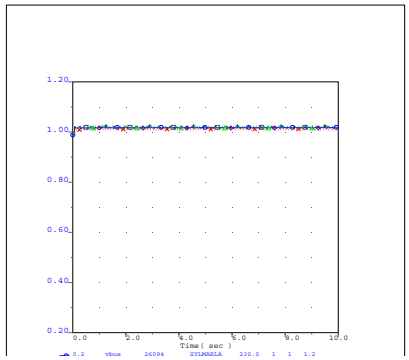


Figure 100 Bus-V:SCE 500 & 230 kV

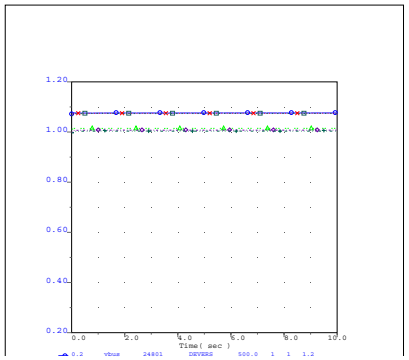


Figure 101 Bus-V: LADWP 500 kV:

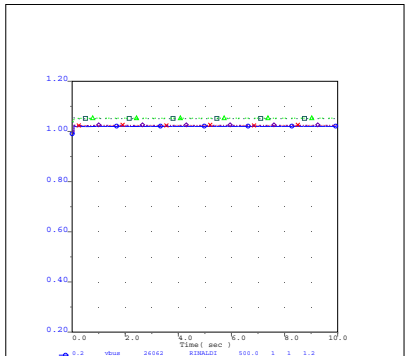


Figure 102 Bus-V:LADWP Load:

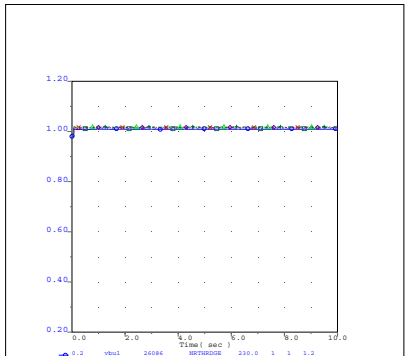


Figure 103 Bus-V: NW & S.CAL 500 kV

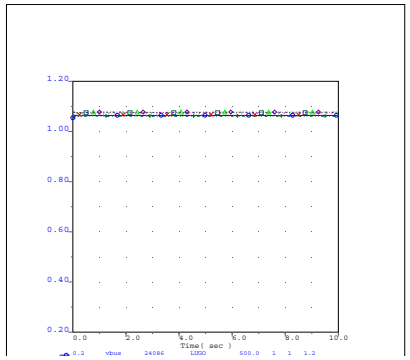


Figure 104 Bus-V: Others 500 kV

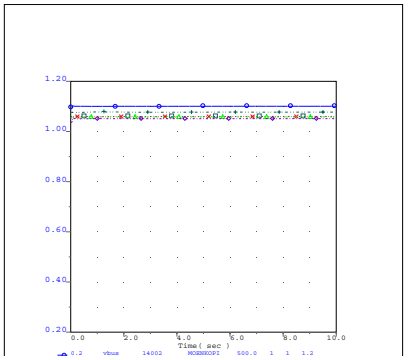


Figure 105 Bus-V: Others 230 kV

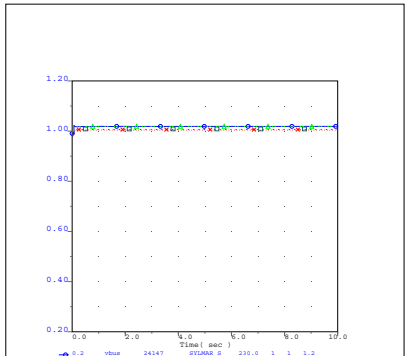


Figure 106 REL_RTR_ANG:S.Cal

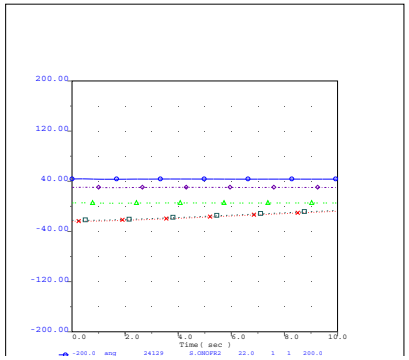


Figure 107 RELATIVE_ROTOR_ANGLE:S.Cal:

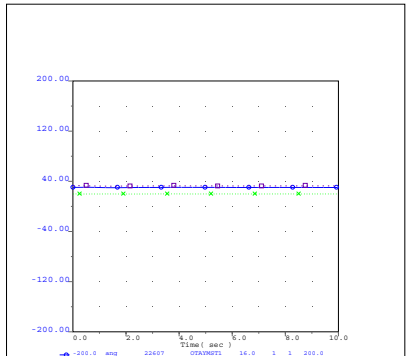
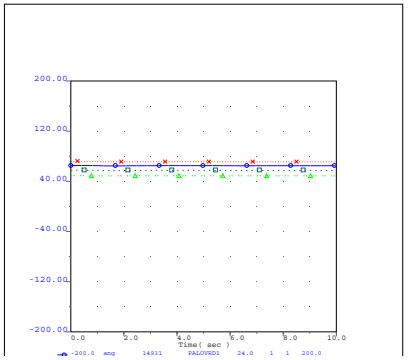


Figure 108 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: Pinetree-BR-RAS

Possible Violations: MORC 1[9]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[9] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 109 Bus-V:Owens Gorge/Rinaldi 230 kV

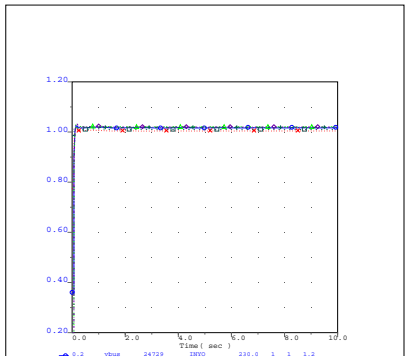


Figure 110 Bus-V:SCE North 115 kV

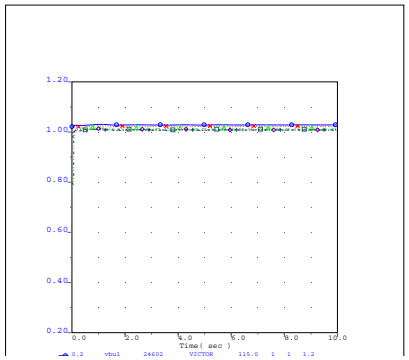


Figure 111 Bus-V:LA BASIN 230 & 138 kV

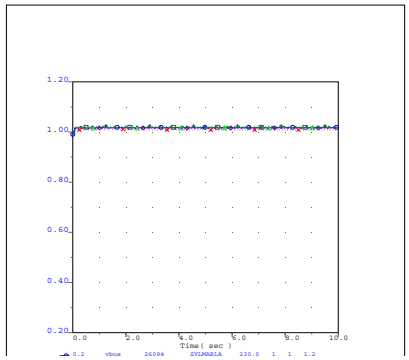


Figure 112 Bus-V:SCE 500 & 230 kV

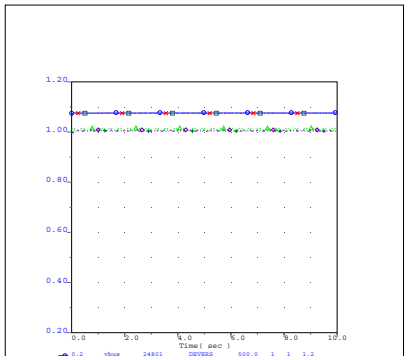


Figure 113 Bus-V: LADWP 500 kV:

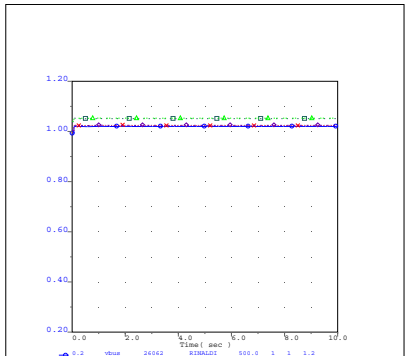


Figure 114 Bus-V:LADWP Load:

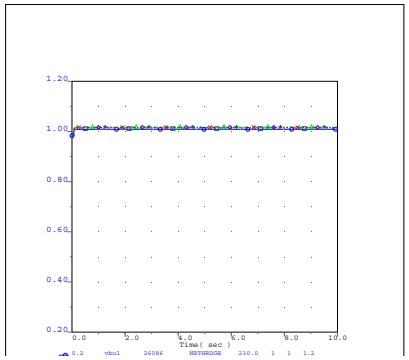


Figure 115 Bus-V: NW & S.CAL 500 kV

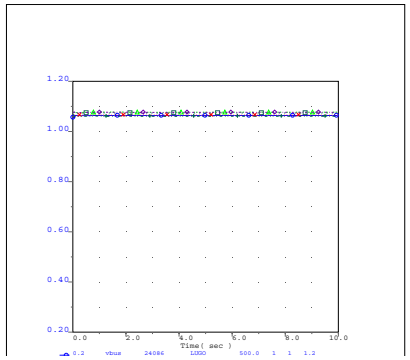


Figure 116 Bus-V: Others 500 kV

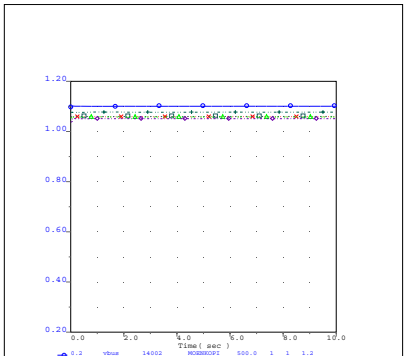


Figure 117 Bus-V: Others 230 kV

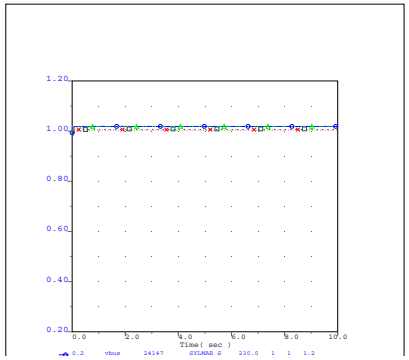


Figure 118 REL_RTR_ANG:S.Cal

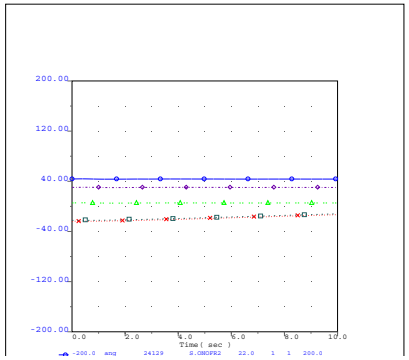


Figure 119 RELATIVE_ROTOR_ANGLE:S.Cal:

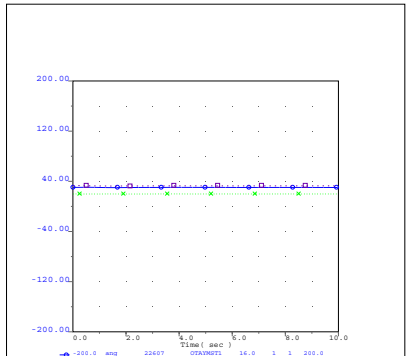
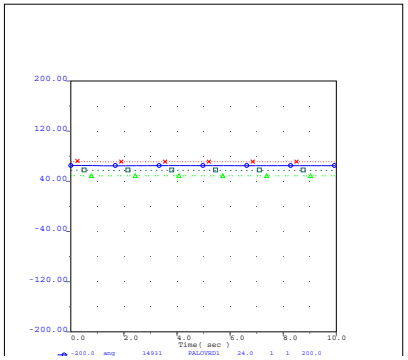


Figure 120 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: HoffmanSummit-Pinetree-RAS

Possible Violations: MORC 1[10]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[10] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 121 Bus-V:Owens Gorge/Rinaldi 230 kV

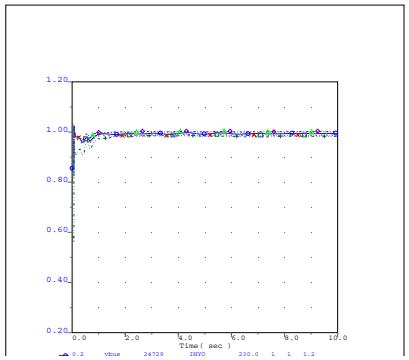


Figure 122 Bus-V:SCE North 115 kV

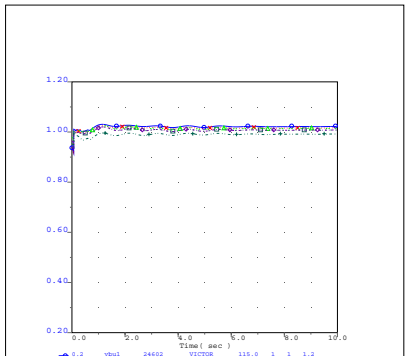


Figure 123 Bus-V:LA BASIN 230 & 138 kV

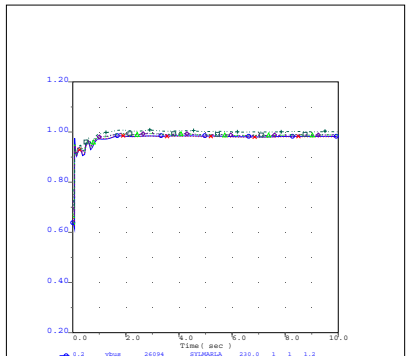


Figure 124 Bus-V:SCE 500 & 230 kV

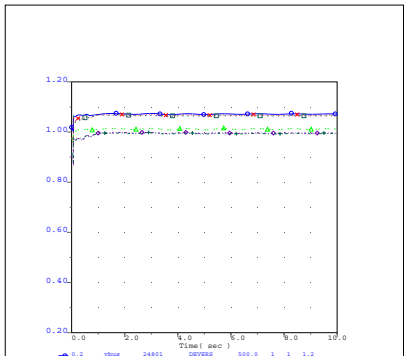


Figure 125 Bus-V: LADWP 500 kV:

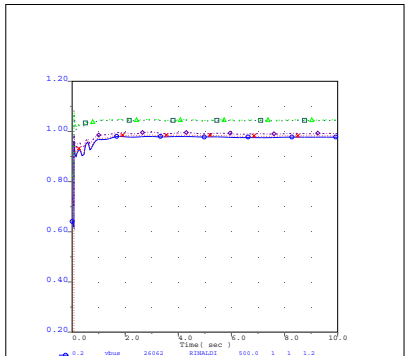


Figure 126 Bus-V:LADWP Load:

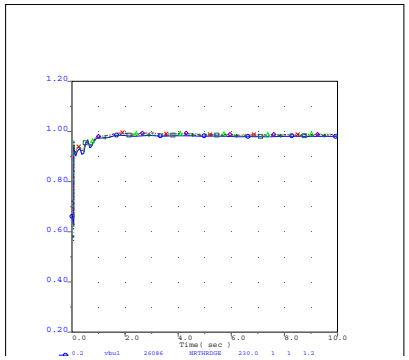


Figure 127 Bus-V: NW & S.CAL 500 kV

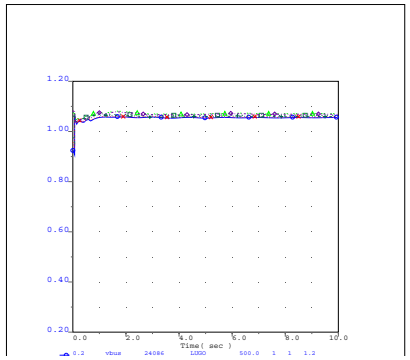


Figure 128 Bus-V: Others 500 kV

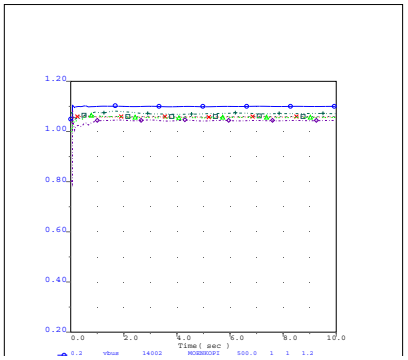


Figure 129 Bus-V: Others 230 kV

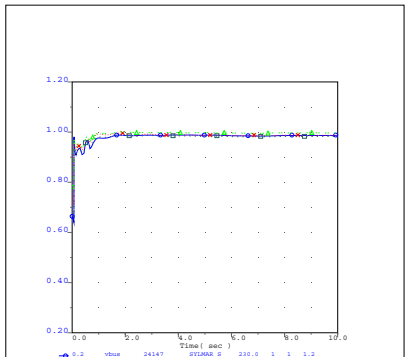


Figure 130 REL_RTR_ANG:S.Cal

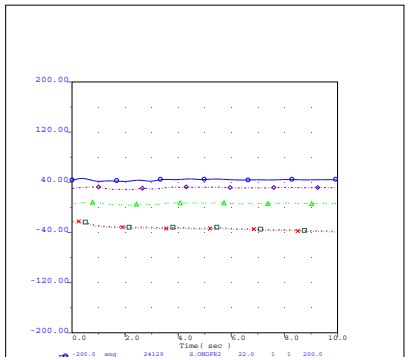


Figure 131 RELATIVE_ROTOR_ANGLE:S.Cal:

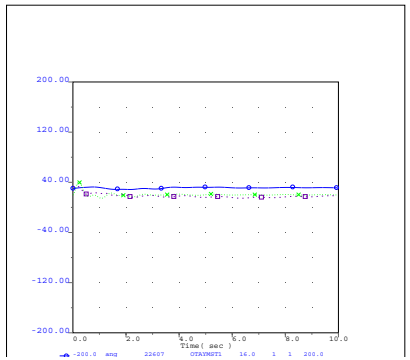
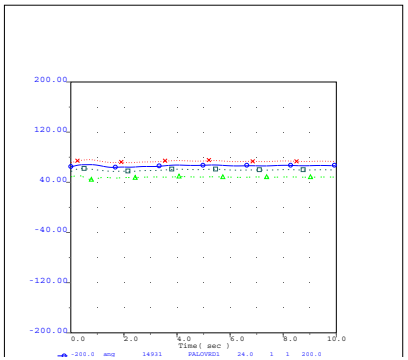


Figure 132 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: Adel-Vict-Rinaldi-dlo

Possible Violations: MORC 1[11]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[11] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 133 Bus-V:Owens Gorge/Rinaldi 230 kV

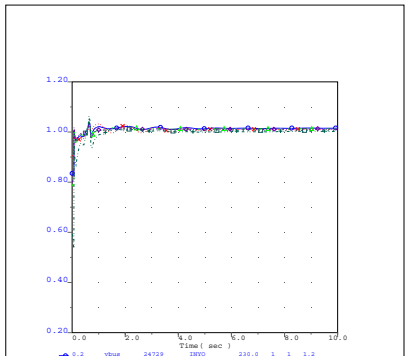


Figure 134 Bus-V:SCE North 115 kV

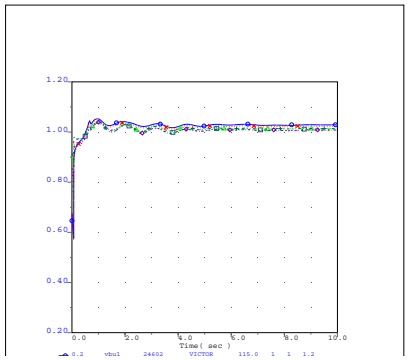


Figure 135 Bus-V:LA BASIN 230 & 138 kV

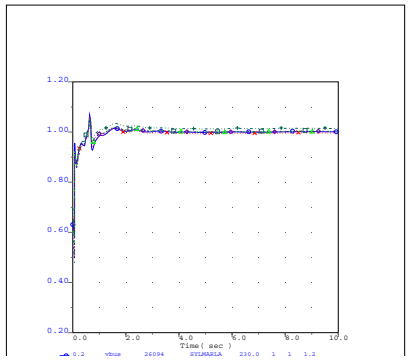


Figure 136 Bus-V:SCE 500 & 230 kV

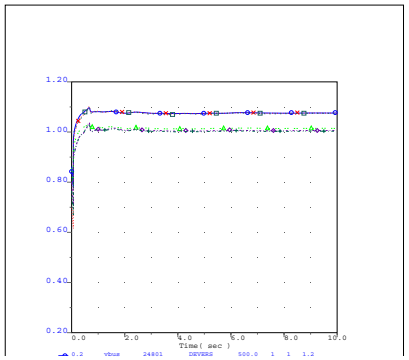


Figure 137 Bus-V: LADWP 500 kV:

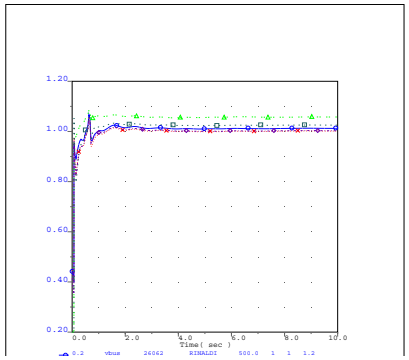


Figure 138 Bus-V:LADWP Load:

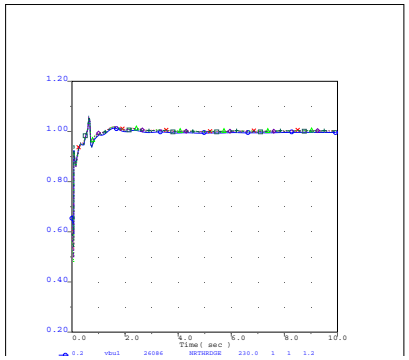


Figure 139 Bus-V: NW & S.CAL 500 kV

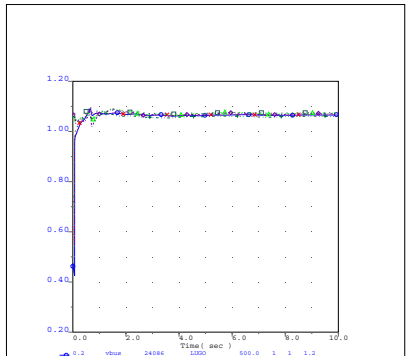


Figure 140 Bus-V: Others 500 kV

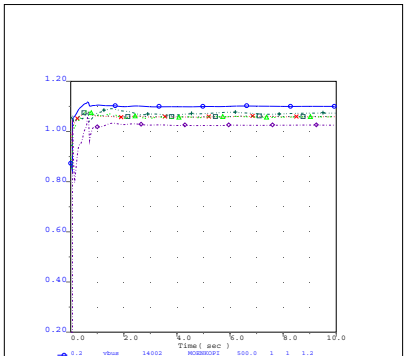


Figure 141 Bus-V: Others 230 kV

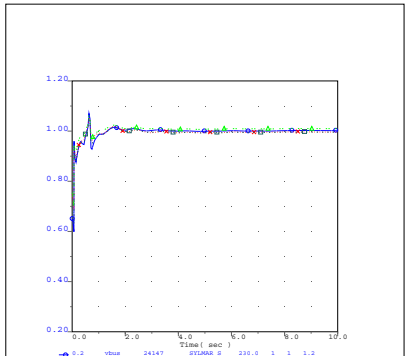


Figure 142 REL_RTR_ANG:S.Cal

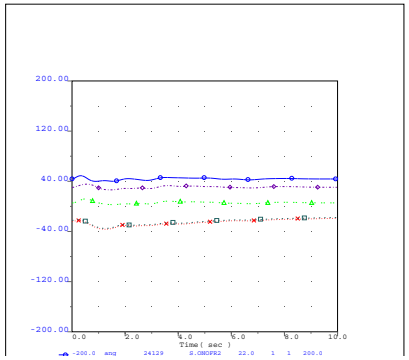


Figure 143 RELATIVE_ROTOR_ANGLE:S.Cal:

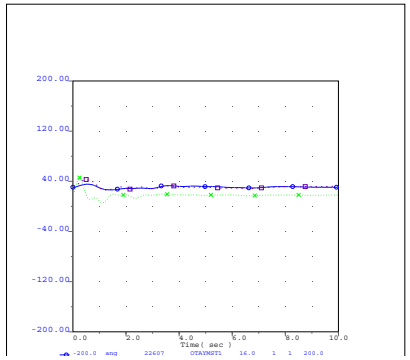
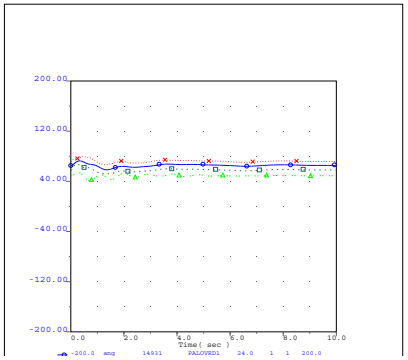


Figure 144 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: Adel-Victorvl-dlo

Possible Violations: MORC 1[12]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[12] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 145 Bus-V:Owens Gorge/Rinaldi 230 kV

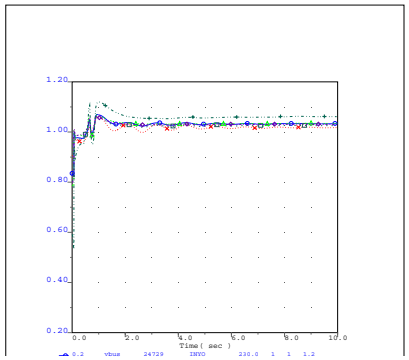


Figure 146 Bus-V:SCE North 115 kV

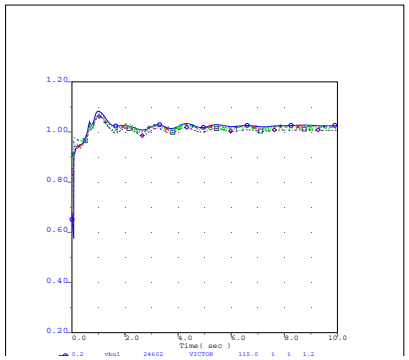


Figure 147 Bus-V:LA BASIN 230 & 138 kV

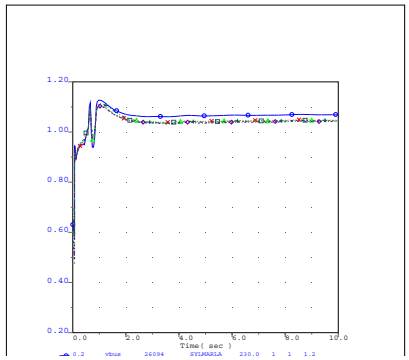


Figure 148 Bus-V:SCE 500 & 230 kV

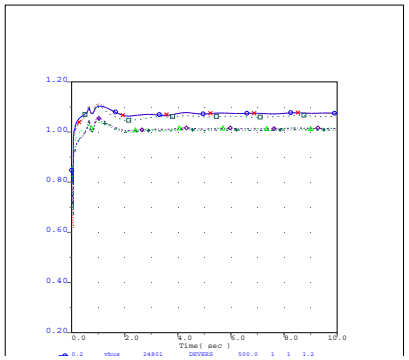


Figure 149 Bus-V: LADWP 500 kV:

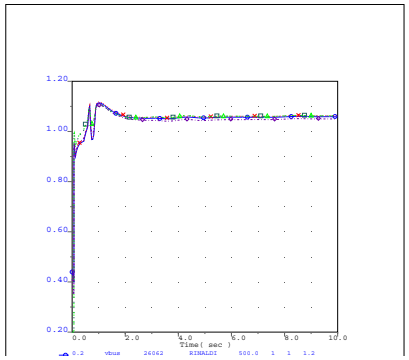


Figure 150 Bus-V:LADWP Load:

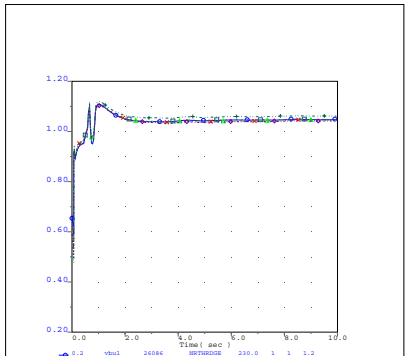


Figure 151 Bus-V: NW & S.CAL 500 kV

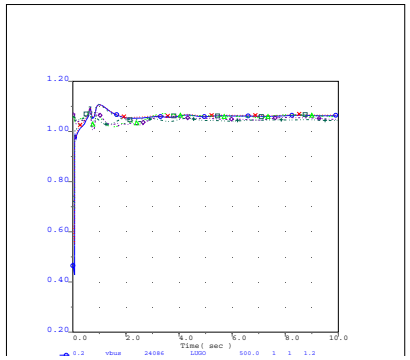


Figure 152 Bus-V: Others 500 kV

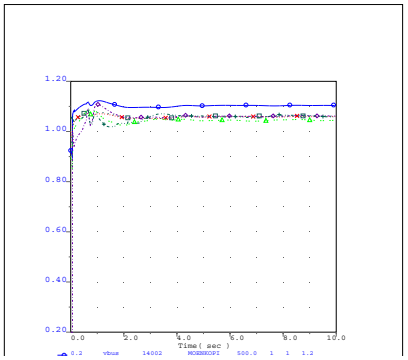


Figure 153 Bus-V: Others 230 kV

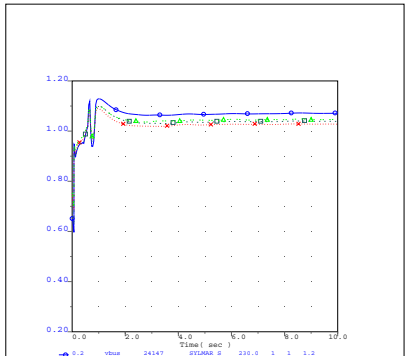


Figure 154 REL_RTR_ANG:S.Cal

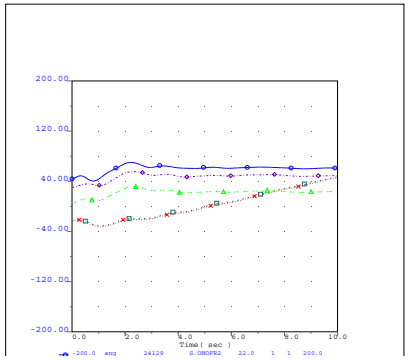


Figure 155 RELATIVE_ROTOR_ANGLE:S.Cal:

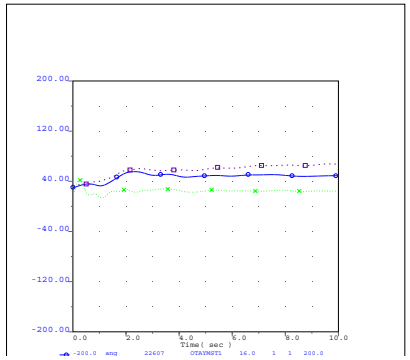
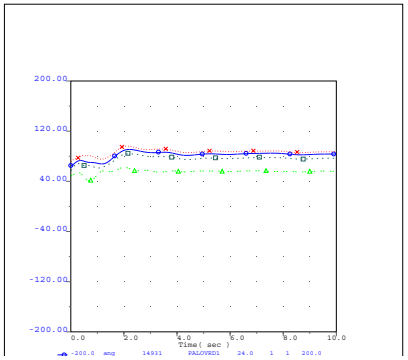


Figure 156 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: McCullgh-Victorvl-dlo

Possible Violations: MORC 1[13]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[13] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 157 Bus-V:Owens Gorge/Rinaldi 230 kV

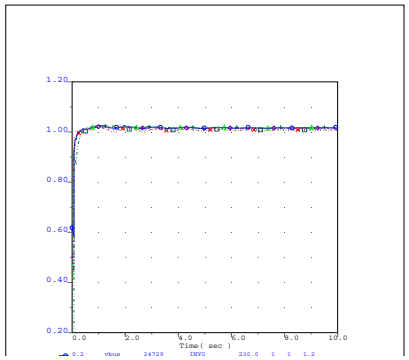


Figure 158 Bus-V:SCE North 115 kV

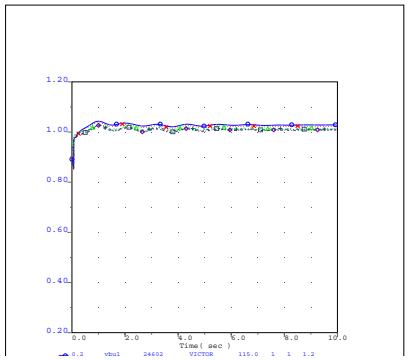


Figure 159 Bus-V:LA BASIN 230 & 138 kV

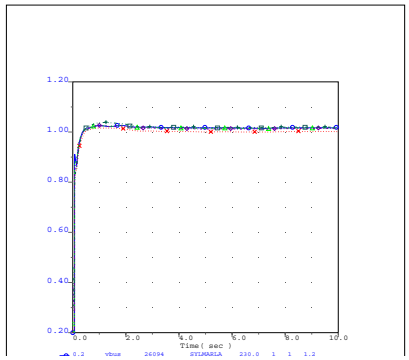


Figure 160 Bus-V:SCE 500 & 230 kV

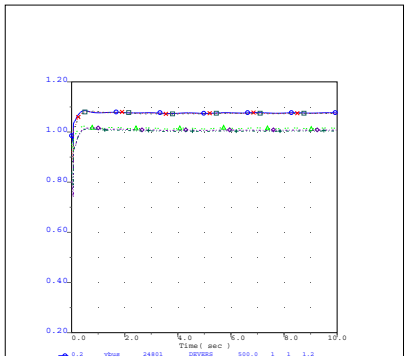


Figure 161 Bus-V: LADWP 500 kV:

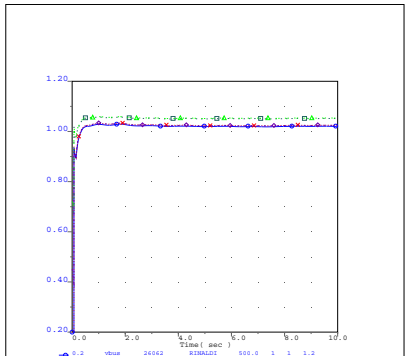


Figure 162 Bus-V:LADWP Load:

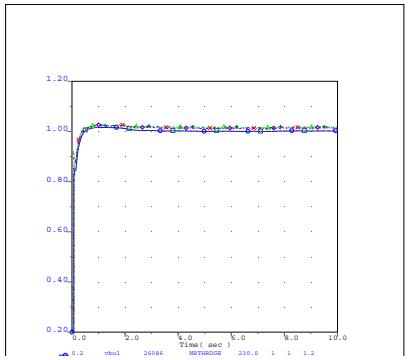


Figure 163 Bus-V: NW & S.CAL 500 kV

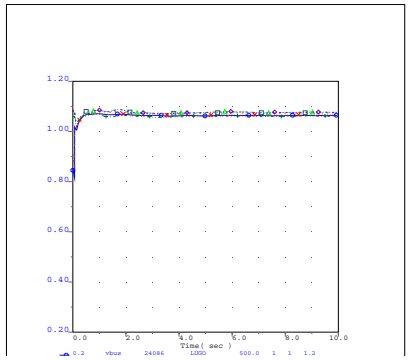


Figure 164 Bus-V: Others 500 kV

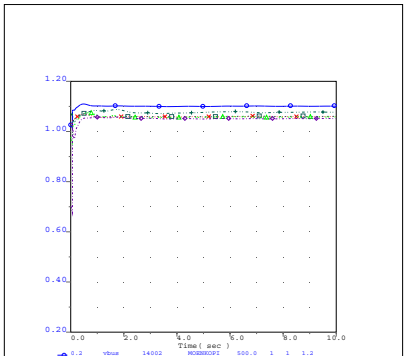


Figure 165 Bus-V: Others 230 kV

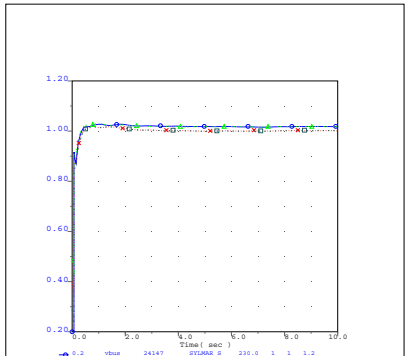


Figure 166 REL_RTR_ANG:S.Cal

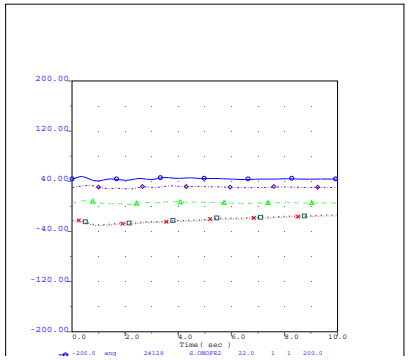


Figure 167 RELATIVE_ROTOR_ANGLE:S.Cal:

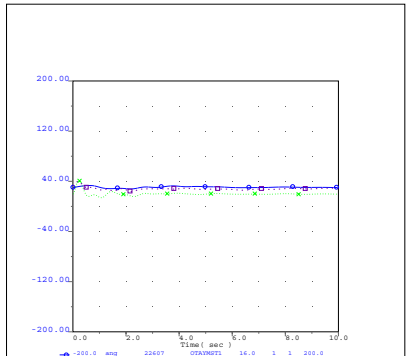
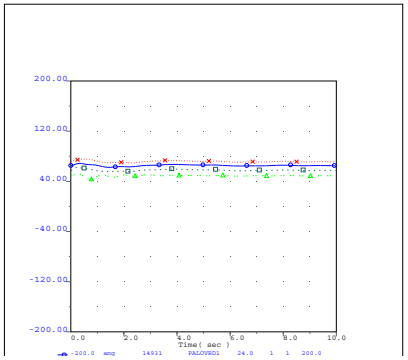


Figure 168 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: Rin-Tar-dlo

Possible Violations: MORC 1[14]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[14] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 169 Bus-V:Owens Gorge/Rinaldi 230 kV

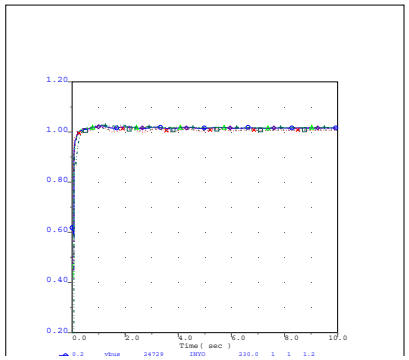


Figure 170 Bus-V:SCE North 115 kV

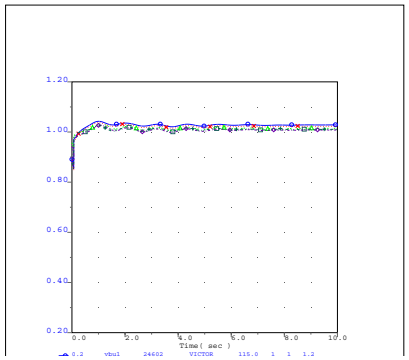


Figure 171 Bus-V:LA BASIN 230 & 138 kV

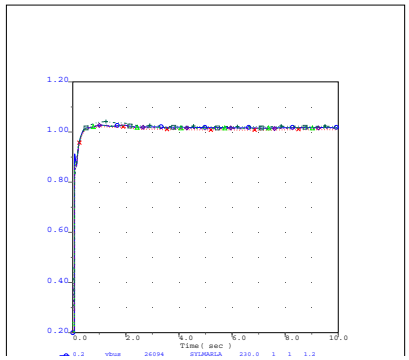


Figure 172 Bus-V:SCE 500 & 230 kV

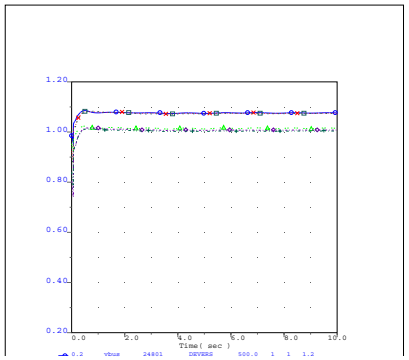


Figure 173 Bus-V: LADWP 500 kV:

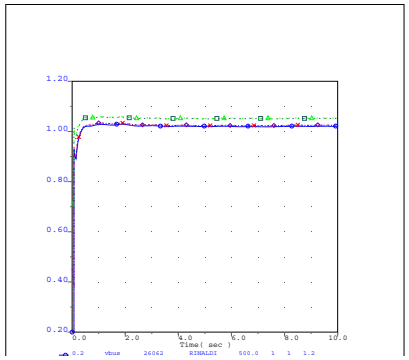


Figure 174 Bus-V:LADWP Load:

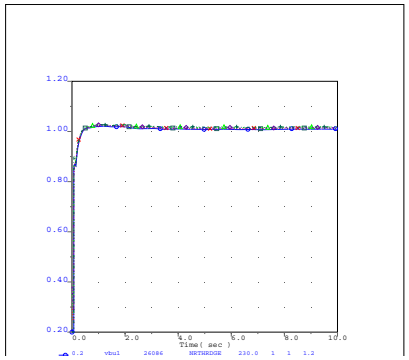


Figure 175 Bus-V: NW & S.CAL 500 kV

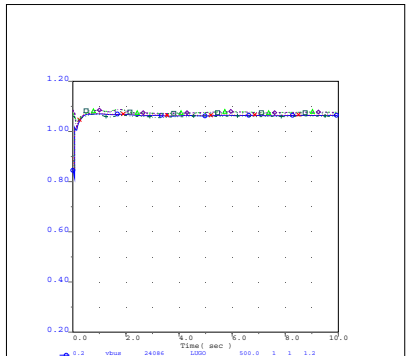


Figure 176 Bus-V: Others 500 kV

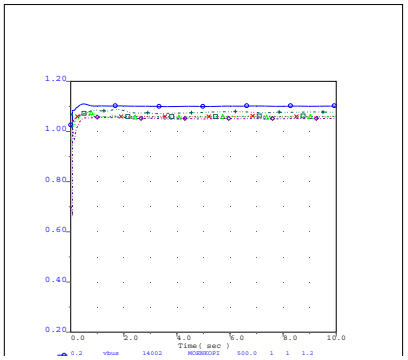


Figure 177 Bus-V: Others 230 kV

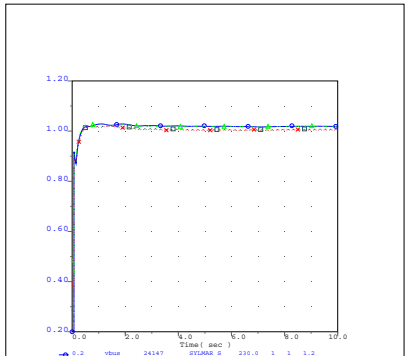


Figure 178 REL_RTR_ANG:S.Cal

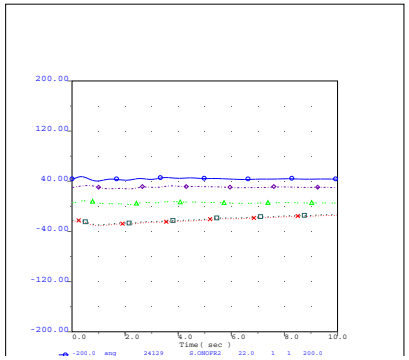


Figure 179 RELATIVE_ROTOR_ANGLE:S.Cal:

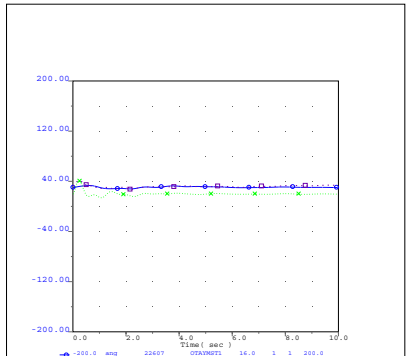
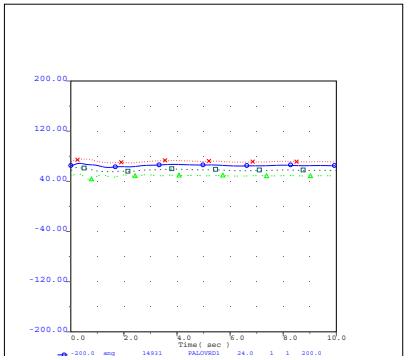


Figure 180 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: Rin-Glendl-dlo

Possible Violations: MORC 1[15]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[15] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 181 Bus-V:Owens Gorge/Rinaldi 230 kV

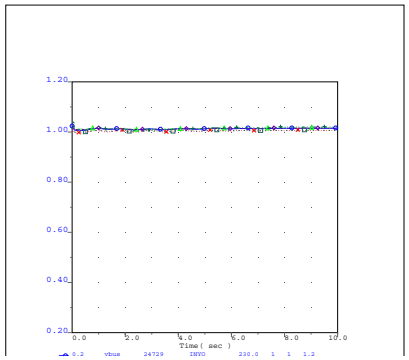


Figure 182 Bus-V:SCE North 115 kV

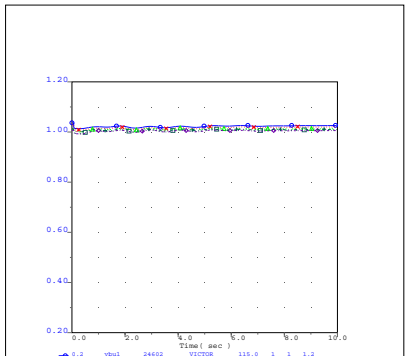


Figure 183 Bus-V:LA BASIN 230 & 138 kV

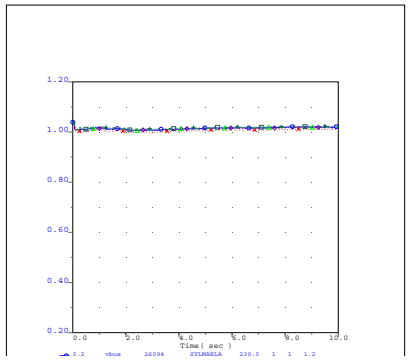


Figure 184 Bus-V:SCE 500 & 230 kV

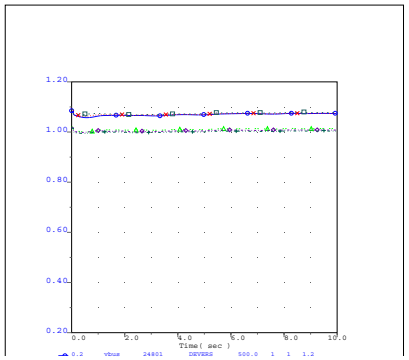


Figure 185 Bus-V: LADWP 500 kV:

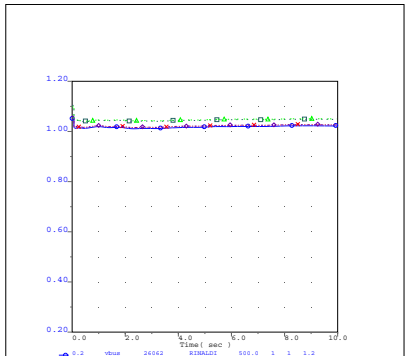


Figure 186 Bus-V:LADWP Load:

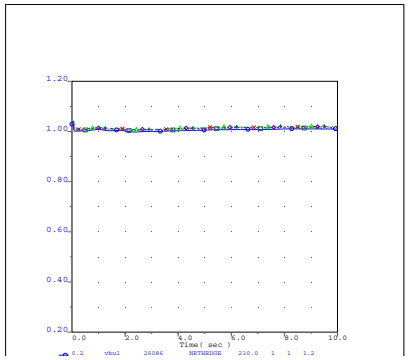


Figure 187 Bus-V: NW & S.CAL 500 kV

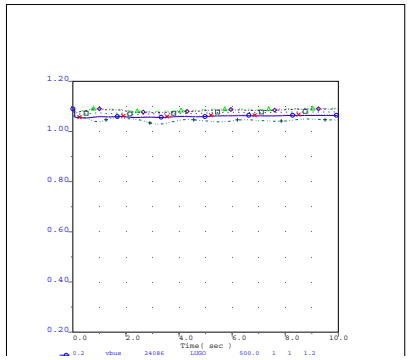


Figure 188 Bus-V: Others 500 kV

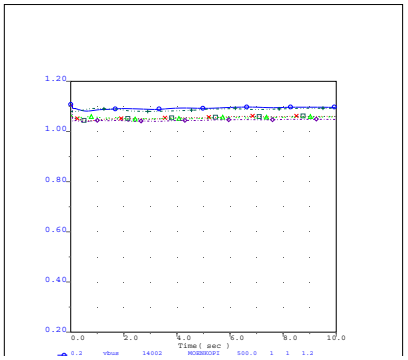


Figure 189 Bus-V: Others 230 kV

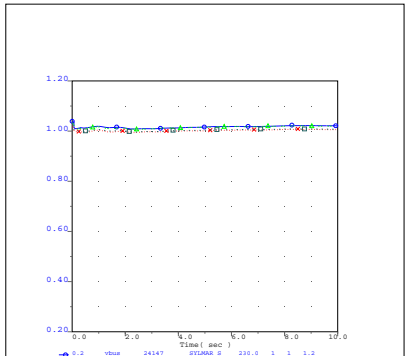


Figure 190 REL_RTR_ANG:S.Cal

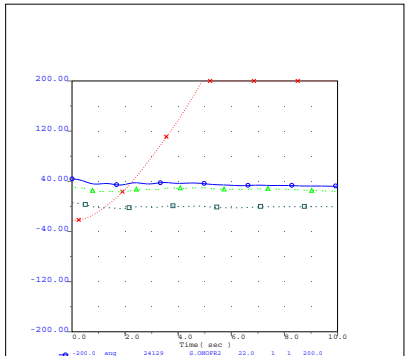


Figure 191 RELATIVE_ROTOR_ANGLE:S.Cal:

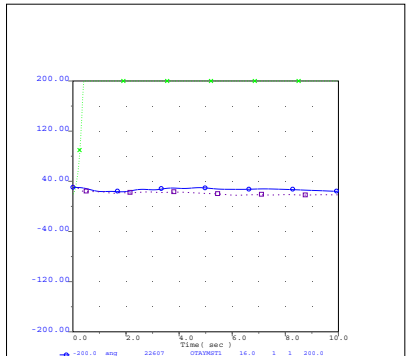
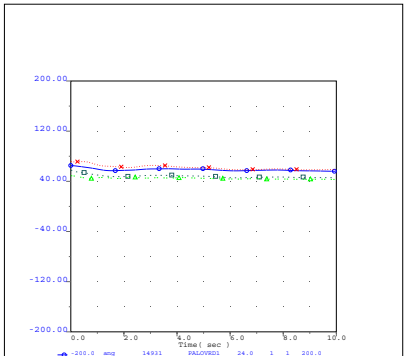


Figure 192 REL_RTR_ANG:Others



Study: BSP Case: laprebsp_50iy_ov_0og Contingency: IPP-bipolar-upc

Possible Violations: MORC 1[16]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[16] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Study: BSP Case: labsp1_50iy_ov_0og

Figure 1 Bus-V:Owens Gorge/Rinaldi 230 kV

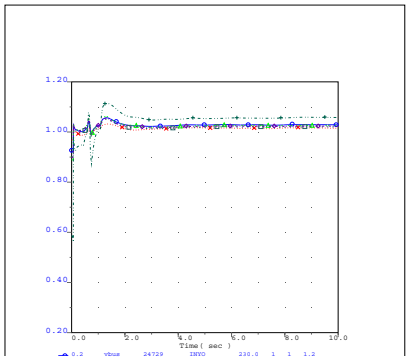


Figure 2 Bus-V:SCE North 115 kV

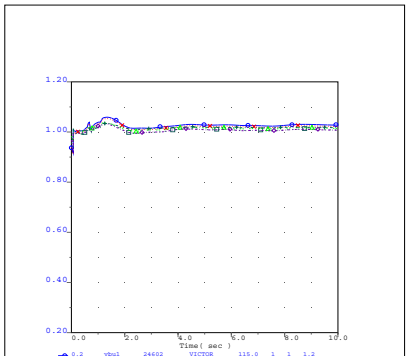


Figure 3 Bus-V:LA BASIN 230 & 138 kV

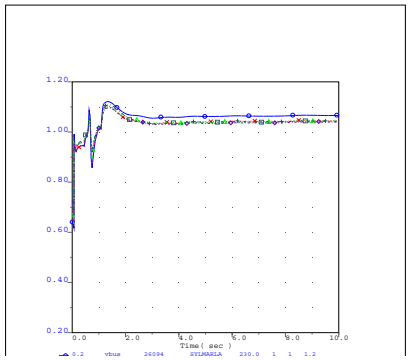


Figure 4 Bus-V:SCE 500 & 230 kV

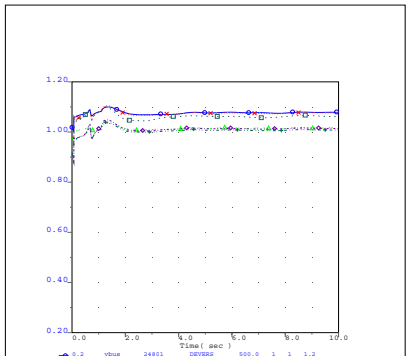


Figure 5 Bus-V: LADWP 500 kV:

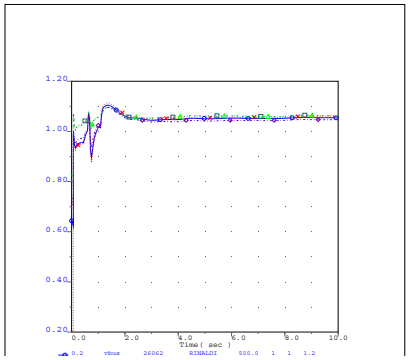


Figure 6 Bus-V:LADWP Load:

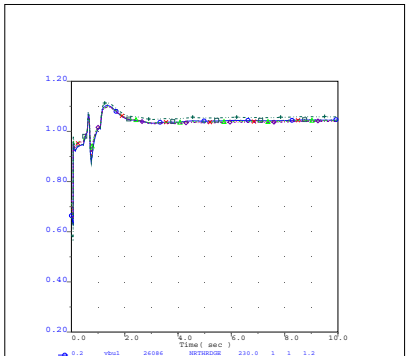


Figure 7 Bus-V: NW & S.CAL 500 kV

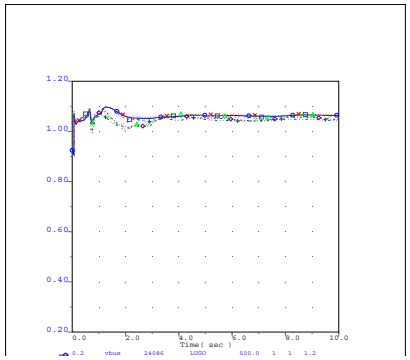


Figure 8 Bus-V: Others 500 kV

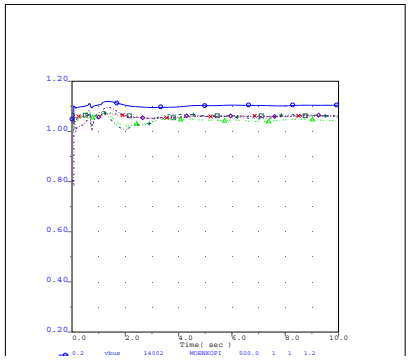


Figure 9 Bus-V: Others 230 kV

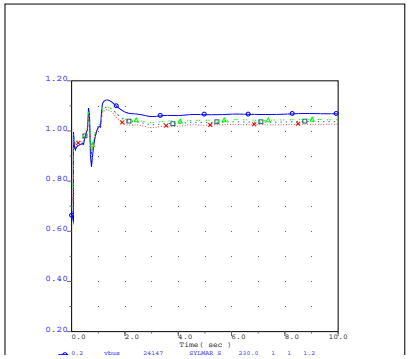


Figure 10 REL_RTR_ANG:S.Cal

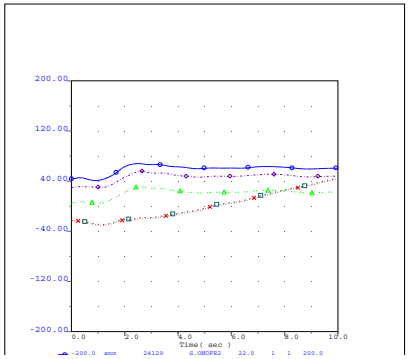


Figure 11 RELATIVE_ROTOR_ANGLE:S.Cal:

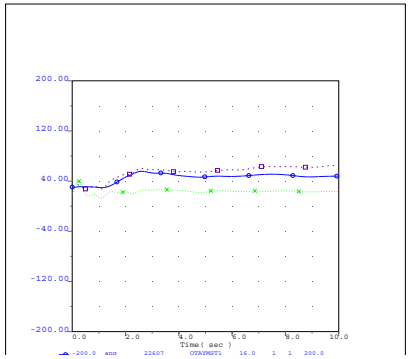
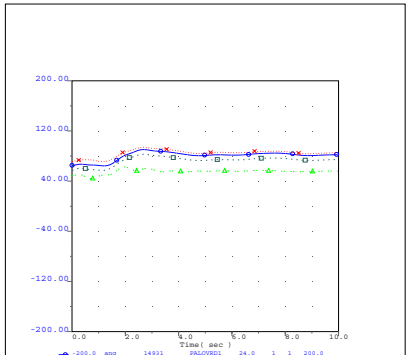


Figure 12 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Adel-Rinaldi-slo
Possible Violations: MORC 1[1]- None MORC 2- None FREQ Dip- None
Buses with post-tran changes >5%: None, >10%: None

[1] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 13 Bus-V:Owens Gorge/Rinaldi 230 kV

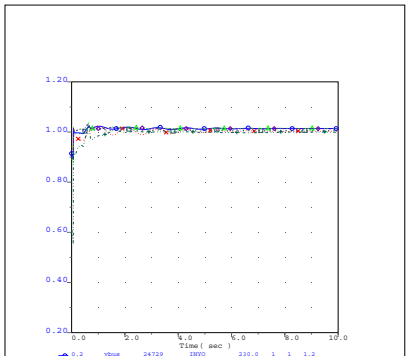


Figure 14 Bus-V:SCE North 115 kV

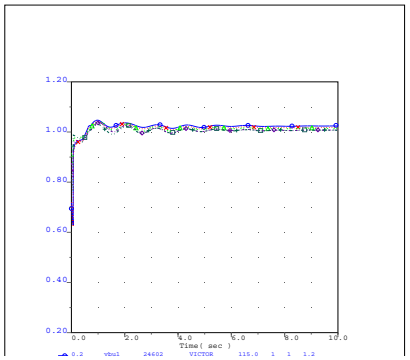


Figure 15 Bus-V:LA BASIN 230 & 138 kV

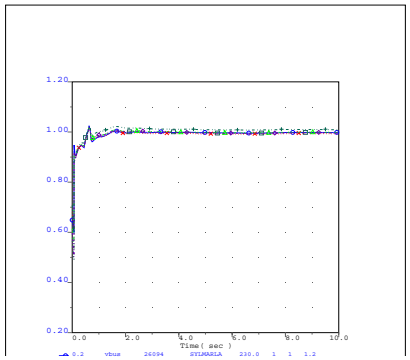


Figure 16 Bus-V:SCE 500 & 230 kV

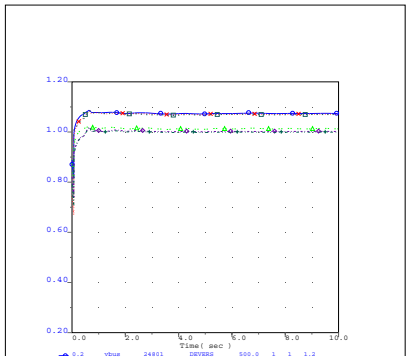


Figure 17 Bus-V: LADWP 500 kV:

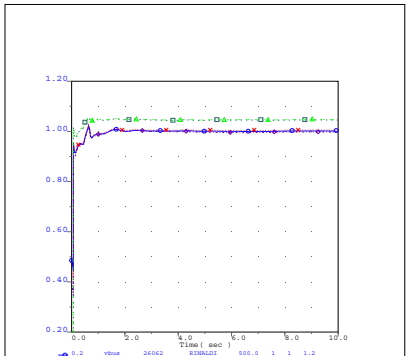


Figure 18 Bus-V:LADWP Load:

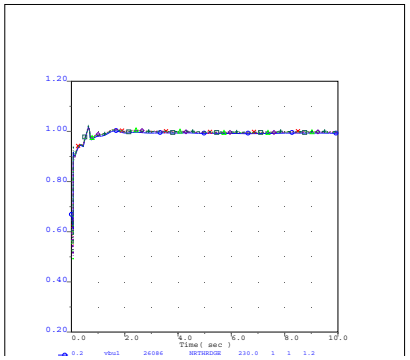


Figure 19 Bus-V: NW & S.CAL 500 kV

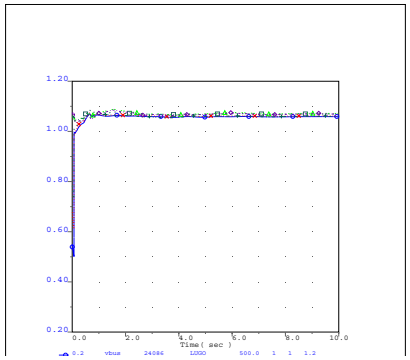


Figure 20 Bus-V: Others 500 kV

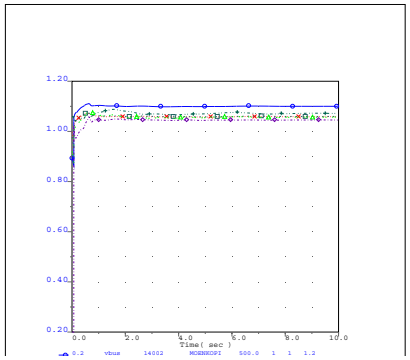


Figure 21 Bus-V: Others 230 kV

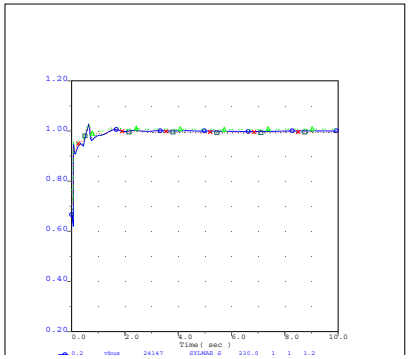


Figure 22 REL_RTR_ANG:S.Cal

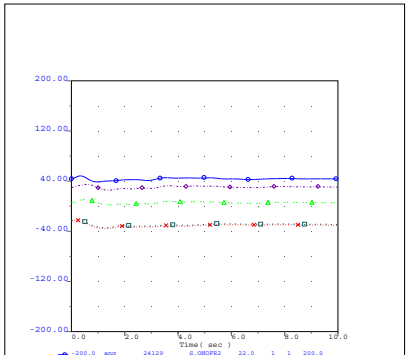


Figure 23 RELATIVE_ROTOR_ANGLE:S.Cal:

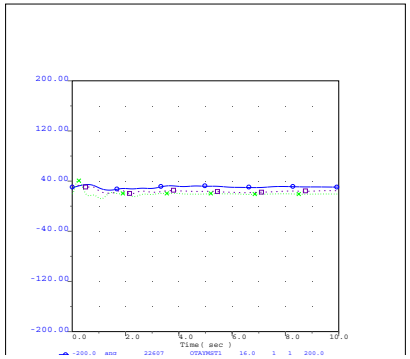
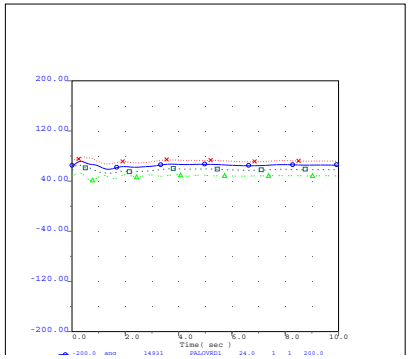


Figure 24 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Adel-Toluca

Possible Violations: MORC 1[2]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[2] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 1 Bus-V:Owens Gorge/Rinaldi 230 kV

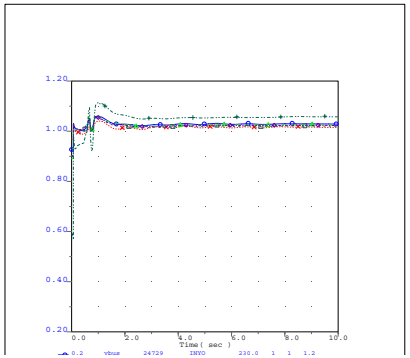


Figure 2 Bus-V:SCE North 115 kV

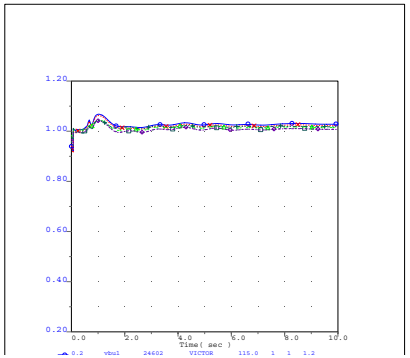


Figure 3 Bus-V:LA BASIN 230 & 138 kV

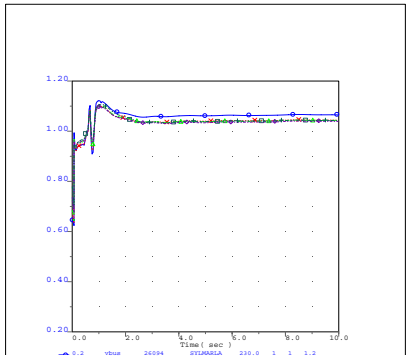


Figure 4 Bus-V:SCE 500 & 230 kV

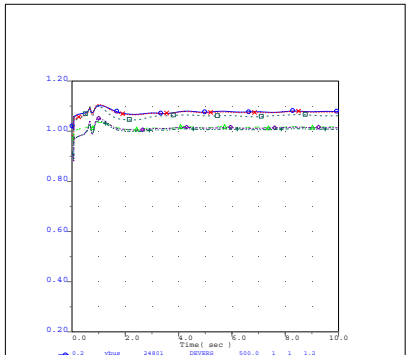


Figure 5 Bus-V: LADWP 500 kV:

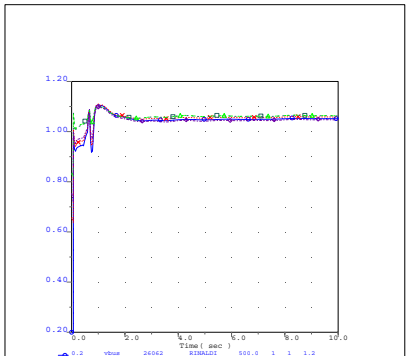


Figure 6 Bus-V:LADWP Load:

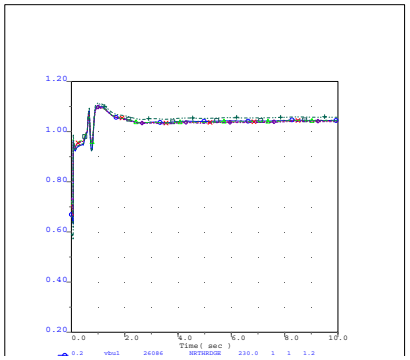


Figure 7 Bus-V: NW & S.CAL 500 kV

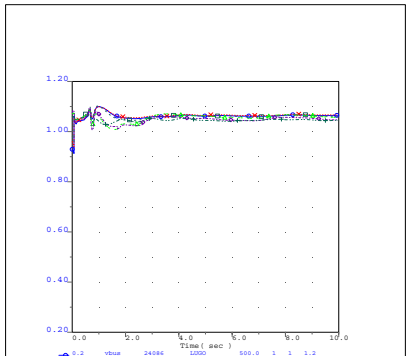


Figure 8 Bus-V: Others 500 kV

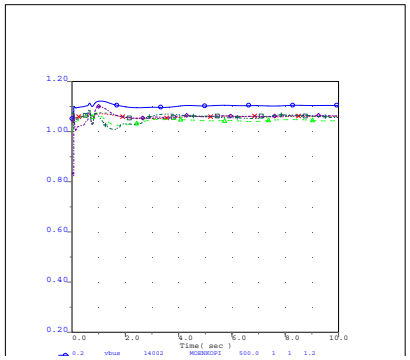


Figure 9 Bus-V: Others 230 kV

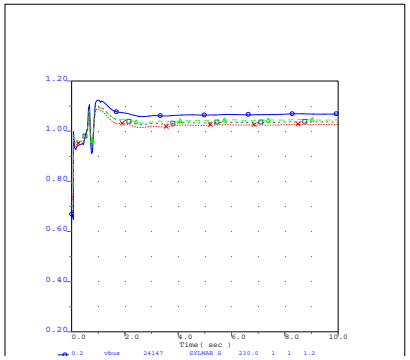


Figure 10 REL_RTR_ANG:S.Cal

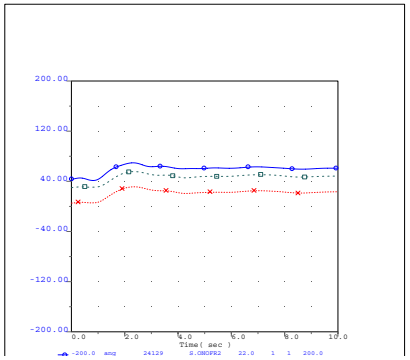


Figure 11 RELATIVE_ROTOR_ANGLE:S.Cal:

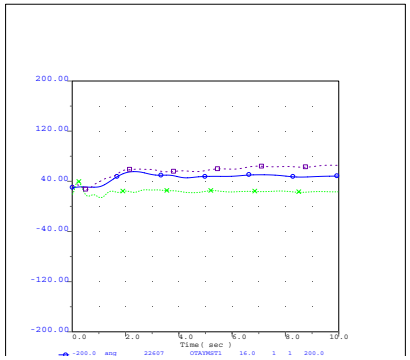
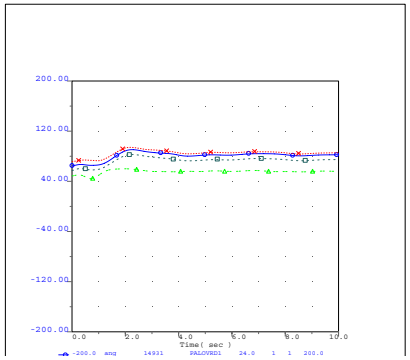


Figure 12 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Vict-Rinaldi-slo

Possible Violations: MORC 1[1]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[1] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 25 Bus-V:Owens Gorge/Rinaldi 230 kV

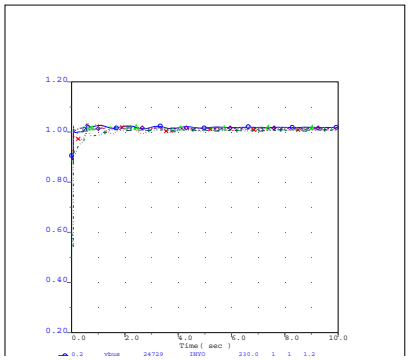


Figure 26 Bus-V:SCE North 115 kV

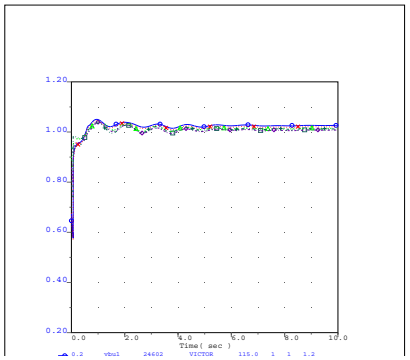


Figure 27 Bus-V:LA BASIN 230 & 138 kV

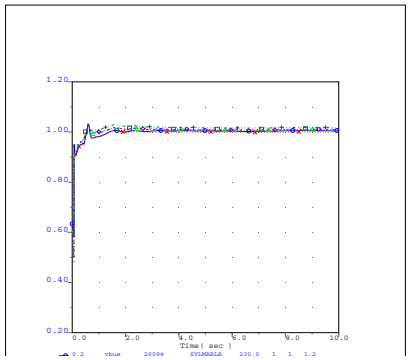


Figure 28 Bus-V:SCE 500 & 230 kV

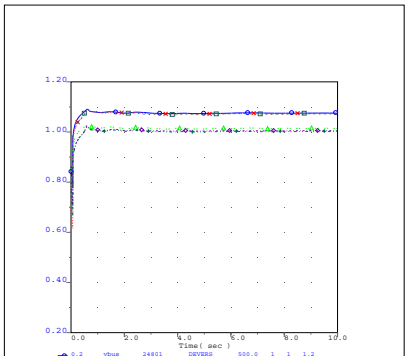


Figure 29 Bus-V: LADWP 500 kV:

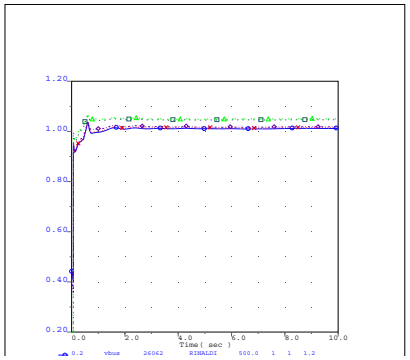


Figure 30 Bus-V:LADWP Load:

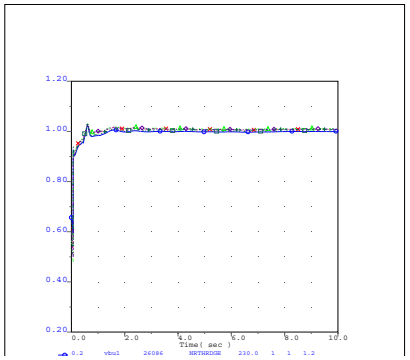


Figure 31 Bus-V: NW & S.CAL 500 kV

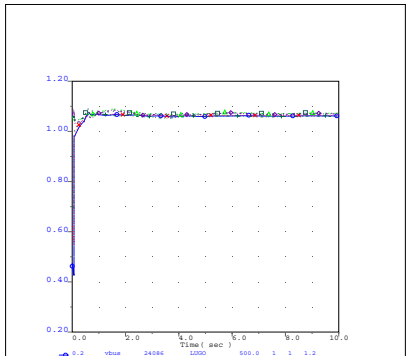


Figure 32 Bus-V: Others 500 kV

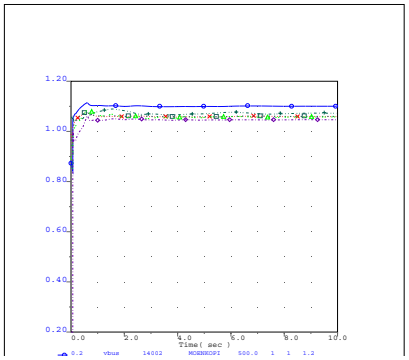


Figure 33 Bus-V: Others 230 kV

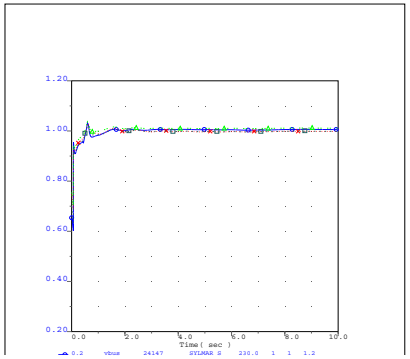


Figure 34 REL_RTR_ANG:S.Cal

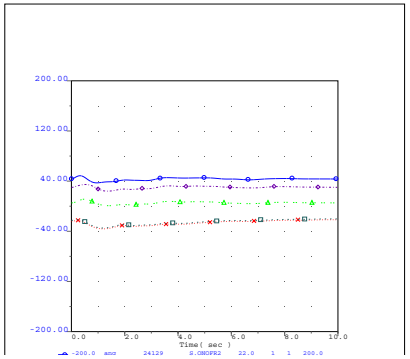


Figure 35 RELATIVE_ROTOR_ANGLE:S.Cal:

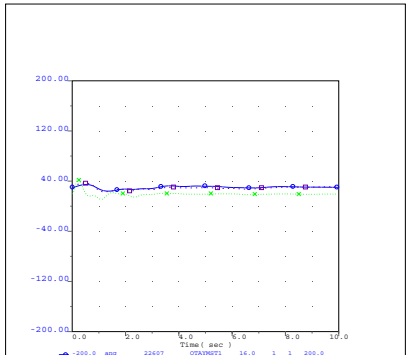
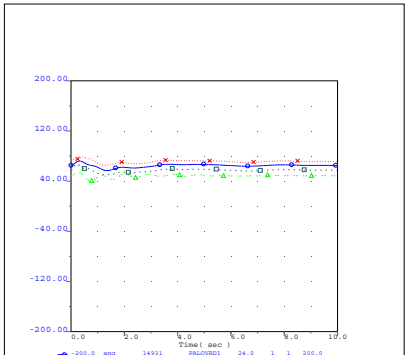


Figure 36 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Adel-Victorvl-slo

Possible Violations: MORC 1[3]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[3] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 37 Bus-V:Owens Gorge/Rinaldi 230 kV

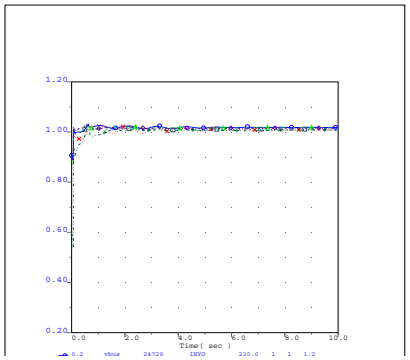


Figure 38 Bus-V:SCE North 115 kV

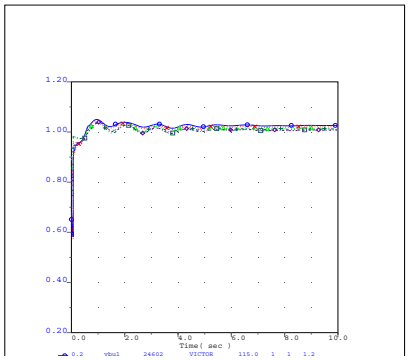


Figure 39 Bus-V:LA BASIN 230 & 138 kV

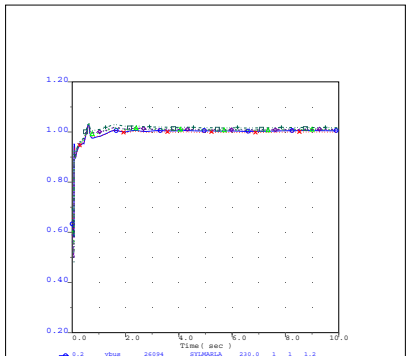


Figure 40 Bus-V:SCE 500 & 230 kV

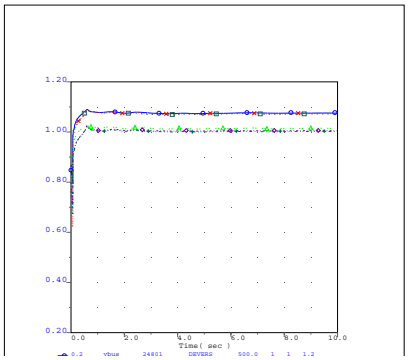


Figure 41 Bus-V: LADWP 500 kV:

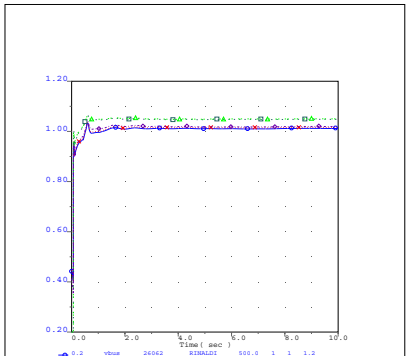


Figure 42 Bus-V:LADWP Load:

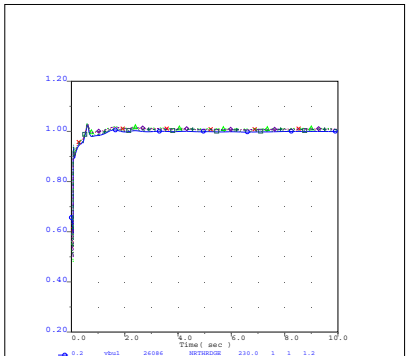


Figure 43 Bus-V: NW & S.CAL 500 kV

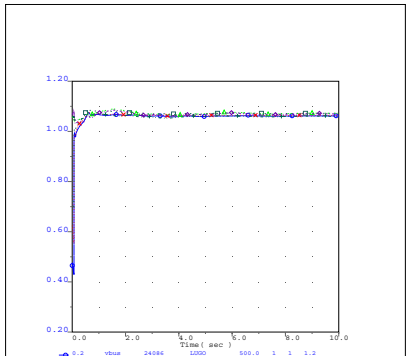


Figure 44 Bus-V: Others 500 kV

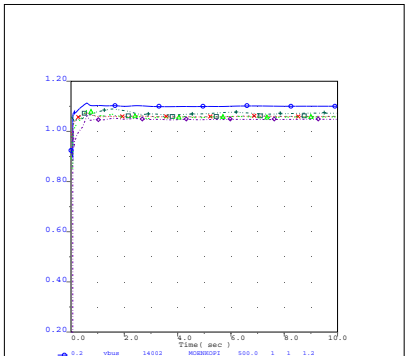


Figure 45 Bus-V: Others 230 kV

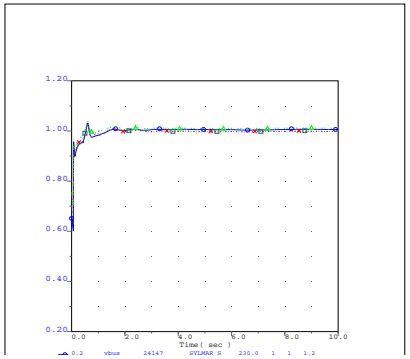


Figure 46 REL_RTR_ANG:S.Cal

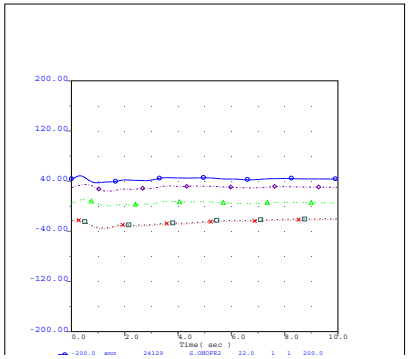


Figure 47 RELATIVE_ROTOR_ANGLE:S.Cal:

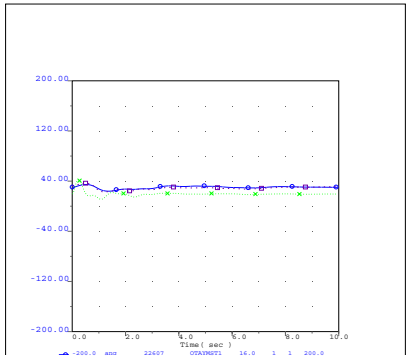
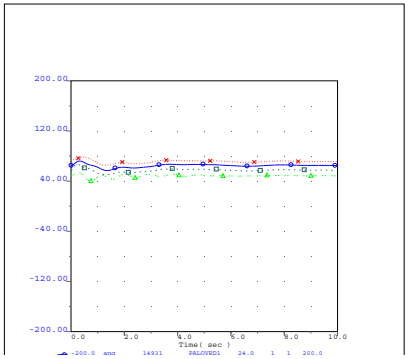


Figure 48 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: McC-Vict-slo

Possible Violations: MORC 1[4]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[4] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 49 Bus-V:Owens Gorge/Rinaldi 230 kV

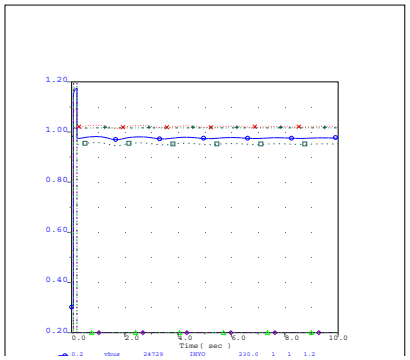


Figure 50 Bus-V:SCE North 115 kV

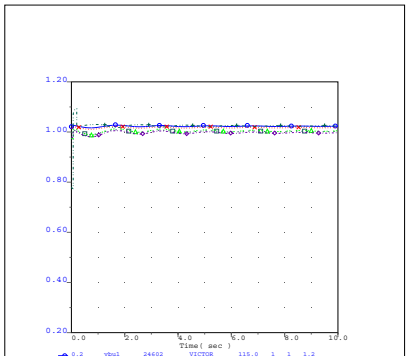


Figure 51 Bus-V:LA BASIN 230 & 138 kV

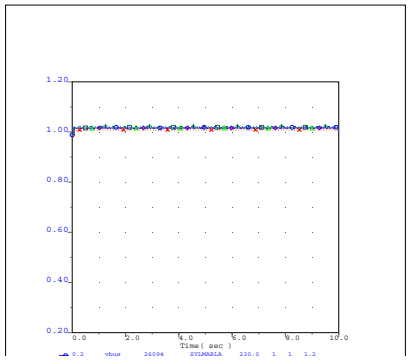


Figure 52 Bus-V:SCE 500 & 230 kV

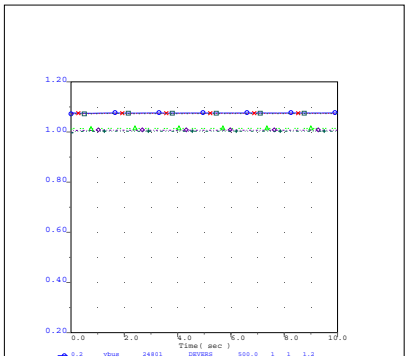


Figure 53 Bus-V: LADWP 500 kV:

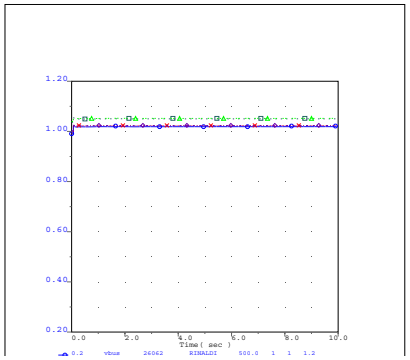


Figure 54 Bus-V:LADWP Load:

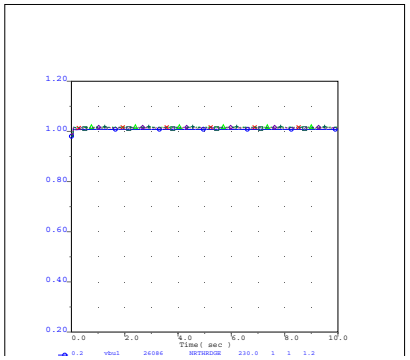


Figure 55 Bus-V: NW & S.CAL 500 kV

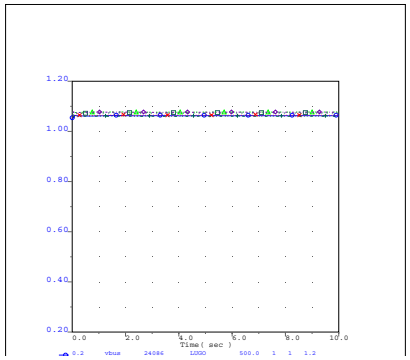


Figure 56 Bus-V: Others 500 kV

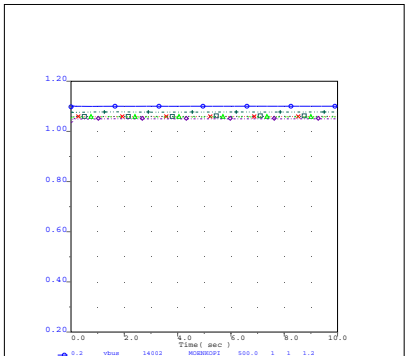


Figure 57 Bus-V: Others 230 kV

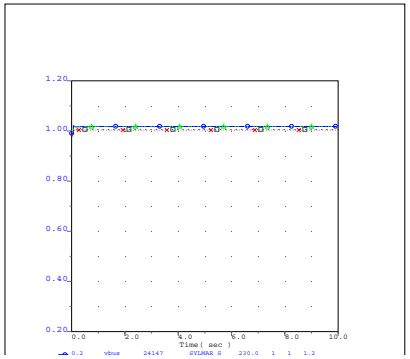


Figure 58 REL_RTR_ANG:S.Cal

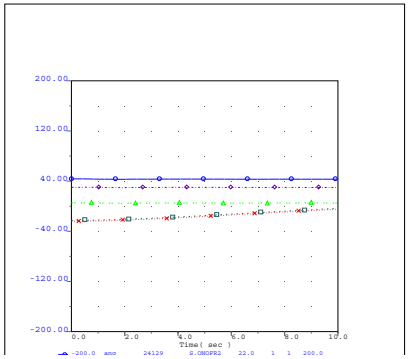


Figure 59 RELATIVE_ROTOR_ANGLE:S.Cal:

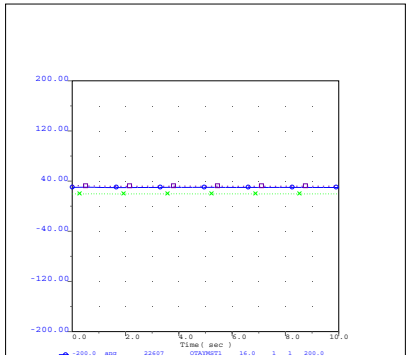
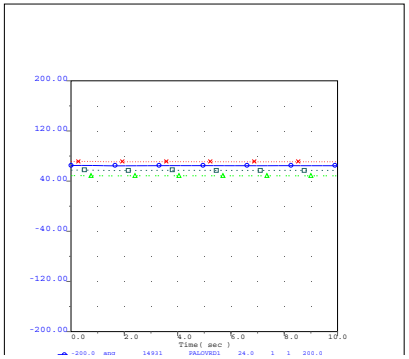


Figure 60 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: BR-Rinaldi-RAS-wIY
Possible Violations: MORC 1[5]- None MORC 2- None FREQ Dip- None
Buses with post-tran changes >5%: None, >10%: None

[5] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 61 Bus-V:Owens Gorge/Rinaldi 230 kV

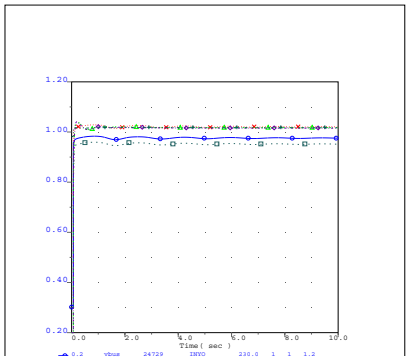


Figure 62 Bus-V:SCE North 115 kV

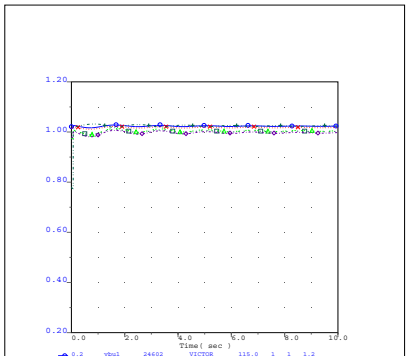


Figure 63 Bus-V:LA BASIN 230 & 138 kV

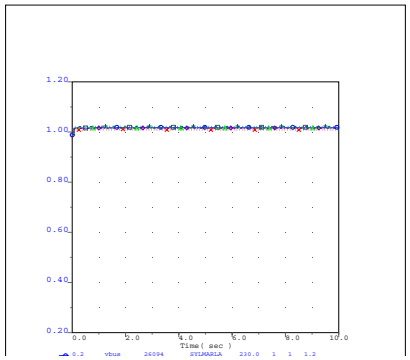


Figure 64 Bus-V:SCE 500 & 230 kV

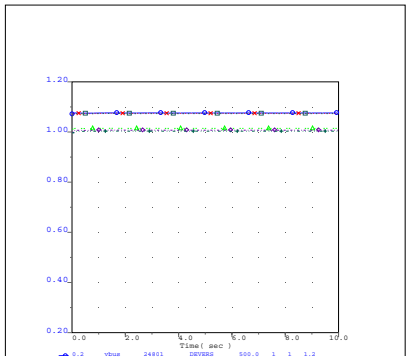


Figure 65 Bus-V: LADWP 500 kV:

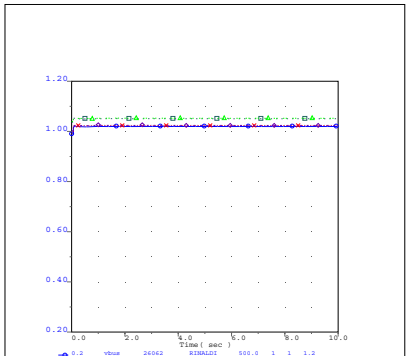


Figure 66 Bus-V:LADWP Load:

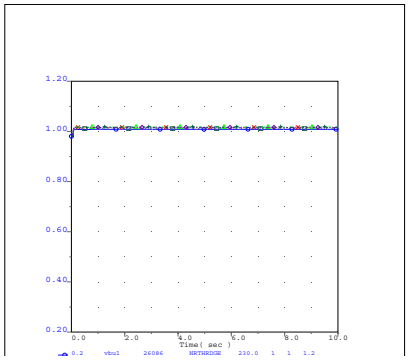


Figure 67 Bus-V: NW & S.CAL 500 kV

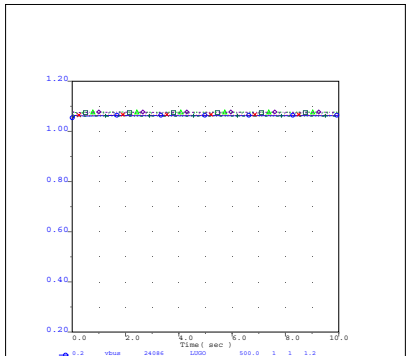


Figure 68 Bus-V: Others 500 kV

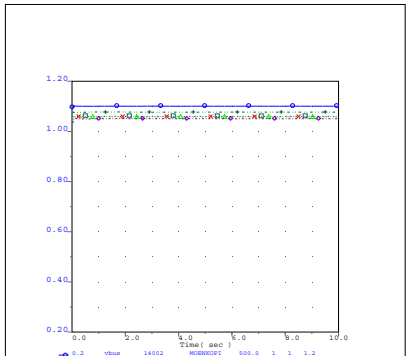


Figure 69 Bus-V: Others 230 kV

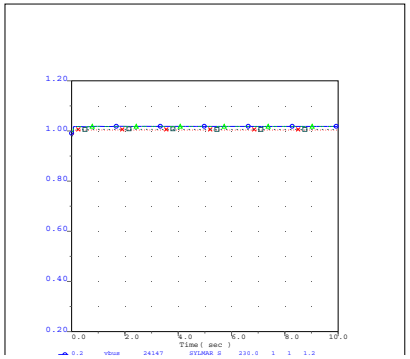


Figure 70 REL_RTR_ANG:S.Cal

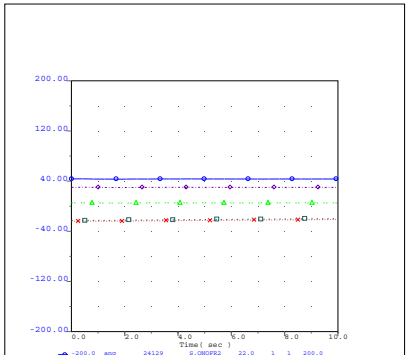


Figure 71 RELATIVE_ROTOR_ANGLE:S.Cal:

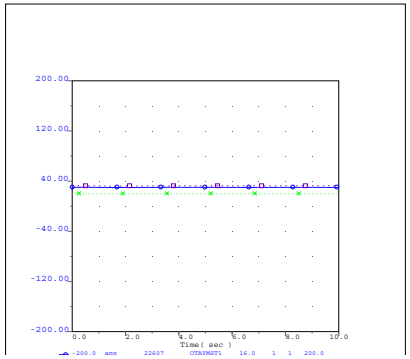
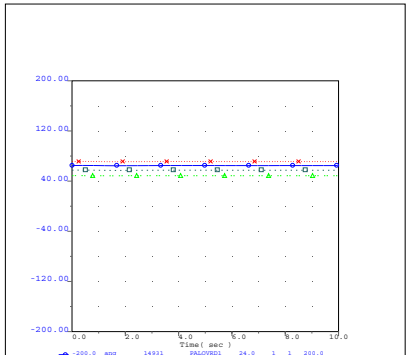


Figure 72 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Cottonwd-BR-NoRAS

Possible Violations: MORC 1[6]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[6] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 73 Bus-V:Owens Gorge/Rinaldi 230 kV

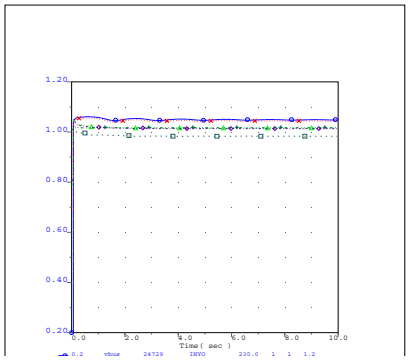


Figure 74 Bus-V:SCE North 115 kV

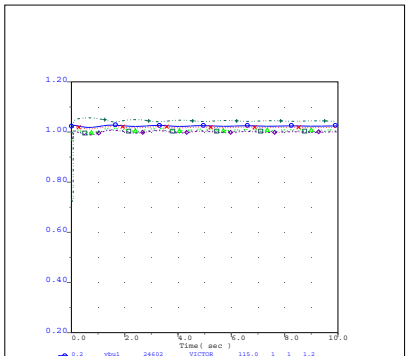


Figure 75 Bus-V:LA BASIN 230 & 138 kV

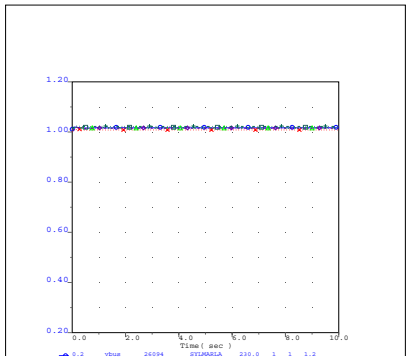


Figure 76 Bus-V:SCE 500 & 230 kV

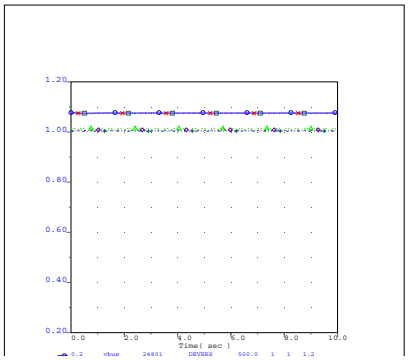


Figure 77 Bus-V: LADWP 500 kV:

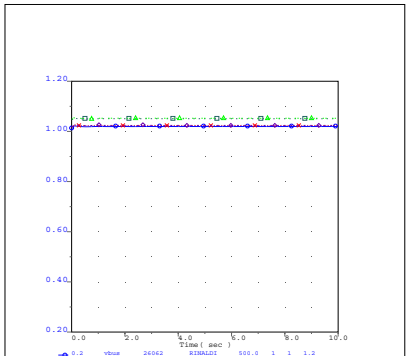


Figure 78 Bus-V:LADWP Load:

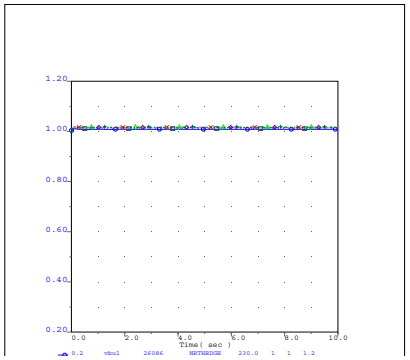


Figure 79 Bus-V: NW & S.CAL 500 kV

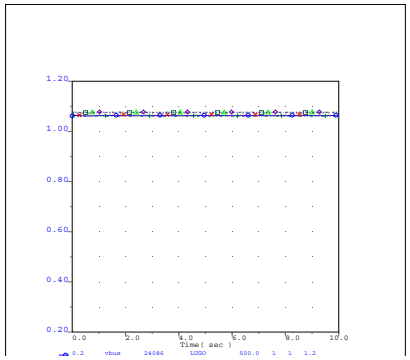


Figure 80 Bus-V: Others 500 kV

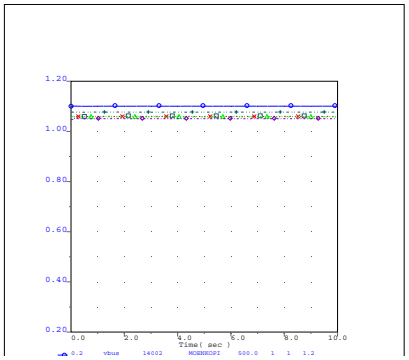


Figure 81 Bus-V: Others 230 kV

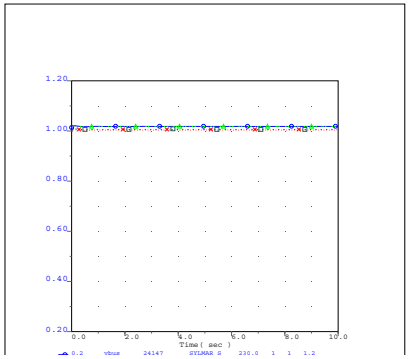


Figure 82 REL_RTR_ANG:S.Cal

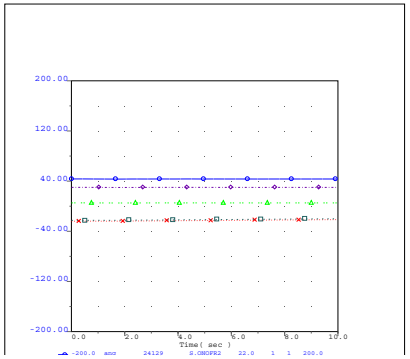


Figure 83 RELATIVE_ROTOR_ANGLE:S.Cal:

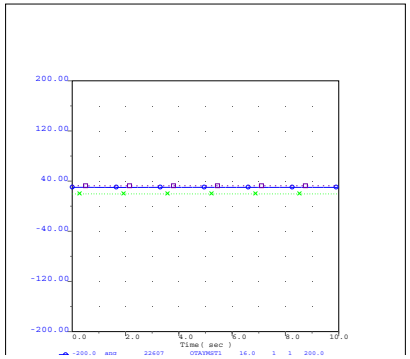
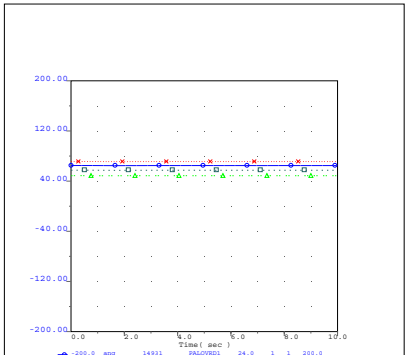


Figure 84 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Cottonwd-Inyo-preRAS

Possible Violations: MORC 1[7]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: 14, >10%: 10

[7] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 85 Bus-V:Owens Gorge/Rinaldi 230 kV

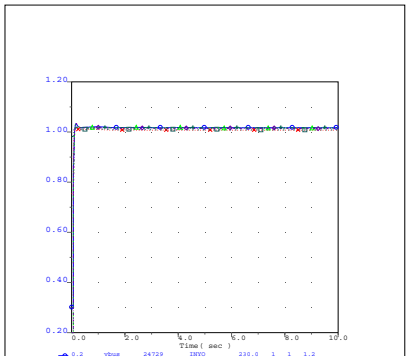


Figure 86 Bus-V:SCE North 115 kV

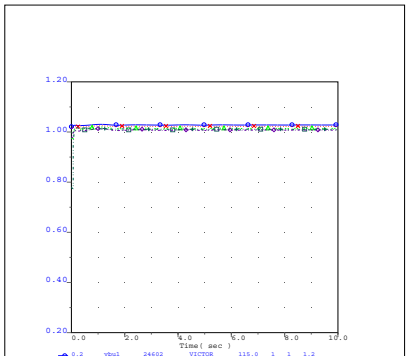


Figure 87 Bus-V:LA BASIN 230 & 138 kV

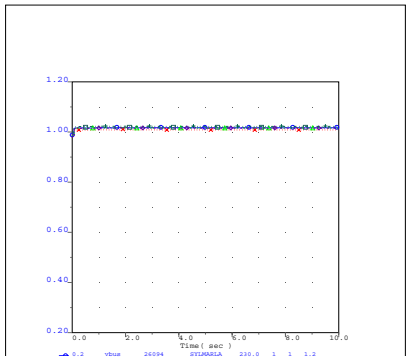


Figure 88 Bus-V:SCE 500 & 230 kV

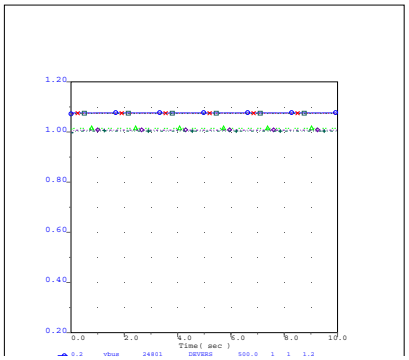


Figure 89 Bus-V: LADWP 500 kV:

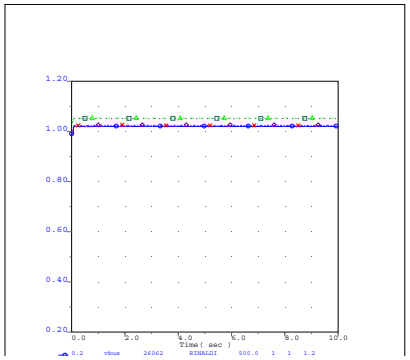


Figure 90 Bus-V:LADWP Load:

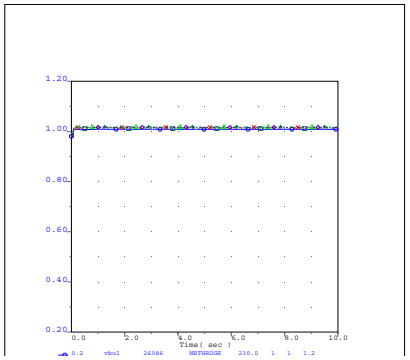


Figure 91 Bus-V: NW & S.CAL 500 kV

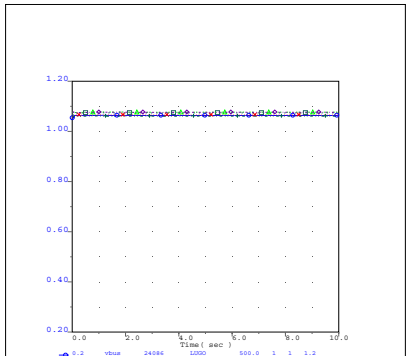


Figure 92 Bus-V: Others 500 kV

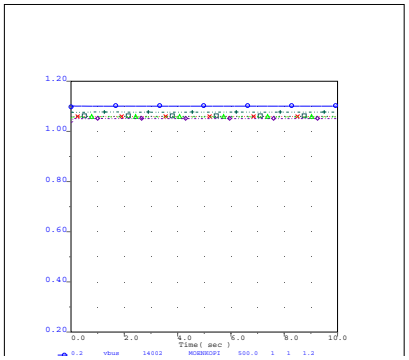


Figure 93 Bus-V: Others 230 kV

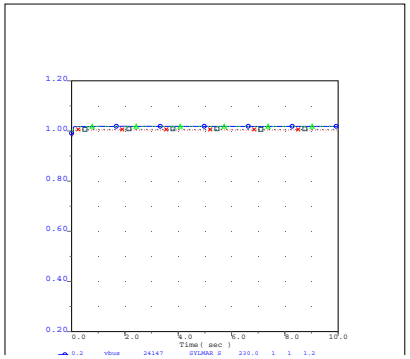


Figure 94 REL_RTR_ANG:S.Cal

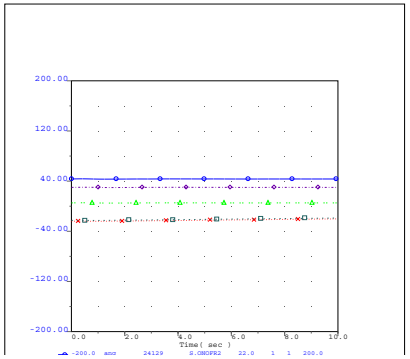


Figure 95 RELATIVE_ROTOR_ANGLE:S.Cal:

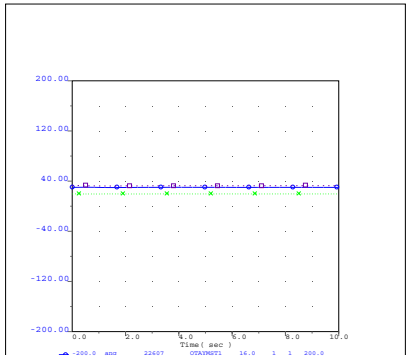
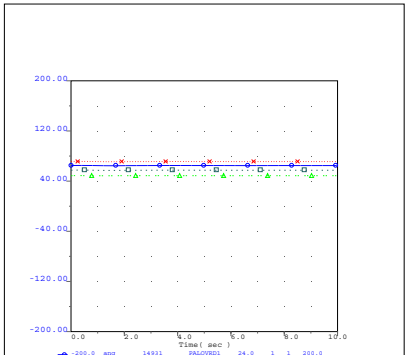


Figure 96 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Beacon-BR-RAS
Possible Violations: MORC 1[8]- 1 MORC 2- None FREQ Dip- None
Buses with post-tran changes >5%: None, >10%: None

[8] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 97 Bus-V:Owens Gorge/Rinaldi 230 kV

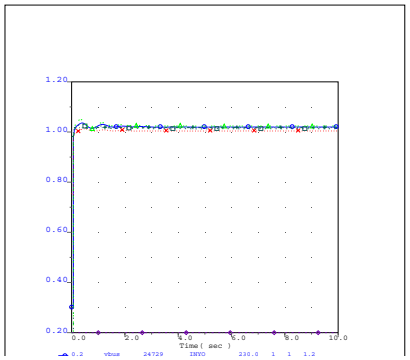


Figure 98 Bus-V:SCE North 115 kV

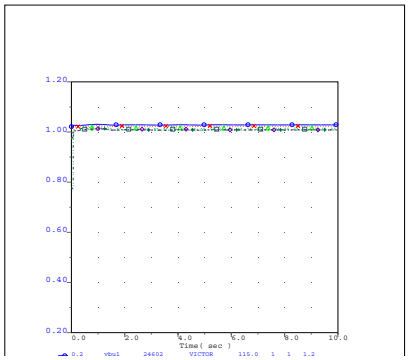


Figure 99 Bus-V:LA BASIN 230 & 138 kV

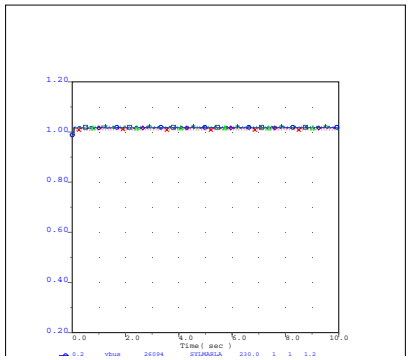


Figure 100 Bus-V:SCE 500 & 230 kV

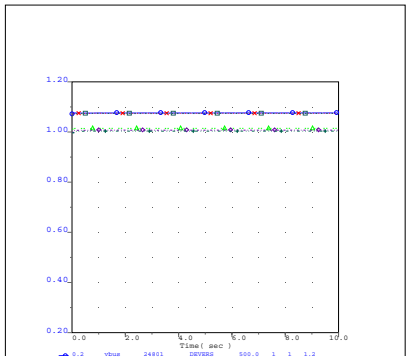


Figure 101 Bus-V: LADWP 500 kV:

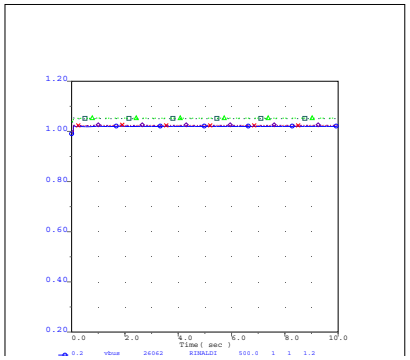


Figure 102 Bus-V:LADWP Load:

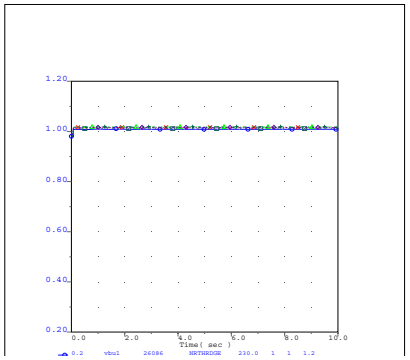


Figure 103 Bus-V: NW & S.CAL 500 kV

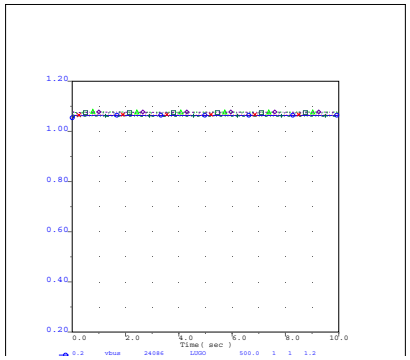


Figure 104 Bus-V: Others 500 kV

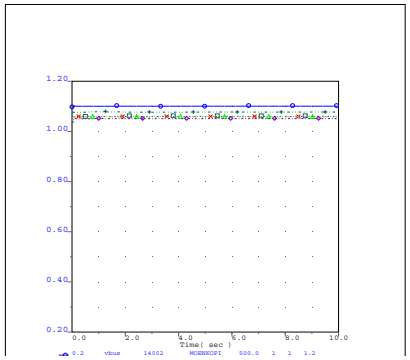


Figure 105 Bus-V: Others 230 kV

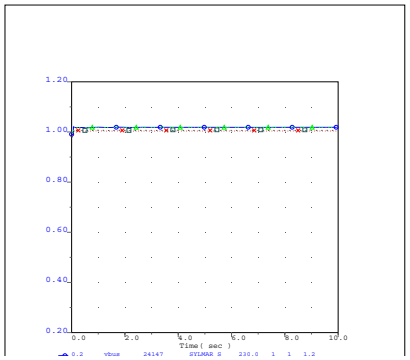


Figure 106 REL_RTR_ANG:S.Cal

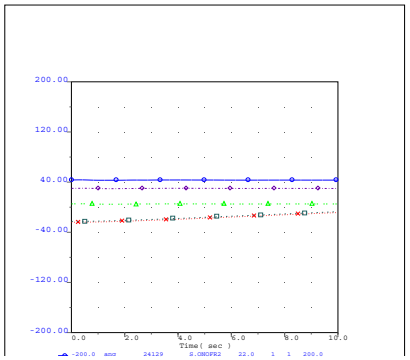


Figure 107 RELATIVE_ROTOR_ANGLE:S.Cal:

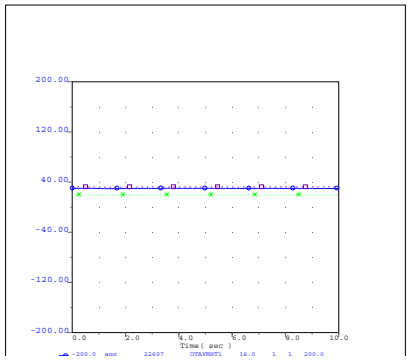
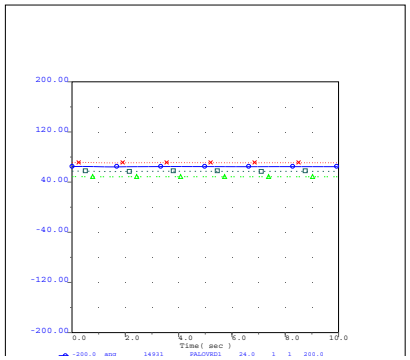


Figure 108 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Pinetree-BR-RAS
Possible Violations: MORC 1[9]- None MORC 2- None FREQ Dip- None
Buses with post-tran changes >5%: None, >10%: None

[9] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 109 Bus-V:Owens Gorge/Rinaldi 230 kV

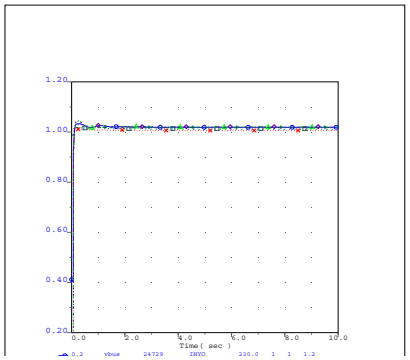


Figure 110 Bus-V:SCE North 115 kV

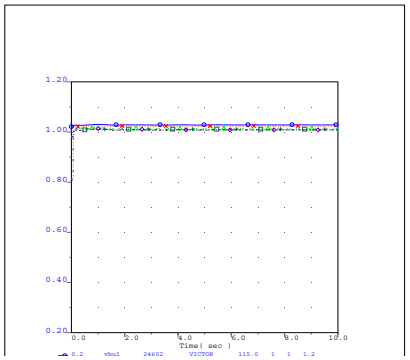


Figure 111 Bus-V:LA BASIN 230 & 138 kV

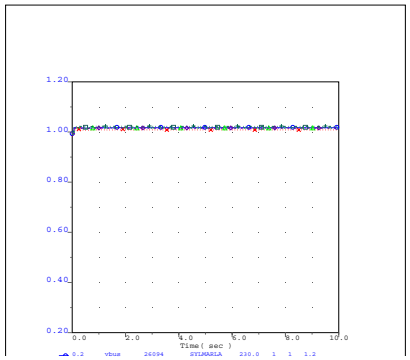


Figure 112 Bus-V:SCE 500 & 230 kV

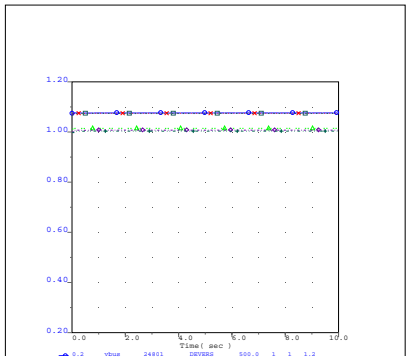


Figure 113 Bus-V: LADWP 500 kV:

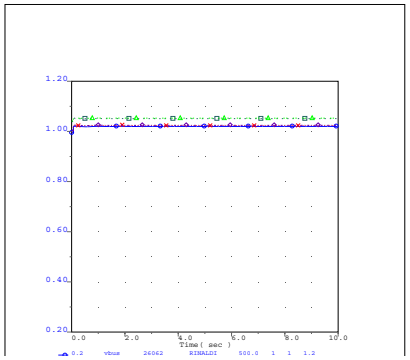


Figure 114 Bus-V:LADWP Load:

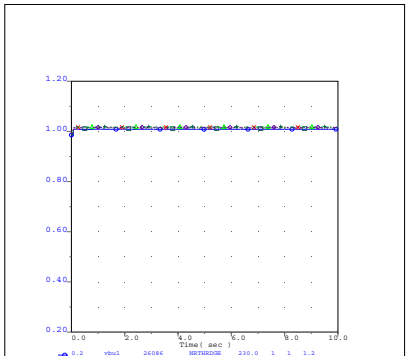


Figure 115 Bus-V: NW & S.CAL 500 kV

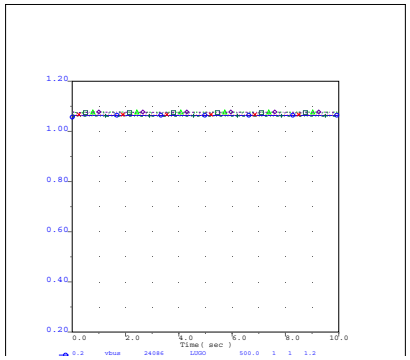


Figure 116 Bus-V: Others 500 kV

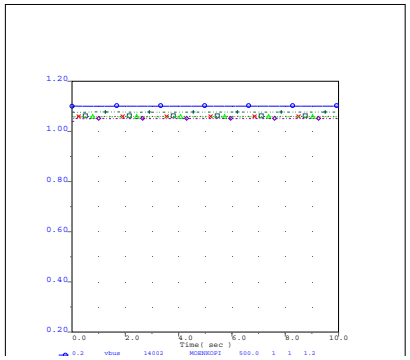


Figure 117 Bus-V: Others 230 kV

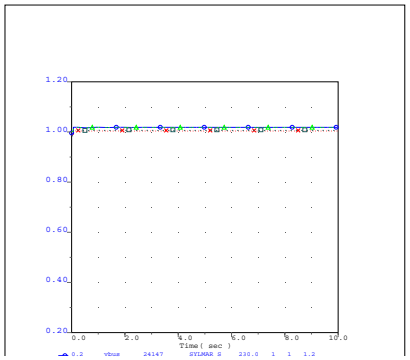


Figure 118 REL_RTR_ANG:S.Cal

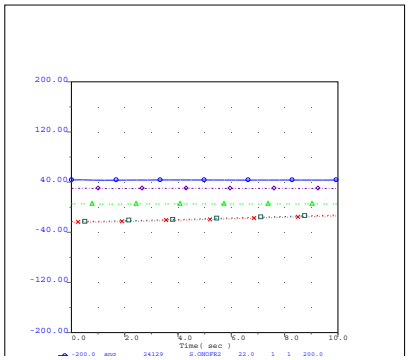


Figure 119 RELATIVE_ROTOR_ANGLE:S.Cal:

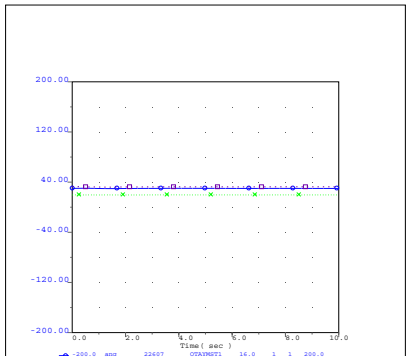
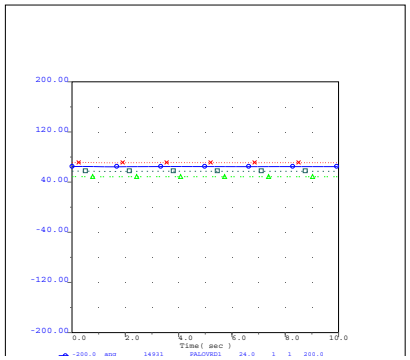


Figure 120 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: HoffmanSummit-Pinetree-RAS
Possible Violations: MORC 1[10]- None MORC 2- None FREQ Dip- None
Buses with post-tran changes >5%: None, >10%: None

[10] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 121 Bus-V:Owens Gorge/Rinaldi 230 kV

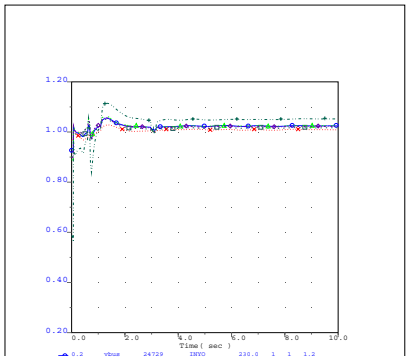


Figure 122 Bus-V:SCE North 115 kV

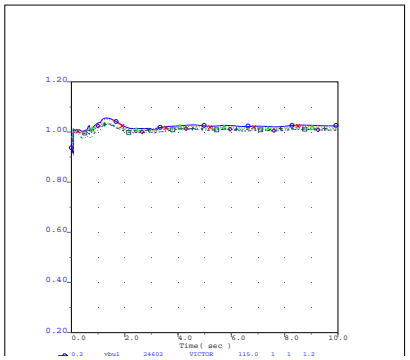


Figure 123 Bus-V:LA BASIN 230 & 138 kV

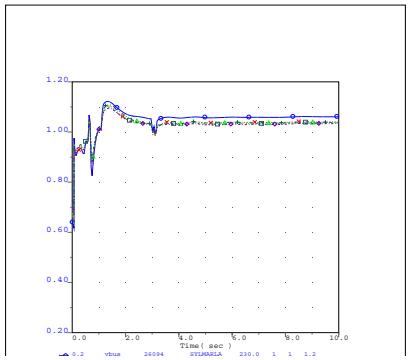


Figure 124 Bus-V:SCE 500 & 230 kV

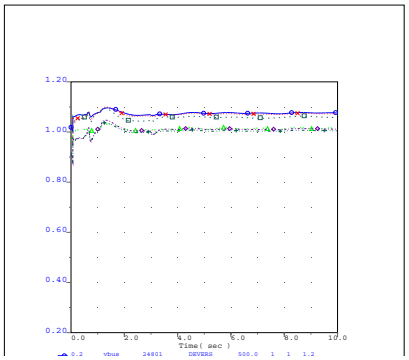


Figure 125 Bus-V: LADWP 500 kV:

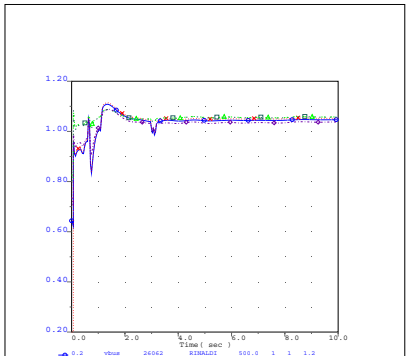


Figure 126 Bus-V:LADWP Load:

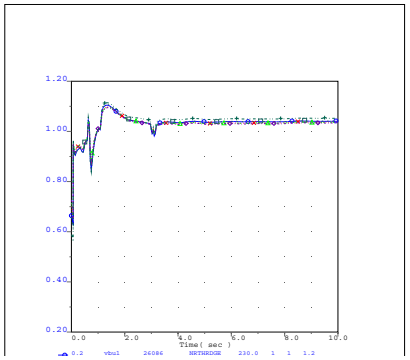


Figure 127 Bus-V: NW & S.CAL 500 kV

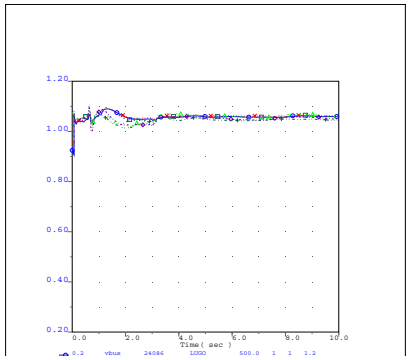


Figure 128 Bus-V: Others 500 kV

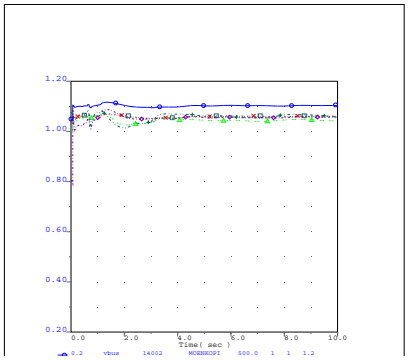


Figure 129 Bus-V: Others 230 kV

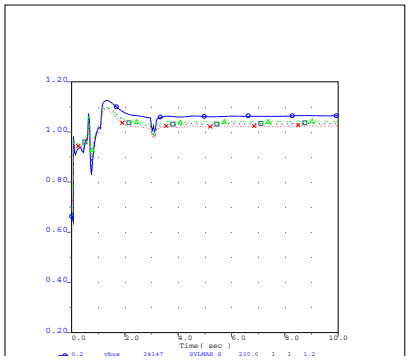


Figure 130 REL_RTR_ANG:S.Cal

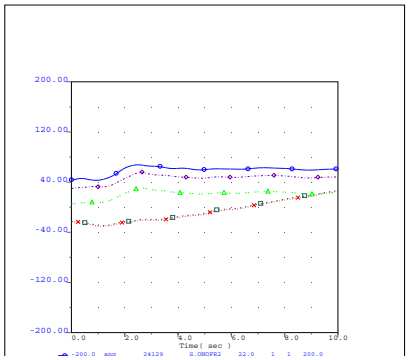


Figure 131 RELATIVE_ROTOR_ANGLE:S.Cal:

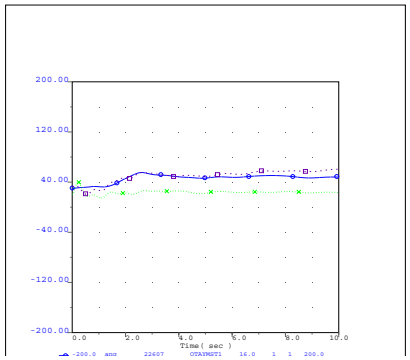
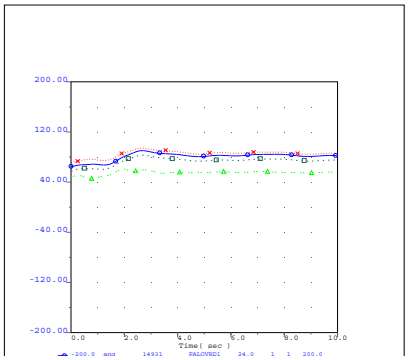


Figure 132 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Adel-Vict-Rinaldi-dlo
Possible Violations: MORC 1[11]- 2 MORC 2- None FREQ Dip- None
Buses with post-tran changes >5%: 2, >10%: None

[11] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 133 Bus-V:Owens Gorge/Rinaldi 230 kV

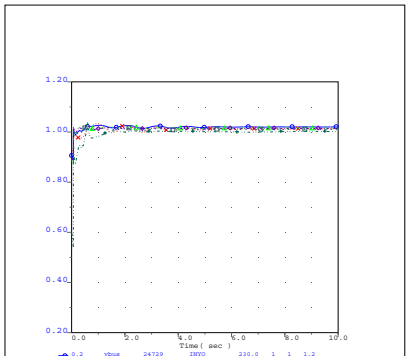


Figure 134 Bus-V:SCE North 115 kV

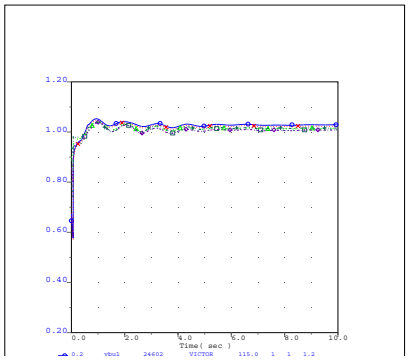


Figure 135 Bus-V:LA BASIN 230 & 138 kV

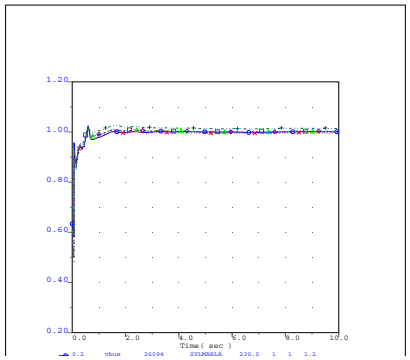


Figure 136 Bus-V:SCE 500 & 230 kV

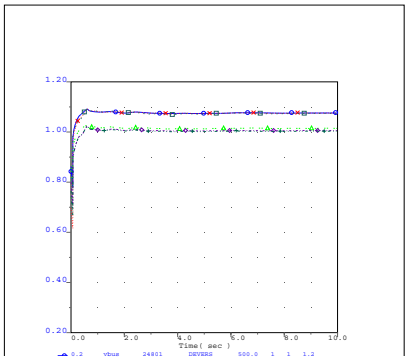


Figure 137 Bus-V: LADWP 500 kV:

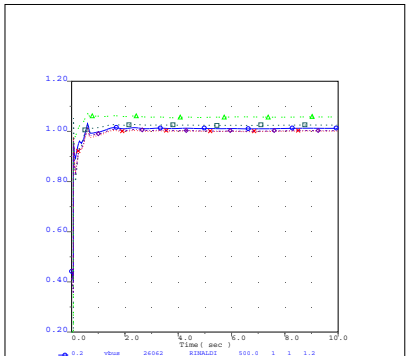


Figure 138 Bus-V:LADWP Load:

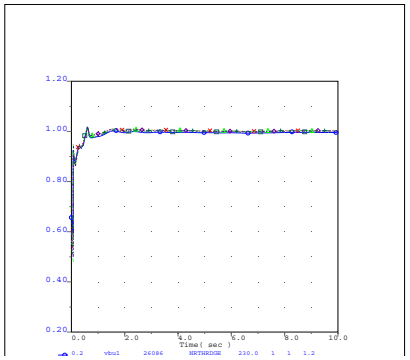


Figure 139 Bus-V: NW & S.CAL 500 kV

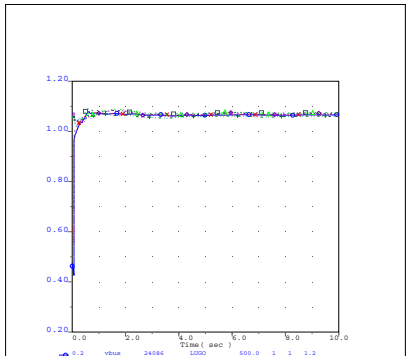


Figure 140 Bus-V: Others 500 kV

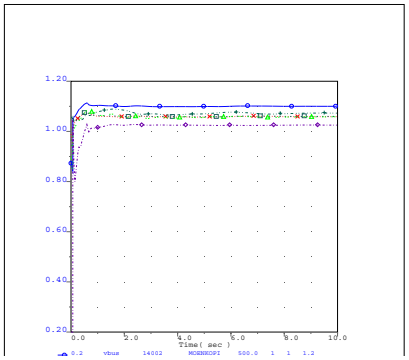


Figure 141 Bus-V: Others 230 kV

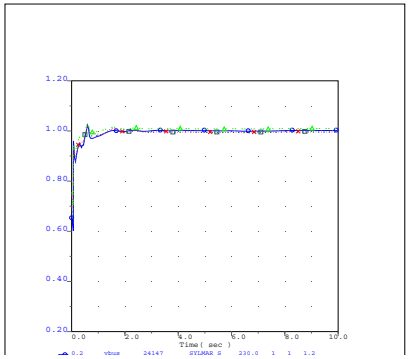


Figure 142 REL_RTR_ANG:S.Cal

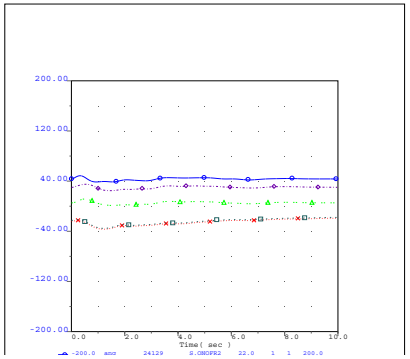


Figure 143 RELATIVE_ROTOR_ANGLE:S.Cal:

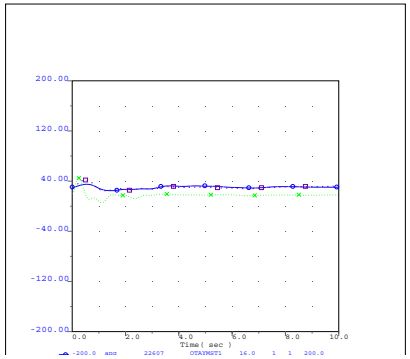
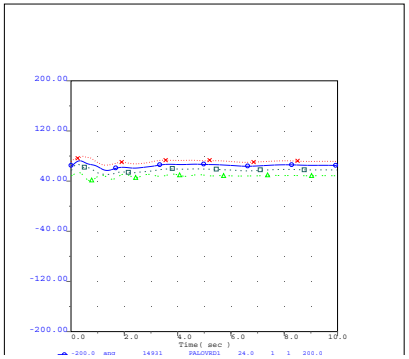


Figure 144 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Adel-Victorvl-dlo

Possible Violations: MORC 1[12]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[12] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 145 Bus-V:Owens Gorge/Rinaldi 230 kV

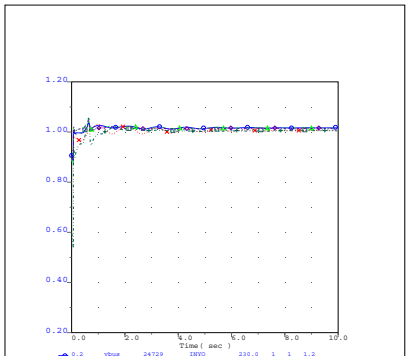


Figure 146 Bus-V:SCE North 115 kV

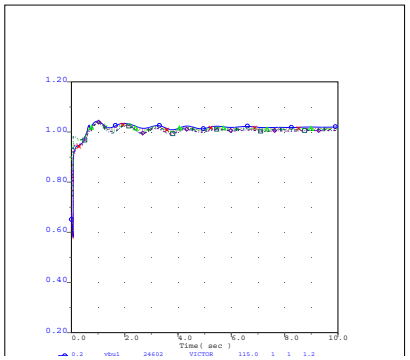


Figure 147 Bus-V:LA BASIN 230 & 138 kV

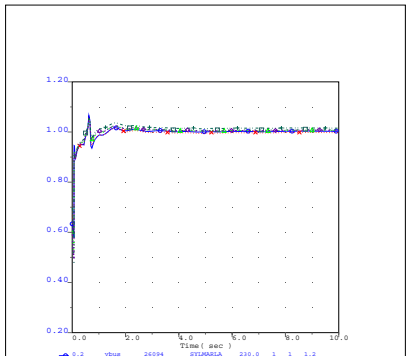


Figure 148 Bus-V:SCE 500 & 230 kV

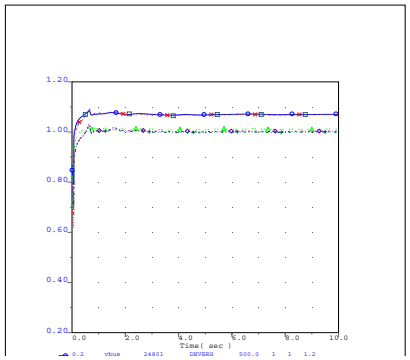


Figure 149 Bus-V: LADWP 500 kV:

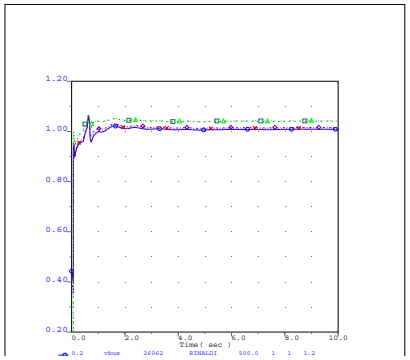


Figure 150 Bus-V:LADWP Load:

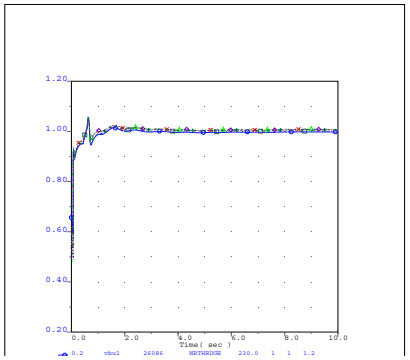


Figure 151 Bus-V: NW & S.CAL 500 kV

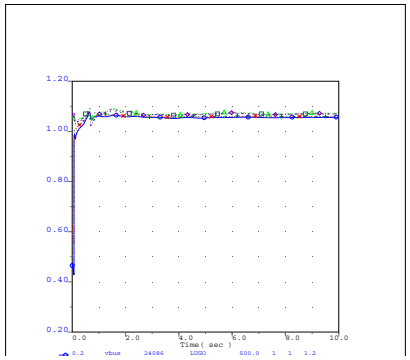


Figure 152 Bus-V: Others 500 kV

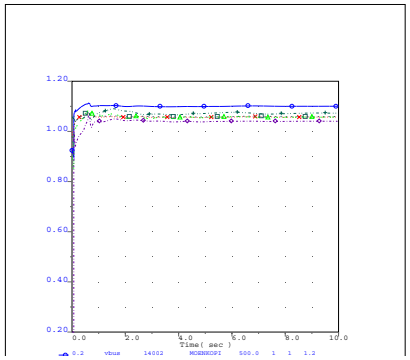


Figure 153 Bus-V: Others 230 kV

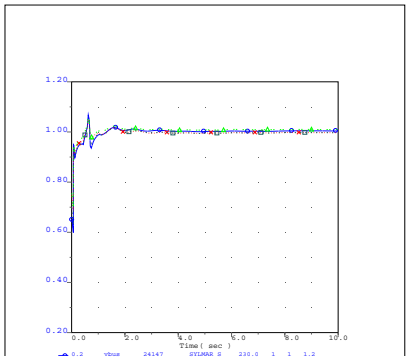


Figure 154 REL_RTR_ANG:S.Cal

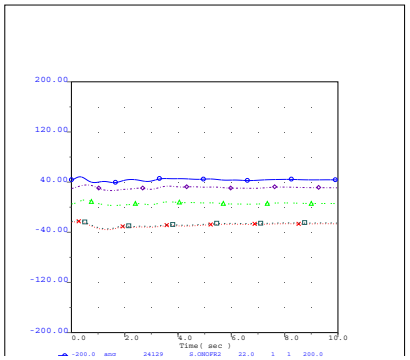


Figure 155 RELATIVE_ROTOR_ANGLE:S.Cal:

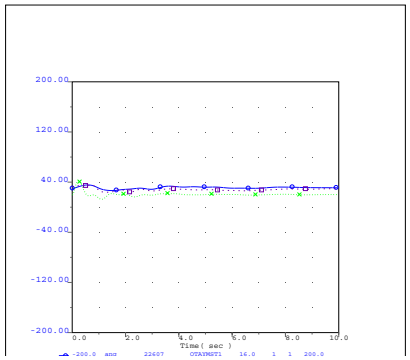
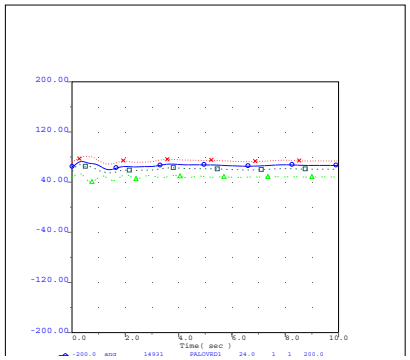


Figure 156 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: McCullgh-Victorvl-dlo

Possible Violations: MORC 1[13]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[13] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 157 Bus-V:Owens Gorge/Rinaldi 230 kV

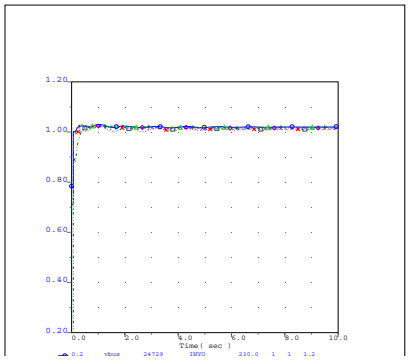


Figure 158 Bus-V:SCE North 115 kV

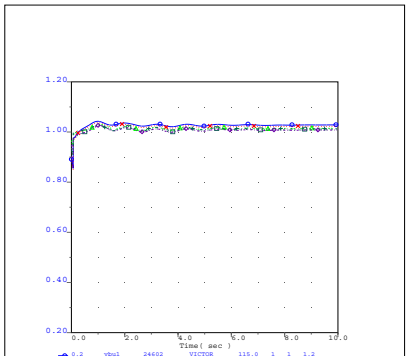


Figure 159 Bus-V:LA BASIN 230 & 138 kV

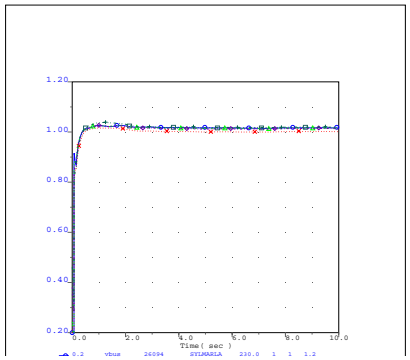


Figure 160 Bus-V:SCE 500 & 230 kV

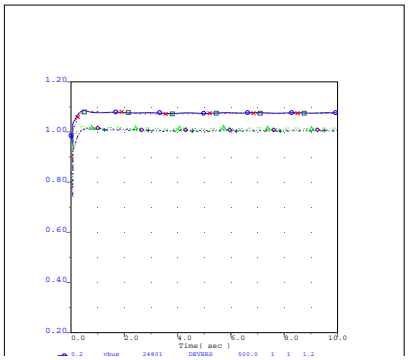


Figure 161 Bus-V: LADWP 500 kV:

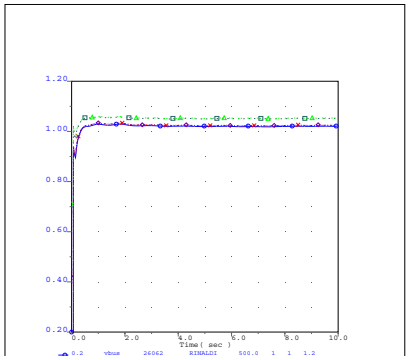


Figure 162 Bus-V:LADWP Load:

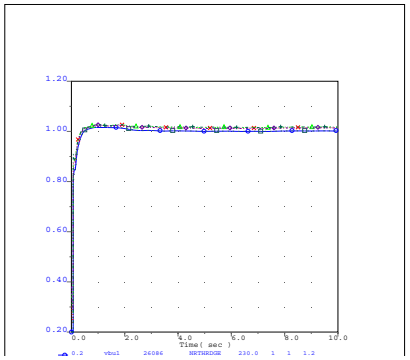


Figure 163 Bus-V: NW & S.CAL 500 kV

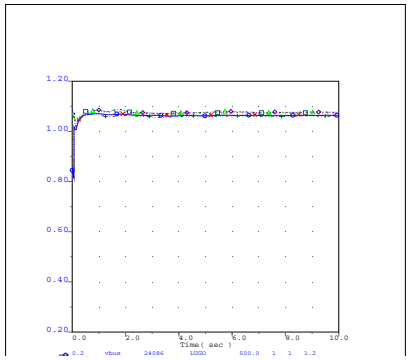


Figure 164 Bus-V: Others 500 kV

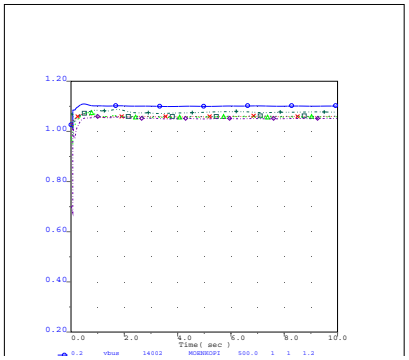


Figure 165 Bus-V: Others 230 kV

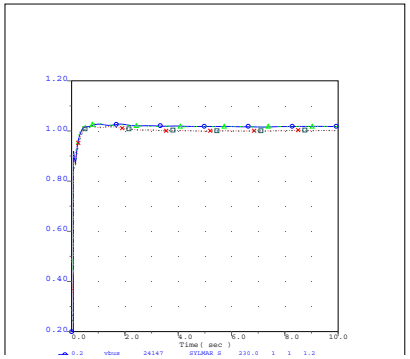


Figure 166 REL_RTR_ANG:S.Cal

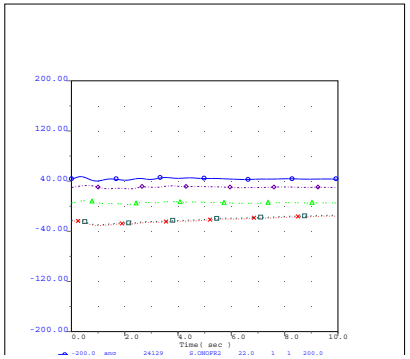


Figure 167 RELATIVE_ROTOR_ANGLE:S.Cal:

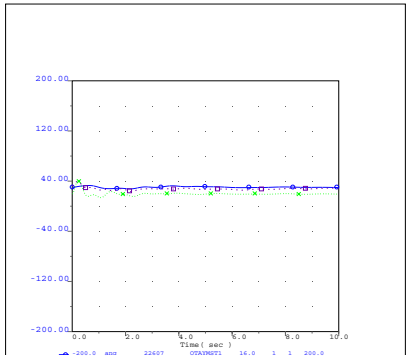
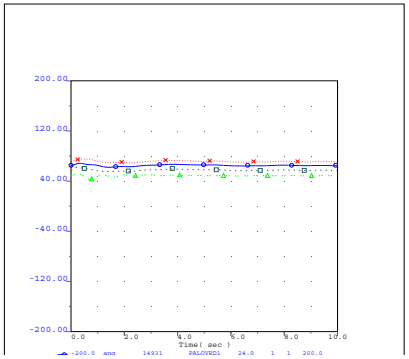


Figure 168 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Rin-Tar-dlo

Possible Violations: MORC 1[14]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[14] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 169 Bus-V:Owens Gorge/Rinaldi 230 kV

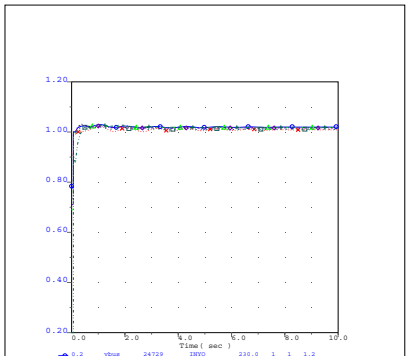


Figure 170 Bus-V:SCE North 115 kV

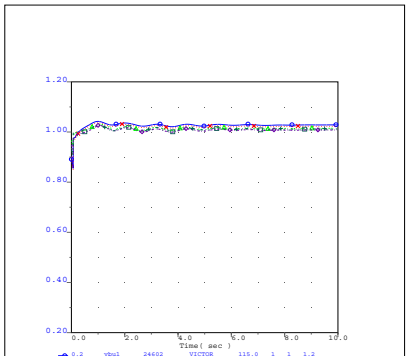


Figure 171 Bus-V:LA BASIN 230 & 138 kV

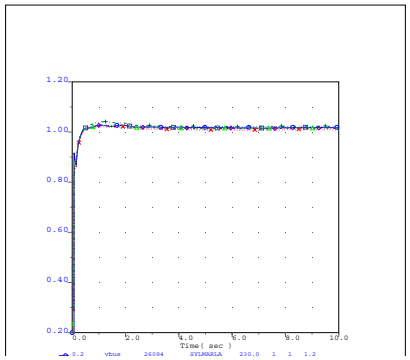


Figure 172 Bus-V:SCE 500 & 230 kV

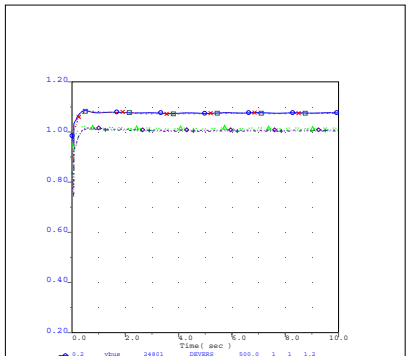


Figure 173 Bus-V: LADWP 500 kV:

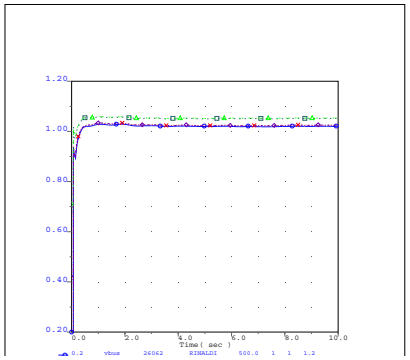


Figure 174 Bus-V:LADWP Load:

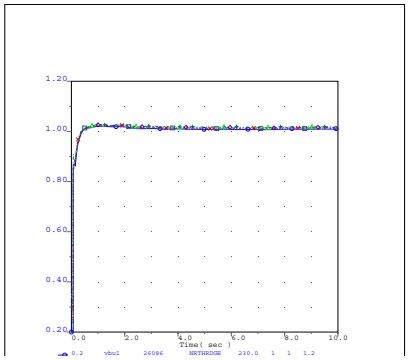


Figure 175 Bus-V: NW & S.CAL 500 kV

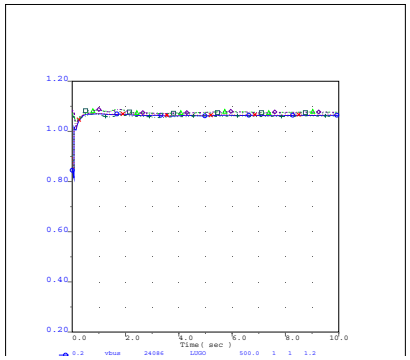


Figure 176 Bus-V: Others 500 kV

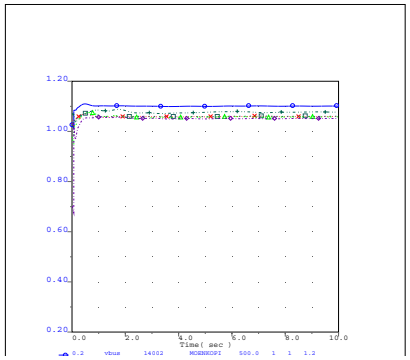


Figure 177 Bus-V: Others 230 kV

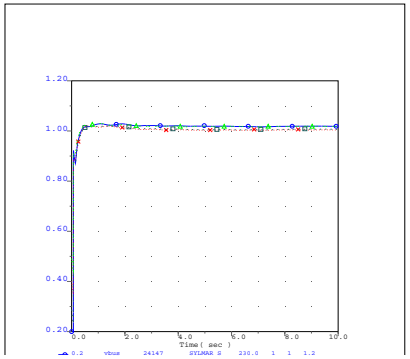


Figure 178 REL_RTR_ANG:S.Cal

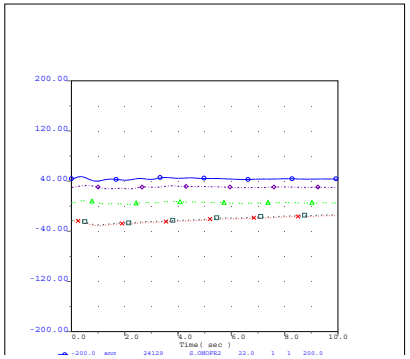


Figure 179 RELATIVE_ROTOR_ANGLE:S.Cal:

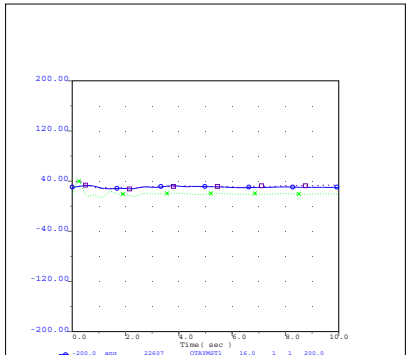
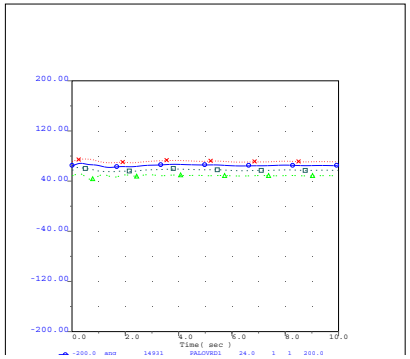


Figure 180 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: Rin-Glendl-dlo

Possible Violations: MORC 1[15]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[15] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 181 Bus-V:Owens Gorge/Rinaldi 230 kV

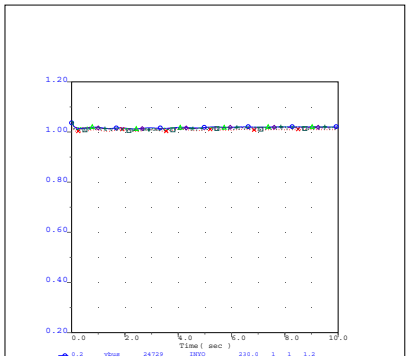


Figure 182 Bus-V:SCE North 115 kV

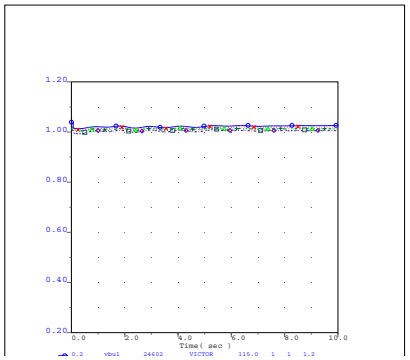


Figure 183 Bus-V:LA BASIN 230 & 138 kV

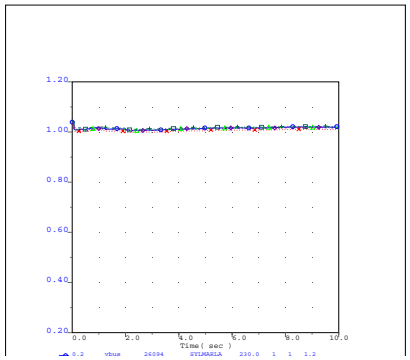


Figure 184 Bus-V:SCE 500 & 230 kV

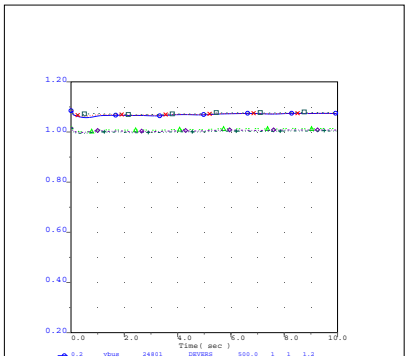


Figure 185 Bus-V: LADWP 500 kV:

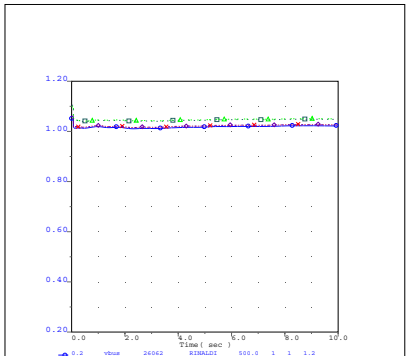


Figure 186 Bus-V:LADWP Load:

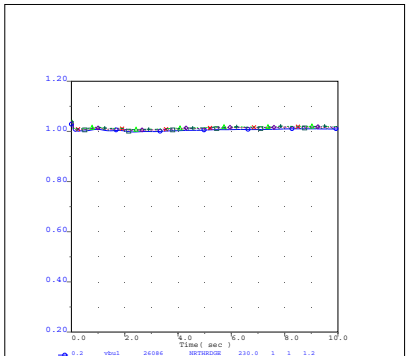


Figure 187 Bus-V: NW & S.CAL 500 kV

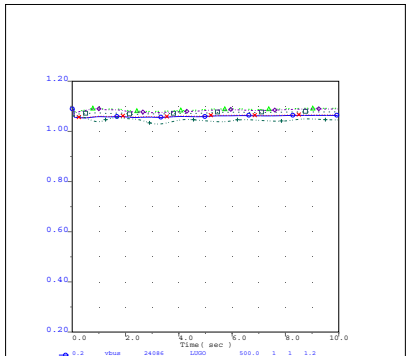


Figure 188 Bus-V: Others 500 kV

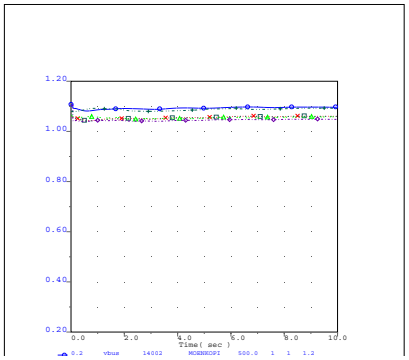


Figure 189 Bus-V: Others 230 kV

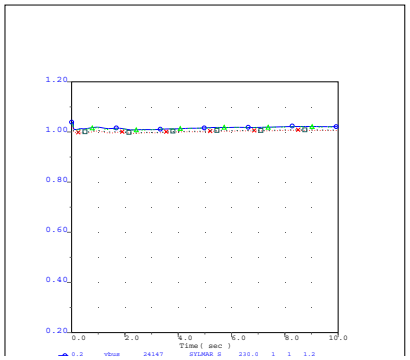


Figure 190 REL_RTR_ANG:S.Cal

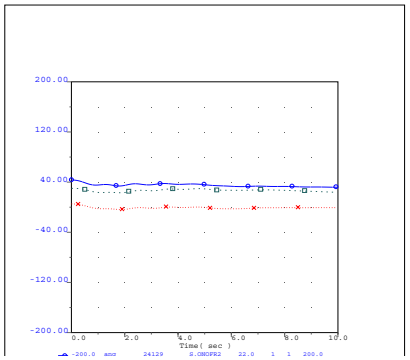


Figure 191 RELATIVE_ROTOR_ANGLE:S.Cal:

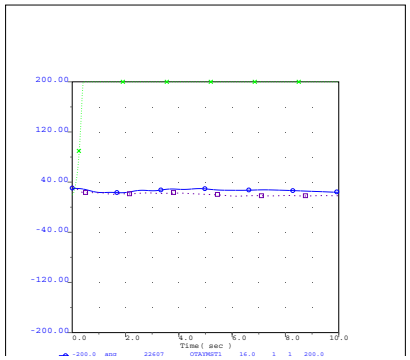
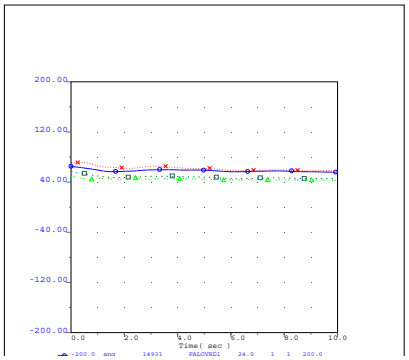


Figure 192 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og Contingency: IPP-bipolar-upc

Possible Violations: MORC 1[16]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[16] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Study: BSP Case: labsp1_50iy_ov_0og_cast

Figure 1 Bus-V:Owens Gorge/Rinaldi 230 kV

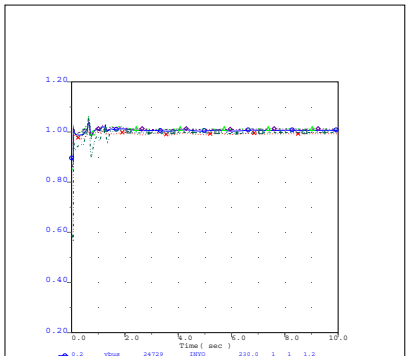


Figure 2 Bus-V:SCE North 115 kV

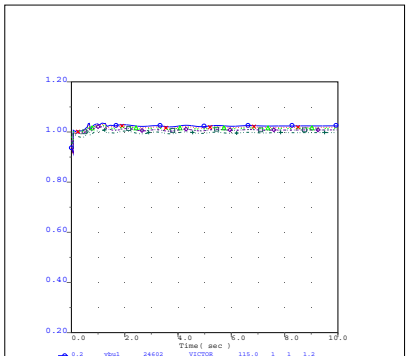


Figure 3 Bus-V:LA BASIN 230 & 138 kV

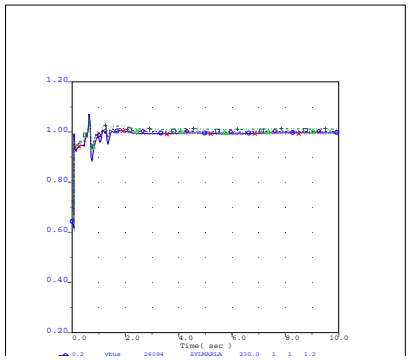


Figure 4 Bus-V:SCE 500 & 230 kV

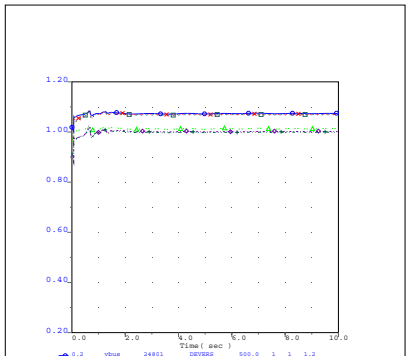


Figure 5 Bus-V: LADWP 500 kV:

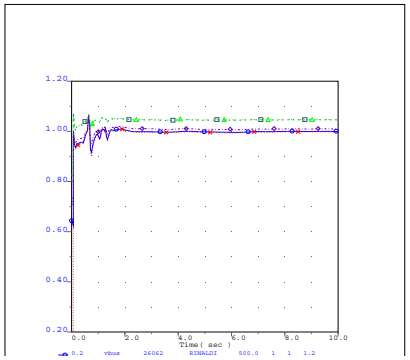


Figure 6 Bus-V:LADWP Load:

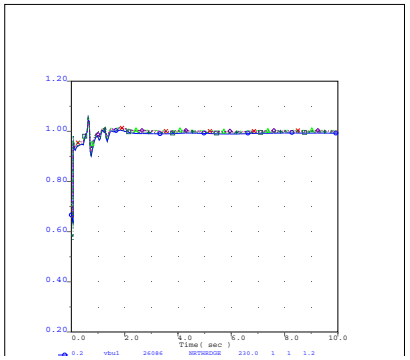


Figure 7 Bus-V: NW & S.CAL 500 kV

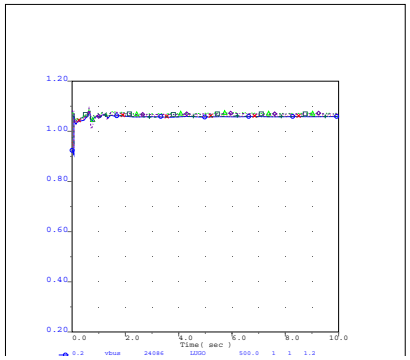


Figure 8 Bus-V: Others 500 kV

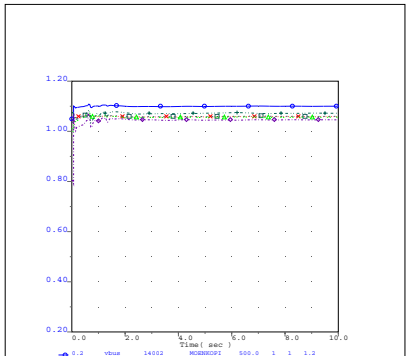


Figure 9 Bus-V: Others 230 kV

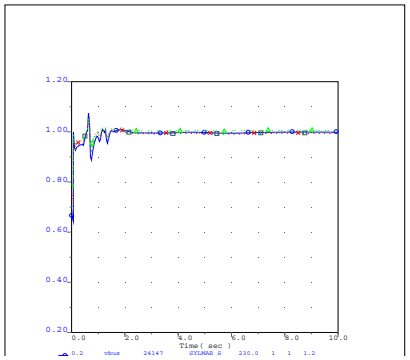


Figure 10 REL_RTR_ANG:S.Cal

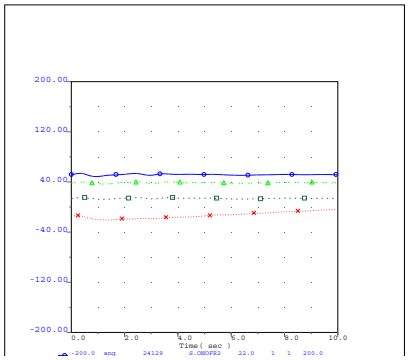


Figure 11 RELATIVE_ROTOR_ANGLE:S.Cal:

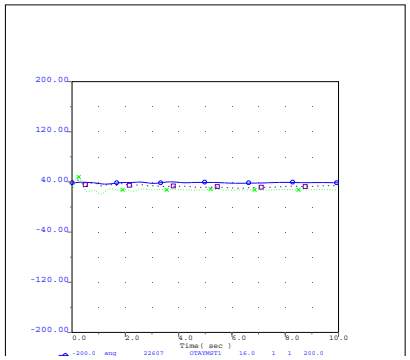
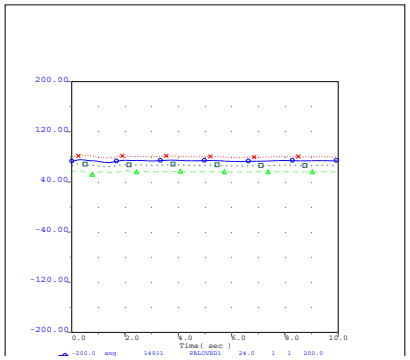


Figure 12 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Adel-Rinaldi-slo

Possible Violations: MORC 1[1]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[1] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 13 Bus-V:Owens Gorge/Rinaldi 230 kV

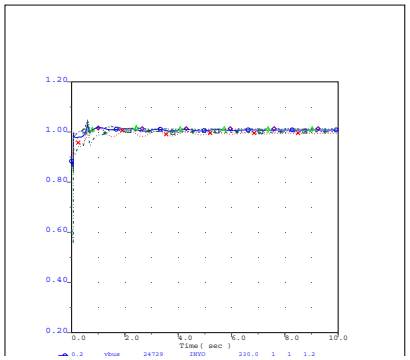


Figure 14 Bus-V:SCE North 115 kV

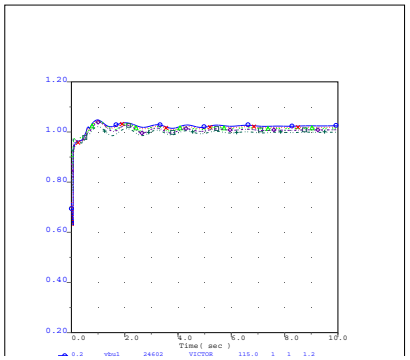


Figure 15 Bus-V:LA BASIN 230 & 138 kV

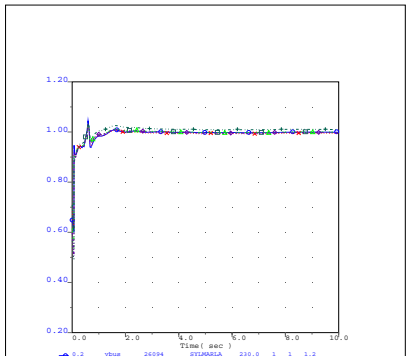


Figure 16 Bus-V:SCE 500 & 230 kV

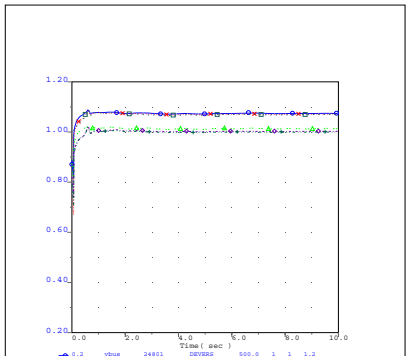


Figure 17 Bus-V: LADWP 500 kV:

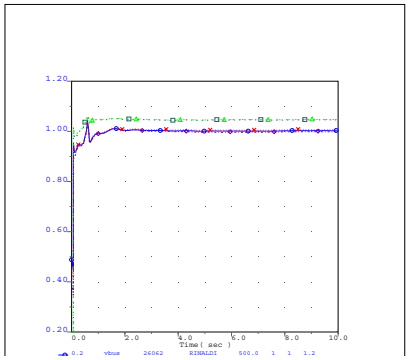


Figure 18 Bus-V:LADWP Load:

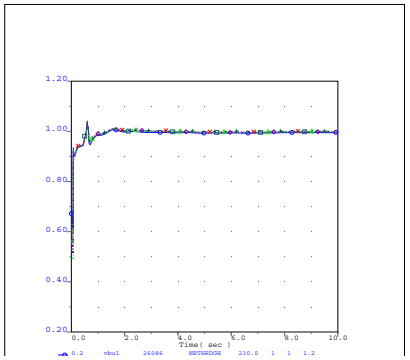


Figure 19 Bus-V: NW & S.CAL 500 kV

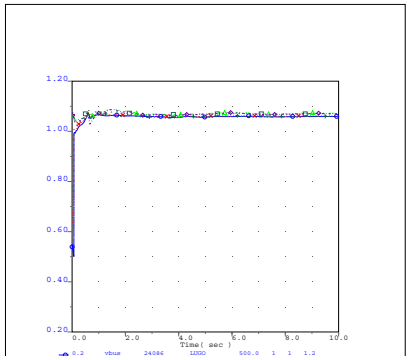


Figure 20 Bus-V: Others 500 kV

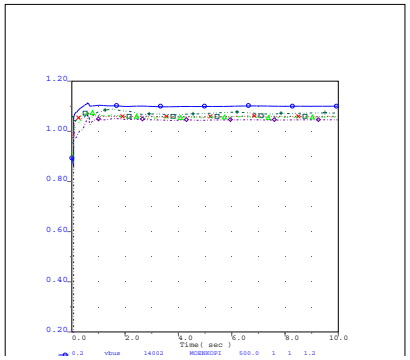


Figure 21 Bus-V: Others 230 kV

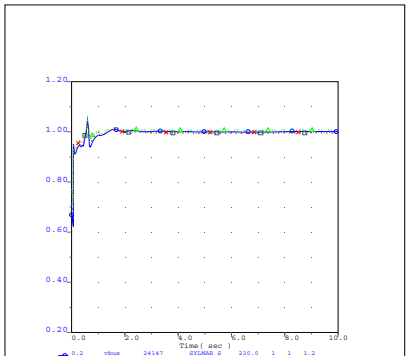


Figure 22 REL_RTR_ANG:S.Cal

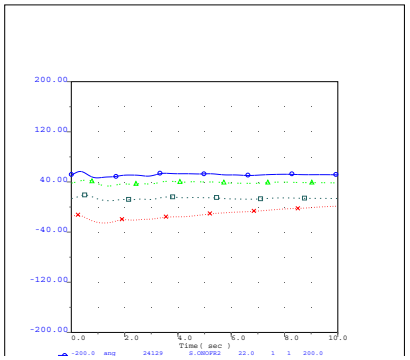


Figure 23 RELATIVE_ROTOR_ANGLE:S.Cal:

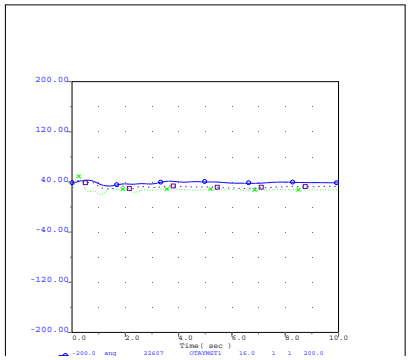
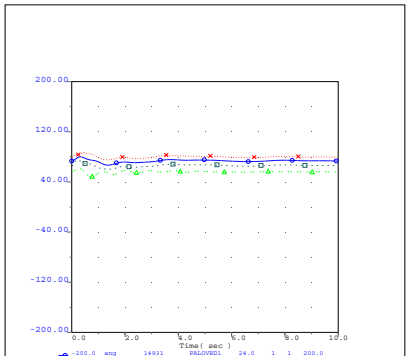


Figure 24 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Adel-Toluca

Possible Violations: MORC 1[2]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[2] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 25 Bus-V:Owens Gorge/Rinaldi 230 kV

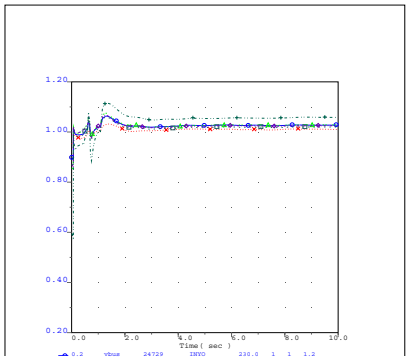


Figure 26 Bus-V:SCE North 115 kV

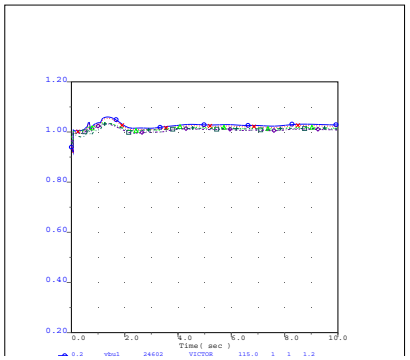


Figure 27 Bus-V:LA BASIN 230 & 138 kV

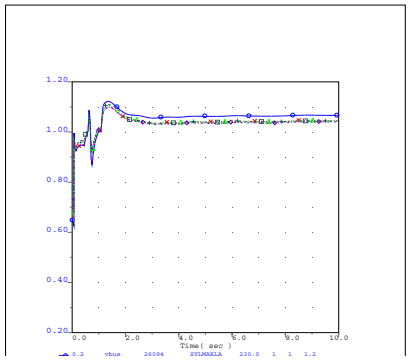


Figure 28 Bus-V:SCE 500 & 230 kV

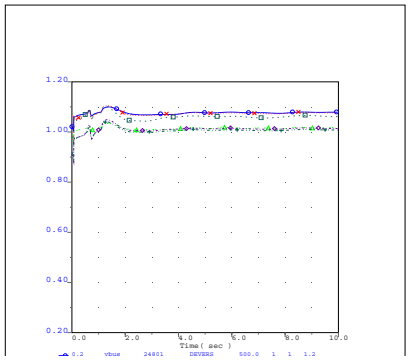


Figure 29 Bus-V: LADWP 500 kV:

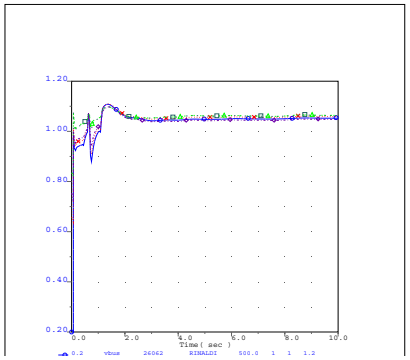


Figure 30 Bus-V:LADWP Load:

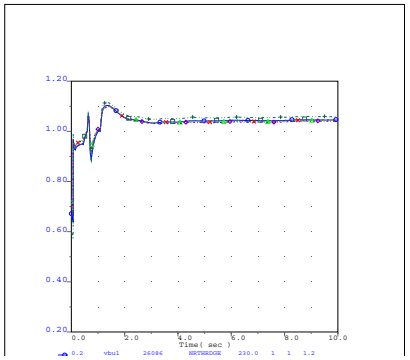


Figure 31 Bus-V: NW & S.CAL 500 kV

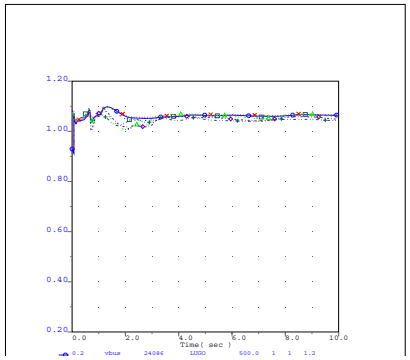


Figure 32 Bus-V: Others 500 kV

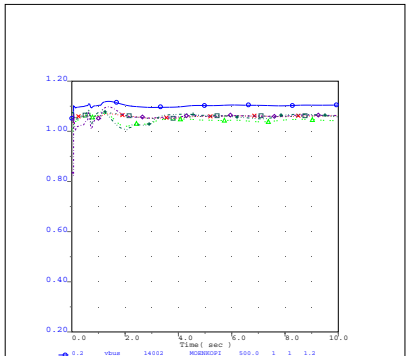


Figure 33 Bus-V: Others 230 kV

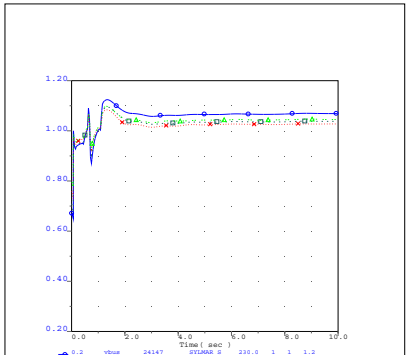


Figure 34 REL_RTR_ANG:S.Cal

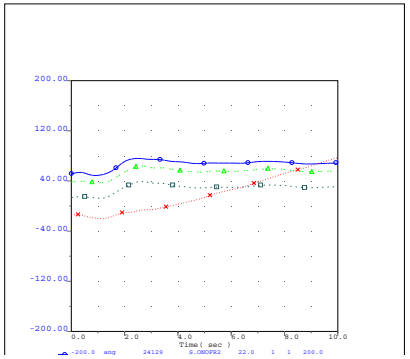


Figure 35 RELATIVE_ROTOR_ANGLE:S.Cal:

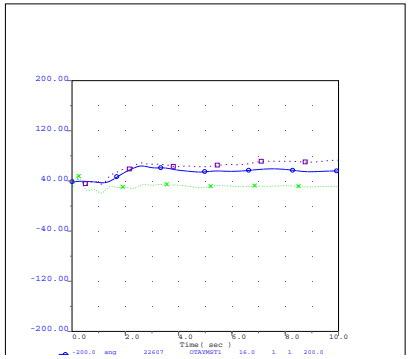
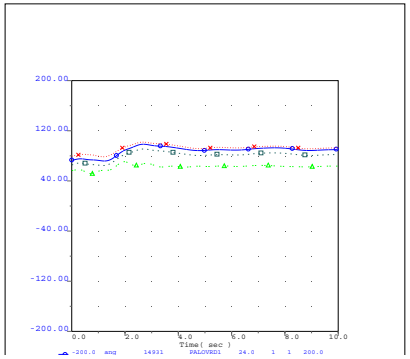


Figure 36 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Vict-Rinaldi-slo

Possible Violations: MORC 1[3]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[3] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 37 Bus-V:Owens Gorge/Rinaldi 230 kV

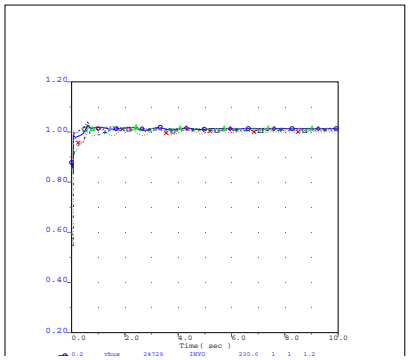


Figure 38 Bus-V:SCE North 115 kV

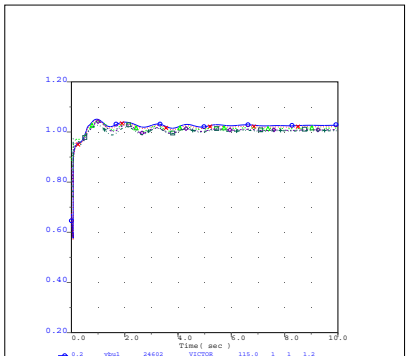


Figure 39 Bus-V:LA BASIN 230 & 138 kV

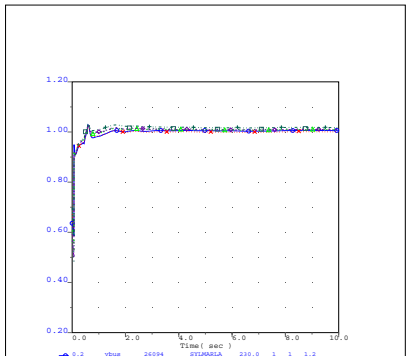


Figure 40 Bus-V:SCE 500 & 230 kV

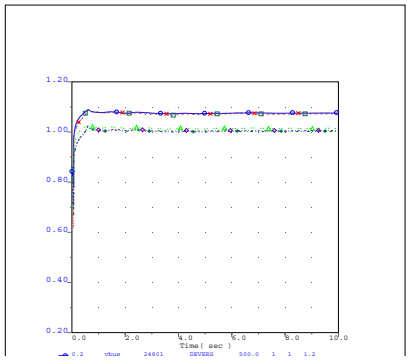


Figure 41 Bus-V: LADWP 500 kV:

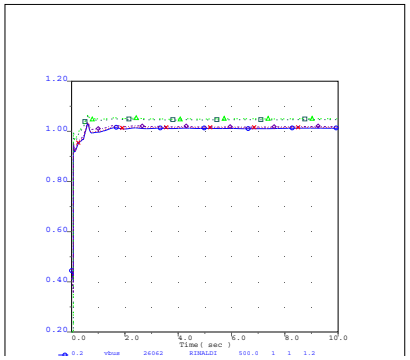


Figure 42 Bus-V:LADWP Load:

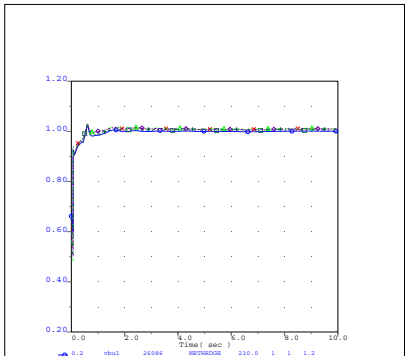


Figure 43 Bus-V: NW & S.CAL 500 kV

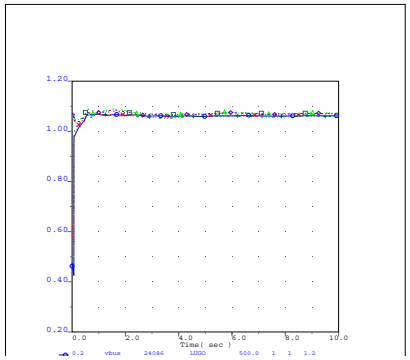


Figure 44 Bus-V: Others 500 kV

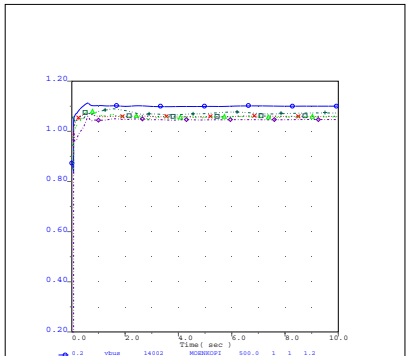


Figure 45 Bus-V: Others 230 kV

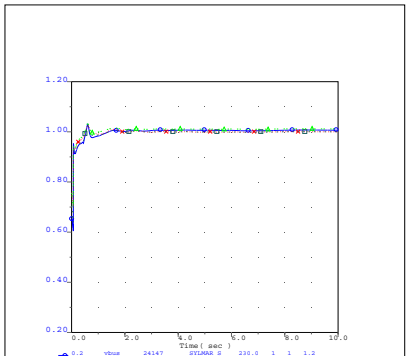


Figure 46 REL_RTR_ANG:S.Cal

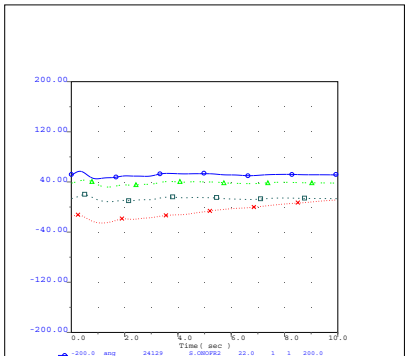


Figure 47 RELATIVE_ROTOR_ANGLE:S.Cal:

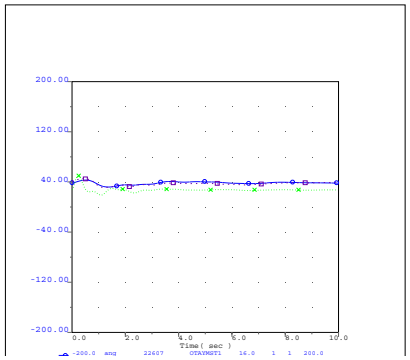
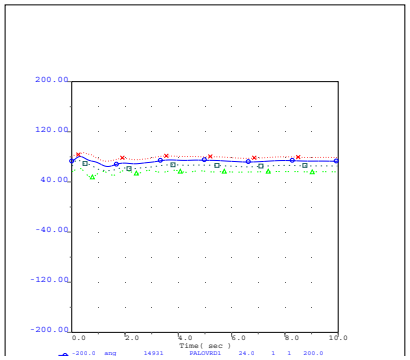


Figure 48 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Adel-Victorvl-slo

Possible Violations: MORC 1[4]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[4] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 49 Bus-V:Owens Gorge/Rinaldi 230 kV

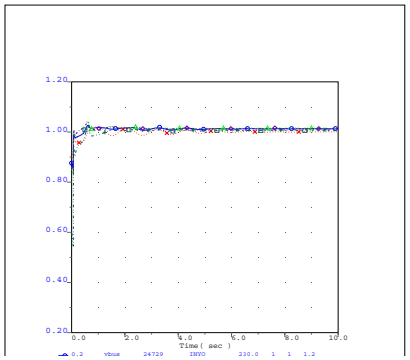


Figure 50 Bus-V:SCE North 115 kV

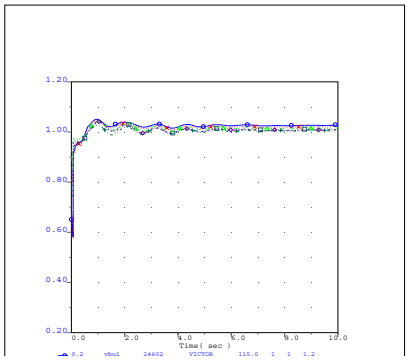


Figure 51 Bus-V:LA BASIN 230 & 138 kV

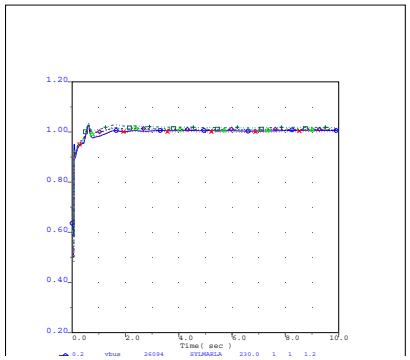


Figure 52 Bus-V:SCE 500 & 230 kV

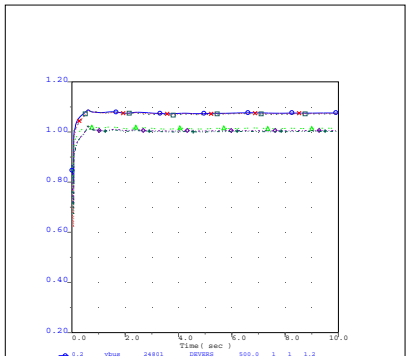


Figure 53 Bus-V: LADWP 500 kV:

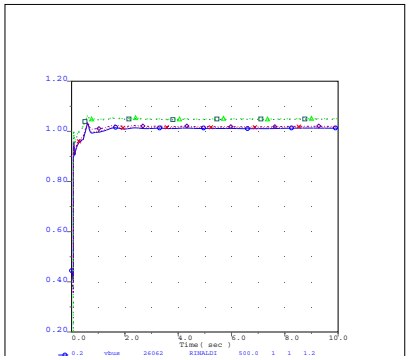


Figure 54 Bus-V:LADWP Load:

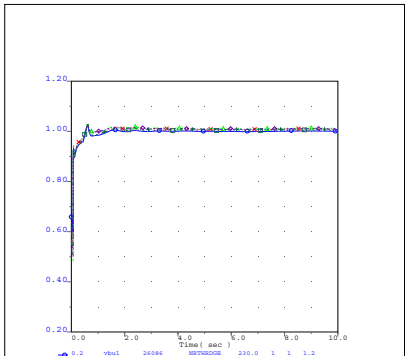


Figure 55 Bus-V: NW & S.CAL 500 kV

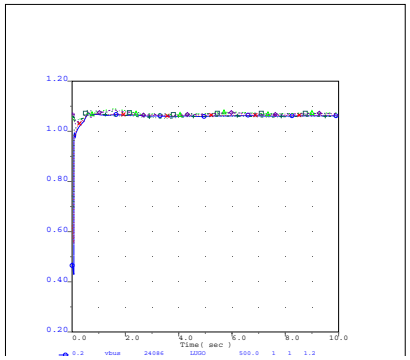


Figure 56 Bus-V: Others 500 kV

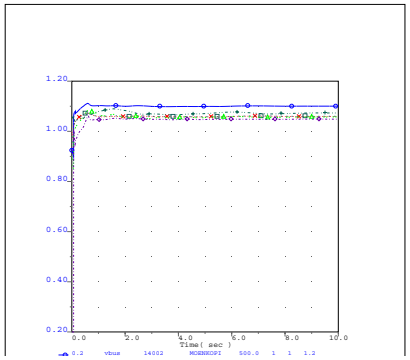


Figure 57 Bus-V: Others 230 kV

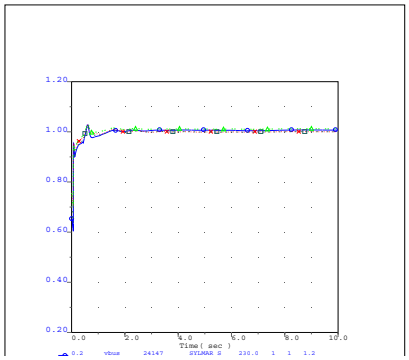


Figure 58 REL_RTR_ANG:S.Cal

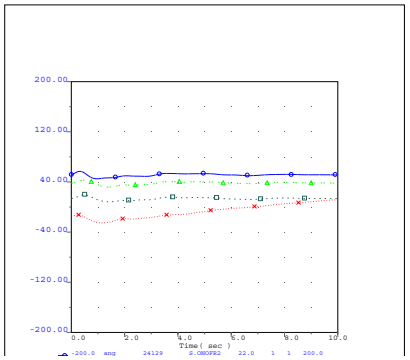


Figure 59 RELATIVE_ROTOR_ANGLE:S.Cal:

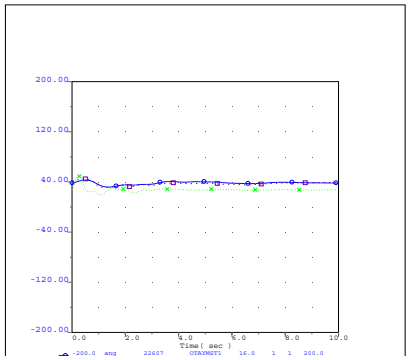
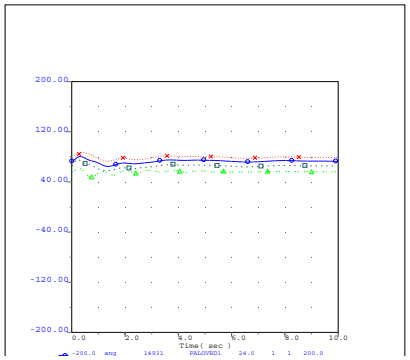


Figure 60 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: McC-Vict-slo

Possible Violations: MORC 1[5]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[5] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 61 Bus-V:Owens Gorge/Rinaldi 230 kV

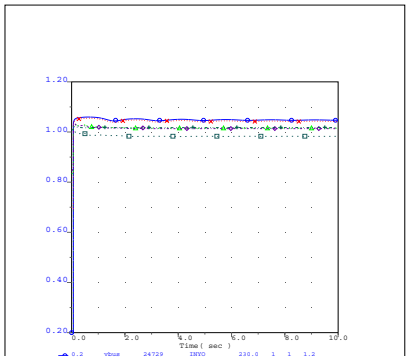


Figure 62 Bus-V:SCE North 115 kV

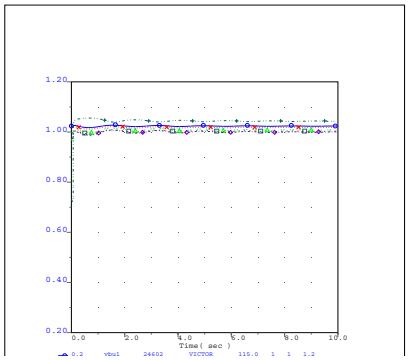


Figure 63 Bus-V:LA BASIN 230 & 138 kV

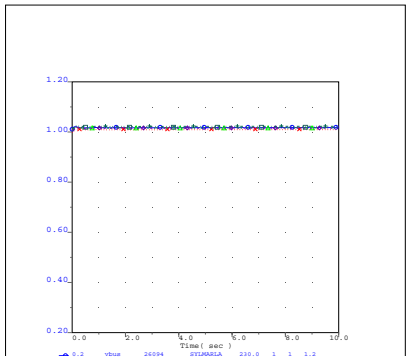


Figure 64 Bus-V:SCE 500 & 230 kV

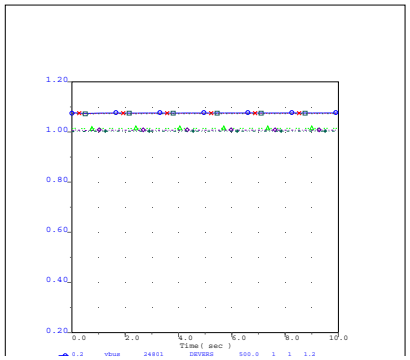


Figure 65 Bus-V: LADWP 500 kV:

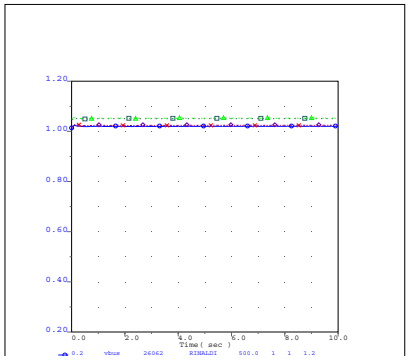


Figure 66 Bus-V:LADWP Load:

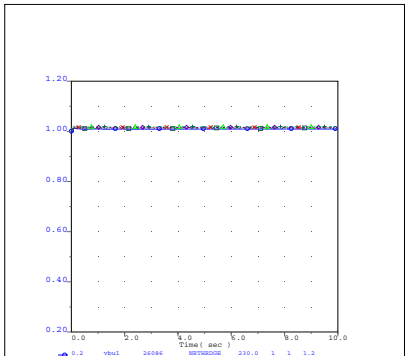


Figure 67 Bus-V: NW & S.CAL 500 kV

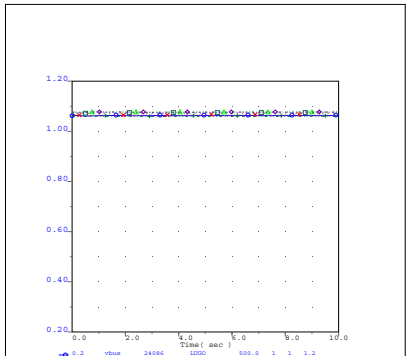


Figure 68 Bus-V: Others 500 kV

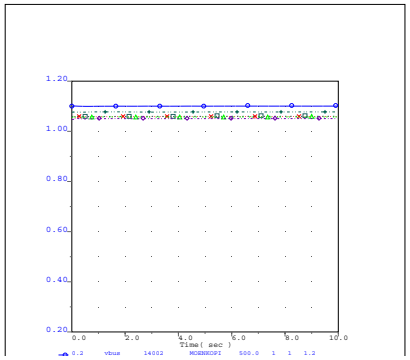


Figure 69 Bus-V: Others 230 kV

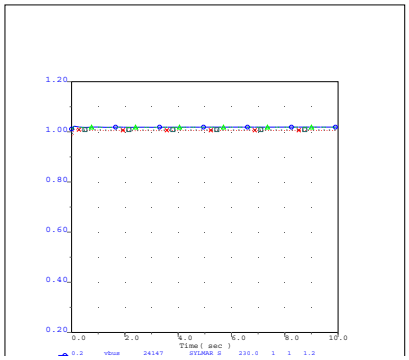


Figure 70 REL_RTR_ANG:S.Cal

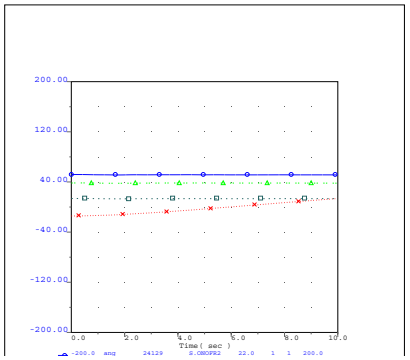


Figure 71 RELATIVE_ROTOR_ANGLE:S.Cal:

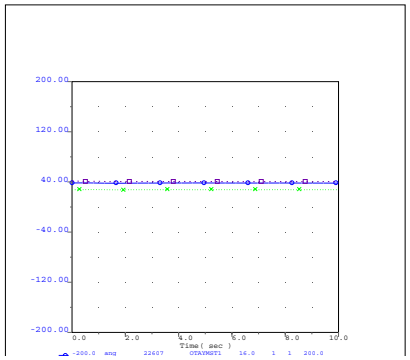
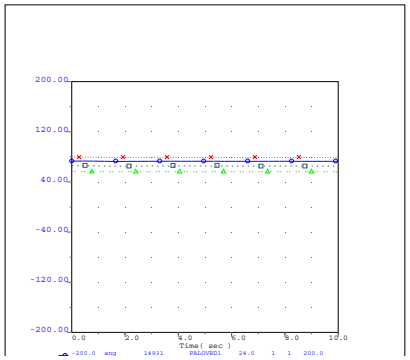


Figure 72 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Cottonwd-Inyo-preRAS

Possible Violations: MORC 1[6]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: 14, >10%: 14

[6] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 73 Bus-V:Owens Gorge/Rinaldi 230 kV

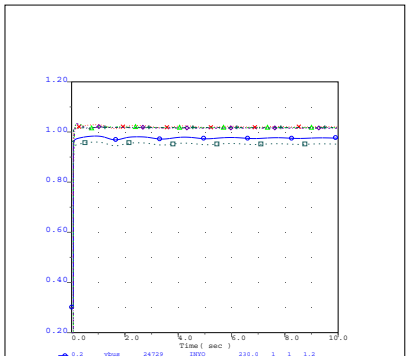


Figure 74 Bus-V:SCE North 115 kV

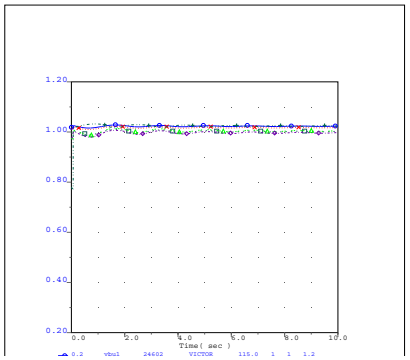


Figure 75 Bus-V:LA BASIN 230 & 138 kV

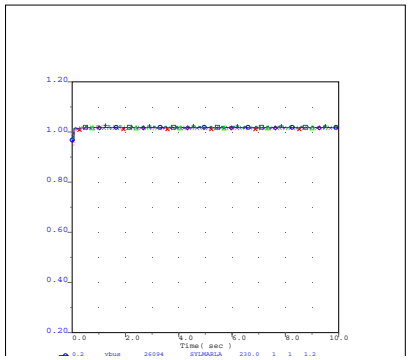


Figure 76 Bus-V:SCE 500 & 230 kV

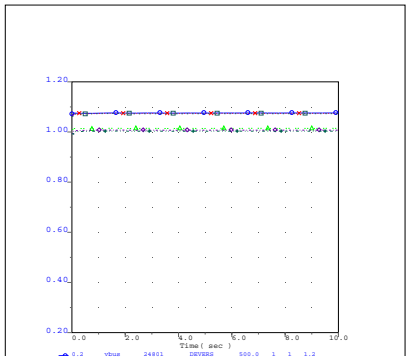


Figure 77 Bus-V: LADWP 500 kV:

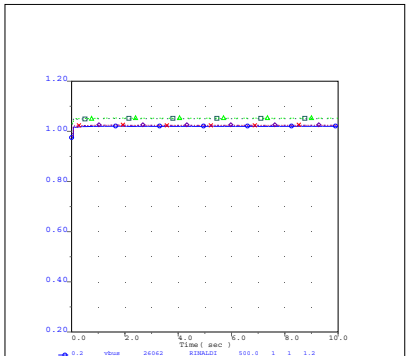


Figure 78 Bus-V:LADWP Load:

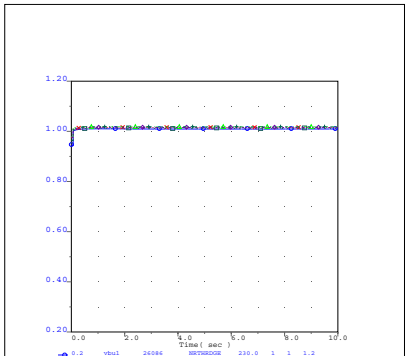


Figure 79 Bus-V: NW & S.CAL 500 kV

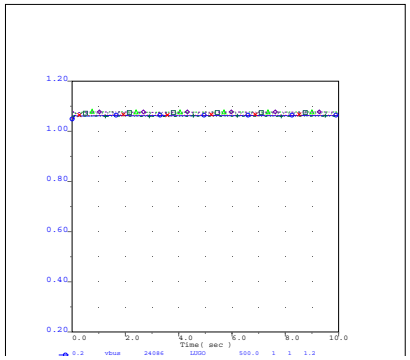


Figure 80 Bus-V: Others 500 kV

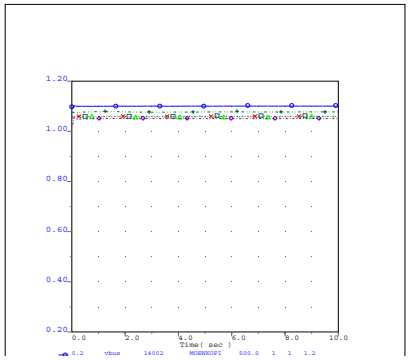


Figure 81 Bus-V: Others 230 kV

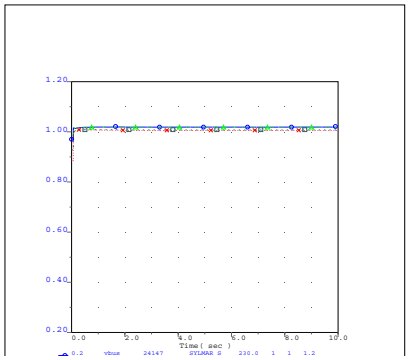


Figure 82 REL_RTR_ANG:S.Cal

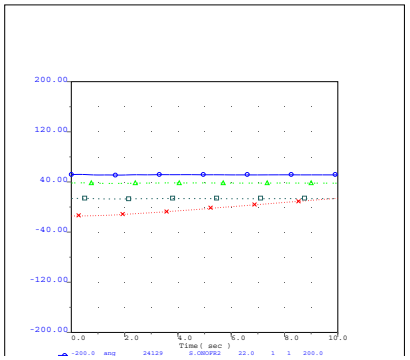


Figure 83 RELATIVE_ROTOR_ANGLE:S.Cal:

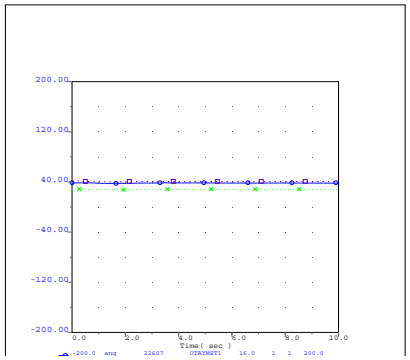
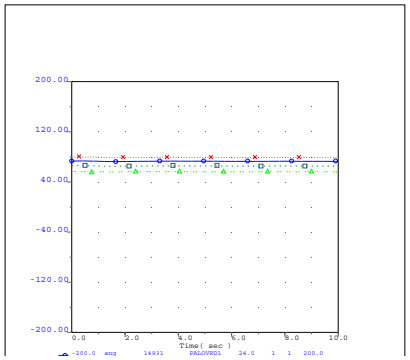


Figure 84 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Cottonwd-BR-OGtrip

Possible Violations: MORC 1[7]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[7] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 85 Bus-V:Owens Gorge/Rinaldi 230 kV

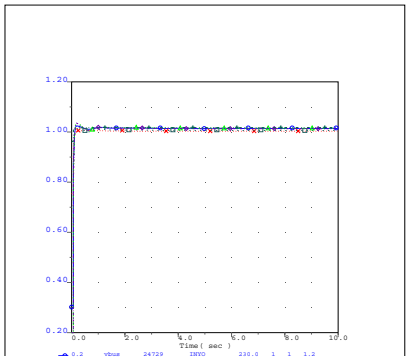


Figure 86 Bus-V:SCE North 115 kV

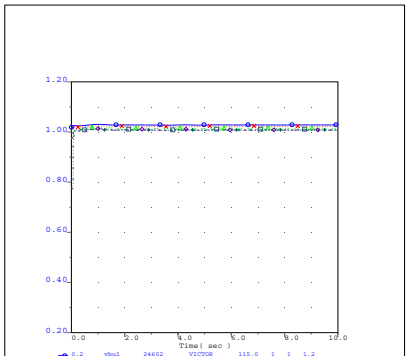


Figure 87 Bus-V:LA BASIN 230 & 138 kV

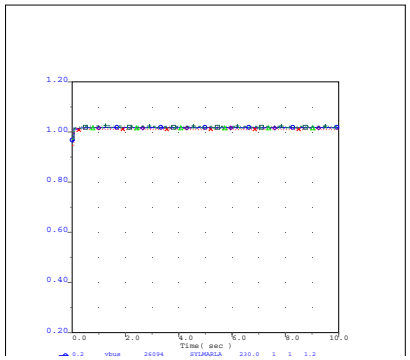


Figure 88 Bus-V:SCE 500 & 230 kV

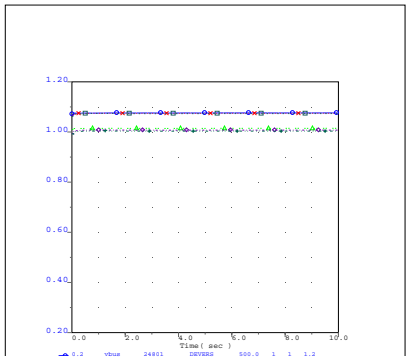


Figure 89 Bus-V: LADWP 500 kV:

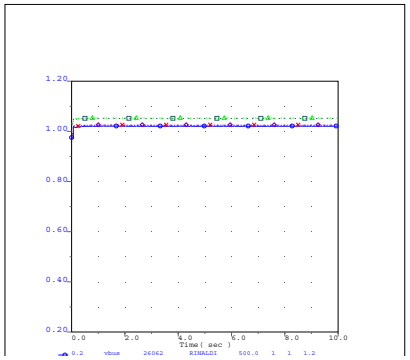


Figure 90 Bus-V:LADWP Load:

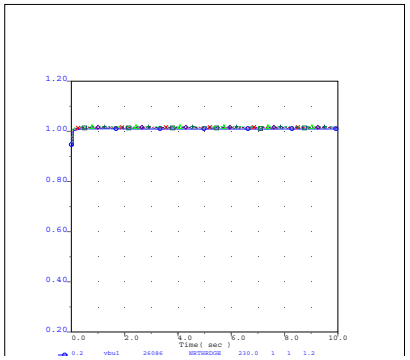


Figure 91 Bus-V: NW & S.CAL 500 kV

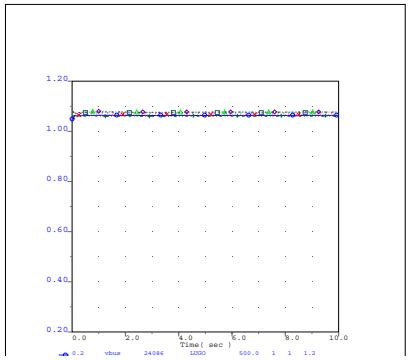


Figure 92 Bus-V: Others 500 kV

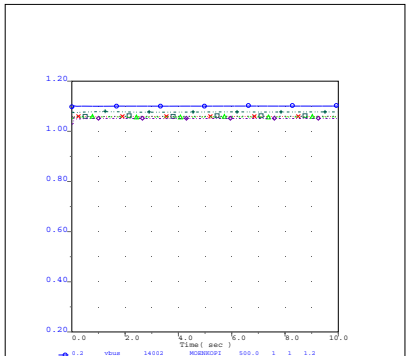


Figure 93 Bus-V: Others 230 kV

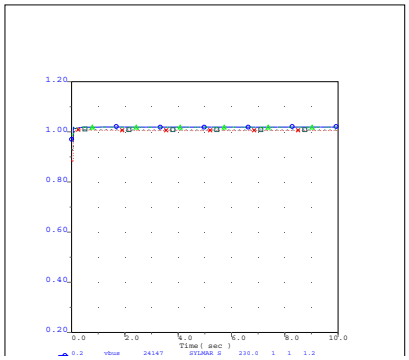


Figure 94 REL_RTR_ANG:S.Cal

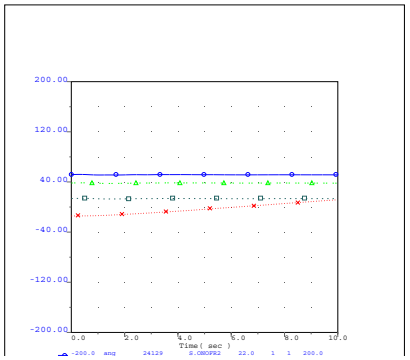


Figure 95 RELATIVE_ROTOR_ANGLE:S.Cal:

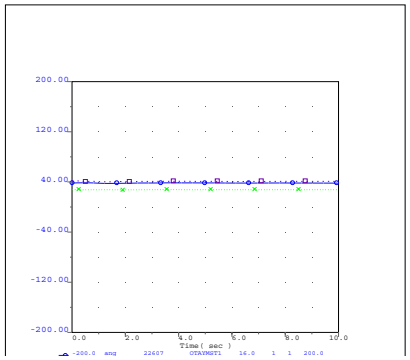
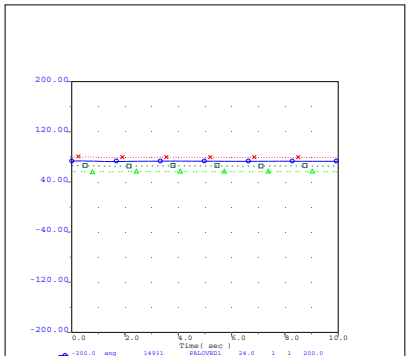


Figure 96 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: BR-Rinaldi-NoRAS

Possible Violations: MORC 1[8]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[8] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 97 Bus-V:Owens Gorge/Rinaldi 230 kV

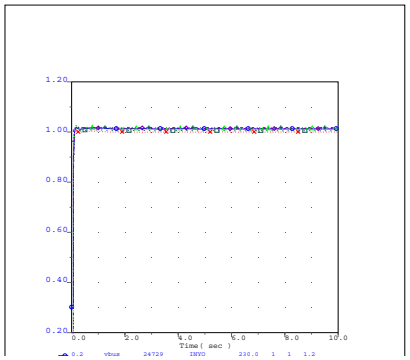


Figure 98 Bus-V:SCE North 115 kV

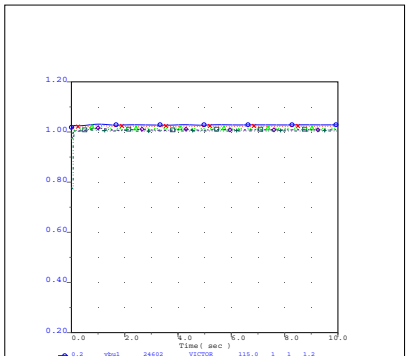


Figure 99 Bus-V:LA BASIN 230 & 138 kV

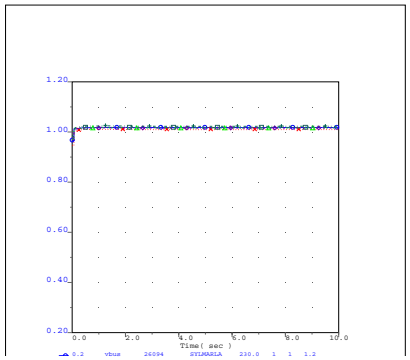


Figure 100 Bus-V:SCE 500 & 230 kV

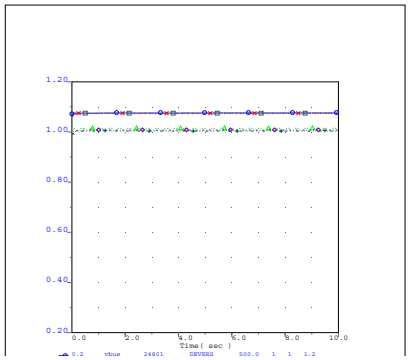


Figure 101 Bus-V: LADWP 500 kV:

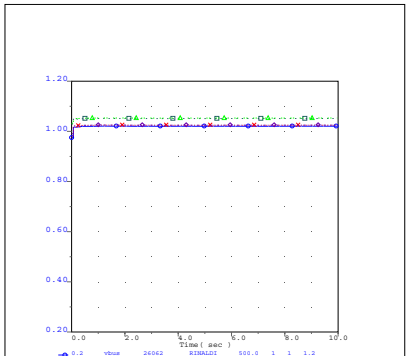


Figure 102 Bus-V:LADWP Load:

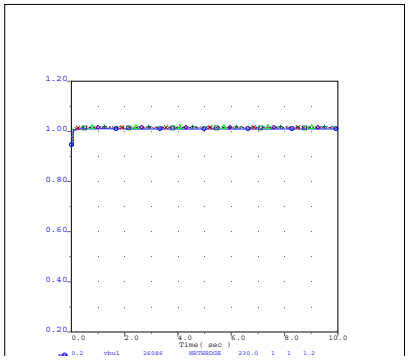


Figure 103 Bus-V: NW & S.CAL 500 kV

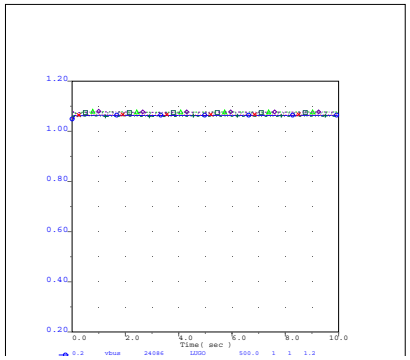


Figure 104 Bus-V: Others 500 kV

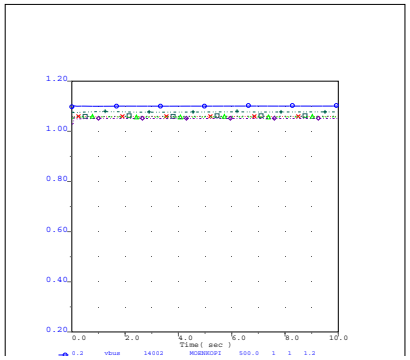


Figure 105 Bus-V: Others 230 kV

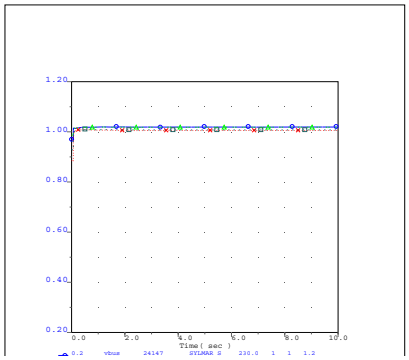


Figure 106 REL_RTR_ANG:S.Cal

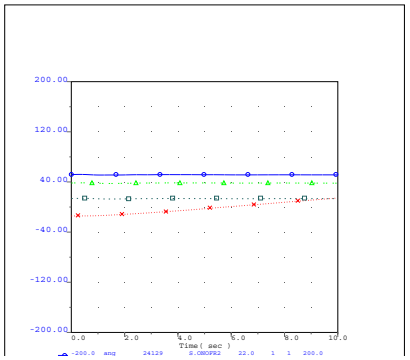


Figure 107 RELATIVE_ROTOR_ANGLE:S.Cal:

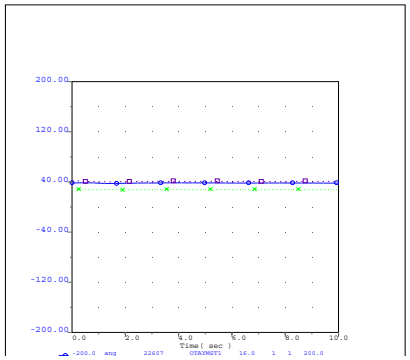
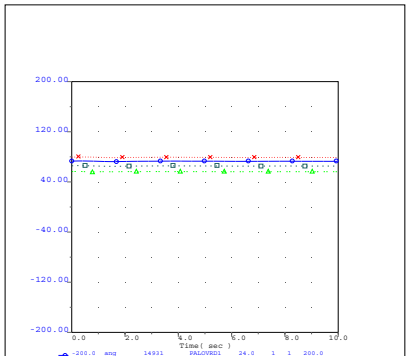


Figure 108 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Beacon-BR-RAS

Possible Violations: MORC 1[9]- 1 MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[9] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 109 Bus-V:Owens Gorge/Rinaldi 230 kV

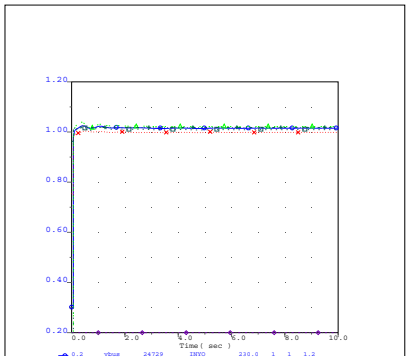


Figure 110 Bus-V:SCE North 115 kV

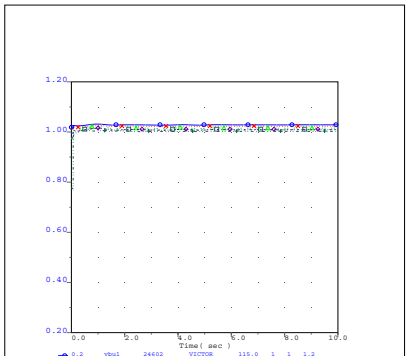


Figure 111 Bus-V:LA BASIN 230 & 138 kV

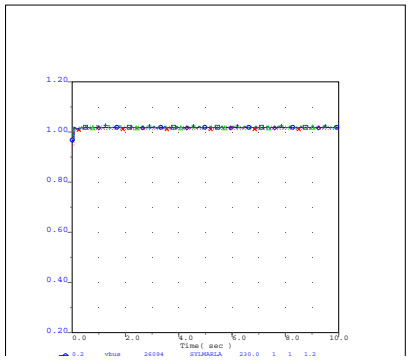


Figure 112 Bus-V:SCE 500 & 230 kV

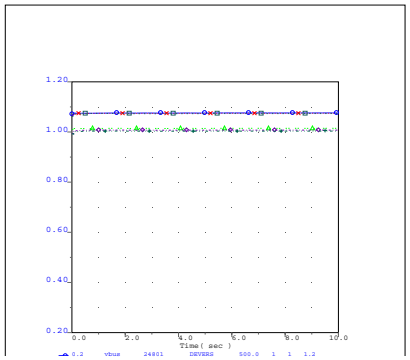


Figure 113 Bus-V: LADWP 500 kV:

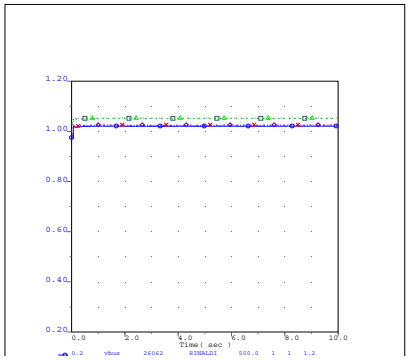


Figure 114 Bus-V:LADWP Load:

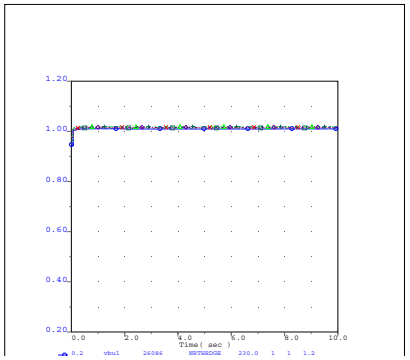


Figure 115 Bus-V: NW & S.CAL 500 kV

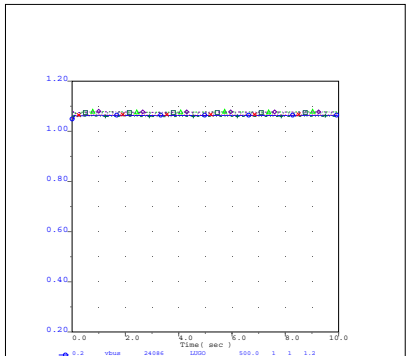


Figure 116 Bus-V: Others 500 kV

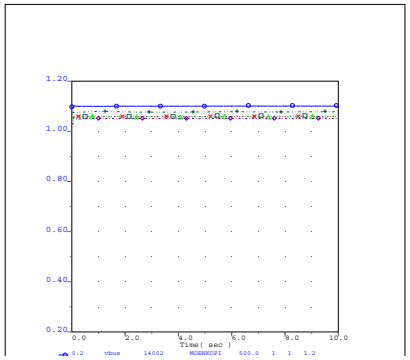


Figure 117 Bus-V: Others 230 kV

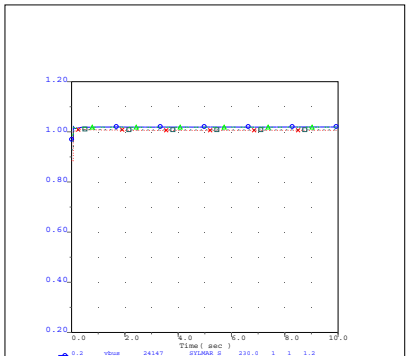


Figure 118 REL_RTR_ANG:S.Cal

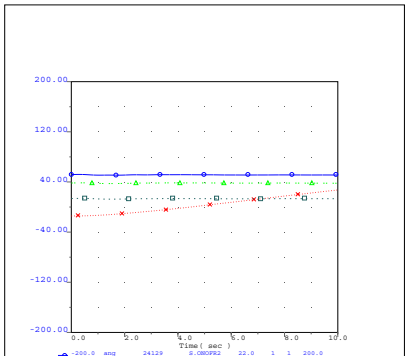


Figure 119 RELATIVE_ROTOR_ANGLE:S.Cal:

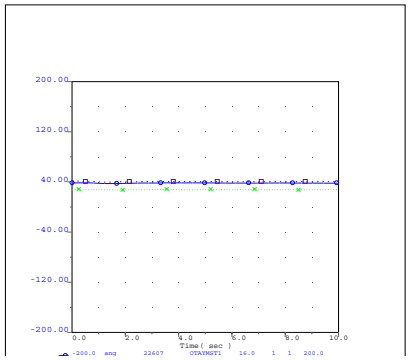
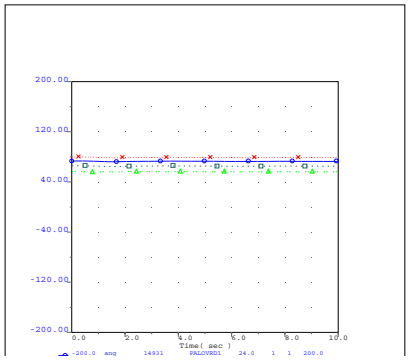


Figure 120 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Pinetree-BR-RAS

Possible Violations: MORC 1[10]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[10] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 121 Bus-V:Owens Gorge/Rinaldi 230 kV

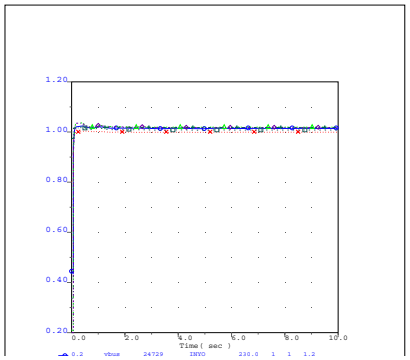


Figure 122 Bus-V:SCE North 115 kV

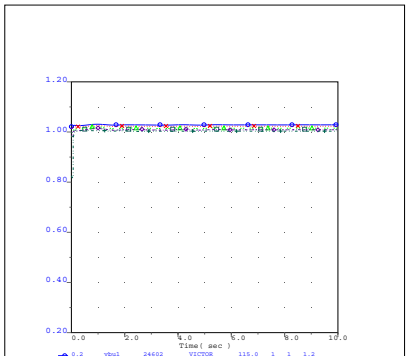


Figure 123 Bus-V:LA BASIN 230 & 138 kV

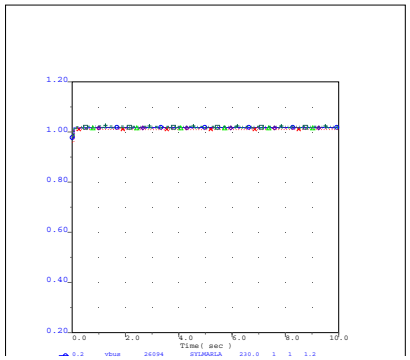


Figure 124 Bus-V:SCE 500 & 230 kV

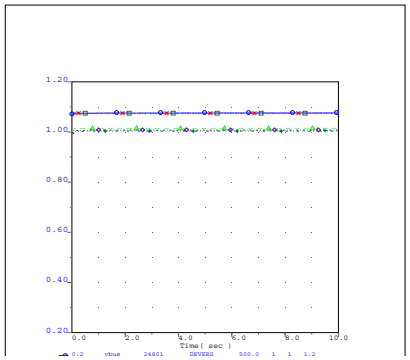


Figure 125 Bus-V: LADWP 500 kV:

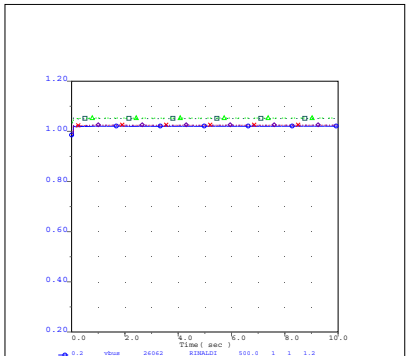


Figure 126 Bus-V:LADWP Load:

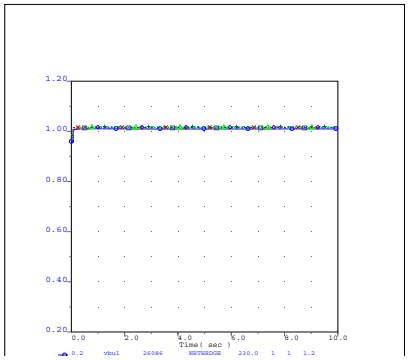


Figure 127 Bus-V: NW & S.CAL 500 kV

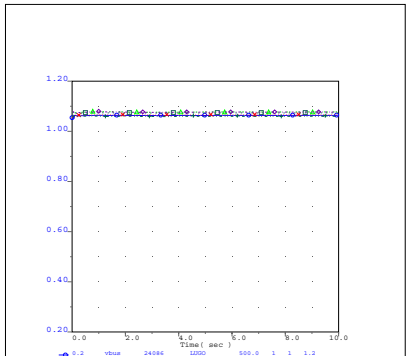


Figure 128 Bus-V: Others 500 kV

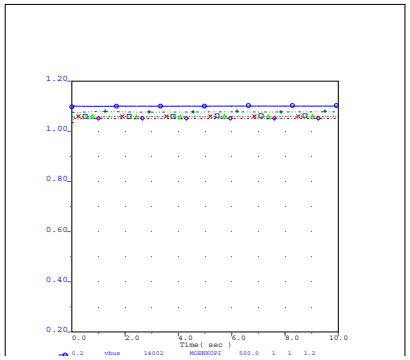


Figure 129 Bus-V: Others 230 kV

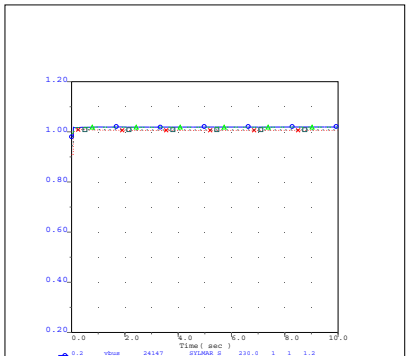


Figure 130 REL_RTR_ANG:S.Cal

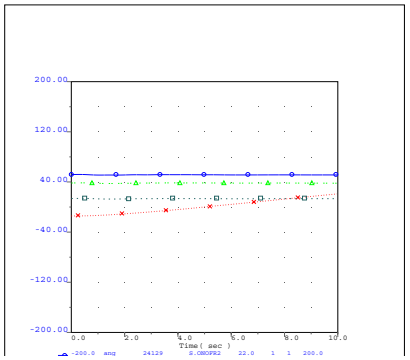


Figure 131 RELATIVE_ROTOR_ANGLE:S.Cal:

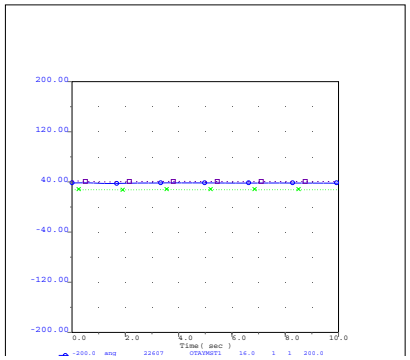
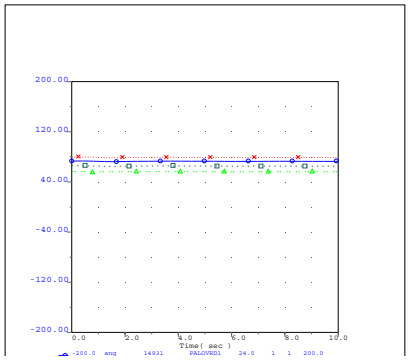


Figure 132 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: HoffmanSummit-Pinetree-RAS

Possible Violations: MORC 1[11]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[11] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 133 Bus-V:Owens Gorge/Rinaldi 230 kV

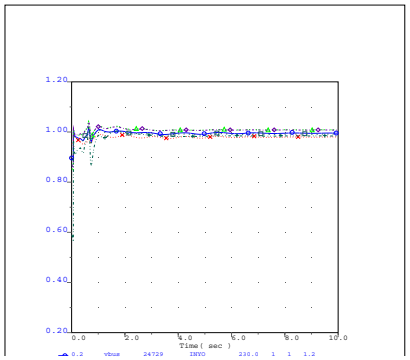


Figure 134 Bus-V:SCE North 115 kV

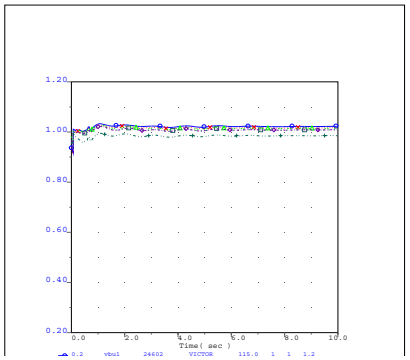


Figure 135 Bus-V:LA BASIN 230 & 138 kV

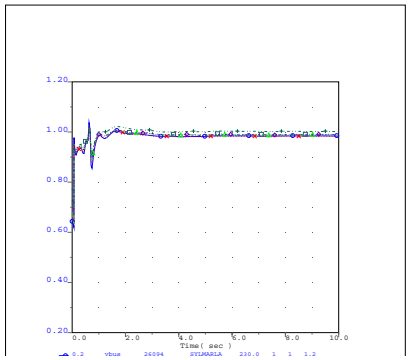


Figure 136 Bus-V:SCE 500 & 230 kV

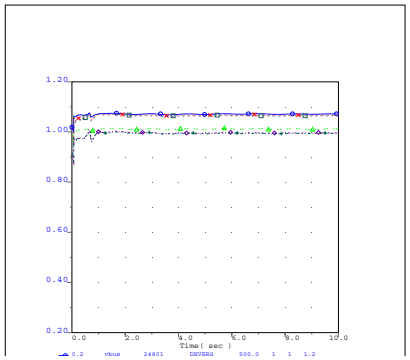


Figure 137 Bus-V: LADWP 500 kV:

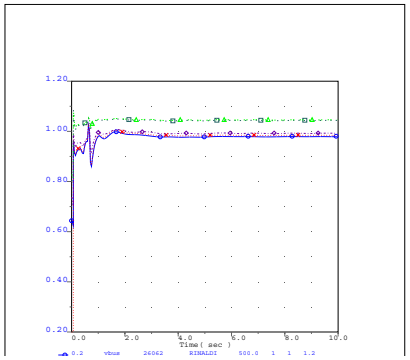


Figure 138 Bus-V:LADWP Load:

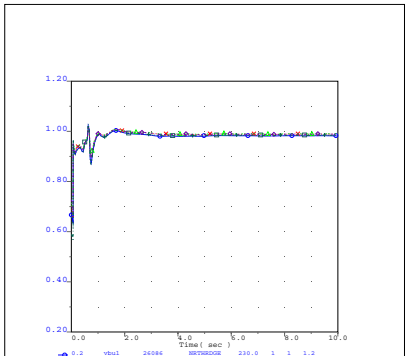


Figure 139 Bus-V: NW & S.CAL 500 kV

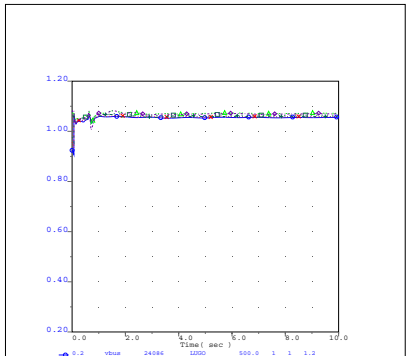


Figure 140 Bus-V: Others 500 kV

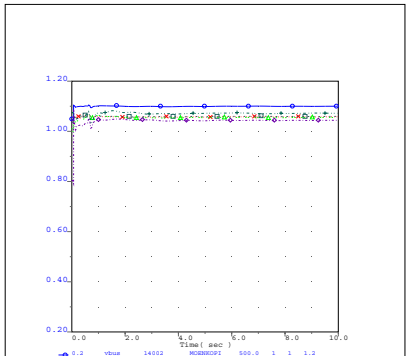


Figure 141 Bus-V: Others 230 kV

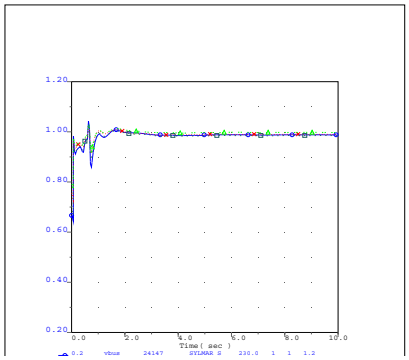


Figure 142 REL_RTR_ANG:S.Cal

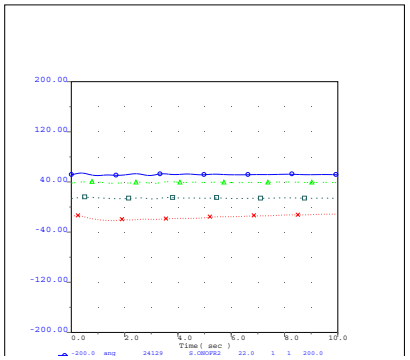


Figure 143 RELATIVE_ROTOR_ANGLE:S.Cal:

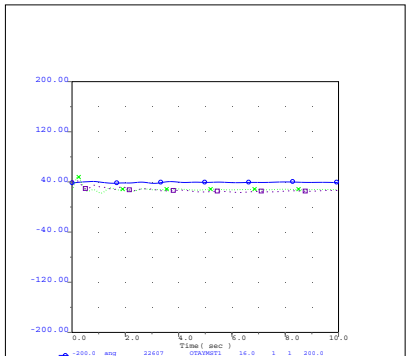
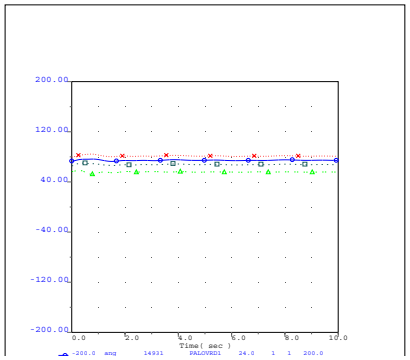


Figure 144 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Adel-Vict-Rinaldi-dlo

Possible Violations: MORC 1[12]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[12] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 145 Bus-V:Owens Gorge/Rinaldi 230 kV

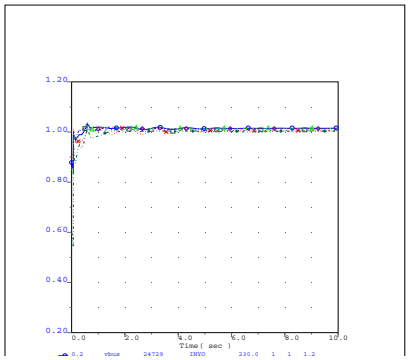


Figure 146 Bus-V:SCE North 115 kV

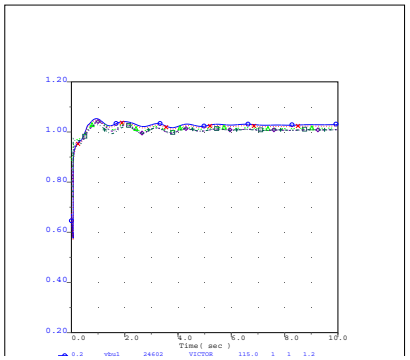


Figure 147 Bus-V:LA BASIN 230 & 138 kV

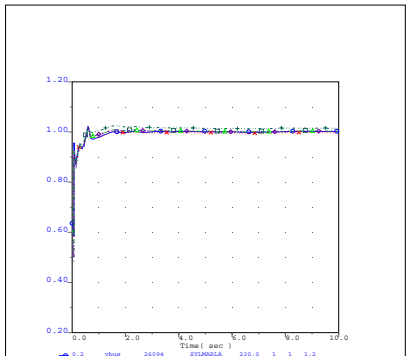


Figure 148 Bus-V:SCE 500 & 230 kV

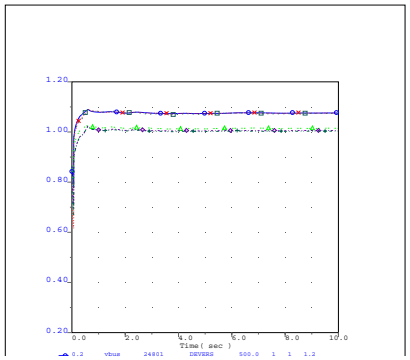


Figure 149 Bus-V: LADWP 500 kV:

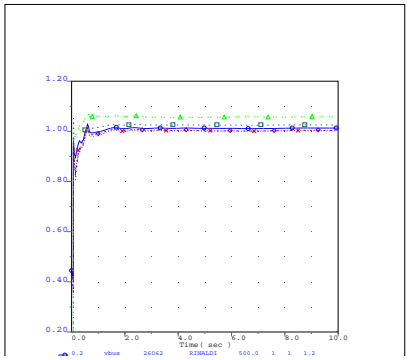


Figure 150 Bus-V:LADWP Load:

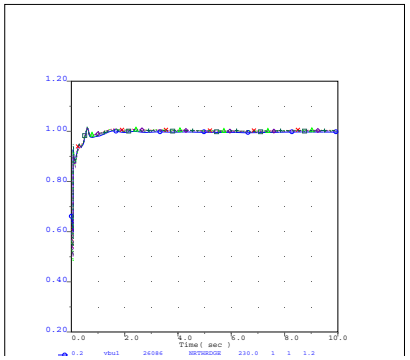


Figure 151 Bus-V: NW & S.CAL 500 kV

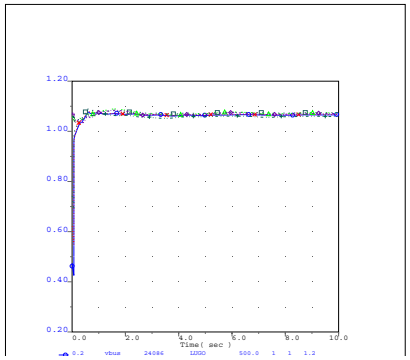


Figure 152 Bus-V: Others 500 kV

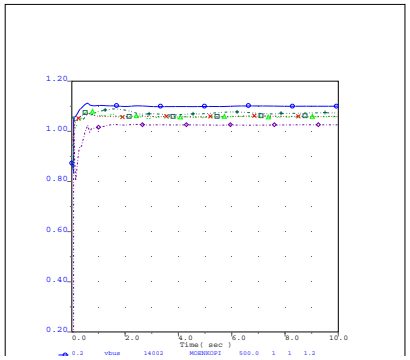


Figure 153 Bus-V: Others 230 kV

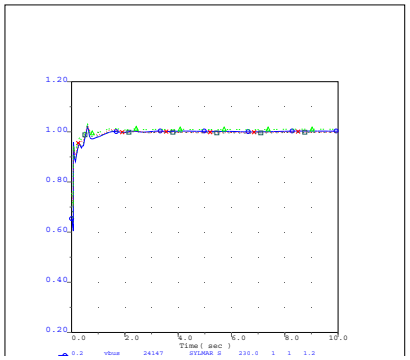


Figure 154 REL_RTR_ANG:S.Cal

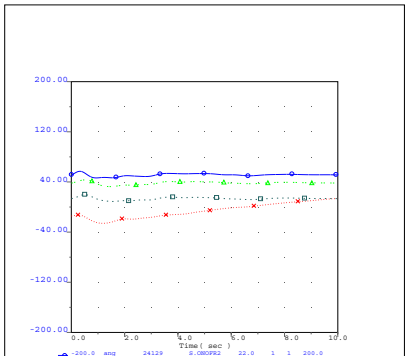


Figure 155 RELATIVE_ROTOR_ANGLE:S.Cal:

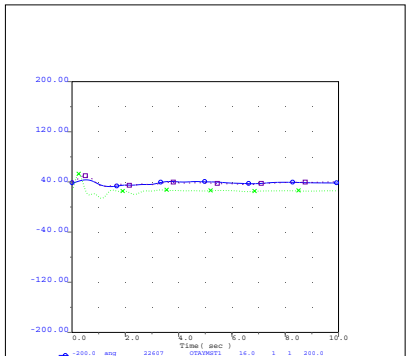
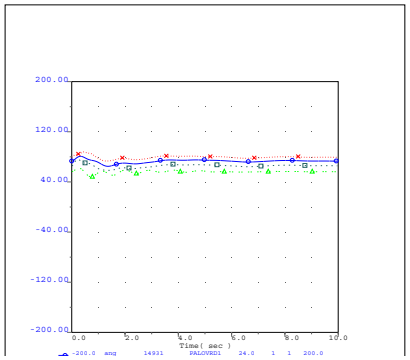


Figure 156 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Adel-Victorvl-dlo

Possible Violations: MORC 1[13]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[13] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 157 Bus-V:Owens Gorge/Rinaldi 230 kV

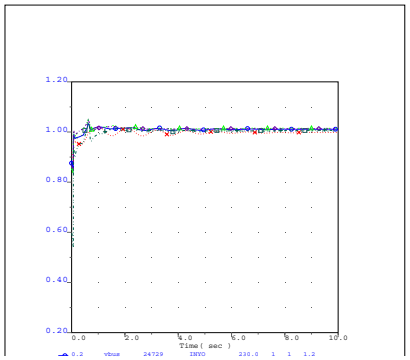


Figure 158 Bus-V:SCE North 115 kV

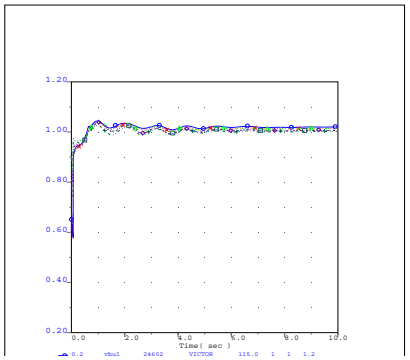


Figure 159 Bus-V:LA BASIN 230 & 138 kV

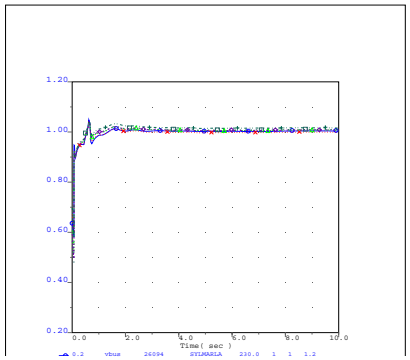


Figure 160 Bus-V:SCE 500 & 230 kV

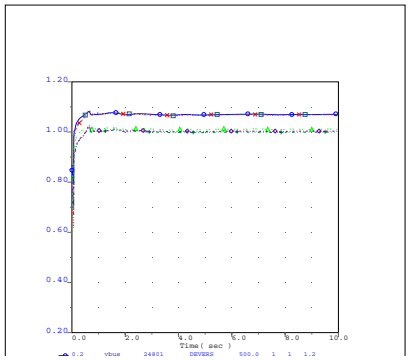


Figure 161 Bus-V: LADWP 500 kV:

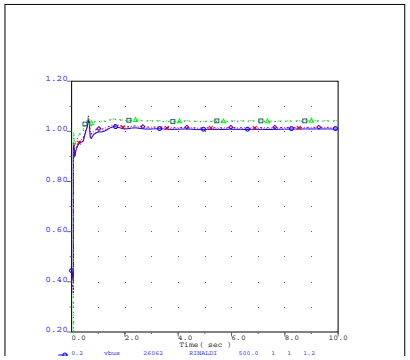


Figure 162 Bus-V:LADWP Load:

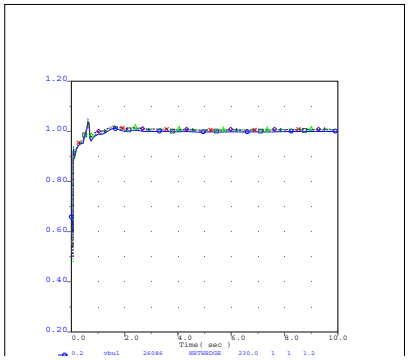


Figure 163 Bus-V: NW & S.CAL 500 kV

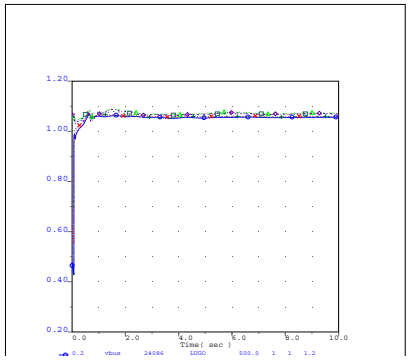


Figure 164 Bus-V: Others 500 kV

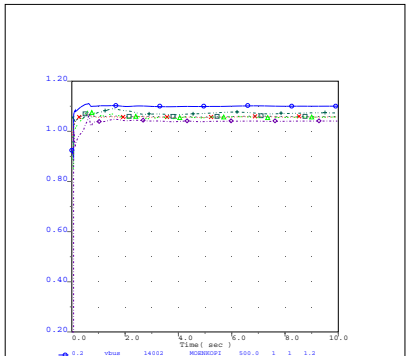


Figure 165 Bus-V: Others 230 kV

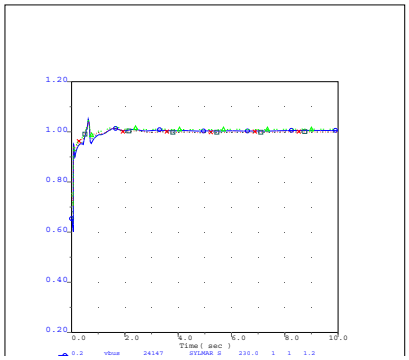


Figure 166 REL_RTR_ANG:S.Cal

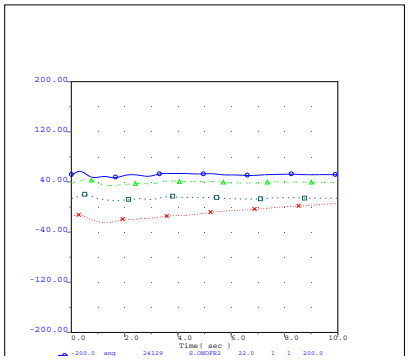


Figure 167 RELATIVE_ROTOR_ANGLE:S.Cal:

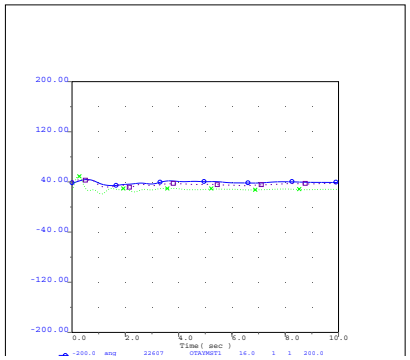
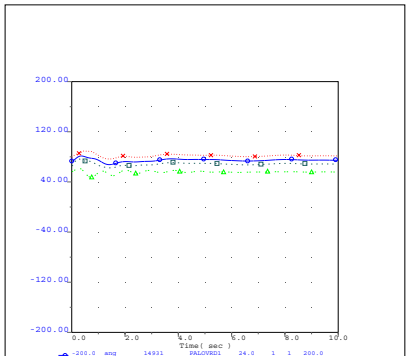


Figure 168 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: McCullgh-Victorvl-dlo

Possible Violations: MORC 1[14]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[14] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 169 Bus-V:Owens Gorge/Rinaldi 230 kV

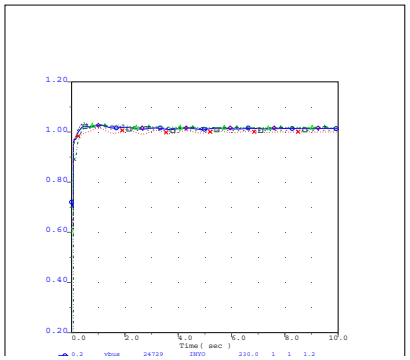


Figure 170 Bus-V:SCE North 115 kV

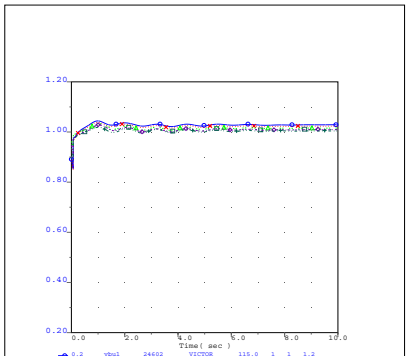


Figure 171 Bus-V:LA BASIN 230 & 138 kV

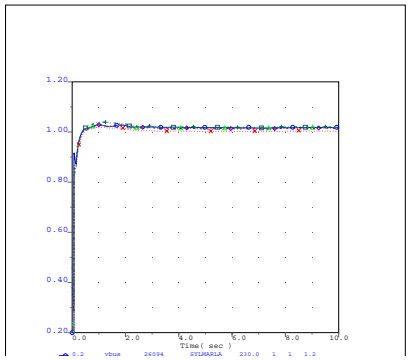


Figure 172 Bus-V:SCE 500 & 230 kV

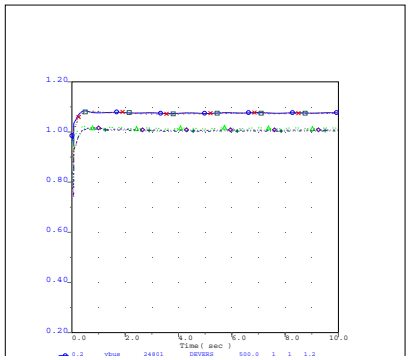


Figure 173 Bus-V: LADWP 500 kV:

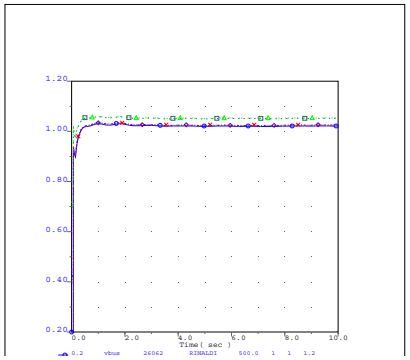


Figure 174 Bus-V:LADWP Load:

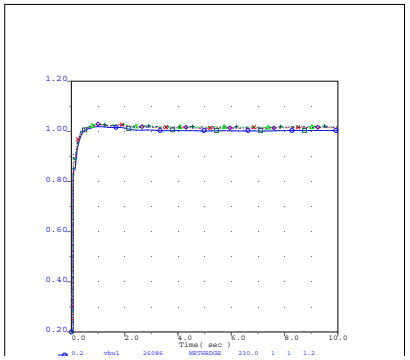


Figure 175 Bus-V: NW & S.CAL 500 kV

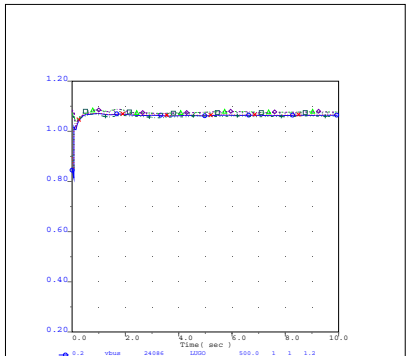


Figure 176 Bus-V: Others 500 kV

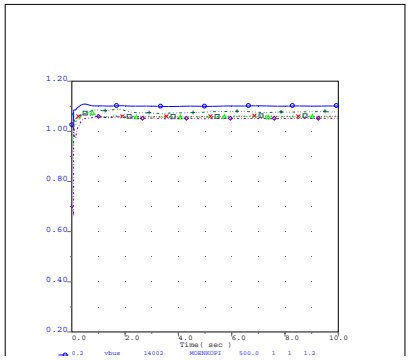


Figure 177 Bus-V: Others 230 kV

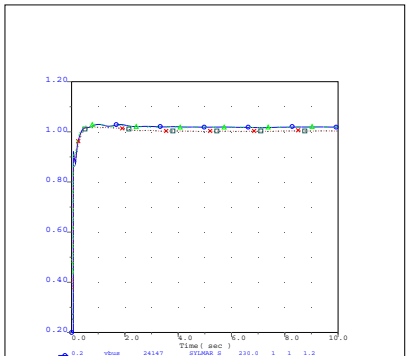


Figure 178 REL_RTR_ANG:S.Cal

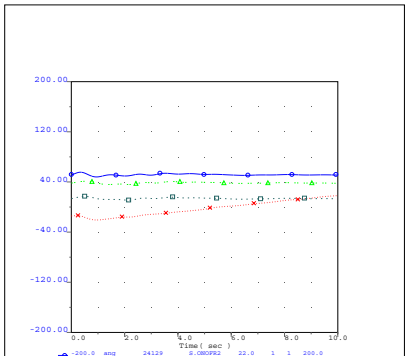


Figure 179 RELATIVE_ROTOR_ANGLE:S.Cal:

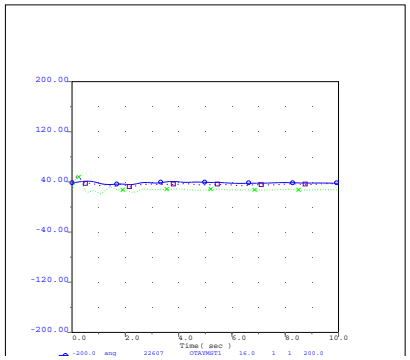
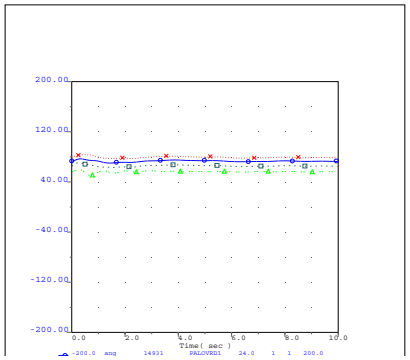


Figure 180 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Rin-Tar-dlo

Possible Violations: MORC 1[15]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[15] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 181 Bus-V:Owens Gorge/Rinaldi 230 kV

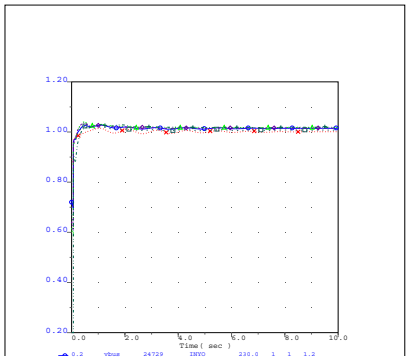


Figure 182 Bus-V:SCE North 115 kV

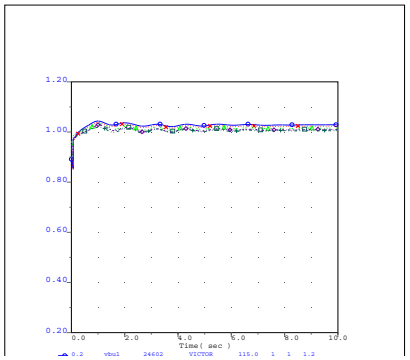


Figure 183 Bus-V:LA BASIN 230 & 138 kV

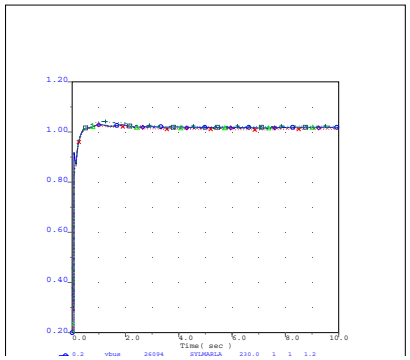


Figure 184 Bus-V:SCE 500 & 230 kV

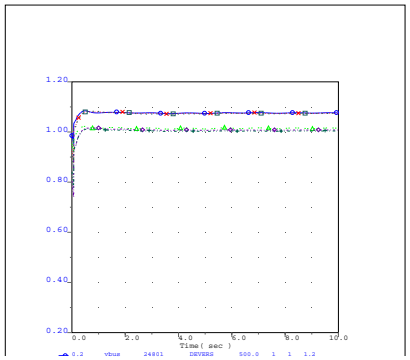


Figure 185 Bus-V: LADWP 500 kV:

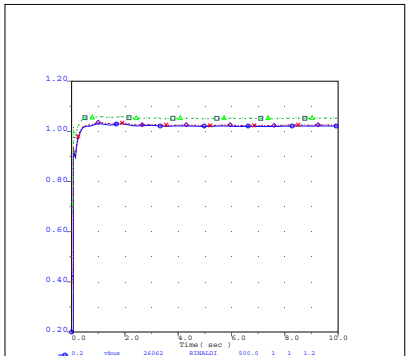


Figure 186 Bus-V:LADWP Load:

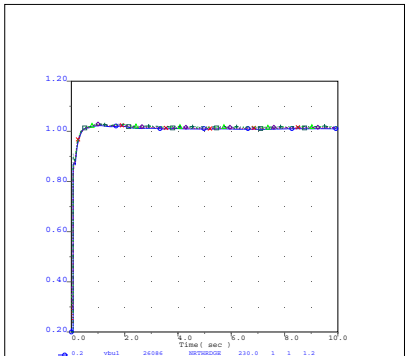


Figure 187 Bus-V: NW & S.CAL 500 kV

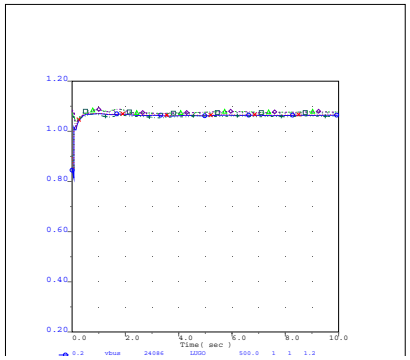


Figure 188 Bus-V: Others 500 kV

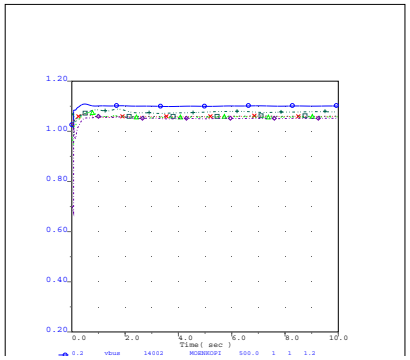


Figure 189 Bus-V: Others 230 kV

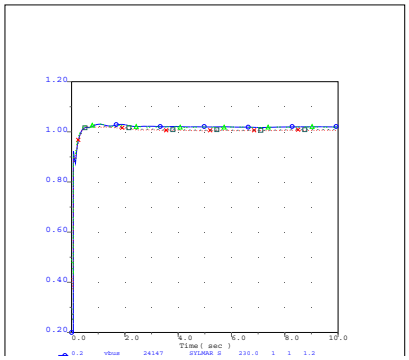


Figure 190 REL_RTR_ANG:S.Cal

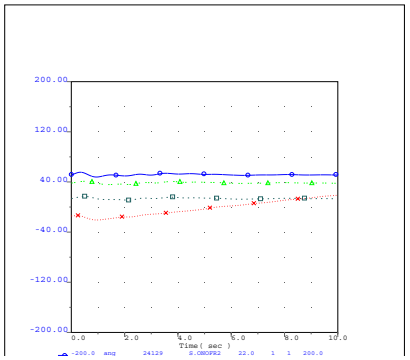


Figure 191 RELATIVE_ROTOR_ANGLE:S.Cal:

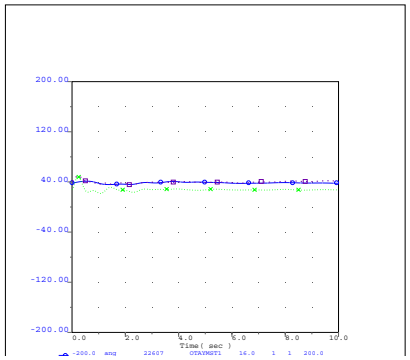
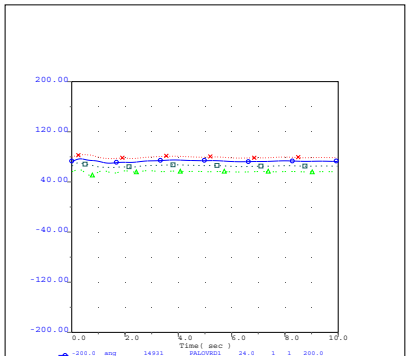


Figure 192 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: Rin-Glendl-dlo

Possible Violations: MORC 1[16]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[16] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 193 Bus-V:Owens Gorge/Rinaldi 230 kV

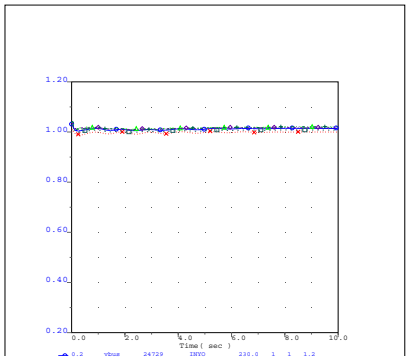


Figure 194 Bus-V:SCE North 115 kV

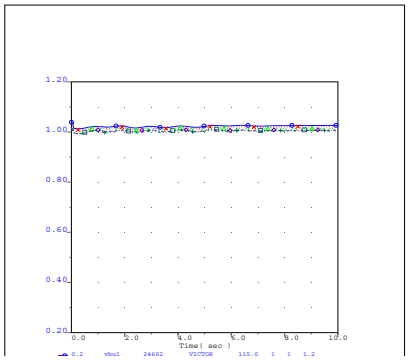


Figure 195 Bus-V:LA BASIN 230 & 138 kV

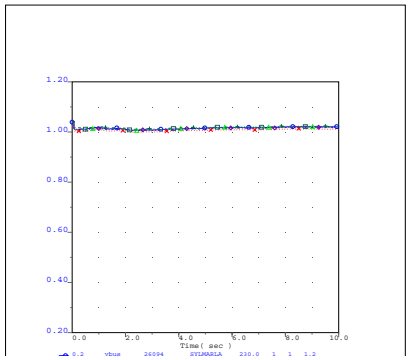


Figure 196 Bus-V:SCE 500 & 230 kV

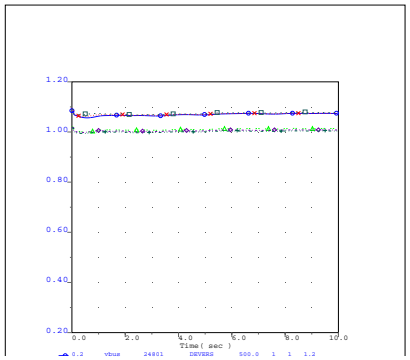


Figure 197 Bus-V: LADWP 500 kV:

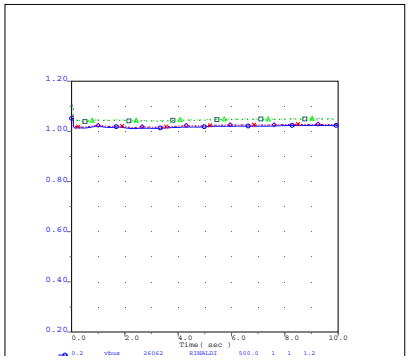


Figure 198 Bus-V:LADWP Load:

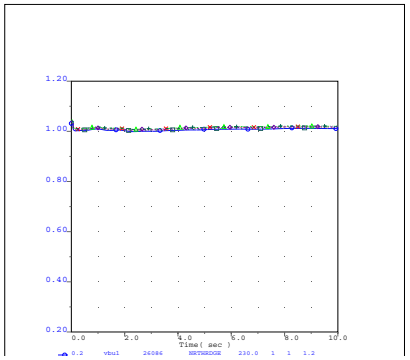


Figure 199 Bus-V: NW & S.CAL 500 kV

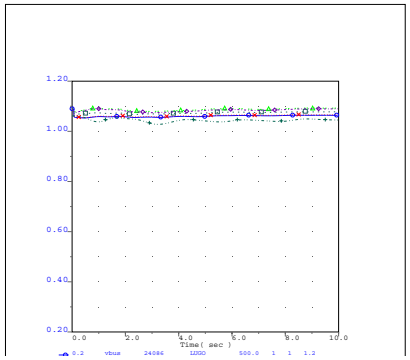


Figure 200 Bus-V: Others 500 kV

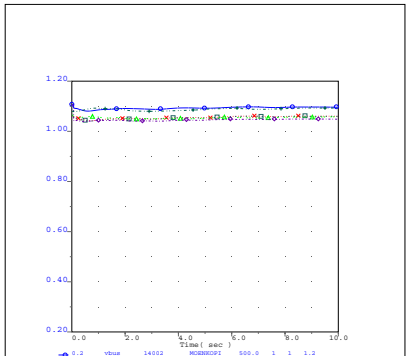


Figure 201 Bus-V: Others 230 kV

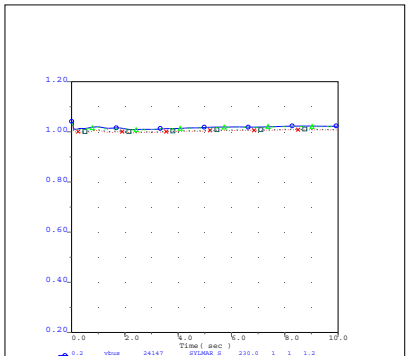


Figure 202 REL_RTR_ANG:S.Cal

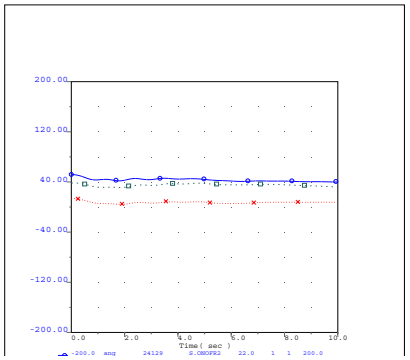


Figure 203 RELATIVE_ROTOR_ANGLE:S.Cal:

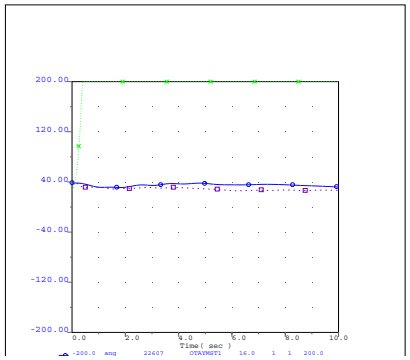
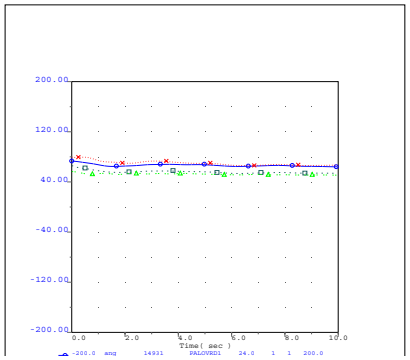


Figure 204 REL_RTR_ANG:Others



Study: BSP Case: labsp1_50iy_ov_0og_cast Contingency: IPP-bipolar-upc

Possible Violations: MORC 1[17]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[17] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Study: BSP Case: labsp2_50iy_ov_0og

Figure 1 Bus-V:Owens Gorge/Rinaldi 230 kV

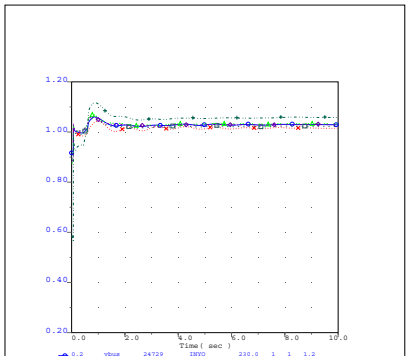


Figure 2 Bus-V:SCE North 115 kV

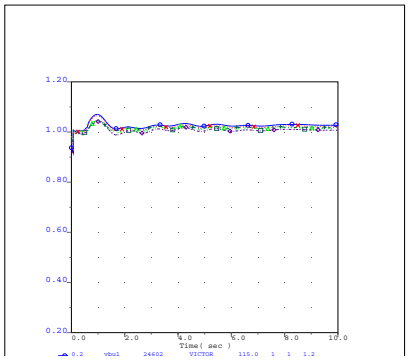


Figure 3 Bus-V:LA BASIN 230 & 138 kV

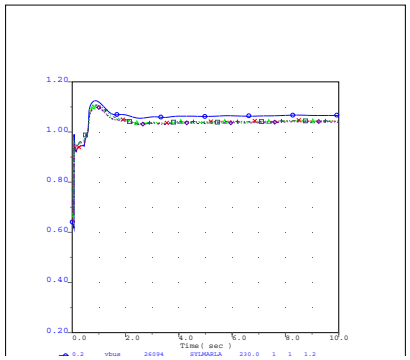


Figure 4 Bus-V:SCE 500 & 230 kV

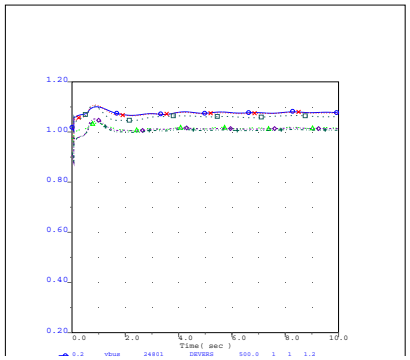


Figure 5 Bus-V: LADWP 500 kV:

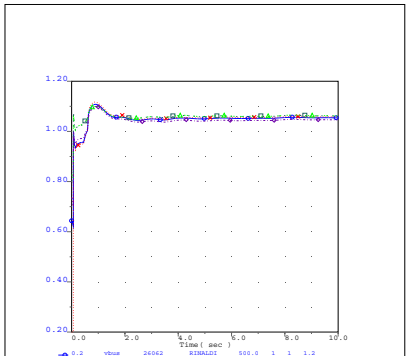


Figure 6 Bus-V:LADWP Load:

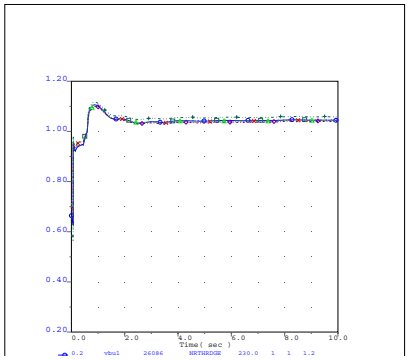


Figure 7 Bus-V: NW & S.CAL 500 kV

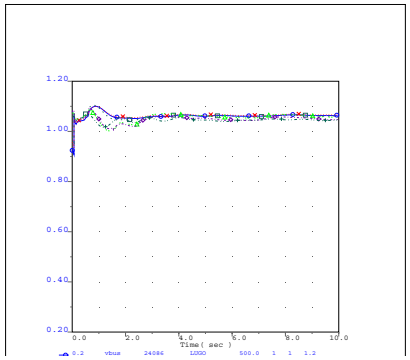


Figure 8 Bus-V: Others 500 kV

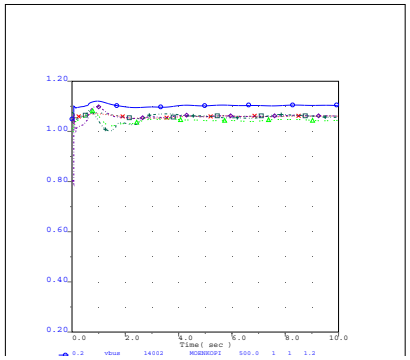


Figure 9 Bus-V: Others 230 kV

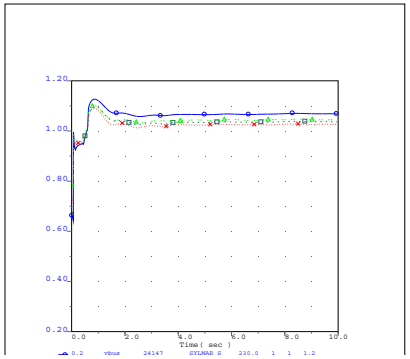


Figure 10 REL_RTR_ANG:S.Cal

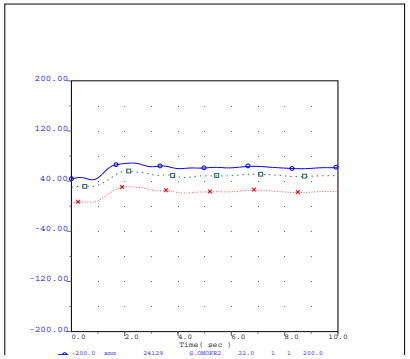


Figure 11 RELATIVE_ROTOR_ANGLE:S.Cal:

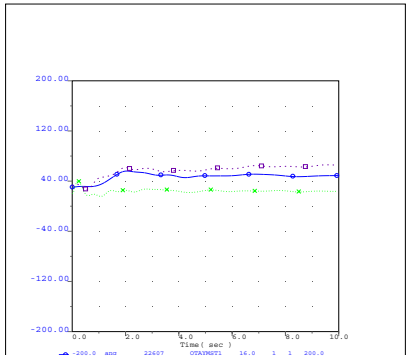
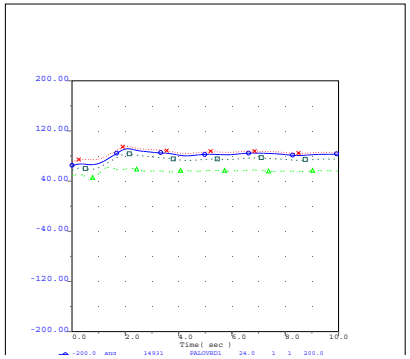


Figure 12 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Adel-Rinaldi-slo

Possible Violations: MORC 1[1]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[1] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 13 Bus-V:Owens Gorge/Rinaldi 230 kV

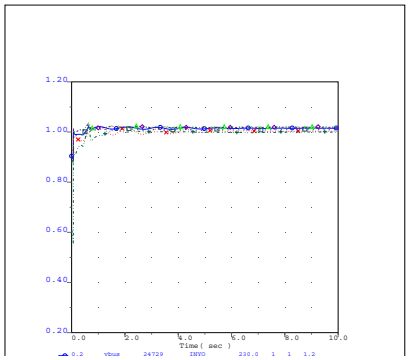


Figure 14 Bus-V:SCE North 115 kV

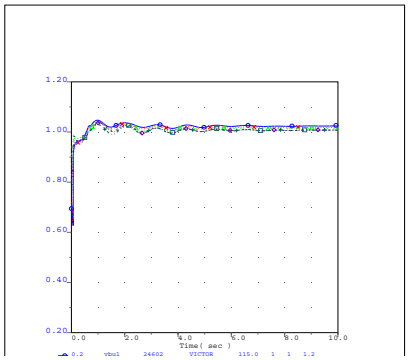


Figure 15 Bus-V:LA BASIN 230 & 138 kV

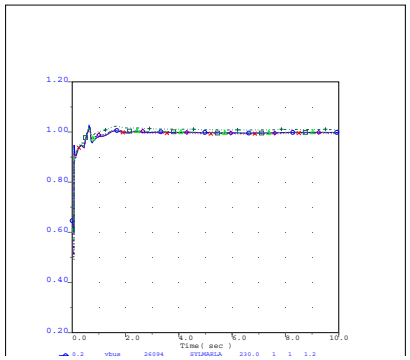


Figure 16 Bus-V:SCE 500 & 230 kV

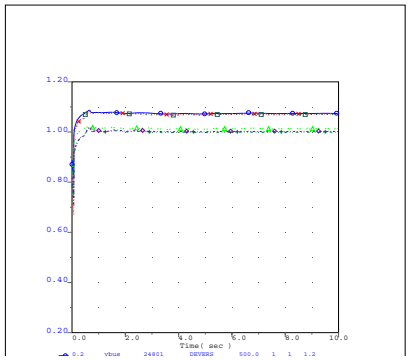


Figure 17 Bus-V: LADWP 500 kV:

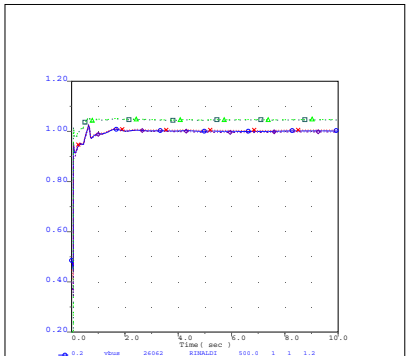


Figure 18 Bus-V:LADWP Load:

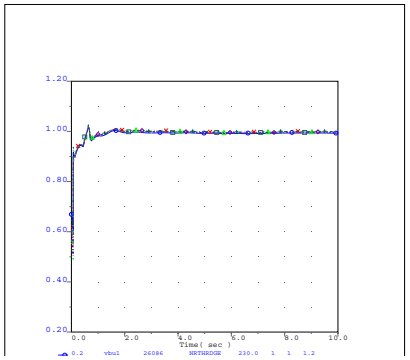


Figure 19 Bus-V: NW & S.CAL 500 kV

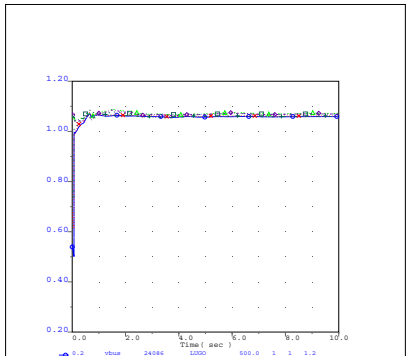


Figure 20 Bus-V: Others 500 kV

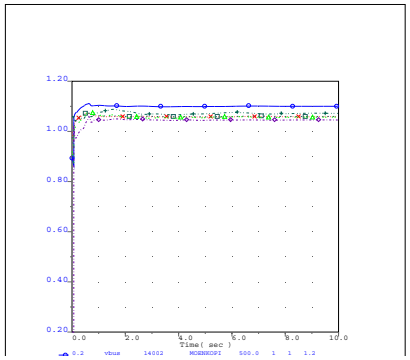


Figure 21 Bus-V: Others 230 kV

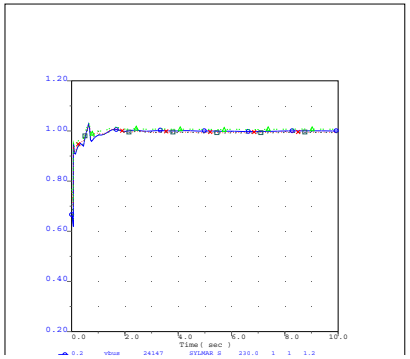


Figure 22 REL_RTR_ANG:S.Cal

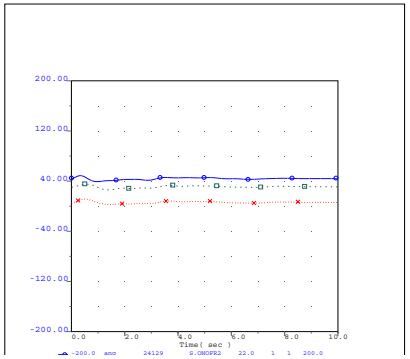


Figure 23 RELATIVE_ROTOR_ANGLE:S.Cal:

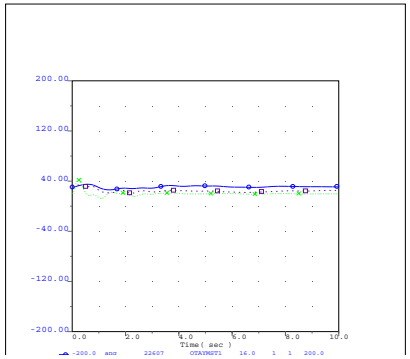
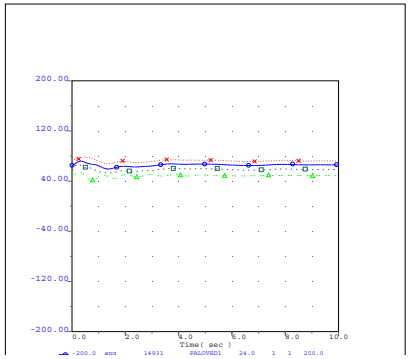


Figure 24 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Adel-Toluca

Possible Violations: MORC 1[2]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[2] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 25 Bus-V:Owens Gorge/Rinaldi 230 kV

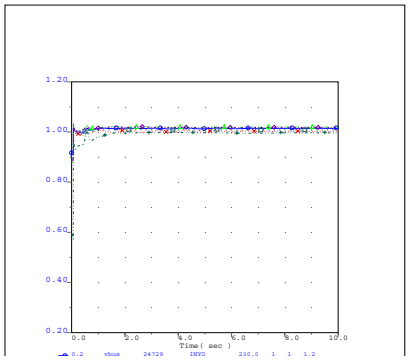


Figure 26 Bus-V:SCE North 115 kV

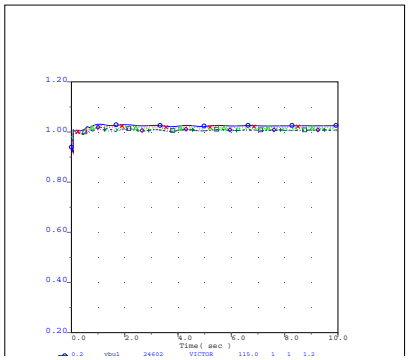


Figure 27 Bus-V:LA BASIN 230 & 138 kV

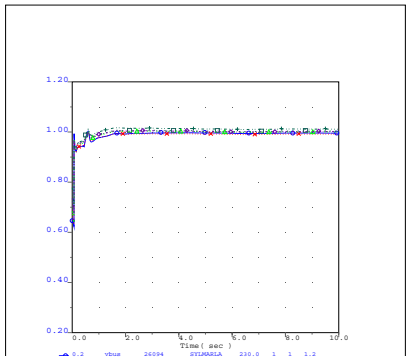


Figure 28 Bus-V:SCE 500 & 230 kV

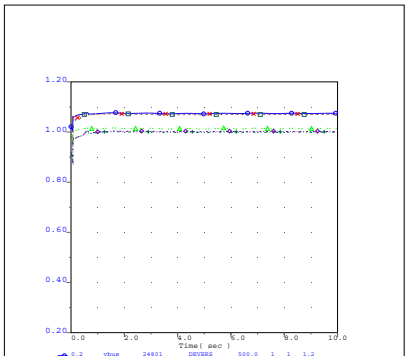


Figure 29 Bus-V: LADWP 500 kV:

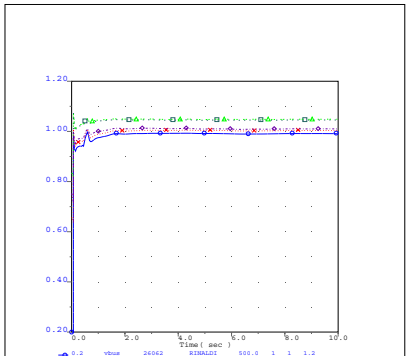


Figure 30 Bus-V:LADWP Load:

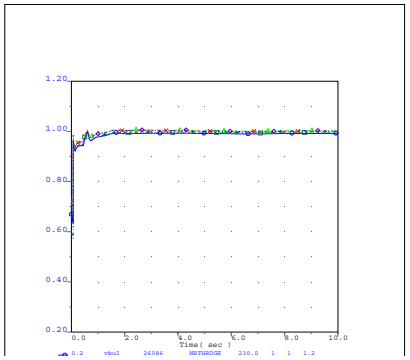


Figure 31 Bus-V: NW & S.CAL 500 kV

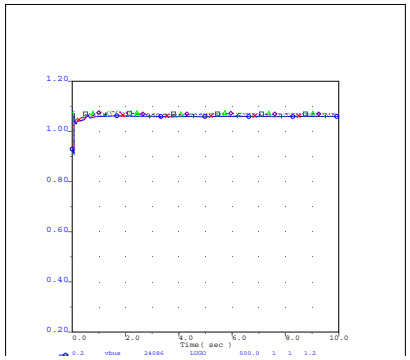


Figure 32 Bus-V: Others 500 kV

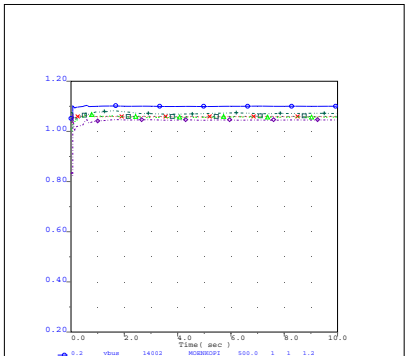


Figure 33 Bus-V: Others 230 kV

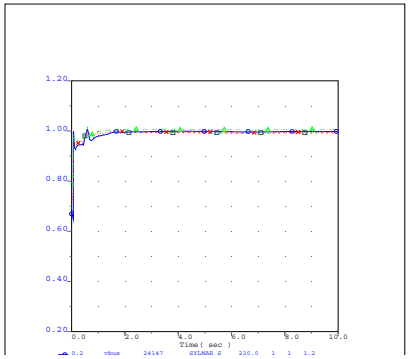


Figure 34 REL_RTR_ANG:S.Cal

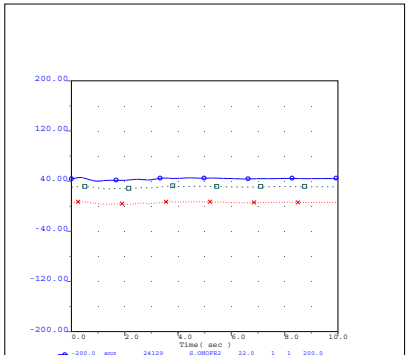


Figure 35 RELATIVE_ROTOR_ANGLE:S.Cal:

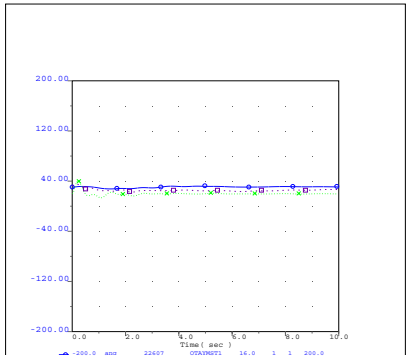
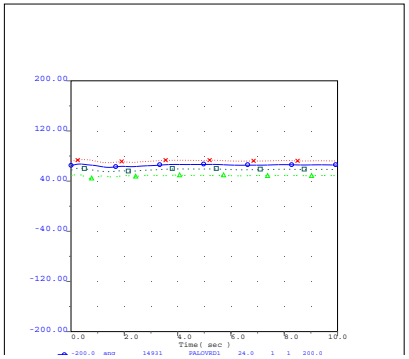


Figure 36 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Vict-Rinaldi-slo

Possible Violations: MORC 1[3]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[3] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 37 Bus-V:Owens Gorge/Rinaldi 230 kV

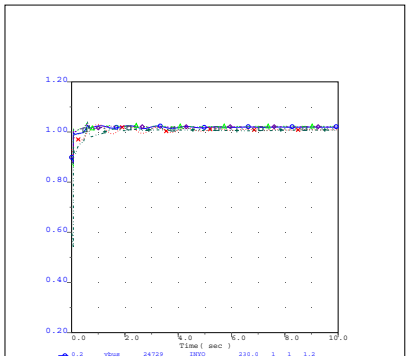


Figure 38 Bus-V:SCE North 115 kV

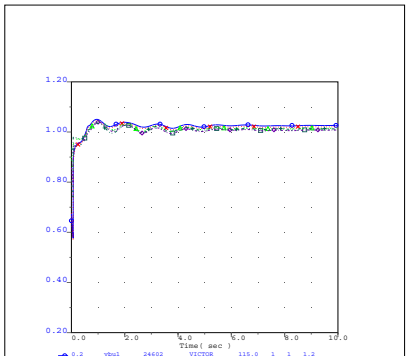


Figure 39 Bus-V:LA BASIN 230 & 138 kV

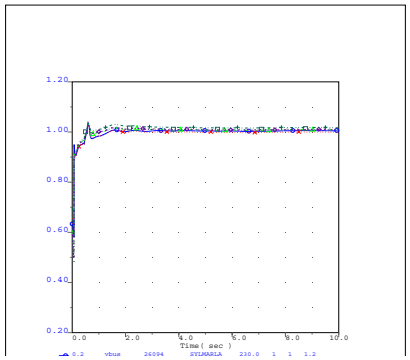


Figure 40 Bus-V:SCE 500 & 230 kV

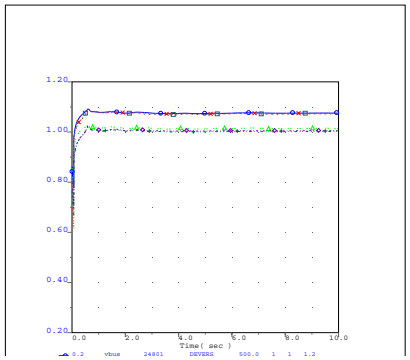


Figure 41 Bus-V: LADWP 500 kV:

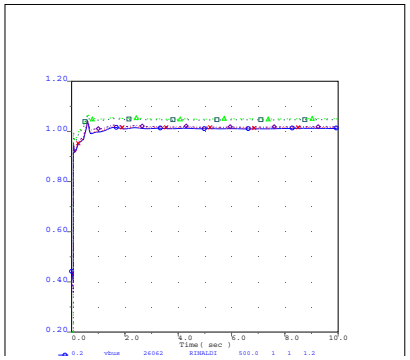


Figure 42 Bus-V:LADWP Load:

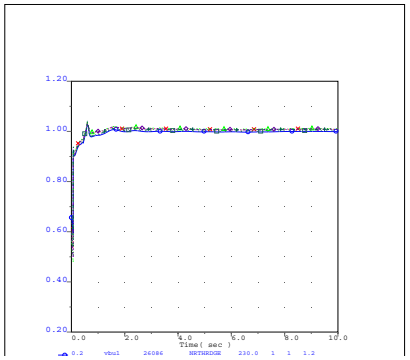


Figure 43 Bus-V: NW & S.CAL 500 kV

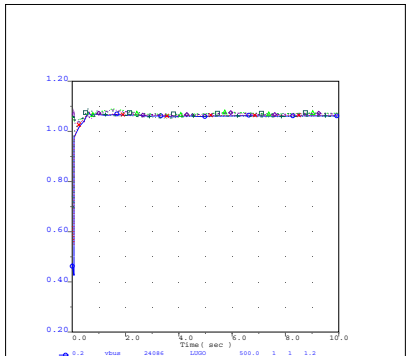


Figure 44 Bus-V: Others 500 kV

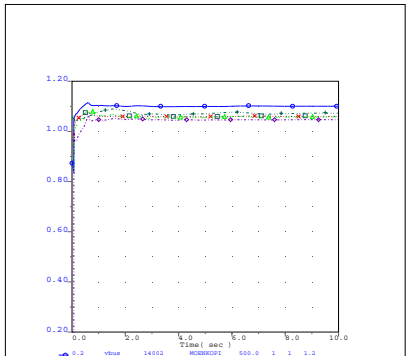


Figure 45 Bus-V: Others 230 kV

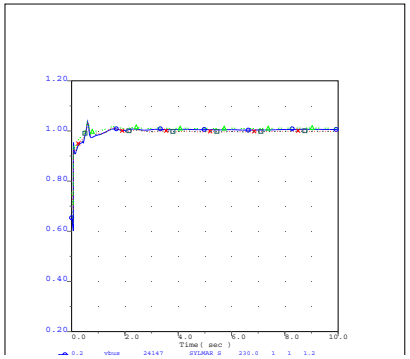


Figure 46 REL_RTR_ANG:S.Cal

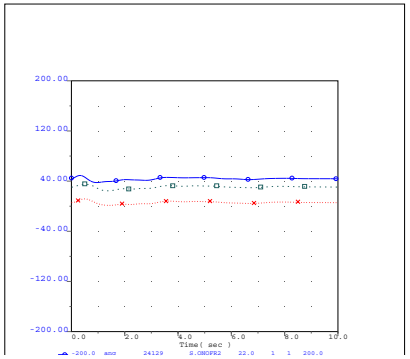


Figure 47 RELATIVE_ROTOR_ANGLE:S.Cal:

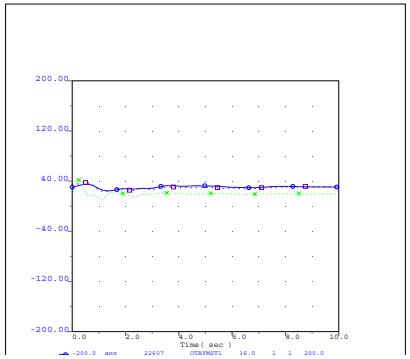
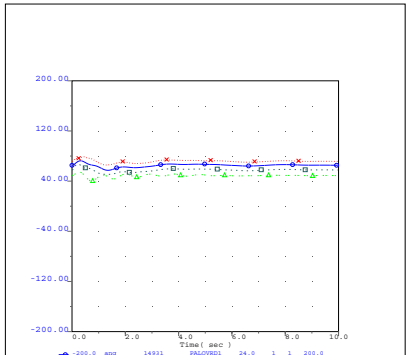


Figure 48 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Adel-Victorvl-slo

Possible Violations: MORC 1[4]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[4] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 49 Bus-V:Owens Gorge/Rinaldi 230 kV

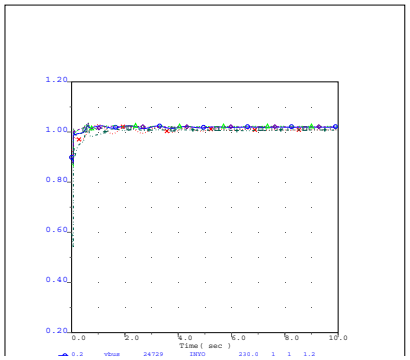


Figure 50 Bus-V:SCE North 115 kV

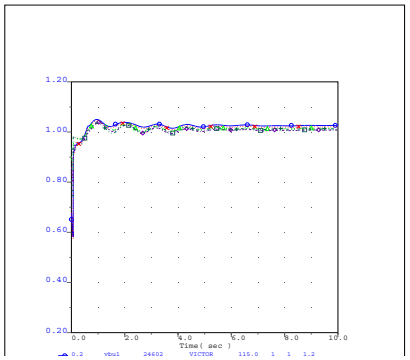


Figure 51 Bus-V:LA BASIN 230 & 138 kV

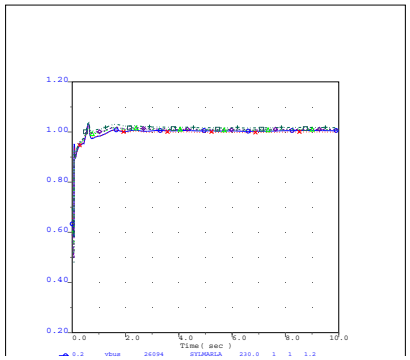


Figure 52 Bus-V:SCE 500 & 230 kV

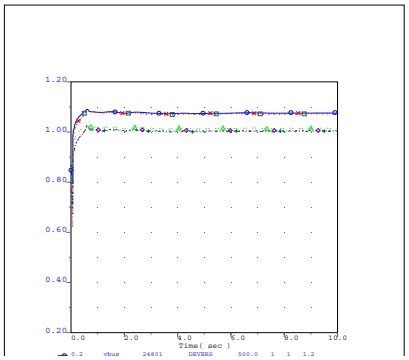


Figure 53 Bus-V: LADWP 500 kV:

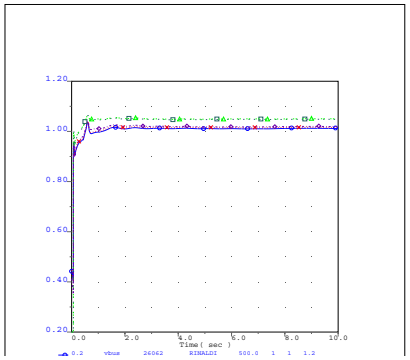


Figure 54 Bus-V:LADWP Load:

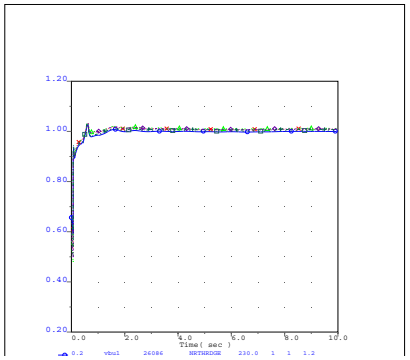


Figure 55 Bus-V: NW & S.CAL 500 kV

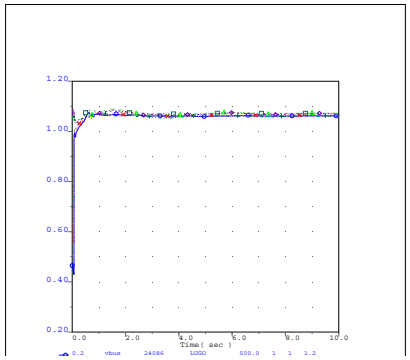


Figure 56 Bus-V: Others 500 kV

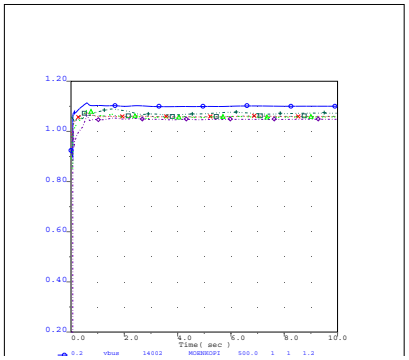


Figure 57 Bus-V: Others 230 kV

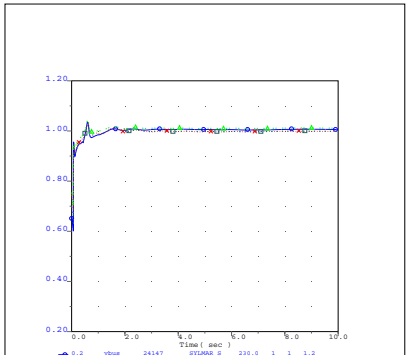


Figure 58 REL_RTR_ANG:S.Cal

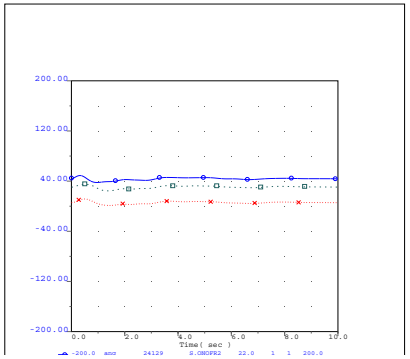


Figure 59 RELATIVE_ROTOR_ANGLE:S.Cal:

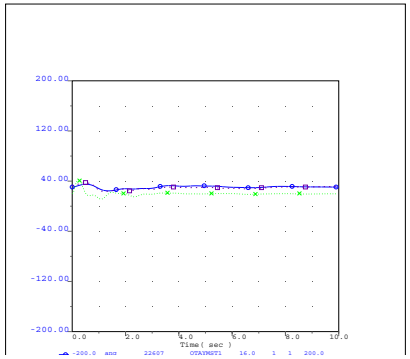
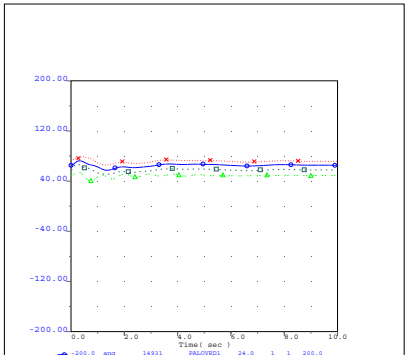


Figure 60 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: McC-Vict-slo

Possible Violations: MORC 1[5]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[5] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 61 Bus-V:Owens Gorge/Rinaldi 230 kV

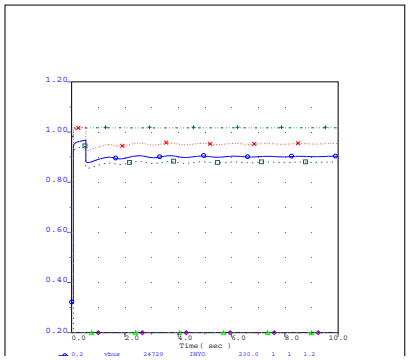


Figure 62 Bus-V:SCE North 115 kV

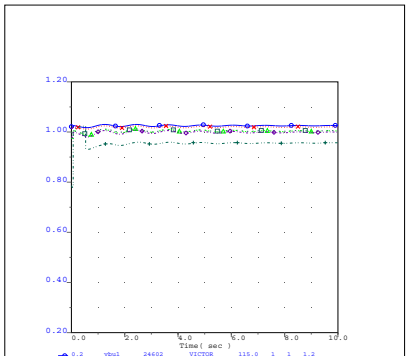


Figure 63 Bus-V:LA BASIN 230 & 138 kV

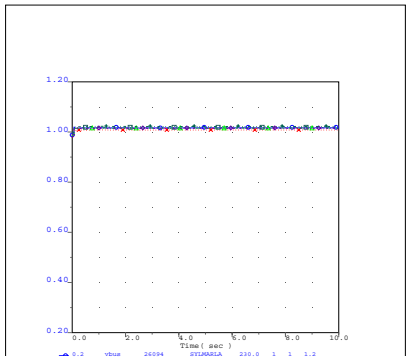


Figure 64 Bus-V:SCE 500 & 230 kV

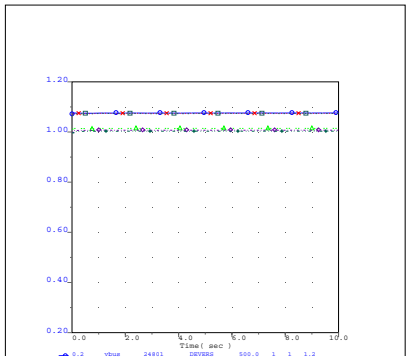


Figure 65 Bus-V: LADWP 500 kV:

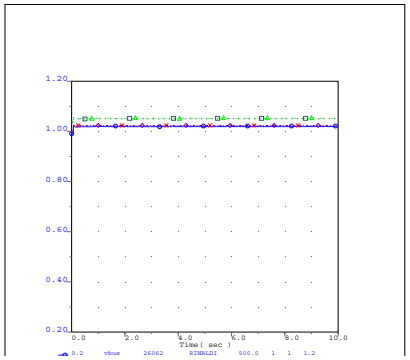


Figure 66 Bus-V:LADWP Load:

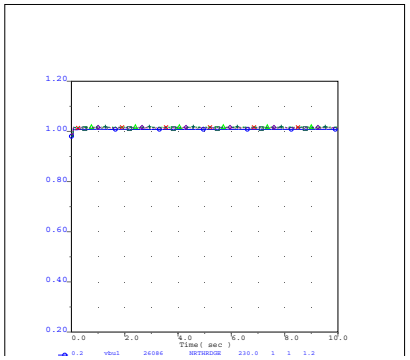


Figure 67 Bus-V: NW & S.CAL 500 kV

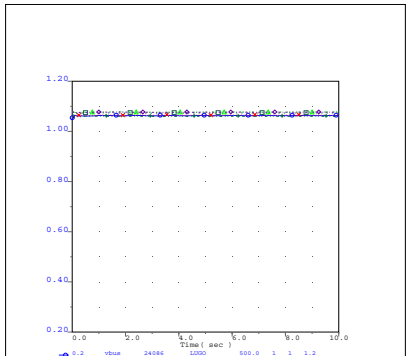


Figure 68 Bus-V: Others 500 kV

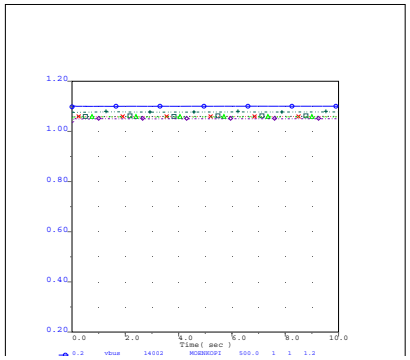


Figure 69 Bus-V: Others 230 kV

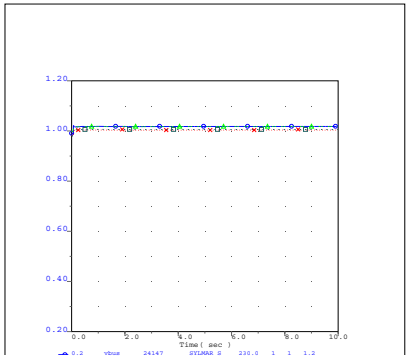


Figure 70 REL_RTR_ANG:S.Cal

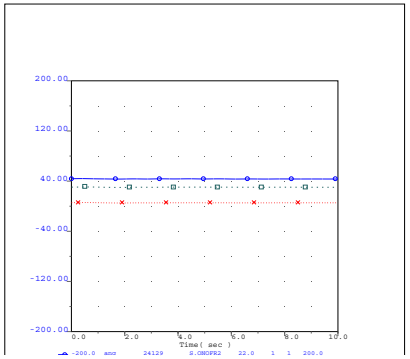


Figure 71 RELATIVE_ROTOR_ANGLE:S.Cal:

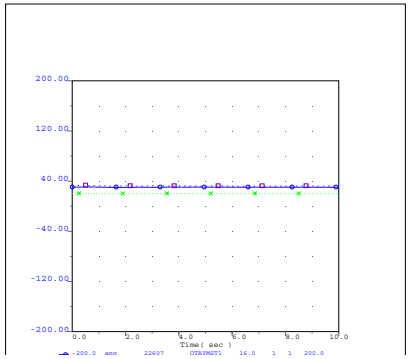
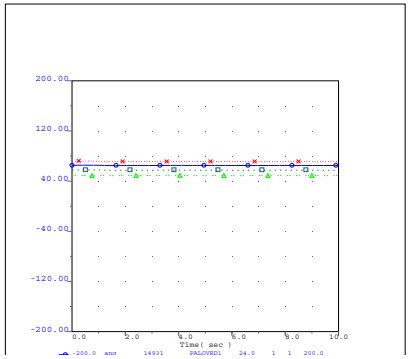


Figure 72 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: BR-Rinaldi-o2-RAS-wIY

Possible Violations: MORC 1[6]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[6] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 73 Bus-V:Owens Gorge/Rinaldi 230 kV

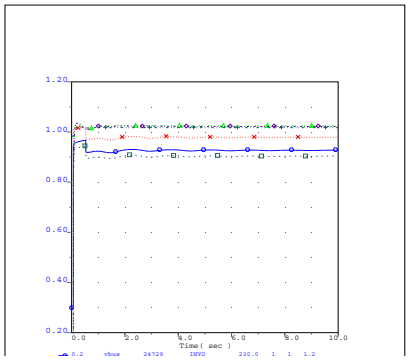


Figure 74 Bus-V:SCE North 115 kV

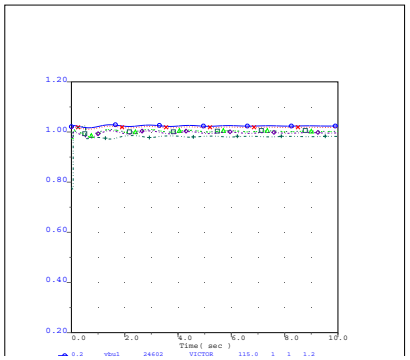


Figure 75 Bus-V:LA BASIN 230 & 138 kV

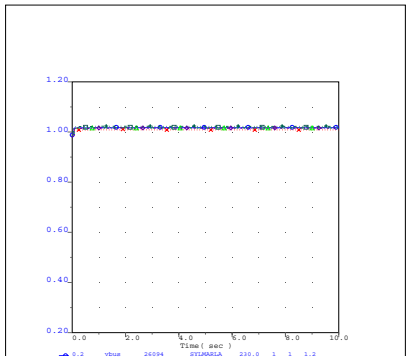


Figure 76 Bus-V:SCE 500 & 230 kV

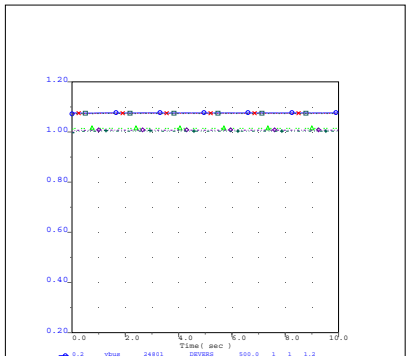


Figure 77 Bus-V: LADWP 500 kV:

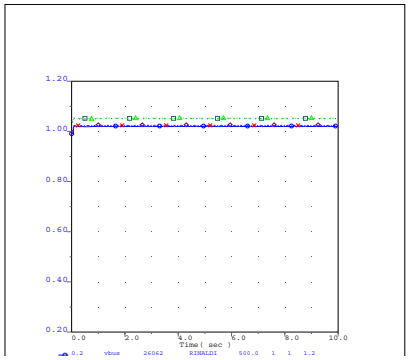


Figure 78 Bus-V:LADWP Load:

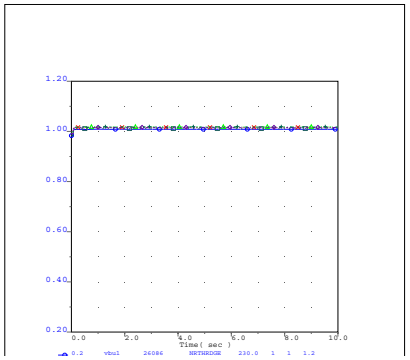


Figure 79 Bus-V: NW & S.CAL 500 kV

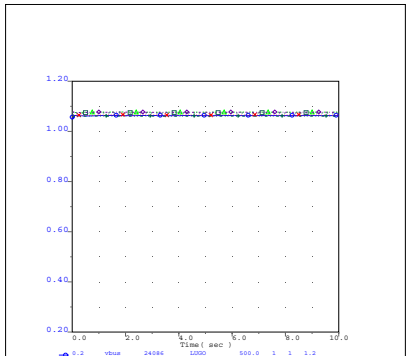


Figure 80 Bus-V: Others 500 kV

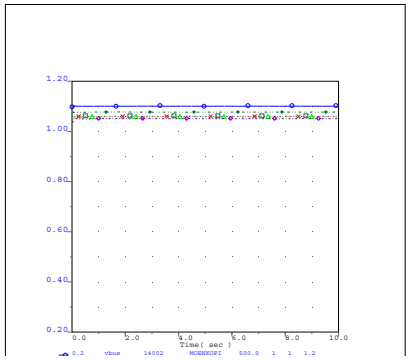


Figure 81 Bus-V: Others 230 kV

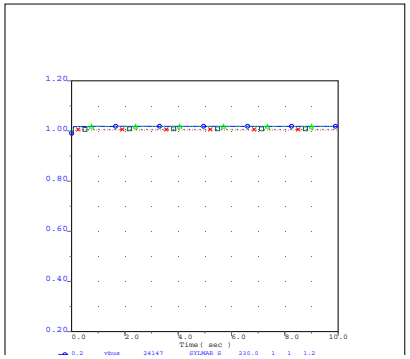


Figure 82 REL_RTR_ANG:S.Cal

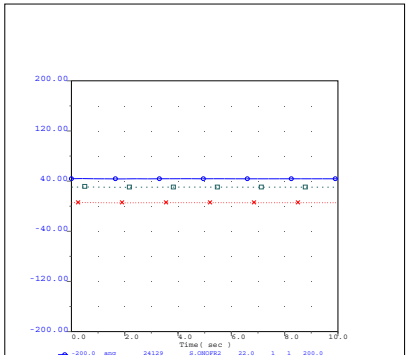


Figure 83 RELATIVE_ROTOR_ANGLE:S.Cal:

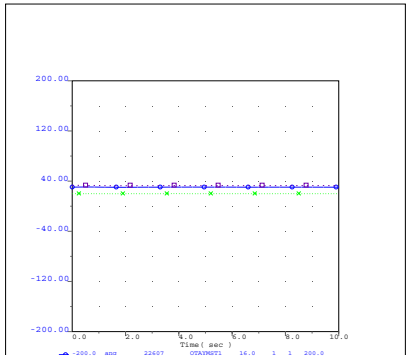
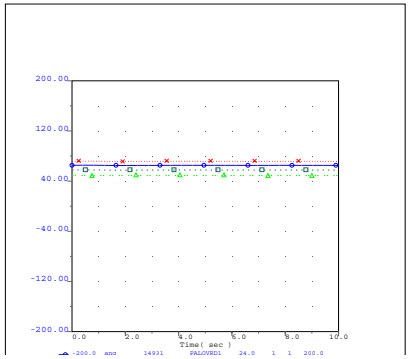


Figure 84 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Cottonwd-BTAP-o2-RAS

Possible Violations: MORC 1[7]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[7] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 85 Bus-V:Owens Gorge/Rinaldi 230 kV

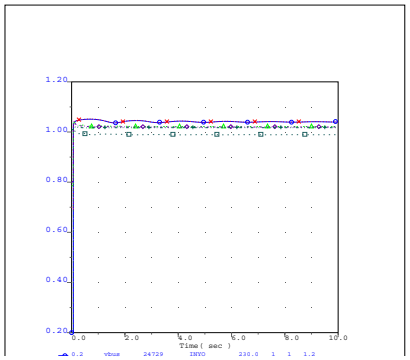


Figure 86 Bus-V:SCE North 115 kV

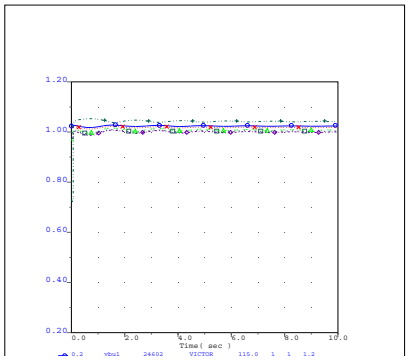


Figure 87 Bus-V:LA BASIN 230 & 138 kV

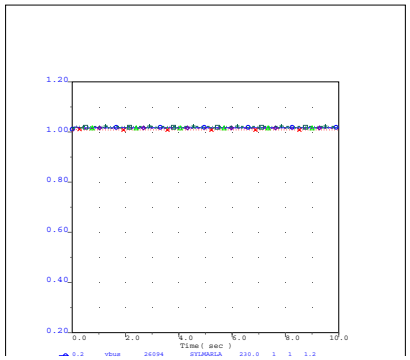


Figure 88 Bus-V:SCE 500 & 230 kV

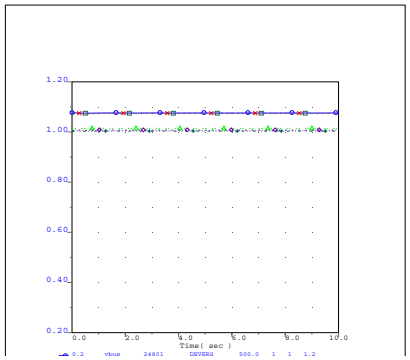


Figure 89 Bus-V: LADWP 500 kV:

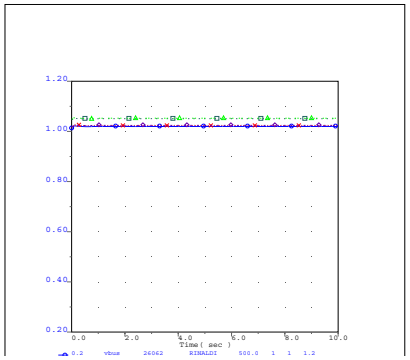


Figure 90 Bus-V:LADWP Load:

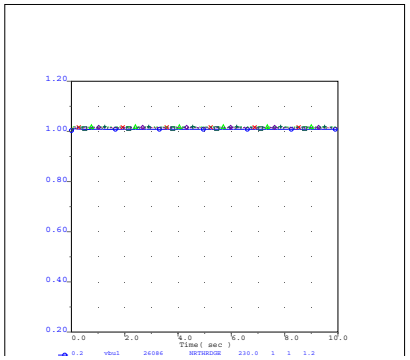


Figure 91 Bus-V: NW & S.CAL 500 kV

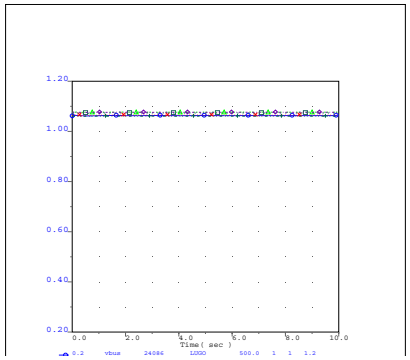


Figure 92 Bus-V: Others 500 kV

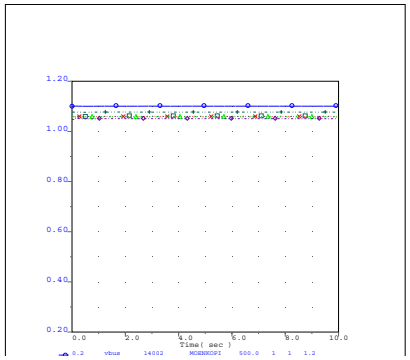


Figure 93 Bus-V: Others 230 kV

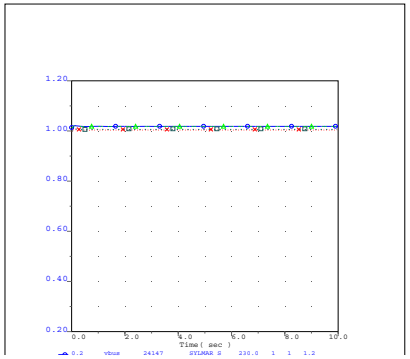


Figure 94 REL_RTR_ANG:S.Cal

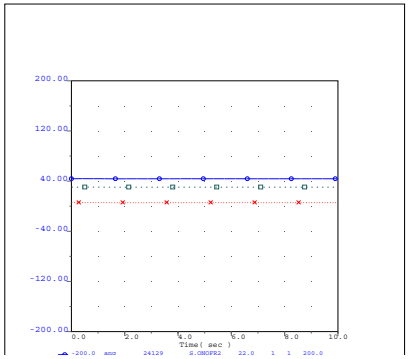


Figure 95 RELATIVE_ROTOR_ANGLE:S.Cal:

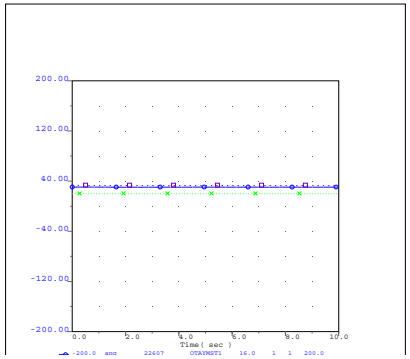
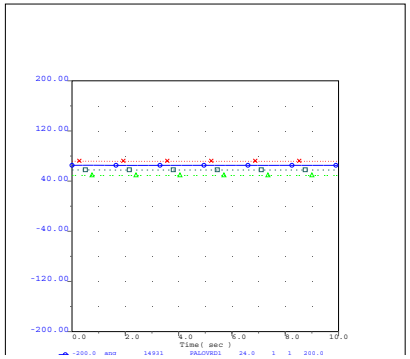


Figure 96 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Cottonwd-Inyo-preRAS

Possible Violations: MORC 1[8]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: 14, >10%: 12

[8] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 97 Bus-V:Owens Gorge/Rinaldi 230 kV

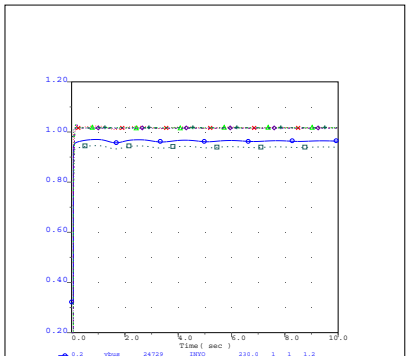


Figure 98 Bus-V:SCE North 115 kV

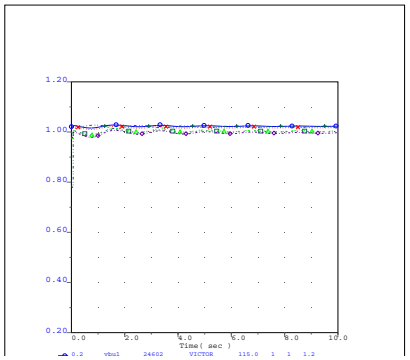


Figure 99 Bus-V:LA BASIN 230 & 138 kV

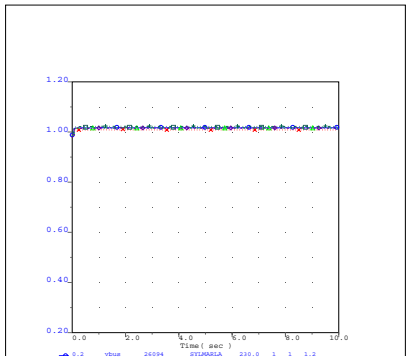


Figure 100 Bus-V:SCE 500 & 230 kV

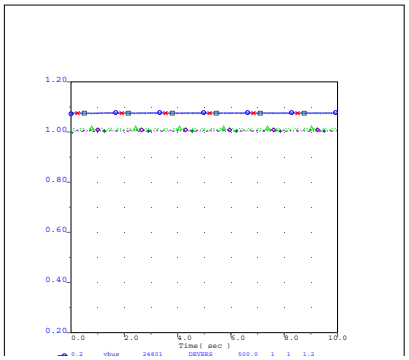


Figure 101 Bus-V: LADWP 500 kV:

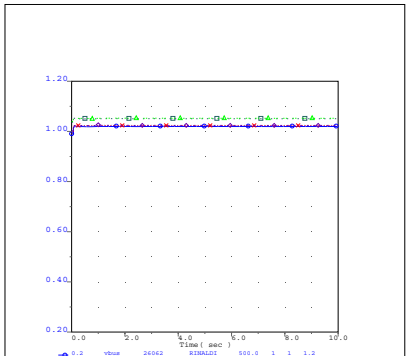


Figure 102 Bus-V:LADWP Load:

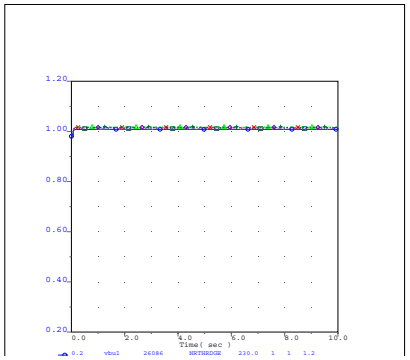


Figure 103 Bus-V: NW & S.CAL 500 kV

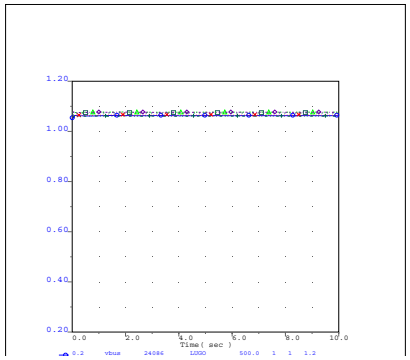


Figure 104 Bus-V: Others 500 kV

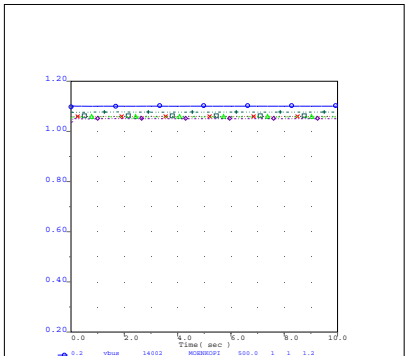


Figure 105 Bus-V: Others 230 kV

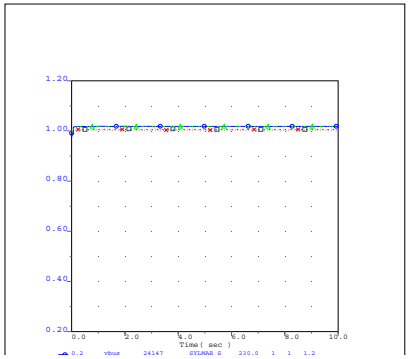


Figure 106 REL_RTR_ANG:S.Cal

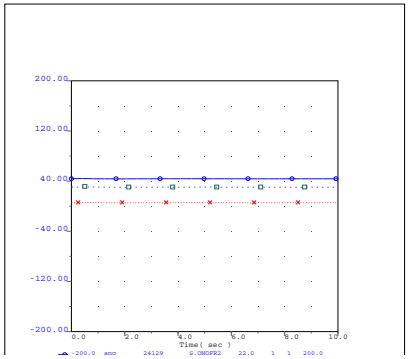


Figure 107 RELATIVE_ROTOR_ANGLE:S.Cal:

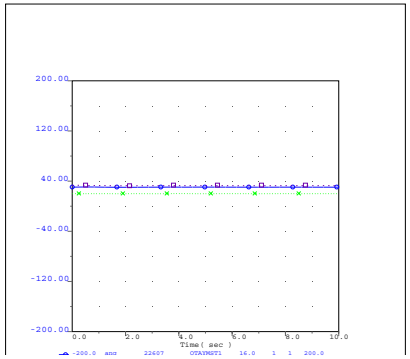
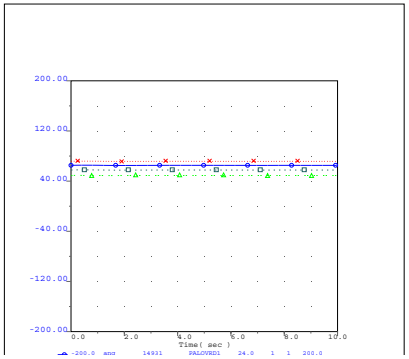


Figure 108 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: BTAP-BR-preRAS

Possible Violations: MORC 1[9]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[9] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 109 Bus-V:Owens Gorge/Rinaldi 230 kV

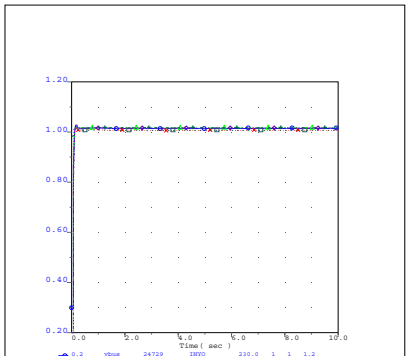


Figure 110 Bus-V:SCE North 115 kV

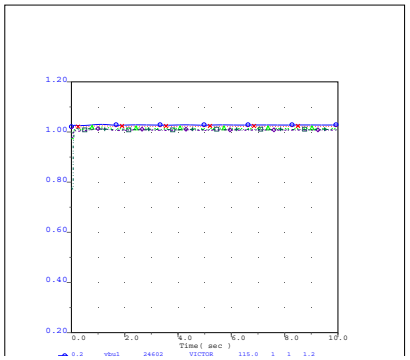


Figure 111 Bus-V:LA BASIN 230 & 138 kV

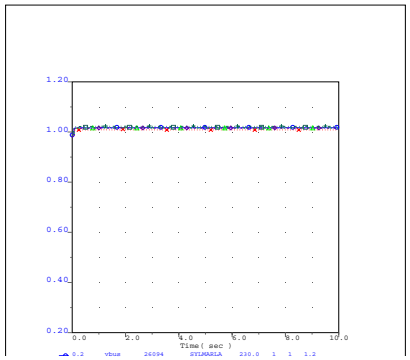


Figure 112 Bus-V:SCE 500 & 230 kV

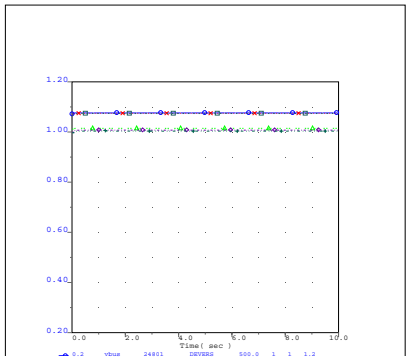


Figure 113 Bus-V: LADWP 500 kV:

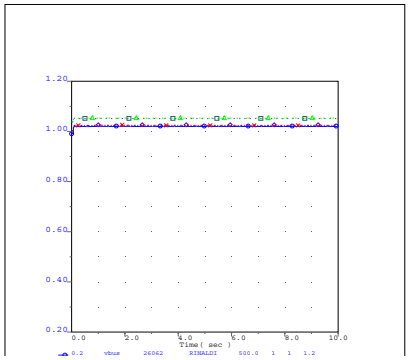


Figure 114 Bus-V:LADWP Load:

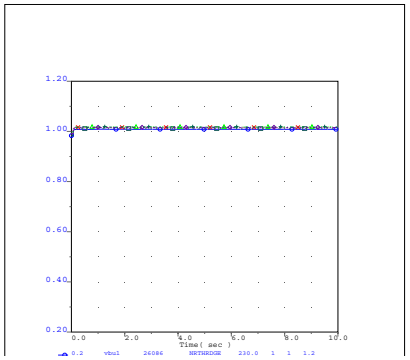


Figure 115 Bus-V: NW & S.CAL 500 kV

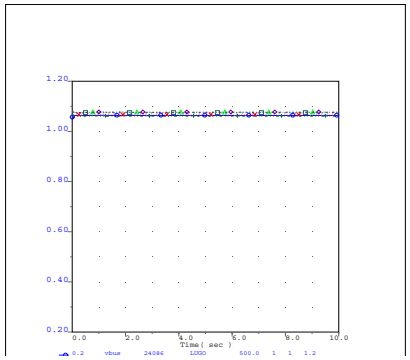


Figure 116 Bus-V: Others 500 kV

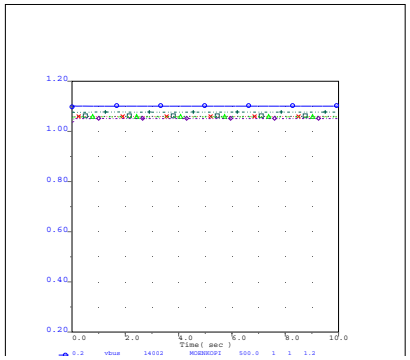


Figure 117 Bus-V: Others 230 kV

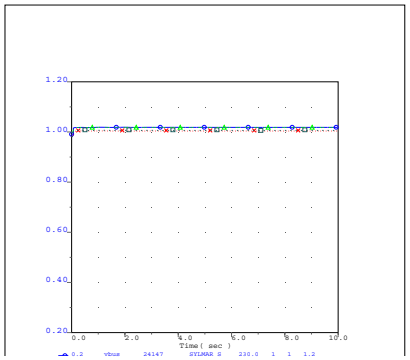


Figure 118 REL_RTR_ANG:S.Cal

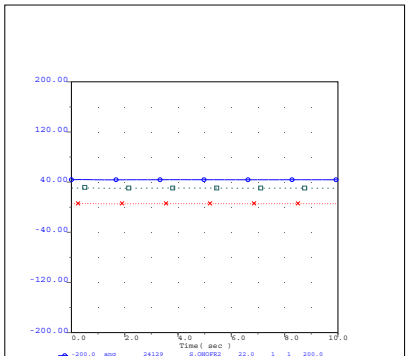


Figure 119 RELATIVE_ROTOR_ANGLE:S.Cal:

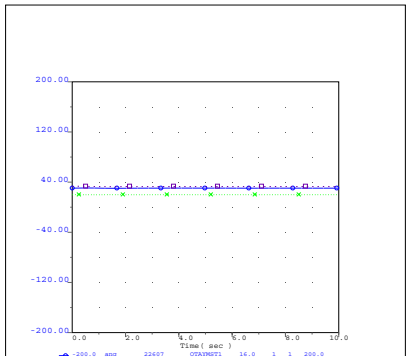
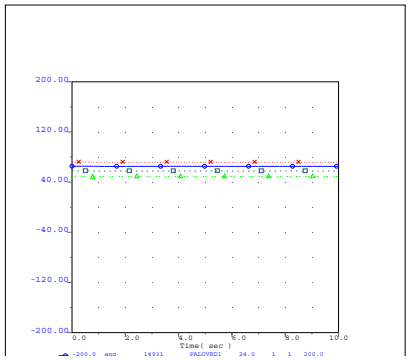


Figure 120 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Beacon-BTAP-RAS

Possible Violations: MORC 1[10]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[10] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 121 Bus-V:Owens Gorge/Rinaldi 230 kV

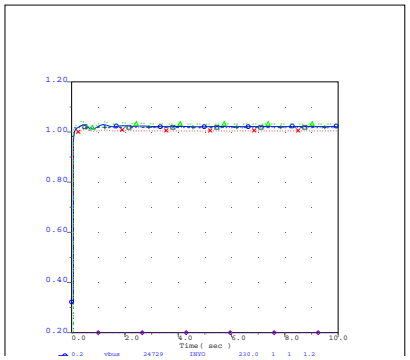


Figure 122 Bus-V:SCE North 115 kV

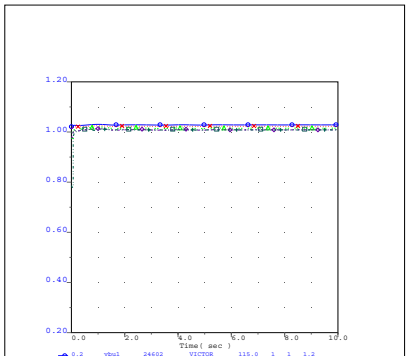


Figure 123 Bus-V:LA BASIN 230 & 138 kV

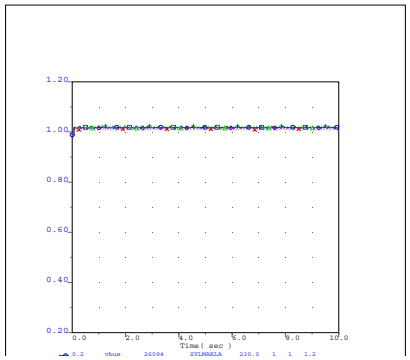


Figure 124 Bus-V:SCE 500 & 230 kV

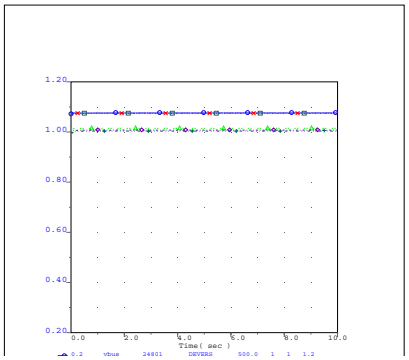


Figure 125 Bus-V: LADWP 500 kV:

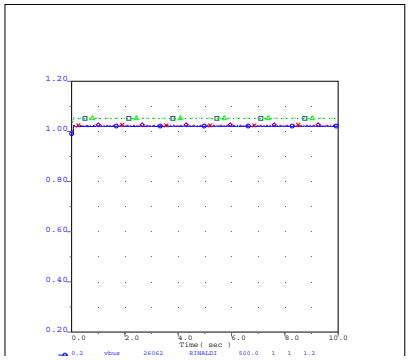


Figure 126 Bus-V:LADWP Load:

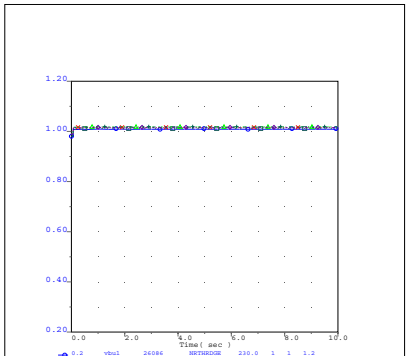


Figure 127 Bus-V: NW & S.CAL 500 kV

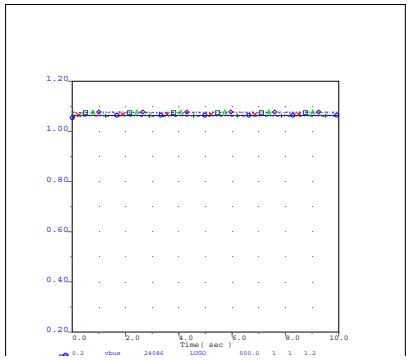


Figure 128 Bus-V: Others 500 kV

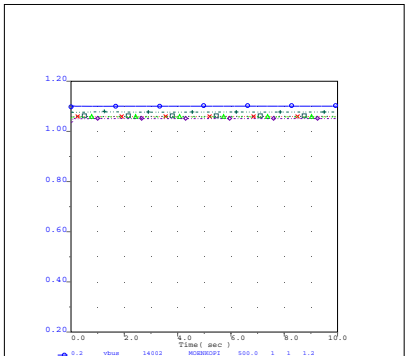


Figure 129 Bus-V: Others 230 kV

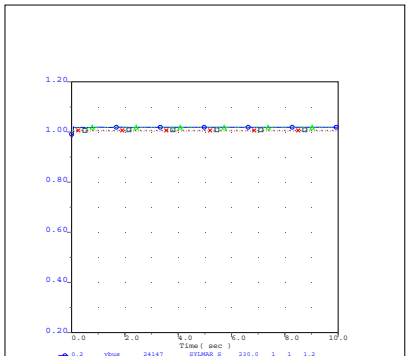


Figure 130 REL_RTR_ANG:S.Cal

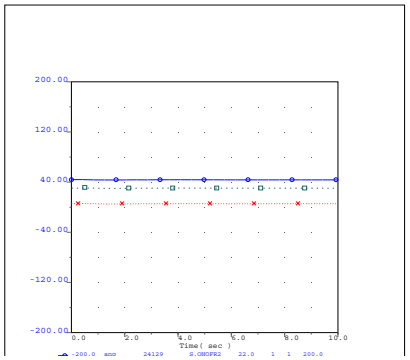


Figure 131 RELATIVE_ROTOR_ANGLE:S.Cal:

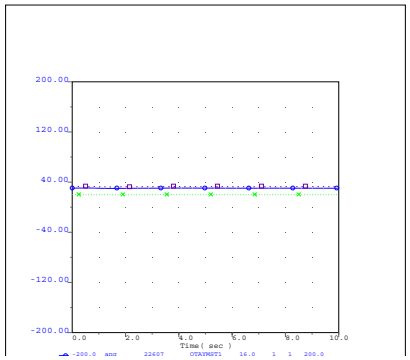
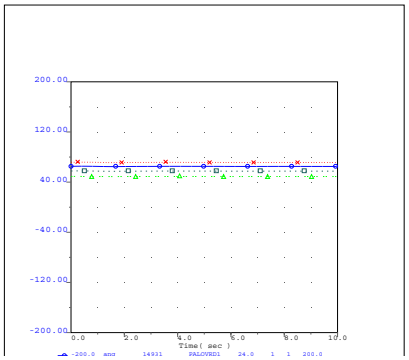


Figure 132 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Pinetree-BR-RAS

Possible Violations: MORC 1[11]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[11] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 133 Bus-V:Owens Gorge/Rinaldi 230 kV

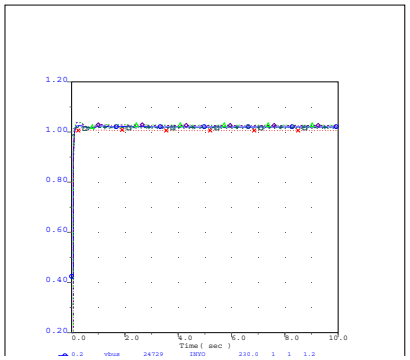


Figure 134 Bus-V:SCE North 115 kV

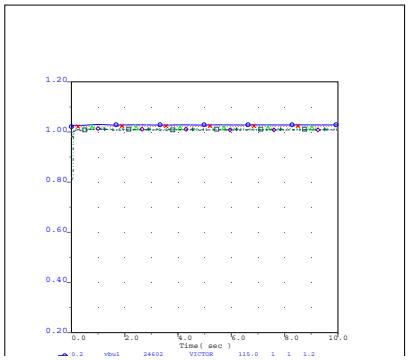


Figure 135 Bus-V:LA BASIN 230 & 138 kV

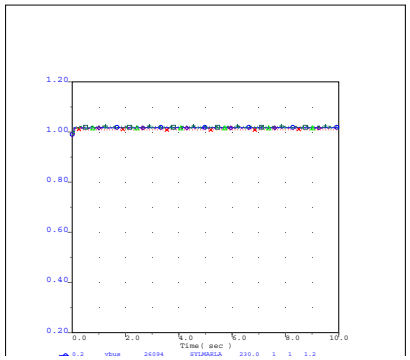


Figure 136 Bus-V:SCE 500 & 230 kV

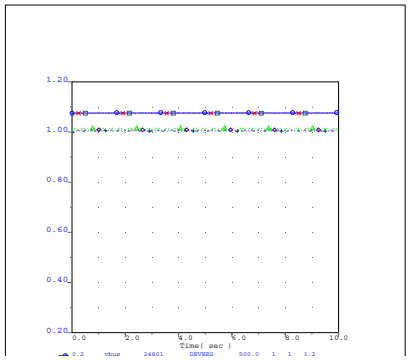


Figure 137 Bus-V: LADWP 500 kV:

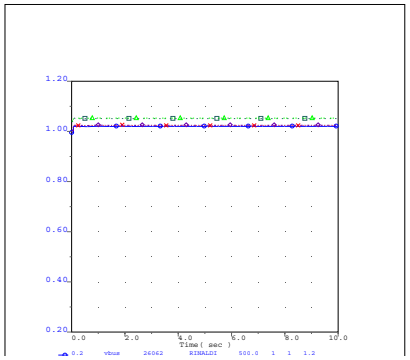


Figure 138 Bus-V:LADWP Load:

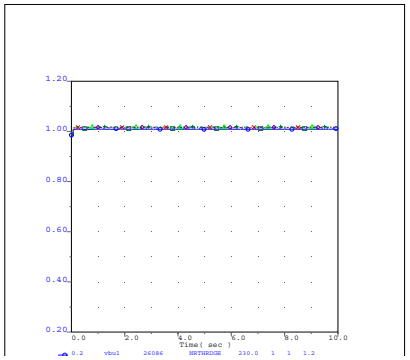


Figure 139 Bus-V: NW & S.CAL 500 kV

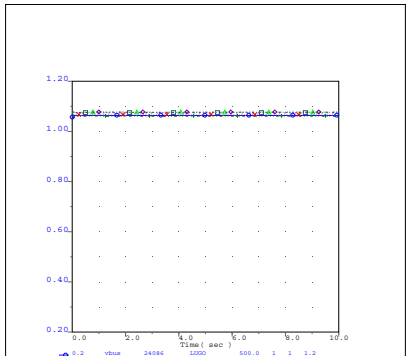


Figure 140 Bus-V: Others 500 kV

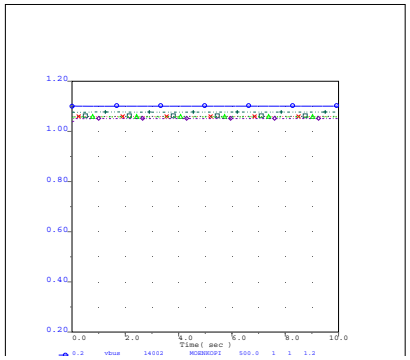


Figure 141 Bus-V: Others 230 kV

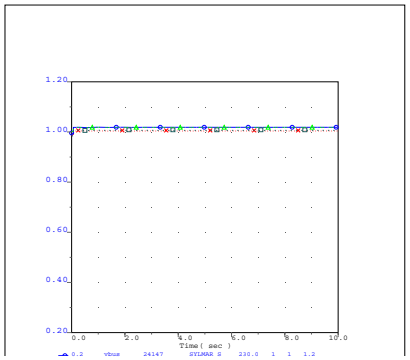


Figure 142 REL_RTR_ANG:S.Cal

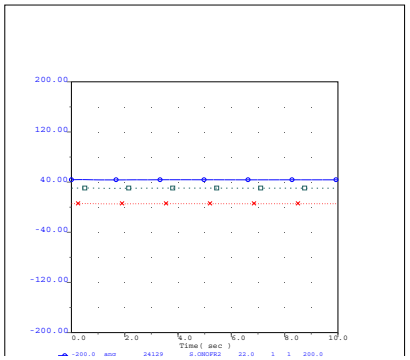


Figure 143 RELATIVE_ROTOR_ANGLE:S.Cal:

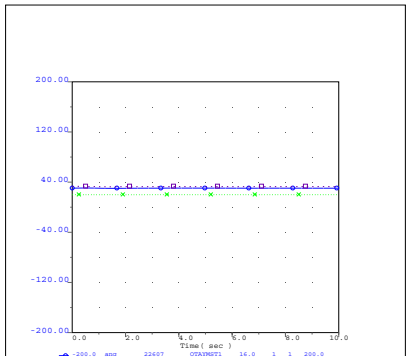
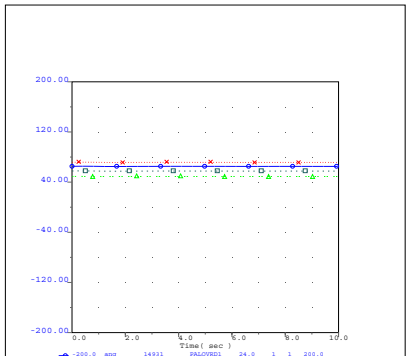


Figure 144 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: HoffmanSummit-Pinetree-RAS

Possible Violations: MORC 1[12]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[12] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 145 Bus-V:Owens Gorge/Rinaldi 230 kV

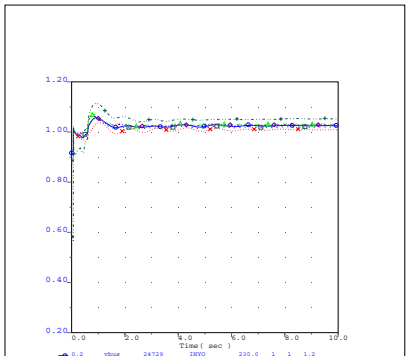


Figure 146 Bus-V:SCE North 115 kV

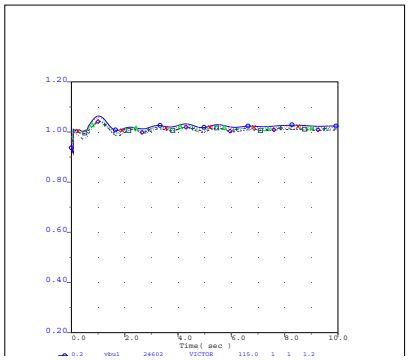


Figure 147 Bus-V:LA BASIN 230 & 138 kV

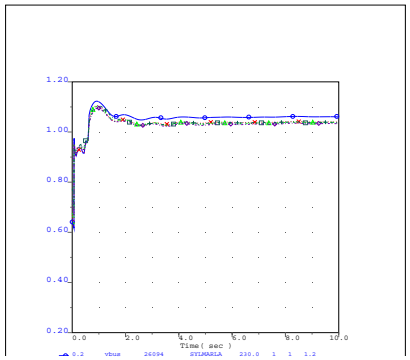


Figure 148 Bus-V:SCE 500 & 230 kV

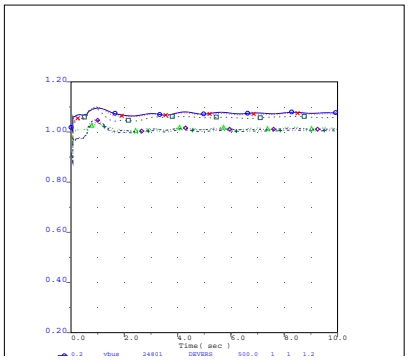


Figure 149 Bus-V: LADWP 500 kV:

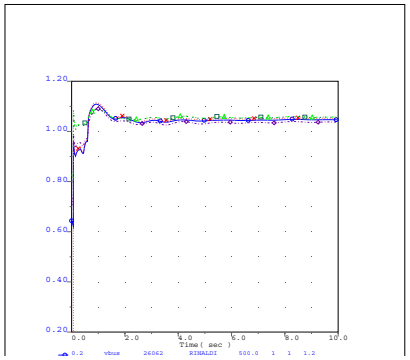


Figure 150 Bus-V:LADWP Load:

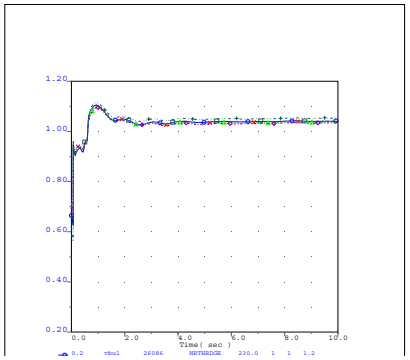


Figure 151 Bus-V: NW & S.CAL 500 kV

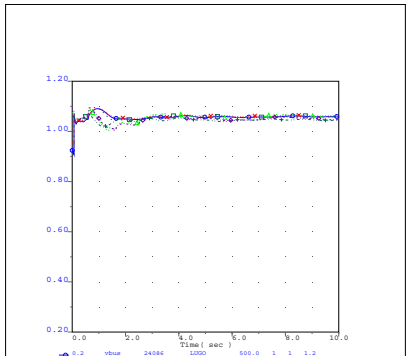


Figure 152 Bus-V: Others 500 kV

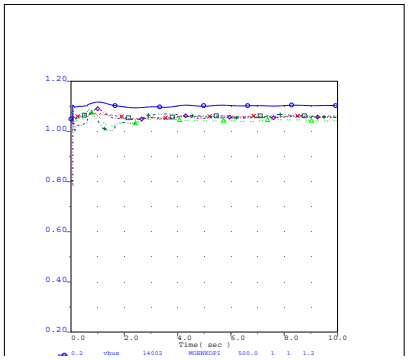


Figure 153 Bus-V: Others 230 kV

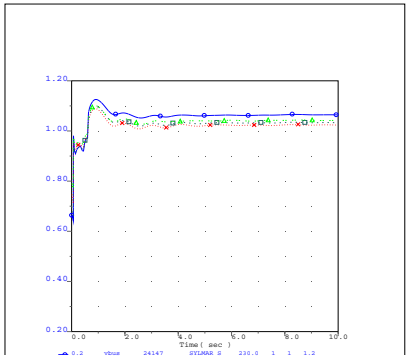


Figure 154 REL_RTR_ANG:S.Cal

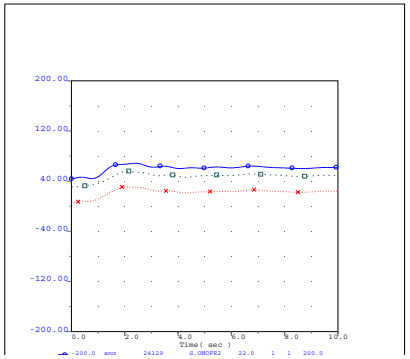


Figure 155 RELATIVE_ROTOR_ANGLE:S.Cal:

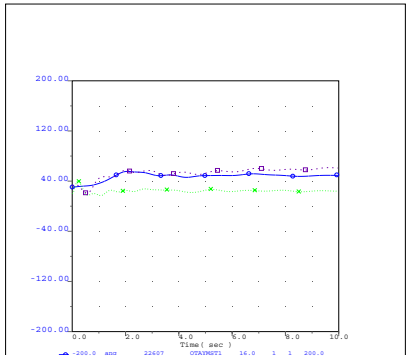
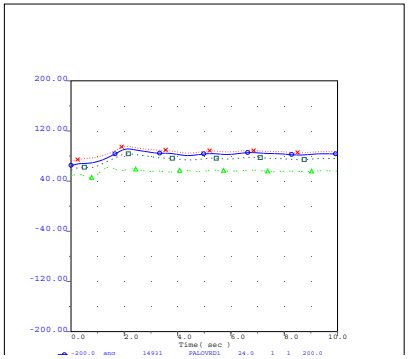


Figure 156 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Adel-Vict-Rinaldi-dlo

Possible Violations: MORC 1[13]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[13] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 157 Bus-V:Owens Gorge/Rinaldi 230 kV

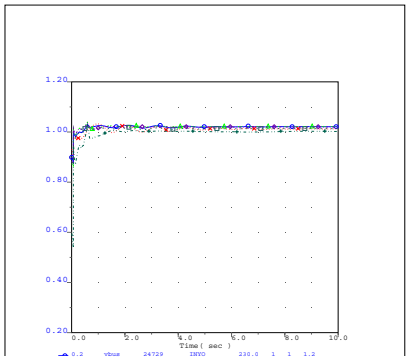


Figure 158 Bus-V:SCE North 115 kV

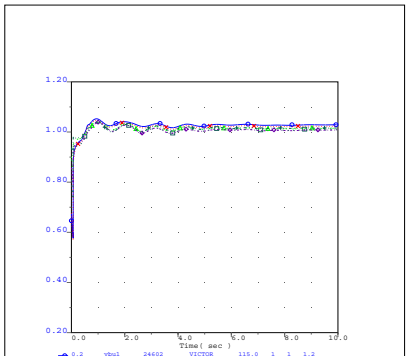


Figure 159 Bus-V:LA BASIN 230 & 138 kV

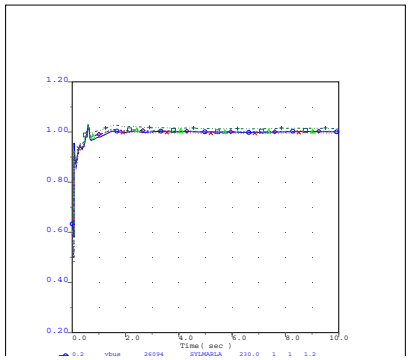


Figure 160 Bus-V:SCE 500 & 230 kV

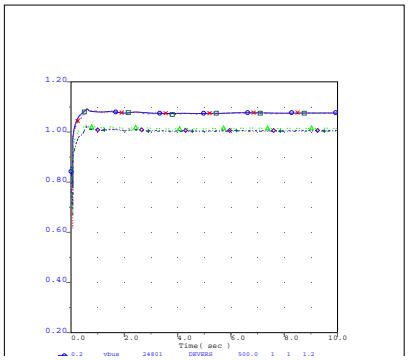


Figure 161 Bus-V: LADWP 500 kV:

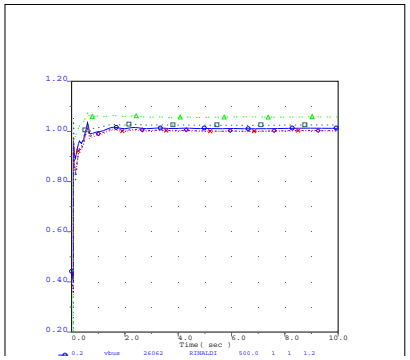


Figure 162 Bus-V:LADWP Load:

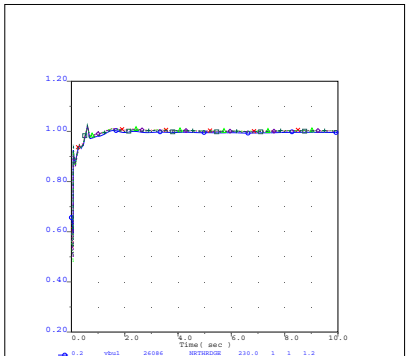


Figure 163 Bus-V: NW & S.CAL 500 kV

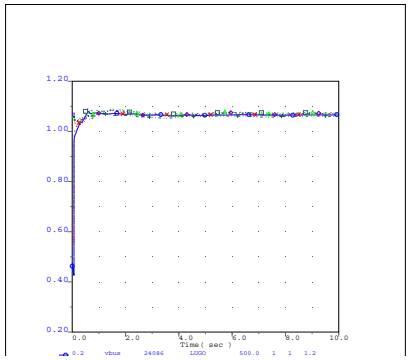


Figure 164 Bus-V: Others 500 kV

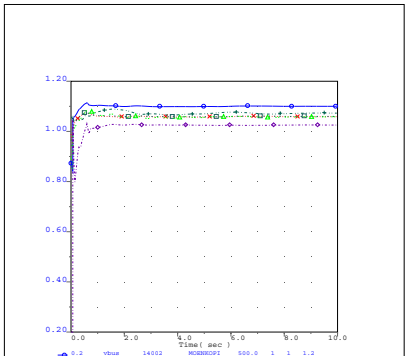


Figure 165 Bus-V: Others 230 kV

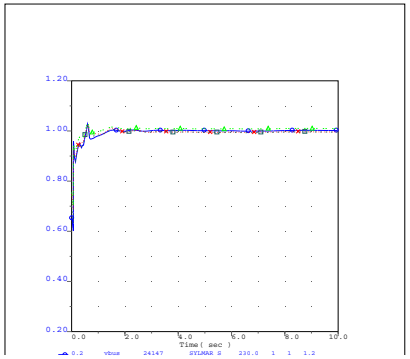


Figure 166 REL_RTR_ANG:S.Cal

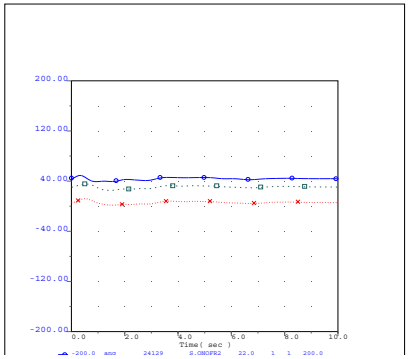


Figure 167 RELATIVE_ROTOR_ANGLE:S.Cal:

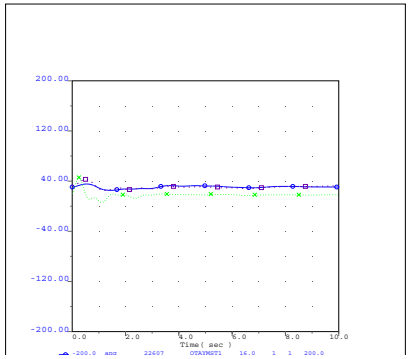
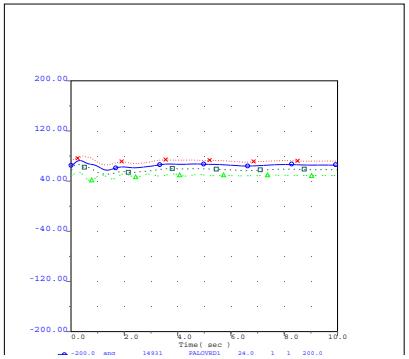


Figure 168 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Adel-Victorvl-dlo

Possible Violations: MORC 1[14]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[14] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 169 Bus-V:Owens Gorge/Rinaldi 230 kV

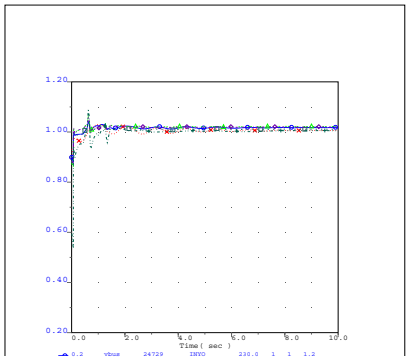


Figure 170 Bus-V:SCE North 115 kV

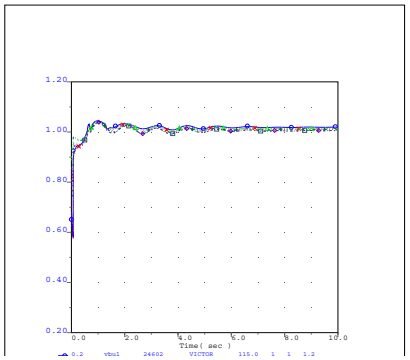


Figure 171 Bus-V:LA BASIN 230 & 138 kV

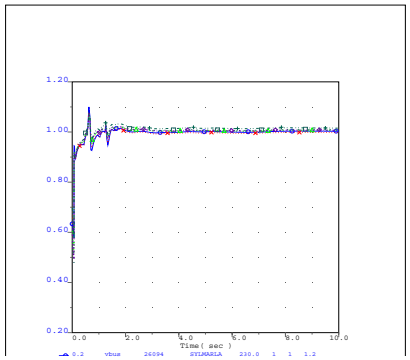


Figure 172 Bus-V:SCE 500 & 230 kV

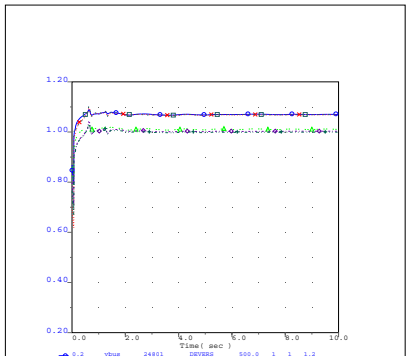


Figure 173 Bus-V: LADWP 500 kV:

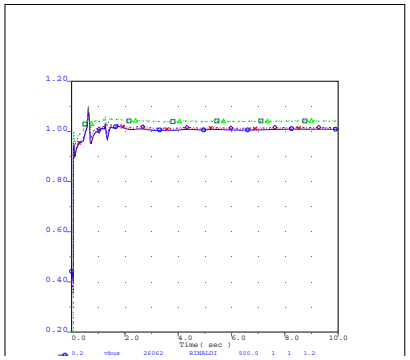


Figure 174 Bus-V:LADWP Load:

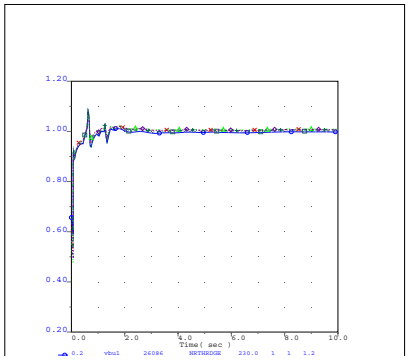


Figure 175 Bus-V: NW & S.CAL 500 kV

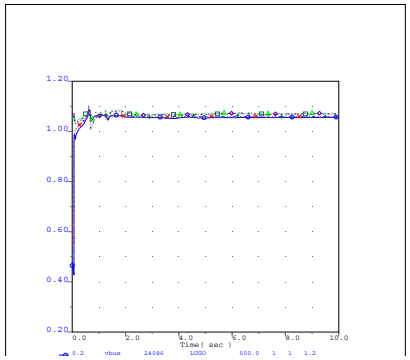


Figure 176 Bus-V: Others 500 kV

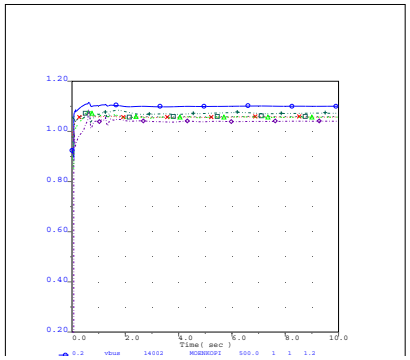


Figure 177 Bus-V: Others 230 kV

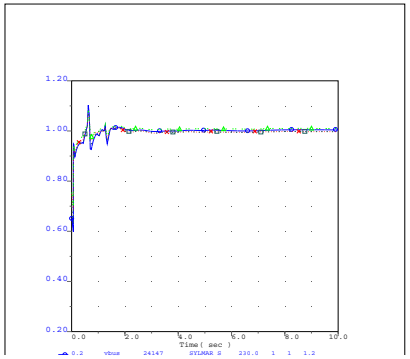


Figure 178 REL_RTR_ANG:S.Cal

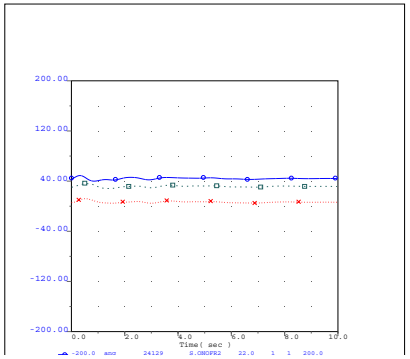


Figure 179 RELATIVE_ROTOR_ANGLE:S.Cal:

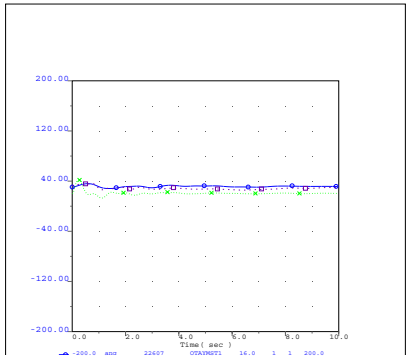
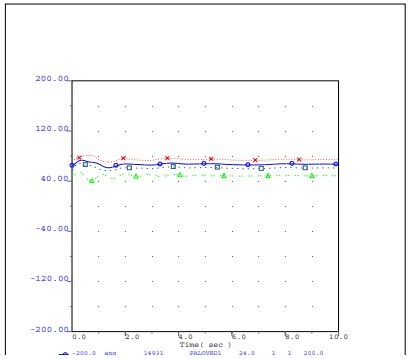


Figure 180 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: McCullgh-Victorvl-dlo

Possible Violations: MORC 1[15]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[15] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 181 Bus-V:Owens Gorge/Rinaldi 230 kV

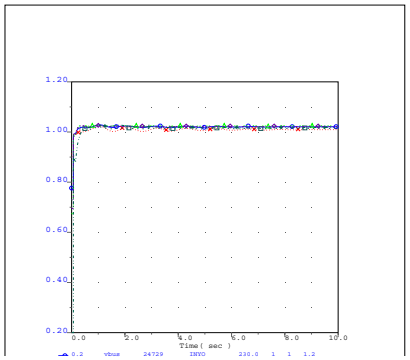


Figure 182 Bus-V:SCE North 115 kV

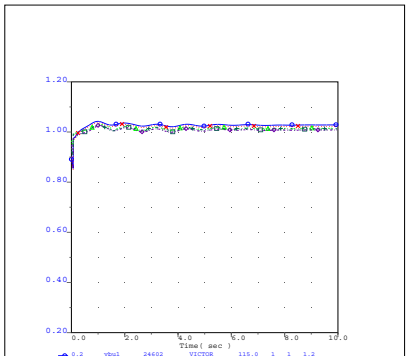


Figure 183 Bus-V:LA BASIN 230 & 138 kV

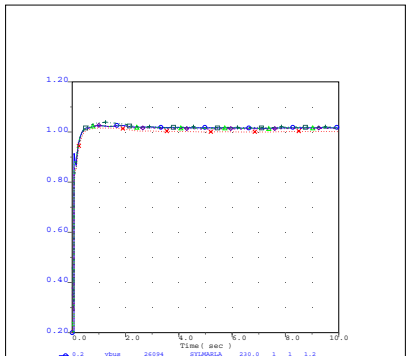


Figure 184 Bus-V:SCE 500 & 230 kV

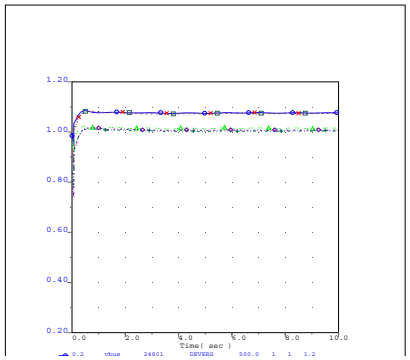


Figure 185 Bus-V: LADWP 500 kV:

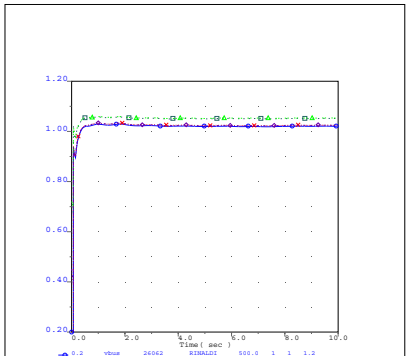


Figure 186 Bus-V:LADWP Load:

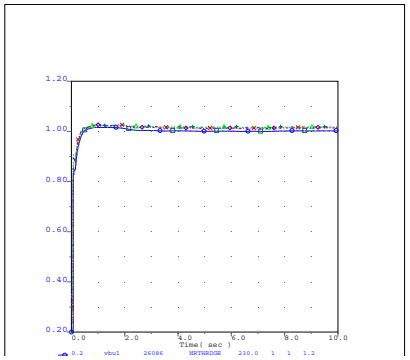


Figure 187 Bus-V: NW & S.CAL 500 kV

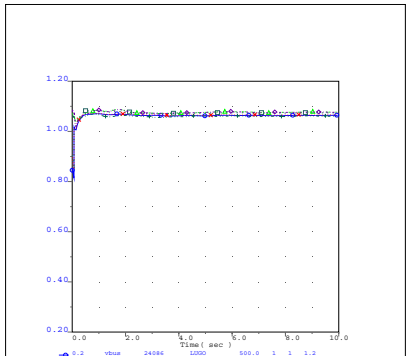


Figure 188 Bus-V: Others 500 kV

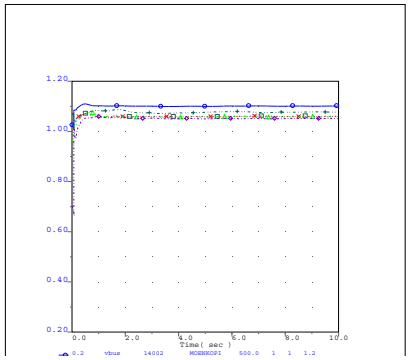


Figure 189 Bus-V: Others 230 kV

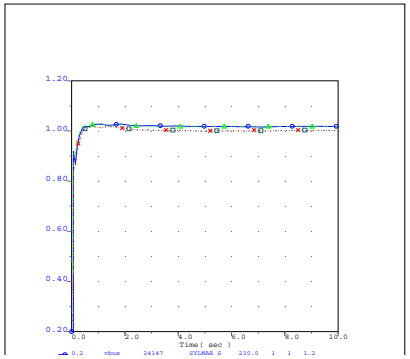


Figure 190 REL_RTR_ANG:S.Cal

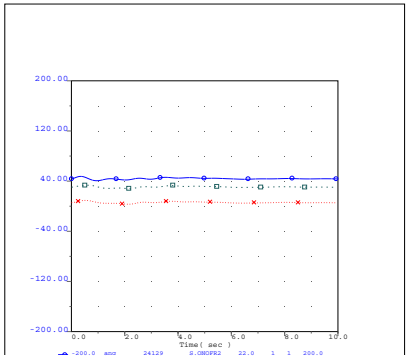


Figure 191 RELATIVE_ROTOR_ANGLE:S.Cal:

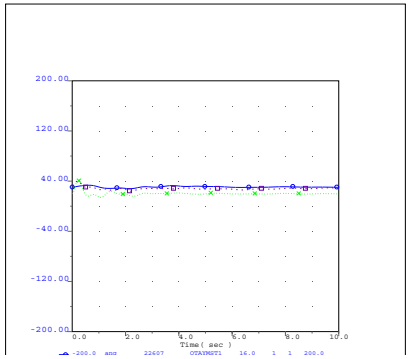
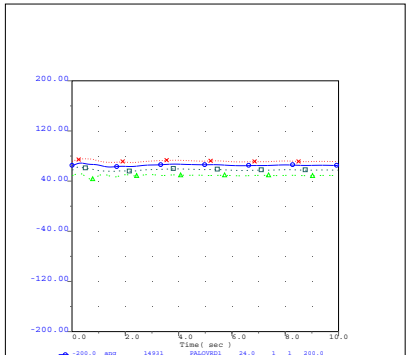


Figure 192 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Rin-Tar-dlo

Possible Violations: MORC 1[16]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[16] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 193 Bus-V:Owens Gorge/Rinaldi 230 kV

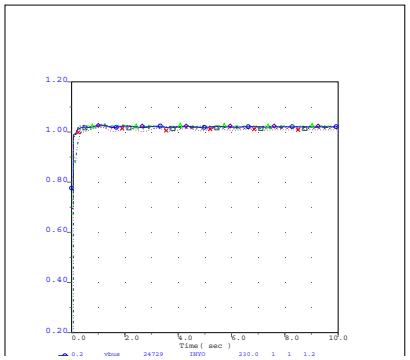


Figure 194 Bus-V:SCE North 115 kV

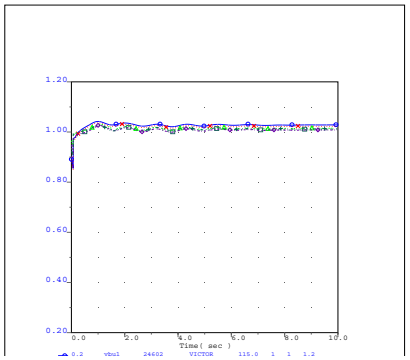


Figure 195 Bus-V:LA BASIN 230 & 138 kV

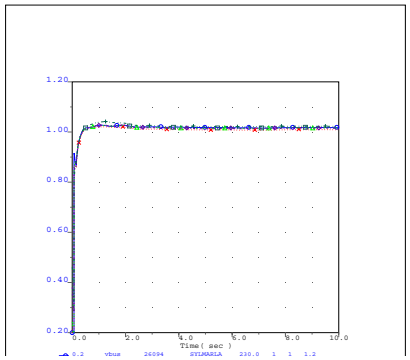


Figure 196 Bus-V:SCE 500 & 230 kV

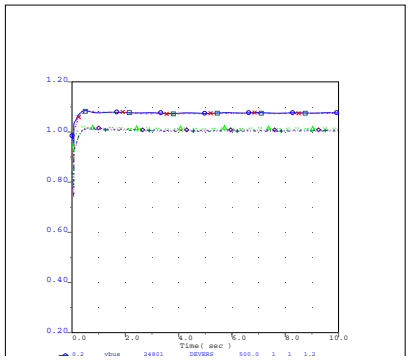


Figure 197 Bus-V: LADWP 500 kV:

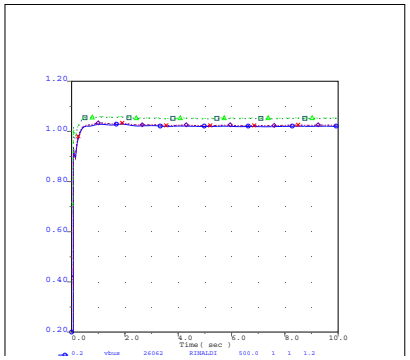


Figure 198 Bus-V:LADWP Load:

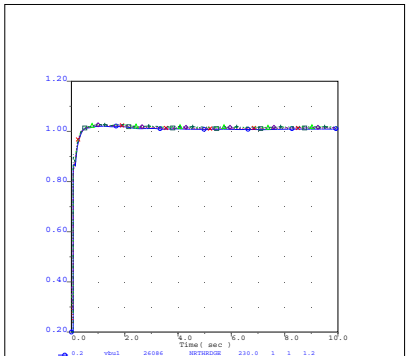


Figure 199 Bus-V: NW & S.CAL 500 kV

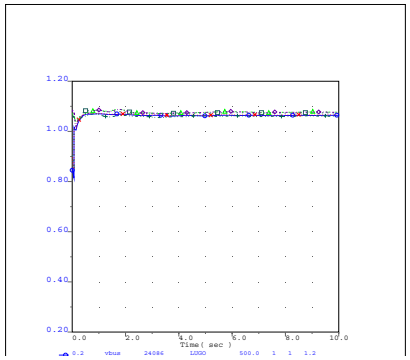


Figure 200 Bus-V: Others 500 kV

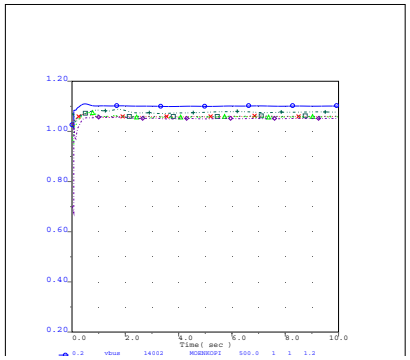


Figure 201 Bus-V: Others 230 kV

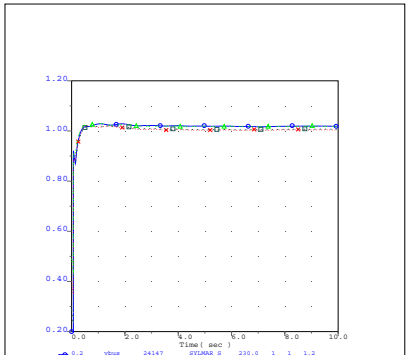


Figure 202 REL_RTR_ANG:S.Cal

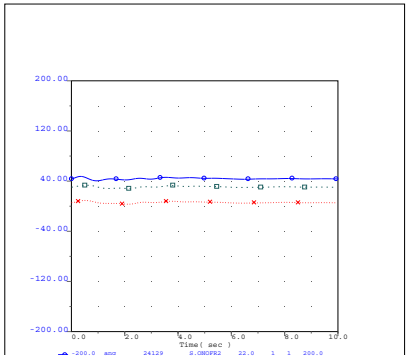


Figure 203 RELATIVE_ROTOR_ANGLE:S.Cal:

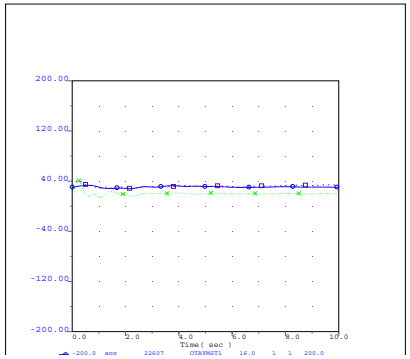
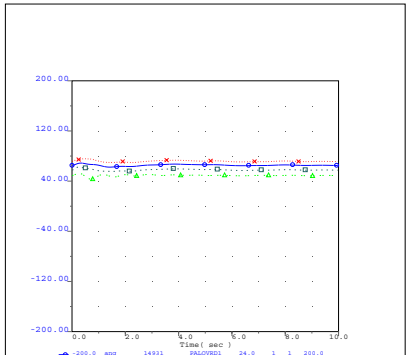


Figure 204 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Rin-Glendl-dlo

Possible Violations: MORC 1[17]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[17] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 205 Bus-V:Owens Gorge/Rinaldi 230 kV

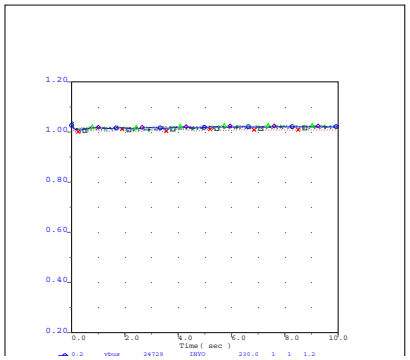


Figure 206 Bus-V:SCE North 115 kV

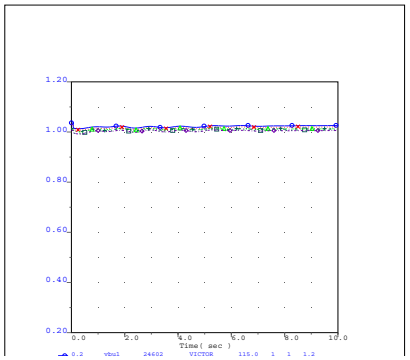


Figure 207 Bus-V:LA BASIN 230 & 138 kV

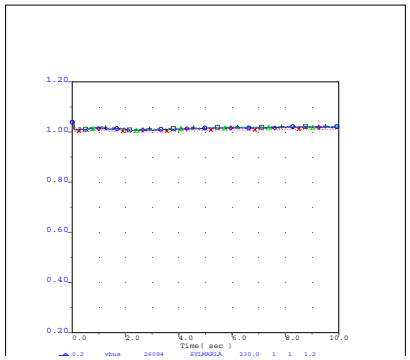


Figure 208 Bus-V:SCE 500 & 230 kV

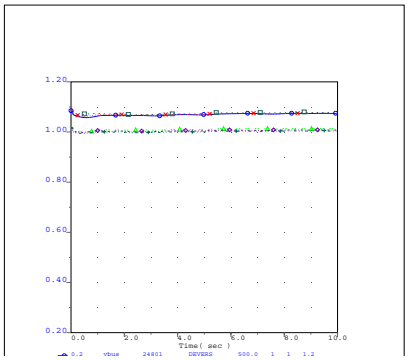


Figure 209 Bus-V: LADWP 500 kV:

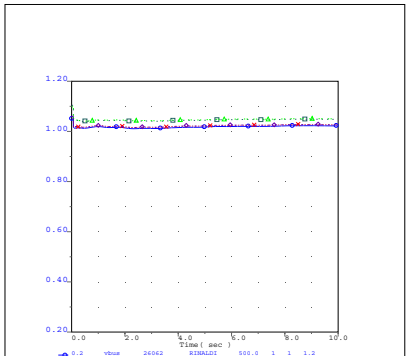


Figure 210 Bus-V:LADWP Load:

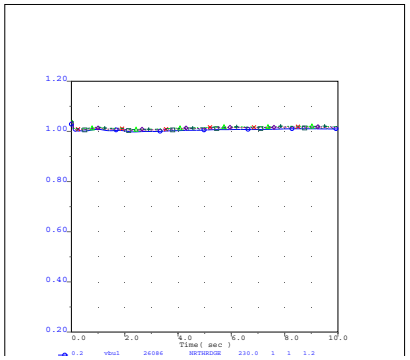


Figure 211 Bus-V: NW & S.CAL 500 kV

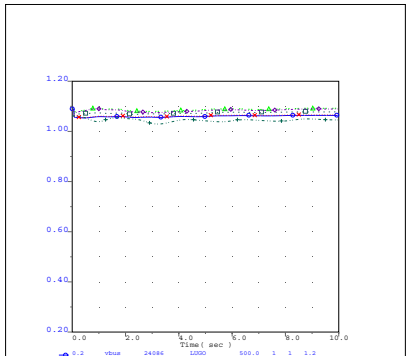


Figure 212 Bus-V: Others 500 kV

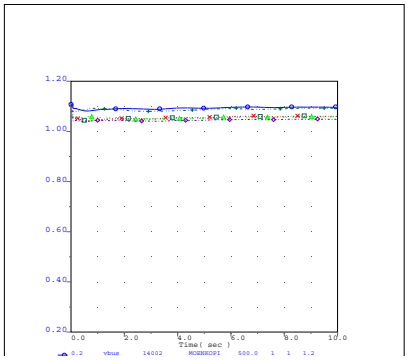


Figure 213 Bus-V: Others 230 kV

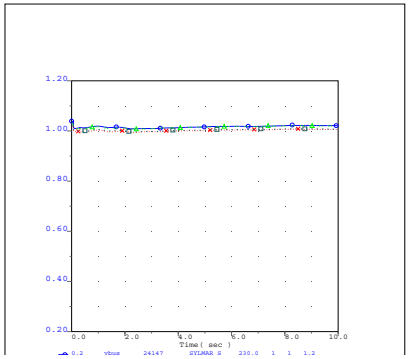


Figure 214 REL_RTR_ANG:S.Cal

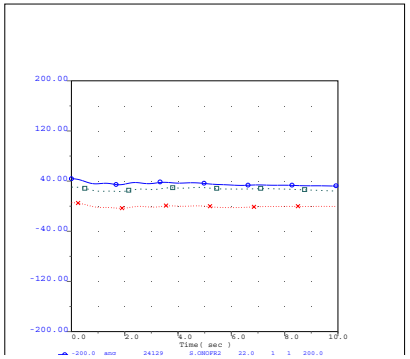


Figure 215 RELATIVE_ROTOR_ANGLE:S.Cal:

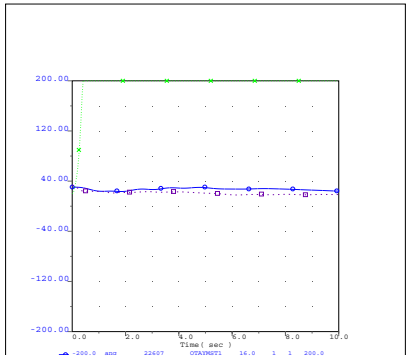
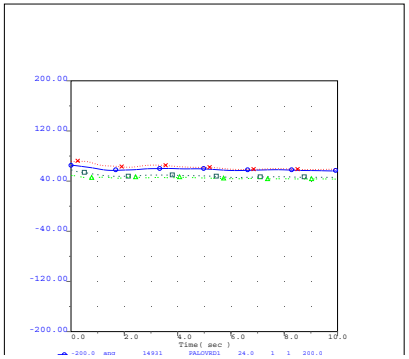


Figure 216 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: IPP-bipolar-upc

Possible Violations: MORC 1[18]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[18] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Study: BSP Case: labsp2_50iy_ov_0og

Figure 1 Bus-V:Owens Gorge/Rinaldi 230 kV

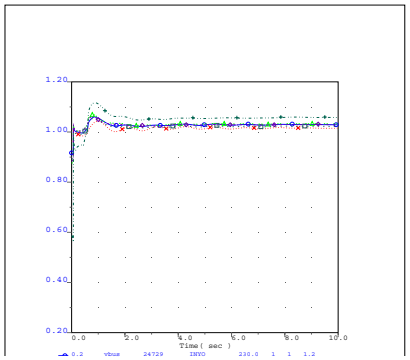


Figure 2 Bus-V:SCE North 115 kV

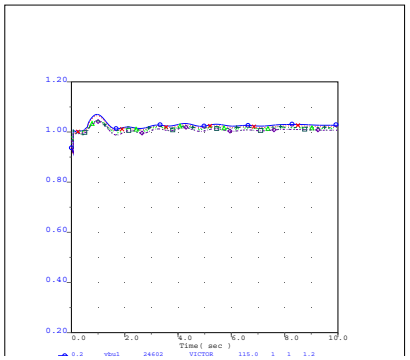


Figure 3 Bus-V:LA BASIN 230 & 138 kV

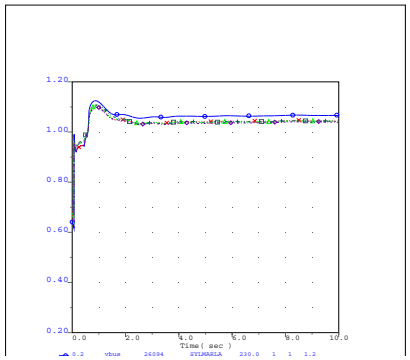


Figure 4 Bus-V:SCE 500 & 230 kV

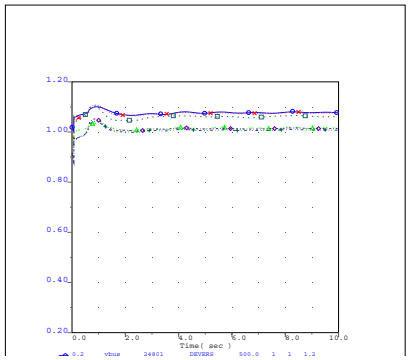


Figure 5 Bus-V: LADWP 500 kV:

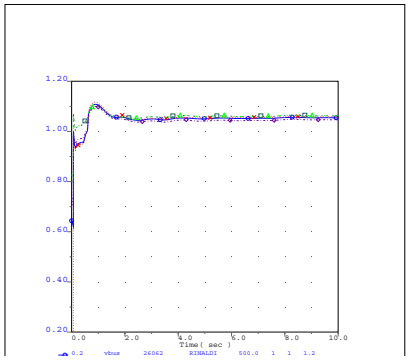


Figure 6 Bus-V:LADWP Load:

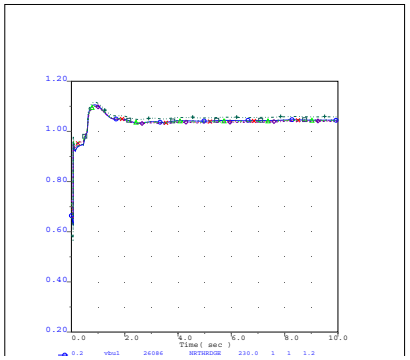


Figure 7 Bus-V: NW & S.CAL 500 kV

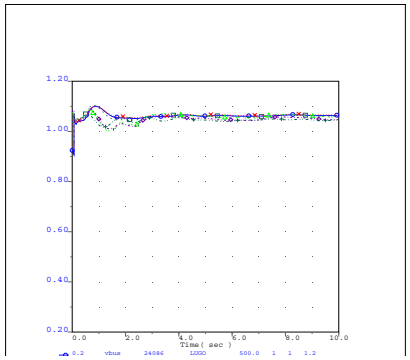


Figure 8 Bus-V: Others 500 kV

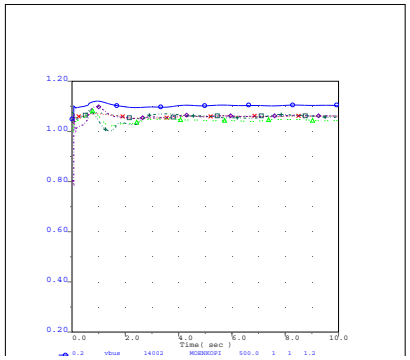


Figure 9 Bus-V: Others 230 kV

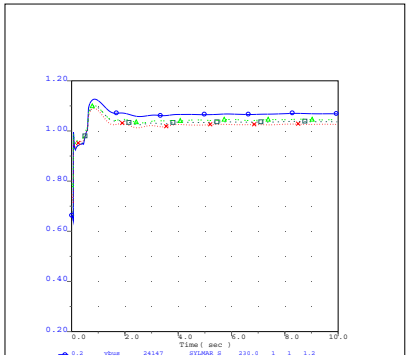


Figure 10 REL_RTR_ANG:S.Cal

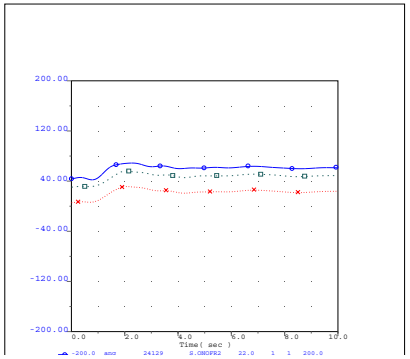


Figure 11 RELATIVE_ROTOR_ANGLE:S.Cal:

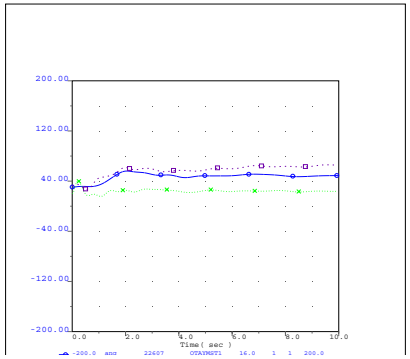
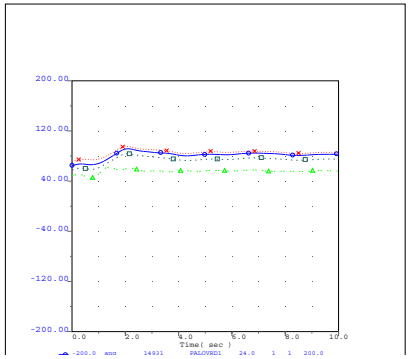


Figure 12 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Adel-Rinaldi-slo

Possible Violations: MORC 1[1]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[1] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 13 Bus-V:Owens Gorge/Rinaldi 230 kV

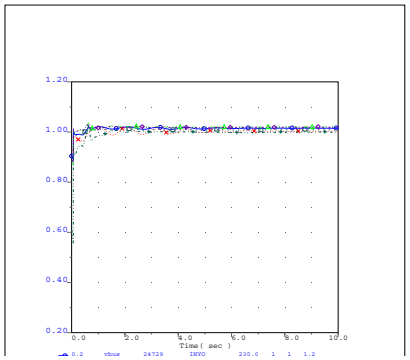


Figure 14 Bus-V:SCE North 115 kV

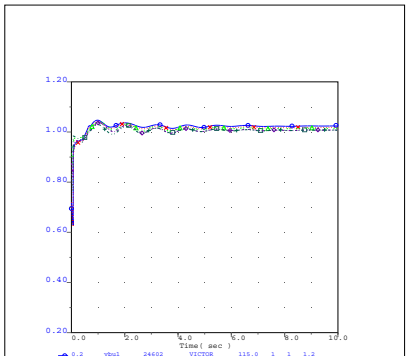


Figure 15 Bus-V:LA BASIN 230 & 138 kV

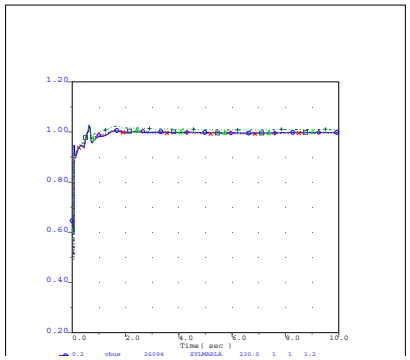


Figure 16 Bus-V:SCE 500 & 230 kV

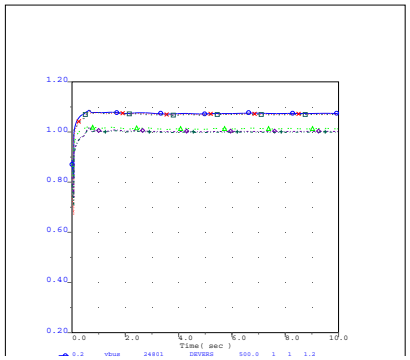


Figure 17 Bus-V: LADWP 500 kV:

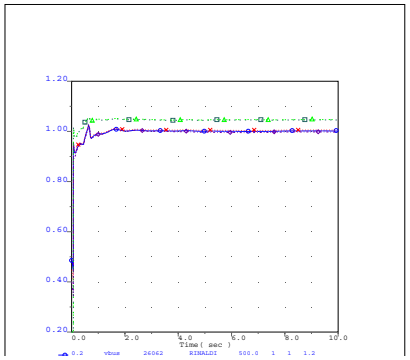


Figure 18 Bus-V:LADWP Load:

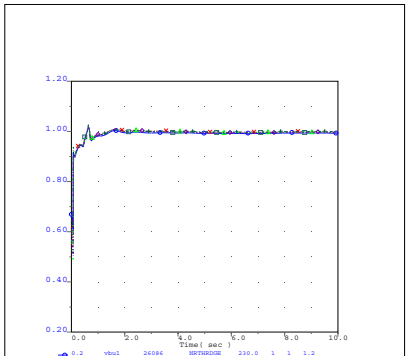


Figure 19 Bus-V: NW & S.CAL 500 kV

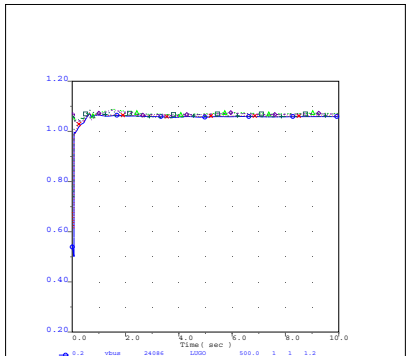


Figure 20 Bus-V: Others 500 kV

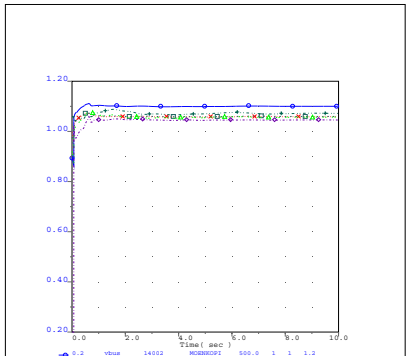


Figure 21 Bus-V: Others 230 kV

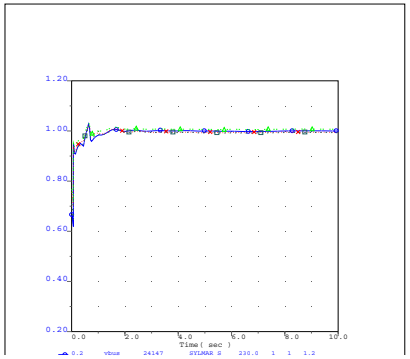


Figure 22 REL_RTR_ANG:S.Cal

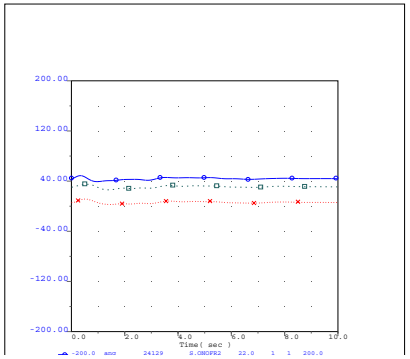


Figure 23 RELATIVE_ROTOR_ANGLE:S.Cal:

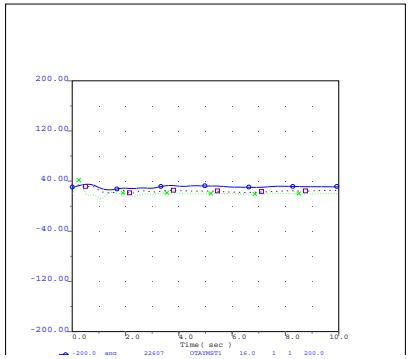
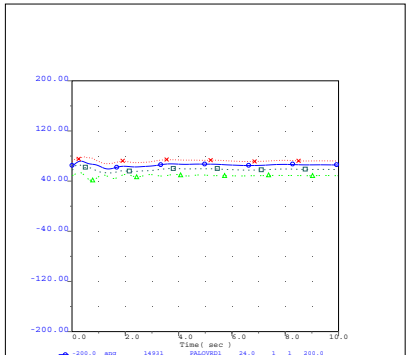


Figure 24 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Adel-Toluca

Possible Violations: MORC 1[2]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[2] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 25 Bus-V:Owens Gorge/Rinaldi 230 kV

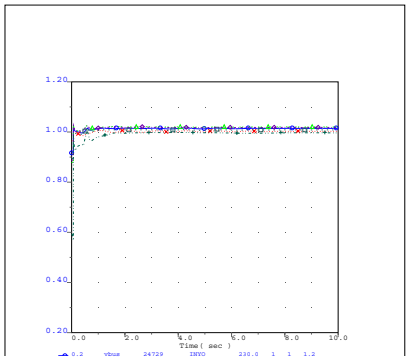


Figure 26 Bus-V:SCE North 115 kV

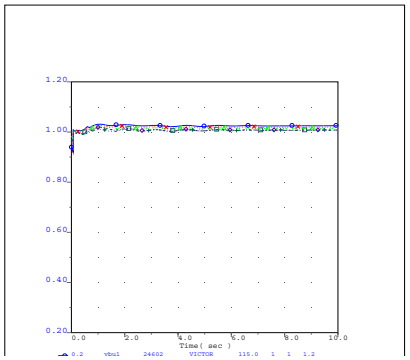


Figure 27 Bus-V:LA BASIN 230 & 138 kV

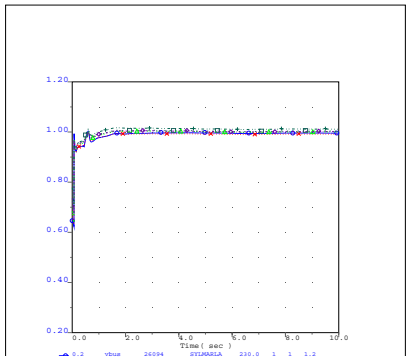


Figure 28 Bus-V:SCE 500 & 230 kV

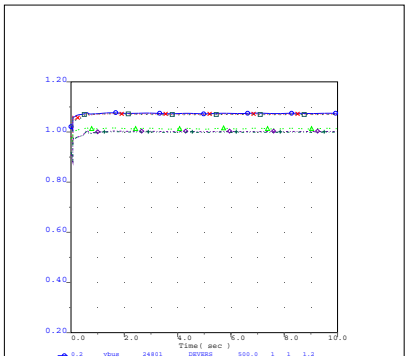


Figure 29 Bus-V: LADWP 500 kV:

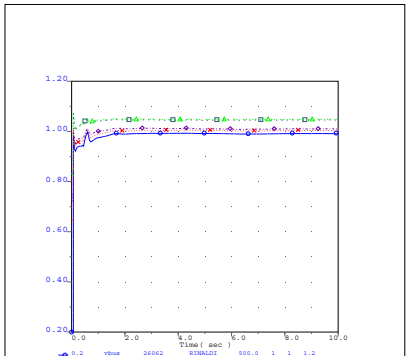


Figure 30 Bus-V:LADWP Load:

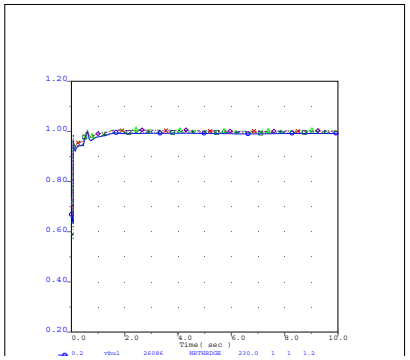


Figure 31 Bus-V: NW & S.CAL 500 kV

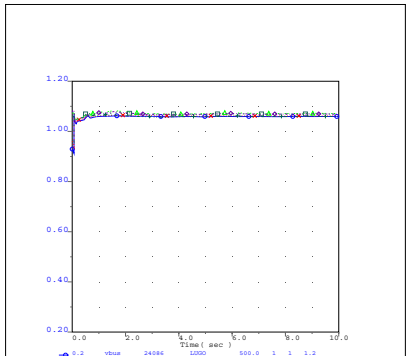


Figure 32 Bus-V: Others 500 kV

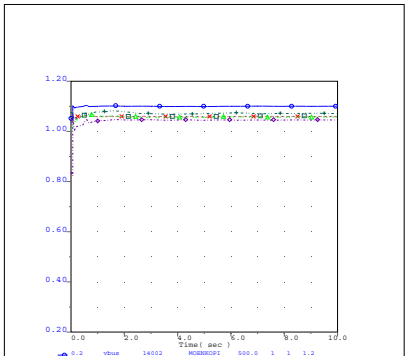


Figure 33 Bus-V: Others 230 kV

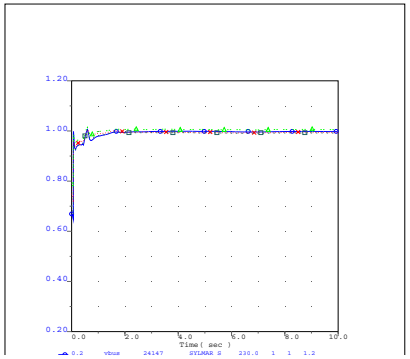


Figure 34 REL_RTR_ANG:S.Cal

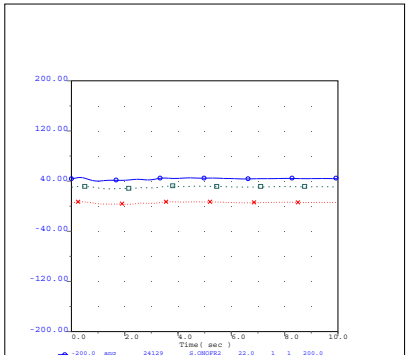


Figure 35 RELATIVE_ROTOR_ANGLE:S.Cal:

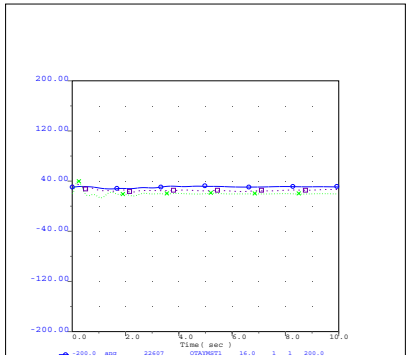
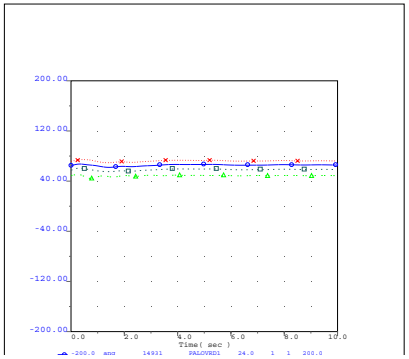


Figure 36 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Vict-Rinaldi-slo

Possible Violations: MORC 1[3]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[3] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 37 Bus-V:Owens Gorge/Rinaldi 230 kV

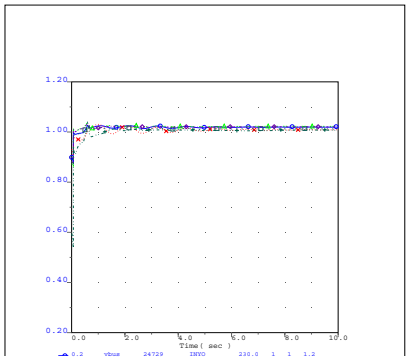


Figure 38 Bus-V:SCE North 115 kV

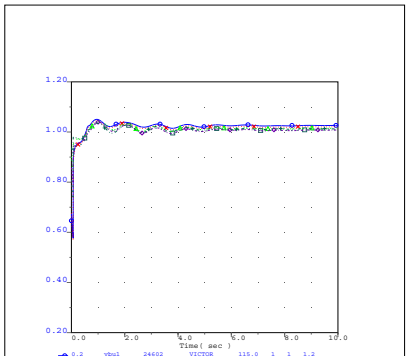


Figure 39 Bus-V:LA BASIN 230 & 138 kV

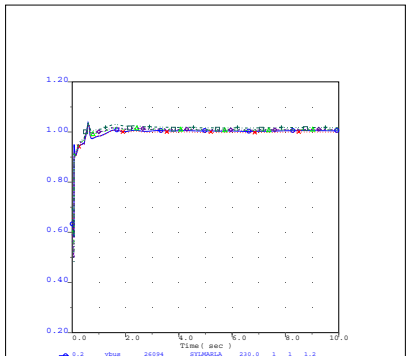


Figure 40 Bus-V:SCE 500 & 230 kV

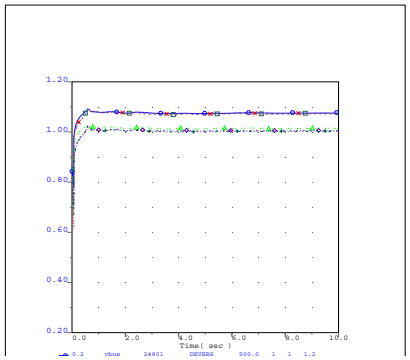


Figure 41 Bus-V: LADWP 500 kV:

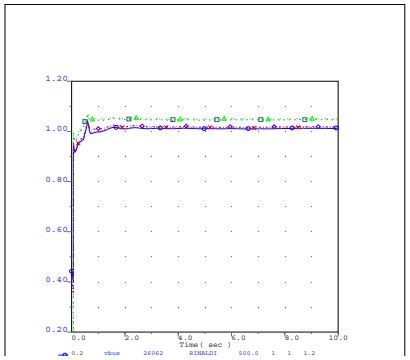


Figure 42 Bus-V:LADWP Load:

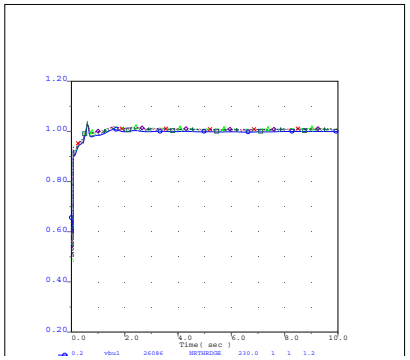


Figure 43 Bus-V: NW & S.CAL 500 kV

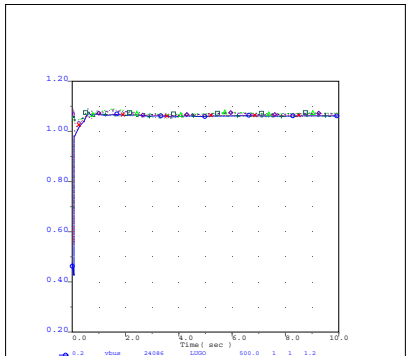


Figure 44 Bus-V: Others 500 kV

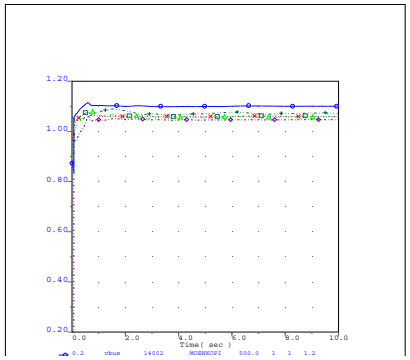


Figure 45 Bus-V: Others 230 kV

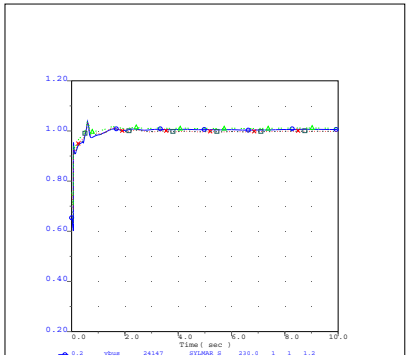


Figure 46 REL_RTR_ANG:S.Cal

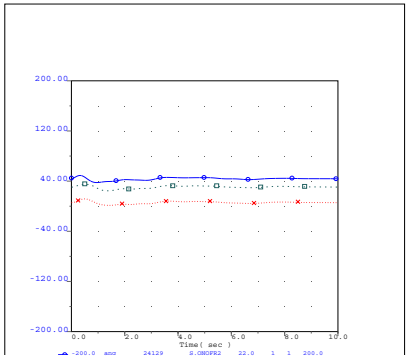


Figure 47 RELATIVE_ROTOR_ANGLE:S.Cal:

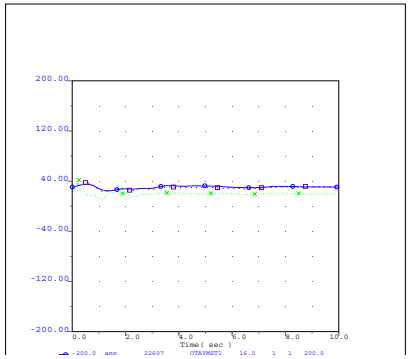
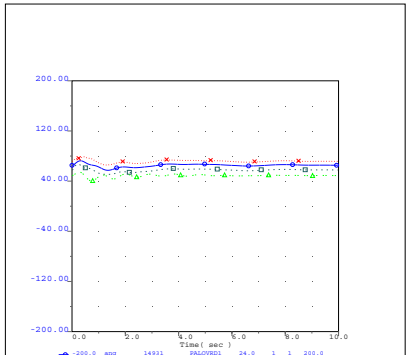


Figure 48 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Adel-Victorvl-slo

Possible Violations: MORC 1[4]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[4] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 49 Bus-V:Owens Gorge/Rinaldi 230 kV

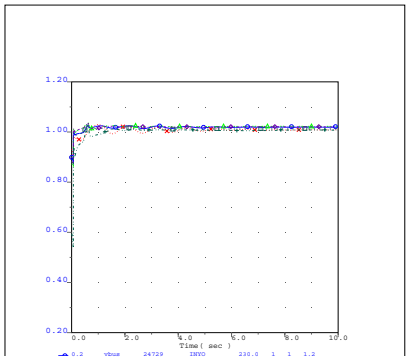


Figure 50 Bus-V:SCE North 115 kV

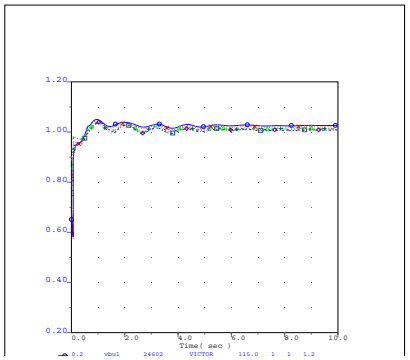


Figure 51 Bus-V:LA BASIN 230 & 138 kV

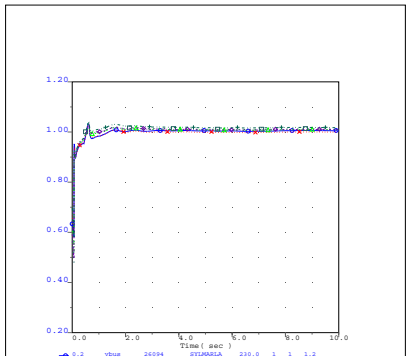


Figure 52 Bus-V:SCE 500 & 230 kV

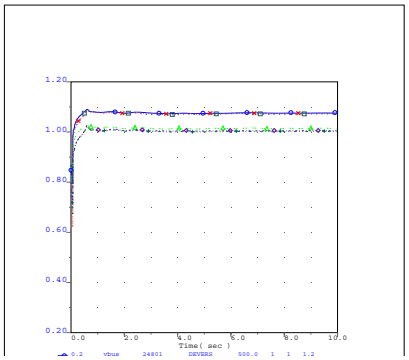


Figure 53 Bus-V: LADWP 500 kV:

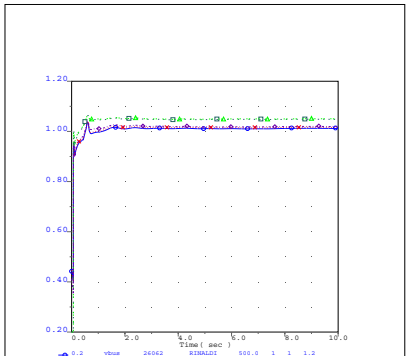


Figure 54 Bus-V:LADWP Load:

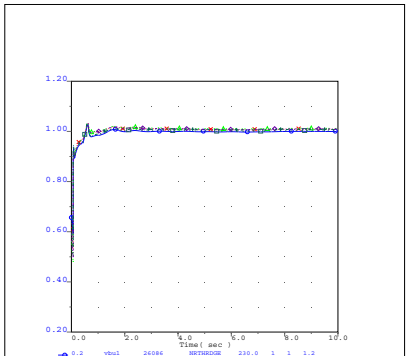


Figure 55 Bus-V: NW & S.CAL 500 kV

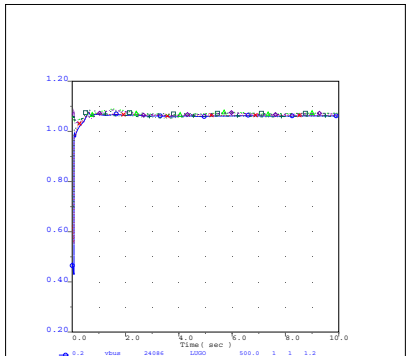


Figure 56 Bus-V: Others 500 kV

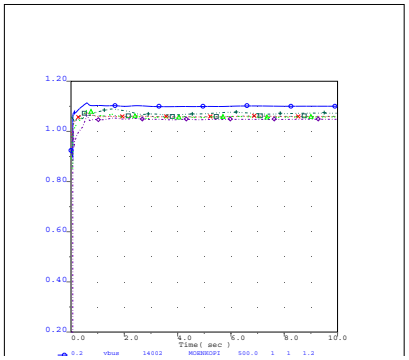


Figure 57 Bus-V: Others 230 kV

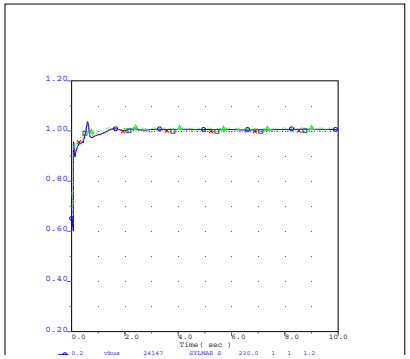


Figure 58 REL_RTR_ANG:S.Cal

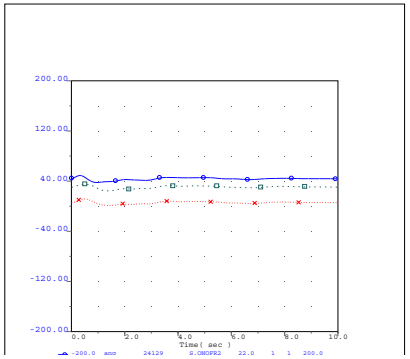


Figure 59 RELATIVE_ROTOR_ANGLE:S.Cal:

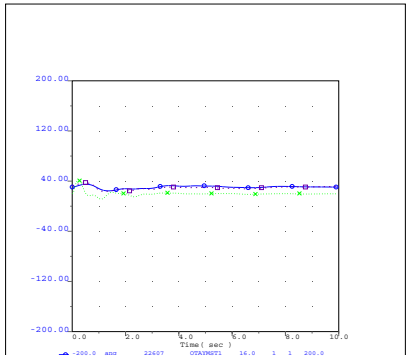
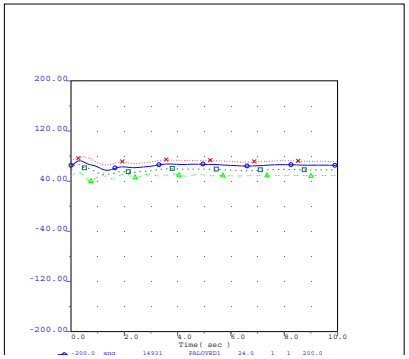


Figure 60 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: McC-Vict-slo

Possible Violations: MORC 1[5]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[5] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 61 Bus-V:Owens Gorge/Rinaldi 230 kV

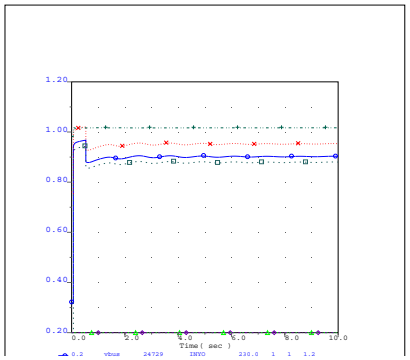


Figure 62 Bus-V:SCE North 115 kV

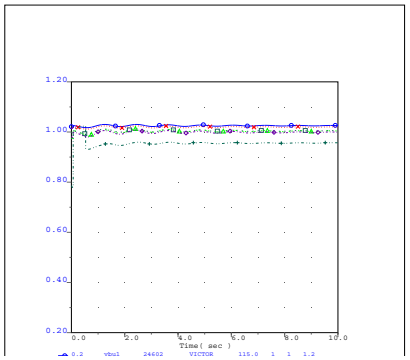


Figure 63 Bus-V:LA BASIN 230 & 138 kV

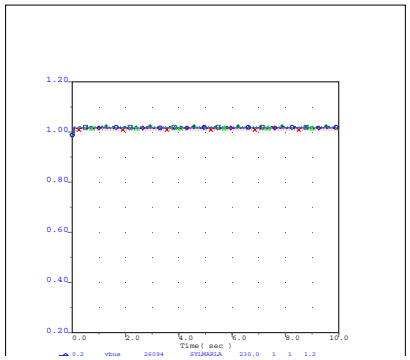


Figure 64 Bus-V:SCE 500 & 230 kV

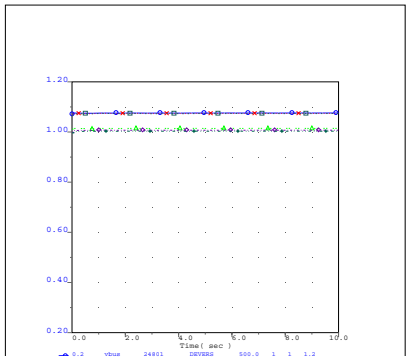


Figure 65 Bus-V: LADWP 500 kV:

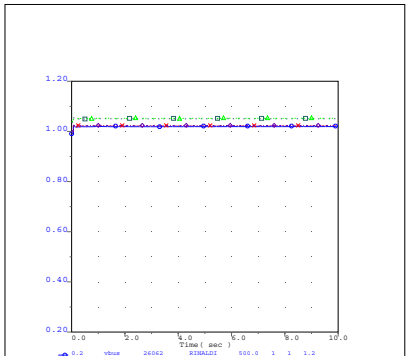


Figure 66 Bus-V:LADWP Load:

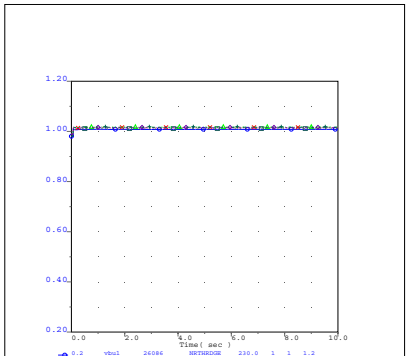


Figure 67 Bus-V: NW & S.CAL 500 kV

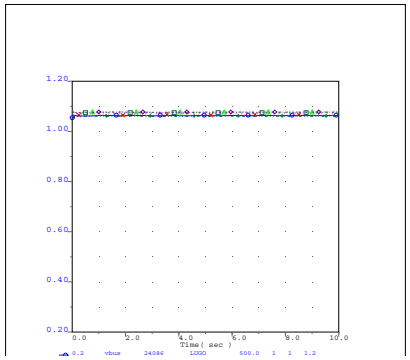


Figure 68 Bus-V: Others 500 kV

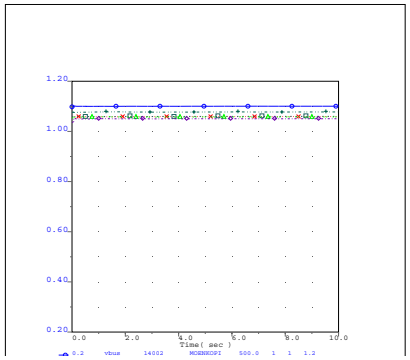


Figure 69 Bus-V: Others 230 kV

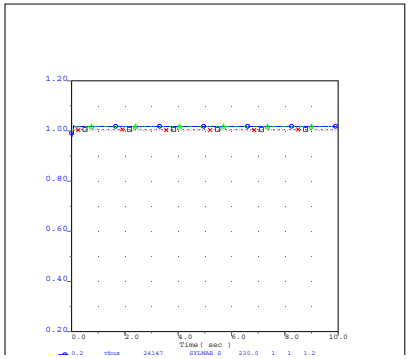


Figure 70 REL_RTR_ANG:S.Cal

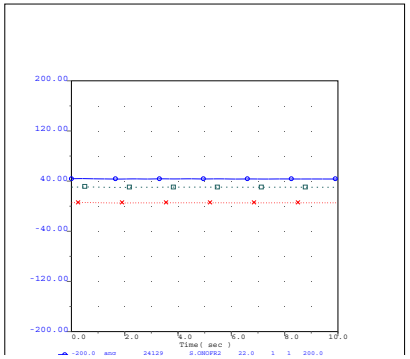


Figure 71 RELATIVE_ROTOR_ANGLE:S.Cal:

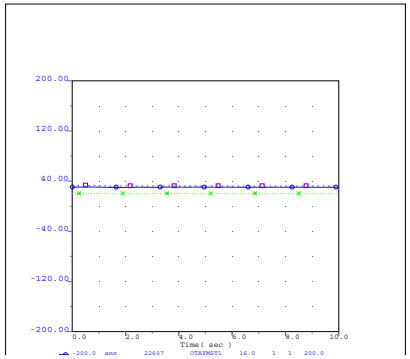
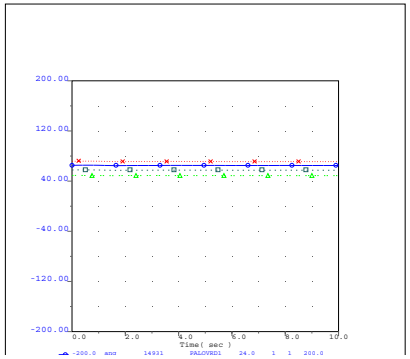


Figure 72 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: BR-Rinaldi-o2-RAS-wIY

Possible Violations: MORC 1[6]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[6] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 73 Bus-V:Owens Gorge/Rinaldi 230 kV

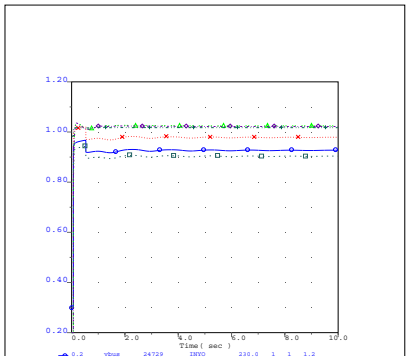


Figure 74 Bus-V:SCE North 115 kV

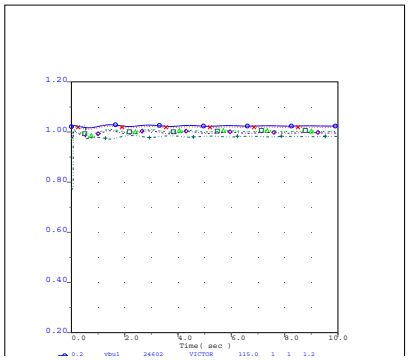


Figure 75 Bus-V:LA BASIN 230 & 138 kV

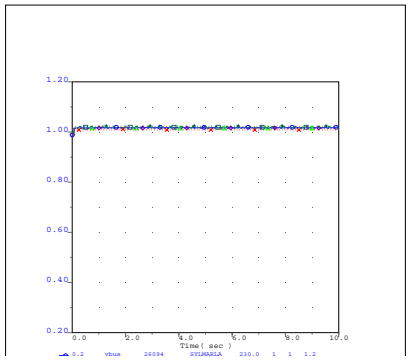


Figure 76 Bus-V:SCE 500 & 230 kV

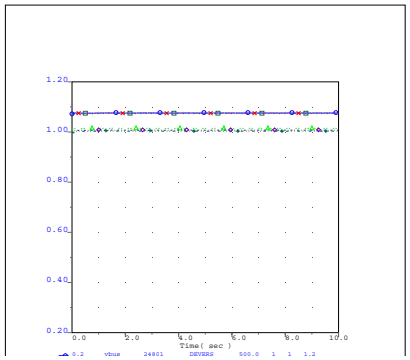


Figure 77 Bus-V: LADWP 500 kV:

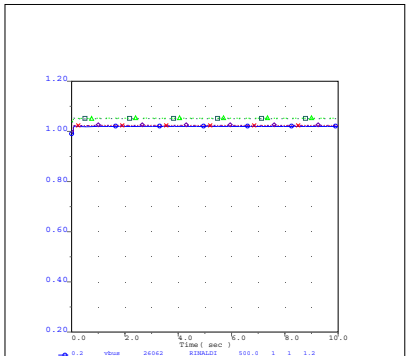


Figure 78 Bus-V:LADWP Load:

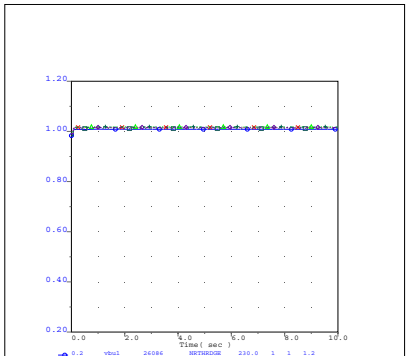


Figure 79 Bus-V: NW & S.CAL 500 kV

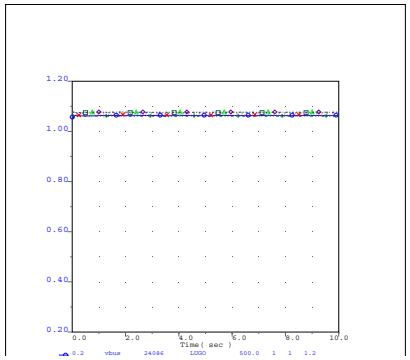


Figure 80 Bus-V: Others 500 kV

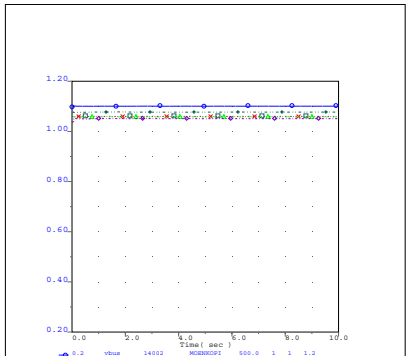


Figure 81 Bus-V: Others 230 kV

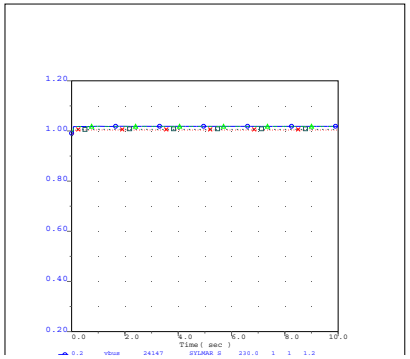


Figure 82 REL_RTR_ANG:S.Cal

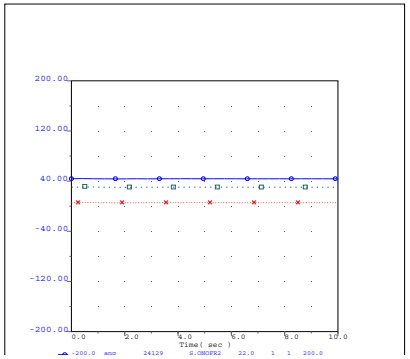


Figure 83 RELATIVE_ROTOR_ANGLE:S.Cal:

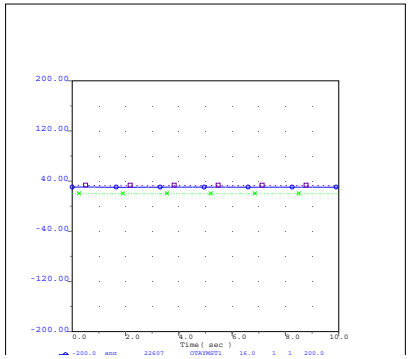
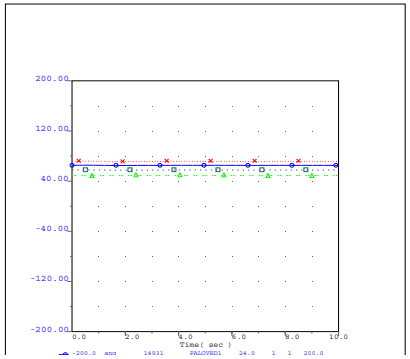


Figure 84 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Cottonwd-BTAP-o2-RAS

Possible Violations: MORC 1[7]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[7] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 85 Bus-V:Owens Gorge/Rinaldi 230 kV

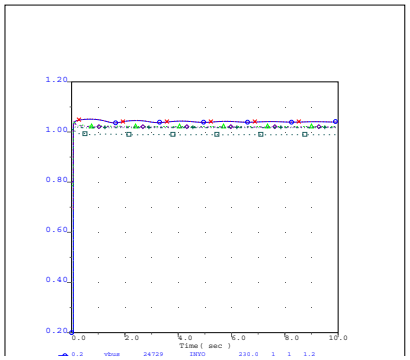


Figure 86 Bus-V:SCE North 115 kV

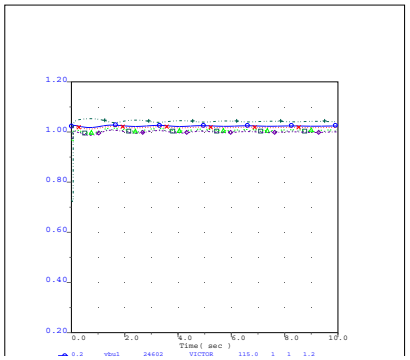


Figure 87 Bus-V:LA BASIN 230 & 138 kV

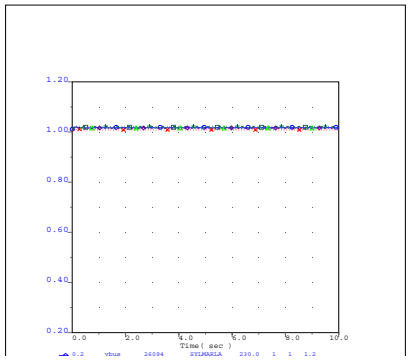


Figure 88 Bus-V:SCE 500 & 230 kV

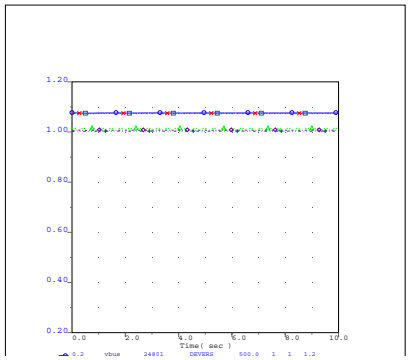


Figure 89 Bus-V: LADWP 500 kV:

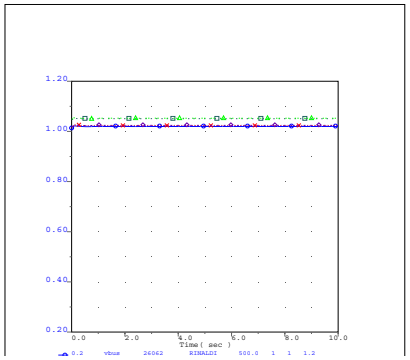


Figure 90 Bus-V:LADWP Load:

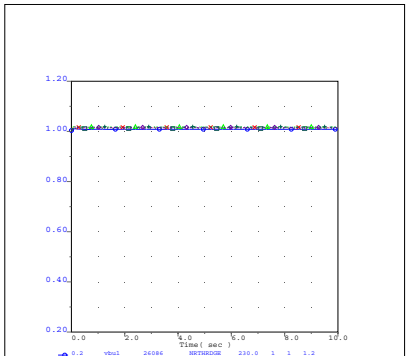


Figure 91 Bus-V: NW & S.CAL 500 kV

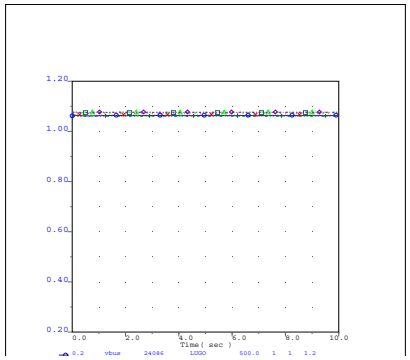


Figure 92 Bus-V: Others 500 kV

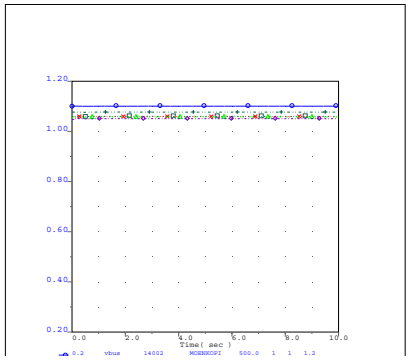


Figure 93 Bus-V: Others 230 kV

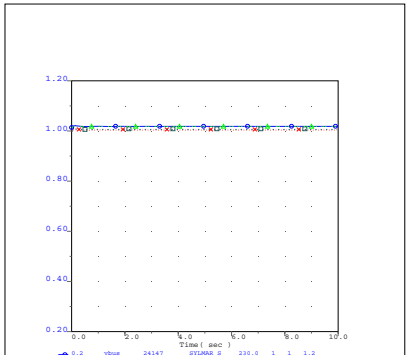


Figure 94 REL_RTR_ANG:S.Cal

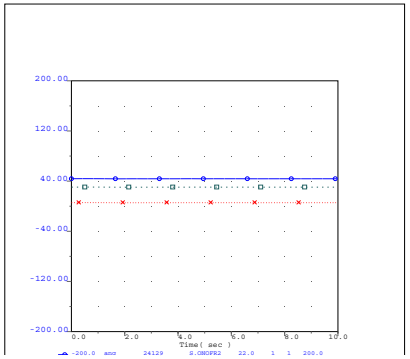


Figure 95 RELATIVE_ROTOR_ANGLE:S.Cal:

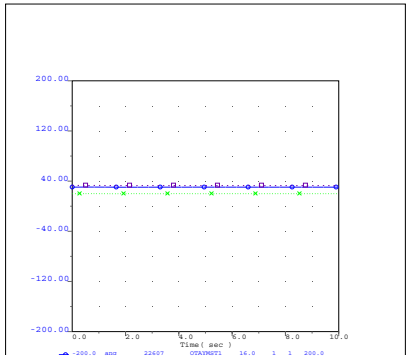
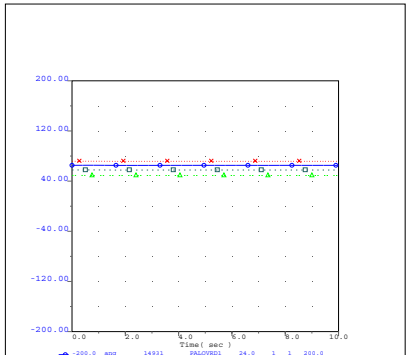


Figure 96 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Cottonwd-Inyo-preRAS

Possible Violations: MORC 1[8]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: 14, >10%: 12

[8] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 97 Bus-V:Owens Gorge/Rinaldi 230 kV

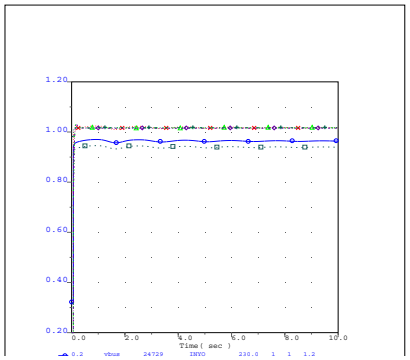


Figure 98 Bus-V:SCE North 115 kV

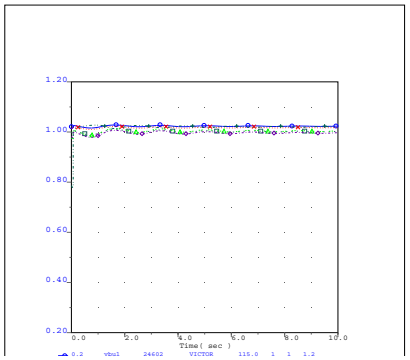


Figure 99 Bus-V:LA BASIN 230 & 138 kV

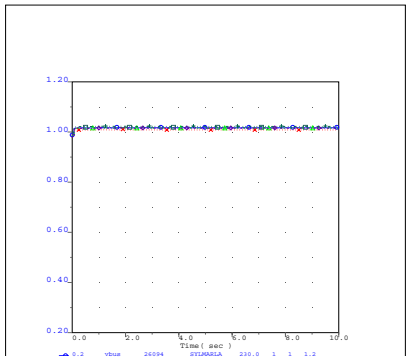


Figure 100 Bus-V:SCE 500 & 230 kV

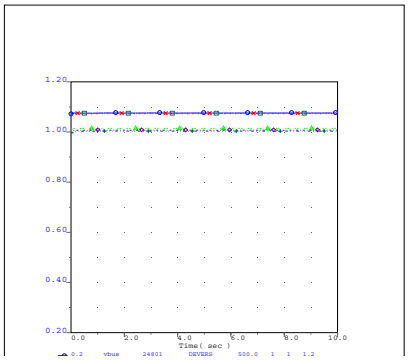


Figure 101 Bus-V: LADWP 500 kV:

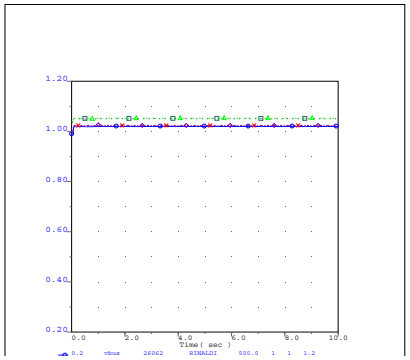


Figure 102 Bus-V:LADWP Load:

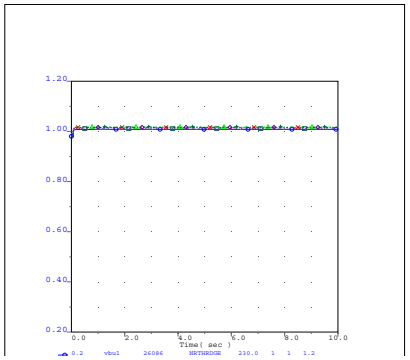


Figure 103 Bus-V: NW & S.CAL 500 kV

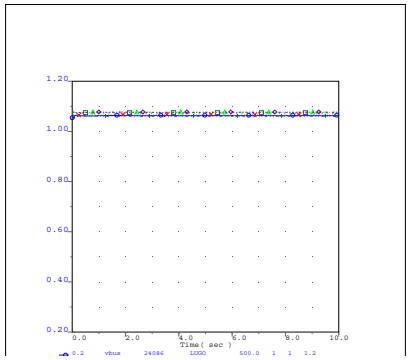


Figure 104 Bus-V: Others 500 kV

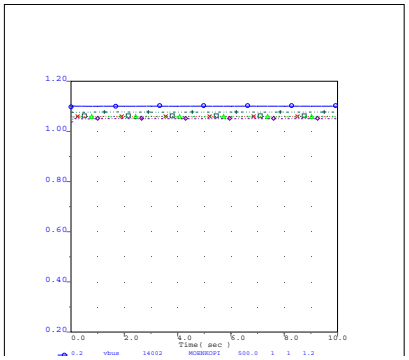


Figure 105 Bus-V: Others 230 kV

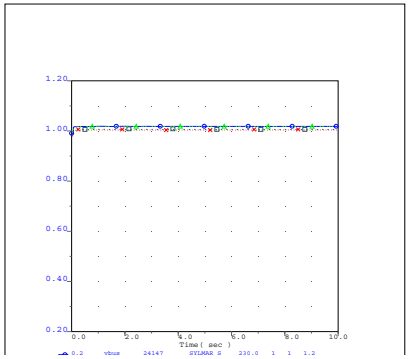


Figure 106 REL_RTR_ANG:S.Cal

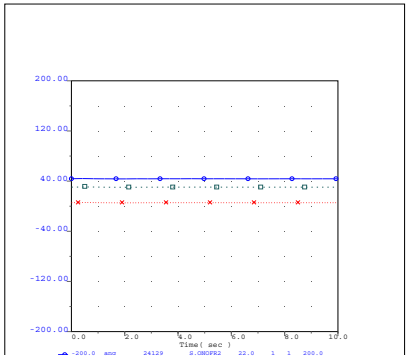


Figure 107 RELATIVE_ROTOR_ANGLE:S.Cal:

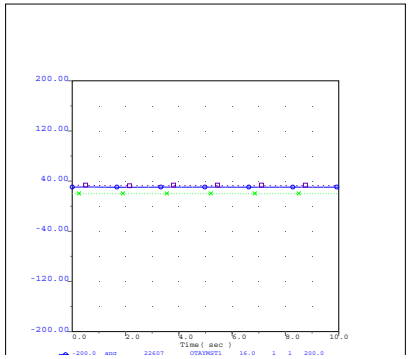
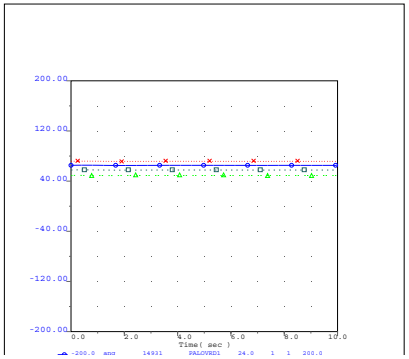


Figure 108 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: BTAP-BR-preRAS

Possible Violations: MORC 1[9]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[9] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 109 Bus-V:Owens Gorge/Rinaldi 230 kV

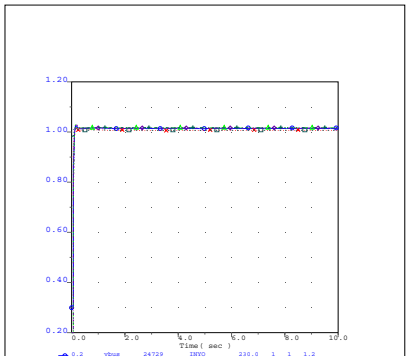


Figure 110 Bus-V:SCE North 115 kV

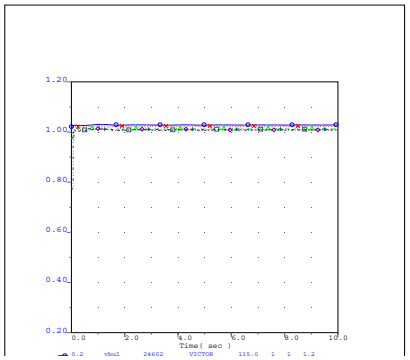


Figure 111 Bus-V:LA BASIN 230 & 138 kV

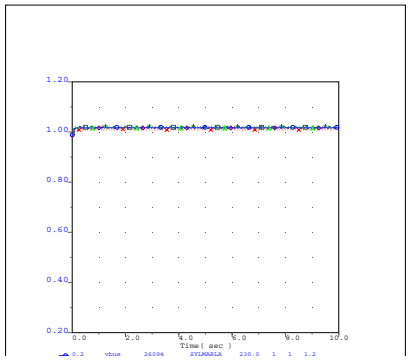


Figure 112 Bus-V:SCE 500 & 230 kV

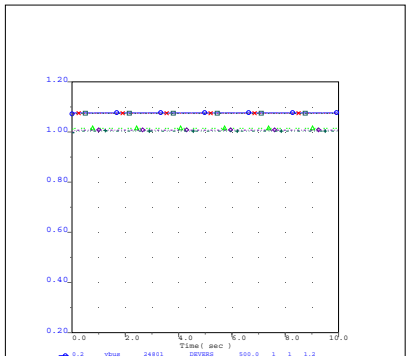


Figure 113 Bus-V: LADWP 500 kV:

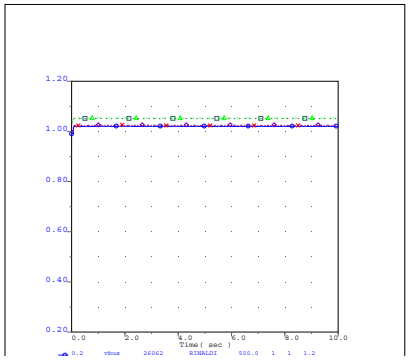


Figure 114 Bus-V:LADWP Load:

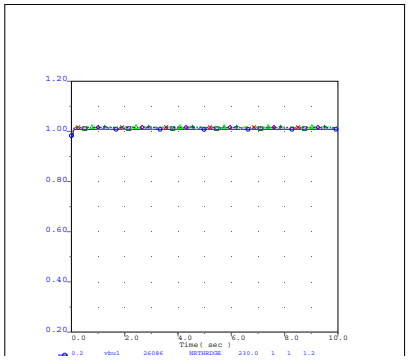


Figure 115 Bus-V: NW & S.CAL 500 kV

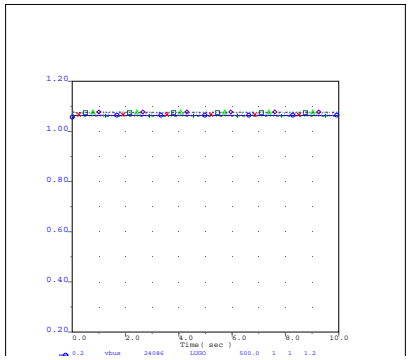


Figure 116 Bus-V: Others 500 kV

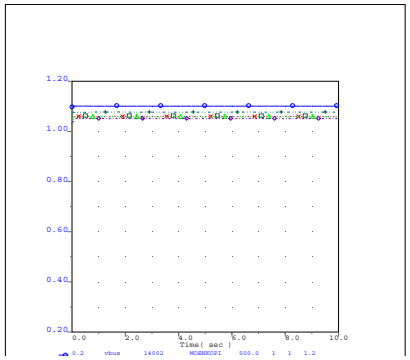


Figure 117 Bus-V: Others 230 kV

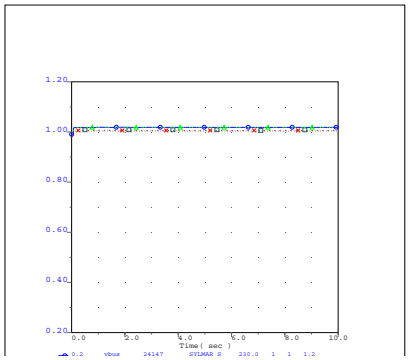


Figure 118 REL_RTR_ANG:S.Cal

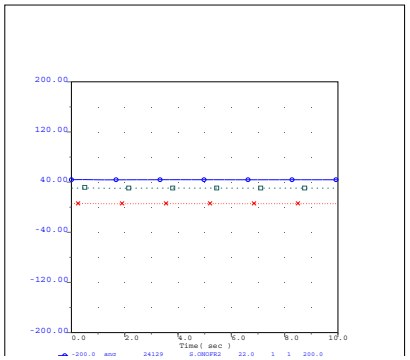


Figure 119 RELATIVE_ROTOR_ANGLE:S.Cal:

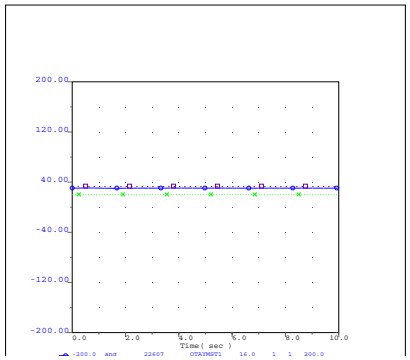
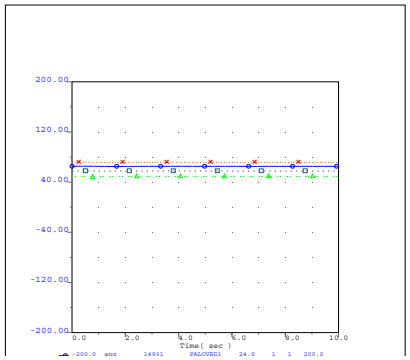


Figure 120 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Beacon-BTAP-RAS

Possible Violations: MORC 1[10]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[10] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 121 Bus-V:Owens Gorge/Rinaldi 230 kV

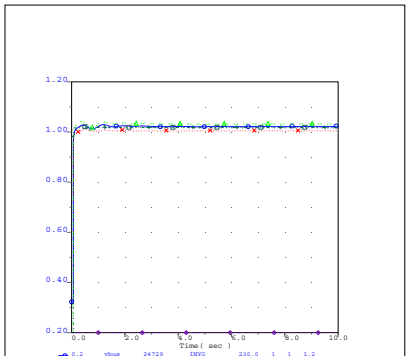


Figure 122 Bus-V:SCE North 115 kV

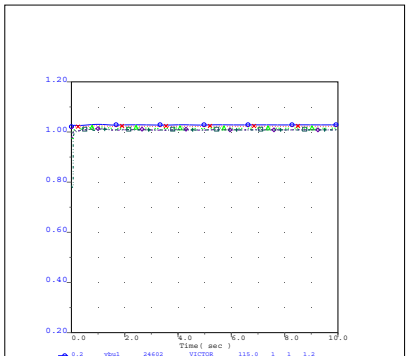


Figure 123 Bus-V:LA BASIN 230 & 138 kV

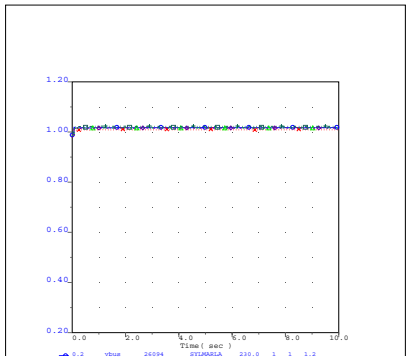


Figure 124 Bus-V:SCE 500 & 230 kV

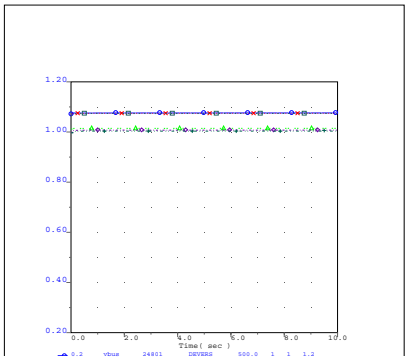


Figure 125 Bus-V: LADWP 500 kV:

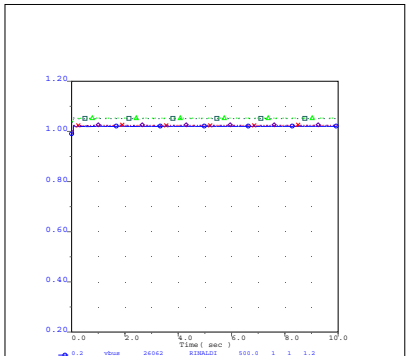


Figure 126 Bus-V:LADWP Load:

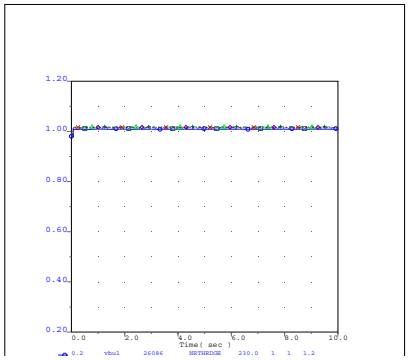


Figure 127 Bus-V: NW & S.CAL 500 kV

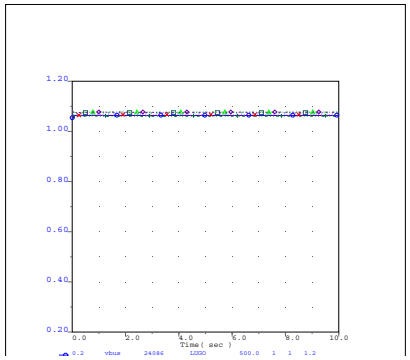


Figure 128 Bus-V: Others 500 kV

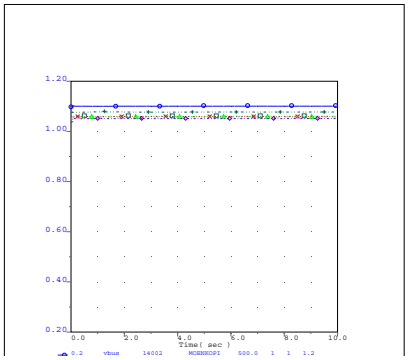


Figure 129 Bus-V: Others 230 kV

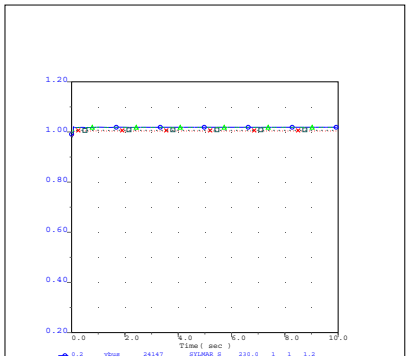


Figure 130 REL_RTR_ANG:S.Cal

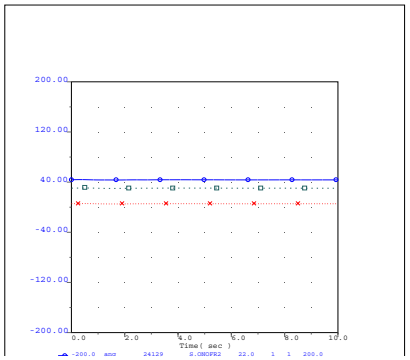


Figure 131 RELATIVE_ROTOR_ANGLE:S.Cal:

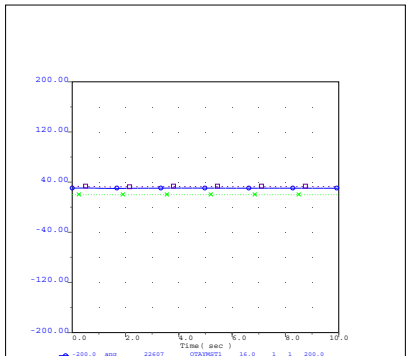
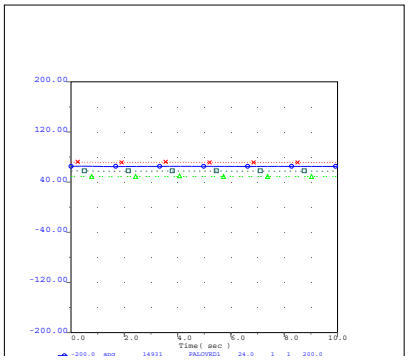


Figure 132 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Pinetree-BR-RAS

Possible Violations: MORC 1[11]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[11] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 133 Bus-V:Owens Gorge/Rinaldi 230 kV

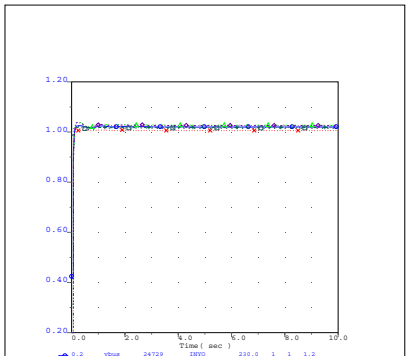


Figure 134 Bus-V:SCE North 115 kV

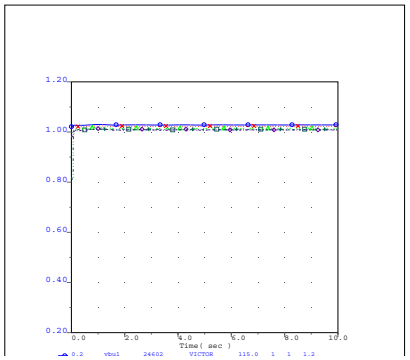


Figure 135 Bus-V:LA BASIN 230 & 138 kV

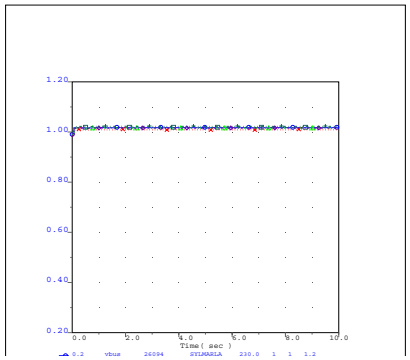


Figure 136 Bus-V:SCE 500 & 230 kV

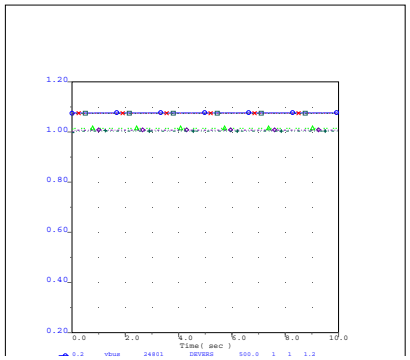


Figure 137 Bus-V: LADWP 500 kV:

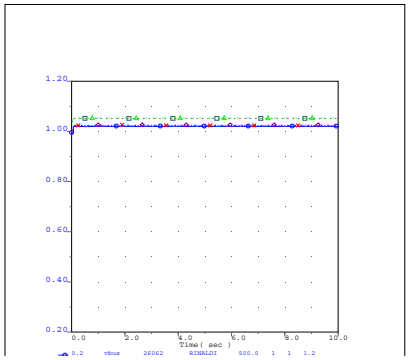


Figure 138 Bus-V:LADWP Load:

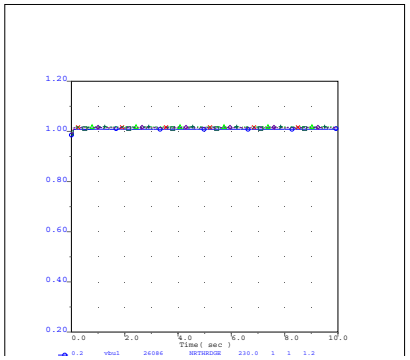


Figure 139 Bus-V: NW & S.CAL 500 kV

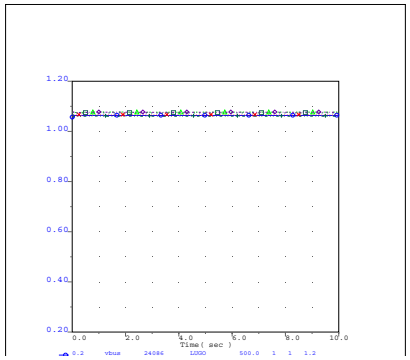


Figure 140 Bus-V: Others 500 kV

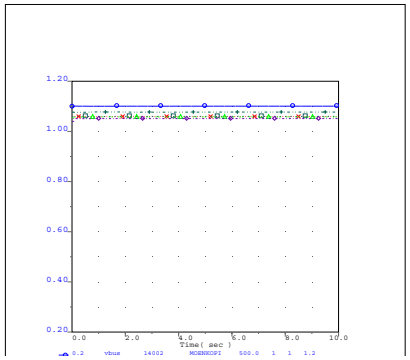


Figure 141 Bus-V: Others 230 kV

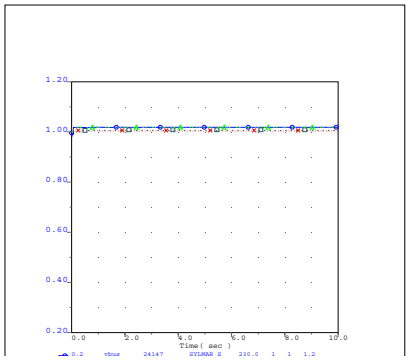


Figure 142 REL_RTR_ANG:S.Cal

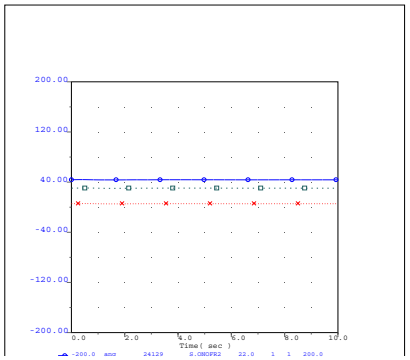


Figure 143 RELATIVE_ROTOR_ANGLE:S.Cal:

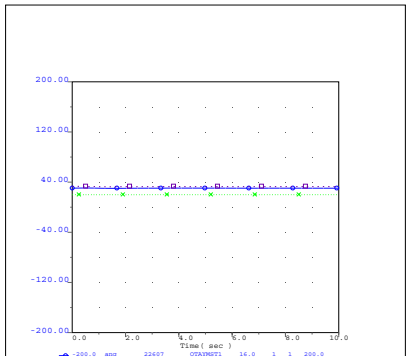
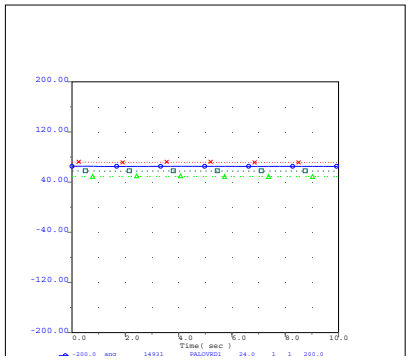


Figure 144 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: HoffmanSummit-Pinetree-RAS

Possible Violations: MORC 1[12]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[12] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 145 Bus-V:Owens Gorge/Rinaldi 230 kV

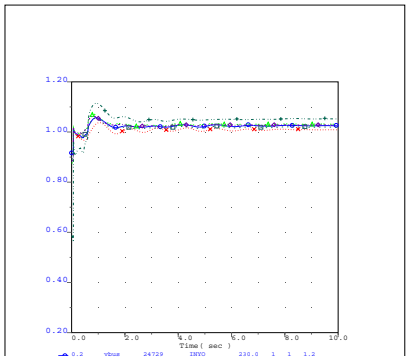


Figure 146 Bus-V:SCE North 115 kV

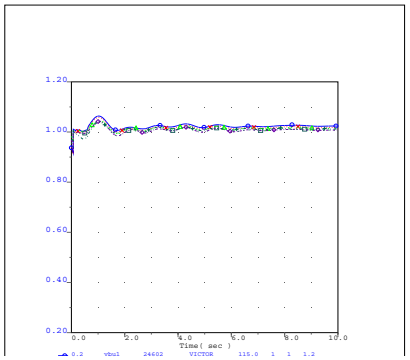


Figure 147 Bus-V:LA BASIN 230 & 138 kV

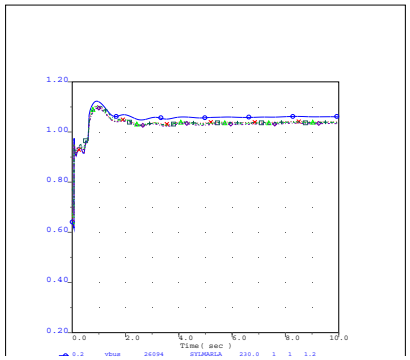


Figure 148 Bus-V:SCE 500 & 230 kV

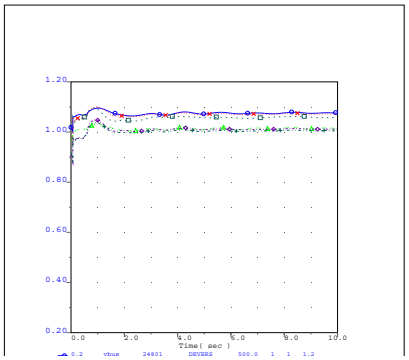


Figure 149 Bus-V: LADWP 500 kV:

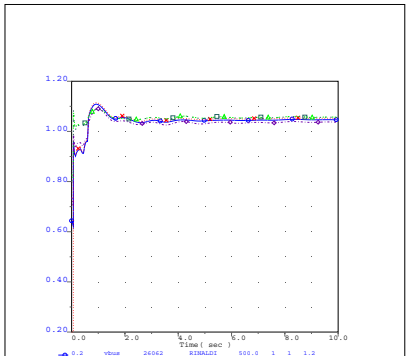


Figure 150 Bus-V:LADWP Load:

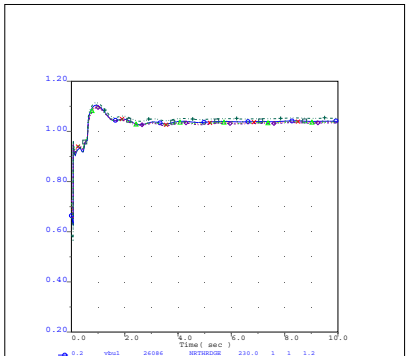


Figure 151 Bus-V: NW & S.CAL 500 kV

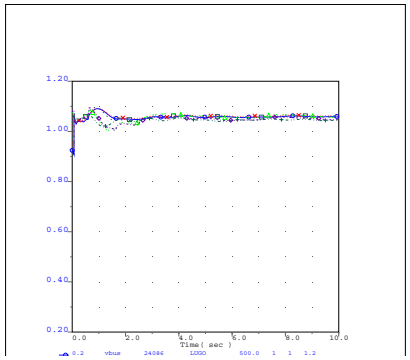


Figure 152 Bus-V: Others 500 kV

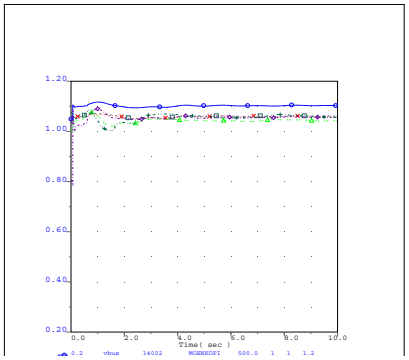


Figure 153 Bus-V: Others 230 kV

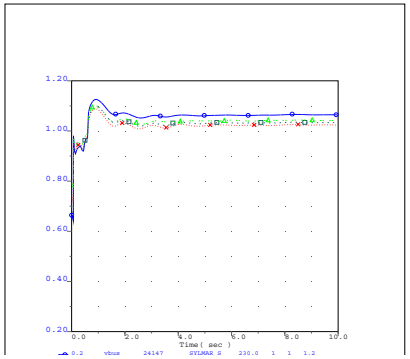


Figure 154 REL_RTR_ANG:S.Cal

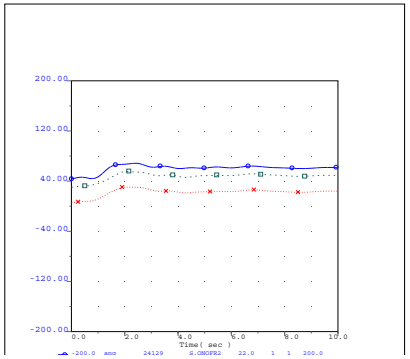


Figure 155 RELATIVE_ROTOR_ANGLE:S.Cal:

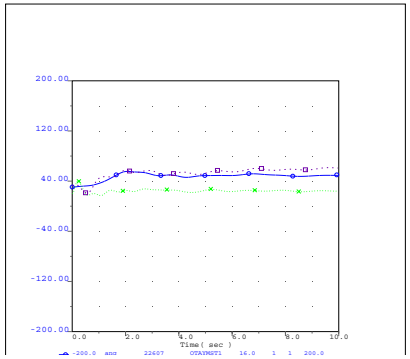
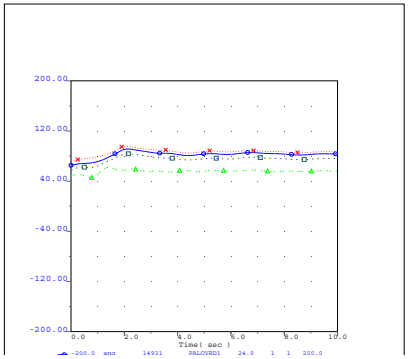


Figure 156 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Adel-Vict-Rinaldi-dlo

Possible Violations: MORC 1[13]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[13] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 157 Bus-V:Owens Gorge/Rinaldi 230 kV

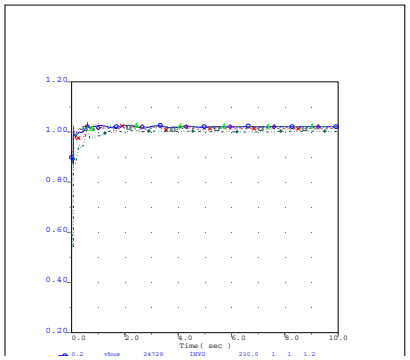


Figure 158 Bus-V:SCE North 115 kV

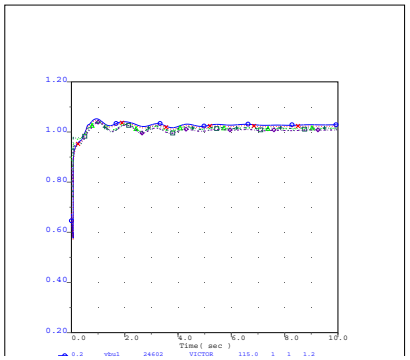


Figure 159 Bus-V:LA BASIN 230 & 138 kV

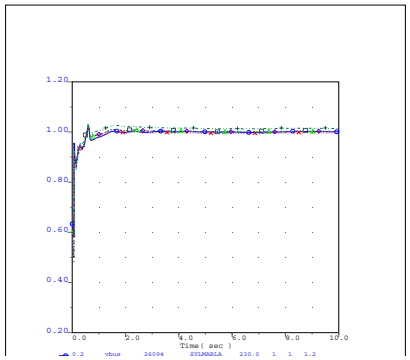


Figure 160 Bus-V:SCE 500 & 230 kV

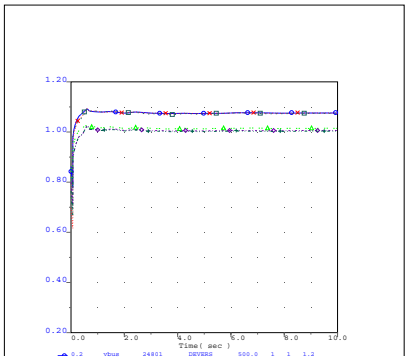


Figure 161 Bus-V: LADWP 500 kV:

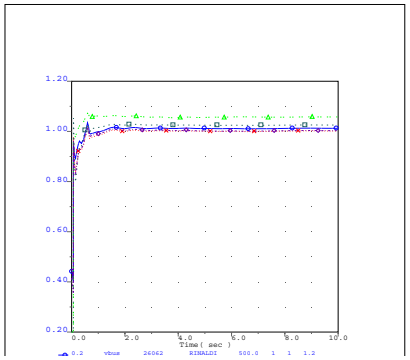


Figure 162 Bus-V:LADWP Load:

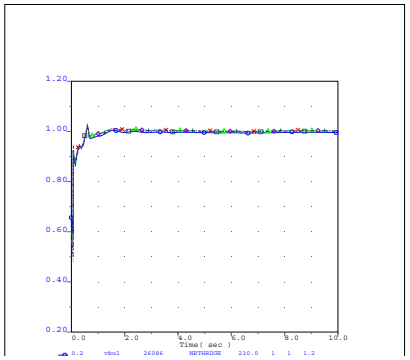


Figure 163 Bus-V: NW & S.CAL 500 kV

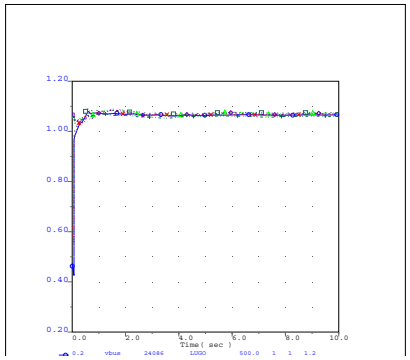


Figure 164 Bus-V: Others 500 kV

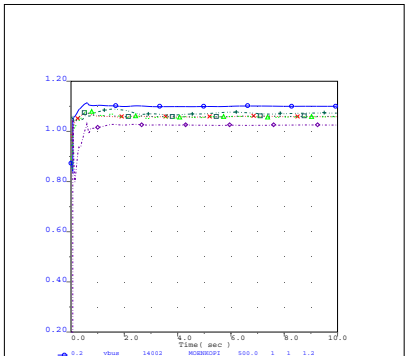


Figure 165 Bus-V: Others 230 kV

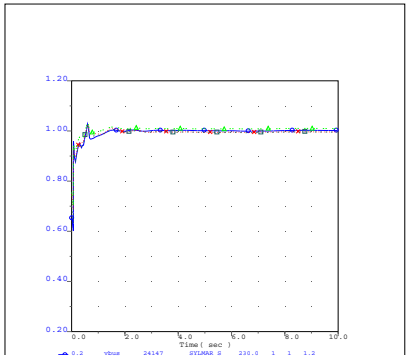


Figure 166 REL_RTR_ANG:S.Cal

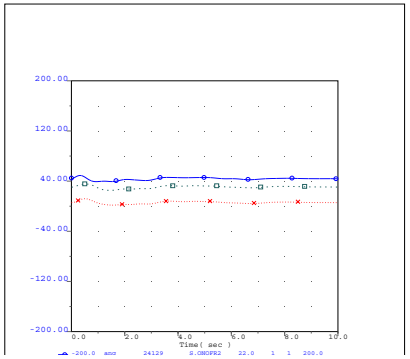


Figure 167 RELATIVE_ROTOR_ANGLE:S.Cal:

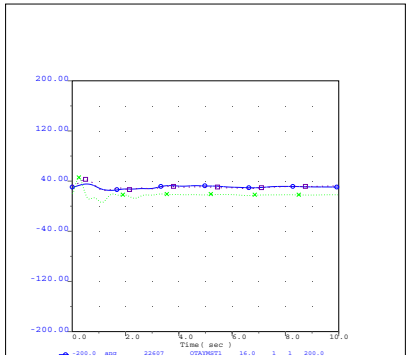
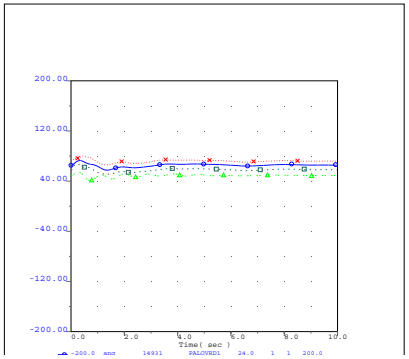


Figure 168 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Adel-Victorvl-dlo

Possible Violations: MORC 1[14]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[14] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 169 Bus-V:Owens Gorge/Rinaldi 230 kV

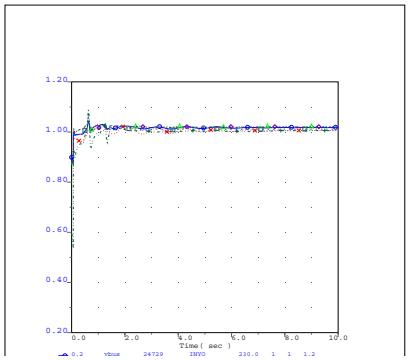


Figure 170 Bus-V:SCE North 115 kV

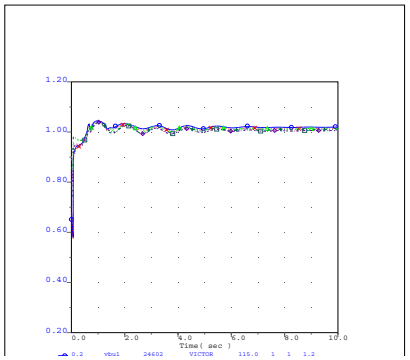


Figure 171 Bus-V:LA BASIN 230 & 138 kV

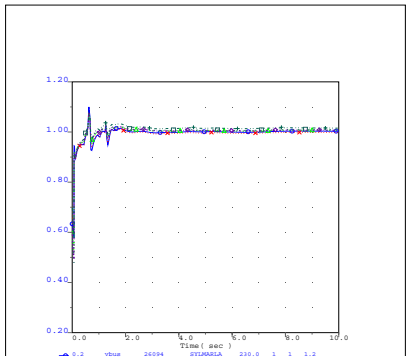


Figure 172 Bus-V:SCE 500 & 230 kV

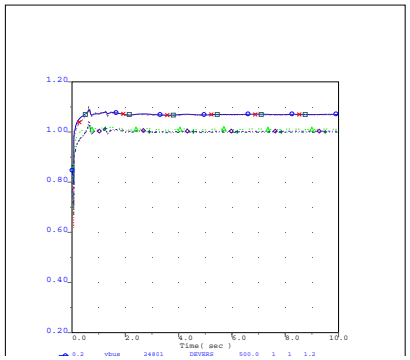


Figure 173 Bus-V: LADWP 500 kV:

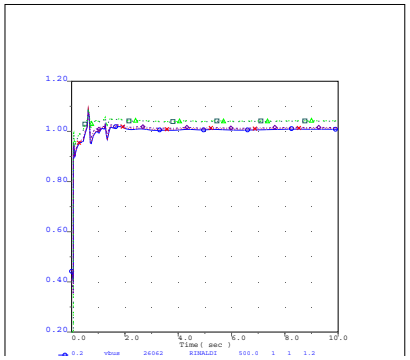


Figure 174 Bus-V:LADWP Load:

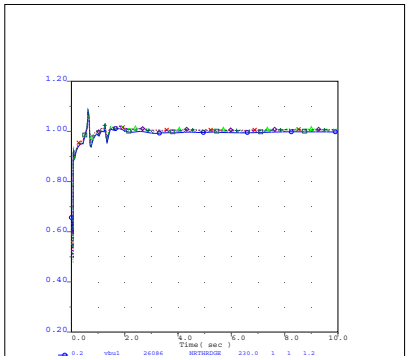


Figure 175 Bus-V: NW & S.CAL 500 kV

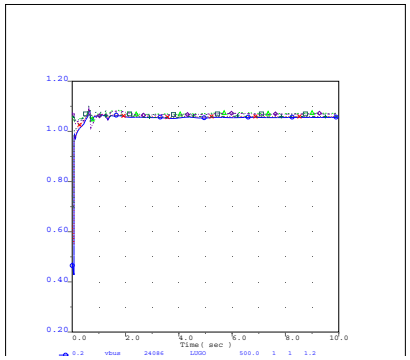


Figure 176 Bus-V: Others 500 kV

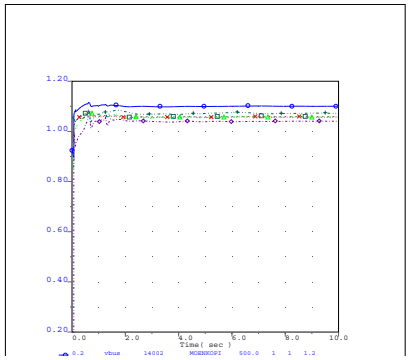


Figure 177 Bus-V: Others 230 kV

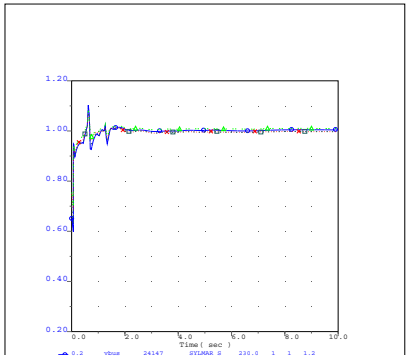


Figure 178 REL_RTR_ANG:S.Cal

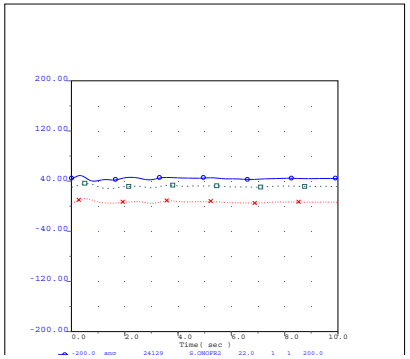


Figure 179 RELATIVE_ROTOR_ANGLE:S.Cal:

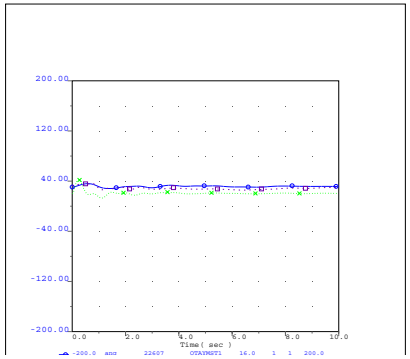
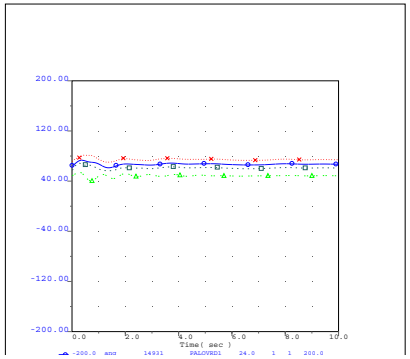


Figure 180 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: McCullgh-Victorvl-dlo

Possible Violations: MORC 1[15]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[15] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 181 Bus-V:Owens Gorge/Rinaldi 230 kV

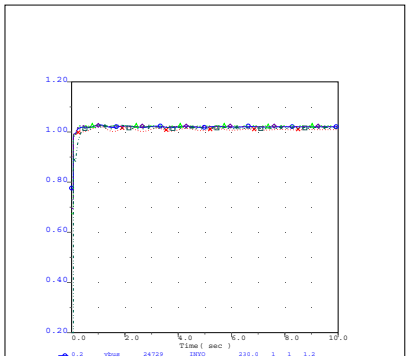


Figure 182 Bus-V:SCE North 115 kV

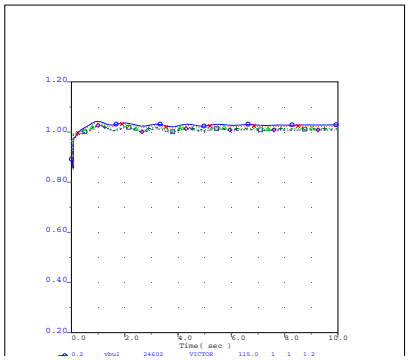


Figure 183 Bus-V:LA BASIN 230 & 138 kV

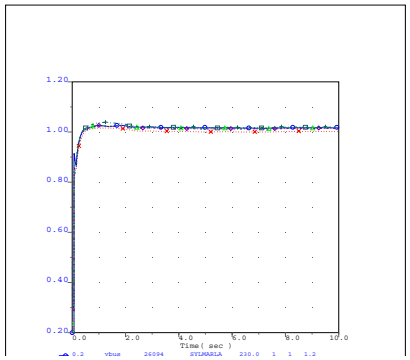


Figure 184 Bus-V:SCE 500 & 230 kV

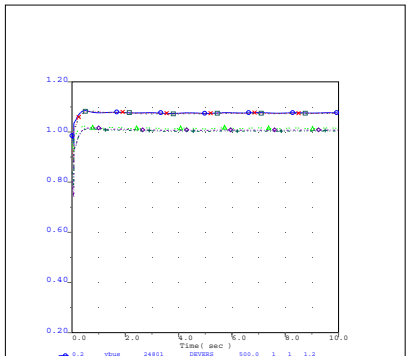


Figure 185 Bus-V: LADWP 500 kV:

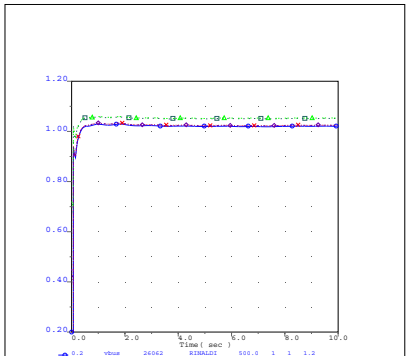


Figure 186 Bus-V:LADWP Load:

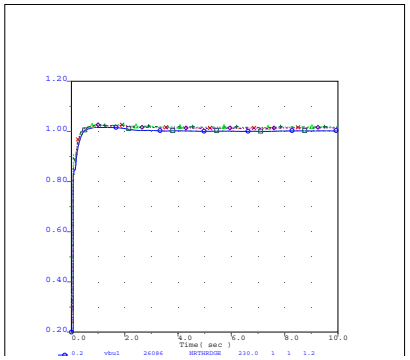


Figure 187 Bus-V: NW & S.CAL 500 kV

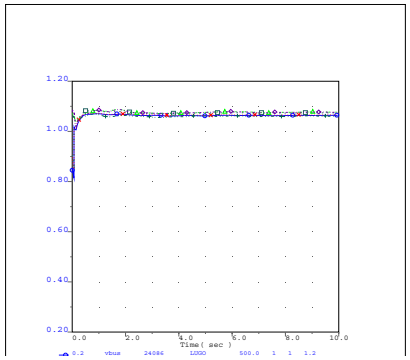


Figure 188 Bus-V: Others 500 kV

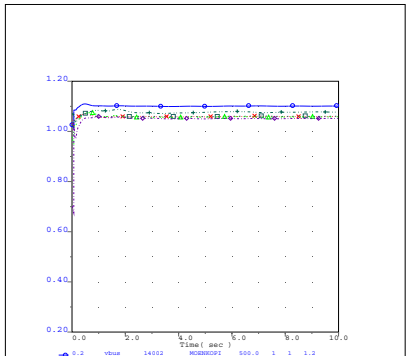


Figure 189 Bus-V: Others 230 kV

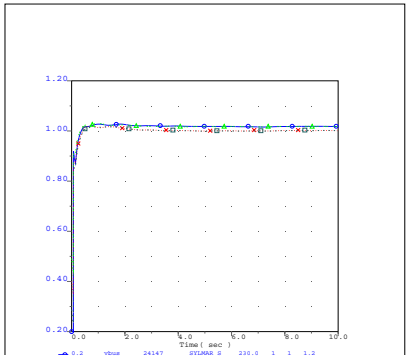


Figure 190 REL_RTR_ANG:S.Cal

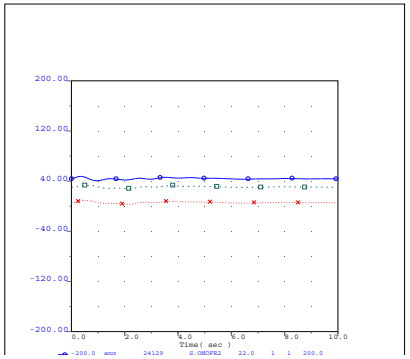


Figure 191 RELATIVE_ROTOR_ANGLE:S.Cal:

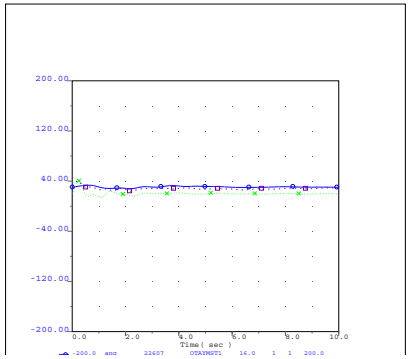
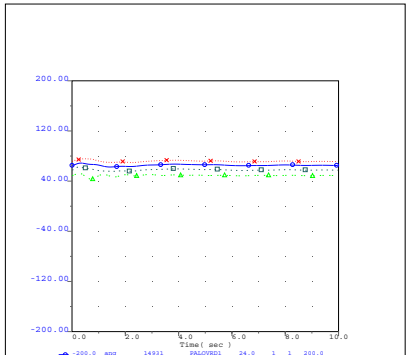


Figure 192 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Rin-Tar-dlo

Possible Violations: MORC 1[16]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[16] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 193 Bus-V:Owens Gorge/Rinaldi 230 kV

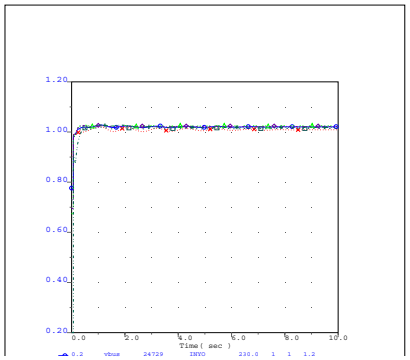


Figure 194 Bus-V:SCE North 115 kV

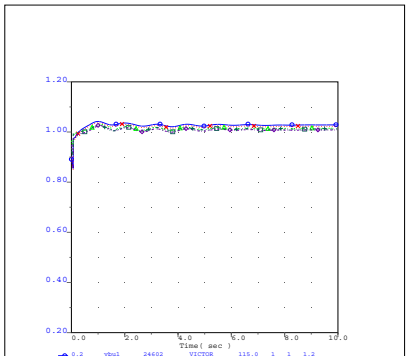


Figure 195 Bus-V:LA BASIN 230 & 138 kV

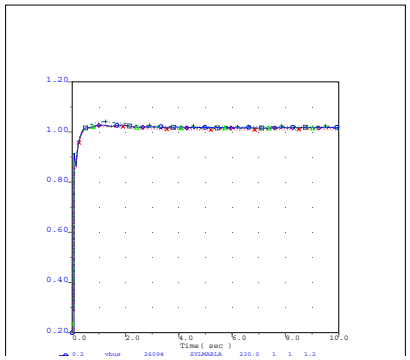


Figure 196 Bus-V:SCE 500 & 230 kV

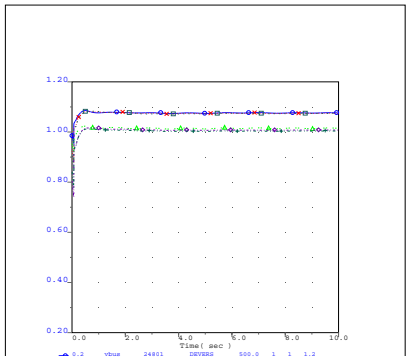


Figure 197 Bus-V: LADWP 500 kV:

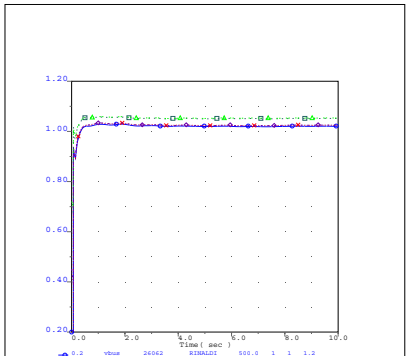


Figure 198 Bus-V:LADWP Load:

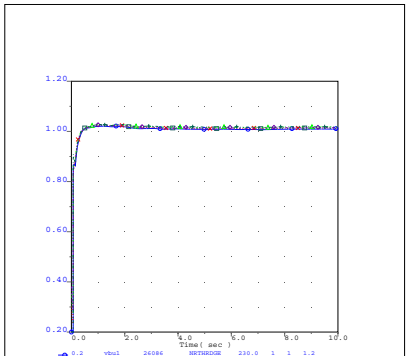


Figure 199 Bus-V: NW & S.CAL 500 kV

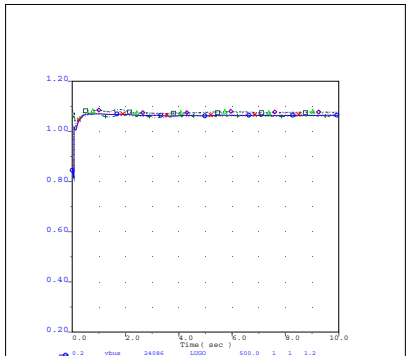


Figure 200 Bus-V: Others 500 kV

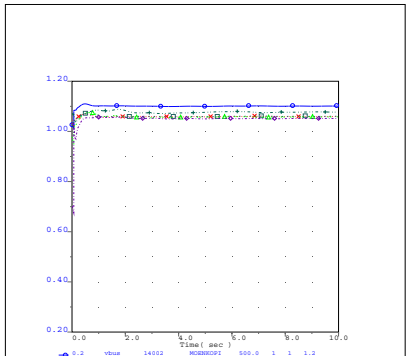


Figure 201 Bus-V: Others 230 kV

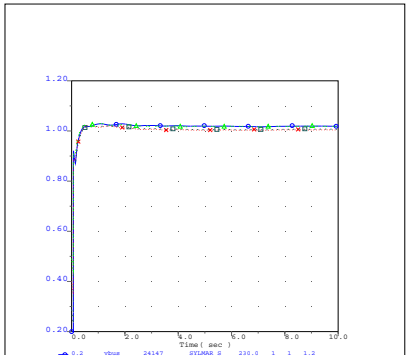


Figure 202 REL_RTR_ANG:S.Cal

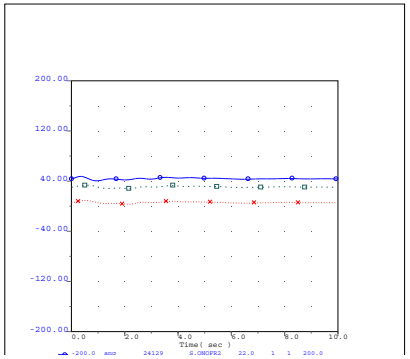


Figure 203 RELATIVE_ROTOR_ANGLE:S.Cal:

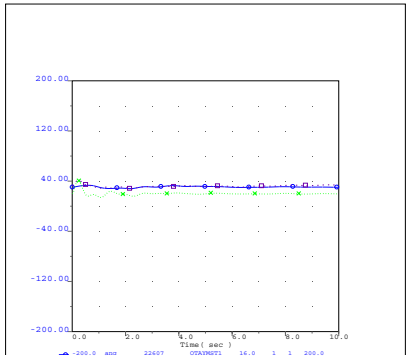
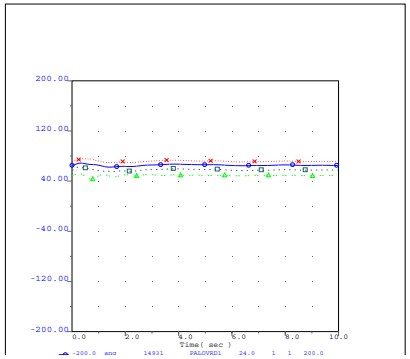


Figure 204 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: Rin-Glendl-dlo

Possible Violations: MORC 1[17]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[17] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

Figure 205 Bus-V:Owens Gorge/Rinaldi 230 kV

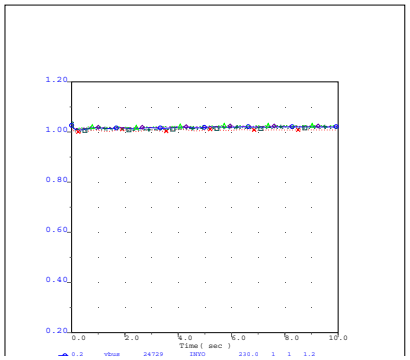


Figure 206 Bus-V:SCE North 115 kV

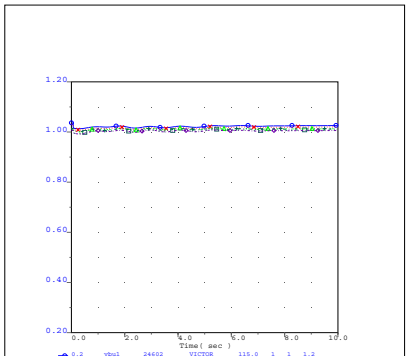


Figure 207 Bus-V:LA BASIN 230 & 138 kV

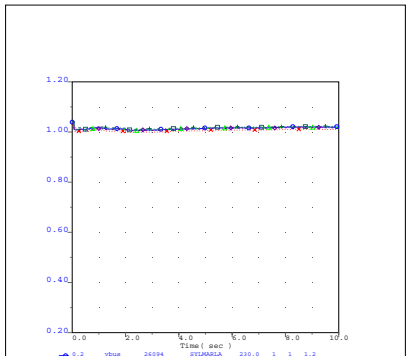


Figure 208 Bus-V:SCE 500 & 230 kV

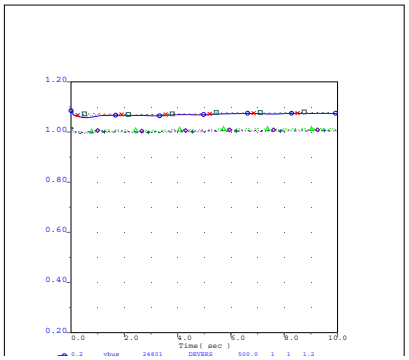


Figure 209 Bus-V: LADWP 500 kV:

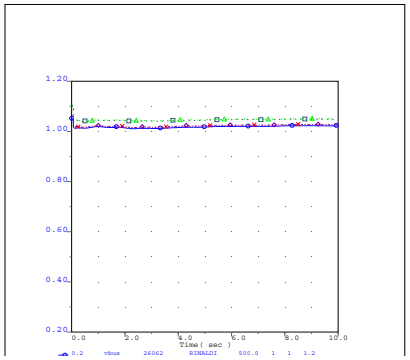


Figure 210 Bus-V:LADWP Load:

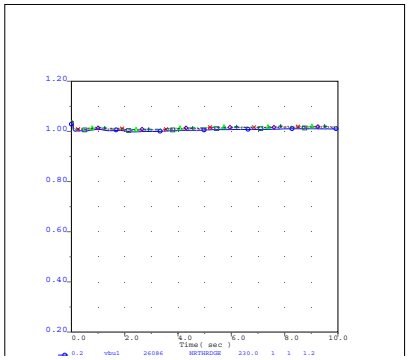


Figure 211 Bus-V: NW & S.CAL 500 kV

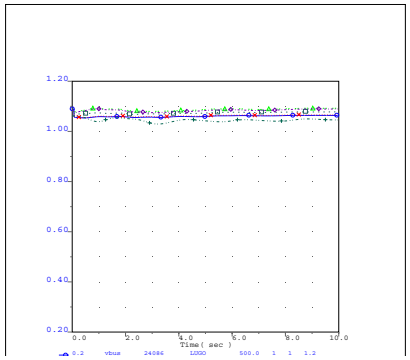


Figure 212 Bus-V: Others 500 kV

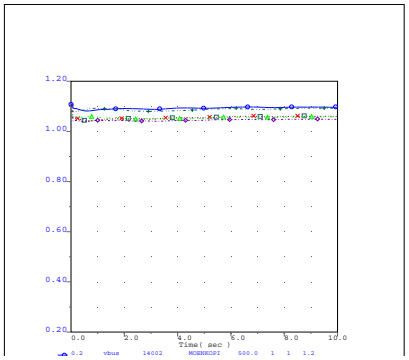


Figure 213 Bus-V: Others 230 kV

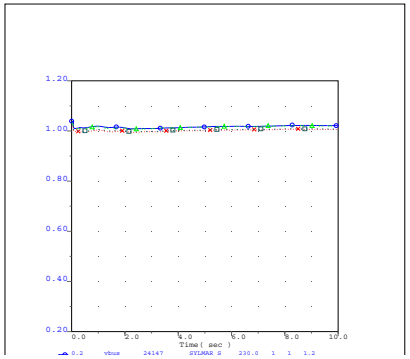


Figure 214 REL_RTR_ANG:S.Cal

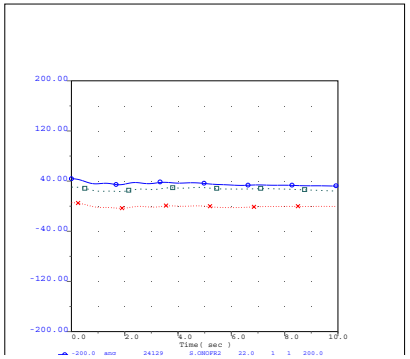


Figure 215 RELATIVE_ROTOR_ANGLE:S.Cal:

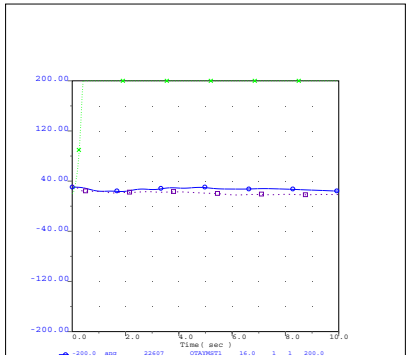
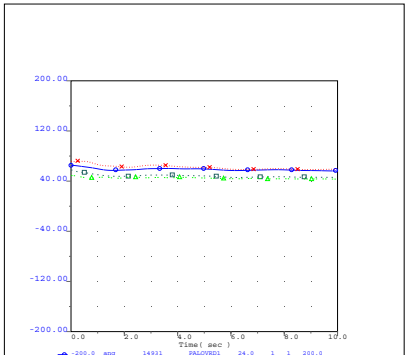


Figure 216 REL_RTR_ANG:Others



Study: BSP Case: labsp2_50iy_ov_0og Contingency: IPP-bipolar-upc

Possible Violations: MORC 1[18]- None MORC 2- None FREQ Dip- None

Buses with post-tran changes >5%: None, >10%: None

[18] WECC MORC1 violation criteria: Voltage dev. >=25%(load), >=30%(others), MORC2: Voltage dev. >=20% for 20cycles. FREQ: 0.66%(0.4 Hz) dip.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE BEACON SOLAR ENERGY PROJECT	DOCKET NO. 08-AFC-2 **PROOF OF SERVICE** (Revised 1/13/09)

INSTRUCTIONS: All parties shall either (1) send an original signed document plus 12 copies or (2) mail one original signed copy AND e-mail the document to the address for the docket as shown below, AND (3) all parties shall also send a printed or electronic copy of the document, which includes a proof of service declaration to each of the individuals on the proof of service list shown below:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-2
1516 Ninth Street, MS-14
Sacramento, CA 95814-5512
docket@energy.state.ca.us

APPLICANT	**APPLICANT'S CONSULTANTS**
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APPLICANT'S COUNSEL Jane Luckhardt, Esq. Downey Brand, LLP 621 Capitol Mall, 18th Floor Sacramento, CA 95814 jluckhardt@downeybrand.com	

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DECLARATION OF SERVICE

I, Lois Navarrot, declare that on January 27, 2009, I deposited copies of the attached **Beacon Energy Solar Project's System Impact Study dated July 31, 2008** in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of the California Code of Regulations, title 20, sections 1209, 1209.5 and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

Lois Navarrot