

# **APPENDIX C: Reliability Assessment Study Results**

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Table with columns for study area, equipment ID, equipment name, and 15 columns of reliability metrics (P6, L-1/L-1, <95%, <95%, <95%, <95%, <95%, <95%, <95%, <95%, <95%, <95%, <95%, <95%, <95%). Includes rows for various systems like ARCO 230.0, MANNING-MIDWAY, and LOSBANOS.









High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)							Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2032 Winter Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring Off-Peak COI	2027 SP High CEC Forecast	
DIABLO 500 kV	Normal Conditions	P0	normal		within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	system adjustments after the first
	Two Statcoms on Gates	P6	S-1/S-1		N/A	1.100	within limits	within limits	within limits	within limits	within limits	N/A	N/A	1.100	
	Two Statcoms on Round Mountain	P6	S-1/S-1		within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	
GATES 500 kV	Normal Conditions	P6	S-1/S-1		within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	
GATES 500 kV	Two Statcoms on Gates	P6	S-1/S-1		N/A	within limits	within limits	within limits	within limits	within limits	within limits	N/A	N/A	within limits	
GATES 500 kV	Two Statcoms on Round Mountain	P6	S-1/S-1		within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	
MIDWAY 500 kV	Normal Conditions	P6	S-1/S-1		within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	
MIDWAY 500 kV	Two Statcoms on Gates	P6	S-1/S-1		N/A	within limits	within limits	within limits	within limits	within limits	within limits	N/A	N/A	within limits	
MIDWAY 500 kV	Two Statcoms on Round Mountain	P6	S-1/S-1		within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	
Round Mountain 500 kV	Normal Conditions	P6	S-1/S-1		within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	
Round Mountain 500 kV	Two Statcoms on Gates	P6	S-1/S-1		N/A	within limits	within limits	within limits	within limits	within limits	within limits	N/A	N/A	within limits	
Round Mountain 500 kV	Two Statcoms on Round Mountain	P6	S-1/S-1		within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	within limits	
Low voltages in the Las Aguilas-Moss Landing area	Mosslanding-Los Banos 500 kV & Tesla-Metcalf 500 kV	P6	L-1/L-1		insufficient reactive margin	No Issue	No Issue	No Issue	No Issue	No Issue	No Issue	insufficient reactive margin	No Issue	No Issue	

Substation	Contingency (All and Worst PE	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2031 Winter Off-Peak	2023 SP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast		2023 SpOP HI Renew & Min Gas Gen
NONE over 8%														

Study Area:

PG&E Bulk

Transient Stability



Contingency	Category	Category Description	2024-SOP	2027-HS	2032-HS	2032-SOP	2027-HS-HICEC	2024-SOP-COI	Potential Mitigation Solutions/Comments
P1_2-0. ROUND MT-RM_DRS #1 500KV LINE	P1	L-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	Re-evaluate with increased pre-contingency var support at Monta Vista 230kV in 2032 scenarios
P1_2-1. ROUND MT-RM_DRS #2 500KV LINE	P1	L-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	no issues	no issues	Re-evaluate with increased pre-contingency var support at Monta Vista 230kV in 2032 scenarios
P1_2-2. TABLE MTN-VACA-DIX #1 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Re-evaluate with increased pre-contingency var support at Monta Vista 230kV in 2032 scenarios
P1_2-3. TABLE MTN-TESLA #1 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Significant # of voltage dips in 2032-SOP case. Lesser # for 2032 HS. Area modeling to be investigated
P1_2-4. OLINDA-TRACY #1 500KV LINE	P1	L-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	Dip in Tesla 500kV voltage in 2032-SOP warrants investigation
P1_2-5. VACA-DIX-TESLA #1 500KV LINE	P1	L-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	Voltage dips at Olinda, Tesla, Collinsville & Tracy 500kV suggests wider area concerns in 2032 SOP. Re-evaluation of var equipment settings and re-run required.
P1_2-6. TRACY-TESLA #1 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	no issues	Re-evaluate with increased pre-contingency var support at Montavis 230kV
P1_2-7. TRACY-LOSBANOS #1 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	Excessive # of voltage dips >30 cycles seen for 2032SOP. Modeling and pre-contingency var settings to be re-evaluated
P1_2-8. TESLA-METCALF #1 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	Significant # of voltage dips for 230kV and lower buses seen for 2032SOP.
P1_2-9. TESLA-LOSBANOS #1 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	Excessive # of voltage dips >30 cycles seen for 2032SOP. Modeling and pre-contingency var settings to be re-evaluated
P1_2-10. METCALF-MOSSLAND #1 500KV LINE	P1	L-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	Voltage dips seen primarily at 60kV and lower buses for 2032SOP and 2032HS cases
P1_2-12. LOSBANOS-GATES #3 500KV LINE	P1	L-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	Re-evaluate with increased pre-contingency var support at Montavis 230kV
P1_2-13. LOSBANOS-GATES #1 500KV LINE	P1	L-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	Voltage dips at Tesla 500kV and Collinsville, Pittsburgh and adjacent 230kV buses seen in 2032SOP. Possible var support required in Bay Area.
P1_2-14. LOSBANOS-MIDWAY #1 500KV LINE	P1	L-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	Voltage dips at Tesla 500kV and Collinsville, Pittsburgh and adjacent 230kV buses seen in 2032SOP. Possible var support required in Bay Area.
P1_2-15. GATES-DIABLOCNYSN #1 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Voltage dips at Tesla 500kV and Collinsville, Pittsburgh and adjacent 230kV buses seen in 2032SOP. Possible var support required in Bay Area.
P1_2-16. GATES-MIDWAY #1 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Voltage dips at Tesla 500kV and Collinsville, Pittsburgh and adjacent 230kV buses seen in 2032SOP. Possible var support required in Bay Area.
P1_2-17. DIABLOCNYSN-MIDWAY #2 500KV LINE	P1	L-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	Voltage dip at Tesla 500kV may be acceptable for 2032SP and 2032HS.
P1_2-18. DIABLOCNYSN-MIDWAY #3 500KV LINE	P1	L-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	Voltage dips of concern seen only at 230kV buses and below for 2032SP and 2032HS scenarios
P1_2-19. MIDWAY-VINCENT #1 500KV LINE	P1	L-1	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Re-evaluate with increased pre-contingency var support at Monta Visa, Saratoga, etc at 230kV
P1_2-20. MIDWAY-VINCENT #2 500KV LINE	P1	L-1	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	no issues	Potential WECC/NERC criteria violation	Variance with P1_2-19 requires investigation
P1_2-21. MIDWAY-WIRLWIND #3 500KV LINE	P1	L-1	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	no issues	Potential WECC/NERC criteria violation	Comparable results as P1_2-20
P1_3-5. VACA-DIX #11 500/230KV TRANSFORMER	P1	T-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	Voltage dips at Vaca Dixon, Collinsville, Tracy, Tesla 500kV noted for 2032SOP
P1_3-6. VACA-DIX #12 500/230KV TRANSFORMER	P1	T-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	Comparable results as P1_3-5
P1_3-8. TESLA D #4 500/230KV TRANSFORMER	P1	T-1	no issues	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	Voltage dips at Vaca Dixon, Collinsville, Tracy, Tesla 500kV noted for 2032SOP
P1_3-9. TESLA C #6 500/230KV TRANSFORMER	P1	T-1	no issues	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	Comparable results as P1_3-8
P1_3-10. METCALF #11 500/230KV TRANSFORMER	P1	T-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	Voltage dips seen on Table Mtn, Vaca-Dixon, Collinsville, Tracey 500kV for 2032SOP.
P1_3-12. METCALF #13 500/230KV TRANSFORMER	P1	T-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	Comparable results as P1_3-10
P1_3-14. LOSBANOS #1 500/230KV TRANSFORMER	P1	T-1	no issues	no issues	N/A	Potential WECC/NERC criteria violation	no issues	no issues	Voltage dips seen on Table Mtn, Vaca-Dixon, Collinsville, Tracey 500kV for 2032SOP
P6_1_1-12. TABLE MTN-TESLA #1 500KV LINE & VACA-DIX-TESLA #1 500K	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	May need additional dynamic reactive support in the Bay Area
P6_1_1-13. TABLE MTN-TESLA #1 500KV LINE & TRACY-TESLA #1 500KV L	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	N/A	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	May need additional dynamic reactive support in the Bay Area
P6_1_1-14. TABLE MTN-TESLA #1 500KV LINE & TESLA-METCALF #1 500KV	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	May need additional dynamic reactive support in the Bay Area

Study Area:

PG&E Bulk

Transient Stability



P6_1_1-15. TABLE MTN-TESLA #1 500KV LINE & TESLA-LOSBANOS #1 500K	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	May need additional dynamic reactive support in the Bay Area
P6_1_1-16. VACA-DIX-TESLA #1 500KV LINE & TRACY-TESLA #1 500KV LI	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-17. VACA-DIX-TESLA #1 500KV LINE & TESLA-METCALF #1 500KV	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-18. VACA-DIX-TESLA #1 500KV LINE & TESLA-LOSBANOS #1 500KV	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-19. TRACY-TESLA #1 500KV LINE & TESLA-METCALF #1 500KV LIN	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	N/A	N/A	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-20. TRACY-TESLA #1 500KV LINE & TESLA-LOSBANOS #1 500KV LI	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	N/A	N/A	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-21. TESLA-METCALF #1 500KV LINE & TESLA-LOSBANOS #1 500KV	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-74. OLINDA-TRACY #1 500KV LINE & TRACY-LOSBANOS #1 500KV L	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-75. TRACY-TESLA #1 500KV LINE & TRACY-LOSBANOS #1 500KV LI	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-8. TABLE MTN-TESLA #1 500KV LINE & TESLA #2 500/230KV BAN	P6	L-1/T-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	May need additional dynamic reactive support in the Bay Area
P6_1_2-9. VACA-DIX-TESLA #1 500KV LINE & TESLA #2 500/230KV BANK	P6	L-1/T-1	no issues	Potential WECC/NERC criteria violation	N/A	N/A	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-11. TESLA-METCALF #1 500KV LINE & TESLA #2 500/230KV BANK	P6	L-1/T-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-12. TESLA-LOSBANOS #1 500KV LINE & TESLA #2 500/230KV BANK	P6	L-1/T-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-15. TESLA-METCALF #1 500KV LINE & METCALF #11 500/230KV BA	P6	L-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-39. OLINDA-TRACY #1 500KV LINE & TRACY #1 500/230KV BANK	P6	L-1/T-1	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-40. TRACY-TESLA #1 500KV LINE & TRACY #1 500/230KV BANK	P6	L-1/T-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-41. TRACY-LOSBANOS #1 500KV LINE & TRACY #1 500/230KV BANK	P6	L-1/T-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-42. ROUND MT-RM_DRS #1 500KV LINE & RM_DRS #1 500/230KV BA	P6	L-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	no issues	no issues	Review of 2032 base case and var support requirements
P6_1_2-43. ROUND MT-RM_DRS #2 500KV LINE & RM_DRS #1 500/230KV BA	P6	L-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	no issues	no issues	Review of 2032 base case and var support requirements
P6_1_2-44. TABLE MTN-RM_DRS #1 500KV LINE & RM_DRS #1 500/230KV B	P6	L-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	no issues	no issues	Review of 2032 base case and var support requirements
P6_1_2-45. TABLE MTN-RM_DRS #2 500KV LINE & RM_DRS #1 500/230KV B	P6	L-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	no issues	no issues	Review of 2032 base case and var support requirements
P6_2_2-0. TESLA #2 & #4 500/230KV BANK	P6	T-1/T-1	no issues	no issues	no issues	N/A	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_2_2-5. TRACY #1 & #2 500/230KV BANK	P6	T-1/T-1	no issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	no issues	May need additional dynamic reactive support in the Bay Area
P6_2_2-10. ROUND MOUNTAIN 500/230KV & TABLE MOUNTAIN 500/230KV	P6	T-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	no issues	no issues	Review of 2032 base case and var support requirements
P6_2_2-11. TABLE MOUNTAIN 500/230KV & VACA DIXON 500/230KV	P6	T-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	no issues	Review of 2032 base case and var support requirements
P6_2_2-12. TABLE MOUNTAIN 500/230KV & TESLA 500/230KV	P6	T-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	no issues	Review of 2032 base case and var support requirements
P6_2_2-13. VACA DIXON 500/230KV & TESLA 500/230KV	P6	T-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	Potential WECC/NERC criteria violation	no issues	Review of 2032 base case and var support requirements
P6_2_2-19. METCALF 500/230KV & MOSS LANDING 500/230KV	P6	T-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	no issues	no issues	Review of 2032 base case and var support requirements
P6_2_2-20. MOSS LANDING 500/230KV & LOS BANOS 500/230KV	P6	T-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	no issues	no issues	Review of 2032 base case and var support requirements
P6_2_2-21. LOS BANOS 500/230KV & GATES 500/230KV	P6	T-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	no issues	no issues	Review of 2032 base case and var support requirements
P6_2_2-22. LOS BANOS 500/230KV & MIDWAY 11 500/230KV	P6	T-1/T-1	no issues	no issues	Potential WECC/NERC criteria violation	N/A	no issues	no issues	Review of 2032 base case and var support requirements

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)													Potential Mitigation Solutions	
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2032 SP with Additional Transportation Electrification		

No single contingency resulted in total load drop of more than 250 MW

Study Area: **PG&E Bulk**

**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)													Potential Mitigation Solutions
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2032 SP with Additional Transportation Electrification	

No single source substation with more than 100 MW



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Bridgeville - Garberville 60 kV Line (BRDGVLE-FRUTLDTJ)	P1-2:A1:5:_KEKAWAKA-GRBRVLE-LYTNVLE 60KV [0]	P1	N-1	86	93	134	52	56	71	74	86	83	51	94	145	Garberville Area Reinforcement	
Bridgeville - Garberville 60 kV Line (BRDGVLE-FRUTLDTJ)	P1-2:A1:5:_KEKAWAKA-GRBRVLE-LYTNVLE 60KV [0]	P1	N-1	63	76	108	44	49	54	60	68	67	44	76	145	Garberville Area Reinforcement	
Bridgeville - Garberville 60 kV Line (BRDGVLE-FRUTLDTJ)	P1-2:A1:5:_KEKAWAKA-GRBRVLE-LYTNVLE 60KV [0]	P1	N-1	57	71	101	42	47	52	57	65	64	42	71	145	Garberville Area Reinforcement	
Bridgeville - Garberville 60 kV Line (BRDGVLE-FRUTLDTJ)	KEKAWAKA-GRBRVLE-LYTNVLE 60KV [0] & FAIRHAVN 13.80KV GEN UNIT 1	P3	G-1/N-1	<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	N/A	Continue to monitor	
Bridgeville - Garberville 60 kV Line (BRDGVLE-FRUTLDTJ)	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110] & P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P6	N-1-1	83	83	70	140	150	123	107	105	106	141	82	N/A	Generation Re-dispatch	
Bridgeville-Cottonwood 115 kV Line	HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP & HMBOBAYPPB 13.80KV GEN UNIT 7	P3	G-1/N-1	<100	<100	104	<100	<100	<100	<100	<100	<100	<100	<100	N/A	Continue to monitor	
Bridgeville-Cottonwood 115 kV Line	P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P6	N-1-1	72	75	106	10	13	28	37	38	38	14	76	N/A	Continue to monitor	
Garberville-Kekawaka 60 kV Line	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVLE_FRUTLDTJ	P1	N-1	107	110	101	53	47	76	79	76	109	52	110	106	Garberville Area Reinforcement	
Garberville-Kekawaka 60 kV Line	BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVLE_FRUTLDTJ & FAIRHAVN 13.80KV GEN UNIT 1	P3	G-1/N-1	<100	111	101	<100	<100	<100	<100	<100	<100	<100	112.58	N/A	Garberville Area Reinforcement	
Garberville-Kekawaka 60 kV Line	BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVLE_FRUTLDTJ & HMBOBAYPPB 13.80KV GEN UNIT	P3	G-1/N-1	<100	112	101	<100	<100	<100	<100	<100	<100	<100	110.47	N/A	Garberville Area Reinforcement	
Garberville-Kekawaka 60 kV Line	P5-5C:A1:2:_BRIDGEVILLE 115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	107	110	101	53	48	76	79	76	108	53	111	106	Install redundant battery supply	
GRBRVLE-KEKAWAKAJCT 60 kV	P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	20	22	NConv	88	88	44	29	25	21	89	24	N/A	Garberville Area Reinforcement	
Humboldt Bay - Rio Dell Jct 60 kV Line	P1-3:A1:3:_BRDGVLE 115/60KV TB 1	P1	N-1	88	94	103	86	74	68	68	75	83	91	94	125	Garberville Area Reinforcement	
Humboldt Bay - Rio Dell Jct 60 kV Line	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	81	87	111	94	86	72	70	77	86	98	87	127	Garberville Area Reinforcement	
Humboldt Bay - Rio Dell Jct 60 kV Line	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	81	87	110	94	86	72	70	77	86	98	87	127	Garberville Area Reinforcement	
Humboldt Bay - Rio Dell Jct 60 kV Line	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	81	87	110	94	86	72	70	77	86	98	87	127	Garberville Area Reinforcement	
Humboldt Bay - Rio Dell Jct 60 kV Line	BRDGVLE 115/60KV TB 1 & PAC.LUMB 13.80KV GEN UNIT 1	P3	G-1/N-1	<100	98	129	<100	<100	<100	<100	<100	<100	<100	99	N/A	Garberville Area Reinforcement	
Humboldt Bay - Rio Dell Jct 60 kV Line	BRDGVLE 115/60KV TB 1 & PAC.LUMB 13.80KV GEN UNIT 1	P3	G-1/N-1	<100	88	108	<100	<100	<100	<100	<100	<100	<100	89	N/A	Garberville Area Reinforcement	
Humboldt Bay - Rio Dell Jct 60 kV Line	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110] & P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115KV [1810]	P6	N-1-1	81	87	110	94	86	86	85	93	86	96	87	N/A	Garberville Area Reinforcement	
Humboldt Bay - Rio Dell Jct 60 kV Line	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115KV [1810] & P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P6	N-1-1	20	28	32	145	158	110	96	102	99	143	20	N/A	Generation Re-dispatch	
Humboldt-Trinity 115 kV Line	P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	NConv	143	133	18	24	40	56	57	59	21	144	N/A	Existing RAS	
KEKAWAKAJCT-LYTNVLE 60 kV	P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	21	22	NConv	88	88	43	28	25	20	89	25	N/A	Garberville Area Reinforcement	
Kekawaka-Laytonville 60 kV Line	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVLE_FRUTLDTJ	P1	N-1	108	110	101	54	49	89	89	86	109	54	109	106	Garberville Area Reinforcement	
Kekawaka-Laytonville 60 kV Line	BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVLE_FRUTLDTJ & FAIRHAVN 13.80KV GEN UNIT 1	P3	G-1/N-1	<100	111	101	<100	<100	<100	<100	<100	<100	<100	110	N/A	Garberville Area Reinforcement	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Kekawaka-Laytonville 60 kV Line	BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVLE_FRUTLDJT & HMBOBAYPPB 13.80KV GEN UNIT 4	P3	G-1/N-1	<100	109	102	<100	<100	<100	<100	<100	<100	<100	111	N/A	Garberville Area Reinforcement	
Kekawaka-Laytonville 60 kV Line	BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVLE_FRUTLDJT & HMBOBAYPPB 13.80KV GEN UNIT 4	P3	G-1/N-1	<100	110	101	<100	<100	<100	<100	<100	<100	<100	111	N/A	Garberville Area Reinforcement	
Kekawaka-Laytonville 60 kV Line	P5-5C:A1:2:_BRIDGEVILLE 115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	108	110	101	54	50	89	89	86	109	54	111	106	Install redundant battery supply	
Newburg-Rio Dell Tap 60 kV Line	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	126	128	112	87	86	29	17	7	9	84	129	122	Garberville Area Reinforcement	
Newburg-Rio Dell Tap 60 kV Line	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	121	92	95	29	16	10	7	89	NConv	129	Garberville Area Reinforcement	
Newburg-Rio Dell Tap 60 kV Line	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	81	86	78	97	82	71	68	69	91	102	84	N/A	Sensitivity only	
Newburg-Rio Dell Tap 60 kV Line	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	81	86	78	97	82	71	68	69	91	102	84	N/A	Sensitivity only	
Newburg-Rio Dell Tap 60 kV Line	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	126	128	112	87	86	29	17	7	9	84	129	122	Garberville Area Reinforcement	
Newburg-Rio Dell Tap 60 kV Line	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	81	86	78	97	82	71	68	69	91	102	84	N/A	Sensitivity only	
Newburg-Rio Dell Tap 60 kV Line	BRDGVLE 115/60KV TB 1 & PAC.LUMB 13.80KV GEN UNIT 1	P3	G-1/N-1	<100	100	103	<100	<100	<100	<100	<100	<100	<100	100	N/A	Garberville Area Reinforcement	
Newburg-Rio Dell Tap 60 kV Line	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	126	128	112	87	86	29	17	7	9	84	129	122	Install redundant relay	
Newburg-Rio Dell Tap 60 kV Line	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	NConv	NConv	121	92	95	29	16	10	7	89	NConv	129	Install redundant battery supply	
Newburg-Rio Dell Tap 60 kV Line	P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP & P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115KV [1810]	P6	N-1-1	17	19	54	164	179	123	102	105	109	160	19	N/A	Generation Re-dispatch	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	133	136	112	69	73	23	13	13	2	67	134	128	Garberville Area Reinforcement	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	139	146	124	65	69	20	8	17	4	63	146	128	Garberville Area Reinforcement	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	139	145	124	65	68	20	8	12	5	62	146	128	Garberville Area Reinforcement	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	117	74	82	23	12	16	2	71	NConv	132	Garberville Area Reinforcement	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	128	70	77	20	7	12	7	67	NConv	132	Garberville Area Reinforcement	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	128	70	76	20	7	12	7	67	NConv	132	Garberville Area Reinforcement	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	133	136	112	69	73	23	13	13	2	67	134	128	Garberville Area Reinforcement	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	139	146	124	65	69	20	8	17	4	63	146	128	Garberville Area Reinforcement	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	139	145	124	65	68	20	8	12	5	62	146	128	Garberville Area Reinforcement	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	133	136	112	69	73	23	13	13	2	67	134	128	Install redundant relay	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	139	146	124	65	69	20	8	17	4	63	146	128	Install redundant relay	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	139	145	124	65	68	20	8	12	5	62	146	128	Install redundant relay	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	NConv	NConv	117	74	82	23	12	16	2	71	NConv	132	Install redundant battery supply	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	NConv	NConv	128	70	77	20	7	12	7	67	NConv	132	Install redundant battery supply	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	NConv	NConv	128	70	76	20	7	12	7	67	NConv	132	Install redundant battery supply	

2022-2023 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt**

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115KV [1810] & P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P6	N-1-1	26	23	89	134	151	106	86	83	88	131	34	N/A	Generation Re-dispatch	
Rio Dell Tap 60 kV Line(SCOTIATP-RIODLLTP)	P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	38	105	63	35	23	21	17	34	16	36	105	N/A	Generation Re-dispatch	
Trinity-Maple Creek 60 kV Line	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	99	102	98	29	36	2	8	27	21	25	103	105	Generation Re-dispatch	
Trinity-Maple Creek 60 kV Line	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	99	103	98	29	36	3	8	27	21	26	102	105	Generation Re-dispatch	
Trinity-Maple Creek 60 kV Line	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	99	102	98	29	36	2	8	27	21	25	103	105	Generation Re-dispatch	
Trinity-Maple Creek 60 kV Line	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	99	103	98	29	36	3	8	27	21	26	102	105	Generation Re-dispatch	
Trinity-Maple Creek 60 kV Line	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	99	102	98	29	36	2	8	27	21	25	103	105	Install redundant relay	
Trinity-Maple Creek 60 kV Line	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	99	103	98	29	36	3	8	27	21	26	102	105	Install redundant relay	
Trinity-Maple Creek 60 kV Line	P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	28	28	NConv	71	89	37	20	18	16	64	31	N/A	Continue to monitor	
Humboldt - Eureka 60 kV Line (HUMBOLDT-HARRIS)	P7-1:A1:2:_HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor	
Humboldt - Eureka 60 kV Line (HUMBOLDT-HARRIS)	P7-1:A1:2:_HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor	
Humboldt Bay - Humboldt No.1 60 kV Line (HUMBOLDT-HMBLT JT)	P7-1:A1:2:_HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	Continue to monitor	
Humboldt-Trinity 115 kV Line	P7-1:A1:2:_HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Continue to monitor	

Study Area: **PG&E Central Coast/Los Padres**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
HUMBOLDT 115 kV	Base Case	P0	Normal	High	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	1.07	0.97	0.97	NA	System adjustments or voltage support if needed	
LOW GAP1 115 kV	Base Case	P0	Normal	High	1.01	1.01	0.99	1.00	1.01	1.01	1.01	1.00	1.00	1.07	1.00	1.01	NA	System adjustments or voltage support if needed
BRDGVLE 115 kV	Base Case	P0	Normal	High	1.00	1.00	0.98	1.00	1.00	1.00	0.99	0.99	1.07	1.00	1.00	NA	System adjustments or voltage support if needed	
HMBOBAYPPB 115 kV	Base Case	P0	Normal	High	0.99	0.98	0.98	0.99	0.99	0.99	0.99	0.99	1.07	0.99	0.98	NA	System adjustments or voltage support if needed	
LP_FLKBD 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
JANS CRK 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
ARCTAJT1 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
ARC_JTZX 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
ARCTA_J2 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
HUMBOLDT 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.06	1.03	1.03	NA	System adjustments or voltage support if needed	
HARRIS 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
HARRISST 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
EUREKA 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.02	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
EUREKA A 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.02	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
HMBLT JT 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.03	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.03	NA	System adjustments or voltage support if needed	
HMBLT BY 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.02	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	NA	System adjustments or voltage support if needed	
HMBOBAYPPC 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.02	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	NA	System adjustments or voltage support if needed	
HMBOBAYPPA 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.02	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	NA	System adjustments or voltage support if needed	
SCOTIATP 60 kV	Base Case	P0	Normal	High	1.03	1.03	0.99	1.03	1.03	1.02	1.01	1.01	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
RIO DELL 60 kV	Base Case	P0	Normal	High	1.03	1.03	0.99	1.03	1.03	1.02	1.01	1.01	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
SWNS FLT 60 kV	Base Case	P0	Normal	High	1.00	1.00	0.97	1.00	1.00	0.99	0.99	0.98	1.05	1.00	1.00	NA	System adjustments or voltage support if needed	
SCTIATP2 60 kV	Base Case	P0	Normal	High	1.03	1.03	0.99	1.03	1.03	1.02	1.01	1.01	1.05	1.03	1.03	NA	System adjustments or voltage support if needed	
BRDGVLE 60 kV	Base Case	P0	Normal	High	0.99	0.99	0.96	0.99	0.99	0.98	0.98	0.97	1.05	0.99	0.99	NA	System adjustments or voltage support if needed	
FRUITLND 60 kV	Base Case	P0	Normal	Low	0.97	0.97	0.89	0.98	1.01	0.94	0.94	0.89	1.03	0.97	0.96	0.89	Continue to monitor	
FRT SWRD 60 kV	Base Case	P0	Normal	Low	0.96	0.96	0.88	0.98	1.02	0.93	0.92	0.89	1.02	0.97	0.96	0.89	Continue to monitor	
GRBRVLE 60 kV	Base Case	P0	Normal	Low	0.97	0.97	0.88	0.99	1.03	0.92	0.90	0.88	1.03	0.98	0.97	0.89	Continue to monitor	
KEKAWAKA 60 kV	Base Case	P0	Normal	Low	0.97	0.97	0.89	0.99	1.03	0.93	0.92	0.90	1.02	0.98	0.97	0.90	Continue to monitor	
FRUITLND 60 kV	Base Case	P0	Normal	Low	0.97	0.97	0.89	0.98	1.01	0.94	0.94	0.89	1.03	0.97	0.96	0.89	Continue to monitor	
FRT SWRD 60 kV	Base Case	P0	Normal	Low	0.96	0.96	0.88	0.98	1.02	0.93	0.92	0.89	1.02	0.97	0.96	0.89	Continue to monitor	
GRBRVLE 60 kV	Base Case	P0	Normal	Low	0.97	0.97	0.88	0.99	1.03	0.92	0.90	0.88	1.03	0.98	0.97	0.89	Continue to monitor	
KEKAWAKA 60 kV	Base Case	P0	Normal	Low	0.97	0.97	0.89	0.99	1.03	0.93	0.92	0.90	1.02	0.98	0.97	0.90	Continue to monitor	
FRUITLND 60 kV	Base Case	P0	Normal	Low	0.97	0.97	0.89	0.98	1.01	0.94	0.94	0.89	1.03	0.97	0.96	0.89	Continue to monitor	
FRT SWRD 60 kV	Base Case	P0	Normal	Low	0.96	0.96	0.88	0.98	1.02	0.93	0.92	0.89	1.02	0.97	0.96	0.89	Continue to monitor	
GRBRVLE 60 kV	Base Case	P0	Normal	Low	0.97	0.97	0.88	0.99	1.03	0.92	0.90	0.88	1.03	0.98	0.97	0.89	Continue to monitor	
KEKAWAKA 60 kV	Base Case	P0	Normal	Low	Not Found	0.97	0.89	0.99	1.03	0.93	0.92	0.90	1.02	0.98	0.97	0.90	Continue to monitor	

Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
FRUITLND 60 kV	Base Case	P0	Normal	Low	0.97	0.97	0.89	0.98	1.01	0.94		0.89	1.03	0.97	0.96	0.89	Continue to monitor
FRT SWRD 60 kV	Base Case	P0	Normal	Low	0.96	0.96	0.88	0.98	1.02	0.93		0.89	1.02	0.97	0.96	0.89	Continue to monitor
GRBRVLE 60 kV	Base Case	P0	Normal	Low	0.97	0.97	0.88	0.99	1.03	0.92		0.88	1.03	0.98	0.97	0.89	Continue to monitor
KEKAWAKA 60 kV	Base Case	P0	Normal	Low	0.97	0.97	0.89	0.99	1.03	0.93		0.90	1.02	0.98	0.97	0.90	Continue to monitor
FRUITLND 60 kV	P1-1:A1:2:_PAC.LUMB 13.80KV GEN UNIT 1	P1	N-1	Low	0.97	0.97	0.88	0.98	1.01	0.94	0.94	0.89	1.03	0.97	0.96	0.88	Continue to monitor
FRT SWRD 60 kV	P1-1:A1:2:_PAC.LUMB 13.80KV GEN UNIT 1	P1	N-1	Low	0.96	0.96	0.88	0.98	1.02	0.93	0.92	0.89	1.02	0.97	0.96	0.87	Continue to monitor
GRBRVLE 60 kV	P1-1:A1:2:_PAC.LUMB 13.80KV GEN UNIT 1	P1	N-1	Low	0.97	0.97	0.87	0.99	1.03	0.92	0.90	0.88	1.03	0.98	0.97	0.87	Continue to monitor
KEKAWAKA 60 kV	P1-1:A1:2:_PAC.LUMB 13.80KV GEN UNIT 1	P1	N-1	Low	0.97	0.97	0.89	0.99	1.03	0.93	0.92	0.90	1.02	0.98	0.97	N/A	Continue to monitor
FRUITLND 60 kV	P1-1:A1:3:_PAC.LUMB 13.80KV GEN UNIT 2	P1	N-1	Low	0.97	0.97	0.88	0.98	1.01	0.94	0.94	0.89	1.03	0.97	0.96	0.88	Continue to monitor
FRT SWRD 60 kV	P1-1:A1:3:_PAC.LUMB 13.80KV GEN UNIT 2	P1	N-1	Low	0.96	0.96	0.88	0.98	1.02	0.93	0.92	0.89	1.02	0.97	0.96	0.87	Continue to monitor
GRBRVLE 60 kV	P1-1:A1:3:_PAC.LUMB 13.80KV GEN UNIT 2	P1	N-1	Low	0.97	0.97	0.87	0.99	1.03	0.92	0.90	0.88	1.03	0.98	0.97	0.87	Continue to monitor
KEKAWAKA 60 kV	P1-1:A1:3:_PAC.LUMB 13.80KV GEN UNIT 2	P1	N-1	Low	0.97	0.97	0.89	0.99	1.03	0.93	0.92	0.90	1.02	0.98	0.97	0.89	Continue to monitor
FRUITLND 60 kV	P1-1:A1:4:_HMBOBAYPPB 13.80KV GEN UNIT 5	P1	N-1	Low	0.97	0.97	0.88	0.99	1.01	0.94	0.94	0.89	1.03	0.98	0.96	0.88	Continue to monitor
KEKAWAKA 60 kV	P1-1:A1:4:_HMBOBAYPPB 13.80KV GEN UNIT 5	P1	N-1	Low	0.97	0.97	0.89	1.00	1.03	0.93	0.92	0.90	1.02	0.99	0.97	0.89	Continue to monitor
FRUITLND 60 kV	P1-1:A1:5:_HMBOBAYPPB 13.80KV GEN UNIT 6	P1	N-1	Low	0.97	0.97	0.88	0.99	1.01	0.94	0.94	0.89	1.03	0.98	0.96	0.88	Continue to monitor
FRT SWRD 60 kV	P1-1:A1:5:_HMBOBAYPPB 13.80KV GEN UNIT 6	P1	N-1	Low	0.96	0.96	0.88	0.99	1.02	0.93	0.92	0.89	1.02	0.98	0.96	0.88	Continue to monitor
GRBRVLE 60 kV	P1-1:A1:5:_HMBOBAYPPB 13.80KV GEN UNIT 6	P1	N-1	Low	0.97	0.97	0.87	1.00	1.03	0.92	0.90	0.88	1.03	0.99	0.97	0.88	Continue to monitor
KEKAWAKA 60 kV	P1-1:A1:5:_HMBOBAYPPB 13.80KV GEN UNIT 6	P1	N-1	Low	0.97	0.97	0.89	1.00	1.03	0.93	0.92	0.90	1.02	0.99	0.97	0.89	Continue to monitor
FRT SWRD 60 kV	P1-2:A1:1:_HUMBOLDT- BRIDGEVILLE 115KV [1810]	P1	N-1	Low	1.00	1.00	0.90	1.01	1.02	0.95	0.94	0.90	1.01	1.00	1.00	0.90	Continue to monitor
GRBRVLE 60 kV	P1-2:A1:1:_HUMBOLDT- BRIDGEVILLE 115KV [1810]	P1	N-1	Low	1.00	1.00	0.89	1.01	1.03	0.94	0.93	0.89	1.01	1.00	1.00	0.90	Continue to monitor
WILLWCRK 60 kV	P1-2:A1:14:_HUMBOLDT- MAPLE CREEK 60KV [7130] MOAS OPENED ON HUMBOLDT_MPLE CRK	P1	N-1	Low	0.88	1.03	1.03	0.93	0.98	0.98	0.99	1.03	0.95	0.97	1.03	N/A	Project: Willo Creek voltage support
HOOPA 60 kV	P1-2:A1:14:_HUMBOLDT- MAPLE CREEK 60KV [7130] MOAS OPENED ON HUMBOLDT_MPLE CRK	P1	N-1	Low	0.87	1.03	1.02	0.92	0.98	0.98	0.99	1.03	0.95	0.96	1.03	N/A	Project: Willo Creek voltage support
NEWBURG 60 kV	P1-2:A1:16:_HUMBOLDT BAY- RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVR_NEWBURG	P1	N-1	Low	1.01	1.00	0.89	1.00	1.01	1.00	0.99	0.95	1.05	1.00	1.00	0.87	Continue to monitor
KEKAWAKA 60 kV	P1-2:A1:2:_HUMBOLDT- TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P1	N-1	Low	0.97	0.97	0.89	0.98	1.03	0.92	0.92	0.90	1.02	0.96	0.97	N/A	Continue to monitor
FRT SWRD 60 kV	P1-2:A1:20:_ 60KV [9999] (2)	P1	N-1	Low	0.96	0.96	0.88	1.00	1.02	0.94	0.93	0.90	1.02	0.99	0.96	N/A	Continue to monitor
GRBRVLE 60 kV	P1-2:A1:20:_ 60KV [9999] (2)	P1	N-1	Low	0.97	0.97	0.88	1.01	1.03	0.93	0.92	0.89	1.03	1.00	0.97	N/A	Continue to monitor
FRUITLND 60 kV	P1-2:A1:21:_HUMBOLDT BAY- RIO DELL JCT 60KV [7100] MOAS OPENED ON NEWBURG_RIOLLTP	P1	N-1	Low	0.97	0.97	0.89	0.99	1.01	0.95	0.94	0.90	1.03	0.98	0.97	N/A	Continue to monitor

Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
GRBRVLE 60 kV	P1-2:A1:22:_RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA_SWNS FLT	P1	N-1	Low	0.96	0.96	0.87	0.98	1.03	0.91	0.90	0.87	1.03	0.98	0.96	0.87	Continue to monitor
KEKAWAKA 60 kV	P1-2:A1:22:_RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA_SWNS FLT	P1	N-1	Low	0.96	0.96	0.88	0.99	1.03	0.93	0.91	0.89	1.02	0.98	0.96	0.88	Continue to monitor
GRBRVLE 60 kV	P1-2:A1:23:_RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA_SWNS FLT (2)	P1	N-1	Low	0.96	0.96	0.87	0.99	1.03	0.92	0.90	0.87	1.03	0.98	0.96	0.87	Continue to monitor
KEKAWAKA 60 kV	P1-2:A1:23:_RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA_SWNS FLT (2)	P1	N-1	Low	0.96	0.96	0.88	0.99	1.03	0.93	0.92	0.89	1.02	0.98	0.96	N/A	Continue to monitor
FRUITLND 60 kV	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVILLE_FRUTLDJT	P1	N-1	Low	0.50	0.49	0.41	1.03	1.03	0.49	0.47	0.41	0.53	1.03	0.48	0.39	Garberville Area Reinforcement
FRT SWRD 60 kV	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVILLE_FRUTLDJT	P1	N-1	Low	0.50	0.50	0.43	1.03	1.03	0.48	0.46	0.43	0.53	1.03	0.48	0.40	Garberville Area Reinforcement
GRBRVLE 60 kV	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVILLE_FRUTLDJT	P1	N-1	Low	0.51	0.51	0.45	1.03	1.03	0.48	0.47	0.45	0.54	1.03	0.49	0.42	Garberville Area Reinforcement
KEKAWAKA 60 kV	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVILLE_FRUTLDJT	P1	N-1	Low	0.55	0.54	0.50	1.03	1.03	0.53	0.52	0.50	0.58	1.03	0.54	0.48	Garberville Area Reinforcement
GRBRVLE 60 kV	P1-2:A1:25:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON FTSWRDJT_GRBRVLE	P1	N-1	Low	0.78	0.74	0.54	1.03	1.03	0.54	0.54	0.54	0.90	1.03	0.73	0.51	Garberville Area Reinforcement
KEKAWAKA 60 kV	P1-2:A1:25:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON FTSWRDJT_GRBRVLE	P1	N-1	Low	0.80	0.76	0.58	1.03	1.03	0.59	0.59	0.58	0.90	1.03	0.74	0.56	Garberville Area Reinforcement
FRUITLND 60 kV	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	Low	0.97	0.96	0.84	0.96	1.00	0.92	0.92	0.87	1.03	0.95	0.96	0.83	Continue to monitor
FRT SWRD 60 kV	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	Low	0.96	0.96	0.83	0.96	1.00	0.91	0.90	0.87	1.02	0.94	0.96	0.83	Continue to monitor
GRBRVLE 60 kV	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	Low	0.97	0.97	0.83	0.96	1.02	0.90	0.89	0.86	1.03	0.95	0.97	0.82	Continue to monitor
KEKAWAKA 60 kV	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	Low	0.97	0.97	0.84	0.96	1.02	0.91	0.91	0.88	1.02	0.95	0.97	0.84	Continue to monitor
HUMBOLDT 115 kV	P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	0.95	0.96	0.83	0.97	0.97	0.96	0.96	0.96	1.07	0.97	0.96	0.65	Continue to monitor
LOW GAP1 115 kV	P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	0.98	1.00	0.89	1.00	1.01	1.01	1.00	1.00	1.07	1.00	1.00	0.76	Continue to monitor
BRDGVLE 115 kV	P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	0.97	0.99	0.86	1.00	1.00	1.00	0.99	0.99	1.07	1.00	0.99	0.70	Continue to monitor
HUMBOLDT 60 kV	P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.02	1.03	0.89	1.03	1.03	1.03	1.03	1.03	1.06	1.03	1.03	0.69	Continue to monitor

Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
HARRIS 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.02	1.03	0.89	1.03	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	0.69	Continue to monitor
EUREKA 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.02	1.03	0.88	1.03	1.04	1.03	1.03	1.03	1.03	1.05	1.03	1.03	0.67	Continue to monitor
EUREKA A 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.02	1.03	0.88	1.03	1.04	1.03	1.03	1.03	1.03	1.05	1.03	1.03	0.67	Continue to monitor
HMBLT BY 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.01	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.03	1.05	1.04	1.02	0.67	Continue to monitor
HMBOBAYPPC 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.01	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.03	1.05	1.04	1.02	0.67	Continue to monitor
HOOPA 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	0.97	1.03	0.89	1.00	1.01	1.01	1.01	1.03	1.03	1.02	1.00	1.03	0.64	Continue to monitor
HMBOBAYPPA 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.01	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.03	1.05	1.04	1.02	0.67	Continue to monitor
EEL RIVR 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.00	1.01	0.85	1.02	1.03	1.02	1.02	1.01	1.01	1.05	1.02	1.01	0.64	Continue to monitor
NEWBURG 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.00	1.01	0.85	1.02	1.03	1.02	1.01	1.01	1.01	1.05	1.02	1.01	0.64	Continue to monitor
PCLUMBER 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.01	1.02	0.85	1.02	1.02	1.01	1.01	1.00	1.00	1.05	1.02	1.02	0.65	Continue to monitor
CARLOTTA 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.01	1.02	0.85	1.02	1.02	1.01	1.01	1.00	1.00	1.05	1.02	1.02	0.65	Continue to monitor
RIO DELL 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.02	1.03	0.86	1.03	1.03	1.02	1.01	1.01	1.01	1.05	1.03	1.03	0.65	Continue to monitor
SWNS FLT 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	0.98	0.99	0.85	1.00	1.00	0.99	0.99	0.98	0.98	1.05	1.00	0.99	0.67	Continue to monitor
SCTIATP2 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	1.02	1.03	0.86	1.03	1.03	1.02	1.01	1.01	1.01	1.05	1.03	1.03	0.66	Continue to monitor
BRDGVLE 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	0.97	0.99	0.85	0.99	0.99	0.98	0.98	0.97	0.97	1.05	0.99	0.99	0.68	Continue to monitor
FRUITLND 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	0.96	0.97	0.78	1.00	1.01	0.96	0.94	0.90	0.90	1.04	0.99	0.96	0.59	Continue to monitor
FRT SWRD 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	0.96	0.96	0.78	1.00	1.02	0.94	0.93	0.90	0.90	1.03	0.99	0.96	0.59	Continue to monitor
GRBRVLE 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	0.97	0.97	0.78	1.01	1.03	0.93	0.91	0.89	0.89	1.03	1.00	0.97	0.59	Continue to monitor
KEKAWAKA 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	Low	0.97	0.97	0.80	1.01	1.03	0.94	0.93	0.90	0.90	1.03	1.00	0.97	0.63	Continue to monitor
FRUITLND 60 kV	P1-2:A1:5_ KEKAWAKA-GRBRVLE-LYTNVLE 60KV [0]	P1	N-1	Low	0.95	0.94	0.69	1.00	1.01	0.88	0.85	0.77	0.77	1.03	1.00	0.94	0.65	Continue to monitor
FRT SWRD 60 kV	P1-2:A1:5_ KEKAWAKA-GRBRVLE-LYTNVLE 60KV [0]	P1	N-1	Low	0.94	0.93	0.65	1.01	1.02	0.84	0.81	0.75	0.75	1.03	1.00	0.93	0.61	Continue to monitor
GRBRVLE 60 kV	P1-2:A1:5_ KEKAWAKA-GRBRVLE-LYTNVLE 60KV [0]	P1	N-1	Low	0.94	0.93	0.59	1.02	1.03	0.81	0.77	0.71	0.71	1.03	1.01	0.93	0.56	Continue to monitor
FRUITLND 60 kV	P1-3:A1:1_ HUMBOLDT 115/60KV TB 1	P1	N-1	Low	0.97	0.97	0.89	0.99	1.01	0.95	0.94	0.90	0.90	1.03	0.98	0.96	N/A	Continue to monitor
FRUITLND 60 kV	P1-3:A1:2_ HUMBOLDT 115/60KV TB 2	P1	N-1	Low	0.97	0.97	0.89	0.99	1.01	0.95	0.94	0.90	0.90	1.03	0.98	0.97	N/A	Continue to monitor
SWNS FLT 60 kV	P1-3:A1:3_ BRDGVLE 115/60KV TB 1	P1	N-1	Low	1.00	0.99	0.86	1.02	1.02	0.97	0.96	0.90	0.90	1.02	1.01	0.99	0.76	Continue to monitor
BRDGVLE 60 kV	P1-3:A1:3_ BRDGVLE 115/60KV TB 1	P1	N-1	Low	0.99	0.99	0.84	1.02	1.02	0.96	0.95	0.88	0.88	1.01	1.01	0.99	0.74	Continue to monitor
FRUITLND 60 kV	P1-3:A1:3_ BRDGVLE 115/60KV TB 1	P1	N-1	Low	0.98	0.97	0.78	1.02	1.02	0.94	0.92	0.81	0.81	1.00	1.00	0.97	0.64	Continue to monitor
FRT SWRD 60 kV	P1-3:A1:3_ BRDGVLE 115/60KV TB 1	P1	N-1	Low	0.98	0.97	0.77	1.03	1.03	0.93	0.91	0.81	0.81	1.00	1.01	0.97	0.64	Continue to monitor
GRBRVLE 60 kV	P1-3:A1:3_ BRDGVLE 115/60KV TB 1	P1	N-1	Low	0.98	0.97	0.77	1.03	1.03	0.92	0.90	0.81	0.81	1.01	1.01	0.97	0.63	Continue to monitor

Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
KEKAWAKA 60 kV	P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P1	N-1	Low	0.98	0.97	0.79	1.03	1.03	0.93	0.91	0.83	1.01	1.01	0.97	0.66	Continue to monitor
HUMBOLDT 115 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	0.95	0.96	0.83	0.97	0.97	0.96	0.96	0.96	1.07	0.97	0.96	0.65	Continue to monitor
LOW GAP1 115 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	0.98	1.00	0.89	1.00	1.01	1.01	1.00	1.00	1.07	1.00	1.00	0.76	Continue to monitor
BRDGVILLE 115 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	0.97	0.99	0.86	1.00	1.00	1.00	0.99	0.99	1.07	1.00	0.99	0.70	Continue to monitor
HUMBOLDT 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.02	1.03	0.89	1.03	1.03	1.03	1.03	1.03	1.06	1.03	1.03	0.69	Continue to monitor
HARRIS 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.02	1.03	0.89	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	0.69	Continue to monitor
EUREKA 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.02	1.03	0.88	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.67	Continue to monitor
EUREKA A 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.02	1.03	0.88	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.67	Continue to monitor
HMBLT BY 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.01	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.67	Continue to monitor
HMBOBAYPPC 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.01	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.67	Continue to monitor
HOOPA 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	0.97	1.03	0.89	1.00	1.01	1.01	1.01	1.03	1.02	1.00	1.03	0.64	Continue to monitor
HMBOBAYPPA 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.01	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.67	Continue to monitor
EEL RIVR 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.00	1.01	0.85	1.02	1.03	1.02	1.02	1.01	1.05	1.02	1.01	0.64	Continue to monitor
NEWBURG 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.00	1.01	0.85	1.02	1.03	1.02	1.01	1.01	1.05	1.02	1.01	0.64	Continue to monitor
PCLUMBER 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.01	1.02	0.85	1.02	1.02	1.01	1.01	1.00	1.05	1.02	1.02	0.65	Continue to monitor
CARLOTTA 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.01	1.02	0.85	1.02	1.02	1.01	1.01	1.00	1.05	1.02	1.02	0.65	Continue to monitor
RIO DELL 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.02	1.03	0.86	1.03	1.03	1.02	1.01	1.01	1.05	1.03	1.03	0.65	Continue to monitor
SWNS FLT 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	0.98	0.99	0.85	1.00	1.00	0.99	0.99	0.98	1.05	1.00	0.99	0.67	Continue to monitor
SCTIATP2 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	1.02	1.03	0.86	1.03	1.03	1.02	1.01	1.01	1.05	1.03	1.03	0.66	Continue to monitor
BRDGVILLE 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	0.97	0.99	0.85	0.99	0.99	0.98	0.98	0.97	1.05	0.99	0.99	0.68	Continue to monitor
FRUITLND 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	0.96	0.97	0.78	1.00	1.01	0.96	0.94	0.90	1.04	0.99	0.96	0.59	Continue to monitor
FRT SWRD 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	0.96	0.96	0.78	1.00	1.02	0.94	0.93	0.90	1.03	0.99	0.96	0.59	Continue to monitor
GRBRVILLE 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	0.97	0.97	0.78	1.01	1.03	0.93	0.91	0.89	1.03	1.00	0.97	0.59	Continue to monitor
KEKAWAKA 60 kV	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	Low	0.97	0.97	0.80	1.01	1.03	0.94	0.93	0.90	1.03	1.00	0.97	0.63	Continue to monitor
FRT SWRD 60 kV	P1-3:A1:7:_HMBOBAYPPA 60/13.8KV TB 1	P1	N-1	Low	0.96	0.96	0.88	1.00	1.02	0.94	0.93	0.90	1.02	0.99	0.96	N/A	Continue to monitor
GRBRVILLE 60 kV	P1-3:A1:7:_HMBOBAYPPA 60/13.8KV TB 1	P1	N-1	Low	0.97	0.97	0.88	1.01	1.03	0.93	0.92	0.89	1.03	1.00	0.97	N/A	Continue to monitor
FRUITLND 60 kV	P1-4:A1:4:_HUMBOLDT 60.00KV ID=7H & HUMBOLDT 60.00KV ID=5H & HUMBOLDT 60.00KV ID=1H & HUMBOLDT 60.00KV ID=V SHUNT DEVICES	P1	N-1	Low	0.99	0.99	0.90	1.00	1.02	0.98	0.97	0.91	1.02	1.00	0.99	N/A	Continue to monitor



Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
FRT SWRD 60 kV	P1-4:A1:4:_HUMBOLDT 60.00KV ID=7H & HUMBOLDT 60.00KV ID=5H & HUMBOLDT 60.00KV ID=1H & HUMBOLDT 60.00KV ID=V SHUNT DEVICES	P1	N-1	Low	0.99	0.99	0.89	1.00	1.03	0.96	0.95	0.90	1.01	0.99	0.98	N/A	Continue to monitor
GRBRVLE 60 kV	P1-4:A1:4:_HUMBOLDT 60.00KV ID=7H & HUMBOLDT 60.00KV ID=5H & HUMBOLDT 60.00KV ID=1H & HUMBOLDT 60.00KV ID=V SHUNT DEVICES	P1	N-1	Low	0.99	0.99	0.89	1.01	1.03	0.95	0.93	0.90	1.02	1.00	0.99	N/A	Continue to monitor
FRUITLND 60 kV	P1-4:A1:5:_GRBRVLE 60.00KV ID=8H & GRBRVLE 60.00KV ID=7H & GRBRVLE 60.00KV ID=5H & GRBRVLE 60.00KV ID=V SHUNT DEVICES	P1	N-1	Low	0.91	0.91	0.83	0.92	0.96	0.88	0.87	0.83	0.97	0.91	0.91	0.80	Continue to monitor
FRT SWRD 60 kV	P1-4:A1:5:_GRBRVLE 60.00KV ID=8H & GRBRVLE 60.00KV ID=7H & GRBRVLE 60.00KV ID=5H & GRBRVLE 60.00KV ID=V SHUNT DEVICES	P1	N-1	Low	0.89	0.89	0.81	0.91	0.96	0.85	0.83	0.82	0.95	0.90	0.89	0.78	Garberville Area Reinforcement
GRBRVLE 60 kV	P1-4:A1:5:_GRBRVLE 60.00KV ID=8H & GRBRVLE 60.00KV ID=7H & GRBRVLE 60.00KV ID=5H & GRBRVLE 60.00KV ID=V SHUNT DEVICES	P1	N-1	Low	0.87	0.88	0.79	0.89	0.95	0.81	0.80	0.79	0.93	0.88	0.87	0.75	Garberville Area Reinforcement
KEKAWAKA 60 kV	P1-4:A1:5:_GRBRVLE 60.00KV ID=8H & GRBRVLE 60.00KV ID=7H & GRBRVLE 60.00KV ID=5H & GRBRVLE 60.00KV ID=V SHUNT DEVICES	P1	N-1	Low	0.89	0.89	0.81	0.91	0.96	0.84	0.83	0.82	0.94	0.90	0.89	0.78	Garberville Area Reinforcement
FRUITLND 60 kV	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (FRSTGLEN-LOW GAP1)	P2	Bus/Breaker	Low	0.97	0.97	0.84	0.96	1.00	0.93	0.92	0.87	1.03	0.95	0.96	0.82	Continue to monitor
FRT SWRD 60 kV	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (FRSTGLEN-LOW GAP1)	P2	Bus/Breaker	Low	0.96	0.96	0.83	0.96	1.01	0.91	0.90	0.87	1.03	0.95	0.96	0.81	Continue to monitor
GRBRVLE 60 kV	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (FRSTGLEN-LOW GAP1)	P2	Bus/Breaker	Low	0.97	0.97	0.83	0.97	1.02	0.90	0.89	0.86	1.03	0.95	0.97	0.81	Continue to monitor
KEKAWAKA 60 kV	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (FRSTGLEN-LOW GAP1)	P2	Bus/Breaker	Low	0.97	0.97	0.84	0.97	1.02	0.91	0.91	0.88	1.02	0.96	0.97	0.83	Continue to monitor
HUMBOLDT 115 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	0.95	0.96	0.83	0.97	0.97	0.96	0.96	0.96	1.07	0.97	0.96	0.65	Continue to monitor

Study Area: **PG&E Central Coast/Los Padres**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
LOW GAP1 115 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	0.98	1.00	0.89	1.00	1.01	1.01	1.00	1.00	1.07	1.00	1.00	0.76	Continue to monitor
BRDGVLE 115 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	0.97	0.99	0.86	1.00	1.00	1.00	0.99	0.99	1.07	1.00	0.99	0.70	Continue to monitor
HUMBOLDT 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.02	1.03	0.89	1.03	1.03	1.03	1.03	1.03	1.06	1.03	1.03	0.69	Continue to monitor
HARRIS 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.02	1.03	0.89	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	0.69	Continue to monitor
EUREKA 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.02	1.03	0.88	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.67	Continue to monitor
EUREKA A 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.02	1.03	0.88	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.67	Continue to monitor
HMBLT BY 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.01	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.67	Continue to monitor
HMBOBAYPPC 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.01	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.67	Continue to monitor
HOOPA 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	0.97	1.03	0.89	1.00	1.01	1.01	1.01	1.03	1.02	1.00	1.03	0.64	Continue to monitor
HMBOBAYPPA 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.01	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.67	Continue to monitor
EEL RIVR 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.00	1.01	0.85	1.02	1.03	1.02	1.02	1.01	1.05	1.02	1.01	0.64	Continue to monitor
SCOTIATP 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.02	1.03	0.86	1.03	1.03	1.02	1.01	1.01	1.05	1.03	1.03	0.65	Continue to monitor
NEWBURG 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.00	1.01	0.85	1.02	1.03	1.02	1.01	1.01	1.05	1.02	1.01	0.64	Continue to monitor
PCLUMBER 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.01	1.02	0.85	1.02	1.02	1.01	1.01	1.00	1.05	1.02	1.02	0.65	Continue to monitor
CARLOTTA 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.01	1.02	0.85	1.02	1.02	1.01	1.01	1.00	1.05	1.02	1.02	0.65	Continue to monitor

Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
RIO DELL 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.02	1.03	0.86	1.03	1.03	1.02	1.01	1.01	1.05	1.03	1.03	0.65	Continue to monitor
SWNS FLT 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	0.98	0.99	0.85	1.00	1.00	0.99	0.99	0.98	1.05	1.00	0.99	0.67	Continue to monitor
SCTIATP2 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	1.02	1.03	0.86	1.03	1.03	1.02	1.01	1.01	1.05	1.03	1.03	0.66	Continue to monitor
BRDGVLE 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	0.97	0.99	0.85	0.99	0.99	0.98	0.98	0.97	1.05	0.99	0.99	0.68	Continue to monitor
FRUITLND 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	0.96	0.97	0.78	1.00	1.01	0.96	0.94	0.90	1.04	0.99	0.96	0.59	Continue to monitor
FRT SWRD 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	0.96	0.96	0.78	1.00	1.02	0.94	0.93	0.90	1.03	0.99	0.96	0.59	Continue to monitor
GRBRVLE 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	0.97	0.97	0.78	1.01	1.03	0.93	0.91	0.89	1.03	1.00	0.97	0.59	Continue to monitor
KEKAWAKA 60 kV	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	Low	0.97	0.97	0.80	1.01	1.03	0.94	0.93	0.90	1.03	1.00	0.97	0.63	Continue to monitor
FRUITLND 60 kV	P2-1:A1:50:_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (SCTIATP2-SCOTIATP)	P2	Bus/Breaker	Low	0.97	0.97	0.88	0.98	1.01	0.94	0.93	0.88	1.03	0.97	0.96	0.87	Continue to monitor
FRT SWRD 60 kV	P2-1:A1:50:_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (SCTIATP2-SCOTIATP)	P2	Bus/Breaker	Low	0.96	0.96	0.87	0.98	1.02	0.93	0.91	0.88	1.02	0.97	0.96	0.86	Continue to monitor
GRBRVLE 60 kV	P2-1:A1:50:_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (SCTIATP2-SCOTIATP)	P2	Bus/Breaker	Low	0.97	0.97	0.87	0.99	1.03	0.92	0.90	0.87	1.03	0.98	0.97	0.86	Continue to monitor
KEKAWAKA 60 kV	P2-1:A1:50:_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (SCTIATP2-SCOTIATP)	P2	Bus/Breaker	Low	0.97	0.97	0.88	0.99	1.03	0.93	0.92	0.89	1.02	0.98	0.97	0.88	Continue to monitor
LOW GAP1 115 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.86	0.87	0.79	1.04	1.05	1.05	1.04	1.02	1.07	1.04	0.86	0.78	Garberville Area Reinforcement
BRDGVLE 115 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.83	0.83	0.73	1.04	1.04	1.04	1.03	1.02	1.07	1.04	0.82	0.71	Garberville Area Reinforcement
HUMBOLDT 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.55	0.54	0.39	1.03	1.03	1.03	1.03	1.03	1.08	1.03	0.52	0.35	Garberville Area Reinforcement
HARRIS 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.55	0.54	0.39	1.03	1.03	1.03	1.03	1.03	1.08	1.03	0.52	0.35	Garberville Area Reinforcement
EUREKA 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.54	0.54	0.39	1.03	1.04	1.03	1.03	1.03	1.08	1.03	0.52	0.34	Garberville Area Reinforcement
EUREKA A 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.54	0.54	0.39	1.03	1.04	1.03	1.03	1.03	1.08	1.03	0.52	0.34	Garberville Area Reinforcement

Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
HMBLT BY 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.55	0.54	0.39	1.04	1.04	1.03	1.03	1.03	1.07	1.04	0.52	0.35	Garberville Area Reinforcement	
RDGE CBN 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.61	0.62	0.55	1.02	1.02	1.04	1.04	1.04	1.06	1.02	0.61	0.51	Garberville Area Reinforcement	
MPLC CRK 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.55	0.56	0.44	1.02	1.03	1.03	1.03	1.03	1.06	1.02	0.54	0.39	Garberville Area Reinforcement	
RUSS RCH 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.54	0.55	0.43	1.02	1.02	1.03	1.03	1.03	1.06	1.02	0.53	0.39	Garberville Area Reinforcement	
WILLWCRK 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.51	0.55	0.42	1.01	1.02	1.02	1.02	1.03	1.04	1.01	0.52	0.37	Garberville Area Reinforcement	
HMBOBAYPPC 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.55	0.54	0.39	1.04	1.04	1.03	1.03	1.03	1.07	1.04	0.52	0.35	Garberville Area Reinforcement	
HOOPA 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.50	0.53	0.41	1.00	1.01	1.01	1.01	1.03	1.04	1.00	0.51	0.35	Garberville Area Reinforcement	
HMBOBAYPPA 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.55	0.54	0.39	1.04	1.04	1.03	1.03	1.03	1.07	1.04	0.52	0.35	Garberville Area Reinforcement	
EEL RIVR 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.58	0.58	0.43	1.02	1.03	1.03	1.02	1.01	1.06	1.02	0.56	0.39	Garberville Area Reinforcement	
SCOTIATP 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.68	0.68	0.51	1.03	1.03	1.03	1.02	1.02	1.06	1.03	0.66	0.48	Garberville Area Reinforcement	
NEWBURG 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.61	0.60	0.45	1.02	1.03	1.03	1.02	1.01	1.06	1.02	0.58	0.42	Garberville Area Reinforcement	
PCLUMBER 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.66	0.65	0.50	1.03	1.02	1.03	1.02	1.01	1.06	1.03	0.63	0.47	Garberville Area Reinforcement	
CARLOTTA 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.66	0.65	0.50	1.03	1.02	1.03	1.02	1.01	1.06	1.03	0.63	0.47	Garberville Area Reinforcement	
RIO DELL 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.68	0.68	0.51	1.03	1.03	1.03	1.02	1.02	1.06	1.03	0.66	0.48	Garberville Area Reinforcement	
SWNS FLT 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.77	0.76	0.64	1.02	1.02	1.03	1.02	1.00	1.05	1.02	0.75	0.61	Garberville Area Reinforcement	
SCTIATP2 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.68	0.68	0.51	1.03	1.03	1.03	1.02	1.02	1.06	1.03	0.66	0.48	Garberville Area Reinforcement	
BRDGVLE 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.81	0.81	0.69	1.02	1.02	1.03	1.02	0.99	1.05	1.02	0.80	0.67	Garberville Area Reinforcement	
FRUITLND 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.81	0.81	0.60	1.02	1.02	0.99	0.98	0.92	1.03	1.01	0.80	0.58	Garberville Area Reinforcement	
FRT SWRD 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.82	0.81	0.60	1.02	1.03	0.98	0.96	0.92	1.03	1.01	0.80	0.58	Garberville Area Reinforcement	
GRBRVLE 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.83	0.82	0.60	1.03	1.03	0.96	0.95	0.91	1.03	1.02	0.82	0.58	Garberville Area Reinforcement	
KEKAWAKA 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	Low	0.85	0.84	0.64	1.02	1.03	0.97	0.95	0.92	1.03	1.02	0.83	0.63	Garberville Area Reinforcement	
HUMBOLDT 115 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.95	0.96	0.83	0.97	0.97	0.96	0.96	0.96	1.07	0.97	0.96	0.64	Continue to monitor	
LOW GAP1 115 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.98	1.00	0.89	1.00	1.01	1.01	1.00	1.00	1.07	1.00	1.00	0.75	Continue to monitor	
BRDGVLE 115 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.98	0.99	0.86	1.00	1.00	1.00	0.99	0.99	1.07	1.00	0.99	0.69	Continue to monitor	
HMBOBAYPPB 115 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.95	0.96	0.83	0.97	0.97	0.96	0.96	0.96	1.07	0.97	0.96	0.64	Continue to monitor	
HUMBOLDT 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.03	1.03	0.89	1.03	1.03	1.03	1.03	1.03	1.06	1.03	1.03	0.68	Continue to monitor	
HARRIS 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.02	1.03	0.89	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	0.68	Continue to monitor	
EUREKA 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.02	1.03	0.88	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.66	Continue to monitor	
EUREKA A 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.02	1.03	0.88	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.66	Continue to monitor	
HMBLT BY 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.02	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.66	Continue to monitor	

Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
HMBOBAYPPC 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.02	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.66	Continue to monitor
HOOPA 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.97	1.03	0.90	1.00	1.01	1.01	1.01	1.03	1.02	1.00	1.03	0.62	Continue to monitor
HMBOBAYPPA 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.02	1.03	0.88	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.66	Continue to monitor
EEL RIVR 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.00	1.01	0.85	1.02	1.03	1.02	1.02	1.01	1.05	1.02	1.01	0.63	Continue to monitor
SCOTIATP 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.02	1.03	0.86	1.03	1.03	1.02	1.01	1.01	1.05	1.03	1.03	0.64	Continue to monitor
NEWBURG 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.00	1.01	0.85	1.02	1.03	1.02	1.01	1.01	1.05	1.02	1.01	0.62	Continue to monitor
PCLUMBER 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.01	1.02	0.85	1.02	1.02	1.01	1.01	1.00	1.05	1.02	1.02	0.63	Continue to monitor
CARLOTTA 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.01	1.02	0.85	1.02	1.02	1.01	1.01	1.00	1.05	1.02	1.02	0.63	Continue to monitor
RIO DELL 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.02	1.03	0.86	1.03	1.03	1.02	1.01	1.01	1.05	1.03	1.03	0.64	Continue to monitor
SWNS FLT 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.98	0.99	0.85	1.00	1.00	0.99	0.99	0.98	1.05	1.00	0.99	0.66	Continue to monitor
SCTIATP2 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	1.02	1.03	0.86	1.03	1.03	1.02	1.01	1.01	1.05	1.03	1.03	0.64	Continue to monitor
BRDGVLE 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.98	0.99	0.85	0.99	0.99	0.98	0.98	0.97	1.05	0.99	0.99	0.67	Continue to monitor
FRUITLND 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.96	0.97	0.78	1.00	1.01	0.96	0.94	0.90	1.04	0.99	0.96	0.58	Continue to monitor
FRT SWRD 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.96	0.96	0.78	1.00	1.02	0.94	0.93	0.90	1.03	0.99	0.96	0.58	Continue to monitor
GRBRVLE 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.97	0.97	0.78	1.01	1.03	0.93	0.91	0.89	1.03	1.00	0.97	0.58	Continue to monitor
KEKAWAKA 60 kV	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.97	0.97	0.80	1.01	1.03	0.94	0.93	0.90	1.03	1.00	0.97	0.63	Continue to monitor
FRT SWRD 60 kV	P2-2:A1:12:_HMBOBAYPPA 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.96	0.96	0.88	1.00	1.02	0.94	0.93	0.90	1.02	0.99	0.96	N/A	Continue to monitor
GRBRVLE 60 kV	P2-2:A1:12:_HMBOBAYPPA 13.8KV SECTION 1D	P2	Bus/Breaker	Low	0.97	0.97	0.88	1.01	1.03	0.93	0.92	0.89	1.03	1.00	0.97	N/A	Continue to monitor
FRUITLND 60 kV	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.97	0.96	0.84	0.96	1.00	0.92	0.92	0.87	1.03	0.95	0.96	0.83	Continue to monitor
FRT SWRD 60 kV	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.96	0.96	0.84	0.96	1.00	0.91	0.90	0.87	1.02	0.94	0.96	0.83	Continue to monitor
GRBRVLE 60 kV	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.97	0.97	0.83	0.96	1.02	0.90	0.89	0.86	1.03	0.95	0.97	0.82	Continue to monitor
KEKAWAKA 60 kV	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.97	0.97	0.84	0.96	1.02	0.91	0.91	0.88	1.02	0.95	0.97	0.84	Continue to monitor
LOW GAP1 115 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.78	1.04	1.04	1.05	1.04	1.02	1.07	1.04	NConv	0.77	Garberville Area Reinforcement
BRDGVLE 115 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.72	1.04	1.04	1.04	1.03	1.02	1.07	1.04	NConv	0.70	Garberville Area Reinforcement
HUMBOLDT 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.36	1.03	1.03	1.03	1.03	1.03	1.08	1.03	NConv	0.31	Garberville Area Reinforcement
HARRIS 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.36	1.03	1.03	1.03	1.03	1.03	1.08	1.03	NConv	0.31	Garberville Area Reinforcement
EUREKA 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.36	1.03	1.04	1.03	1.03	1.03	1.08	1.03	NConv	0.31	Garberville Area Reinforcement

Study Area: **PG&E Central Coast/Los Padres**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
EUREKA A 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.35	1.03	1.04	1.03	1.03	1.03	1.08	1.03	NConv	0.31	Garberville Area Reinforcement
HMBLT BY 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.36	1.04	1.04	1.03	1.03	1.03	1.07	1.04	NConv	0.32	Garberville Area Reinforcement
RDGE CBN 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.45	1.02	1.02	1.03	1.03	1.03	1.06	1.03	NConv	0.41	Garberville Area Reinforcement
MPLC CRK 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.38	1.02	1.03	1.03	1.03	1.03	1.06	1.02	NConv	0.33	Garberville Area Reinforcement
RUSS RCH 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.38	1.02	1.02	1.02	1.03	1.03	1.06	1.02	NConv	0.32	Garberville Area Reinforcement
WILLWCRK 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.36	1.01	1.02	1.01	1.02	1.03	1.04	1.01	NConv	0.31	Garberville Area Reinforcement
HMBOBAYPPC 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.36	1.04	1.04	1.03	1.03	1.03	1.07	1.04	NConv	0.32	Garberville Area Reinforcement
HOOPA 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.35	1.00	1.01	1.01	1.01	1.03	1.03	1.00	NConv	0.30	Garberville Area Reinforcement
HMBOBAYPPA 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.36	1.04	1.04	1.03	1.03	1.03	1.07	1.04	NConv	0.32	Garberville Area Reinforcement
EEL RIVR 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.40	1.02	1.03	1.03	1.02	1.01	1.06	1.02	NConv	0.36	Garberville Area Reinforcement
SCOTIATP 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.49	1.03	1.03	1.03	1.02	1.02	1.06	1.03	NConv	0.46	Garberville Area Reinforcement
NEWBURG 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.43	1.02	1.03	1.03	1.02	1.01	1.06	1.02	NConv	0.39	Garberville Area Reinforcement
PCLUMBER 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.48	1.02	1.02	1.03	1.02	1.01	1.06	1.02	NConv	0.44	Garberville Area Reinforcement
CARLOTTA 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.48	1.02	1.02	1.03	1.02	1.01	1.06	1.02	NConv	0.44	Garberville Area Reinforcement
RIO DELL 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.49	1.03	1.03	1.03	1.02	1.02	1.06	1.03	NConv	0.46	Garberville Area Reinforcement
SWNS FLT 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.62	1.02	1.01	1.03	1.02	1.00	1.05	1.02	NConv	0.60	Garberville Area Reinforcement
SCTIATP2 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.49	1.03	1.03	1.03	1.02	1.02	1.06	1.03	NConv	0.46	Garberville Area Reinforcement
BRDGVLE 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.68	1.02	1.01	1.03	1.02	0.99	1.05	1.02	NConv	0.66	Garberville Area Reinforcement
FRUITLND 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.60	1.01	1.02	0.99	0.98	0.92	1.03	1.01	NConv	0.57	Garberville Area Reinforcement
FRT SWRD 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.59	1.01	1.03	0.98	0.96	0.92	1.03	1.01	NConv	0.57	Garberville Area Reinforcement

Study Area: **PG&E Central Coast/Los Padres**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
GRBRVLE 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.59	1.02	1.03	0.96	0.95	0.91	1.03	1.02	NConv	0.57	Garberville Area Reinforcement	
KEKAWAKA 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	Low	NConv	NConv	0.64	1.02	1.03	0.97	0.95	0.92	1.03	1.01	NConv	0.62	Garberville Area Reinforcement	
HUMBOLDT 115 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	0.96	0.96	0.79	0.97	0.97	0.97	0.97	0.97	1.07	0.97	0.96	0.78	Continue to monitor	
HMBOBAYPPB 115 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	0.98	0.98	0.81	0.99	0.99	0.99	0.99	0.99	1.07	0.99	0.98	0.80	Continue to monitor	
HUMBOLDT 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.84	1.03	1.03	1.03	1.03	1.03	1.06	1.03	1.03	0.83	Continue to monitor	
HARRIS 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.84	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	0.82	Continue to monitor	
EUREKA 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.82	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.80	Continue to monitor	
EUREKA A 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.82	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.80	Continue to monitor	
HMBLT BY 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.81	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.79	Continue to monitor	
RDGE CBN 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.02	1.03	0.87	1.01	1.01	1.03	1.03	1.03	1.05	1.01	1.03	0.85	Continue to monitor	
MPLC CRK 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.02	1.03	0.85	1.02	1.02	1.03	1.03	1.03	1.04	1.02	1.03	0.83	Continue to monitor	
RUSS RCH 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.01	1.03	0.85	1.02	1.02	1.02	1.03	1.03	1.04	1.02	1.03	0.82	Continue to monitor	
WILLWCRK 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	0.99	1.03	0.85	1.00	1.01	1.01	1.02	1.03	1.02	1.01	1.03	0.81	Continue to monitor	
HMBOBAYPPC 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.81	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.79	Continue to monitor	
HOOPA 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	0.99	1.03	0.84	1.00	1.01	1.01	1.01	1.03	1.02	1.00	1.03	0.80	Continue to monitor	
HMBOBAYPPA 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.81	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.79	Continue to monitor	
EEL RIVR 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.01	1.01	0.75	1.02	1.03	1.01	1.01	0.99	1.03	1.02	1.01	0.72	Continue to monitor	
SCOTIATP 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.73	1.03	1.03	1.01	1.00	0.97	1.04	1.03	1.03	0.69	Continue to monitor	
NEWBURG 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.01	1.01	0.73	1.02	1.03	1.01	1.00	0.98	1.03	1.02	1.01	0.70	Continue to monitor	
PCLUMBER 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.02	1.02	0.72	1.02	1.02	1.00	0.99	0.96	1.03	1.01	1.02	0.68	Continue to monitor	
CARLOTTA 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.02	1.02	0.72	1.02	1.02	1.00	0.99	0.96	1.03	1.01	1.02	0.68	Continue to monitor	
RIO DELL 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.73	1.03	1.03	1.01	1.00	0.97	1.04	1.03	1.03	0.69	Continue to monitor	
SWNS FLT 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.00	1.00	0.65	1.00	1.01	0.96	0.95	0.89	1.01	1.00	1.00	0.62	Continue to monitor	
SCTIATP2 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.73	1.03	1.03	1.01	1.00	0.97	1.04	1.03	1.03	0.69	Continue to monitor	
BRDGVLE 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	1.00	0.99	0.63	1.00	1.01	0.95	0.94	0.87	1.01	0.99	0.99	0.60	Continue to monitor	
FRUITLND 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	0.98	0.98	0.56	0.99	1.02	0.93	0.91	0.81	1.00	0.98	0.98	0.53	Continue to monitor	
FRT SWRD 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	0.98	0.98	0.56	1.00	1.02	0.91	0.89	0.81	1.00	0.98	0.97	0.53	Continue to monitor	
GRBRVLE 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	0.98	0.98	0.56	1.01	1.03	0.90	0.88	0.80	1.00	0.99	0.97	0.53	Continue to monitor	
KEKAWAKA 60 kV	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	Low	0.98	0.97	0.60	1.01	1.03	0.92	0.90	0.83	1.00	0.99	0.97	0.57	Continue to monitor	

Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
HUMBOLDT 115 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	0.96	0.96	0.80	0.97	0.97	0.97	0.97	0.97	1.07	0.97	0.96	0.79	Continue to monitor
BRDGVLE 115 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	0.97	0.97	0.80	0.97	0.97	0.97	0.97	0.97	1.08	0.97	0.97	0.79	Continue to monitor
HMBOBAYPPB 115 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	0.99	0.98	0.82	0.99	0.99	0.99	0.99	0.99	1.07	0.99	0.98	0.81	Continue to monitor
HUMBOLDT 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.86	1.03	1.03	1.03	1.03	1.03	1.06	1.03	1.03	0.84	Continue to monitor
HARRIS 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.85	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	0.84	Continue to monitor
EUREKA 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.84	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.82	Continue to monitor
EUREKA A 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.84	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.82	Continue to monitor
HMBLBY 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.83	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.80	Continue to monitor
RDGE CBN 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.02	1.03	0.88	1.01	1.01	1.03	1.03	1.03	1.05	1.01	1.03	0.86	Continue to monitor
MPLER 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.02	1.03	0.86	1.02	1.02	1.03	1.03	1.03	1.04	1.02	1.03	0.84	Continue to monitor
RUSS RCH 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.01	1.03	0.86	1.02	1.02	1.02	1.03	1.03	1.04	1.02	1.03	0.83	Continue to monitor
WILLWCRK 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	0.99	1.03	0.86	1.00	1.01	1.01	1.02	1.03	1.02	1.01	1.03	0.83	Continue to monitor
HMBOBAYPPC 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.83	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.80	Continue to monitor
HOOPA 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	0.99	1.03	0.85	1.00	1.01	1.01	1.01	1.03	1.02	1.00	1.03	0.81	Continue to monitor
HMBOBAYPPA 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.83	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.80	Continue to monitor
EEL RIVR 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.01	1.01	0.76	1.02	1.03	1.01	1.01	0.99	1.03	1.02	1.01	0.73	Continue to monitor
SCOTIATP 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.74	1.03	1.03	1.01	1.00	0.97	1.04	1.03	1.03	0.70	Continue to monitor
NEWBURG 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.01	1.01	0.75	1.02	1.03	1.01	1.00	0.98	1.03	1.02	1.01	0.71	Continue to monitor
PCLUMBER 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.02	1.02	0.73	1.02	1.02	1.00	0.99	0.96	1.03	1.01	1.02	0.69	Continue to monitor
CARLOTTA 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.02	1.02	0.73	1.02	1.02	1.00	0.99	0.96	1.03	1.01	1.02	0.69	Continue to monitor
RIO DELL 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.74	1.03	1.03	1.01	1.00	0.97	1.04	1.03	1.03	0.70	Continue to monitor
SWNS FLT 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.00	1.00	0.66	1.00	1.01	0.96	0.95	0.89	1.01	1.00	1.00	0.62	Continue to monitor
SCTIATP2 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.03	1.03	0.74	1.03	1.03	1.01	1.00	0.97	1.04	1.03	1.03	0.70	Continue to monitor
BRDGVLE 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	1.00	0.99	0.64	1.00	1.01	0.95	0.95	0.87	1.01	0.99	0.99	0.60	Continue to monitor
FRUITLND 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	0.98	0.98	0.57	0.99	1.02	0.93	0.91	0.81	0.99	0.98	0.98	0.53	Continue to monitor
FRT SWRD 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	0.98	0.98	0.57	1.00	1.02	0.91	0.90	0.81	1.00	0.98	0.97	0.53	Continue to monitor
GRBRVLE 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	0.98	0.98	0.56	1.01	1.03	0.90	0.89	0.80	1.00	0.99	0.97	0.53	Continue to monitor
KEKAWAKA 60 kV	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	Low	0.98	0.97	0.60	1.01	1.03	0.92	0.90	0.83	1.00	0.99	0.97	0.57	Continue to monitor
LOW GAP#1 115 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY- HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.86	0.87	0.79	1.04	1.05	1.05	1.04	1.02	1.07	1.04	0.86	0.78	Garberville Area Reinforcement



Study Area: **PG&E Central Coast/Los Padres**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
BRDGVLE 115 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.83	0.83	0.73	1.04	1.04	1.04	1.03	1.02	1.07	1.04	0.82	0.71	Garberville Area Reinforcement	
HUMBOLDT 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.55	0.54	0.39	1.03	1.03	1.03	1.03	1.03	1.08	1.03	0.52	0.35	Garberville Area Reinforcement	
HARRIS 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.55	0.54	0.39	1.03	1.03	1.03	1.03	1.03	1.08	1.03	0.52	0.35	Garberville Area Reinforcement	
EUREKA 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.54	0.54	0.39	1.03	1.04	1.03	1.03	1.03	1.08	1.03	0.52	0.34	Garberville Area Reinforcement	
EUREKA A 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.54	0.54	0.39	1.03	1.04	1.03	1.03	1.03	1.08	1.03	0.52	0.34	Garberville Area Reinforcement	
HMBLT BY 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.55	0.54	0.39	1.04	1.04	1.03	1.03	1.03	1.07	1.04	0.52	0.35	Garberville Area Reinforcement	
RDGE CBN 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.61	0.62	0.55	1.02	1.02	1.04	1.04	1.04	1.06	1.02	0.61	0.51	Garberville Area Reinforcement	
MPLC CRK 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.55	0.56	0.44	1.02	1.03	1.03	1.03	1.03	1.06	1.02	0.54	0.39	Garberville Area Reinforcement	
RUSS RCH 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.54	0.55	0.43	1.02	1.02	1.03	1.03	1.03	1.06	1.02	0.53	0.39	Garberville Area Reinforcement	
WILLWCRK 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.51	0.55	0.42	1.01	1.02	1.02	1.02	1.03	1.04	1.01	0.52	0.37	Garberville Area Reinforcement	
HMBOBAYPPC 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.55	0.54	0.39	1.04	1.04	1.03	1.03	1.03	1.07	1.04	0.52	0.35	Garberville Area Reinforcement	
HOOPA 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.50	0.53	0.41	1.00	1.01	1.01	1.01	1.03	1.04	1.00	0.51	0.35	Garberville Area Reinforcement	
HMBOBAYPPA 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.55	0.54	0.39	1.04	1.04	1.03	1.03	1.03	1.07	1.04	0.52	0.35	Garberville Area Reinforcement	
EEL RIVR 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.58	0.58	0.43	1.02	1.03	1.03	1.02	1.01	1.06	1.02	0.56	0.39	Garberville Area Reinforcement	
SCOTIATP 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.68	0.68	0.51	1.03	1.03	1.03	1.02	1.02	1.06	1.03	0.66	0.48	Garberville Area Reinforcement	
NEWBURG 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.61	0.60	0.45	1.02	1.03	1.03	1.02	1.01	1.06	1.02	0.58	0.42	Garberville Area Reinforcement	
PCLUMBER 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.66	0.65	0.50	1.03	1.02	1.03	1.02	1.01	1.06	1.03	0.63	0.47	Garberville Area Reinforcement	
CARLOTTA 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.66	0.65	0.50	1.03	1.02	1.03	1.02	1.01	1.06	1.03	0.63	0.47	Garberville Area Reinforcement	
RIO DELL 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.68	0.68	0.51	1.03	1.03	1.03	1.02	1.02	1.06	1.03	0.66	0.48	Garberville Area Reinforcement	
SWNS FLT 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.77	0.76	0.64	1.02	1.02	1.03	1.02	1.00	1.05	1.02	0.75	0.61	Garberville Area Reinforcement	

Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
SCTIATP2 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.68	0.68	0.51	1.03	1.03	1.03	1.02	1.02	1.06	1.03	0.66	0.48	Garberville Area Reinforcement
BRDGVLE 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.81	0.81	0.69	1.02	1.02	1.03	1.02	0.99	1.05	1.02	0.80	0.67	Garberville Area Reinforcement
FRUITLND 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.81	0.81	0.60	1.02	1.02	0.99	0.98	0.92	1.03	1.01	0.80	0.58	Garberville Area Reinforcement
FRT SWRD 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.82	0.81	0.60	1.02	1.03	0.98	0.96	0.92	1.03	1.01	0.80	0.58	Garberville Area Reinforcement
GRBRVLE 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.83	0.82	0.60	1.03	1.03	0.96	0.95	0.91	1.03	1.02	0.82	0.58	Garberville Area Reinforcement
KEKAWAKA 60 kV	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	Low	0.85	0.84	0.64	1.02	1.03	0.97	0.95	0.92	1.03	1.02	0.83	0.63	Garberville Area Reinforcement
HUMBOLDT 115 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	0.96	0.96	0.79	0.97	0.97	0.97	0.97	0.97	1.07	0.97	0.96	0.77	Continue to monitor
BRDGVLE 115 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.02	1.02	0.65	1.02	1.03	0.97	0.96	0.89	1.03	1.01	1.02	0.61	Continue to monitor
HMBOBAYPPB 115 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	0.98	0.98	0.81	0.99	0.99	0.99	0.99	0.99	1.07	0.99	0.98	0.80	Continue to monitor
HUMBOLDT 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.03	1.03	0.85	1.03	1.03	1.03	1.03	1.03	1.06	1.03	1.03	0.83	Continue to monitor
HARRIS 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.03	1.03	0.84	1.03	1.03	1.03	1.03	1.03	1.05	1.03	1.03	0.82	Continue to monitor
EUREKA 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.03	1.03	0.83	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.80	Continue to monitor
EUREKA A 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.03	1.03	0.83	1.03	1.04	1.03	1.03	1.03	1.05	1.03	1.03	0.80	Continue to monitor
HMBLT BY 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.03	1.03	0.82	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.79	Continue to monitor
RDGE CBN 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.02	1.03	0.87	1.01	1.01	1.03	1.03	1.03	1.05	1.01	1.03	0.84	Continue to monitor
MPLC CRK 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.02	1.03	0.85	1.02	1.02	1.03	1.03	1.03	1.04	1.02	1.03	0.82	Continue to monitor
RUSS RCH 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.01	1.03	0.85	1.02	1.02	1.02	1.03	1.03	1.04	1.02	1.03	0.82	Continue to monitor
WILLWCRK 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	0.99	1.03	0.85	1.00	1.01	1.01	1.02	1.03	1.02	1.01	1.03	0.81	Continue to monitor
HMBOBAYPPC 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.03	1.03	0.82	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.79	Continue to monitor
HOOPA 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	0.99	1.03	0.84	1.00	1.01	1.01	1.01	1.03	1.02	1.00	1.03	0.79	Continue to monitor
HMBOBAYPPA 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.03	1.03	0.82	1.04	1.04	1.03	1.03	1.03	1.05	1.04	1.02	0.79	Continue to monitor
EEL RIVR 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.01	1.01	0.75	1.02	1.03	1.01	1.01	0.99	1.03	1.02	1.01	0.72	Continue to monitor
SCOTIATP 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.03	1.03	0.73	1.03	1.03	1.01	1.00	0.97	1.04	1.03	1.03	0.69	Continue to monitor
NEWBURG 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.01	1.01	0.74	1.02	1.03	1.01	1.00	0.98	1.03	1.02	1.01	0.70	Continue to monitor
PCLUMBER 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.02	1.02	0.72	1.02	1.02	1.00	0.99	0.96	1.03	1.01	1.02	0.68	Continue to monitor
CARLOTTA 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.02	1.02	0.72	1.02	1.02	1.00	0.99	0.96	1.03	1.01	1.02	0.68	Continue to monitor
RIO DELL 60 kV	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.03	1.03	0.73	1.03	1.03	1.01	1.00	0.97	1.04	1.03	1.03	0.69	Continue to monitor

Study Area: **PG&E Central Coast/Los Padres**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
SWNS FLT 60 kV	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.00	1.00	0.66	1.00	1.01	0.96	0.95	0.89	1.01	1.00	1.00	0.61	Continue to monitor	
SCTIATP2 60 kV	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.03	1.03	0.74	1.03	1.03	1.01	1.00	0.97	1.04	1.03	1.03	0.69	Continue to monitor	
BRDGVILLE 60 kV	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	1.00	0.99	0.64	1.00	1.01	0.95	0.94	0.87	1.01	0.99	0.99	0.59	Continue to monitor	
FRUITLND 60 kV	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	0.98	0.98	0.56	0.99	1.02	0.93	0.91	0.81	1.00	0.98	0.98	0.53	Continue to monitor	
FRT SWRD 60 kV	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	0.98	0.98	0.56	1.00	1.02	0.91	0.89	0.81	1.00	0.98	0.97	0.52	Continue to monitor	
GRBRVILLE 60 kV	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	0.98	0.98	0.56	1.01	1.03	0.90	0.88	0.80	1.00	0.99	0.97	0.53	Continue to monitor	
KEKAWAKA 60 kV	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	Low	0.98	0.97	0.60	1.01	1.03	0.92	0.90	0.83	1.00	0.99	0.97	0.57	Continue to monitor	
LOW GAP1 115 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.86	0.87	0.79	1.04	1.05	1.05	1.04	1.02	1.07	1.04	0.86	0.78	Install redundant relay	
BRDGVILLE 115 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.83	0.83	0.73	1.04	1.04	1.04	1.03	1.02	1.07	1.04	0.82	0.71	Install redundant relay	
HUMBOLDT 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.55	0.54	0.39	1.03	1.03	1.03	1.03	1.03	1.08	1.03	0.52	0.35	Install redundant relay	
HARRIS 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.55	0.54	0.39	1.03	1.03	1.03	1.03	1.03	1.08	1.03	0.52	0.35	Install redundant relay	
EUREKA 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.54	0.54	0.39	1.03	1.04	1.03	1.03	1.03	1.08	1.03	0.52	0.34	Install redundant relay	
EUREKA A 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.54	0.54	0.39	1.03	1.04	1.03	1.03	1.03	1.08	1.03	0.52	0.34	Install redundant relay	
HMBLT BY 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.55	0.54	0.39	1.04	1.04	1.03	1.03	1.03	1.07	1.04	0.52	0.35	Install redundant relay	
RDGE CBN 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.61	0.62	0.55	1.02	1.02	1.04	1.04	1.04	1.06	1.02	0.61	0.51	Install redundant relay	
MPLC CRK 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.55	0.56	0.44	1.02	1.03	1.03	1.03	1.03	1.06	1.02	0.54	0.39	Install redundant relay	
RUSS RCH 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.54	0.55	0.43	1.02	1.02	1.03	1.03	1.03	1.06	1.02	0.53	0.39	Install redundant relay	
WILLWCRK 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.51	0.55	0.42	1.01	1.02	1.02	1.02	1.03	1.04	1.01	0.52	0.37	Install redundant relay	
HMBOBAYPPC 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.55	0.54	0.39	1.04	1.04	1.03	1.03	1.03	1.07	1.04	0.52	0.35	Install redundant relay	
HOOPA 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.50	0.53	0.41	1.00	1.01	1.01	1.01	1.03	1.04	1.00	0.51	0.35	Install redundant relay	
HMBOBAYPPA 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.55	0.54	0.39	1.04	1.04	1.03	1.03	1.03	1.07	1.04	0.52	0.35	Install redundant relay	
EEL RIVR 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.58	0.58	0.43	1.02	1.03	1.03	1.02	1.01	1.06	1.02	0.56	0.39	Install redundant relay	

Study Area: **PG&E Central Coast/Los Padres**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
SCOTIATP 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.68	0.68	0.51	1.03	1.03	1.03	1.02	1.02	1.06	1.03	0.66	0.48	Install redundant relay
NEWBURG 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.61	0.60	0.45	1.02	1.03	1.03	1.02	1.01	1.06	1.02	0.58	0.42	Install redundant relay
PCLUMBER 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.66	0.65	0.50	1.03	1.02	1.03	1.02	1.01	1.06	1.03	0.63	0.47	Install redundant relay
CARLOTTA 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.66	0.65	0.50	1.03	1.02	1.03	1.02	1.01	1.06	1.03	0.63	0.47	Install redundant relay
RIO DELL 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.68	0.68	0.51	1.03	1.03	1.03	1.02	1.02	1.06	1.03	0.66	0.48	Install redundant relay
SWNS FLT 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.77	0.76	0.64	1.02	1.02	1.03	1.02	1.00	1.05	1.02	0.75	0.61	Install redundant relay
SCTIATP2 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.68	0.68	0.51	1.03	1.03	1.03	1.02	1.02	1.06	1.03	0.66	0.48	Install redundant relay
BRDGVLE 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.81	0.81	0.69	1.02	1.02	1.03	1.02	0.99	1.05	1.02	0.80	0.67	Install redundant relay
FRUITLND 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.81	0.81	0.60	1.02	1.02	0.99	0.98	0.92	1.03	1.01	0.80	0.58	Install redundant relay
FRT SWRD 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.82	0.81	0.60	1.02	1.03	0.98	0.96	0.92	1.03	1.01	0.80	0.58	Install redundant relay
GRBRVLE 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.83	0.82	0.60	1.03	1.03	0.96	0.95	0.91	1.03	1.02	0.82	0.58	Install redundant relay
KEKAWAKA 60 kV	P5-5:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.85	0.84	0.64	1.02	1.03	0.97	0.95	0.92	1.03	1.02	0.83	0.63	Install redundant relay
LOW GAP1 115 kV	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.78	1.04	1.04	1.05	1.04	1.02	1.07	1.04	NConv	0.77	Install redundant battery supply
BRDGVLE 115 kV	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.72	1.04	1.04	1.04	1.03	1.02	1.07	1.04	NConv	0.70	Install redundant battery supply
HUMBOLDT 60 kV	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.36	1.03	1.03	1.03	1.03	1.03	1.08	1.03	NConv	0.31	Install redundant battery supply
HARRIS 60 kV	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.36	1.03	1.03	1.03	1.03	1.03	1.08	1.03	NConv	0.31	Install redundant battery supply
EUREKA 60 kV	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.36	1.03	1.04	1.03	1.03	1.03	1.08	1.03	NConv	0.31	Install redundant battery supply
EUREKA A 60 kV	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.35	1.03	1.04	1.03	1.03	1.03	1.08	1.03	NConv	0.31	Install redundant battery supply
HMBLT BY 60 kV	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.36	1.04	1.04	1.03	1.03	1.03	1.07	1.04	NConv	0.32	Install redundant battery supply
RDGE CBN 60 kV	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.45	1.02	1.02	1.03	1.03	1.03	1.06	1.03	NConv	0.41	Install redundant battery supply

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
MPLE CRK 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.38	1.02	1.03	1.03	1.03	1.03	1.06	1.02	NConv	0.33	Install redundant battery supply
RUSS RCH 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.38	1.02	1.02	1.02	1.03	1.03	1.06	1.02	NConv	0.32	Install redundant battery supply
WILLWCRK 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.36	1.01	1.02	1.01	1.02	1.03	1.04	1.01	NConv	0.31	Install redundant battery supply
HMBOBAYPPC 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.36	1.04	1.04	1.03	1.03	1.03	1.07	1.04	NConv	0.32	Install redundant battery supply
HOOPA 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.35	1.00	1.01	1.01	1.01	1.03	1.03	1.00	NConv	0.30	Install redundant battery supply
HMBOBAYPPA 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.36	1.04	1.04	1.03	1.03	1.03	1.07	1.04	NConv	0.32	Install redundant battery supply
EEL RIVR 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.40	1.02	1.03	1.03	1.02	1.01	1.06	1.02	NConv	0.36	Install redundant battery supply
SCOTIATP 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.49	1.03	1.03	1.03	1.02	1.02	1.06	1.03	NConv	0.46	Install redundant battery supply
NEWBURG 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.43	1.02	1.03	1.03	1.02	1.01	1.06	1.02	NConv	0.39	Install redundant battery supply
PCLUMBER 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.48	1.02	1.02	1.03	1.02	1.01	1.06	1.02	NConv	0.44	Install redundant battery supply
CARLOTTA 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.48	1.02	1.02	1.03	1.02	1.01	1.06	1.02	NConv	0.44	Install redundant battery supply
RIO DELL 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.49	1.03	1.03	1.03	1.02	1.02	1.06	1.03	NConv	0.46	Install redundant battery supply
SWNS FLT 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.62	1.02	1.01	1.03	1.02	1.00	1.05	1.02	NConv	0.60	Install redundant battery supply
SCTIATP2 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.49	1.03	1.03	1.03	1.02	1.02	1.06	1.03	NConv	0.46	Install redundant battery supply
BRDGVLL 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.68	1.02	1.01	1.03	1.02	0.99	1.05	1.02	NConv	0.66	Install redundant battery supply
FRUITLND 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.60	1.01	1.02	0.99	0.98	0.92	1.03	1.01	NConv	0.57	Install redundant battery supply
FRT SWRD 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.59	1.01	1.03	0.98	0.96	0.92	1.03	1.01	NConv	0.57	Install redundant battery supply
GRBRVLL 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.59	1.02	1.03	0.96	0.95	0.91	1.03	1.02	NConv	0.57	Install redundant battery supply
KEKAWAKA 60 kV	P5-5C:A1:1: HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	NConv	NConv	0.64	1.02	1.03	0.97	0.95	0.92	1.03	1.01	NConv	0.62	Install redundant battery supply
FRUITLND 60 kV	P5-5C:A1:2: BRIDGEVILLE 115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.50	0.49	0.42	1.03	1.03	0.49	0.47	0.41	0.53	1.03	0.49	0.39	Install redundant battery supply

Study Area: **PG&E Central Coast/Los Padres**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
FRT SWRD 60 kV	P5-5C:A1:2: BRIDGEVILLE 115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.50	0.50	0.43	1.03	1.03	0.48	0.46	0.43	0.53	1.03	0.50	0.40	Install redundant battery supply
GRBRVLE 60 kV	P5-5C:A1:2: BRIDGEVILLE 115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.51	0.51	0.45	1.03	1.03	0.48	0.47	0.45	0.54	1.03	0.51	0.42	Install redundant battery supply
KEKAWAKA 60 kV	P5-5C:A1:2: BRIDGEVILLE 115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.55	0.54	0.50	1.03	1.03	0.53	0.52	0.50	0.57	1.03	0.54	0.48	Install redundant battery supply
FRUITLND 60 kV	P7-1:A1:1: ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT LINES	P7	DCTL	Low	0.97	0.97	0.89	0.97	1.01	0.94		0.89	1.03	0.96	0.96	N/A	Continue to monitor
FRT SWRD 60 kV	P7-1:A1:1: ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT LINES	P7	DCTL	Low	0.96	0.96	0.88	0.97	1.02	0.93		0.88	1.02	0.96	0.96	N/A	Continue to monitor
GRBRVLE 60 kV	P7-1:A1:1: ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT LINES	P7	DCTL	Low	0.97	0.97	0.88	0.98	1.03	0.92		0.88	1.03	0.97	0.97	N/A	Continue to monitor
KEKAWAKA 60 kV	P7-1:A1:1: ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT LINES	P7	DCTL	Low	0.97	0.97	0.89	0.98	1.03	0.93		0.89	1.02	0.97	0.97	N/A	Continue to monitor
HUMBOLDT 115 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	0.95	0.96	0.82	0.97	0.97	0.96		0.96	1.07	0.97	0.96	0.89	Continue to monitor
LOW GAP1 115 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	0.98	1.00	0.89	Not Found	1.01	1.01		1.00	1.07	1.00	1.00	N/A	Continue to monitor
BRDGVLE 115 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	0.97	0.99	0.86	1.00	1.00	1.00		0.99	1.07	1.00	0.99	N/A	Continue to monitor
HUMBOLDT 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.03	1.03	0.89	1.03	1.03	1.03		1.03	1.06	1.03	1.03	N/A	Continue to monitor
HARRIS 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.02	1.03	0.88	1.03	1.03	1.03		1.03	1.05	1.03	1.03	N/A	Continue to monitor
EUREKA 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.01	1.03	0.87	1.03	1.04	1.03		1.03	1.05	1.03	1.03	N/A	Continue to monitor
EUREKA A 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.01	1.03	0.86	1.03	1.04	1.03		1.03	1.05	1.03	1.03	N/A	Continue to monitor
HMBLT BY 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.01	1.02	0.86	1.04	1.04	1.03		1.03	1.05	1.04	1.02	N/A	Continue to monitor
MPLC CRK 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.00	1.03	0.89	1.02	1.03	1.03		1.03	1.04	1.02	1.03	N/A	Continue to monitor
RUSS RCH 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.00	1.03	0.90	1.02	1.02	1.02		1.03	1.04	1.02	1.03	N/A	Continue to monitor
WILLWCRK 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	0.98	1.03	0.90	1.01	1.02	1.01		1.03	1.02	1.01	1.03	N/A	Continue to monitor
HMBOBAYPPC 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.01	1.02	0.86	1.04	1.04	1.03		1.03	1.05	1.04	1.02	N/A	Continue to monitor
HOOPA 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	0.97	1.03	0.89	1.00	1.01	1.01		1.03	1.02	1.00	1.03	N/A	Continue to monitor
HMBOBAYPPA 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.01	1.02	0.86	1.04	1.04	1.03		1.03	1.05	1.04	1.02	N/A	Continue to monitor
EEL RIVR 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.00	1.01	0.83	1.02	1.03	1.02		1.01	1.05	1.02	1.01	N/A	Continue to monitor
SCOTIATP 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.02	1.03	0.84	1.03	1.03	1.02		1.01	1.05	1.03	1.03	N/A	Continue to monitor
NEWBURG 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.00	1.01	0.83	1.02	1.03	1.02		1.01	1.05	1.02	1.01	N/A	Continue to monitor
PCLUMBER 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.00	1.01	0.83	1.02	1.02	1.01		1.00	1.05	1.02	1.01	N/A	Continue to monitor
CARLOTTA 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.00	1.01	0.83	1.02	1.02	1.01		1.00	1.05	1.02	1.01	N/A	Continue to monitor
RIO DELL 60 kV	P7-1:A1:2: HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.02	1.03	0.84	1.03	1.03	1.02		1.01	1.05	1.03	1.03	N/A	Continue to monitor

Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
SWNS FLT 60 kV	P7-1:A1:2_ HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	0.98	0.99	0.84	1.00	1.00	0.99		0.98	1.05	1.00	0.99	N/A	Continue to monitor
SCTIATP2 60 kV	P7-1:A1:2_ HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	1.02	1.03	0.84	1.03	1.03	1.02		1.01	1.05	1.03	1.03	N/A	Continue to monitor
BRDGVLE 60 kV	P7-1:A1:2_ HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	0.97	0.99	0.84	0.99	0.99	0.98		0.97	1.05	0.99	0.99	N/A	Continue to monitor
FRUITLND 60 kV	P7-1:A1:2_ HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	0.96	0.97	0.77	1.00	1.01	0.95		0.90	1.04	0.99	0.96	0.84	Continue to monitor
FRT SWRD 60 kV	P7-1:A1:2_ HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	0.96	0.96	0.77	1.00	1.02	0.94		0.90	1.03	0.99	0.96	0.84	Continue to monitor
GRBRVLE 60 kV	P7-1:A1:2_ HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	0.97	0.97	0.77	1.01	1.03	0.93		0.89	1.03	1.00	0.97	0.85	Continue to monitor
KEKAWAKA 60 kV	P7-1:A1:2_ HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	Low	0.97	0.97	0.79	1.01	1.03	0.94		0.90	1.03	1.00	0.97	0.86	Continue to monitor
FRUITLND 60 kV	P7-1:A1:5_ ESSEX JCT-ARCATA-FAIRHAVEN & FAIRHAVEN-HUMBOLDT LINES	P7	DCTL	Low	0.97	0.97	0.88	0.98	1.01	0.94		0.89	1.03	0.97	0.96	N/A	Continue to monitor
FRT SWRD 60 kV	P7-1:A1:5_ ESSEX JCT-ARCATA-FAIRHAVEN & FAIRHAVEN-HUMBOLDT LINES	P7	DCTL	Low	0.96	0.96	0.88	0.98	1.02	0.93		0.89	1.02	0.97	0.96	0.90	Continue to monitor
GRBRVLE 60 kV	P7-1:A1:5_ ESSEX JCT-ARCATA-FAIRHAVEN & FAIRHAVEN-HUMBOLDT LINES	P7	DCTL	Low	0.97	0.97	0.87	0.99	1.03	0.92		0.88	1.03	0.98	0.97	0.90	Continue to monitor
KEKAWAKA 60 kV	P7-1:A1:5_ ESSEX JCT-ARCATA-FAIRHAVEN & FAIRHAVEN-HUMBOLDT LINES	P7	DCTL	Low	0.97	0.97	0.89	0.99	1.03	0.93		0.90	1.02	0.98	0.97	N/A	Continue to monitor
FRUITLND 60 kV	P7-1:A1:6_ ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	P7	DCTL	Low	0.97	0.97	0.89	0.97	1.01	0.94		0.88	1.03	0.96	0.96	N/A	Continue to monitor
FRT SWRD 60 kV	P7-1:A1:6_ ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	P7	DCTL	Low	0.96	0.96	0.88	0.97	1.02	0.93		0.88	1.02	0.96	0.96	N/A	Continue to monitor
GRBRVLE 60 kV	P7-1:A1:6_ ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	P7	DCTL	Low	0.96	0.97	0.88	0.98	1.03	0.92		0.87	1.03	0.97	0.97	N/A	Continue to monitor
KEKAWAKA 60 kV	P7-1:A1:6_ ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	P7	DCTL	Low	0.97	0.97	0.89	0.98	1.03	0.93		0.89	1.02	0.97	0.97	N/A	Continue to monitor
BRDGVLE 115 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.55	0.46	0.98	0.99	0.98	0.97	0.96	1.07	0.98	0.54	N/A	Generation redispatch
BRDGVLE 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.55	0.46	0.98	0.99	0.97	0.97	0.95	1.06	0.98	0.55	N/A	Generation redispatch
CARLOTTA 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.59	0.47	1.02	1.02	1.01	1.00	1.00	1.05	1.02	0.58	N/A	Generation redispatch

Study Area: **PG&E Central Coast/Los Padres**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
EEL RIVR 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.56	0.46		1.02	1.03	1.02	1.01	1.01	1.04	1.02	0.56	N/A	Generation redispatch
EUREKA 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.56	0.48		1.03	1.04	1.03	1.03	1.03	1.05	1.03	0.56	N/A	Generation redispatch
EUREKA A 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.56	0.48		1.03	1.04	1.03	1.03	1.03	1.05	1.03	0.56	N/A	Generation redispatch
FRT SWRD 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.56	0.46		0.96	1.00	0.91	0.90	0.87	1.03	0.94	0.56	N/A	Generation redispatch
FRUITLND 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.55	0.45		0.96	1.00	0.92	0.92	0.87	1.04	0.95	0.55	N/A	Generation redispatch
GRBRVLE 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.57	0.48		0.96	1.02	0.90	0.89	0.86	1.03	0.95	0.57	N/A	Generation redispatch
HARRIS 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.57	0.49		1.03	1.03	1.03	1.03	1.03	1.05	1.03	0.57	N/A	Generation redispatch
HMBLT BY 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.56	0.48		1.04	1.04	1.03	1.03	1.03	1.05	1.04	0.56	N/A	Generation redispatch
HMBOBAYPPA 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.56	0.48		1.04	1.04	1.03	1.03	1.03	1.05	1.04	0.56	N/A	Generation redispatch
HMBOBAYPPC 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.56	0.48		1.04	1.04	1.03	1.03	1.03	1.05	1.04	0.56	N/A	Generation redispatch
HOOPA 60 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.56	0.48		1.00	1.01	1.01	1.01	1.03	1.02	1.00	0.55	N/A	Generation redispatch
HUMBOLDT 115 kV	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.53	0.46		0.97	0.97	0.96	0.96	0.97	1.07	0.97	0.53	N/A	Generation redispatch



Study Area: **PG&E Central Coast/Los Padres**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
HUMBOLDT 60 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.57	0.49		1.03	1.03	1.03	1.03	1.03	1.05	1.03	0.57	N/A	Generation redispatch
KEKAWAKA 60 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.61	0.54		0.96	1.02	0.91	0.91	0.88	1.03	0.95	0.61	N/A	Generation redispatch
LOW GAP1 115 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P6	N-1-1	Low	NConv	NConv	0.67		1.00	1.00	1.00	1.00	1.00	1.06	1.00	NConv	N/A	Generation redispatch
MPLE CRK 60 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.58	0.52		1.02	1.02	1.03	1.03	1.03	1.04	1.02	0.58	N/A	Generation redispatch
NEWBURG 60 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.57	0.46		1.02	1.03	1.01	1.01	1.00	1.05	1.02	0.57	N/A	Generation redispatch
PCLUMBER 60 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.59	0.47		1.02	1.02	1.01	1.00	1.00	1.05	1.02	0.58	N/A	Generation redispatch
RDGE CBN 60 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.62	0.58		1.01	1.01	1.03	1.03	1.03	1.05	1.01	0.62	N/A	Generation redispatch
RIO DELL 60 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.62	0.49		1.03	1.03	1.02	1.01	1.01	1.05	1.03	0.61	N/A	Generation redispatch
RIODLLTP 60 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.59	0.47		1.02	1.02	1.01	1.01	1.00	1.05	1.02	0.58	N/A	Generation redispatch
RUSS RCH 60 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.58	0.51		1.01	1.02	1.02	1.03	1.03	1.04	1.02	0.58	N/A	Generation redispatch
SWNS FLT 60 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.56	0.46		0.99	1.00	0.98	0.97	0.96	1.06	0.99	0.56	N/A	Generation redispatch
WILLWCRK 60 kV	P1-2:A1:4-_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] & P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	Low	NConv	0.57	0.49		1.00	1.01	1.01	1.02	1.03	1.02	1.00	0.57	N/A	Generation redispatch



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)									Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
HMBOBAYPPC 60 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	<8	N/A	Continue to monitor
HOOPA 60 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	13	<8	<8	<8	<8	<8	<8	<8	<8	<8	38	Continue to monitor
HUMBOLDT 60 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	<8	N/A	Continue to monitor
HUMBOLDT 115 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	<8	N/A	Continue to monitor
KEKAWAKA 60 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	10	<8	<8	<8	<8	<8	<8	<8	<8	<8	N/A	Continue to monitor
LOW GAP1 115 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	10	<8	<8	<8	<8	<8	<8	<8	<8	<8	22	Continue to monitor
NEWBURG 60 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	<8	34	Continue to monitor
PCLUMBER 60 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	<8	N/A	Continue to monitor
RIO DELL 60 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	<8	33	Continue to monitor
SCOTIATP 60 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	<8	N/A	Continue to monitor
SCTIATP2 60 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	<8	N/A	Continue to monitor
SWNS FLT 60 kV	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	12	<8	<8	<8	<8	<8	<8	<8	<8	<8	N/A	Continue to monitor
FRT SWRD 60 kV	P1-4:A1:5_ GRBRVLE 60.00KV ID=8H & GRBRVLE 60.00KV ID=7H & GRBRVLE 60.00KV ID=5H & GRBRVLE 60.00KV ID=V SHUNT DEVICES	P1	N-1	<8	<8	8	<8	<8	9	9	8	<8	<8	<8	0	0	Continue to monitor
GRBRVLE 60 kV	P1-4:A1:5_ GRBRVLE 60.00KV ID=8H & GRBRVLE 60.00KV ID=7H & GRBRVLE 60.00KV ID=5H & GRBRVLE 60.00KV ID=V SHUNT DEVICES	P1	N-1	10	10	11	10	<8	11	12	10	10	10	10	10	0	Garberville Area Reinforcement
KEKAWAKA 60 kV	P1-4:A1:5_ GRBRVLE 60.00KV ID=8H & GRBRVLE 60.00KV ID=7H & GRBRVLE 60.00KV ID=5H & GRBRVLE 60.00KV ID=V SHUNT DEVICES	P1	N-1	9	8	9	8	<8	10	10	9	8	9	8	N/A	Garberville Area Reinforcement	

Study Area: **PG&E Humboldt**



Transient Stability

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2027 SP High CEC Forecast	

In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2020-21 Transmission Planning Process.

<http://www.caiso.com/Documents/BoardApproved2020-2021TransmissionPlan.pdf>

2022-2023 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt**



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		2027 SP High CEC Forecast

No single contingency resulted in total load drop of more than 250 MW

Study Area: **PG&E Humboldt**

**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)										Potential Mitigation Solutions	
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		2027 SP High CEC Forecast

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
31522 COTWD_2D 115 31466 JESSUP1 115 1 1	COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2	P6	N-1-1	<100	111	166	<100	<100	<100	115	<100	<100	Operating solution
Benton-Deschutes 60 kV Line	P2-4:A3:22:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2-4	Bus Tie Breaker Fault	38	48	116	12	147	104	54	72	56	Continue to monitor
Benton-Deschutes 60 kV Line	P5-5(DC):A3:3:_Station	p5	Non-Redundant Battery Supply	NConv	NConv	NConv	NConv	NConv	NConv	NConv	20	74	Install redundant battery supply
Benton-Deschutes 60 kV Line	P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	NConv	NConv	NConv	NConv	NConv	NConv	NConv	20	76	Install Redundant Relay
Caribou No.11 230/115/60 kV Transformer	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (BELDENTP-TABLE MTN D)	P2-1	Line Section w/o Fault	NConv	NConv	NConv	NConv	NConv	NConv	NConv	NConv	NConv	Existing RAS
Caribou No.11 230/115/60 kV Transformer	P2-2:A3:28:_TABLE MTN D 230KV SECTION 1D	P2-2	Bus	NConv	NConv	NConv	NConv	NConv	NConv	NConv	NConv	NConv	Existing RAS
Caribou No.11 230/115/60 kV Transformer	P2-3:A3:27:_TABLE MTN D - 1D 230KV & LINE	P2-3	Non-Bus Tie Breaker Fault	NConv	NConv	NConv	NConv	NConv	NConv	<100	NConv	NConv	Existing RAS
Caribou No.11 230/115/60 kV Transformer	P2-4:A3:23:_TABLE MTN D SECTION 1D & TABLE MTN E SECTION 1E 230KV	P2-4	Bus Tie Breaker Fault	NConv	NConv	NConv	NConv	NConv	NConv	NConv	NConv	NConv	Existing RAS
Caribou No.11 230/115/60 kV Transformer	P2-4:A3:6:_TABLE MTN D 230KV - SECTION 1D & 2D	P2-4	Bus Tie Breaker Fault	NConv	NConv	NConv	NConv	NConv	NConv	<100	NConv	NConv	Existing RAS
Caribou No.11 230/115/60 kV Transformer	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	NConv	NConv	NConv	NConv	NConv	NConv	<100	NConv	NConv	Existing RAS
Caribou-Plumas Jct 60 kV Line	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (BELDENTP-TABLE MTN D)	P2-1	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Monitor future forecast
Caribou-Plumas Jct 60 kV Line	P2-2:A3:28:_TABLE MTN D 230KV SECTION 1D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Monitor future forecast
Caribou-Plumas Jct 60 kV Line	P2-4:A3:23:_TABLE MTN D SECTION 1D & TABLE MTN E SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Monitor future forecast
Cascade-Benton-Deschute 60 kV line	P2-4:A3:22:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2-4	Bus Tie Breaker Fault	<100	<100	116	<100	147	<100	<100	<100	<100	Continue to monitor
Cascade-Benton-Deschute 60 kV line	COTTONWOOD 230KV BUS SECTION E/G (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	NConv	NConv	NConv	NConv	NConv	<100	NConv	<100	<100	Operating solution
Cascade-Benton-Deschute 60 kV line	COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2	P6	N-1-1	146	149	241	<100	108	<100	153	<100	<100	Operating solution
Cascade-Cottonwood 115 kV Line (31459 31469)	P2-4: COTTONWD 60KV - SECTION 1D & 1E	P2-4	Bus Tie Breaker Fault	<100	<100	Nconv	<100	<100	<100	<100	<100	<100	Continue to monitor
Cascade-Cottonwood 115 kV Line (31459 31469)	COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2	P6	N-1-1	116	110	170	<100	<100	<100	116	<100	<100	Operating solution
Cascade-Craig View 115 kV Line (Path 25)	P5-5(DC):A3:1:_Station	p5	Non-Redundant Battery Supply	NConv	NConv	NConv	60	N/A	<100	NConv	NConv	NConv	Install redundant battery supply
Cascade-Craig View 115 kV Line (Path 25)	P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	NConv	NConv	NConv	NConv	N/A	<100	NConv	43	84	Operating solution
Cascade-Craig View 115 kV Line (Path 25)	P5-5(DC):A3:3:_Station	p5	Non-Redundant Battery Supply	NConv	NConv	NConv	NConv	N/A	<100	NConv	42	85	Install redundant battery supply
Cascade-Deschutes 60 kV Line (31578 31592)	P2-4:A3:22:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2-4	Bus Tie Breaker Fault	22	81	182	30	162	<100	87	<100	<100	Continue to monitor
Cascade-Deschutes 60 kV Line (31578 31592)	P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	NConv	NConv	NConv	NConv	NConv	<100	NConv	<100	<100	Operating solution
Cascade-Deschutes 60 kV Line (31578 31592)	P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	NConv	78	NConv	NConv	42	<100	82	NConv	NConv	Operating solution
Cascade-Deschutes 60 kV Line (31578 31592)	P5-5(DC):A3:1:_Station	p5	Non-Redundant Battery Supply	NConv	NConv	NConv	36	17	<100	NConv	NConv	NConv	Install redundant battery supply
Cascade-Deschutes 60 kV Line (31578 31592)	P5-5(DC):A3:24:_Station	p5	Non-Redundant Battery Supply	65	67	NConv	51	42	<100	71	40	53	Install redundant battery supply
Cascade-Deschutes 60 kV Line (31578 31592)	P5-5(DC):A3:3:_Station	p5	Non-Redundant Battery Supply	NConv	NConv	NConv	NConv	NConv	<100	NConv	41	94	Install redundant battery supply
Cascade-Deschutes 60 kV Line (31578 31592)	COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2	P6	N-1-1	223	228	366	108	172	<100	233	<100	<100	Operating solution
Cottonwood-Benton No.1 60 kV Line (31570 31572)	P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	NConv	NConv	NConv	NConv	NConv	<100	NConv	<100	<100	Operating solution
Cottonwood-Benton No.1 60 kV Line (31570 31572)	P5-5(DC):A3:3:_Station	p5	Non-Redundant Battery Supply	NConv	NConv	NConv	NConv	NConv	<100	NConv	18	43	Install redundant battery supply
Cottonwood-Benton No.1 60 kV Line (31570 31572)	COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2	P6	N-1-1	<100	<100	148	<100	<100	<100	<100	<100	<100	Continue to monitor
Cottonwood-Round Mountain 230 kV Line	P5-5(DC):A3:2:_Station	p5	Non-Redundant Battery Supply	NConv	NConv	NConv	2	61	NConv	NConv	NConv	NConv	Install redundant battery supply
Cottonwood-Round Mountain 230 kV Line	ROUND MOUNTAIN 230KV BUS 1 & 2 SEC. E (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	NConv	NConv	NConv	NConv	NConv	<100	NConv	NConv	NConv	Operating solution

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
Delevan-Cortina 230 kV Line	P5-5(DC):A3:2:_Station	P5	Non-Redundant Battery Supply	NConv	NConv	NConv	58	6	<100	NConv	NConv	NConv	Install redundant battery supply
Delevan-Cortina 230 kV Line	P7-1:A3:4:_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	P7	DCTL	102	106	123	59	12	<100	107	47	59	Operating solution
Glenn No.1 60 kV Line	P1-2:A3:99:_GLENN #5 60KV [8427]	P1	N-1	<100	100	103	48	12	114	101	27	48	Operating solution
Glenn No.1 60 kV Line	P1-1:A3:56:_CSC HYDR 9.11KV GEN UNIT 1 & P1-2:A3:99:_GLENN #5 60KV [8427]	P3	N-1/G-1	<100	111	119	<100	<100	<100	<100	<100	<100	Operating solution
Keswick-Cascade 60 kV Line (31564 31566)	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	106	<100	<100	NConv	<100	<100	<100	<100	NConv	Project: Cottonwood 115 kV Bus Sectionalizing Breakers Project
Keswick-Cascade 60 kV Line (31564 31566)	P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	NConv	82	NConv	NConv	79	NConv	90	NConv	NConv	Operating solution
Keswick-Cascade 60 kV Line (31564 31566)	P5-5(DC):A3:24:_Station	P5	Non-Redundant Battery Supply	45	46	NConv	39	65	NConv	53	43	37	Install redundant battery supply
Keswick-Cascade 60 kV Line (31564 31566)	P6: CASCADE-COTTONWOOD 115KV [1240] & CASCADE-BENTON-DESCHUTES 60KV [6310]	P6	N-1-1	163	161	<100	<100	<100	<100	<100	<100	<100	Operating solution
Oroville-Thermalito-Table Mountain No.3 230 kV Line	P2-1:A3:29:_TABLE MTN E-THM JCT 230KV [1] NO FAULT	P2-1	Line Section w/o Fault	89	89	103	114	92	103	121	91	116	Continue to monitor
Round Mountain 500/230 kV Bank	P5-5(DC):A3:2:_Station	P5	Non-Redundant Battery Supply	NConv	NConv	NConv	64	117	<100	NConv	NConv	NConv	Install redundant battery supply
Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498)	P2-1:A3:68:_BUTTE-SYCAMORE CREEK 115KV [1190] (CHICOTP2-BUTTE)	P2-1	Line Section w/o Fault	90	93	104	58	15	<100	93	39	58	Continue to monitor
Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498)	P2-2:A3:49:_TBLE MTN 115KV SECTION 1D	P2-2	Bus	86	89	104	51	9	<100	89	41	51	Table Mountain SPS recommended in 2017-2018 TPP
Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498)	P2-2:A3:45:_BUTTE 115KV SECTION MD	P2-2	Bus	90	93	104	58	15	<100	93	39	58	Continue to monitor
Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498)	P2-3:A3:47:_BUTTE - MD 115KV & TABLE MTN-BUTTE #1 LINE	P2-3	Non-Bus Tie Breaker Fault	115	117	132	<100	<100	<100	118	<100	<100	Table Mountain SPS recommended in 2017-2018 TPP
Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498)	P2-4:A3:12:_BUTTE 115KV - SECTION MD & ME	P2-4	Bus Tie Breaker Fault	93	96	108	58	15	<100	96	39	58	Continue to monitor
Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498)	TABLE MTN-BUTTE #2 115KV [3920] & TABLE MTN-BUTTE #1 115KV [3910]	P6	N-1-1	<100	<100	103	<100	<100	<100	<100	<100	<100	Table Mountain SPS recommended in 2017-2018 TPP
Table Mountain No.3 230/115 kV Transformer	P2-2:A3:28:_TABLE MTN D 230KV SECTION 1D	P2-2	Bus	NConv	NConv	NConv	NConv	69	NConv	NConv	NConv	NConv	Existing RAS
Table Mountain No.3 230/115 kV Transformer	P2-3:A3:26:_TABLE MTN D - 1D 230KV & CARIBOU-TABLE MTN LINE	P2-3	Non-Bus Tie Breaker Fault	79	NConv	NConv	8	69	NConv	NConv	31	26	Existing RAS
Table Mountain-Butte No.1 115 kV Line (31500 31501)	TABLE MTN-BUTTE #2 115KV [3920] & SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV [4314]	P6	N-1-1	117	121	140	<100	<100	<100	122	<100	<100	Table Mountain SPS recommended in 2017-2018 TPP
Table Mountain-Butte No.1 115 kV Line (31500 31501)	P7-1:A3:4:_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	P7	DCTL	117	121	140	<100	<100	<100	122	<100	<100	Table Mountain SPS recommended in 2017-2018 TPP
Table Mountain-Paradise 115 kV Line (31478 31494)	P2-2:A3:49:_TBLE MTN 115KV SECTION 1D	P2-2	Bus	89	93	109	51	9	<100	93	45	51	Continue to monitor
Table Mountain-Paradise 115 kV Line (31478 31494)	P2-3:A3:51:_TBLE MTN - 1D 115KV & TABLE MTN-BUTTE #1 LINE	P2-3	Non-Bus Tie Breaker Fault	89	93	108	51	8	<100	93	45	51	Continue to monitor
Table Mountain-Paradise 115 kV Line (31478 31494)	TABLE MTN-BUTTE #1 115KV [3910] & TABLE MTN-BUTTE #2 115KV [3920]	P6	N-1-1	<100	<100	107	<100	<100	<100	<100	<100	<100	Continue to monitor
Trinity-Keswick 60 kV Line (31556 31564)	P5-5(DC):A3:24:_Station	P5	Non-Redundant Battery Supply	14	75	NConv	19	70	<100	82	24	17	Install redundant battery supply
Trinity-Keswick 60 kV Line (31556 31564)	P1-2:A3:70:_CASCADE-BENTON-DESCHUTES 60KV [6310]	P6	N-1-1	158	160	<100	<100	<100	<100	<100	<100	<100	Operating solution



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
AMERESCO 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
AMERESCOTAP 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
ANITA 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
BCKS CRK 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.08	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
BELDEN 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
BELDENTP 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
BIG BAR 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.06	<1.05	System adjustments or voltage support if needed
BIGBENTP 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
BTTE CRK 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
BUTTE 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
BUTTVLLY 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
CANAL TP 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	1.05	<1.05	N/A	<1.05	<1.05	1.05	System adjustments or voltage support if needed
CARBOU M 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
CARIBOU 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
CARIBOU 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
CEDR CRK 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	1.06	1.07	N/A	<1.05	1.07	1.06	System adjustments or voltage support if needed
CHALLENGE 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	1.06	1.09	N/A	<1.05	<1.05	1.05	System adjustments or voltage support if needed
CHICOTP2 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
CLARK RD 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
CLOV TAP 60 kV	Basecase	P0	Normal Condition	High	1.05	<1.05	1.05	1.06	1.07	1.05	<1.05	1.07	1.06	System adjustments or voltage support if needed
CNTRVLE 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
CORNING 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	1.05	<1.05	N/A	<1.05	<1.05	1.06	System adjustments or voltage support if needed
COWCK TP 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.05	<1.05	System adjustments or voltage support if needed
CR CANAL 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	1.05	<1.05	N/A	<1.05	<1.05	1.05	System adjustments or voltage support if needed
CRESTA 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.08	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
DE SABLA 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
DRHM JCA 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
DRHMSW45 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
ELKCREEK 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	1.05	System adjustments or voltage support if needed
FORBSTWN 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	1.07	1.05	1.06	1.07	<1.05	1.07	<1.05	System adjustments or voltage support if needed
FRBSTNTP 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	1.07	1.05	1.06	1.07	<1.05	1.07	<1.05	System adjustments or voltage support if needed
FRSTGLEN 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.07	<1.05	System adjustments or voltage support if needed
GPH-BC 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.07	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
GRIZZLY1 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.07	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
GRIZZLYT4-2 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.07	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
GROUSCRK 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.06	<1.05	System adjustments or voltage support if needed
HONC JT1 115 kV	Basecase	P0	Normal Condition	High	1.05	1.05	<1.05	1.06	1.06	N/A	<1.05	1.06	1.06	System adjustments or voltage support if needed
HONC JT3 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	1.05	1.06	1.06	1.05	<1.05	1.05	1.05	System adjustments or voltage support if needed
HONCUT 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	1.05	1.06	1.06	1.05	<1.05	1.05	1.05	System adjustments or voltage support if needed
HYAMPOM 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.06	<1.05	System adjustments or voltage support if needed
HYMPOMJT 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.06	<1.05	System adjustments or voltage support if needed
JACINTO 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	1.06	<1.05	System adjustments or voltage support if needed
KANAKAT 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	1.07	1.05	1.06	1.07	<1.05	1.07	<1.05	System adjustments or voltage support if needed
KILARC 60 kV	Basecase	P0	Normal Condition	High	1.05	<1.05	1.05	1.06	1.07	1.05	<1.05	1.07	1.06	System adjustments or voltage support if needed
MALACHA1 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.08	<1.05	System adjustments or voltage support if needed
MALACHA2 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.07	<1.05	System adjustments or voltage support if needed
MCNE JCT 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
NDAME J 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
NEO REDT 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	1.05	<1.05	N/A	<1.05	<1.05	1.05	System adjustments or voltage support if needed
NORD 1 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
NOTRDAME 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
OLSEN JCT 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	1.05	1.06	1.07	1.05	<1.05	1.07	1.06	System adjustments or voltage support if needed
OLSENHYDRO 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	1.05	1.06	1.07	1.05	<1.05	1.07	1.06	System adjustments or voltage support if needed
OWID 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	1.07	1.05	1.06	1.07	<1.05	1.07	<1.05	System adjustments or voltage support if needed

2022-2023 ISO Reliability Assessment - Study Results

Study Area: **PG&E North Valley**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
PALERMO 115 kV	Basecase	P0	Normal Condition	High	1.05	1.05	1.06	1.06	1.06	1.06	<1.05	1.06	1.05	System adjustments or voltage support if needed
PALERMO 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
PARADSE 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
POE 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.07	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
RASN JNT 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	1.05	<1.05	N/A	<1.05	<1.05	1.05	System adjustments or voltage support if needed
RED B JT 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	1.05	<1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
RED BLFF 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	1.05	<1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
RK C JT1 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
RK C JT2 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.08	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
ROCKCK 1 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
ROCKCK 2 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.08	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
SLYCREEK 115 kV	Basecase	P0	Normal Condition	High	1.05	1.05	1.08	1.05	1.06	1.08	<1.05	1.08	1.05	System adjustments or voltage support if needed
SYCAMORE 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
TABLE MTN D 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
TABLE MTN E 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.06	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
TAP 65 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.06	<1.05	System adjustments or voltage support if needed
TBL MT2M 230 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
TBLE MTN 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
TKO TAP 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.05	<1.05	System adjustments or voltage support if needed
TRINITY 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.06	<1.05	System adjustments or voltage support if needed
TRINITY 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.06	<1.05	System adjustments or voltage support if needed
TYLER 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	1.05	<1.05	N/A	<1.05	<1.05	1.05	System adjustments or voltage support if needed
WHITMORE 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	1.06	1.06	N/A	<1.05	1.07	1.05	System adjustments or voltage support if needed
WILDWOOD 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.07	<1.05	System adjustments or voltage support if needed
WILLOWS 60 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	<1.05	1.05	System adjustments or voltage support if needed
WOODLEAFJCT 115 kV	Basecase	P0	Normal Condition	High	<1.05	<1.05	1.08	1.05	1.06	1.08	<1.05	1.08	1.05	System adjustments or voltage support if needed
WYANDJT3 115 kV	Basecase	P0	Normal Condition	High	1.05	1.05	1.06	1.06	1.06	1.05	<1.05	1.06	1.06	System adjustments or voltage support if needed
WYANDTTE 115 kV	Basecase	P0	Normal Condition	High	1.05	1.05	1.06	1.06	1.06	1.05	<1.05	1.06	1.06	System adjustments or voltage support if needed
CANAL TP 60 kV	P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1	P1	N-1	Low	0.90	1.00	1.01	1.00	1.05	N/A	0.99	0.93	1.00	Project: Tyler 60kV capacitor
CR CANAL 60 kV	P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1	P1	N-1	Low	0.89	1.00	1.01	1.00	1.05	N/A	0.99	0.93	1.00	Project: Tyler 60kV capacitor
NEO REDT 60 kV	P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1	P1	N-1	Low	0.90	1.00	1.01	1.00	1.05	N/A	0.99	0.93	1.00	Project: Tyler 60kV capacitor
RASN JNT 60 kV	P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1	P1	N-1	Low	0.90	1.00	1.01	1.00	1.05	N/A	0.99	0.93	1.00	Project: Tyler 60kV capacitor
TYLER 60 kV	P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1	P1	N-1	Low	0.90	1.00	1.01	1.00	1.05	N/A	1.00	0.93	1.00	Project: Tyler 60kV capacitor
CHESTER 60 kV	P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	Low	0.85	NConv	NConv	0.91	0.90	N/A	NConv	0.85	0.91	Existing RAS
COLLINSPINE 60 kV	P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	Low	0.84	NConv	NConv	0.91	0.90	N/A	NConv	0.84	0.91	Existing RAS
COLLINSNJCT 60 kV	P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	Low	0.85	NConv	NConv	0.91	0.90	N/A	NConv	0.85	0.91	Existing RAS
HMLTN BR 60 kV	P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	Low	0.89	NConv	NConv	0.95	0.94	N/A	NConv	0.89	0.94	Existing RAS
ULTR WSD 60 kV	P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	Low	0.89	NConv	NConv	0.95	0.94	N/A	NConv	0.89	0.94	Existing RAS
WESTWOOD 60 kV	P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	Low	0.89	NConv	NConv	0.94	0.94	N/A	NConv	0.89	0.94	Existing RAS
KESWICK 60 kV	P1-2:A3:71:_KESWICK-CASCADE 60KV [7260] MOAS OPENED ON CASCADE_STLLWATR	P1	N-1	Low	0.97	0.96	0.89	0.98	1.02	N/A	0.95	1.05	0.98	Continue to monitor
STLLWATR 60 kV	P1-2:A3:71:_KESWICK-CASCADE 60KV [7260] MOAS OPENED ON CASCADE_STLLWATR	P1	N-1	Low	0.96	0.95	0.88	0.98	1.02	N/A	0.94	1.04	0.97	Continue to monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
ANTLER 60 kV	P2-2:A3:37:_CASCADE 115KV SECTION MA	P2-2	Bus Section	Low	0.93	0.92	0.90	0.94	1.01	0.89	0.92	0.99	0.94	Continue to monitor
BIG MDWS 60 kV	P2-3:A3:21:_CARIBOU - 1D 230KV & CARIBOU-TABLE MTN LINE	P2-3	Non-Bus Tie Breaker Fault	Low	0.90	NConv	NConv	0.95	0.95	N/A	NConv	0.90	0.95	Existing RAS
CHESTER 60 kV	P2-1:A3:19:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	Low	0.85	NConv	NConv	>0.9	>0.9	N/A	NConv	0.85	>0.9	Existing RAS
COLLINSPIKE 60 kV	P2-1:A3:19:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	Low	0.84	NConv	NConv	>0.9	0.90	N/A	NConv	0.84	>0.9	Existing RAS
HMLTN BR 60 kV	P2-1:A3:19:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	Low	0.89	NConv	NConv	>0.9	>0.9	N/A	NConv	0.89	>0.9	Existing RAS
PPL 60 kV	P2-2:A3:37:_CASCADE 115KV SECTION MA	P2-2	Bus Section	Low	0.93	0.92	0.90	0.94	1.01	0.89	0.92	0.99	0.94	Continue to monitor
ULTR WSD 60 kV	P2-1:A3:19:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	Low	0.89	NConv	NConv	>0.9	>0.9	N/A	NConv	0.89	>0.9	Existing RAS
WESTWOOD 60 kV	P2-1:A3:19:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	Low	0.89	NConv	NConv	0.94	0.94	N/A	NConv	0.89	0.94	Existing RAS
CASCADE 115kV	P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1 & P1-2:A3:42:_CASCADE-COTTONWOOD 115KV [1240]	P3	N-1/G-1	Low	0.89	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Install reactive support or SPS (Cascade 115kV Area)
NEO REDT 60kV	P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	N-1/G-1	Low	0.89	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Project: Tyler 60kV capacitor
RASN JNT 60kV	P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	N-1/G-1	Low	0.89	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Project: Tyler 60kV capacitor
TYLER 60kV	P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	N-1/G-1	Low	0.89	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Project: Tyler 60kV capacitor
CASCADE 115kV	P1-1:A3:47:_VOLTA1-2 9.11KV GEN UNIT 1 & P1-2:A3:42:_CASCADE-COTTONWOOD 115KV [1240]	P3	N-1/G-1	Low	>0.9	0.89	>0.9	>0.9	>0.9	N/A	0.88	>0.9	>0.9	Install reactive support or SPS (Cascade 115kV Area)
LS ML JT 60kV	P1-1:A3:47:_VOLTA1-2 9.11KV GEN UNIT 1 & P1-2:A3:81:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT RED BLFF	P3	N-1/G-1	Low	>0.9	>0.9	0.89	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
VINA 60kV	P1-1:A3:47:_VOLTA1-2 9.11KV GEN UNIT 1 & P1-2:A3:81:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT RED BLFF	P3	N-1/G-1	Low	>0.9	>0.9	0.88	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
RED BLFF 60kV	P1-1:A3:49:_SOUTH G 4.16KV GEN UNIT 1 & P1-2:A3:81:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT RED BLFF	P3	N-1/G-1	Low	>0.9	>0.9	0.90	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
LS MLNSJ 60kV	P1-1:A3:79:_COLEMAN 6.60KV GEN UNIT 1 & P1-2:A3:81:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT_RED BLFF	P3	N-1/G-1	Low	>0.9	>0.9	0.89	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
KESWICK 60 kV	P5-5(DC):A3:15:_Station	P5	Non-Redundant Battery Supply	Low	0.97	0.96	0.89	0.99	1.02	0.88	0.95	1.05	0.98	Install station back-up battery
STLLWATR 60 kV	P5-5(DC):A3:15:_Station	P5	Non-Redundant Battery Supply	Low	0.96	0.95	0.88	0.98	1.02	0.86	0.94	1.05	0.97	Install station back-up battery
COLLINSPINE 60 kV	P5-5(DC):A3:2:_Station	P5	Non-Redundant Battery Supply	Low	NConv	NConv	NConv	>0.9	0.90	N/A	NConv	NConv	NConv	Install station back-up battery
ANTLER 60 kV	P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	0.89	NConv	NConv	>0.9	N/A	0.88	NConv	NConv	Operating solution
CASCADE 115 kV	P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	0.86	NConv	NConv	>0.9	N/A	0.85	NConv	NConv	Operating solution
MTN GATE 60 kV	P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	0.89	NConv	NConv	>0.9	N/A	0.88	NConv	NConv	Operating solution
PPL 60 kV	P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	0.89	NConv	NConv	>0.9	N/A	0.88	NConv	NConv	Operating solution
CHESTER 60 kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	0.85	NConv	0.90	>0.9	>0.9	0.90	NConv	0.84	>0.9	Install Redundant Relay
COLLINSPINE 60 kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	0.84	NConv	0.90	>0.9	>0.9	0.89	NConv	0.84	>0.9	Install Redundant Relay
HMLTN BR 60 kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	0.89	NConv	0.95	>0.9	>0.9	N/A	NConv	0.89	>0.9	Install Redundant Relay
ULTR WSD 60 kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	0.89	NConv	>0.9	>0.9	>0.9	N/A	NConv	0.88	>0.9	Install Redundant Relay
WESTWOOD 60 kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	0.89	NConv	>0.9	>0.9	>0.9	N/A	NConv	0.88	>0.9	Install Redundant Relay
BIG MDWS 60 kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	0.90	NConv	0.95	>0.9	>0.9	N/A	NConv	0.90	>0.9	Install Redundant Relay
CASCADE 115kV	P1-2:A3:42:_CASCADE-COTTONWOOD 115KV [1240] & P1-3:A3:39:_TRINITY 115/60KV TB 1	P6	N-1-1	Low	0.89	0.88	>0.9	>0.9	>0.9	N/A	0.88	>0.9	>0.9	Operating solution
DIRYVLE 60kV	P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P6	N-1-1	Low	0.86	0.90	0.56	>0.9	>0.9	N/A	0.89	>0.9	>0.9	Operating solution
GERBER 60kV	P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P6	N-1-1	Low	0.85	0.90	0.55	>0.9	>0.9	N/A	0.89	>0.9	>0.9	Operating solution
LPSP1 60kV	P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P6	N-1-1	Low	0.86	>0.9	0.57	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Operating solution

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
LS MLNSJ 60kV	P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P6	N-1-1	Low	0.85	0.89	0.54	>0.9	>0.9	N/A	0.88	>0.9	>0.9	Operating solution
RWSN J2 60kV	P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P6	N-1-1	Low	0.86	>0.9	0.58	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Operating solution
VINA 60kV	P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P6	N-1-1	Low	0.84	0.88	0.53	>0.9	>0.9	N/A	0.88	>0.9	>0.9	Operating solution
BIG MDWS 60 kV	P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line	P7	DCTL	Low	0.89	NConv	NConv	>0.9	>0.9	N/A	NConv	0.89	0.95	Operating solution
CHESTER 60 kV	P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line	P7	DCTL	Low	0.83	NConv	NConv	>0.9	>0.9	N/A	NConv	0.84	0.91	Operating solution
COLLINSPINE 60 kV	P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line	P7	DCTL	Low	0.83	NConv	NConv	>0.9	0.90	N/A	NConv	0.83	0.90	Operating solution
GANSNER 60 kV	P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line	P7	DCTL	Low	0.90	NConv	NConv	>0.9	>0.9	N/A	NConv	>0.9	>0.9	Operating solution
HMLTN BR 60 kV	P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line	P7	DCTL	Low	0.88	NConv	NConv	>0.9	>0.9	N/A	NConv	0.88	0.94	Operating solution
ULTR WSD 60 kV	P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line	P7	DCTL	Low	0.88	NConv	NConv	>0.9	>0.9	N/A	NConv	0.88	0.94	Operating solution
WESTWOOD 60 kV	P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line	P7	DCTL	Low	0.88	NConv	NConv	>0.9	>0.9	N/A	NConv	0.88	0.94	Operating solution

2022-2023 ISO Reliability Assessment - Study Results

Study Area: **PG&E North Valley**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
TYLER 60 kV	P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1	P1	N-1	13	<8	<8	<8	<8	NA	<8	<8	<8	Project: Tyler 60kV capacitor

Study Area: **PG&E North Valley**



*Transient Stability*

Contingency	Category	Category Description	Transient Stability Performance				Potential Mitigation Solutions
			Baseline Scenarios		Sensitivity Scenarios		
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	
In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2019-20 Transmission Planning Process for transient stability studies:							
<a href="http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf">http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf</a>							

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)													Potential Mitigation Solutions	
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2032 SP with Additional Transportation Electrification		

No single contingency resulted in total load drop of more than 250 MW



**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)													Potential Mitigation Solutions
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2032 SP with Additional Transportation Electrification	

No single source substation with more than 100 MW











2022-2023 ISO Reliability Assessment - Study Results

Study Area: PG&E North Coast & North Bay

Thermal Overloads



Table with columns: Overloaded Facility, Contingency (All and Worst P6), Category, Category Description, Loading % (Baseline Scenarios), Loading % (Sensitivity Scenarios), and Project & Potential Mitigation Solutions.

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		
Tulucay - Vaca 230 kV	P5-5a:A2:14:_LAKEVILLE 230 kV BUS 1&2 SECTION E(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	103	109	98	<100	<100	<100	<100	<100	<100	123	112	95	107	Project: Vaca Dixon-Lakeville 230 kV corridor series compensation
Tulucay - Vaca 230 kV	VACA-LAKEVILLE #1 230KV [5840] & GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SANTAFE	P6	N-1-1	102	<100	<100	<100	<100	<100	<100	<100	<100	N/A	<100	<100	<100	Project: Vaca Dixon-Lakeville 230 kV corridor series compensation
Tulucay - Vaca 230 kV	P7-1:A2:11:_GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	112	<100	<100	<100	Continue to monitor
Tulucay - Vaca 230 kV	P7-1:A6:10:_LAKEVILLE-SOBRANTE #2 & IGNACIO-SOBRANTE 230KV L	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	110	<100	<100	<100	Continue to monitor
Tulucay - Vaca 230 kV	P7-1:A6:17:_IGNACIO-SOBRANTE 230KV & LAKEVILLE-SOBRANTE #2 2	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	<100	<100	<100	Continue to monitor
Ukiah-Hopland-Cloverdale 115 kV (Ukiah sub 115)	P7-1:A2:23:_EAGLE ROCK -REDBUD & CORTINA-MENDOCINO #1 LINES	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	128	<100	<100	<100	Continue to monitor
Ukiah-Hopland-Cloverdale 115 kV (Ukiah sub 115)	P7-1:A2:23:_EAGLE ROCK -REDBUD & CORTINA-MENDOCINO #1 LINES	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	<100	<100	<100	Continue to monitor
Vaca-Lakeville #1 230kV	GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SANTAFE & TULUCAY-VACA 230KV [5800]	P6	N-1-1	<100	106	<100	<100	<100	<100	<100	<100	<100	N/A	108	<100	<100	Project: Vaca Dixon-Lakeville 230 kV corridor series compensation
Vaca-Vacaville-Jameson-North Tower 115 kV Line	P2-2:A6:16:_NRTH TWR 115KV SECTION 1E	P2-2	Bus	109	108	56	82	88	33	119	106	N/A	112	152	154	Project: North Tower 115kV Looping project	
Vaca-Vacaville-Jameson-North Tower 115 kV Line	P2-2:A6:18:_NRTH TWR 115KV SECTION 1G	P2-2	Bus	109	108	56	82	88	33	119	106	N/A	112	152	154	Project: North Tower 115kV Looping project	
Vaca-Vacaville-Jameson-North Tower 115 kV Line	P2-4:A6:5:_NRTH TWR 115KV - SECTION 1E & 1F	P2-4	Bus Tie Breaker Fault	109	108	56	82	88	33	119	106	N/A	112	152	154	Project: North Tower 115kV Looping project	
Vaca-Vacaville-Jameson-North Tower 115 kV Line	P2-4:A6:6:_NRTH TWR 115KV - SECTION 1F & 1G	P2-4	Bus Tie Breaker Fault	109	108	56	82	88	33	119	106	N/A	112	152	154	Project: North Tower 115kV Looping project	



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
MENDOCNO 115 kV	Basecase	P0	Base Case	High	1.05	<1.05	<1.05	1.06	1.05	<1.05	1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
CALPELLA 115 kV	Basecase	P0	Base Case	High	1.05	<1.05	<1.05	1.06	1.05	<1.05	1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
HPLND JT 115 kV	Basecase	P0	Base Case	High	<1.05	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
LUCERNE 115 kV	Basecase	P0	Base Case	High	<1.05	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
INDIN VL 115 kV	Basecase	P0	Base Case	High	<1.05	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
FRT BRGG 60 kV	Basecase	P0	Base Case	High	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.05	<1.05	System adjustments or voltage support if needed
BIG RIVR 60 kV	Basecase	P0	Base Case	High	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.07	<1.05	System adjustments or voltage support if needed
ELK 60 kV	Basecase	P0	Base Case	High	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.06	<1.05	System adjustments or voltage support if needed
PNT ARNA 60 kV	Basecase	P0	Base Case	High	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.05	<1.05	System adjustments or voltage support if needed
GARCIA 60 kV	Basecase	P0	Base Case	High	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	N/A	<1.05	1.06	<1.05	System adjustments or voltage support if needed
MLNO JCT 60 kV	Basecase	P0	Base Case	High	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	1.05	1.05	N/A	<1.05	<1.05	<1.05	System adjustments or voltage support if needed
CALISTGA 60 kV	Basecase	P0	Base Case	Low	0.82	0.79	0.90	0.89	0.90	>0.9	>0.9	>0.9	N/A	0.80	0.85	>0.9	Voltage support
PENNGRVE 115 kV	P1-2:A2:32:_CORONA-LAKEVILLE 115KV [4311]	P1	N-1	Low	0.97	0.97	0.90	1.00	0.99	0.93	1.05	1.04	0.86	0.97	0.99	1.04	Continue to monitor
CORONA 115 kV	P1-2:A2:32:_CORONA-LAKEVILLE 115KV [4311]	P1	N-1	Low	0.97	0.96	0.90	0.99	0.98	0.93	1.05	1.04	0.85	0.96	0.99	1.04	Continue to monitor
LYTNVLE 60 kV	P1-2:A2:43:_LAYTONVILLE-WILLITS 60KV [8360]	P1	N-1	Low	0.99	0.99	0.79	0.71	0.62	0.49	1.02	1.04	0.59	0.99	0.99	1.01	Continue to monitor
COVELO6 60 kV	P1-2:A2:43:_LAYTONVILLE-WILLITS 60KV [8360]	P1	N-1	Low	0.99	0.98	0.78	0.70	0.61	0.49	1.01	1.04	0.57	0.98	0.99	1.01	Continue to monitor
HARTLEY 60 kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	Low	0.98	0.95	0.90	0.98	0.96	0.93	0.98	1.02	0.87	0.95	0.98	0.98	Continue to monitor
CLER LKE 60 kV	P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	Low	0.98	0.95	0.89	0.97	0.96	0.92	0.98	1.01	0.87	0.95	0.97	0.97	Continue to monitor
KONOCTI6 60 kV	P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	Low	0.96	0.95	0.88	0.95	0.94	0.90	0.95	1.02	0.84	0.96	0.94	0.95	Continue to monitor
LOWR LKE 60 kV	P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	Low	0.96	0.97	0.89	0.94	0.94	0.91	0.95	1.03	0.86	0.97	0.93	0.94	Continue to monitor
EGLE RCK 60 kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	Low	0.96	0.96	0.88	0.95	0.94	0.90	0.95	1.02	0.84	0.96	0.94	0.95	Continue to monitor
GUALALA 60 kV	P1-3:A2:2:_FULTON 230/115KV TB 9	P1	N-1	Low	1.00	0.99	0.88	1.00	0.99	0.92	1.01	1.05	0.81	0.99	1.03	1.01	Continue to monitor
PUEBLO 115 kV	P1-2:A2:35:_SONOMA-PUEBLO 115KV [3810]	P1	N-1	Low	0.90	0.90	0.96	0.99	0.99	0.90	1.03	1.03	N/A	0.90	0.94	1.02	Review the power factor in near term base cases
HIGHWAY 115 kV	P1-3:A6:5:_IGNACIO 230/115KV TB 6	P1	N-1	Low	0.93	0.92	0.86	0.99	0.99	0.93	0.98	1.02	0.80	0.92	0.95	0.98	Continue to monitor
NTWR ALT 115 kV	P1-3:A6:5:_IGNACIO 230/115KV TB 6	P1	N-1	Low	0.93	0.92	0.86	0.99	0.98	0.93	0.98	1.02	0.80	0.92	0.94	0.98	Continue to monitor
CALISTGA 60 kV	P1-1:A2:10:_GEYSER14 13.80KV GEN UNIT 1	P1	N-1	Low	0.82	0.78	0.89	0.89	0.90	0.96	0.96	1.03	N/A	0.79	0.85	0.95	Voltage support
MONROE1 115 kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	Low	0.86	0.85	0.76	0.93	0.92	0.83	0.96	0.98	0.72	0.85	0.90	0.96	Switch in the Fulton SVD (230 kV)
MONROE2 115 kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	Low	0.86	0.85	0.76	0.93	0.92	0.83	0.96	0.98	0.72	0.85	0.90	0.96	Operating solution
SNTA RSA 115 kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	Low	0.86	0.85	0.77	0.93	0.92	0.83	0.96	0.98	0.72	0.85	0.90	0.96	Operating solution
STNY PTP 115 kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	Low	0.87	0.87	0.79	0.94	0.93	0.85	0.96	0.98	0.75	0.87	0.91	0.96	Operating solution
STONY PT 115 kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	Low	0.87	0.87	0.79	0.94	0.93	0.85	0.96	0.98	0.75	0.86	0.91	0.96	Operating solution
BELLVUE 115 kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	Low	0.88	0.88	0.80	0.94	0.93	0.86	0.96	0.98	0.77	0.87	0.92	0.96	Operating solution
PENNGRVE 115 kV	P2-4:A2:11:_LAKEVILLE 115KV - SECTION 1D & 2D	P2-4	Bus Tie Breaker Fault	Low	0.97	0.97	0.89	0.99	0.98	0.93	1.05	1.05	0.85	0.97	1.00	1.04	Continue to monitor
PENNGRVE 115 kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	Low	0.91	0.91	0.85	0.95	0.94	0.89	0.97	0.98	0.83	0.90	0.94	0.97	Continue to monitor
CORONA 115 kV	P2-2:A2:36:_LAKEVILLE 115KV SECTION 1D	P2-2	Bus	Low	0.97	0.96	0.89	0.99	0.98	0.93	1.05	1.04	0.85	0.96	0.99	1.04	Continue to monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
SONOMA 115 kV	P2-4:A2:11:_LAKEVILLE 115KV - SECTION 1D & 2D	P2-4	Bus Tie Breaker Fault	Low	0.92	0.92	0.84	0.96	0.94	0.91	1.03	1.05	0.78	0.92	0.96	1.02	Continue to monitor
WILLITS 60 kV	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus Tie Breaker Fault	Low	0.98	0.93	0.88	0.99	0.98	0.90	1.02	1.03	0.57	0.93	1.00	0.99	Continue to monitor
LYTNVILLE 60 kV	P2-2:A2:16:_MENDOCNO 115KV SECTION 2D	P2-2	Bus	Low	0.99	0.98	0.89	0.97	0.96	0.93	1.02	1.02	0.75	0.98	1.01	1.01	Continue to monitor
COVELO6 60 kV	P2-2:A2:16:_MENDOCNO 115KV SECTION 2D	P2-2	Bus	Low	0.99	0.97	0.88	0.96	0.95	0.92	1.01	1.02	0.73	0.97	1.01	1.00	Continue to monitor
HARTLEY 60 kV	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	Low	0.98	0.97	0.90	0.98	0.96	0.93	0.98	1.02	NConv	0.97	0.98	0.99	Continue to monitor
CLER LKE 60 kV	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	Low	0.98	0.97	0.89	0.97	0.96	0.92	0.98	1.02	NConv	0.97	0.97	0.99	Continue to monitor
KONOCIT6 60 kV	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	Low	0.96	0.97	0.88	0.95	0.94	0.91	0.95	1.02	NConv	0.97	0.95	0.96	Continue to monitor
LOWR LKE 60 kV	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	Low	0.96	0.99	0.89	0.94	0.94	0.91	0.95	1.03	NConv	0.99	0.93	0.96	Continue to monitor
EGLE RCK 60 kV	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	Low	0.96	0.97	0.88	0.95	0.94	0.91	0.95	1.02	NConv	0.97	0.95	0.96	Continue to monitor
GUALALA 60 kV	P2-2:A2:36:_LAKEVILLE 115KV SECTION 1D	P2-2	Bus	Low	1.00	0.99	0.90	1.00	1.00	0.94	1.02	1.05	N/A	0.99	1.04	1.01	Continue to monitor
WILLITSJ 60 kV	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus Tie Breaker Fault	Low	0.98	0.93	0.88	1.00	0.98	0.91	1.02	1.03	0.57	0.93	1.00	0.99	Continue to monitor
PUEBLO 115 kV	P2-4:A2:11:_LAKEVILLE 115KV - SECTION 1D & 2D	P2-4	Bus Tie Breaker Fault	Low	0.95	0.94	0.87	0.97	0.95	0.93	1.03	1.05	0.82	0.94	0.98	1.02	Continue to monitor
HIGHWAY J2 115 kV	P2-3:A2:7:_GEYSR20 - 1D 230KV & GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 LINE	P2-3	Non-Bus Tie Breaker Fault	Low	0.95	0.94	0.89	1.01	1.00	0.95	1.02	1.04	N/A	0.94	0.96	1.00	Continue to monitor
HIGHWAY 115 kV	P2-2:A2:5:_NCPA2 230KV SECTION 1D	P2-2	Bus	Low	0.95	0.94	0.88	1.01	1.00	0.95	1.02	1.04	0.81	0.94	0.96	1.00	Continue to monitor
NTWR ALT 115 kV	P2-2:A2:10:_GEYSR17 230KV SECTION 1D	P2-2	Bus	Low	0.96	0.95	0.90	1.01	1.01	0.96	1.02	1.04	N/A	0.95	0.97	1.00	Continue to monitor
MEYERTP2 115 kV	P2-2:A2:5:_NCPA2 230KV SECTION 1D	P2-2	Bus	Low	0.94	0.94	0.88	1.00	1.00	0.95	1.01	1.04	0.81	0.94	0.96	1.00	Continue to monitor
CALISTGA 60 kV	P2-2:A2:26:_FULTON 115KV SECTION 1D	P2-2	Bus	Low	0.82	0.79	0.86	0.89	0.89	0.93	0.94	1.02	N/A	0.79	0.83	0.95	Voltage support
ANNAPOLS 60kV	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:2:_FULTON-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P3	G-1/N-1	Low	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
CALISTGA 60kV	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-3:A2:2:_FULTON 230/115KV TB 9	P3	G-1/N-1	Low	0.80	0.77	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	0.77	>0.9	>0.9	Voltage support
CLER LKE 60kV	P1-1:A2:17:_POTTRVLY 2.40KV GEN UNIT 3 & P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P3	G-1/N-1	Low	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
CORONA 115kV	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:32:_CORONA-LAKEVILLE 115KV [4311]	P3	G-1/N-1	Low	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
COVELO6 60kV	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:43:_LAYTONVILLE-WILLITS 60KV [8360]	P3	G-1/N-1	Low	>0.9	>0.9	0.72	>0.9	0.54	0.48	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
DUNBAR 60kV	P1-1:A2:8:_GEYSER12 13.80KV GEN UNIT 1 & P1-2:A2:65:_LAKEVILLE #1 60KV [7360]	P3	G-1/N-1	Low	0.84	0.82	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	0.82	>0.9	>0.9	Switch in the Fulton SVD (230 kV)
EGLE RCK 60kV	P1-1:A2:17:_POTTRVLY 2.40KV GEN UNIT 3 & P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P3	G-1/N-1	Low	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
GUALALA 60kV	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:2:_FULTON-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P3	G-1/N-1	Low	>0.9	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
HARTLEY 60kV	P1-1:A2:17:_POTTRVLY 2.40KV GEN UNIT 3 & P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P3	G-1/N-1	Low	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
HIGHWAY 115kV	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-3:A6:5:_IGNACIO 230/115KV TB 6	P3	G-1/N-1	Low	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		
KONOCT16 60KV	P1-1:A2:17:_POTTRVLY 2.40KV GEN UNIT 3 & P1-3:A2:25:_EGLE RCK 115V/60KV TB 1	P3	G-1/N-1	Low	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
LOWR LKE 60KV	P1-1:A2:17:_POTTRVLY 2.40KV GEN UNIT 3 & P1-3:A2:25:_EGLE RCK 115V/60KV TB 1	P3	G-1/N-1	Low	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
LYTNVLE 60KV	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:43:_LAYTONVILLE-WILLITS 60KV [8360]	P3	G-1/N-1	Low	>0.9	>0.9	0.73	>0.9	0.55	0.49	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
MEYERTP2 115KV	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-3:A6:5:_IGNACIO 230/115KV TB 6	P3	G-1/N-1	Low	>0.9	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
NTWR ALT 115KV	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-3:A6:5:_IGNACIO 230/115KV TB 6	P3	G-1/N-1	Low	>0.9	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
PENNGRVE 115KV	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:32:_CORONA-LAKEVILLE 115KV [4311]	P3	G-1/N-1	Low	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Continue to monitor
PUEBLO 115KV	P1-1:A2:10:_GEYSER14 13.80KV GEN UNIT 1 & P1-2:A2:35:_SONOMA-PUEBLO 115KV [3810]	P3	G-1/N-1	Low	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Operating solution
ST.HELNA 60KV	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:2:_FULTON-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P3	G-1/N-1	Low	>0.9	0.89	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	0.89	>0.9	>0.9	Fulton-Calistoga Maintenance project
DUNBAR 60 kV	P5-5c(DC):A2:2:_Station	P5	Non-Redundant Battery Supply	Low	0.83	0.79	NConv	0.93	0.95	0.81	0.99	1.05	NConv	0.79	0.92	0.98	0.98	Install redundant battery supply
FULTON 115 KV	P5-5a:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.88	0.87	0.80	>0.9	>0.9	0.85	>0.9	>0.9	0.54	0.87	>0.9	>0.9	>0.9	Install Redundant Relay
SNTA RSA 115 KV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.78	>0.9	NConv	0.83	>0.9	>0.9	NConv	NConv	>0.9	>0.9	>0.9	Install Redundant Relay
STONY PT 115 KV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.81	>0.9	NConv	0.85	>0.9	>0.9	NConv	NConv	>0.9	>0.9	>0.9	Install Redundant Relay
PENNGRVE 115 KV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.87	>0.9	NConv	0.89	>0.9	>0.9	NConv	NConv	>0.9	>0.9	>0.9	Install Redundant Relay
PTTR VLY 60 KV	P5-5c(DC):A2:3:_Station	P5	Non-Redundant Battery Supply	Low	0.86	0.36	0.54	NConv	NConv	NConv	NConv	>0.9	NConv	0.36	0.49	0.42	0.42	Install redundant battery supply
WILLITS 60 KV	P5-5c(DC):A2:3:_Station	P5	Non-Redundant Battery Supply	Low	0.82	0.39	0.49	NConv	NConv	NConv	NConv	>0.9	NConv	0.39	0.53	0.44	0.44	Install redundant battery supply
LYTNVLE 60 KV	P5-5c(DC):A2:3:_Station	P5	Non-Redundant Battery Supply	Low	0.83	0.46	0.52	NConv	NConv	NConv	NConv	>0.9	NConv	0.46	0.59	0.48	0.48	Install redundant battery supply
COVELO6 60 KV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.90	>0.9	NConv	>0.9	>0.9	>0.9	NConv	NConv	>0.9	>0.9	>0.9	Install Redundant Relay
GUALALA 60 KV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.30	0.29	NConv	0.35	0.28	0.50	NConv	NConv	0.36	0.28	0.28	Install Redundant Relay
FORT RSS 60 KV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.33	0.30	NConv	0.38	0.29	0.50	NConv	NConv	0.36	0.29	0.29	Install Redundant Relay
SLMRN CRK 60 KV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.33	0.30	NConv	0.38	0.29	0.50	NConv	NConv	0.36	0.29	0.29	Install Redundant Relay
MONTE RO 60 KV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.35	0.31	NConv	0.40	0.29	0.50	NConv	NConv	0.37	0.30	0.30	Install Redundant Relay
WOHLER 60 KV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.38	0.32	NConv	0.43	0.31	0.50	NConv	NConv	0.37	0.31	0.31	Install Redundant Relay

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
WHLR TAP 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.38	0.32	NConv	0.43	0.31	0.50	NConv	NConv	0.37	0.31	Install Redundant Relay
MIRABEL 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.38	0.32	NConv	0.43	0.31	0.50	NConv	NConv	0.37	0.31	Install Redundant Relay
MOLINO 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.42	0.32	NConv	0.46	0.31	0.51	NConv	NConv	0.38	0.32	Install Redundant Relay
GYSRVLE 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.41	0.36	NConv	0.46	0.33	0.50	NConv	NConv	0.40	0.33	Install Redundant Relay
GYSR 1-2 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.41	0.36	NConv	0.46	0.33	0.50	NConv	NConv	0.40	0.33	Install Redundant Relay
WINDSOR 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.41	0.35	NConv	0.46	0.32	0.50	NConv	NConv	0.39	0.32	Install Redundant Relay
FCHMNT2 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.41	0.36	NConv	0.47	0.33	0.50	NConv	NConv	0.40	0.33	Install Redundant Relay
FULTON 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.40	0.33	NConv	0.45	0.31	0.50	NConv	NConv	0.38	0.31	Install Redundant Relay
FTCH MTN 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.42	0.36	NConv	0.47	0.33	0.50	NConv	NConv	0.40	0.33	Install Redundant Relay
HDSBGTP1 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.42	0.36	NConv	0.47	0.33	0.51	NConv	NConv	0.40	0.33	Install Redundant Relay
FTCHMTNP 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.43	0.37	NConv	0.48	0.34	0.51	NConv	NConv	0.41	0.34	Install Redundant Relay
LAGUNA 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.49	0.31	NConv	0.53	0.31	0.50	NConv	NConv	0.38	0.31	Install Redundant Relay
COTATI 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.57	0.31	NConv	0.60	0.31	0.50	NConv	NConv	0.38	0.32	Install Redundant Relay
LAGUNATP 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.49	0.31	NConv	0.53	0.31	0.50	NConv	NConv	0.38	0.31	Install Redundant Relay
PETC_JCT 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.72	>0.9	NConv	0.74	>0.9	>0.9	NConv	NConv	>0.9	>0.9	Install Redundant Relay
PETLMA A 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.73	>0.9	NConv	0.75	>0.9	>0.9	NConv	NConv	>0.9	>0.9	Install Redundant Relay
SNMA TAP 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.56	0.31	NConv	0.59	0.31	0.50	NConv	NConv	0.38	0.32	Install Redundant Relay
SNMALDFL 60 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.56	0.31	NConv	0.59	0.31	0.50	NConv	NConv	0.38	0.32	Install Redundant Relay
DUNBAR 60 kV	P5-5c(DC):A2:2:_Station	P5	Non-Redundant Battery Supply	Low	0.83	0.79	NConv	>0.9	>0.9	0.81	>0.9	>0.9	NConv	0.79	>0.9	>0.9	Install redundant battery supply
HIGHWAY 115 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.88	>0.9	NConv	>0.9	>0.9	>0.9	NConv	NConv	>0.9	>0.9	Install Redundant Relay
NTWR ALT 115 kV	P5-5a:A2:10:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.88	>0.9	NConv	>0.9	>0.9	>0.9	NConv	NConv	>0.9	>0.9	Install Redundant Relay

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
MEYERTP2 115 kV	P5-5a:A2:10: FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.88	>0.9	NConv	>0.9	>0.9	>0.9	NConv	NConv	>0.9	>0.9	Install Redundant Relay
ST.HELNA 60 kV	P5-5a:A2:10: FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.35	0.28	NConv	0.41	0.28	0.49	NConv	NConv	0.31	0.28	Install Redundant Relay
CALISTGA 60 kV	P5-5a:A2:10: FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Low	NConv	NConv	0.30	0.24	NConv	0.36	0.25	0.48	NConv	NConv	0.26	0.25	Install Redundant Relay
ANNAPOLS 60kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	Low	0.89	0.87	0.75	>0.9	>0.9	0.81	>0.9	>0.9	N/A	0.87	>0.9	>0.9	Operating solution
BELLVUE 115kV	P1-2:A2:25: FULTON-SANTA ROSA #1 115KV [1620] & P1-2:A2:26: FULTON-SANTA ROSA #2 115KV [1630]	P6	N-1-1	Low	0.88	0.88	0.80	>0.9	>0.9	0.86	>0.9	>0.9	N/A	0.87	>0.9	>0.9	Operating solution
CALISTGA 60kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	Low	0.63	0.59	0.68	0.82	0.80	0.80	>0.9	>0.9	N/A	0.59	0.75	>0.9	Voltage support
CALPELLA 115kV	P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR & P1-2:A2:11: MENDOCINO-UKIAH 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA	P6	N-1-1	Low	0.72	0.68	0.59	0.84	0.82	0.76	0.78	0.86	N/A	0.67	0.79	0.78	Operating solution
CLOVRDLE 115kV	P1-2:A2:11: MENDOCINO-UKIAH 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	Low	0.74	0.70	0.61	0.84	0.83	0.77	0.80	0.87	N/A	0.70	0.80	0.80	Operating solution
COTATI 60kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	Low	>0.9	0.89	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	0.89	>0.9	>0.9	Operating solution
FORT RSS 60kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	Low	0.90	0.88	0.76	>0.9	>0.9	0.83	>0.9	>0.9	N/A	0.88	>0.9	>0.9	Operating solution
FULTON 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	Low	0.88	0.87	0.81	>0.9	>0.9	0.85	>0.9	>0.9	N/A	0.87	>0.9	>0.9	Operating solution
GUALALA 60kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	Low	0.88	0.86	0.71	>0.9	>0.9	0.79	>0.9	>0.9	N/A	0.86	>0.9	>0.9	Operating solution
GYSRVLE 60kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	Low	>0.9	0.90	0.83	>0.9	>0.9	0.88	>0.9	>0.9	N/A	0.90	>0.9	>0.9	Operating solution
HPLND JT 115kV	P1-2:A2:11: MENDOCINO-UKIAH 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	Low	0.75	0.70	0.62	0.84	0.83	0.77	0.80	0.87	N/A	0.70	0.81	0.80	Operating solution
PUEBLO 115kV	P1-2:A2:35: SONOMA-PUEBLO 115KV [3810] & P1-2:A6:5: IGNACIO-SOBRANTE 230KV [4920]	P6	N-1-1	Low	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	>0.9	>0.9	>0.9	Operating solution
RINCON 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	Low	0.90	0.89	0.83	>0.9	>0.9	0.87	>0.9	>0.9	N/A	0.89	>0.9	>0.9	SPS, battery storage or line capacity increase
SILVERDO 115kV	P1-3:A2:1: FULTON 230/115KV TB 4 & P1-3:A2:2: FULTON 230/115KV TB 9	P6	N-1-1	Low	0.90	0.89	0.83	>0.9	>0.9	0.87	>0.9	>0.9	N/A	0.89	>0.9	>0.9	SPS, battery storage or line capacity increase
SLMN CRK 60kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	Low	0.90	0.88	0.77	>0.9	>0.9	0.83	>0.9	>0.9	N/A	0.88	>0.9	>0.9	SPS, battery storage or line capacity increase
SNMALDFL 60kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	Low	>0.9	0.89	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	0.89	>0.9	>0.9	SPS, battery storage or line capacity increase
SNTA RSA 115kV	P1-2:A2:25: FULTON-SANTA ROSA #1 115KV [1620] & P1-2:A2:26: FULTON-SANTA ROSA #2 115KV [1630]	P6	N-1-1	Low	0.86	0.85	0.76	>0.9	>0.9	0.83	>0.9	>0.9	N/A	0.85	>0.9	>0.9	Operating solution
ST.HELNA 60kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	Low	0.77	0.74	0.77	0.90	0.88	0.85	>0.9	>0.9	N/A	0.74	0.85	>0.9	Fulton-Calistoga Maintenance project
STONY PT 115kV	P1-2:A2:26: FULTON-SANTA ROSA #2 115KV [1630] & P1-2:A2:25: FULTON-SANTA ROSA #1 115KV [1620]	P6	N-1-1	Low	0.87	0.87	0.79	>0.9	>0.9	0.85	>0.9	>0.9	N/A	0.86	>0.9	>0.9	Operating solution

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
UKIAH 115kV	P1-2:A2:11: MENDOCINO-UKIAH 115KV [2420] MOAS OPENED ON MENDOCINO_CALPELLA & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	Low	0.73	0.68	0.59	0.83	0.82	0.76	0.78	0.86	N/A	0.68	0.79	0.78	Operating solution
FULTON 230 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	0.96	0.96	0.90	0.99	0.99	0.94	1.01	1.01	0.84	0.96	0.97	1.00	Continue to monitor
MONROE1 115 kV	P7-1:A2:15: FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	Low	0.86	0.85	0.76	0.93	0.92	0.83	0.95	0.98	0.73	0.85	0.90	0.95	Operating solution
MONROE2 115 kV	P7-1:A2:15: FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	Low	0.86	0.85	0.76	0.92	0.92	0.83	0.95	0.98	0.72	0.85	0.90	0.95	Operating solution
SNTA RSA 115 kV	P7-1:A2:15: FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	Low	0.86	0.85	0.76	0.93	0.92	0.83	0.95	0.98	0.73	0.85	0.90	0.95	Operating solution
STONY PT 115 kV	P7-1:A2:15: FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	Low	0.87	0.87	0.79	0.93	0.93	0.85	0.95	0.98	0.76	0.86	0.91	0.95	Operating solution
PENNGRVE 115 kV	P7-1:A2:15: FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	Low	0.91	0.90	0.85	0.95	0.94	0.89	0.97	0.98	0.83	0.90	0.94	0.97	Continue to monitor
SONOMA 115 kV	P7-1:A2:16: LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 LINES	P7	DCTL	Low	0.92	0.92	0.86	0.95	0.94	0.92	1.02	1.04	0.82	0.92	0.96	1.02	Continue to monitor
STHELJ2 115 kV	P7-1:A2:21: FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	0.98	0.97	0.90	1.01	1.00	0.94	1.03	1.04	0.86	0.97	0.99	1.02	Continue to monitor
LYTNVLE 60 kV	P7-1:A2:23: EAGLE ROCK -REDBUD & CORTINA-MENDOCINO #1 LINES	P7	DCTL	Low	0.98	1.00	0.88	0.96	0.96	0.92	1.02	1.02	0.52	0.98	1.01	1.00	Continue to monitor
COVELO6 60 kV	P7-1:A2:23: EAGLE ROCK -REDBUD & CORTINA-MENDOCINO #1 LINES	P7	DCTL	Low	0.98	0.99	0.87	0.96	0.95	0.91	1.01	1.02	0.50	0.97	1.01	1.00	Continue to monitor
GUALALA 60 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	0.99	0.98	0.84	1.00	1.00	0.91	1.01	1.04	0.72	0.98	1.03	1.01	Continue to monitor
ANNAPOLS 60 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	1.00	0.99	0.86	1.01	1.01	0.93	1.02	1.04	0.75	0.99	1.04	1.01	Continue to monitor
FORT RSS 60 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	1.01	1.00	0.88	1.02	1.02	0.94	1.02	1.04	0.78	0.99	1.04	1.02	Continue to monitor
SLMN JCT 60 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	1.01	1.00	0.89	1.02	1.02	0.95	1.02	1.04	0.79	1.00	1.04	1.02	Continue to monitor
SLMN CRK 60 kV	P7-1:A2:21: FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	1.00	1.00	0.87	1.02	1.02	0.94	1.02	1.04	0.79	0.99	1.03	1.02	Continue to monitor
MONTE RO 60 kV	P7-1:A2:21: FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	1.01	1.01	0.89	1.02	1.03	0.95	1.02	1.04	0.82	1.00	1.03	1.02	Continue to monitor
GYSRVLE 60 kV	P7-1:A2:21: FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	0.99	0.98	0.86	1.03	1.02	0.94	1.03	1.03	0.80	0.98	1.01	1.03	Continue to monitor
GYSR 1-2 60 kV	P7-1:A2:21: FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	0.99	0.99	0.87	1.03	1.02	0.94	1.03	1.03	0.81	0.98	1.01	1.03	Continue to monitor
WINDSOR 60 kV	P7-1:A2:21: FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	1.00	0.99	0.89	1.03	1.02	0.96	1.03	1.03	0.84	0.99	1.02	1.03	Continue to monitor
HDSBGP2 60 kV	P7-1:A2:21: FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	0.99	0.99	0.87	1.03	1.02	0.94	1.03	1.03	0.81	0.99	1.01	1.03	Continue to monitor
FTCH MTN 60 kV	P7-1:A2:21: FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	0.99	0.99	0.87	1.03	1.02	0.94	1.03	1.03	0.81	0.99	1.01	1.03	Continue to monitor
HDSBGP1 60 kV	P7-1:A2:21: FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	0.99	0.99	0.87	1.03	1.02	0.94	1.03	1.03	0.81	0.99	1.01	1.03	Continue to monitor
SILVRD2 115 kV	P7-1:A2:21: FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	0.98	0.97	0.90	1.01	1.00	0.95	1.03	1.04	0.86	0.97	0.99	1.02	Continue to monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen		2024 OP Sensitivity
SILVERDO 115 kV	P7-1:A2:21: FULTON - HOPLAND 60 kV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	0.98	0.97	0.90	1.01	1.00	0.94	1.03	1.04	0.86	0.97	0.99	1.02	Continue to monitor
MONTCCLO 115 kV	P7-1:A2:21: FULTON - HOPLAND 60 kV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	Low	0.98	0.97	0.90	1.01	1.00	0.94	1.03	1.04	0.86	0.97	0.99	1.02	Continue to monitor
MNTCLOPH 115 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	0.98	0.97	0.90	1.01	1.00	0.94	1.03	1.04	0.85	0.97	0.99	1.02	Continue to monitor
PUEBLO 115 kV	P7-1:A2:16: LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 LINES	P7	DCTL	Low	0.95	0.94	0.89	0.97	0.95	0.94	1.02	1.04	0.85	0.94	0.98	1.01	Continue to monitor
LS GLLNS 115 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	0.98	0.97	0.90	1.01	1.01	0.95	1.03	1.04	0.83	0.97	0.99	1.01	Continue to monitor
SAN RAFL 115 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	0.98	0.97	0.89	1.01	1.01	0.95	1.03	1.04	0.83	0.97	0.99	1.01	Continue to monitor
HIGHWAY 115 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	0.93	0.92	0.84	1.00	0.99	0.93	1.01	1.04	0.75	0.92	0.95	0.99	Continue to monitor
NTWR ALT 115 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	0.93	0.92	0.84	1.00	0.99	0.92	1.01	1.04	0.75	0.92	0.95	0.99	Continue to monitor
CARQUINZ 115 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	0.98	0.97	0.88	1.02	1.01	0.95	1.02	1.04	0.81	0.97	0.99	1.01	Continue to monitor
ST.HELNA 60 kV	P7-1:A2:11: GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	Low	0.91	0.89	0.88	0.96	0.97	0.96	0.99	1.03	0.79	0.89	0.93	0.99	Fulton-Calistoga Maintenance project
CALISTGA 60 kV	P7-1:A2:10: FULTON-IGNACIO #1 & FULTON-LAKEVILLE LINES	P7	DCTL	Low	0.82	0.78	0.90	0.89	0.89	0.95	0.96	1.03	0.84	0.80	0.85	0.95	Voltage support

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Study Area: **PG&E North Coast & North Bay**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)									Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2035 ATE	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		
CALISTGA 60 kV	P1-2:A2:65:_LAKEVILLE #1 60KV [7360]	P1	N-1	<8	<8	10	<8	<8	<8	<8	<8	<8	20	9	<8	<8	Voltage support
CORONA 115 kV	P1-2:A2:32:_CORONA-LAKEVILLE 115KV [4311]	P1	N-1	<8	<8	9	<8	<8	<8	<8	<8	<8	12	<8	<8	<8	Continue to monitor
COVELO6 60 kV	P1-2:A2:43:_LAYTONVILLE-WILLITS 60KV [8360]	P1	N-1	<8	<8	13	27	36	44	<8	<8	<8	33	<8	<8	<8	Continue to monitor
DUNBAR 60 kV	P1-2:A2:65:_LAKEVILLE #1 60KV [7360]	P1	N-1	14	16	14	<8	<8	<8	<8	<8	<8	23	18	<8	<8	Switch in the Fulton SVD (230 kV)
KONOCI6 60 kV	P1-2:A2:54:_KONOCI-EAGLE ROCK 60KV [6861]	P1	N-1	<8	<8	11	<8	<8	<8	<8	<8	<8	13	<8	<8	<8	Continue to monitor
LYTNVLL 60 kV	P1-2:A2:43:_LAYTONVILLE-WILLITS 60KV [8360]	P1	N-1	<8	<8	13	27	35	44	<8	<8	<8	32	<8	<8	<8	Continue to monitor



Study Area: **PG&E North Coast & North Bay**



*Transient Stability*

Contingency	Category	Category Description	Transient Stability Performance				Potential Mitigation Solutions	
			Baseline Scenarios		Sensitivity Scenarios			
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak		
In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2019-2020 Transmission Planning Process for transient stability studies:								
<a href="http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf">http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf</a>								

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)													Potential Mitigation Solutions	
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2032 SP with Additional Transportation Electrification		

No single contingency resulted in total load drop of more than 250 MW

**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)													Potential Mitigation Solutions	
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2032 SP with Additional Transportation Electrification		

No single source substation with more than 100 MW



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Study Area: PG&E Central Valley  
Thermal Overloads



Table with 14 columns: Overloaded Facility, Contingency (All and Worst P6), Category, Category Description, Loading % (Baseline Scenarios) [2024 Summer Peak, 2027 Summer Peak, 2032 Summer Peak, 2024 Spring Off-Peak, 2027 Spring Off-Peak], Loading % (Sensitivity Scenarios) [2024 SP Heavy Renewable & Min Gas Gen, 2024 Spring OP Sensitivity, 2027 SP High CEC Forecast, 2035 ATE], Project & Potential Mitigation Solutions.















Study Area: **PG&E Central Valley**  
 Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Woodland - Davis 115 kV Line	P5-5a:A4.7:_BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor future forecast
Woodland - Davis 115 kV Line	P5-5c(DC):A4.2:_Station	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor future forecast
WOODLANDBMJT-Q653FJCT 115 kV Line No 1	P1-2:A4.9:_RIO OSO-BRIGHTON 230KV [5600] & P1-2:A4.1:_BRIGHTON-LOCKFORD 230KV [0]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	123	Continue to monitor future forecast
WOODLANDBMJT-Q653FJCT 115 kV Line No 1	P5-5a:A4.7:_BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	123	Continue to monitor future forecast
WOODLANDBMJT-Q653FJCT 115 kV Line No 1	P5-5c(DC):A4.2:_Station	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	123	Continue to monitor future forecast
WOODLANDBMJT-Q653FJCT 115KV	BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant Relay	109	76	92	89	7	61	89	67	67	67	Operating solution
WOODLANDBMJT-Q653FJCT 115KV	P5-5c(DC):A4.2:_Station	P5-5	Non-Redundant Relay	109	76	92	89	7	61	89	67	67	67	Operating solution
WOODLANDBMJT-Q653FJCT 115KV	BRIGHTON-DAVIS 115KV [1140] MOAS OPENED ON HOWARDJCT3_BRKRJCT & WEST SACRAMENTO-DAVIS 115KV [4120]	P6	N-1-1	112	<100	91	<100	<100	<100	<100	<100	<100	<100	SPS recommended in 2017-2018 TPP
WOODLANDBMJT-Q653FJCT 115KV	BRIGHTON-DAVIS 115KV [1140] MOAS OPENED ON HOWARDJCT3_BRKRJCT & WEST SACRAMENTO-DAVIS 115KV [4120]	P6	N-1-1	112	<100	<100	<100	<100	<100	<100	<100	<100	<100	SPS recommended in 2017-2018 TPP
WOODLANDBMJT-Q653FJCT 115KV	Rio Oso-Brighton 230 KV Line & Rio Oso-Lockeford 230 KV Line	P7	DCTL	88	62	75	75	17	81	102	57	57	57	Sensitivity Only
WOODLANDBMJT-WOODLD 115 kV Line No 1	P1-2:A4.9:_RIO OSO-BRIGHTON 230KV [5600] & P1-2:A4.1:_BRIGHTON-LOCKFORD 230KV [0]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor future forecast
#N/A	P2-4:A11.8:_TESLA D 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	225	Continue to monitor future forecast
#N/A	P5-5a:A11.5:_TESLA 230KV BUS D (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	224	Continue to monitor future forecast





Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
ARBUCKLE 60 kV	P2-3:A4:60:_CORTINA 230KV - RING R1 & R4	P2	Non-Bus Tie Breaker Fault	L	>0.9	0.97	0.90	>0.9	1.02	>0.9	0.96	N/A	Continue to monitor future load forecast	
AUBURN 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.02	0.56	>0.9	1.03	>0.9	1.02	N/A	Continue to monitor future load forecast	
AVENA 115 kV	P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472]	P6	N-1-1	L	0.59	>0.9	>0.9	>0.9	>0.9	0.82	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan	
AVENA 115 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	0.98	1.00	0.98	1.03	1.04	0.83	1.03	1.00	N/A	Sensitivity only
BANTA 60 kV	P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472]	P6	N-1-1	L	0.55	>0.9	>0.9	>0.9	>0.9	0.82	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
BANTA 60 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.62	0.95	0.64	0.99	0.95	0.84	0.99	0.95	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
BANTA 60 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.02	1.03	1.03	1.03	1.03	0.84	1.04	1.04	N/A	Sensitivity only
BARRY 60 kV	P1-2:A5:16:_PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & P1-2:A5:27:_RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	L	>0.9	>0.9	0.63	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
BARRY 60 kV	P1-2:A5:16:_PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & P1-2:A5:27:_RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	L	>0.9	>0.9	0.63	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
BEARDSLY 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	1.02	1.01	0.78	1.05	1.09	1.03	1.05	1.01	1.04	SPS Recommended in 2019-2020 TPP
BELL PGE 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.00	0.58	>0.9	1.06	>0.9	>0.9	0.99	N/A	Continue to monitor future load forecast
BELLOTA 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	0.86	0.87	0.51	>0.9	>0.9	>0.9	>0.9	0.86	N/A	SPS Recommended in 2019-2020 TPP
BELLOTA 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.88	0.87	0.51	1.13	1.17	0.90	1.13	0.86	N/A	SPS Recommended in 2019-2020 TPP
BNTA CRB 60 kV	P1-2:A11:52:_TESLA-SCHULTE SW STA #2 115KV [3970] & P1-2:A11:51:_TESLA-SCHULTE SW STA #1 115KV [3980]	P6	N-1-1	L	>0.9	>0.9	>0.9	>0.9	>0.9	0.83	>0.9	>0.9	N/A	Sensitivity only
BNTA CRB 60 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.61	0.94	0.62	0.98	1.00	0.83	0.98	0.95	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
BNTA CRB 60 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.02	1.03	1.01	1.03	1.01	0.83	1.03	1.03	N/A	Sensitivity only
BONNIE N 60 kV	P1-2:A4:30:_RIO OSO-WOODLAND #1 115KV [3460] & P1-2:A5:35:_BELL-PLACER 115KV [4395] MOAS OPENED ON PLACER_BELL PGE	P6	N-1-1	L	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
BRKR SLG 115 kV	P1-2:A4:33:_WEST SACRAMENTO-DAVIS 115KV [4120] & P1-2:A4:24:_WOODLAND-DAVIS 115KV [4210]	P6	N-1-1	L	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
CALVO 60 kV	P1-2:A11:52:_TESLA-SCHULTE SW STA #2 115KV [3970] & P1-2:A11:51:_TESLA-SCHULTE SW STA #1 115KV [3980]	P6	N-1-1	L	0.55	>0.9	>0.9	>0.9	>0.9	0.82	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
CALVO 60 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.64	0.96	0.67	1.00	0.96	0.85	0.99	0.96	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
CALVO 60 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.02	1.03	1.03	1.04	1.03	0.84	1.04	1.04	N/A	Sensitivity only
CAMANCHE 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	0.86	0.87	0.50	>0.9	>0.9	>0.9	>0.9	0.87	N/A	SPS Recommended in 2019-2020 TPP
CAMANCHE 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.88	0.87	0.50	1.14	1.18	0.90	1.14	0.86	N/A	SPS Recommended in 2019-2020 TPP
CAMPUS 115 kV	P1-2:A4:24:_WOODLAND-DAVIS 115KV [4210] & P1-2:A4:33:_WEST SACRAMENTO-DAVIS 115KV [4120]	P6	N-1-1	L	0.89	0.89	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
CAPEHORN 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.01	0.89	>0.9	1.02	>0.9	>0.9	1.01	N/A	Continue to monitor future load forecast
CAPEHORN 60 kV	P1-2:A4:30:_RIO OSO-WOODLAND #1 115KV [3460] & P1-2:A5:35:_BELL-PLACER 115KV [4395] MOAS OPENED ON PLACER_BELL PGE	P6	N-1-1	L	>0.9	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
CARBONA 60 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.59	0.93	0.59	0.99	0.90	0.82	0.98	0.93	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
CARBONA 60 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.01	1.02	1.00	1.03	0.99	0.82	1.03	1.02	N/A	Sensitivity only
CATARACT 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.74	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan

2022-2023 ISO Reliability Assessment - Study Results

Study Area: PG&E Central Valley  
 High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
CATARACT 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.98	0.97	0.79	1.06	1.08	0.99	1.06	0.97	N/A	SPS Recommended in 2019-2020 TPP
CATARACT 115 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.88	1.02	0.95	1.04	1.05	0.97	1.04	1.02	N/A	Project: Vierra Looping in Project. Short term: Action Plan
CATLETT 60 kV	P1-2:A5:16:_PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E_MRY J2 & P1-2:A5:27:_RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	L	>0.9	>0.9	0.62	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
CDCRSTN 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	L	0.85	0.85	0.48	>0.9	>0.9	0.88	>0.9	0.85	N/A	SPS Recommended in 2019-2020 TPP
CDCRSTN 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	0.85	0.85	0.48	>0.9	>0.9	0.88	>0.9	0.85	N/A	SPS Recommended in 2019-2020 TPP
CDCRSTN 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.86	0.85	0.48	1.14	1.17	0.88	1.13	0.85	N/A	SPS Recommended in 2019-2020 TPP
CHCGO PK 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.03	0.81	>0.9	1.06	>0.9	>0.9	1.03	N/A	Continue to monitor future load forecast
CHINESESTA 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.95	0.95	0.72	1.05	1.09	0.98	1.05	0.95	0.99	SPS Recommended in 2019-2020 TPP
CHINESESTA 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	>0.9	>0.9	0.74	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
CL AMMNA 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.53	>0.9	>0.9	>0.9	>0.9	0.77	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
CL AMMNA 115 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	0.98	1.00	0.98	1.03	1.03	0.78	1.02	1.01	N/A	Sensitivity only
CNTRY CB 60 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.36	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
CNTRY CB 60 kV	P2-4:A11:23:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus Tie Breaker Fault	L	N/A	N/A	0.41	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
CNTRY CB 60 kV	P5-5a:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	N/A	N/A	0.46	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
CNTRY CB 60 kV	P5-5d:A11:1:_No BF Relay STAGG 230 KV CB252	P5	Non-Redundant Relay	L	N/A	N/A	0.46	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
CNTRY CB 60 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.36	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
CORTINA 230 kV	P2-3:A4:57:_CORTINA 230KV - RING R2 & R3	P2	Non-Bus Tie Breaker Fault	L	>0.9	0.92	0.87	>0.9	1.06	>0.9	>0.9	0.93	0.88	Continue to monitor future load forecast
CPM 115 kV	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (GOLDHILL-CPM TAP)	P2	Line Section w/o Fault	L	0.97	0.98	0.87	1.07	1.08	0.99	1.07	0.98	0.83	Continue to monitor future load forecast
CURTISS 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.96	0.96	0.73	1.05	1.09	0.98	1.05	0.96	1.00	SPS Recommended in 2019-2020 TPP
CURTISS 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	>0.9	>0.9	0.74	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
DAVIS 115 kV	P1-2:A4:24:_WOODLAND-DAVIS 115KV [4210] & P1-2:A4:33:_WEST SACRAMENTO-DAVIS 115KV [4120]	P6	N-1-1	L	0.89	0.90	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
DEEPWATR 115 kV	P1-2:A4:32:_BRIGHTN-W.SCRMNO 115KV [0] & P1-4:A4:13:_W.SCRMNO SVD=V	P6	N-1-1	L	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
DEL MAR 60 kV	P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590] & P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330]	P6	N-1-1	L	>0.9	>0.9	0.77	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
DIMOND_1 115 kV	P2-1:A5:50:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (SHPRING1-CLRKSVL1)	P2	Line Section w/o Fault	L	0.97	0.98	0.87	1.06	1.08	0.99	1.06	0.98	0.83	Continue to monitor future load forecast
DONNELLS 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	1.02	1.02	0.79	1.05	1.09	1.04	1.05	1.02	1.05	SPS Recommended in 2019-2020 TPP
DRAKE 60 kV	P2-3:A4:60:_CORTINA 230KV - RING R1 & R4	P2	Non-Bus Tie Breaker Fault	L	>0.9	0.95	0.88	>0.9	1.01	>0.9	>0.9	0.94	0.92	Continue to monitor future load forecast
DRAKE 60 kV	P1-3:A4:21:_CORTINA 230/115KV TB 6 & P1-3:A4:4:_CORTINA 230/115KV TB 4	P6	N-1-1	L	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
DUNNIGAN 60 kV	P1-2:A4:10:_CORTINA-VACA 230KV [4540]	P1	N-1	L	0.98	0.93	0.89	1.00	1.00	1.00	1.00	0.91	0.88	Continue to monitor future load forecast
DUNNIGAN 60 kV	P2-3:A4:60:_CORTINA 230KV - RING R1 & R4	P2	Non-Bus Tie Breaker Fault	L	>0.9	0.92	0.84	>0.9	1.00	>0.9	>0.9	0.91	0.88	Continue to monitor future load forecast
DUNNIGAN 60 kV	P5-5a:A4:6:_VACA-DIXON 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.97	0.92	0.88	0.99	1.01	1.00	0.99	0.90	N/A	Continue to monitor future load forecast
DUNNIGAN 60 kV	P5-5c(DC):A4:4:_Station	P5	Non-Redundant Relay	L	0.97	0.92	0.88	0.99	1.01	1.00	0.99	0.90	N/A	Continue to monitor future load forecast
DUNNIGAN 60 kV	P1-3:A4:4:_CORTINA 230/115KV TB 4 & P1-3:A4:21:_CORTINA 230/115KV TB 6	P6	N-1-1	L	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	0.90	N/A	Continue to monitor future load forecast
DUNNIGAN 60 kV	P7-1:A4:18_CORTINA-VACA and DELEVAN-VACA 1	P7	DCTL	L	0.98	0.93	0.89	1.00	1.00	1.00	1.00	0.91	0.88	Continue to monitor future load forecast
DUNNIGAN 60 kV	P7-1:A4:5_Logan Creek-Delevan 230 KV Line & Delevan-Cortina 230 KV Line	P7	DCTL	L	0.98	0.92	0.90	1.01	1.00	0.99	1.00	0.90	N/A	Continue to monitor future load forecast
DUTCHFLAT1PH 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.04	0.87	>0.9	1.05	>0.9	>0.9	1.04	N/A	Continue to monitor future load forecast



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
E.MRYSVE 115 kV	P2-1:A5:15:_PALERMO-NICOLAUS 115KV [3210] (E.MRYSVE-E.MRY J2)	P2	Line Section w/o Fault	L	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	Continue to monitor future load forecast
E.MRYSVE 115 kV	P1-2:A5:16:_PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & P1-2:A5:27:_RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	L	>0.9	>0.9	0.66	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
E.NICOLS 60 kV	P1-2:A5:16:_PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & P1-2:A5:27:_RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	L	>0.9	>0.9	0.66	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
EIGHT MI 230 kV	P7-1:A11:9:_EIGHT MILE ROAD-TESLA 230KV [4660] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	0.97	0.98	0.96	1.04	1.14	0.90	1.03	0.98	N/A	System adjustments or voltage support if needed
ELLS GTY 115 kV	P2-2:A11:31:_TESLA 115KV SECTION 1D	P2	Bus Fault	L	0.96	N/A	N/A	0.99	N/A	0.89	0.99	N/A	N/A	Tesla 115 kV Bus Upgrade
ELLS GTY 115 kV	P2-3:A11:26:_TESLA - 1D 115KV & TESLA-SCHULTE SW STA #1 line	P2	Non-Bus Tie Breaker Fault	L	0.96	N/A	N/A	0.99	N/A	0.89	0.99	N/A	N/A	Tesla 115 kV Bus Upgrade
FLINT 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.00	0.57	>0.9	1.06	>0.9	>0.9	1.00	N/A	Continue to monitor future load forecast
FORST HL 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.00	0.86	>0.9	1.04	>0.9	>0.9	1.00	N/A	Continue to monitor future load forecast
FORST HL 60 kV	P1-1:A5:23:_OXBOW F 9.11KV GEN UNIT 1 & P1-2:A5:74:_DRUM-SPAULDING 60KV [6770]	P3	N-G-1	L	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
FORST HL 60 kV	P1-2:A4:30:_RIO OSO-WOODLAND #1 115KV [3460] & P1-2:A5:35:_BELL-PLACER 115KV [4395] MOAS OPENED ON PLACER_BELL PGE	P6	N-1-1	L	>0.9	>0.9	0.77	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
FROGTOWN 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.74	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
FROGTOWN 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	>0.9	>0.9	0.76	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
FROGTOWN 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.96	0.96	0.77	1.06	1.09	0.98	1.06	0.96	N/A	SPS Recommended in 2019-2020 TPP
FROGTOWN 115 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.88	1.01	0.94	1.03	1.05	0.96	1.03	1.01	N/A	Project: Vierra Looping in Project. Short term: Action Plan
GRONMYER 60 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.58	>0.9	>0.9	>0.9	>0.9	0.84	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
GRONMYER 60 kV	P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472]	P6	N-1-1	L	0.57	>0.9	>0.9	>0.9	>0.9	0.84	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
GRONMYER 60 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.72	1.00	0.81	1.02	1.01	0.91	1.02	1.01	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
GRONMYER 60 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.02	1.03	1.03	1.04	1.03	0.86	1.04	1.04	N/A	Sensitivity only
GUSTINE 60 kV	P1-2:A12:16:_SALADO-NEWMAN #2 60KV [7870] MOAS OPENED ON CRWS LDG CRWS LDJ	P1	N-1	L	0.91	0.90	0.89	0.98	0.94	1.01	0.97	0.90	0.87	Continue to monitor future load forecast
GUSTINE 60 kV	P1-1:A11:31:_GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS & P1-2:A12:19:_CROW CREEK SW STA-FRONTIER SOLAR PV 60KV [7859]	P3	N-G-1	L	0.88	0.85	0.83	>0.9	>0.9	>0.9	>0.9	0.85	N/A	Project: Vierra Looping in Project. Short term: Action Plan
GWFTRCY 115 kV	P1-2:A11:51:_TESLA-SCHULTE SW STA #1 115KV [3980] & P1-2:A11:52:_TESLA-SCHULTE SW STA #2 115KV [3970]	P6	N-1-1	L	>0.9	>0.9	>0.9	>0.9	>0.9	0.77	>0.9	>0.9	N/A	Sensitivity only
GWFTRCY 115 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.00	1.01	1.00	1.03	1.03	0.77	1.02	1.02	N/A	Sensitivity only
HALSEY 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.02	0.56	>0.9	1.03	>0.9	>0.9	1.02	N/A	Continue to monitor future load forecast
HAMMER 60 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.37	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
HAMMER 60 kV	P2-4:A11:23:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus Tie Breaker Fault	L	N/A	N/A	0.42	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
HAMMER 60 kV	P5-5a:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	N/A	N/A	0.47	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
HAMMER 60 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.38	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
HARINTON 60 kV	P2-3:A4:60:_CORTINA 230KV - RING R1 & R4	P2	Non-Bus Tie Breaker Fault	L	>0.9	0.96	0.89	>0.9	1.01	>0.9	>0.9	0.95	0.93	Continue to monitor future load forecast
HARINTON 60 kV	P1-3:A4:21:_CORTINA 230/115KV TB 6 & P1-3:A4:4:_CORTINA 230/115KV TB 4	P6	N-1-1	L	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
HIGGINS 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.01	0.65	>0.9	1.06	>0.9	>0.9	1.00	N/A	Continue to monitor future load forecast
HJ HEINZ 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.52	>0.9	>0.9	>0.9	>0.9	0.76	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
HJ HEINZ 115 kV	P1-2:A11:46:_VIERRA-TESLA 115KV [0] & P1-2:A11:64:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	System Upgrade/ Preferred Resources/Operating Solution as needed
HORSESH 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	0.99	0.54	>0.9	1.07	>0.9	>0.9	0.99	N/A	Continue to monitor future load forecast

2022-2023 ISO Reliability Assessment - Study Results

Study Area: PG&E Central Valley  
 High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
HOWLANDRD 115 kV	P1-2:A11:46:_VIERRA-TESLA 115KV [0] & P1-2:A11:64:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast	
HOWLANDRD 115 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	N/A	0.96	0.88	N/A	1.02	N/A	N/A	0.97	N/A	Continue to monitor future load forecast	
INE PRSN 60 kV	P1-1:A11:25:_PRDE 1-3 7.20KV GEN UNIT 1 & P1-2:A11:75:_VALLEY SPRINGS-MARTELL #1 60KV [8240]	P3	N-G-1	L	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan	
INGRM C. 115 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.89	0.98	0.94	1.01	1.02	0.96	1.01	0.99	N/A	Project: Vierra Looping in Project. Short term: Action Plan	
INGRM C. 115 kV	P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472]	P6	N-1-1	L	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan	
KASSON 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:50:_LAMMERS-KASSON 115KV [3972]	P6	N-1-1	L	0.82	>0.9	>0.9	>0.9	>0.9	0.87	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan	
KASSON 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.52	>0.9	>0.9	>0.9	>0.9	0.76	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan	
KASSON 115 kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus Tie Breaker Fault	L	0.98	0.98	0.94	1.01	1.02	0.90	1.01	0.98	N/A	Sensitivity only	
KASSON 115 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.60	0.91	0.60	0.98	0.92	0.79	0.97	0.92	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue	
KASSON 115 kV	P5-5a:A11:5:_TESLA 230KV BUS D (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.97	0.98	0.94	1.01	1.02	0.90	1.01	0.98	N/A	Sensitivity only	
KASSON 115 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	0.99	1.01	0.98	1.02	1.03	0.78	1.02	1.01	N/A	Sensitivity only	
KASSON 60 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.62	0.95	0.64	0.99	0.95	0.84	0.99	0.95	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue	
KASSON 60 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.02	1.03	1.03	1.03	1.03	0.84	1.04	1.04	N/A	Sensitivity only	
KMPUDGREEN 115 kV	P1-2:A4:32:_BRIGHTN-W.SCRMNO 115KV [0] & P1-2:A11:15:_VALLEY SPRINGS-BELLOTA 230KV [5860]	P6	N-1-1	L	>0.9	0.90	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	System Upgrade/ Preferred Resources/Operating Solution as needed	
LAMMERS 115 kV	P1-2:A11:52:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:64:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	>0.9	0.90	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	System Upgrade/ Preferred Resources/Operating Solution as needed	
LAMMERS 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.50	>0.9	>0.9	>0.9	>0.9	0.74	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan	
LAMMERS 115 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.00	1.01	1.00	1.02	1.03	0.77	1.02	1.01	N/A	Sensitivity only	
LEPRINO 115 kV	P1-2:A11:59:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO_TRACY JC & P1-2:A11:64:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast	
LEPRINO 115 kV	P2-2:A11:31:_TESLA 115KV SECTION 1D	P2	Bus Fault	L	0.96	N/A	N/A	0.99	N/A	0.89	0.99	N/A	N/A	Tesla 115 kV Bus Upgrade	
LEPRINO 115 kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus Tie Breaker Fault	L	0.97	0.97	0.91	1.00	1.02	0.90	1.00	0.98	N/A	Sensitivity only	
LEPRINO 115 kV	P5-5a:A11:5:_TESLA 230KV BUS D (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.97	0.97	0.91	1.00	1.02	0.90	1.00	0.98	N/A	Sensitivity only	
LID 115 kV	P1-2:A11:46:_VIERRA-TESLA 115KV [0] & P1-2:A11:64:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast	
LINDEN 60 kV	P1-2:A11:20:_BELLOTA-WARNERVILLE 230KV [4380]	P1	N-1	L	N/A	1.03	1.01	N/A	1.10	N/A	N/A	1.02	N/A	System adjustments or voltage support if needed	
LINDEN 60 kV	P5-5a:A11:11:_WARNERVILLE 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	1.00	1.03	1.01	1.04	1.10	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed	
LINDEN 60 kV	P7-1:A11:27:_TESLA-NEWARK #1 230KV [5720] & TESLA-RAVENSWOOD 230KV [5730]	P7	DCTL	L	1.00	1.02	1.01	1.04	1.10	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed	
LINDEN 60 kV	P7-1:A12:7:_COTTLE-MELONES 230KV [4530] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	L	NConv	1.03	1.01	1.04	1.10	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed	
LOCKFORD 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	L	0.86	0.86	0.50	>0.9	>0.9	0.90	>0.9	0.86	N/A	SPS Recommended in 2019-2020 TPP	
LOCKFORD 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	0.86	0.86	0.50	>0.9	>0.9	0.90	>0.9	0.86	N/A	SPS Recommended in 2019-2020 TPP	
LOCKFORD 230 kV	P1-1:A11:1:_Q1109 0.48KV GEN UNIT 1 & P1-2:A11:4:_LOCKEFORD-BELLOTA 230KV [4990]	P3	N-G-1	L	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: Lockeford - Lodi Area 230 kV Project. Short term: Action Plan	
LOCKFORD 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.87	0.86	0.49	1.14	1.18	0.89	1.14	0.86	N/A	SPS Recommended in 2019-2020 TPP	
LOCKFORD 230 kV	P1-2:A11:4:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	L	0.90	N/A	N/A	0.97	N/A	0.89	0.95	N/A	N/A	Project: Lockeford - Lodi Area 230 kV Project. Short term: Action Plan	
LOCKFORD 230 kV	P2-2:A11:8:_BELLOTA 230KV SECTION 2E	P2	Bus Fault	L	0.90	0.91	0.97	0.97	1.01	0.89	0.95	0.92	N/A	SPS Recommended in 2019-2020 TPP	
LOCKFORD 230 kV	P2-3:A11:89:_LOCKFORD 230KV - Ring R3 & R4	P2	Non-Bus Tie Breaker Fault	L	0.89	N/A	N/A	0.96	N/A	0.87	0.95	N/A	N/A	Project: Lockeford - Lodi Area 230 kV Project. Short term: Action Plan	
LOCKFORD 230 kV	P2-3:A11:90:_LOCKFORD 230KV - Ring R3 & R2	P2	Non-Bus Tie Breaker Fault	L	0.90	N/A	N/A	0.96	N/A	0.87	0.95	N/A	N/A	Project: Lockeford - Lodi Area 230 kV Project. Short term: Action Plan	

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
LOCKFORD 230 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.89	0.91	0.90	0.96	1.02	0.88	0.95	0.92	N/A	SPS Recommended in 2019-2020 TPP
LOCKFORD 230 kV	P2-4:A11:3:_BELLOTA 230KV - SECTION 2E & 2D	P2	Bus Tie Breaker Fault	L	0.90	0.91	0.97	0.96	1.01	0.89	0.95	0.92	N/A	Project: Lockeford - Lodi Area 230 kV Project. Short term: Action Plan
LOCKFORD 230 kV	P7-1:A11:11:_BRIGHTON-BELLOTA 230KV [4420] & LOCKFORD-BELLOTA 230KV [4990]	P7	DCTL	L	0.89	0.91	Contingency Invalid	0.96	1.02	0.88	0.95	0.92	N/A	Project: Lockeford - Lodi Area 230 kV Project. Short term: Action Plan
LOUISE 60 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.57	>0.9	>0.9	>0.9	>0.9	0.84	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
LOUISE 60 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.70	0.99	0.76	1.01	0.99	0.89	1.01	1.00	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
LOUISE 60 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.03	1.04	1.03	1.04	1.03	0.86	1.04	1.04	N/A	Sensitivity only
LYOTH-SP 60 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:50:_LAMMERS-KASSON 115KV [3972]	P6	N-1-1	L	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
LYOTH-SP 60 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.54	>0.9	>0.9	>0.9	>0.9	0.81	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
LYOTH-SP 60 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.61	0.94	0.62	0.99	0.95	0.83	0.99	0.94	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
LYOTH-SP 60 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.01	1.03	1.01	1.03	1.03	0.83	1.03	1.03	N/A	Sensitivity only
MANTECA 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:50:_LAMMERS-KASSON 115KV [3972]	P6	N-1-1	L	0.83	>0.9	>0.9	>0.9	>0.9	0.88	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
MANTECA 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.55	>0.9	>0.9	>0.9	>0.9	0.79	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
MANTECA 115 kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus Tie Breaker Fault	L	0.97	0.97	0.93	1.01	1.02	0.90	1.01	0.97	N/A	Sensitivity only
MANTECA 115 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.74	0.95	0.87	0.99	1.02	0.87	0.99	0.96	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
MANTECA 115 kV	P5-5a:A11:5:_TESLA 230KV BUS D (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.96	0.97	0.93	1.01	1.02	0.89	1.01	0.97	N/A	Sensitivity only
MANTECA 115 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	0.98	1.00	0.98	1.02	1.03	0.80	1.02	1.00	N/A	Sensitivity only
MANTECA 60 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.74	1.02	0.84	1.02	1.02	0.92	1.02	1.02	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
MANTECA 60 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.03	1.03	1.03	1.04	1.03	0.86	1.04	1.04	N/A	Sensitivity only
MARTELL 60 kV	P1-1:A11:15:_STCKNBIOMASS 13.80KV GEN UNIT 1 & P1-2:A11:75:_VALLEY SPRINGS-MARTELL #1 60KV [8240]	P3	N-G-1	L	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Existing Operating Procedure
MARTELL 60 kV	P1-1:A11:16:_WEST PNT 11.50KV GEN UNIT 1 & P1-2:A11:82:_VALLEY SPRINGS-MARTELL #1 60KV [8240]	P3	N-G-1	L	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	N/A	Existing Operating Procedure
MARTELL 60 kV	P1-1:A11:25:_PRDE 1-3 7.20KV GEN UNIT 1 & P1-2:A11:75:_VALLEY SPRINGS-MARTELL #1 60KV [8240]	P3	N-G-1	L	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Existing Operating Procedure
MARTELL 60 kV	P1-2:A11:75:_VALLEY SPRINGS-MARTELL #1 60KV [8240]	P1	N-1	L	0.88	0.89	N/A	1.02	N/A	0.98	1.02	0.89	N/A	Existing Operating Procedure
MCSP 60 kV	P1-1:A11:25:_PRDE 1-3 7.20KV GEN UNIT 1 & P1-2:A11:75:_VALLEY SPRINGS-MARTELL #1 60KV [8240]	P3	N-G-1	L	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Existing Operating Procedure
MCSP 60 kV	P1-1:A11:26:_PRDE 1-3 7.20KV GEN UNIT 2 & P1-2:A11:75:_VALLEY SPRINGS-MARTELL #1 60KV [8240]	P3	N-G-1	L	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Existing Operating Procedure
MI-WUK 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.98	0.98	0.75	1.05	1.09	1.00	1.04	0.98	1.01	SPS Recommended in 2019-2020 TPP
MI-WUK 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	>0.9	>0.9	0.76	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
MRYSVLLE 60 kV	P1-2:A5:156:_EMRYSVE-MRYSVLE #1 60KV [0]	P1	N-1	L	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	0.84	Continue to monitor future load forecast
MRYSVLLE 60 kV	P1-1:A4:16:_WOODLANDBIOM 13.80KV GEN UNIT 1 & P1-2:A5:156:_EMRYSVE-MRYSVLE #1 60KV [0]	P3	N-G-1	L	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
MRYSVLLE 60 kV	P1-2:A5:16:_PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & P1-2:A5:27:_RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	L	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
MSHR 60V 60 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.52	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
MSHR 60V 60 kV	P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:14:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	0.53	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
MSHR 60V 60 kV	P1-3:A11:16:_STAGG-E 230/60KV TB 4	P1	N-1	L	0.99	0.99	1.00	1.07	1.10	0.99	1.08	0.99	N/A	System adjustments or voltage support if needed

2022-2023 ISO Reliability Assessment - Study Results

Study Area: PG&E Central Valley  
 High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
MSHR 60V 60 kV	P1-2:A11:95:_STAGG-HAMMER 60KV [8100]	P1	N-1	L	N/A	0.98	1.00	N/A	1.11	N/A	N/A	0.97	N/A	System adjustments or voltage support if needed
MSHR 60V 60 kV	P2-4:A11:23:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus Tie Breaker Fault	L	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
MSHR 60V 60 kV	P5-5a:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	N/A	N/A	0.58	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
MSHR 60V 60 kV	P5-5d:A11:1:_No BF Relay STAGG 230 KV CB252	P5	Non-Redundant Relay	L	N/A	N/A	0.58	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
MSHR 60V 60 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.53	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
MSSDLESW 60 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:50:_LAMMERS-KASSON 115KV [3972]	P6	N-1-1	L	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Vierra Looping in Project. Short term: Action Plan
MSSDLESW 60 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.69	0.99	0.75	1.01	0.99	0.89	1.01	1.00	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
MSSDLESW 60 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.03	1.04	1.03	1.04	1.03	0.85	1.04	1.04	N/A	Sensitivity only
MTN_QUAR 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.02	0.55	>0.9	1.03	>0.9	>0.9	1.02	N/A	Continue to monitor future load forecast
NEWCASTLE 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.00	0.56	>0.9	1.06	>0.9	>0.9	0.99	N/A	Continue to monitor future load forecast
NEWMAN 60 kV	P1-2:A12:16:_SALADO-NEWMAN #2 60KV [7870] MOAS OPENED ON CRWS LDG_CRWS LDJ	P1	N-1	L	0.91	0.90	0.90	0.98	0.93	1.01	0.98	0.90	0.89	Existing Operating Procedure
NEWMAN 60 kV	P1-2:A12:19:_CROW CREEK SW STA-FRONTIER SOLAR PV 60KV [7859]	P1	N-1	L	0.91	0.89	0.89	0.97	0.93	1.00	0.97	0.89	0.84	Existing Operating Procedure
NEWMAN 60 kV	P1-1:A11:31:_GWFRYCY3 18.00KV & GWFRYCY1 13.80KV & GWFRYCY2 13.80KV GEN UNITS & P1-2:A12:19:_CROW CREEK SW STA-FRONTIER SOLAR PV 60KV [7859]	P3	N-G-1	L	>0.9	0.88	0.87	>0.9	>0.9	>0.9	>0.9	0.88	N/A	Existing Operating Procedure
OI GLASS 115 kV	P1-2:A11:52:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:64:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	>0.9	0.90	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	System Upgrade/ Preferred Resources/Operating Solution as needed
OI GLASS 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.50	>0.9	>0.9	>0.9	>0.9	0.74	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
OI GLASS 115 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.00	1.01	0.99	1.02	1.03	0.77	1.02	1.01	N/A	Sensitivity only
OXBOW 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.00	0.87	>0.9	1.05	>0.9	>0.9	1.01	N/A	Continue to monitor future load forecast
PEASE 115 kV	P1-2:A5:22:_PALERMO-PEASE 115KV [3220] MOAS OPENED ON PEASE_HONC JT1 & P1-2:A5:23:_PEASE-RIO OSO 115KV [3270] MOAS OPENED ON PEASE_E.MRY J1	P6	N-1-1	L	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	N/A	Sensitivity only
PEASE 115 kV	P7-1:A5:20_Palermo-Pease 115 KV Line amd Pease-Rio OsO 115 KV Line	P7	DCTL	L	0.97	0.97	0.96	0.97	1.06	0.90	0.97	0.97	N/A	System adjustments or voltage support if needed
PENRYN 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.01	0.53	>0.9	1.03	>0.9	>0.9	1.01	N/A	Continue to monitor future load forecast
PEORIA 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.95	0.94	0.72	1.05	1.09	0.97	1.05	0.94	0.99	SPS Recommended in 2019-2020 TPP
PEORIA 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	>0.9	>0.9	0.74	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
PLACER 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.00	0.57	>0.9	1.06	>0.9	>0.9	0.99	N/A	Continue to monitor future load forecast
PLACER 115 kV	P5-5a:A5:6:_GOLD HILL 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.90	0.90	0.90	1.02	1.08	0.99	1.02	0.88	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
PLACER 115 kV	P5-5d:A5:2:_No BF Relay Gold Hill 115KV CB 172 or 392	P5	Non-Redundant Relay	L	0.90	0.90	>0.9	1.02	1.08	0.99	1.02	0.88	N/A	Project: Gold Hill 230/115 kV Transformer Addition Project. Short term: Action Plan
PLACER 115 kV	P1-2:A5:18:_PLACER-GOLD HILL #2 115KV [4290] & P1-2:A5:17:_PLACER-GOLD HILL #1 115KV [3340]	P6	N-1-1	L	>0.9	0.90	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	System Upgrade/ Preferred Resources/Operating Solution as needed
PLACER 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 KV Line and Placer-Gold Hill No. 2 115 KV Line	P7	DCTL	L	0.90	0.90	0.89	1.02	1.08	0.99	1.02	0.88	0.53	System Upgrade/ Preferred Resources/Operating Solution as needed
PLACER 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.02	0.57	>0.9	1.03	>0.9	>0.9	1.02	N/A	Continue to monitor future load forecast
PLSNT GR 115 kV	P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590] & P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330]	P6	N-1-1	L	>0.9	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
PLUMAS 60 kV	P1-2:A5:16:_PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & P1-2:A5:27:_RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	L	>0.9	>0.9	0.61	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
POST 115 kV	P1-2:A4:32:_BRIGHTN-W.SCRMNO 115KV [0] & P1-4:A4:13:_W.SCRMNO 5D=V	P6	N-1-1	L	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
Q1109 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	0.86	0.87	0.51	>0.9	>0.9	>0.9	>0.9	0.86	N/A	SPS Recommended in 2019-2020 TPP

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
Q1109 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	L	0.86	0.87	0.51	>0.9	>0.9	>0.9	>0.9	0.86	N/A	SPS Recommended in 2019-2020 TPP
Q1109 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.88	0.87	0.51	1.13	1.17	0.90	1.13	0.86	N/A	SPS Recommended in 2019-2020 TPP
R.TRACK 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.94	0.94	0.72	1.06	1.10	0.97	1.06	0.94	0.99	SPS Recommended in 2019-2020 TPP
R.TRACK 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	>0.9	>0.9	0.73	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
RIO OSO 230 kV	P5-5a:A5:2:_RIO OSO 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.93	1.02	0.87	1.03	1.20	0.90	1.01	1.03	N/A	Continue to monitor future load forecast
RIPON 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:50:_LAMMERS-KASSON 115KV [3972]	P6	N-1-1	L	0.82	>0.9	>0.9	>0.9	>0.9	0.88	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
RIPON 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.55	>0.9	>0.9	>0.9	>0.9	0.79	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
RIPON 115 kV	P2-3:A11:19:_KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA line	P2	Non-Bus Tie Breaker Fault	L	0.90	N/A	N/A	1.01	N/A	0.93	1.01	N/A	N/A	Project: Vierra Looping in Project. Short term: Action Plan
RIPON 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.97	0.97	0.88	1.03	1.05	0.96	1.03	0.98	N/A	SPS Recommended in 2019-2020 TPP
RIPON 115 kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus Tie Breaker Fault	L	0.96	0.96	0.92	1.01	1.03	0.89	1.00	0.96	N/A	Sensitivity only
RIPON 115 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.73	0.95	0.86	0.99	1.02	0.87	0.99	0.95	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
RIPON 115 kV	P5-5a:A11:5:_TESLA 230KV BUS D (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.96	0.96	0.92	1.01	1.03	0.89	1.00	0.96	N/A	Sensitivity only
RIPON 115 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	0.97	0.99	0.97	1.02	1.04	0.80	1.02	0.99	N/A	Sensitivity only
ROCKLIN 60 kV	P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590] & P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330]	P6	N-1-1	L	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
ROLLINS 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.02	0.90	>0.9	1.02	>0.9	>0.9	1.02	N/A	Continue to monitor future load forecast
RVRBANK 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.89	0.88	0.53	1.13	1.18	0.91	1.13	0.87	0.99	SPS Recommended in 2019-2020 TPP
RVRBANK 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	L	0.89	0.88	0.54	>0.9	>0.9	>0.9	>0.9	0.88	N/A	SPS Recommended in 2019-2020 TPP
SANDBAR 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	1.01	1.01	0.78	1.05	1.09	1.03	1.05	1.01	1.04	SPS Recommended in 2019-2020 TPP
SCHULTE 115 kV	P1-2:A11:51:_TESLA-SCHULTE SW STA #1 115KV [3980] & P1-2:A11:52:_TESLA-SCHULTE SW STA #2 115KV [3970]	P6	N-1-1	L	>0.9	>0.9	>0.9	>0.9	>0.9	0.77	>0.9	>0.9	N/A	Sensitivity only
SCHULTE 115 kV	P1-2:A11:52:_TESLA-SCHULTE SW STA #2 115KV [3970] & P1-2:A11:51:_TESLA-SCHULTE SW STA #1 115KV [3980]	P6	N-1-1	L	>0.9	>0.9	>0.9	>0.9	>0.9	0.77	>0.9	>0.9	N/A	Sensitivity only
SCHULTE 115 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	1.00	1.01	1.00	1.03	1.03	0.77	1.02	1.02	N/A	Sensitivity only
SEBASTIA 60 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.33	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
SEBASTIA 60 kV	P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:14:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	0.33	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
SEBASTIA 60 kV	P2-4:A11:23:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus Tie Breaker Fault	L	N/A	N/A	0.38	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
SEBASTIA 60 kV	P5-5a:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	N/A	N/A	0.43	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
SEBASTIA 60 kV	P5-5d:A11:1:_No BF Relay STAGG 230 KV CB252	P5	Non-Redundant Relay	L	N/A	N/A	0.43	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
SEBASTIA 60 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.33	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
SHADYGLN 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.01	0.89	>0.9	1.02	>0.9	>0.9	1.01	N/A	Continue to monitor future load forecast
SHADYGLN 60 kV	P1-2:A4:30:_RIO OSO-WOODLAND #1 115KV [3460] & P1-2:A5:35:_BELL-PLACER 115KV [4395] MOAS OPENED ON PLACER_BELL PGE	P6	N-1-1	L	>0.9	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
SHPRING 115 kV	P2-1:A5:50:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (SHPRING1-CLRKSVLTV)	P2	Line Section w/o Fault	L	0.97	0.97	0.87	1.06	1.08	0.99	1.06	0.98	0.83	Continue to monitor future load forecast
SHPRING1 115 kV	P2-1:A5:50:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (SHPRING1-CLRKSVLTV)	P2	Line Section w/o Fault	L	0.97	0.97	0.87	1.06	1.08	0.99	1.06	0.98	0.83	Continue to monitor future load forecast
SHW 60 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.33	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
SHW 60 kV	P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:14:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	0.33	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast

2022-2023 ISO Reliability Assessment - Study Results

Study Area: PG&E Central Valley

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
SHW 60 kV	P2-4:A11:23:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus Tie Breaker Fault	L	N/A	N/A	0.37	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
SHW 60 kV	P5-5a:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	N/A	N/A	0.43	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
SHW 60 kV	P5-5d:A11:1:_No BF Relay STAGG 230 KV CB252	P5	Non-Redundant Relay	L	N/A	N/A	0.43	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
SHW 60 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.33	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
SIERRAPI 60 kV	P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590] & P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330]	P6	N-1-1	L	>0.9	>0.9	0.77	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
SI COGEN 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.86	0.85	0.47	1.14	1.18	0.88	1.13	0.84	0.98	SPS Recommended in 2019-2020 TPP
SLT SPRG 115 kV	P1-2:A4:32:_BRIGHTN-W. SCRMMO 115KV [0] & P1-2:A11:15:_VALLEY SPRINGS-BELLOTA 230KV [5860]	P6	N-1-1	L	>0.9	0.90	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
SLT SPRG 115 kV	P1-3:A5:3:_RIO OSO 230/115KV TB 1 & P1-2:A11:15:_VALLEY SPRINGS-BELLOTA 230KV [5860]	P6	N-1-1	L	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
SLT SPRG 115 kV	P1-3:A5:4:_RIO OSO 230/115KV TB 2 & P1-2:A11:15:_VALLEY SPRINGS-BELLOTA 230KV [5860]	P6	N-1-1	L	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
SND BR JT 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	1.01	1.01	0.78	1.05	1.09	1.03	1.05	1.01	1.04	SPS Recommended in 2019-2020 TPP
SPICAMIN 115 kV	P2-1:A5:50:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (SHPRING1-CLRKSVLT)	P2	Line Section w/o Fault	L	0.98	0.99	0.90	1.06	1.07	1.00	1.06	1.00	0.86	Continue to monitor future load forecast
SPISONORA 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.96	0.96	0.73	1.05	1.09	0.98	1.05	0.96	1.00	SPS Recommended in 2019-2020 TPP
SPRNG GP 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	1.01	1.01	0.78	1.05	1.09	1.03	1.05	1.01	1.04	SPS Recommended in 2019-2020 TPP
SPRNG GP 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	>0.9	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
STAGG 60 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.36	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
STAGG 60 kV	P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:14:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	0.36	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
STAGG 60 kV	P2-4:A11:23:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus Tie Breaker Fault	L	N/A	N/A	0.41	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
STAGG 60 kV	P5-5a:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	N/A	N/A	0.46	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
STAGG 60 kV	P5-5d:A11:1:_No BF Relay STAGG 230 KV CB252	P5	Non-Redundant Relay	L	N/A	N/A	0.46	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
STAGG 60 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.36	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
STAGG-D 230 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.32	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
STAGG-D 230 kV	P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:14:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	0.32	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
STAGG-D 230 kV	P2-4:A11:7:_TESLA E 230KV - SECTION 2E & 1E	P2	Bus Tie Breaker Fault	L	0.96	0.97	0.94	1.04	1.15	0.89	1.04	0.97	N/A	System Upgrade/ Preferred Resources/Operating Solution as needed
STAGG-D 230 kV	P5-5a:A11:6:_TESLA 230KV BUS E (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.96	0.97	0.94	1.04	1.15	0.89	1.04	0.97	N/A	Sensitivity only
STAGG-D 230 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.32	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
STAGG-D 230 kV	P7-1:A11:9:_EIGHT MILE ROAD-TESLA 230KV [4660] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	0.96	0.97	0.95	1.04	1.14	0.89	1.03	0.97	N/A	Sensitivity only
STAGG-E 230 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.32	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
STAGG-E 230 kV	P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:14:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	0.32	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
STAGG-E 230 kV	P1-2:A11:26:_EIGHT MILE ROAD-TESLA 230KV [4660] & P1-2:A11:8:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	N/A	Sensitivity only
STAGG-E 230 kV	P1-2:A11:8:_STAGG-TESLA 230KV [5680] & P1-2:A11:26:_EIGHT MILE ROAD-TESLA 230KV [4660]	P6	N-1-1	L	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	N/A	Sensitivity only
STAGG-E 230 kV	P2-4:A11:7:_TESLA E 230KV - SECTION 2E & 1E	P2	Bus Tie Breaker Fault	L	0.96	0.97	0.94	1.04	1.15	0.89	1.04	0.97	N/A	System adjustments or voltage support if needed
STAGG-E 230 kV	P5-5a:A11:6:_TESLA 230KV BUS E (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.96	0.97	0.94	1.04	1.15	0.89	1.04	0.97	N/A	Sensitivity only
STAGG-E 230 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.32	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
STAGG-E 230 kV	P7-1:A11:9:_EIGHT MILE ROAD-TESLA 230KV [4660] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	0.96	0.97	0.95	1.04	1.14	0.89	1.03	0.97	N/A	Sensitivity only
STAGG-F 230 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.32	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
STAGG-F 230 kV	P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:14:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	0.32	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
STAGG-F 230 kV	P1-2:A11:26:_EIGHT MILE ROAD-TESLA 230KV [4660] & P1-2:A11:8:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	N/A	Sensitivity only	
STAGG-F 230 kV	P1-2:A11:8:_STAGG-TESLA 230KV [5680] & P1-2:A11:26:_EIGHT MILE ROAD-TESLA 230KV [4660]	P6	N-1-1	L	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	N/A	Sensitivity only	
STAGG-F 230 kV	P2-4:A11:7:_TESLA E 230KV - SECTION 2E & 1E	P2	Bus Tie Breaker Fault	L	0.96	0.97	0.94	1.04	1.15	0.89	1.04	0.97	N/A	System adjustments or voltage support if needed	
STAGG-F 230 kV	P5-5a:A11:6:_TESLA 230KV BUS E (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.96	0.97	0.94	1.04	1.15	0.89	1.04	0.97	N/A	Sensitivity only	
STAGG-F 230 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.32	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast	
STAGG-F 230 kV	P7-1:A11:9:_EIGHT MILE ROAD-TESLA 230KV [4660] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	0.96	0.97	0.95	1.04	1.14	0.89	1.03	0.97	N/A	Sensitivity only	
STAGG-H 230 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.32	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast	
STAGG-H 230 kV	P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:14:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	0.32	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast	
STAGG-H 230 kV	P1-2:A11:26:_EIGHT MILE ROAD-TESLA 230KV [4660] & P1-2:A11:8:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	N/A	Sensitivity only	
STAGG-H 230 kV	P1-2:A11:8:_STAGG-TESLA 230KV [5680] & P1-2:A11:26:_EIGHT MILE ROAD-TESLA 230KV [4660]	P6	N-1-1	L	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	N/A	Sensitivity only	
STAGG-H 230 kV	P2-4:A11:7:_TESLA E 230KV - SECTION 2E & 1E	P2	Bus Tie Breaker Fault	L	0.96	0.97	0.95	1.04	1.15	0.89	1.04	0.97	N/A	System adjustments or voltage support if needed	
STAGG-H 230 kV	P5-5a:A11:6:_TESLA 230KV BUS E (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.96	0.97	0.95	1.04	1.15	0.89	1.04	0.97	N/A	Sensitivity only	
STAGG-H 230 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.32	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast	
STAGG-H 230 kV	P7-1:A11:9:_EIGHT MILE ROAD-TESLA 230KV [4660] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	0.96	0.97	0.95	1.04	1.14	0.89	1.04	0.97	N/A	Sensitivity only	
STANISLS 115 kV	P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	0.73	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan	
STANISLS 115 kV	P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472]	P6	N-1-1	L	0.73	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan	
STANISLS 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	L	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP	
STANISLS 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP	
STANISLS 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.98	0.98	0.80	1.06	1.08	0.99	1.06	0.98	N/A	SPS Recommended in 2019-2020 TPP	
STANISLS 115 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.88	1.02	0.95	1.04	1.05	0.97	1.04	1.02	N/A	Project: Vierra Looping in Project. Short term: Action Plan	
STCKTNJB 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	L	0.85	0.86	0.49	>0.9	>0.9	0.89	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP	
STCKTNJB 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	0.85	0.86	0.49	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP	
STCKTNJB 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.86	0.85	0.49	1.14	1.18	0.89	1.14	0.85	N/A	SPS Recommended in 2019-2020 TPP	
STKTON A 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	L	0.84	0.84	0.47	>0.9	>0.9	0.88	>0.9	0.84	N/A	SPS Recommended in 2019-2020 TPP	
STKTON A 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	0.84	0.84	0.47	>0.9	>0.9	0.88	>0.9	0.84	N/A	SPS Recommended in 2019-2020 TPP	
STKTON A 115 kV	P2-3:A11:41:_BELLOTA - 1D 115KV & GOLD HILL-BELLOTA-LOCKEFORD LINE	P2	Non-Bus Tie Breaker Fault	L	N/A	0.94	0.90	N/A	1.05	N/A	N/A	0.94	N/A	SPS Recommended in 2019-2020 TPP	
STKTON A 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.85	0.84	0.47	1.14	1.18	0.87	1.13	0.84	N/A	SPS Recommended in 2019-2020 TPP	
STKTON B 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	L	0.85	0.85	0.49	>0.9	>0.9	0.89	>0.9	0.85	N/A	SPS Recommended in 2019-2020 TPP	
STKTON B 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	0.85	0.85	0.49	>0.9	>0.9	0.89	>0.9	0.85	N/A	SPS Recommended in 2019-2020 TPP	
STKTON B 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.86	0.85	0.49	1.14	1.18	0.89	1.14	0.85	N/A	SPS Recommended in 2019-2020 TPP	
STN COGN 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	L	0.84	0.85	0.48	>0.9	>0.9	0.88	>0.9	0.84	N/A	SPS Recommended in 2019-2020 TPP	
STN COGN 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	0.84	0.85	0.48	>0.9	>0.9	0.88	>0.9	0.84	N/A	SPS Recommended in 2019-2020 TPP	
STN COGN 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.86	0.85	0.47	1.14	1.18	0.88	1.13	0.84	N/A	SPS Recommended in 2019-2020 TPP	
TAYLOR 60 kV	P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590] & P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330]	P6	N-1-1	L	>0.9	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast	
TERMNOUS 60 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.33	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast	
TERMNOUS 60 kV	P2-4:A11:23:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus Tie Breaker Fault	L	N/A	N/A	0.38	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast	

2022-2023 ISO Reliability Assessment - Study Results

Study Area: PG&E Central Valley  
 High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
TERMNOUS 60 kV	P5-5a:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	N/A	N/A	0.43	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
TERMNOUS 60 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.34	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
TESLAMTR 115 kV	P1-2:A11:46:_VIERRA-TESLA 115KV [0] & P1-2:A11:64:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
TESLAMTR 115 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	1.03	0.96	0.88	1.03	1.02	1.02	1.03	0.97	N/A	Continue to monitor future load forecast
THURMAN SS 230 kV	P1-2:A11:10:_LOCKEFORD-BELLOTA 230KV [4990] & P1-2:A11:5:_BELLOTA-LOCKFORD 230KV [0]	P6	N-1-1	L	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
THURMAN SS 230 kV	P7-1:A11:37:_LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	L	Bus Invalid	Bus Invalid	0.90	Bus Invalid	Bus Invalid	Bus Invalid	Bus Invalid	Bus Invalid	N/A	Continue to monitor future load forecast
TIGR CRK 115 kV	P1-2:A4:32:_BRIGHTN-W.SCRMNO 115KV [0] & P1-2:A11:15:_VALLEY SPRINGS-BELLOTA 230KV [5860]	P6	N-1-1	L	>0.9	0.90	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
TRACY 115 kV	P1-2:A11:59:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO_TRACY JC & P1-2:A11:64:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	L	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
TRACY 115 kV	P2-2:A11:31:_TESLA 115KV SECTION 1D	P2	Bus Fault	L	0.96	N/A	N/A	0.99	N/A	0.89	0.99	N/A	N/A	Tesla 115 kV Bus Upgrade
TRACY 115 kV	P2-3:A11:26:_TESLA - 1D 115KV & TESLA-SCHULTE SW STA #1 line	P2	Non-Bus Tie Breaker Fault	L	0.96	N/A	N/A	0.99	N/A	0.89	0.99	N/A	N/A	Tesla 115 kV Bus Upgrade
TRACY 115 kV	P2-3:A11:27:_TESLA - 1D 115KV & TESLA-TRACY line	P2	Non-Bus Tie Breaker Fault	L	0.96	N/A	N/A	1.00	N/A	0.89	0.99	N/A	N/A	Tesla 115 kV Bus Upgrade
TRACY 115 kV	P2-3:A11:28:_TESLA - 1D 115KV & TESLA-LAWRENCE LAB line	P2	Non-Bus Tie Breaker Fault	L	0.96	N/A	N/A	0.99	N/A	0.89	0.99	N/A	N/A	Tesla 115 kV Bus Upgrade
TRACY 115 kV	P2-3:A11:29:_TESLA - 1D 115KV & TESLA-SALADO-Q1103 line	P2	Non-Bus Tie Breaker Fault	L	0.96	N/A	N/A	0.99	N/A	0.89	0.99	N/A	N/A	Tesla 115 kV Bus Upgrade
TRACY 115 kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus Tie Breaker Fault	L	0.96	0.97	0.91	1.00	1.02	0.90	1.00	0.97	N/A	Sensitivity only
TRACY 115 kV	P5-5a:A11:5:_TESLA 230KV BUS D (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.97	0.97	0.91	1.00	1.02	0.89	1.00	0.97	N/A	Sensitivity only
TUDOR 60 kV	P1-2:A5:16:_PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & P1-2:A5:27:_RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	L	>0.9	>0.9	0.64	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
TULLOCH 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.92	0.91	0.66	1.07	1.11	0.95	1.07	0.91	1.00	SPS Recommended in 2019-2020 TPP
UOP 60 kV	P1-2:A11:14:_STAGG-TESLA 230KV [5680] & P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	L	>0.9	>0.9	0.36	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
UOP 60 kV	P1-2:A11:16:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:14:_STAGG-TESLA 230KV [5680]	P6	N-1-1	L	>0.9	>0.9	0.36	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
UOP 60 kV	P2-4:A11:23:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus Tie Breaker Fault	L	N/A	N/A	0.41	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
UOP 60 kV	P5-5a:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	N/A	N/A	0.47	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
UOP 60 kV	P5-5d:A11:1:_No BF Relay STAGG 230 KV CB252	P5	Non-Redundant Relay	L	N/A	N/A	0.47	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
UOP 60 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.37	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
VALLY HM 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus Tie Breaker Fault	L	0.96	0.96	0.83	1.04	1.06	0.96	1.04	0.97	0.97	SPS Recommended in 2019-2020 TPP
VALLY HM 115 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.78	0.96	0.90	1.00	1.03	0.90	1.00	0.97	N/A	Project: Vierra Looping in Project. Short term: Action Plan
VALLY HM 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	L	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	SPS Recommended in 2019-2020 TPP
VALLY HM 115 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	0.98	1.00	0.99	1.03	1.05	0.84	1.03	1.00	N/A	Sensitivity only
VIERRA 115 kV	P1-2:A11:58:_SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:45:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472]	P6	N-1-1	L	0.53	>0.9	>0.9	>0.9	>0.9	0.77	>0.9	>0.9	N/A	Project: Vierra Looping in Project. Short term: Action Plan
VIERRA 115 kV	P1-2:A11:64:_SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:46:_VIERRA-TESLA 115KV [0]	P6	N-1-1	L	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
VIERRA 115 kV	P1-2:A11:64:_SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:52:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472]	P6	N-1-1	L	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
VIERRA 115 kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus Tie Breaker Fault	L	0.97	0.97	0.94	1.01	1.02	0.89	1.01	0.98	N/A	Continue to monitor future load forecast
VIERRA 115 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.73	0.96	0.88	0.99	1.02	0.87	0.99	0.97	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
VIERRA 115 kV	P5-5a:A11:5:_TESLA 230KV BUS D (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	L	0.97	0.97	0.94	1.01	1.02	0.89	1.01	0.98	N/A	Sensitivity only
VIERRA 115 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	0.98	1.00	0.98	1.03	1.03	0.79	1.02	1.01	N/A	Sensitivity only



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
W.SCRMNO 115 kV	P1-2:A4:32:_BRIGHTN-W.SCRMNO 115KV [0] & P1-4:A4:13:_W.SCRMNO SVD=V	P6	N-1-1	L	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
WEMR SWS 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus Tie Breaker Fault	L	>0.9	1.01	0.88	>0.9	1.02	>0.9	>0.9	1.01	N/A	Continue to monitor future load forecast
WEMR SWS 60 kV	P1-2:A4:30:_RIO OSO-WOODLAND #1 115KV [3460] & P1-2:A5:35:_BELL-PLACER 115KV [4395] MOAS OPENED ON PLACER_BELL PGE	P6	N-1-1	L	>0.9	>0.9	0.83	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
WESTLEY 60 kV	P5-5a:A11:17:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	L	0.57	0.91	0.53	0.96	0.99	0.79	0.96	0.92	N/A	Project: Vierra Looping in Project. Short term: Action Plan - Continue to monitor future load forecast for the long term issue
WESTLEY 60 kV	P1-2:A11:64:_SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:52:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472]	P6	N-1-1	L	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
WESTLEY 60 kV	P7-1:A11:28:_TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV [3982]	P7	DCTL	L	0.99	1.00	0.95	1.01	0.99	0.79	1.01	1.00	N/A	Sensitivity only
WHEATLND 60 kV	P1-2:A5:16:_PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & P1-2:A5:27:_RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	L	>0.9	>0.9	0.59	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
WILKINS 60 kV	P2-3:A4:60:_CORTINA 230KV - RING R1 & R4	P2	Non-Bus Tie Breaker Fault	L	>0.9	0.95	0.86	>0.9	0.99	>0.9	>0.9	0.96	0.88	Continue to monitor future load forecast
WILKINS 60 kV	P1-3:A4:21:_CORTINA 230/115KV TB 6 & P1-3:A4:4:_CORTINA 230/115KV TB 4	P6	N-1-1	L	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor future load forecast
WSTLNEW 60 kV	P2-4:A11:23:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus Tie Breaker Fault	L	N/A	N/A	0.42	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
WSTLNEW 60 kV	P5-5a:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	L	N/A	N/A	0.47	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
WSTLNEW 60 kV	P5-5d:A11:1:_No BF Relay STAGG 230 KV CB252	P5	Non-Redundant Relay	L	N/A	N/A	0.47	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast
WSTLNEW 60 kV	P7-1:A11:33:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	L	N/A	N/A	0.38	N/A	N/A	N/A	N/A	N/A	N/A	Continue to monitor future load forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
GUSTINE 60 kV	P1-2:A12:19:.. CROW CREEK SW STA-FRONTIER SOLAR PV 60KV [7859]	P1	N-1	<8	11	10	<8	<8	<8	<8	<8	11	15	Existing Procedure
NEWMAN 60 kV	P1-2:A12:16:.. SALADO-NEWMAN #2 60KV [7870] MOAS OPENED ON CRWS LDG_CRWS	P1	N-1	<8	8	<8	<8	<8	<8	<8	<8	8	N/A	Existing Procedure
NEWMAN 60 kV	P1-2:A12:19:.. CROW CREEK SW STA-FRONTIER SOLAR PV 60KV [7859]	P1	N-1	<8	9	9	<8	<8	<8	<8	<8	9	12	Existing Procedure
MRYSVLLE 60 kV	P1-2:A5:156:.. E.MRYSVLLE-MRYSVLLE #1 60KV [0]	P1	N-1	<8	<8	14.4	<8	<8	<8	<8	<8	<8	16	Under Review
MARTELL 60kV	P1-2:A11:75:.. VALLEY SPRINGS-MARTELL #1 60KV [8240]	P1	N-1	13	13	<8	<8	<8	<8	<8	<8	13	N/A	Existing Procedure

Study Area: **PG&E Central Valley**



*Transient Stability*

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Sensitivity	
In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2019-20 Transmission Planning Process for transient stability studies:									
<a href="http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf">http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf</a>									

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)													Potential Mitigation Solutions	
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2032 SP with Additional Transportation Electrification		

No single contingency resulted in total load drop of more than 250 MW

Study Area: **PG&E Central Valley**

**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)													Potential Mitigation Solutions
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2032 SP with Additional Transportation Electrification	

No single source substation with more than 100 MW

2022-2023 ISO Reliability Assessment - Study Results

Study Area: PG&E Central Coast/Los Padres

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
35901 GREENVALLEY 115 35646 MRGN HIL 115 1 1	P5-5C:A19:1:_MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundent battery supply	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Continue to monitor
35922 MOSSLNSW 115 35927 DOLAN J1 115 1 1	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	126	Continue to monitor
35922 MOSSLNSW 115 35928 DOLAN J2 115 1 1	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	118	Continue to monitor
36025 SALINAS2 60.0 36027 SALINAS1 60.0 1 1	P1-3:A19:21:_SALINAS 115/60KV TB 3	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	133	Continue to monitor
36025 SALINAS2 60.0 36027 SALINAS1 60.0 1 1	P2-2:A19:7:_SALINAS 115KV SECTION 2D	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	133	Continue to monitor
36025 SALINAS2 60.0 36027 SALINAS1 60.0 1 1	P5-5A:A19:1:_SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundent battery supply	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Continue to monitor
36025 SALINAS2 60.0 36027 SALINAS1 60.0 1 1	P5-5C:A19:1:_MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundent battery supply	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Continue to monitor
AECCEORTP-ZACA 115 kv	P2-4:A20:5:_MESA_PGE 115KV - SECTION 2D & 1D	P2	Bus/Breaker	Diverge	Diverge	Diverge	Diverge	36	Diverge	Diverge	Diverge	0	Diverge	Diverge	NA	Existing UVLS	
AECCEORTP-ZACA 115 kv	P5-5C:A20:7:_MESA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	Diverge	36	Diverge	Diverge	Diverge	0	Diverge	Diverge	NA	Install redundant battery supply	
AECCEORTP-ZACA 115 kv	P1-2:A20:24:_MESA_PGE-SNTA MRA 115KV [0] & P1-2:A20:23:_MESA-SISQUOC 115KV [2460]	P6	N-1-1	11	30	121	27	21	21	12	20	38	30	31	NA	Continue to monitor	
AECCEORTP-ZACA 115 kv	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7	DCTL	64	48	58	144	35	87	49	57	22	120	48	NA	Generation redispatch	
Atascadero-Cayucos 70 kv Line	P2-4:A20:3:_MORROBAY 230KV - SECTION 1D & 1E	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor	
Atascadero-Cayucos 70 kv Line	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	70	Diverge	Diverge	Diverge	80	Diverge	Diverge	NConv	Install redundant relay	
Atascadero-Cayucos 70 kv Line	P5-5C:A20:3:_MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	Diverge	62	Diverge	Diverge	Diverge	73	Diverge	Diverge	NConv	Install redundant battery supply	
Atascadero-San Luis Obispo 70 kv Line	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	53	Diverge	Diverge	Diverge	63	Diverge	Diverge	NConv	Install redundant relay	
Atascadero-San Luis Obispo 70 kv Line	P5-5C:A20:3:_MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	Diverge	47	Diverge	Diverge	Diverge	62	Diverge	Diverge	NConv	Install redundant battery supply	
Baywood-San Luis Obispo 70 kv Line	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundent battery supply	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Continue to monitor	
Baywood-San Luis Obispo 70 kv Line	P5-5C:A20:3:_MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundent battery supply	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Continue to monitor	
CABRILLO-SW149CBOSNYZ 115 kv	P1-2:A20:24:_MESA_PGE-SNTA MRA 115KV [0] & P1-2:A20:23:_MESA-SISQUOC 115KV [2460]	P6	N-1-1	16	55	168	33	31	24	26	37	36	35	56	NA	Continue to monitor	
Callender Sw. Sta-Mesa 115 kv Line	P2-4:A20:4:_MORROBAY 230KV - SECTION 1E & 2E	P2	Bus/Breaker	120	Diverge	Diverge	161	85	99	115	Diverge	66	138	160	0	Existing UVLS	
Callender Sw. Sta-Mesa 115 kv Line	P5-5A:A20:1:_MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	96	0	0	137	78	86	94	69	57	121	127	0	Install redundant relay	
Callender Sw. Sta-Mesa 115 kv Line	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	0	Diverge	Diverge	Diverge	80	Diverge	Diverge	NConv	Install redundant relay	
Callender Sw. Sta-Mesa 115 kv Line	P5-5C:A20:3:_MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	Diverge	0	Diverge	Diverge	Diverge	80	Diverge	Diverge	NConv	Install redundant battery supply	
Callender Sw. Sta-Mesa 115 kv Line	P1-2:A20:15:_DIABLO-MESA 230KV [4620] & P1-2:A20:7:_MORRO BAY-MESA 230KV [5290]	P6	N-1-1	12	136	Diverge	142	80	93	105	Diverge	61	132	140	NA	Existing UVLS	
Callender Sw. Sta-Mesa 115 kv Line	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kv Lines	P7	DCTL	112	143	Diverge	154	83	97	107	Diverge	66	139	146	0	Existing UVLS	
Callender Sw. Sta-Mesa 115 kv Line	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kv Lines	P7	DCTL	106	136	Diverge	148	80	93	104	Diverge	61	132	140	0	Existing UVLS	
Coalinga #1-San Miguel 70 kv Line	P1-2:A20:35:_PASO ROBLES-TEMPLETON 70KV [9400]	P1	N-1	193	24	58	207	25	145	2	3	183	204	24	NA	Project: Estrella substation project	
Coalinga #1-San Miguel 70 kv Line	P1-2:A20:2:_TEMPLETON-GATES 230KV [5934] & P1-2:A20:46:_ESTRELLA-CALFLATSS #1 230KV [0]	P6	N-1-1	N/A	74	113	N/A	50	N/A	17	20	N/A	N/A	68	NA	Review PasoRobles UVLS	
Crazy Horse-Moss Landing #1 115 kv Line	P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	51	89	103	46	38	36	44	56	50	46	90	NA	Continue to monitor	
Crazy Horse-Moss Landing #1 115 kv Line	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	51	89	103	46	38	36	44	56	50	46	90	118	Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Crazy Horse-Moss Landing #2 115 kV Line	P1-2:A19:22:_SALINAS-MOSSLSNW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	53	91	107	49	40	38	47	58	52	49	93	NA	Continue to monitor	
Crazy Horse-Moss Landing #2 115 kV Line	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	53	91	107	49	40	38	47	58	52	49	93	122	Continue to monitor	
Crazy Horse-Natividad #1 115 kV Line	P2-1:A19:20:_MOSS LANDING-SALINAS #1 115KV [2880] (MOSSLSNW-DOLAN J1)	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Continue to monitor	
Crazy Horse-Natividad #1 115 kV Line	P5-5C:A19:1:_MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0	Diverge	Diverge	0	36	0	Diverge	Diverge	0	0	Diverge	NConv	Install redundant battery supply	
Crazy Horse-Natividad #1 115 kV Line	P1-2:A19:22:_SALINAS-MOSSLSNW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	106	176	203	96	67	64	78	99	99	96	179	NA	Previously proposed RAS	
Crazy Horse-Natividad #1 115 kV Line	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	106	176	203	96	67	64	78	99	99	96	179	231	Previously proposed RAS	
Crazy Horse-Natividad #1 115 kV Line	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	72	126	139	68	63	43	53	62	67	68	128	112	Previously proposed RAS	
Crazy Horse-Soledad 115 kV Line	P2-1:A19:20:_MOSS LANDING-SALINAS #1 115KV [2880] (MOSSLSNW-DOLAN J1)	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Continue to monitor	
Crazy Horse-Soledad 115 kV Line	P5-5C:A19:1:_MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0	Diverge	Diverge	0	36	0	Diverge	Diverge	0	0	Diverge	NConv	Install redundant battery supply	
Crazy Horse-Soledad 115 kV Line	P1-2:A19:22:_SALINAS-MOSSLSNW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	106	176	203	96	67	64	78	99	99	96	179	NA	Previously proposed RAS	
Crazy Horse-Soledad 115 kV Line	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	106	176	203	96	67	64	78	99	99	96	179	231	Previously proposed RAS	
Crazy Horse-Soledad 115 kV Line	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	72	126	139	68	63	43	53	62	67	68	128	112	Previously proposed RAS	
Divide-Cabrillo 115 kV Line No. 1	P1-2:A20:24:_MESA_PGE-SNTA MRA 115KV [0] & P1-2:A20:23:_MESA-SISQUOC 115KV [2460]	P6	N-1-1	24	61	174	40	38	29	31	41	43	42	62	NA	Existing UVLS	
ESTRELLA-PSA RBLs 70 kV	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant battery supply	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Continue to monitor	
ESTRELLA-PSA RBLs 70 kV	P5-5C:A20:3:_MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant battery supply	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Continue to monitor	
ESTRELLA-PSA RBLs 70 kV	P1-2:A20:2:_TEMPLETON-GATES 230KV [5934] & P1-2:A20:3:_MORRO BAY-TEMPLETON 230KV [5933]	P6	N-1-1	N/A	110	61	N/A	33	N/A	45	55	N/A	N/A	111	NA	Review PasoRobles UVLS	
ESTRELLA-PSA RBLs 70 kV	P7-1:A20:12:_Morro Bay-CalFlats SS and Templeton-Gates 230 kV Lines	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110	Continue to monitor	
Green Valley 115/60 Transformer #1	P5-5A:A19:1:_SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	222	Diverge	Diverge	217	242	215	222	220	224	216	Diverge	NConv	Install redundant relay	
Green Valley 115/60 Transformer #1	P5-5C:A19:1:_MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant battery supply	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Continue to monitor	
Green Valley 115/60 Transformer #1	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor	
Green Valley 115/60 Transformer #2	P5-5C:A19:1:_MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0	Diverge	Diverge	0	Diverge	0	Diverge	Diverge	0	0	Diverge	NA	Install redundant battery supply	
Green Valley-Morgan Hill 115 kV Line	P5-5C:A19:1:_MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	N/A	Diverge	Diverge	N/A	Diverge	N/A	Diverge	Diverge	N/A	N/A	Diverge	NA	Install redundant battery supply	
Green Valley-Watsonville 60 kV	P5-5A:A19:1:_SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	169	Diverge	Diverge	164	180	126	130	131	168	163	Diverge	NConv	Install redundant relay	
Green Valley-Watsonville 60 kV	P5-5C:A19:1:_MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0	Diverge	Diverge	0	Diverge	0	Diverge	Diverge	0	0	Diverge	NConv	Install redundant battery supply	
Green Valley-Watsonville 60 kV	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	140	9	34	143	30	100	32	26	97	143	13	NA	Project: Morgan Hill area reinforcement	
King City-Coburn #2 60 kV Line	P1-2:A19:50:_COBURN-KING CTY 60KV [0]	P1	N-1	82	102	89	53	94	35	41	50	71	53	103	NA	Coburn 60kv bus reliability improvement	
Lagunitas 60 kV Tap	Base Case	P0	Normal	56	87	109	50	23	31	35	44	45	50	88	124	Continue to monitor	
Lagunitas 60 kV Tap	P5-5A:A19:1:_SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	214	Diverge	Diverge	228	235	173	183	169	217	227	Diverge	NConv	Install redundant relay	
Lagunitas 60 kV Tap	P5-5C:A19:1:_MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0	Diverge	Diverge	0	Diverge	0	Diverge	Diverge	0	0	Diverge	NConv	Install redundant battery supply	

2022-2023 ISO Reliability Assessment - Study Results

Study Area: **PG&E Central Coast/Los Padres**

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Lagunitas 60 kV Tap	P1-2:A19:22:_SALINAS-MOSSLSNW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	56	87	104	50	23	31	35	48	45	50	88	NA	Continue to monitor	
Lagunitas 60 kV Tap	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	267	91	78	255	84	190	84	71	198	253	99	NA	Project: Morgan Hill area reinforcement	
Lagunitas 60 kV Tap	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	50	78	104	45	20	29	32	45	40	45	78	122	Continue to monitor	
Lagunitas 60 kV Tap	P7-1:A19:7:_Crazy Horse - San Benito & Crazy Horse - Hollister 115 kV Lines	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	108	Continue to monitor	
Mesa-Santa Maria 115 kV Line	P1-2:A20:23:_MESA-SISQUOC 115KV [2460]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor	
Mesa-Santa Maria 115 kV Line	P1-3:A20:5:_MORROBAY 230/115KV TB 6	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	108	Continue to monitor	
Mesa-Santa Maria 115 kV Line	P2-1:A20:15:_MESA-SISQUOC 115KV [2460] (MESA_PGE-S.M.ASSO)	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor	
Mesa-Santa Maria 115 kV Line	P2-1:A20:17:_MESA-SISQUOC 115KV [2460] (S.M.ASSO-SISQUOC)	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor	
Mesa-Santa Maria 115 kV Line	P2-2:A20:10:_MESA_PGE 115KV SECTION 2D	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Continue to monitor	
Mesa-Santa Maria 115 kV Line	P2-3:A20:11:_MORRO BY - 1D 115KV & MORRO BAY-SAN LUIS OBISPO #1 LINE	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor	
Mesa-Santa Maria 115 kV Line	P2-3:A20:15:_MESA_PGE - 2D 115KV & MESA-SISQUOC LINE	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110	Continue to monitor	
Mesa-Santa Maria 115 kV Line	P1-2:A20:23:_MESA-SISQUOC 115KV [2460] & P1-3:A20:5:_MORROBAY 230/115KV TB 6	P6	N-1-1	70	100	124	72	64	62	67	87	64	75	101	NA	Continue to monitor	
Mesa-Santa Maria 115 kV Line	P7-1:A20:9:_Mesa-Sisquoc and Callender Sw Sta-Mesa 115 kV Lines	P7	DCTL	72	80	102	57	56	48	52	72	53	59	83	113	Continue to monitor	
Mesa-Sisquoc 115 kV Line	P7-1:A20:8:_Mesa-Santa Maria & San Luis Obispo-Santa Maria 115 kV Lines	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor	
Morro Bay 230/115 Transformer No. 6	P2-4:A20:4:_MORROBAY 230KV - SECTION 1E & 2E	P2	Bus/Breaker	114	Diverge	Diverge	117	61	78	87	Diverge	68	120	138	72	Existing UVLS / Project: Mesa BESS	
Morro Bay 230/115 Transformer No. 6	P2-4:A20:5:_MESA_PGE 115KV - SECTION 2D & 1D	P2	Bus/Breaker	Diverge	Diverge	Diverge	Diverge	79	Diverge	Diverge	Diverge	67	Diverge	Diverge	73	Existing UVLS / Project: Mesa BESS	
Morro Bay 230/115 Transformer No. 6	P5-5A:A20:1:_MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	113	121	67	124	77	79	89	77	70	119	139	72	Install redundant relay	
Morro Bay 230/115 Transformer No. 6	P5-5C:A20:7:_MESA 230-115KV BATT (FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	Diverge	79	Diverge	Diverge	Diverge	67	Diverge	Diverge	73	Install redundant battery supply	
Morro Bay 230/115 Transformer No. 6	P1-2:A20:15:_DIABLO-MESA 230KV [4620] & P1-2:A20:7:_MORRO BAY-MESA 230KV [5290]	P6	N-1-1	57	142	Diverge	127	77	83	93	Diverge	73	123	145	NA	Existing UVLS / Project: Mesa BESS	
Morro Bay 230/115 Transformer No. 6	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7	DCTL	121	143	Diverge	129	79	84	95	Diverge	75	126	146	72	Existing UVLS / Project: Mesa BESS	
Morro Bay 230/115 Transformer No. 6	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7	DCTL	118	142	Diverge	127	77	83	93	Diverge	73	123	146	72	Existing UVLS / Project: Mesa BESS	
Morro Bay-Mesa 230 kV Line	P2-4:A20:3:_MORROBAY 230KV - SECTION 1D & 1E	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	Continue to monitor	
Morro Bay-SLO 115 kV Line No. 1	P1-2:A20:15:_DIABLO-MESA 230KV [4620] & P1-2:A20:7:_MORRO BAY-MESA 230KV [5290]	P6	N-1-1	33	87	Diverge	78	48	50	57	27	45	77	89	NA	Existing UVLS	
Morro Bay-SLO 115 kV Line No. 2	P1-2:A20:15:_DIABLO-MESA 230KV [4620] & P1-2:A20:7:_MORRO BAY-MESA 230KV [5290]	P6	N-1-1	34	88	Diverge	79	48	65	74	36	44	78	90	NA	Existing UVLS	
Moss Landing-Del Monte #2 115 kV Line	P2-1:A19:19:_MOSS LANDING-DEL MONTE #1 115KV [2830] (MOSSLNSW-CSTRVLJ1)	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	Continue to monitor	
Moss Landing-Salinas #1 115 kV Line	P1-2:A19:18:_MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE & P1-2:A19:19:_MOSS LANDING-CRAZY HORSE CANYON #2 115KV [2983]	P6	N-1-1	52	89	103	47	39	37	46	56	51	48	91	NA	Continue to monitor	
Moss Landing-Salinas #1 115 kV Line	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	52	89	103	48	39	37	46	56	51	48	91	117	Continue to monitor	
Moss Landing-Salinas #2 115 kV Line	P1-2:A19:18:_MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE & P1-2:A19:19:_MOSS LANDING-CRAZY HORSE CANYON #2 115KV [2983]	P6	N-1-1	52	90	103	48	40	38	46	57	51	48	92	NA	Continue to monitor	



2022-2023 ISO Reliability Assessment - Study Results

Study Area: **PG&E Central Coast/Los Padres**

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Moss Landing-Salinas #2 115 kV Line	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	52	90	103	48	40	38	46	57	51	48	92	118	Continue to monitor	
MOSSLNSW-DOLAN J1 115 kV	P1-2:A19:18:_MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE & P1-2:A19:19:_MOSS LANDING-CRAZY HORSE CANYON #2 115KV [2983]	P6	N-1-1	59	96	111	53	43	43	52	64	56	53	98	NA	Continue to monitor	
MOSSLNSW-DOLAN J1 115 kV	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	59	96	111	53	43	43	52	64	56	53	98	NA	Continue to monitor	
MOSSLNSW-DOLAN J2 115 kV	P1-2:A19:18:_MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE & P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0]	P6	N-1-1	60	96	110	54	43	44	53	65	56	54	98	NA	Continue to monitor	
MOSSLNSW-DOLAN J2 115 kV	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	52	90	103	48	40	39	47	58	51	48	91	NA	Continue to monitor	
MOSSLNSW-MOSSLNSW 230\115 kV	P1-3:A19:7:_MOSSLNSW 230/115KV TB 1 & P1-3:A19:8:_MOSSLNSW 230/115KV TB 2	P6	N-1-1	65	92	101	54	45	52	58	82	45	54	95	NA	Continue to monitor	
Oceano-Callender Sw. Sta 115 kV Line	P2-4:A20:4:_MORROBAY 230KV - SECTION 1E & 2E	P2	Bus/Breaker	121	Diverge	Diverge	159	81	97	113	Diverge	64	136	160	3	Existing UVLS	
Oceano-Callender Sw. Sta 115 kV Line	P5-5A:A20:1:_MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	95	4	2	135	75	84	92	68	56	119	126	NA	Install redundant relay	
Oceano-Callender Sw. Sta 115 kV Line	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	3	Diverge	Diverge	Diverge	79	Diverge	Diverge	NConv	Install redundant relay	
Oceano-Callender Sw. Sta 115 kV Line	P5-5C:A20:3:_MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	Diverge	3	Diverge	Diverge	Diverge	78	Diverge	Diverge	NConv	Install redundant battery supply	
Oceano-Callender Sw. Sta 115 kV Line	P1-2:A20:15:_DIABLO-MESA 230KV [4620] & P1-2:A20:7:_MORRO BAY-MESA 230KV [5290]	P6	N-1-1	14	135	Diverge	141	76	90	102	Diverge	60	131	139	NA	Existing UVLS	
Oceano-Callender Sw. Sta 115 kV Line	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7	DCTL	114	143	Diverge	153	79	94	105	Diverge	63	137	146	3	Existing UVLS	
Oceano-Callender Sw. Sta 115 kV Line	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7	DCTL	105	135	Diverge	146	76	90	101	Diverge	60	131	140	3	Existing UVLS	
S.M.ASSO-Sisquoc 115 kV Line	P7-1:A20:8:_Mesa-Santa Maria & San Luis Obispo-Santa Maria 115 kV Lines	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor	
Salinas 115/60 kV Bank #2	P1-3:A19:21:_SALINAS 115/60KV TB 3	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor	
Salinas 115/60 kV Bank #2	P2-2:A19:7:_SALINAS 115KV SECTION 2D	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor	
Salinas-Firestone #1 60 kV Line	Base Case	P0	Normal	66	114	120	64	64	44	47	54	87	63	114	128	Review project: Salinas- Firestone #1 and #2 reconductor	
Salinas-Firestone #1 60 kV Line	P1-2:A19:38:_SALINAS-FIRESTONE #2 60KV [7910]	P1	N-1	108	97	104	114	57	90	45	52	149	114	97	174	Review project: Salinas- Firestone #1 and #2 reconductor	
Salinas-Firestone #1 60 kV Line	P2-3:A19:25:_MOSSLNSW 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	58	102	120	56	56	42	44	50	76	56	103	NA	Review project: Salinas- Firestone #1 and #2 reconductor	
Salinas-Firestone #1 60 kV Line	P1-2:A19:18:_MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE & P1-2:A19:19:_MOSS LANDING-CRAZY HORSE CANYON #2 115KV [2983]	P6	N-1-1	66	115	121	64	64	44	47	54	87	63	103	NA	Review project: Salinas- Firestone #1 and #2 reconductor	
Salinas-Firestone #1 60 kV Line	P1-2:A19:16:_CRAZY HORSE CANYON-SALINAS-SOLEDAD #2 115KV [2910] & P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0]	P6	N-1-1	59	96	114	57	59	40	43	50	80	57	97	NA	Review project: Salinas- Firestone #1 and #2 reconductor	
Salinas-Firestone #1 60 kV Line	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	58	102	114	56	56	42	44	51	78	56	103	124	Review project: Salinas- Firestone #1 and #2 reconductor	
Salinas-Firestone #1 60 kV Line	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	58	102	120	56	56	42	44	51	76	56	103	NA	Review project: Salinas- Firestone #1 and #2 reconductor	
Salinas-Firestone #1 60 kV Line	P7-1:A19:7:_Crazy Horse - San Benito & Crazy Horse - Hollister 115 kV Lines	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor	
Salinas-Firestone #1 60 kV Line	P7-1:A19:7:_Crazy Horse - San Benito & Crazy Horse - Hollister 115 kV Lines	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor	
Salinas-Firestone #2 60 kV Line	P1-2:A19:37:_SALINAS1-FIRESTONE 60KV [0]	P1	N-1	109	98	107	115	56	90	45	52	151	115	98	175	Review project: Salinas- Firestone #1 and #2 reconductor	
Salinas-Firestone #2 60 kV Line	P1-2:A19:45:_SALINAS-FIRESTONE #2 60KV [7910] (2)	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	115	Continue to monitor	
Salinas-Firestone #2 60 kV Line	P1-2:A19:38:_SALINAS-FIRESTONE #2 60KV [7910]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	108	Continue to monitor	
Salinas-Firestone #2 60 kV Line	P1-2:A19:45:_SALINAS-FIRESTONE #2 60KV [7910] (2)	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Salinas-Firestone #2 60 kV Line	P1-2:A19:45:_SALINAS-FIRESTONE #2 60KV [7910] (2)	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Continue to monitor
Salinas-Firestone #2 60 kV Line	P1-2:A19:38:_SALINAS-FIRESTONE #2 60KV [7910]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	108	Continue to monitor
San Luis Obispo 115/70 kV Trans No. 3	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant battery supply	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Continue to monitor
San Luis Obispo-Oceano 115 kV Line	P2-4:A20:4:_MORROBAY 230KV - SECTION 1E & 2E	P2	Bus/Breaker	116	Diverge	Diverge	142	83	91	109	Diverge	58	125	154	48	Existing UVLS	
San Luis Obispo-Oceano 115 kV Line	P5-5A:A20:1:_MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	101	32	42	127	78	83	95	76	52	114	130	48	Install redundant relay	
San Luis Obispo-Oceano 115 kV Line	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	30	Diverge	Diverge	Diverge	70	Diverge	Diverge	NConv	Install redundant relay	
San Luis Obispo-Oceano 115 kV Line	P5-5C:A20:3:_MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	Diverge	31	Diverge	Diverge	Diverge	69	Diverge	Diverge	NConv	Install redundant battery supply	
San Luis Obispo-Oceano 115 kV Line	P1-2:A20:15:_DIABLO-MESA 230KV [4620] & P1-2:A20:7:_MORRO BAY-MESA 230KV [5290]	P6	N-1-1	34	134	Diverge	129	79	85	101	Diverge	55	121	139	NA	Existing UVLS	
San Luis Obispo-Oceano 115 kV Line	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7	DCTL	112	139	Diverge	137	81	89	103	Diverge	58	125	142	48	Existing UVLS	
San Luis Obispo-Oceano 115 kV Line	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7	DCTL	107	134	Diverge	133	79	85	100	Diverge	55	121	140	48	Existing UVLS	
San Luis Obispo-Santa Maria 115 kV Line	P2-4:A20:4:_MORROBAY 230KV - SECTION 1E & 2E	P2	Bus/Breaker	154	Diverge	Diverge	192	112	118	139	Diverge	82	169	204	0	Existing UVLS	
San Luis Obispo-Santa Maria 115 kV Line	P2-4:A20:5:_MESA_PGE 115KV - SECTION 2D & 1D	P2	Bus/Breaker	Diverge	Diverge	Diverge	Diverge	173	Diverge	Diverge	Diverge	0	Diverge	Diverge	0	Existing UVLS	
San Luis Obispo-Santa Maria 115 kV Line	P2-2:A20:6:_MORROBAY 230KV SECTION 2E	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor	
San Luis Obispo-Santa Maria 115 kV Line	P2-3:A20:7:_MESA PGE 230KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor	
San Luis Obispo-Santa Maria 115 kV Line	P5-5A:A20:1:_MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	135	0	0	172	105	108	121	96	74	155	173	0	Install redundant relay	
San Luis Obispo-Santa Maria 115 kV Line	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	0	Diverge	Diverge	Diverge	96	Diverge	Diverge	NConv	Install redundant relay	
San Luis Obispo-Santa Maria 115 kV Line	P5-5C:A20:3:_MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	Diverge	0	Diverge	Diverge	Diverge	95	Diverge	Diverge	NConv	Install redundant battery supply	
San Luis Obispo-Santa Maria 115 kV Line	P5-5C:A20:7:_MESA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	Diverge	174	Diverge	Diverge	Diverge	0	Diverge	Diverge	0	Install redundant battery supply	
San Luis Obispo-Santa Maria 115 kV Line	P1-2:A20:15:_DIABLO-MESA 230KV [4620] & P1-2:A20:7:_MORRO BAY-MESA 230KV [5290]	P6	N-1-1	42	178	Diverge	174	106	111	129	Diverge	78	164	184	NA	Existing UVLS	
San Luis Obispo-Santa Maria 115 kV Line	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7	DCTL	147	183	Diverge	186	110	115	131	Diverge	82	169	188	0	Existing UVLS	
San Luis Obispo-Santa Maria 115 kV Line	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7	DCTL	141	178	Diverge	181	106	111	128	Diverge	78	164	185	0	Existing UVLS	
San Miguel-Paso Robles 70 kV Line	P1-2:A20:35:_PASO ROBLES-TEMPLETON 70KV [9400]	P1	N-1	158	N/A	N/A	169	N/A	122	N/A	N/A	158	167	N/A	NA	Project: Estrella substation project	
Santa Maria-Sisquoc 115 kV Line	P2-4:A20:5:_MESA_PGE 115KV - SECTION 2D & 1D	P2	Bus/Breaker	Diverge	Diverge	Diverge	Diverge	83	Diverge	Diverge	Diverge	0	Diverge	Diverge	0	Existing UVLS	
Santa Maria-Sisquoc 115 kV Line	P5-5C:A20:7:_MESA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	Diverge	106	Diverge	Diverge	Diverge	0	Diverge	Diverge	0	Install redundant battery supply	
Sisquoc-Santa Ynez 115 kV	P2-4:A20:5:_MESA_PGE 115KV - SECTION 2D & 1D	P2	Bus/Breaker	Diverge	Diverge	Diverge	Diverge	43	Diverge	Diverge	Diverge	0	Diverge	Diverge	NA	Existing UVLS	
Sisquoc-Santa Ynez 115 kV	P5-5C:A20:7:_MESA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	Diverge	43	Diverge	Diverge	Diverge	0	Diverge	Diverge	NA	Install redundant battery supply	
Sisquoc-Santa Ynez 115 kV	P1-2:A20:24:_MESA_PGE-SNTA MRA 115KV [0] & P1-2:A20:23:_MESA-SISQUOC 115KV [2460]	P6	N-1-1	25	23	111	14	18	13	6	13	24	18	24	NA	Continue to monitor	
Sisquoc-Santa Ynez 115 kV	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7	DCTL	77	55	65	158	43	97	55	63	36	134	55	NA	Continue to monitor	
Sisquoc-Santa Ynez Sw.Sta. 115 kV Line	P2-4:A20:5:_MESA_PGE 115KV - SECTION 2D & 1D	P2	Bus/Breaker	Diverge	Diverge	Diverge	Diverge	46	Diverge	Diverge	Diverge	0	Diverge	Diverge	NA	Existing UVLS	
Sisquoc-Santa Ynez Sw.Sta. 115 kV Line	P2-4:A20:5:_MESA_PGE 115KV - SECTION 2D & 1D	P2	Bus/Breaker	Diverge	Diverge	Diverge	Diverge	35	Diverge	Diverge	Diverge	0	Diverge	Diverge	NA	Existing UVLS	
Sisquoc-Santa Ynez Sw.Sta. 115 kV Line	P5-5C:A20:7:_MESA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	Diverge	47	Diverge	Diverge	Diverge	0	Diverge	Diverge	NA	Install redundant battery supply	
Sisquoc-Santa Ynez Sw.Sta. 115 kV Line	P1-2:A20:24:_MESA_PGE-SNTA MRA 115KV [0] & P1-2:A20:23:_MESA-SISQUOC 115KV [2460]	P6	N-1-1	7	34	127	37	21	29	14	22	49	41	35	NA	Continue to monitor	



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Sisquoc-Santa Ynez Sw.Sta. 115 kV Line	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7	DCTL	83	58	70	163	45	101	57	65	42	138	58	NA	Continue to monitor	
SW149CBOSNYZ-SANTAYNEZSS 115 kV	P1-2:A20:24:_MESA_PGE-SNTA MRA 115KV [0] & P1-2:A20:23:_MESA-SISQUOC 115KV [2460]	P6	N-1-1	16	55	169	33	31	24	26	37	37	35	56	NA	Continue to monitor	
Tembler-San Luis Obispo 115 kV Line	P2-4:A20:4:_MORROBAY 230KV - SECTION 1E & 2E	P2	Bus/Breaker	92	Diverge	Diverge	138	114	71	88	Diverge	41	88	128	NA	Existing UVLS	
Tembler-San Luis Obispo 115 kV Line	P2-2:A20:4:_MORROBAY 230KV SECTION 1D	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor	
Tembler-San Luis Obispo 115 kV Line	P2-4:A20:3:_MORROBAY 230KV - SECTION 1D & 1E	P2	Bus/Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	128	Continue to monitor	
Tembler-San Luis Obispo 115 kV Line	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	2	Diverge	Diverge	Diverge	132	Diverge	Diverge	NConv	Install redundant relay	
Tembler-San Luis Obispo 115 kV Line	P5-5C:A20:3:_MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	Diverge	2	Diverge	Diverge	Diverge	129	Diverge	Diverge	NConv	Install redundant battery supply	
Tembler-San Luis Obispo 115 kV Line	P5-5C:A20:4:_SOLAR SW STA 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	61	78	59	103	89	51	63	77	17	56	85	NA	Install redundant battery supply	
Tembler-San Luis Obispo 115 kV Line	P5-5C:A20:5:_CALIENTE 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	61	77	58	103	34	51	63	77	12	56	84	NA	Install redundant battery supply	
Tembler-San Luis Obispo 115 kV Line	P1-2:A20:4:_MORRO BAY-SOLAR SW STA #1 230KV [5300] & P1-2:A20:5:_MORRO BAY-SOLAR SW STA #2 230KV [5310]	P6	N-1-1	46	78	60	101	97	51	63	78	26	56	85	NA	Continue to monitor	
Tembler-San Luis Obispo 115 kV Line	P7-1:A10:14:_SOLARSS-CALNTESS 230 kV Line No. 1 & 2	P7	DCTL	61	77	58	103	38	51	63	77	11	56	84	NA	Continue to monitor	
Tembler-San Luis Obispo 115 kV Line	P7-1:A20:13:_MORROBAY-SOLARSS 230 kV Line No. 1 & 2	P7	DCTL	61	78	60	103	97	51	63	78	26	56	85	NA	Continue to monitor	
Tembler-San Luis Obispo 115 kV Line	P7-1:A20:15:_MIDWAY-CALNTESS 230 kV Line No. 1 & 2	P7	DCTL	61	77	58	103	13	51	64	77	12	56	84	NA	Continue to monitor	
Tembler-San Luis Obispo 115 kV Line	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7	DCTL	71	89	Diverge	103	69	55	65	Diverge	26	75	95	NA	Existing UVLS	
Tembler-San Luis Obispo 115 kV Line	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7	DCTL	70	88	Diverge	101	68	54	64	Diverge	25	73	94	NA	Existing UVLS	
Tembler-San Luis Obispo 115 kV Line	P7-1:A20:11:_Morro Bay-CalFlats SS and Morro Bay-Templeton 230 kV Lines	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor	
Tembler-San Luis Obispo 115 kV Line	P7-1:A20:12:_Morro Bay-CalFlats SS and Templeton-Gates 230 kV Lines	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor	
Templeton 230/70 kV Transformer	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	27	Diverge	Diverge	Diverge	67	Diverge	Diverge	NConv	Install redundant relay	
Templeton 230/70 kV Transformer	P5-5C:A20:3:_MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	Diverge	25	Diverge	Diverge	Diverge	67	Diverge	Diverge	NConv	Install redundant battery supply	
Templeton-Atascadero 70 kV Line	P5-5A:A20:6:_MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	68	Diverge	Diverge	Diverge	84	Diverge	Diverge	NConv	Install redundant relay	
Templeton-Atascadero 70 kV Line	P5-5C:A20:3:_MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	Diverge	63	Diverge	Diverge	Diverge	82	Diverge	Diverge	NConv	Install redundant battery supply	
Watsonville-Salinas 60 kV	P5-5A:A19:1:_SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	230	Diverge	Diverge	222	248	174	179	178	231	221	Diverge	NConv	Install redundant relay	
Watsonville-Salinas 60 kV	P5-5C:A19:1:_MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0	Diverge	Diverge	0	Diverge	0	Diverge	Diverge	0	0	Diverge	NConv	Install redundant battery supply	
Watsonville-Salinas 60 kV	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	270	91	78	257	84	191	84	71	200	257	99	NA	Project: Morgan Hill area reinforcement	

Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
MESA PGE 230 kV	Base Case	P0	Normal	High	1.02	1.03	1.01	1.03	1.06	1.02	1.04	1.02	1.04	1.03	1.02	NA	System adjustments or voltage support if needed	
HOLLISTR 115 kV	Base Case	P0	Normal	High	1.02	1.01	0.98	1.03	1.07	1.03	1.04	1.01	1.03	1.03	1.01	NA	System adjustments or voltage support if needed	
CRZY_H&1 115 kV	Base Case	P0	Normal	High	1.02	1.01	0.99	1.03	1.05	1.03	1.03	1.01	1.03	1.03	1.01	NA	System adjustments or voltage support if needed	
CRZY_H&1 115 kV	Base Case	P0	Normal	High	1.02	1.01	0.99	1.03	1.05	1.03	1.03	1.01	1.03	1.03	1.01	NA	System adjustments or voltage support if needed	
HLLT_TP 115 kV	Base Case	P0	Normal	High	1.02	1.01	0.98	1.03	1.07	1.03	1.04	1.01	1.03	1.03	1.01	NA	System adjustments or voltage support if needed	
HOLST D 115 kV	Base Case	P0	Normal	High	1.02	1.01	0.98	1.03	1.07	1.03	1.04	1.01	1.03	1.03	1.01	NA	System adjustments or voltage support if needed	
SNBENITO 115 kV	Base Case	P0	Normal	High	1.02	1.01	0.99	1.03	1.05	1.03	1.03	1.01	1.03	1.03	1.01	NA	System adjustments or voltage support if needed	
BIG BASN 60 kV	Base Case	P0	Normal	High	1.04	1.06	1.04	1.04	1.05	1.04	1.04	1.04	1.05	1.04	1.06	NA	System adjustments or voltage support if needed	
BURNS 60 kV	Base Case	P0	Normal	High	1.04	1.06	1.03	1.04	1.05	1.03	1.03	1.04	1.05	1.04	1.06	NA	System adjustments or voltage support if needed	
BURNS J2 60 kV	Base Case	P0	Normal	High	1.04	1.06	1.03	1.04	1.05	1.03	1.03	1.04	1.05	1.04	1.06	NA	System adjustments or voltage support if needed	
BURNS J1 60 kV	Base Case	P0	Normal	High	1.04	1.06	1.03	1.04	1.05	1.03	1.03	1.04	1.05	1.04	1.06	NA	System adjustments or voltage support if needed	
LONE STR 60 kV	Base Case	P0	Normal	High	1.04	1.06	1.03	1.04	1.05	1.03	1.03	1.04	1.05	1.04	1.05	NA	System adjustments or voltage support if needed	
LSTAR J 60 kV	Base Case	P0	Normal	High	1.04	1.06	1.03	1.04	1.05	1.03	1.03	1.04	1.05	1.04	1.05	NA	System adjustments or voltage support if needed	
PT MRTTI 60 kV	Base Case	P0	Normal	High	1.04	1.06	1.03	1.04	1.05	1.03	1.03	1.04	1.05	1.04	1.05	NA	System adjustments or voltage support if needed	
CRUSHER 60 kV	Base Case	P0	Normal	High	1.04	1.06	1.03	1.04	1.05	1.03	1.03	1.04	1.05	1.04	1.05	NA	System adjustments or voltage support if needed	
GREENVALLEY 60 kV	Base Case	P0	Normal	High	1.06	1.07	1.03	1.07	1.08	1.05	1.06	1.03	1.08	1.07	1.06	NA	System adjustments or voltage support if needed	
ERTA 60 kV	Base Case	P0	Normal	High	1.06	1.06	1.02	1.07	1.07	1.05	1.05	1.02	1.08	1.07	1.06	NA	System adjustments or voltage support if needed	
CIC JCT 60 kV	Base Case	P0	Normal	High	1.06	1.06	1.01	1.06	1.07	1.04	1.05	1.02	1.07	1.07	1.06	NA	System adjustments or voltage support if needed	
WTSNVLE 60 kV	Base Case	P0	Normal	High	1.06	1.06	1.01	1.06	1.07	1.04	1.05	1.01	1.07	1.06	1.06	NA	System adjustments or voltage support if needed	
ERTA JCT 60 kV	Base Case	P0	Normal	High	1.06	1.06	1.02	1.07	1.07	1.05	1.05	1.02	1.08	1.07	1.06	NA	System adjustments or voltage support if needed	
AGRILINK 60 kV	Base Case	P0	Normal	High	1.06	1.06	1.01	1.06	1.07	1.04	1.05	1.01	1.07	1.06	1.06	NA	System adjustments or voltage support if needed	
TEXCO J2 60 kV	Base Case	P0	Normal	High	1.02	1.02	1.02	1.05	1.03	1.02	1.04	1.02	1.03	1.05	1.02	NA	System adjustments or voltage support if needed	
TEXCO J1 60 kV	Base Case	P0	Normal	High	1.02	1.02	1.02	1.05	1.03	1.02	1.04	1.02	1.03	1.05	1.02	NA	System adjustments or voltage support if needed	
OILFLDS 60 kV	Base Case	P0	Normal	High	1.02	1.02	1.02	1.05	1.03	1.02	1.04	1.02	1.03	1.05	1.02	NA	System adjustments or voltage support if needed	
CHVSANARDO 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.02	1.06	1.03	1.01	1.05	1.02	1.04	1.06	1.03	NA	System adjustments or voltage support if needed	
SARG CYN 60 kV	Base Case	P0	Normal	High	1.02	1.02	1.02	1.05	1.03	1.02	1.04	1.02	1.03	1.05	1.02	NA	System adjustments or voltage support if needed	
SALN RVR 60 kV	Base Case	P0	Normal	High	1.03	1.03	1.02	1.06	1.03	1.02	1.05	1.02	1.04	1.06	1.03	NA	System adjustments or voltage support if needed	
AERA_ENG 60 kV	Base Case	P0	Normal	High	1.02	1.02	1.02	1.05	1.03	1.02	1.04	1.02	1.03	1.05	1.02	NA	System adjustments or voltage support if needed	
AERA_MTR 60 kV	Base Case	P0	Normal	High	1.02	1.02	1.02	1.05	1.03	1.02	1.04	1.02	1.03	1.05	1.02	NA	System adjustments or voltage support if needed	
AERA_TP1 60 kV	Base Case	P0	Normal	High	1.02	1.02	1.02	1.05	1.03	1.02	1.04	1.02	1.03	1.05	1.02	NA	System adjustments or voltage support if needed	
AERA_TP2 60 kV	Base Case	P0	Normal	High	1.02	1.02	1.02	1.05	1.03	1.02	1.04	1.02	1.03	1.05	1.02	NA	System adjustments or voltage support if needed	
AERA_TP3 60 kV	Base Case	P0	Normal	High	1.02	1.02	1.02	1.05	1.03	1.02	1.04	1.02	1.03	1.05	1.02	NA	System adjustments or voltage support if needed	
CHOLAME 70 kV	Base Case	P0	Normal	High	1.05	1.04	1.00	1.05	1.05	1.04	1.06	1.03	1.03	1.03	1.03	NA	System adjustments or voltage support if needed	
PSA RBL5 70 kV	Base Case	P0	Normal	High	1.02	1.03	0.98	1.05	1.05	1.04	1.03	1.01	1.03	1.03	1.03	NA	System adjustments or voltage support if needed	



Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)							Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast		2035 ATE
CMP EVRS 115 kV	P1-2:A19:11:_MOSS LANDING-GREEN VALLEY #1 115KV [2850] & P1-2:A19:13:_MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Low	0.26	1.01	0.90	0.31	1.04	0.33	1.01	0.99	0.52	0.31	1.01	NA	Project: Morgan Hill area reinforcement
ERTA 60 kV	P1-2:A19:11:_MOSS LANDING-GREEN VALLEY #1 115KV [2850] & P1-2:A19:13:_MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Low	0.33	1.05	1.00	0.37	1.07	0.41	1.04	1.02	0.57	0.38	1.05	NA	Project: Morgan Hill area reinforcement
GRANT RK 60 kV	P1-2:A19:11:_MOSS LANDING-GREEN VALLEY #1 115KV [2850] & P1-2:A19:13:_MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Low	0.55	1.01	0.96	0.59	1.02	0.61	1.02	0.98	0.69	0.59	1.01	NA	Project: Morgan Hill area reinforcement
GREENVALLEY 115 kV	P1-2:A19:11:_MOSS LANDING-GREEN VALLEY #1 115KV [2850] & P1-2:A19:13:_MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Low	0.27	1.01	0.98	0.31	1.04	0.34	1.01	1.00	0.52	0.31	1.00	NA	Project: Morgan Hill area reinforcement
GREENVALLEY 60 kV	P1-2:A19:11:_MOSS LANDING-GREEN VALLEY #1 115KV [2850] & P1-2:A19:13:_MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Low	0.31	1.05	1.00	0.35	1.08	0.39	1.04	1.02	0.56	0.36	1.05	NA	Project: Morgan Hill area reinforcement
PAUL SWT 115 kV	P1-2:A19:11:_MOSS LANDING-GREEN VALLEY #1 115KV [2850] & P1-2:A19:13:_MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Low	0.26	1.01	0.89	0.31	1.04	0.33	1.01	0.99	0.52	0.31	1.01	NA	Project: Morgan Hill area reinforcement
ROB ROY 115 kV	P1-2:A19:11:_MOSS LANDING-GREEN VALLEY #1 115KV [2850] & P1-2:A19:13:_MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Low	0.26	1.01	0.90	0.31	1.04	0.33	1.01	0.99	0.52	0.31	1.00	NA	Project: Morgan Hill area reinforcement
WTSNVLE 60 kV	P1-2:A19:11:_MOSS LANDING-GREEN VALLEY #1 115KV [2850] & P1-2:A19:13:_MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Low	0.37	1.05	0.99	0.41	1.07	0.44	1.04	1.01	0.59	0.41	1.05	NA	Project: Morgan Hill area reinforcement
CRZY_H&1 115 kV	P1-2:A19:18:_MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE & P1-2:A19:19:_MOSS LANDING-CRAZY HORSE CANYON #2 115KV [2983]	P6	N-1-1	Low	1.02	1.00	0.89	1.03	1.06	1.03	1.03	1.00	1.02	1.03	1.00	NA	Continue to monitor
HOLLISTR 115 kV	P1-2:A19:18:_MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE & P1-2:A19:19:_MOSS LANDING-CRAZY HORSE CANYON #2 115KV [2983]	P6	N-1-1	Low	1.02	1.00	0.88	1.03	1.07	1.03	1.03	1.00	1.02	1.03	0.99	NA	Continue to monitor
SNBENITO 115 kV	P1-2:A19:18:_MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE & P1-2:A19:19:_MOSS LANDING-CRAZY HORSE CANYON #2 115KV [2983]	P6	N-1-1	Low	1.02	1.00	0.89	1.03	1.06	1.03	1.03	1.00	1.02	1.03	1.00	NA	Continue to monitor
BNA VSTA 60 kV	P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	Low	0.98	0.97	0.90	0.99	1.01	0.99	1.01	0.98	0.98	0.99	0.97	NA	Continue to monitor
CAMPORA 60 kV	P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	Low	0.99	0.97	0.88	1.02	1.04	1.03	1.03	0.98	1.00	1.02	0.97	NA	Continue to monitor
FIRESTNE 60 kV	P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	Low	0.97	0.96	0.89	0.98	1.01	0.99	1.01	0.97	0.97	0.98	0.96	NA	Continue to monitor
GABILAN 60 kV	P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	Low	0.98	0.97	0.90	0.99	1.01	0.99	1.01	0.98	0.99	0.99	0.97	NA	Continue to monitor
GONZALES 60 kV	P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	Low	0.99	0.96	0.87	1.02	1.04	1.03	1.03	0.98	0.99	1.01	0.96	NA	Continue to monitor
LAURELES 60 kV	P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	Low	0.98	0.97	0.88	0.99	1.02	0.99	1.00	0.96	1.00	0.99	0.98	NA	Continue to monitor
OTTER 60 kV	P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	Low	0.97	0.96	0.87	0.99	1.01	0.98	0.99	0.95	1.00	0.98	0.97	NA	Continue to monitor
SALINAS 115 kV	P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	Low	1.01	0.99	0.88	1.02	1.04	1.02	1.02	1.00	1.02	1.02	0.99	NA	Continue to monitor
SLDAD 4M 115 kV	P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	Low	1.00	0.98	0.89	1.02	1.04	1.03	1.03	0.99	1.00	1.02	0.97	NA	Continue to monitor
SLDAD 5M 115 kV	P1-2:A19:22:_SALINAS-MOSSLNSW-DOLAN RD 115KV [0] & P1-2:A19:23:_MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	Low	1.00	0.98	0.89	1.02	1.04	1.03	1.03	0.99	1.00	1.02	0.97	NA	Continue to monitor



Study Area: **PG&E Central Coast/Los Padres**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)							Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast		2035 ATE
CRZY_H&1 115 kV	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	Low	1.00	0.96	0.89	1.02	1.07	1.02	1.02	0.97	1.00	1.02	0.95	0.87	Continue to monitor
CRZY_H&1 115 kV	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	Low	1.00	0.96	0.89	1.02	1.07	1.02	1.02	0.97	1.00	1.02	0.95	0.87	Continue to monitor
SOLEDAD 115 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.98	0.93	0.89	1.01	1.04	1.01	1.01	0.95	0.98	1.00	0.93	0.86	Continue to monitor
SALINAS 115 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.99	0.94	0.88	1.00	1.04	1.00	1.00	0.95	0.99	1.00	0.93	0.85	Continue to monitor
SLDAD 4M 115 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.98	0.93	0.89	1.00	1.04	1.01	1.01	0.95	0.98	1.00	0.93	0.86	Continue to monitor
SLDAD 5M 115 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.98	0.93	0.89	1.00	1.04	1.01	1.01	0.95	0.98	1.00	0.93	0.86	Continue to monitor
SNBENITO 115 kV	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	Low	1.00	0.95	0.89	1.02	1.07	1.02	1.02	0.97	1.00	1.02	0.95	0.87	Continue to monitor
GREENVALLEY 60 kV	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Low	0.32	1.00	0.93	0.36	1.09	0.39	1.01	0.96	0.56	0.36	1.00	NA	Project: Morgan Hill area reinforcement
ERTA 60 kV	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Low	0.34	1.00	0.93	0.38	1.09	0.41	1.01	0.95	0.57	0.38	1.00	0.90	Project: Morgan Hill area reinforcement
WTSNVLE 60 kV	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Low	0.37	1.00	0.92	0.41	1.08	0.44	1.00	0.95	0.59	0.41	0.99	0.90	Project: Morgan Hill area reinforcement
GRANT RK 60 kV	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Low	0.55	0.97	0.92	0.60	1.02	0.61	0.99	0.94	0.69	0.60	0.96	0.90	Project: Morgan Hill area reinforcement
AGRILINK 60 kV	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Low	0.37	1.00	0.92	0.41	1.08	0.44	1.00	0.95	0.59	0.41	0.99	0.90	Project: Morgan Hill area reinforcement
BRIGTANO 60 kV	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Low	0.57	0.98	0.92	0.61	1.03	0.62	0.99	0.94	0.70	0.61	0.97	NA	Project: Morgan Hill area reinforcement
GABILAN 60 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.97	0.97	0.90	0.98	1.01	0.98	0.99	0.97	0.97	0.97	0.97	0.86	Continue to monitor
LAURELES 60 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.97	0.97	0.88	0.98	1.02	0.97	0.98	0.95	0.99	0.97	0.97	0.83	Continue to monitor
OTTER 60 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.96	0.96	0.87	0.97	1.01	0.97	0.98	0.94	0.98	0.97	0.96	0.81	Continue to monitor
BNA VSTA 60 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.97	0.96	0.90	0.98	1.01	0.98	0.99	0.97	0.96	0.97	0.96	0.87	Continue to monitor
FIRESTNE 60 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.96	0.96	0.89	0.97	1.01	0.97	0.99	0.96	0.95	0.96	0.96	0.85	Continue to monitor
SPENCE 60 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.96	0.95	0.88	0.96	1.01	0.97	0.99	0.96	0.94	0.95	0.95	0.85	Continue to monitor
GONZALES 60 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.96	0.91	0.87	1.00	1.04	1.02	1.02	0.94	0.97	1.00	0.91	0.84	Continue to monitor
GONZALES 60 kV	P7-1:A19:6:_Moss Landing - Crazy Horse #1 and #2 115 kV Lines	P7	DCTL	Low	0.97	0.93	0.89	1.02	1.05	1.03	1.03	0.95	0.98	1.01	0.92	0.87	Continue to monitor
CAMPORA 60 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.97	0.92	0.88	1.00	1.03	1.02	1.01	0.95	0.98	1.00	0.92	0.86	Continue to monitor
SOLEDAD 60 kV	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	Low	0.98	0.93	0.89	1.01	1.04	1.02	1.02	0.95	0.98	1.00	0.92	0.86	Continue to monitor



Study Area: **PG&E Central Coast/Los Padres**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)									Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
SAN MIGL 70 kV	P1-2:A20:49:_SAN MIGL-UNIONPGAE #1 70KV [0]	P1	N-1	<8	<8	10	<8	<8	<8	<8	<8	<8	<8	<8	<8	12	Continue to monitor

Study Area: **PG&E Central Coast**  
**PG&E Los Padres**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2027 SP High CEC Forecast	

In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2020-21 Transmission Planning Process.

<http://www.caiso.com/Documents/BoardApproved2020-2021TransmissionPlan.pdf>

2022-2023 ISO Reliability Assessment - Study Results

Study Area: **PG&E Central Coast/Los Padres**



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		2027 SP High CEC Forecast

No single contingency resulted in total load drop of more than 250 MW

**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)										Potential Mitigation Solutions	
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		2027 SP High CEC Forecast

No single source substation with more than 100 MW

Study Area:  
Thermal Overloads

PG&E Greater Bay Area



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
AMES-Mountain View 115 kV	P2-4:A17:5_ MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	144	15	26	88	16	74	22	15	118	89	14	<100	Project: Monta Vista bus upgrade	
	P5-5C:A18:1_ METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	144	157	42	49	Diverge	Diverge	148	Diverge	<100	Install redundant battery supply	
AMES-Whisman 115 kV	P2-4:A17:5_ MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	150	2	23	83	50	72	35	1	117	84	4	<100	Project: Monta Vista bus upgrade	
	P5-5C:A18:1_ METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	135	140	36	46	Diverge	Diverge	137	Diverge	<100	Install redundant battery supply	
	TESLA-METCALF 500KV & MOSSLAND-LOSBANOS 500KV	P6	N-1-1	<100	<100	103	<100	82	<100	<100	<100	<100	<100	<100	<100	Continue to monitor	
AWSGILROYSS-LLAGAS 115 kV	METCALF-MORGAN HILL 115KV & METCALF-EL PATIO #2 115KV	P6	N-1-1	119	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Morgan Hill-Green Valley project	
AWSGILROYSS-LLAGAS 115 kV Line No 1	METCALF-MORGAN HILL 115KV [257Q] & GREENVALLEY-MRGN	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	137	Continue to monitor	
Bahia - Moraga 230 kV	P5-5A:A8:2_ C.COSTAPP 230KV BUS 1&2(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	92	96	67	65	57	53	55	38	102	89	101	<100	Install redundant relay	
	P5-5C:A8:2_ CONTRA COSTA PP 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	89	93	64	63	57	51	54	36	100	87	97	<100	Install redundant battery supply	
Bair 115/60kV Transformer #1	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	217	214	206	222	222	201	212	207	190	222	211	<100	Install redundant relay	
	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	p5	Non-Redundant battery supply	202	177	177	221	225	202	211	192	Diverge	220	170	<100	Install redundant battery supply	
Bair-Belmont 115kV Line	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	143	147	147	118	121	99	105	118	128	118	145	<100	Install redundant relay	
	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	p5	Non-Redundant battery supply	138	137	137	117	118	99	105	112	Diverge	117	135	<100	Install redundant battery supply	
Bair-Cooley Landing #1 60kV Line	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	352	353	344	343	338	276	302	307	308	343	349	<100	Install redundant relay	
	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	p5	Non-Redundant battery supply	337	322	319	343	339	275	302	292	Diverge	344	313	<100	Install redundant battery supply	
	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	p5	Non-Redundant battery supply	234	223	222	238	235	158	174	168	Diverge	239	218	<100	Install redundant battery supply	
	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	p5	Non-Redundant battery supply	83	75	73	101	96	71	65	62	Diverge	100	74	<100	Install redundant battery supply	
Bair-Cooley Landing #2 60kV Line	Base Case	Base	P0	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor	
	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	294	301	299	264	278	186	196	211	266	264	297	<100	Install redundant relay	
	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	286	274	278	264	279	186	196	204	Diverge	264	267	<100	Install redundant battery supply	
	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	p5	Non-Redundant battery supply	277	260	251	306	317	237	245	231	Diverge	306	254	<100	Install redundant battery supply	
	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	p5	Non-Redundant battery supply	103	101	107	71	70	50	55	73	Diverge	72	100	<100	Install redundant battery supply	
	CLY LND2 115/60KV TB 2 & CLY LND 115/60KV TB 1	P6	N-1-1	152	153	206	<100	<100	<100	<100	<100	<100	<100	153	<100	Operating solution	
Cayelano-Lone Tree (Lone Tree-USWP) 230kV Line	P2-4:A8:9_ MORAGA 230KV - SECTION 2D & 1D	P2	Bus/Breaker	111	111	104	44	46	48	52	61	73	58	110	<100	Line capacity increase, flow control or generation redispatch	
	P2-4:A8:13_ C.COSTAPPF 230KV - SECTION 2F & 1F	P2	Bus/Breaker	100	93	92	22	36	35	38	52	57	38	91	<100	Project: Contra Costa lines reconfiguratiaon	
	P2-2:A16:10_ NEWARK D 230KV SECTION 1D	P2	Bus/Breaker	99	103	102	37	46	42	50	60	65	51	101	<100	Line capacity increase, flow control or Newark bus upgrade	
	P2-4:A16:17_ NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Bus/Breaker	95	103	105	34	45	39	49	61	61	47	101	<100	Line capacity increase, flow control or Newark bus upgrade	
	P2-4:A16:7_ NEWARK E 230KV - SECTION 1E & 2E	P2	Bus/Breaker	93	94	101	31	36	36	39	59	56	45	92	<100	Line capacity increase, flow control or Newark bus upgrade	
	P1-1:A8:18_ DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS & P1-2:A8:13_ CONTRA COSTA-LAS POSITAS 230KV [4510]	P3	G-1/N-1	100	100	103	<100	<100	<100	<100	<100	<100	<100	100	<100	Line capacity increase, flow control or Newark bus upgrade	
	P5-5C:A18:1_ METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	68	65	58	61	Diverge	Diverge	76	Diverge	<100	Install redundant battery supply	
	P5-5C:A8:8_ MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	p5	Non-Redundant battery supply	113	113	106	45	47	49	55	62	75	59	112	<100	Install redundant battery supply	
	P5-5A:A8:4_ MORAGA 230KV BUS #1 & 2(FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	111	111	104	44	46	48	52	61	73	58	110	<100	Install redundant relay	
	CONTRA COSTA-LAS POSITAS 230KV & COLLNSVL-PITSBG F #1 230KV	P6	N-1-1	<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor	
	P7-1:A8:4_Contra Costa-Moraga Nos. 1 & 2 230 kV lines	P7	DCTL	105	104	100	40	41	44	48	59	64	52	103	<100	Line capacity increase, flow control or generation redispatch	
	P7-1:A16:5_Tesla-Newark No.1 and Tesla-Ravenswood 230 kV lines	P7	DCTL	102	105	103	48	50	46	53	60	72	58	104	<100	Line capacity increase, flow control or generation redispatch	
	P7-1:A16:7_Tesla - Newark No.2 and Metcalf - Los Esteros 230 kV	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Line capacity increase, flow control or generation redispatch	
P2-4:A8:9_ MORAGA 230KV - SECTION 2D & 1D	P2	Bus/Breaker	111	111	104	47	50	50	54	62	86	62	109	<100	Line capacity increase, flow control or generation redispatch		









Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Los Esteros-Silicon Switching Station 230 kV Line	P2-3-A16:41: NEWARK D - 2D 230KV & NEWARK-NRS 230 KV HVDC #1 LINE	P2	Bus/Breaker	<100	<100	117	<100	<100	<100	<100	<100	115	<100	<100	<100	<100	Operating solution
	P2-3-A18:46: LS ESTRS 115KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	97	100	97	92	91	93	97	93	94	91	103	<100	Project: San Jose area HVDC	
	P2-1-A18:35: LOS ESTEROS-NORTECH 115KV [4032] (LS ESTRS-LSSTRSRCTR)	P2	Bus/Breaker	97	100	97	92	91	93	97	93	94	91	103	<100	Project: San Jose area HVDC	
	P2-1-A18:40: LOS ESTEROS-NORTECH 115KV [4032] (LSSTRSRCTR-NORTECH)	P2	Bus/Breaker	97	100	97	92	91	93	97	93	94	91	103	<100	Project: San Jose area HVDC	
	P2-2-A18:52: NORTECH 115KV SECTION 1F	P2	Bus/Breaker	95	98	95	91	90	92	96	91	93	91	102	<100	Operating solution	
	P2-4-A16:18: NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Bus/Breaker	88	92	117	88	88	88	89	115	81	88	90	<100	Operating solution	
	P2-2-A16:11: NEWARK D 230KV SECTION 2D	P2	Bus/Breaker	88	91	117	86	87	87	88	115	86	86	89	<100	Operating solution	
	P5-5C-A18:1: METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	97	95	96	93	Diverge	Diverge	94	Diverge	<100	Install redundant battery supply	
	P5-5A-A18:3: LOS ESTEROS 115KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	103	107	102	94	98	96	102	96	99	93	110	<100	Install redundant relay	
	P5-5C-A18:19: METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	97	103	99	94	96	95	99	95	94	92	100	<100	Install redundant battery supply	
	P5-5C-A18:23: NORTECH 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	95	98	94	90	90	92	96	91	93	90	101	<100	Install redundant battery supply	
	P5-5C-A16:17: NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	92	101	88	85	88	87	94	85	92	86	97	<100	Install redundant battery supply	
	P5-5C-A16:7: NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	72	70	Diverge	82	77	81	78	99	Diverge	79	68	<100	Install redundant battery supply	
	NEWARK-NRS 230KV HVDC & NEWARK-RAVENSWOOD 230KV	P6	N-1-1	<100	<100	116	<100	<100	<100	<100	<100	115	<100	<100	<100	<100	Operating solution
	LOS ESTEROS-NORTECH 115KV & NEWARK-RAVENSWOOD 230KV	P6	N-1-1	<100	101	100	<100	<100	<100	<100	<100	<100	<100	<100	105	<100	Operating solution
LOS ESTEROS-NORTECH 115KV & NEWARK-NORTHERN RECEIVING STATION #1 115KV	P6	N-1-1	102	110	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC	
FMC-SAN JOSE B 115KV & LOS ESTEROS-NORTECH 115KV	P6	N-1-1	101	111	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC	
LS ESTRS-LSSTRSRCTR 115 kV	SVP1-3:6: SSS-NRS 230 kV same as outage of SVP's PST or NRS T2	P1	N-1	<100	109	<100	<100	<100	<100	<100	<100	<100	<100	109	<100	Operating solution	
	P1-3-A18:4: SSS 230/230KV TB 1	P1	N-1	<100	108	<100	<100	<100	<100	<100	<100	<100	<100	108	<100	Operating solution	
	P2-3-A18:2: LS ESTRS 230KV - MIDDLE BREAKER BAY 8	P2	Bus/Breaker	<100	108	<100	<100	<100	<100	<100	<100	<100	<100	108	<100	Operating solution	
	SVP2-2:1: NRS 400 115 kV bus	P2	Bus/Breaker	120	127	64	91	97	80	103	44	110	94	160	<100	Mitigation under review by SVP	
	SVP2-2:4: KRS 115 kV bus	P2	Bus/Breaker	73	104	91	50	49	46	78	57	69	49	128	<100	Mitigation under review by SVP	
	P2-2-A16:11: NEWARK D 230KV SECTION 2D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor	
	P5-5C-A18:19: METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	83	<100	70	56	56	50	68	43	73	55	121	<100	Install redundant battery supply	
	P5-5C-A18:8: TRIMBLE 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	76	<100	60	50	48	47	56	40	60	55	105	<100	Install redundant battery supply	
	P5-5C-A16:17: NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	75	<100	56	46	48	44	70	39	68	48	118	<100	Install redundant battery supply	
	P5-5C-A16:16: NEWARK D 115 & 60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	71	<100	59	47	47	42	60	39	59	47	105	<100	Install redundant battery supply	
	P5-5C-A18:12: SAN JOSE B 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	70	<100	67	49	46	45	62	44	61	50	105	<100	Install redundant battery supply	
LSSTRSRCTR-NORTECH 115 kV	SSS 230/230KV TB 1 & FMC-SAN JOSE B 115KV	P6	N-1-1	<100	131	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC	
	SSS 230/230KV TB 1 & NEWARK-RAVENSWOOD 230KV	P6	N-1-1	<100	111	<100	<100	<100	<100	<100	<100	<100	<100	112	<100	Project: San Jose area HVDC	
	SSS 230/230KV TB 1 & NEWARK-NRS 230KV HVDC [0]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	123	Continue to monitor	
	SVP1-3:6: SSS-NRS 230 kV same as outage of SVP's PST or NRS T2	P1	N-1	<100	109	<100	<100	<100	86	<100	91	<100	<100	142	<100	Operating solution	
	P1-3-A18:4: SSS 230/230KV TB 1	P1	N-1	84	108	75	68	66	58	69	54	77	69	108	<100	Project: San Jose area HVDC	
	SVP2-2:1: NRS 400 115 kV bus	P2	Bus/Breaker	120	127	64	91	97	80	103	44	110	94	160	<100	Mitigation under review by SVP	
	P2-3-A18:2: LS ESTRS 230KV - MIDDLE BREAKER BAY 8	P2	Bus/Breaker	84	108	75	68	66	58	69	54	77	69	108	<100	Project: San Jose area HVDC	
SVP2-2:4: KRS 115 kV bus	P2	Bus/Breaker	73	104	91	50	49	46	78	57	69	49	128	<100	Mitigation under review by SVP		
P2-2-A16:11: NEWARK D 230KV SECTION 2D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor		
P5-5C-A18:19: METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	83	91	70	56	56	50	68	43	73	55	121	<100	Install redundant battery supply		
P5-5C-A18:8: TRIMBLE 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	76	83	60	50	48	47	56	40	60	55	105	<100	Install redundant battery supply		
P5-5C-A16:17: NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	75	94	56	46	48	44	70	39	68	48	118	<100	Install redundant battery supply		



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Metcalfe-El Patio No. 1 115 kV Line	P2-3-A18:31: _MTCALF D - 2D 115KV & METCALF-EL PATIO #2 LINE	P2	Bus/Breaker	100	118	74	75	88	59	79	41	98	64	120	<100	Project: San Jose area HVDC	
	P2-2-A18:39: _MTCALF D 115KV SECTION 2D	P2	Bus/Breaker	100	122	74	75	92	59	83	41	98	64	126	<100	Project: San Jose area HVDC	
	P2-4-A18:25: _MTCALF D SECTION 2D & METCALF E SECTION 2E 115KV	P2	Bus/Breaker	87	102	67	65	75	61	81	45	84	56	103	<100	Project: San Jose area HVDC	
	P2-3-A18:72: _SANJOSEB 115KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	Continue to monitor	
	P5-5C-A18:3: _LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	110	130	87	83	93	66	82	50	107	75	133	117	Install redundant battery supply	
	P5-5A-A18:2: _LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	102	119	78	73	89	58	80	44	101	64	121	101	Install redundant relay	
	P5-5C-A16:7: _NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	101	124	Diverge	68	86	56	73	52	Diverge	65	126	<100	Install redundant battery supply	
	P5-5A-A18:3: _LOS ESTEROS 115KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	93	110	70	68	78	55	68	38	90	61	112	<100	Install redundant relay	
	P5-5C-A17:1: _MONTA VISTA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	90	106	73	70	78	54	70	41	91	59	108	<100	Install redundant battery supply	
	METCALF-EL PATIO #2 115KV [2510] & METCALF 500 KV-SAN J	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor
	METCALF-EL PATIO #2 115KV & SSS 230/230KV TB 1	P6	N-1-1	118	135	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
	P7-1-A18:17: _Metcalfe - Evergreen #1 and #2 115 kV Lines	P7	DCTL	106	123	79	79	91	62	81	43	102	68	125	107	Project: San Jose area HVDC	
	Metcalfe-El Patio No. 2 115 kV Line	P7-1-A18:20: _Newark - Los Esteros & Los Esteros - Metcalfe 230 kV Lines	P7	DCTL	103	120	80	75	91	60	81	45	102	66	123	104	Project: San Jose area HVDC
P7-1-A16:7: _Tesla - Newark No.2 and Metcalfe - Los Esteros 230 kV lines		P7	DCTL	88	104	71	68	77	53	70	40	88	58	106	<100	Project: San Jose area HVDC	
P2-4-A18:24: _MTCALF D SECTION 1D & METCALF E SECTION 1E 115KV		P2	Bus/Breaker	91	106	71	69	79	66	84	50	88	59	108	<100	Project: San Jose area HVDC	
Metcalfe-Evergreen No. 1 115 kV Line	P2-4-A18:24: _MTCALF D SECTION 1D & METCALF E SECTION 1E 115KV	P2	Bus/Breaker	91	106	71	69	79	65	82	48	87	59	108	<100	Project: San Jose area HVDC	
	METCALF 500 KV-SAN JOSE B 115KV HVDC [0] & METCALF-EL	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor	
Metcalfe-Evergreen No. 2 115 kV Line	SAN JOSE B-STONE-EVERGREEN 115KV [1550] & STONE-EVER	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	121	Continue to monitor
	STONE-EVERGREEN-METCALF 115KV & EL PATIO-SAN JOSE A 115KV	P6	N-1-1	<100	104	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
Metcalfe-Hicks 230 kV Line	SAN JOSE B-STONE-EVERGREEN 115KV [1550] & METCALF-EV	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	121	Continue to monitor
	METCALF-EVERGREEN #1 115KV & EL PATIO-SAN JOSE A 115KV	P6	N-1-1	<100	104	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
Metcalfe-Llagas 115 kV Line	P2-4-A18:1: _METCALF 230KV - SECTION 1D & 1E	P2	Bus/Breaker	87	96	100	77	71	70	79	81	79	68	96	<100	Continue to monitor	
	P2-4-A17:20: _MONTAVIS 230KV - SECTION 1E & 1D	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Continue to monitor	
	P2-4-A17:5: _MONTAVIS 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor	
	MONTA VISTA-COYOTE SW STA 230KV [5090] & VASONA-METC	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	117	Continue to monitor	
Metcalfe-Morgan Hill 115 kV Line	P7-1-A17:17: _Metcalfe-Monta Vista No. 3 & Monta Vista-Coyote Sw.	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor	
	P1-1-A18:3: _GROYPKR1 13.80KV GEN UNIT 1 & P1-2-A18:37: _METCALF-MORGAN HILL 115KV [2570]	P3	G-1/N-1	228	<100	<100	<100	<100	<100	<100	<100	<100	<100	0	<100	Project: Morgan Hill-Green Valley project	
Millbrae-Sneath Lane 60kV Line	P5-5C-A18:1: _METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	61	118	57	95	Diverge	Diverge	63	Diverge	<100	Install redundant battery supply	
	MTCALF D-LLAGAS 115KV & LLAGAS-GILROY F-GILROYENG-GILROYPK 115KV	P6	N-1-1	158	104	102	<100	<100	<100	<100	<100	<100	<100	105	<100	Review project: Morgan Hill-Green Valley project	
Milpitas-Swift 115 kV Line	P1-2-A10:49: _HILLSDALE JCT-HALF MOON BAY 60KV [7060]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor	
	P2-4-A16:20: _NEWARK E SECTION 1E & NEWARK F SECTION 1F 115KV	P2	Bus/Breaker	73	86	128	51	79	52	63	106	62	51	87	<100	Continue to monitor	
	P2-3-A16:16: _NEWARK F - 1F 115KV & NEWARK F-ZANKER-KRS LINE	P2	Bus/Breaker	73	85	128	51	79	52	63	106	62	51	86	<100	Continue to monitor	
	P2-2-A16:42: _NEWARK F 115KV SECTION 1F	P2	Bus/Breaker	73	85	128	51	79	52	63	106	62	51	86	<100	Continue to monitor	
	P2-3-A16:17: _NEWARK F - 1F 115KV & NEWARK-MILPITAS #1 LINE	P2	Bus/Breaker	73	85	128	51	79	52	63	106	62	51	86	<100	Continue to monitor	
	P2-3-A16:15: _NEWARK F - 1F 115KV & NEWARK F-LAWRENCE-LOCKHD 1 LINE	P2	Bus/Breaker	73	85	128	51	79	52	63	106	62	51	86	<100	Continue to monitor	
	P5-5C-A18:1: _METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	45	79	51	83	40	Diverge	Diverge	82	Diverge	<100	Install redundant battery supply	
	P5-5C-A16:17: _NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	73	86	129	50	79	52	63	106	62	51	87	<100	Install redundant battery supply	
Mission-Larkin (XY-1) 115kV Cable	NEWARK-MILPITAS #1 115KV [3070] MOAS OPENED ON NEWAR	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	144	Continue to monitor	
	A-X #1 115KV [9951] & P-X #1 115KV [9958]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Continue to monitor	
Monta Vista 230/115 kV Trans No. 2	P2-4-A17:21: _MONTAVIS 230KV - SECTION 2E & 2D	P2	Bus/Breaker	<100	113	112	<100	83	<100	84	88	<100	<100	114	<100	Increase bank capacity	
	P2-2-A17:6: _MONTAVIS 230KV SECTION 2E	P2	Bus/Breaker	106	72	74	94	55	83	57	61	107	77	72	<100	Project: Monta Vista bus upgrade	
	MONTAVIS 230/115KV TB 3 & MONTAVIS 230/115KV TB 4	P6	N-1-1	100	114	117	<100	<100	<100	<100	<100	<100	<100	114	144	Increase bank capacity	
P2-4-A17:2: _MONTAVIS 230KV - SECTION 1D & 2D	P2	Bus/Breaker	41	107	107	26	82	32	82	88	40	21	107	<100	Increase bank capacity		





Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Newark 230/115kV Transformer #11	P2-4-A16:19:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 115KV	P2	Bus/Breaker	88	103	80	40	70	53	65	61	70	55	98	<100	Project: San Jose area HVDC	
	P1-1-A18:8:_LECEPST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2-A16:21:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	105	<100	<100	<100	<100	<100	<100	<100	<100	105	<100	Project: San Jose area HVDC	
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	119	120	101	99	Diverge	Diverge	119	Diverge	<100	Install redundant battery supply	
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	119	121	100	98	Diverge	Diverge	120	Diverge	<100	Install redundant battery supply	
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	96	107	90	57	78	65	72	70	81	71	107	105	Install redundant battery supply	
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	93	102	85	49	76	58	70	64	80	64	101	<100	Install redundant relay	
	P5-5A:A10:2:_RAVENSWOOD 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	92	102	86	58	74	61	67	71	Diverge	69	99	<100	Install redundant relay	
	P5-5A:A10:2:_RAVENSWOOD 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	91	100	85	58	74	61	66	69	Diverge	69	97	<100	Install redundant relay	
	NEWARK E-F BUS TIE 230KV & TESLA-METCALF 500kv	P6	N-1-1	107	117	99	<100	<100	<100	<100	<100	94	<100	119	<100	Project: San Jose area HVDC	
	NEWARK D 230/115KV TB 7 & NEWARK E-F BUS TIE 230KV	P6	N-1-1	105	119	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC	
TESLA-METCALF 500kv & MOSSLAND-LOS BANOS 500KV	P6	N-1-1	95	106	104	<100	90	<100	<100	<100	86	<100	105	<100	Continue to monitor		
P7-1-A18:20:_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	93	101	85	50	76	59	69	64	79	64	101	<100	Project: San Jose area HVDC		
P7-1:A10:2:_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Diverge	Continue to monitor		
NEWARK D-NWRK_7M 13.2 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	101	102	85	84	Diverge	Diverge	101	Diverge	<100	Install redundant battery supply	
NEWARK D-NWRK_7M 230/13.2 kV	NEWARK E-F BUS TIE 230KV & NEWARK E 230/115KV TB 11	P6	N-1-1	98	107	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC		
NEWARK E-NWRK_7M 13.2 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	101	102	85	83	Diverge	Diverge	102	Diverge	<100	Install redundant battery supply	
NEWARK F-RINGWOODSWST 115 kV	SWIFT-METCALF 115KV & NEWARK-MILPITAS #1 115KV	P6	N-1-1	111	123	169	<100	<100	<100	<100	<100	<100	<100	125	<100	Increase line capacity	
NEWARK F-RINGWOODSWST 115 kV Line No 1	SWIFT-METCALF 115KV [3900] & NEWARK-MILPITAS #1 115KV	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	191	Continue to monitor	
Newark-Applied Materials 115kV Line	P1-2-A17:27:_BRITTON-MONTA VISTA 115KV [1170]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor	
Newark-Dixon Landing 115kV Line	P1-2:A18:42:_PIERCY-METCALF 115KV [4318]	P1	N-1	113	117	96	72	89	68	75	69	86	72	119	<100	Project: Metcalf-Dixon Landing reconductor	
	P2-4-A18:25:_METCALF D SECTION 2D & METCALF E SECTION 2E 115KV	P2	Bus/Breaker	114	117	96	72	89	68	75	69	86	72	119	<100	Project: Metcalf-Dixon Landing reconductor	
	P2-2-A18:43:_METCALF E 115KV SECTION 2E	P2	Bus/Breaker	113	117	96	72	89	68	75	69	86	72	119	<100	Project: Metcalf-Dixon Landing reconductor	
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	116	96	112	77	Diverge	Diverge	120	Diverge	<100	Install redundant battery supply	
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	116	121	98	72	89	68	76	70	89	73	123	<100	Install redundant battery supply	
Newark-Jarvis #1 115kV Line	P7-1-A18:6_Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	114	118	97	72	89	68	75	70	86	72	120	<100	Project: Metcalf-Dixon Landing reconductor	
	P1-2-A16:40:_NEWARK-JARVIS #2 115KV [3030]	P1	N-1	98	101	110	60	55	64	71	79	69	60	102	<100	Continue to monitor	
Newark-Kifer 115kV Line	NEWARK-JARVIS #2 115KV [3030] & NEWARK D SVD=v	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	131	Continue to monitor	
	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	232	<100	<100	141	<100	154	<100	<100	243	149	<100	<100	Project: SVP bus tie breaker upgrade	
	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	230	<100	<100	139	<100	153	<100	<100	242	147	<100	<100	Project: SVP bus tie breaker upgrade	
	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	84	121	41	50	63	57	84	35	84	54	105	106	Mitigation under review by SVP	
	SVP2-2:2:_NRS 300 115 kV bus	P2	Bus/Breaker	74	121	41	37	53	45	90	65	73	40	120	<100	Mitigation under review by SVP	
	P1-1-A18:8:_LECEPST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2-A16:21:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	107	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	<100	Project: San Jose area HVDC
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	105	148	78	68	82	73	105	60	106	72	149	<100	Install redundant battery supply	
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	93	121	65	51	76	58	92	49	96	56	122	<100	Install redundant relay	
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	91	119	64	49	74	56	91	48	94	54	120	<100	Install redundant relay	
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	67	101	31	36	48	40	66	16	70	36	94	<100	Install redundant battery supply	
NEWARK E-F BUS TIE 230KV & LOS ESTEROS-METCALF 230KV	P6	N-1-1	96	129	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	88	114	59	44	71	52	86	42	90	50	114	<100	Project: San Jose area HVDC
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	86	113	58	42	69	51	84	42	88	48	112	<100	Project: San Jose area HVDC
Newark-Lawrence 115kV Line	P7-1:A17:12_Newark-Applied Materials & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	104	107	90	54	71	49	49	55	76	54	108	101	Project: San Jose area HVDC
Newark-Livermore 60kV Line	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	90	100	Diverge	27	63	30	36	52	Diverge	47	96	<100	Install redundant battery supply
Newark-Los Esteros 230kV Line	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	94	103	87	94	Diverge	Diverge	97	Diverge	<100	Install redundant battery supply
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	94	103	87	94	Diverge	Diverge	97	Diverge	<100	Install redundant battery supply
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	94	103	87	94	Diverge	Diverge	97	Diverge	<100	Install redundant battery supply
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	94	103	87	94	Diverge	Diverge	96	Diverge	<100	Install redundant battery supply
	TESLA-METCALF 500KV & MOSSLAND-LOS BANOS 500KV	P6	N-1-1	92	101	100	<100	96	<100	<100	<100	93	<100	107	<100	Project: San Jose area HVDC
Newark-Milpitas #1 115kV Line	SWIFT-METCALF 115KV & NEWARK F-RINGWOODSWT #1 115KV	P6	N-1-1	102	114	157	<100	<100	<100	<100	<100	<100	<100	115	177	Increase line capacity
Newark-Newark Dist 230kV section	P1-1:A18:8:_LECEPST1 13.80KV & LECEFGT3 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A18:6:_LOS ESTEROS-METCALF 230KV [5353]	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	<100	Sensitivity only
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	95	104	82	88	Diverge	Diverge	97	Diverge	<100	Install redundant battery supply
Newark-Northern Receiving Station #1 115kV Line	SVP1-3:6:_SSS-NRS 230 kV same as outage of SVP's PST or NRS T2	P1	N-1	<100	103	<100	<100	58	<100	69	<100	<100	<100	88	<100	Project: San Jose area HVDC
	P1-2:A16:21:_NEWARK E-F BUS TIE 230KV [4640]	P1	N-1	80	104	53	20	60	35	65	28	70	36	100	<100	Project: San Jose area HVDC
	P1-3:A18:4:_SSS 230/230KV TB 1	P1	N-1	80	102	59	42	66	51	79	41	72	50	102	<100	Project: San Jose area HVDC
	P2-4:A16:7:_NEWARK E 230KV - SECTION 1E & 2E	P2	Bus/Breaker	81	108	46	20	61	36	66	18	73	37	103	<100	Project: San Jose area HVDC
	P2-3:A18:2:_LS ESTRS 230KV - MIDDLE BREAKER BAY 8	P2	Bus/Breaker	80	102	59	42	66	51	79	41	72	50	102	<100	Project: San Jose area HVDC
	P2-2:A16:12:_NEWARK E 230KV SECTION 1E	P2	Bus/Breaker	79	104	50	20	60	35	65	26	70	36	100	<100	Project: San Jose area HVDC
	SVP2-2:4:_KRS 115 kV bus	P2	Bus/Breaker	48	109	61	20	41	24	65	37	47	21	88	139	Mitigation under review by SVP
	P1-1:A18:8:_LECEPST1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:21:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	134	<100	<100	<100	<100	<100	<100	<100	<100	133	<100	Project: San Jose area HVDC
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	64	75	66	83	Diverge	Diverge	67	Diverge	<100	Install redundant battery supply
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	134	181	104	81	106	90	125	72	127	91	182	<100	Install redundant battery supply
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	119	147	84	56	98	69	109	55	112	68	148	<100	Install redundant relay
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	71	112	45	28	57	36	71	15	67	31	103	<100	Install redundant battery supply
	P5-5A:A18:3:_LOS ESTEROS 115KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	69	105	47	26	49	37	68	28	61	34	103	<100	Install redundant relay
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	68	113	53	18	52	30	67	29	57	26	96	<100	Install redundant battery supply
	NEWARK-NRS 230KV HVDC [0] & SSS 230/230KV TB 1	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	Continue to monitor
NEWARK E-F BUS TIE 230KV & LOS ESTEROS-METCALF 230KV	P6	N-1-1	121	165	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC	
NEWARK E-F BUS TIE 230KV & TESLA-METCALF 500KV	P6	N-1-1	98	131	<100	<100	<100	<100	<100	<100	83	<100	130	<100	Project: San Jose area HVDC	
P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	113	139	77	46	92	61	102	47	105	59	139	<100	Project: San Jose area HVDC	
Newark-Northern Receiving Station #2 115kV Line	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	65	124	27	36	60	42	81	31	69	39	100	<100	Mitigation under review by SVP
	SVP2-2:4:_KRS 115 kV bus	P2	Bus/Breaker	38	110	47	23	37	23	69	36	47	22	87	130	Mitigation under review by SVP
	P1-1:A18:8:_LECEPST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:21:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	114	<100	<100	<100	<100	<100	<100	<100	<100	113	<100	Project: San Jose area HVDC
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	118	170	79	78	94	83	122	59	122	82	172	101	Install redundant battery supply
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	103	136	62	54	86	62	105	44	108	59	137	<100	Install redundant relay
SSS 230/230KV TB 1 & LOS ESTEROS-NORTECH 115KV	P6	N-1-1	108	147	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC	





Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
	P1-2-A7:27:_C-X #2 115KV [9962] & P1-2:A7:28:_C-X #3 115KV [9925]	P6	N-1-1	99	104	119	110	112	82	55	98	114	110	136	<100	Project: Oakland Clean Energy Initiative	
	P7-1:A8:28_Moraga-Oakland X Nos. 1 & 2 115 kV lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	Project: Oakland Clean Energy Initiative	
Oleum - North Tower-Christie 115 kV ( North tower sub to North Tower J12)	P2-4:A8:5_PITSBG D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor
Oleum-Christie 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	101	30	15	79	13	55	28	22	54	79	31	<100	Install redundant battery supply	
Oleum-EI Cerro STA G #1 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Install redundant relay
	P6 N-1-1	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	117	Continue to monitor
	P7-1:A7:3_Sobranle-G Nos. 1 & 2 115 kV lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	118	Continue to monitor
Oleum-Martinez 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	228	193	149	182	78	132	142	167	131	182	196	<100	Install redundant battery supply	
	P5-5A:A8:5:_PITTSBURG PP 230KV (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	51	52	78	74	29	53	61	95	158	77	53	<100	Install redundant relay	
Parkway - Moraga 230 kV	P5-5A:A8:2:_C.COSTAPP 230KV BUS 1&2(FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	91	95	66	67	59	62	65	45	105	87	100	<100	Install redundant relay	
	P5-5C:A8:2:_CONTRA COSTA PP 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	p5	Non-Redundant battery supply	88	92	63	65	59	60	64	43	103	85	97	<100	Install redundant battery supply	
	Base Case	P0	Normal	112	125	67	93	98	65	80	50	99	78	127	<100	Project: Metcalf-Dixon Landing reconductor	
	P1-2:A16:50:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	148	152	94	92	112	76	85	69	111	93	154	113	Project: Metcalf-Dixon Landing reconductor	
	P1-2:A18:11:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	148	152	94	92	112	76	85	69	111	93	154	113	Project: Metcalf-Dixon Landing reconductor	
	P1-2:A18:29:_SWIFT-METCALF 115KV [3900]	P1	N-1	109	121	75	90	95	67	83	55	96	76	123	<100	Project: Metcalf-Dixon Landing reconductor	
	P1-2:A18:6:_LOS ESTEROS-METCALF 230KV [5353]	P1	N-1	106	119	72	90	93	67	83	53	95	74	121	<100	Project: Metcalf-Dixon Landing reconductor	
	P1-2:A16:19:_TESLA-NEWARK #1 230KV [5720]	P1	N-1	106	118	71	88	93	66	81	53	95	76	121	<100	Project: Metcalf-Dixon Landing reconductor	
	P2-2:A16:41:_NEWARK F 115KV SECTION 2F	P2	Bus/Breaker	149	152	94	92	112	77	85	69	112	93	154	113	Project: Metcalf-Dixon Landing reconductor	
	P2-3:A16:12:_NEWARK F - 2F 115KV & NEWARK-NUMMI LINE	P2	Bus/Breaker	149	152	94	92	112	77	85	69	112	93	154	113	Project: Metcalf-Dixon Landing reconductor	
	P2-3:A16:14:_NEWARK F - 2F 115KV & NEWARK-TRIMBLE LINE	P2	Bus/Breaker	149	152	94	92	112	77	85	69	112	93	154	113	Project: Metcalf-Dixon Landing reconductor	
	P2-3:A16:13:_NEWARK F - 2F 115KV & NEWARK F-LOCKHD 2-APP MAT LINE	P2	Bus/Breaker	148	152	94	92	112	76	85	69	111	93	154	113	Project: Metcalf-Dixon Landing reconductor	
	P2-4:A17:5:_MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	128	125	76	104	96	77	85	56	117	87	127	<100	Project: Metcalf-Dixon Landing reconductor	
	P2-4:A18:24:_MTCALF D SECTION 1D & MTCALF E SECTION 1E 115KV	P2	Bus/Breaker	122	136	81	100	106	75	89	61	107	85	139	<100	Project: Metcalf-Dixon Landing reconductor	
Piercy-Metcalf 115 kV Line	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	149	154	96	92	112	77	85	70	112	93	156	<100	Install redundant battery supply	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	135	160	Diverge	102	115	78	96	67	Diverge	95	161	<100	Install redundant battery supply	
	P5-5C:A17:1:_MONTA VISTA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	p5	Non-Redundant battery supply	129	147	87	110	111	80	99	64	121	91	149	103	Install redundant battery supply	
	P5-5A:A17:2:_MONTA VISTA 115KV BAAH (FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	117	133	79	97	101	71	89	58	108	80	135	<100	Install redundant relay	
	P5-5A:A8:2:_C.COSTAPP 230KV BUS 1&2(FAILURE OF NON-REDUNDANT RELAY)	p5	Non-Redundant Relay	113	125	75	87	91	66	81	54	95	75	127	<100	Install redundant relay	
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	111	125	75	94	95	70	85	56	98	78	128	<100	Install redundant battery supply	
	P7-1:A16:16_Newark-Dixon Landing 115 kV and Newark-Milpitas No. 1 115 kV lines	P7	DCTL	149	152	95	92	112	76	85	69	112	93	154	114	Project: Metcalf-Dixon Landing reconductor	
	P7-1:A18:2_Newark - Dixon Landing & Newark - Milpitas #1 115 kV Lines	P7	DCTL	148	152	95	92	112	76	85	69	111	93	154	114	Project: Metcalf-Dixon Landing reconductor	
	P7-1:A16:7_Tesla - Newark No.2 and Metcalf - Los Esteros 230 kV lines	P7	DCTL	115	129	78	96	100	71	88	58	105	81	132	<100	Project: Metcalf-Dixon Landing reconductor	
	P7-1:A16:5_Tesla-Newark No.1 and Tesla-Ravenswood 230 kV lines	P7	DCTL	113	128	76	96	100	70	86	56	105	83	130	<100	Project: Metcalf-Dixon Landing reconductor	
	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	110	123	75	92	95	68	83	55	98	77	125	<100	Project: Metcalf-Dixon Landing reconductor	
Pittsburg-Eastshore 230kV Line	P2-4:A8:36:_PITSBG D SECTION 2D & PITSBG E SECTION 2E 23	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
	P1-1:A16:5:_RUSCTYECT1 18.00KV & RUSCTYECT2 15.00KV & RUSCTYECT3 15.00KV GEN UNITS & Base Case	P3	G-1/N-1	<100	<100	110	<100	<100	<100	<100	<100	<100	<100	0	<100	Continue to monitor	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	p5	Non-Redundant battery supply	62	76	Diverge	28	49	25	25	75	Diverge	40	73	<100	Install redundant battery supply	
	P7-1:A10:2_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Diverge	Continue to monitor	
	P2-2:A16:10:_NEWARK D 230KV SECTION 1D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Continue to monitor
	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Install redundant relay
Pittsburg-San Mateo 230kV Line	EASTSHORE-SAN MATEO 230KV & NEWARK-RAVENSWOOD 230KV	P6	N-1-1	<100	<100	111	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor	







Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
Swift-Metcalf 115 kV Line	P2-3:A16:15;_NEWARK F - 1F 115KV & NEWARK F-LAWRENCE-LOCKHD 1 LINE	P2	Bus/Breaker	112	125	135	76	99	82	94	106	88	76	127	<100	Review project: Metcalf-Dixon Landing reconductor
	P5-5C:A16:17;_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	112	127	136	76	99	82	94	107	88	76	128	<100	Install redundant battery supply
	P5-5C:A16:7;_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	89	108	Diverge	71	79	70	86	70	Diverge	65	109	<100	Install redundant battery supply
	P5-5C:A17:1;_MONTA VISTA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	85	99	88	76	77	71	89	67	82	62	101	102	Install redundant battery supply
	NEWARK-MILPITAS #1 115KV [3070] MOAS OPENED ON NEWAR	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	154	Review project: Metcalf-Dixon Landing reconductor
	NEWARK F-RINGWOODSWST #1 115KV & NEWARK-MILPITAS #1 115KV	P6	N-1-1	112	125	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Review project: Metcalf-Dixon Landing reconductor
Tesla - Newark 230 kV Line No. 1	P5-5C:A18:1;_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	105	98	82	87	Diverge	Diverge	101	Diverge	<100	Install redundant battery supply
Tesla - Newark 230 kV Line No. 2	P2-2:A16:10;_NEWARK D 230KV SECTION 1D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Continue to monitor
	P5-5C:A18:1;_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	98	89	73	77	Diverge	Diverge	100	Diverge	<100	Install redundant battery supply
	TESLA-METCALF 500KV & TESLA-NEWARK #1 230KV	P6	N-1-1	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
	MOSSLAND-LOS BANOS 500KV & TESLA-METCALF 500KV	P6	N-1-1	<100	99	108	<100	<100	<100	<100	<100	<100	<100	99	<100	Continue to monitor
TRAN230B-EGBERT S2 230 kV	P5-5C:A10:1;_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	107	Diverge	Diverge	65	56	54	61	Diverge	79	67	Diverge	<100	Install redundant battery supply
Trimble-San Jose "B" 115 kV Line	SVP2-4:6;_NRS 400 115 kv bus tie breaker to NRS 300 115 kv bus	P2	Bus/Breaker	117	<100	<100	67	<100	80	<100	<100	106	82	<100	<100	Project: SVP bus tie breaker upgrade
	P5-5C:A18:1;_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	144	102	144	92	Diverge	Diverge	149	Diverge	<100	Install redundant battery supply
	P5-5C:A18:19;_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	152	185	65	96	110	101	116	30	129	96	178	<100	Install redundant battery supply
Vasona-Metcalf 230 kV Line	P2-4:A17:2;_MONTAVIS 230KV - SECTION 1D & 2D	P2	Bus/Breaker	107	25	31	89	14	63	18	23	101	78	26	<100	Project: Metcalf-Vasona upgrade
	HICKS-METCALF 230KV [4910] & MONTA VISTA-COYOTE SW S	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
	MONTA VISTA-COYOTE SW STA 230KV & HICKS-METCALF 230KV	P6	N-1-1	113	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Metcalf-Vasona upgrade
Whisman-Monta Vista 115 kV Line	P7-1:A17:17;_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kv Line	P7	DCTL	103	69	74	96	55	67	54	55	93	86	69	<100	Project: Metcalf-Vasona upgrade
	P5-5C:A18:1;_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Diverge	Diverge	Diverge	98	97	16	19	Diverge	Diverge	100	Diverge	<100	Install redundant battery supply
	P5-5C:A18:19;_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	83	100	85	87	77	74	86	64	94	64	101	<100	Install redundant battery supply
	MTN VIEW-MONTA VISTA 115KV [2920] & BRITTON-MONTA VIS	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	115	Continue to monitor

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High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
ALMADEN 60 kV	Basecase	P0	Normal	High	0.98	0.97	0.95	1.05	1.08	1.03	1.02	0.97	1.03	1.03	1.03	N/A	System adjustments or voltage support if needed	
ALTAMONTJCT 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.05	1.05	1.07	1.06	1.06	1.05	1.01	1.05	1.01	N/A	System adjustments or voltage support if needed	
AWSGILROY1 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.00	1.04	1.08	1.04	1.02	0.98	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed	
AWSGILROY2 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.00	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.02	N/A	System adjustments or voltage support if needed	
AWSGILROYSS 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.00	1.04	1.08	1.04	1.02	0.98	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed	
BAILY J1 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.06	1.08	1.06	1.06	1.03	1.03	1.04	1.02	N/A	System adjustments or voltage support if needed	
BAILY J2 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.06	1.08	1.06	1.06	1.03	1.03	1.04	1.02	N/A	System adjustments or voltage support if needed	
BAILY J3 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.06	1.08	1.06	1.05	1.03	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed	
BARTLP 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	1.07	1.04	1.03	1.00	1.03	1.04	1.03	N/A	System adjustments or voltage support if needed	
BARTLP_J 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	1.07	1.04	1.03	1.00	1.03	1.04	1.03	N/A	System adjustments or voltage support if needed	
BARTRC 115 kV	Basecase	P0	Normal	High	1.01	1.00	0.99	1.04	1.06	1.04	1.03	1.00	1.01	1.04	1.01	N/A	System adjustments or voltage support if needed	
BARTRC_J 115 kV	Basecase	P0	Normal	High	1.01	1.00	0.99	1.04	1.06	1.04	1.03	1.00	1.01	1.04	1.01	N/A	System adjustments or voltage support if needed	
BAYSHOR1 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.04	1.07	1.02	1.04	1.03	1.01	1.03	1.01	N/A	System adjustments or voltage support if needed	
BAYSHOR2 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.04	1.07	1.02	1.04	1.03	1.01	1.04	1.01	N/A	System adjustments or voltage support if needed	
BERESFRD 60 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.06	1.03	1.04	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
BIXLER 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.03	1.04	1.06	1.05	1.05	1.04	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
BOLLMAN 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.05	1.05	1.04	1.05	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
BOLLMAN1 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.05	1.05	1.05	1.05	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
BOLLMAN2 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.05	1.05	1.05	1.05	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
BURLNGME 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.05	1.03	1.03	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
BXLR_TAP 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.03	1.04	1.06	1.05	1.05	1.04	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
CALMAT60 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.00	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
CALTRAINSSF 115 kV	Basecase	P0	Normal	High	1.02	1.03	1.00	1.03	1.06	1.01	1.03	1.01	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
CAROLD1 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.07	1.03	1.03	1.01	0.97	1.05	1.04	N/A	System adjustments or voltage support if needed	
CAROLD2 60 kV	Basecase	P0	Normal	High	1.01	1.01	1.00	1.04	1.08	1.03	1.03	1.01	0.96	1.04	1.02	N/A	System adjustments or voltage support if needed	
CAROLNDS 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.07	1.03	1.03	1.01	0.96	1.04	1.03	N/A	System adjustments or voltage support if needed	
CLAYTN 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.06	1.06	1.06	1.07	1.02	0.97	1.04	1.03	N/A	System adjustments or voltage support if needed	
CLMBATAP 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.97	1.04	1.03	N/A	System adjustments or voltage support if needed	
CLMBIAHS 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.96	1.04	1.03	N/A	System adjustments or voltage support if needed	
CLMBIAPV 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
CLY LND 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.05	1.05	1.04	1.04	1.03	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed	
CLY LND2 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.05	1.05	1.04	1.04	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
COLSTJT1 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed	
COLSTJT2 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	

Study Area: **PG&E Greater Bay Area**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
CRYSTLSG 60 kV	Basecase	P0	Normal	High	1.01	1.01	1.00	1.04	1.08	1.03	1.03	1.01	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
CYTE PMP 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.07	1.08	1.06	1.06	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
DALY CTY 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.07	1.02	1.04	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
DCTO JCT 60 kV	Basecase	P0	Normal	High	1.02	1.01	0.99	1.05	1.05	1.03	1.02	1.00	0.97	1.04	1.03	N/A	System adjustments or voltage support if needed	
DIXON LD 115 kV	Basecase	P0	Normal	High	1.01	1.00	0.99	1.04	1.05	1.03	1.03	1.01	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
DLY CTYP 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.07	1.02	1.04	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
DOW TAP1 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed	
DOW TAP2 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed	
DYERJCT 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.05	1.05	1.07	1.06	1.06	1.05	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed	
DYERWND 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.05	1.05	1.07	1.06	1.06	1.05	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed	
E DUBLIN 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.01	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed	
EBAYMUDJ 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.05	1.06	1.07	1.07	1.01	1.02	1.03	1.04	N/A	System adjustments or voltage support if needed	
EDENVALE 115 kV	Basecase	P0	Normal	High	1.02	1.02	1.02	1.06	1.08	1.06	1.05	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
EDNVL J1 115 kV	Basecase	P0	Normal	High	1.03	1.02	1.03	1.06	1.08	1.06	1.05	1.03	1.02	1.03	1.04	N/A	System adjustments or voltage support if needed	
EDNVL J3 115 kV	Basecase	P0	Normal	High	1.02	1.02	1.02	1.06	1.08	1.06	1.05	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
EGBERT S2 230 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.03	1.06	1.02	1.02	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
EL PATIO 115 kV	Basecase	P0	Normal	High	1.00	0.99	1.00	1.04	1.06	1.04	1.02	1.00	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
ELPT_SJ2 115 kV	Basecase	P0	Normal	High	1.00	0.99	1.00	1.04	1.06	1.04	1.02	1.00	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
EMRLD LE 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	1.08	1.04	1.03	1.01	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
EST GRND 115 kV	Basecase	P0	Normal	High	1.02	1.03	1.00	1.03	1.06	1.01	1.03	1.01	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
EVERGREN 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	1.07	1.04	1.02	0.99	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
EVRGRN 1 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.99	1.04	1.06	1.04	1.02	1.00	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
EVRGRN J 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	1.07	1.04	1.02	0.99	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
EVRGRN&1 115 kV	Basecase	P0	Normal	High	1.03	1.02	1.02	1.06	1.08	1.06	1.05	1.04	1.04	1.03	1.04	N/A	System adjustments or voltage support if needed	
EVRGRN&1 115 kV	Basecase	P0	Normal	High	1.03	1.02	1.02	1.06	1.08	1.06	1.05	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
FLOWIND1 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.06	1.04	1.04	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
FOREBAYWIND 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	1.06	1.03	1.03	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed	
FRICKWND 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	1.06	1.03	1.03	1.02	1.02	1.03	1.02	N/A	System adjustments or voltage support if needed	
GILROY F 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed	
GILROYENG 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed	
GILROYENGJCT 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.04	N/A	System adjustments or voltage support if needed	
GILROYPK 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.02	N/A	System adjustments or voltage support if needed	
GILROYTP 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.04	N/A	System adjustments or voltage support if needed	
HICKS 230 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	1.05	1.03	1.03	1.00	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed	

Study Area: PG&E Greater Bay Area



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
HILDAL47 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.08	1.03	1.03	1.01	1.02	1.05	1.03	N/A	System adjustments or voltage support if needed
HILDAL49 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.07	1.03	1.04	1.01	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
HILLSLE 60 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.06	1.03	1.04	1.01	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
HLF MNBY 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.02	1.05	1.07	1.03	1.04	1.01	1.02	1.05	1.03	N/A	System adjustments or voltage support if needed
HLLSDLJT 60 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.07	1.03	1.04	1.01	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed
HNTRS PT 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.04	1.07	1.02	1.04	1.02	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
IBM-BALY 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.06	1.08	1.06	1.06	1.03	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed
IBM-HR J 115 kV	Basecase	P0	Normal	High	1.02	1.02	1.02	1.06	1.08	1.06	1.05	1.02	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
IBM-HRRS 115 kV	Basecase	P0	Normal	High	1.03	1.02	1.02	1.06	1.08	1.06	1.05	1.03	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
IMHOFF 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.05	1.05	1.05	1.05	1.03	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
IMHOFF_1 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.05	1.05	1.04	1.05	1.02	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
IMHOFF_2 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.05	1.05	1.05	1.05	1.03	1.02	1.03	1.04	N/A	System adjustments or voltage support if needed
IUKA 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.00	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed
IUKAJCT 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.00	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed
JEDAMCX1 230 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.04	1.07	1.04	1.03	1.02	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
JEDAMCX2 230 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.04	1.07	1.04	1.03	1.02	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
JEFFERSN 230 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.07	1.04	1.03	1.01	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
JEFRSN_D 60 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.05	1.08	1.04	1.04	1.02	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
JEFRSN_E 60 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.05	1.08	1.04	1.04	1.02	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed
JENING J 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	1.07	1.04	1.02	0.99	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed
KIRKER 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.03	1.04	1.05	N/A	System adjustments or voltage support if needed
KIRKTAP1 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.02	1.04	1.01	N/A	System adjustments or voltage support if needed
KIRKTAP2 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed
LAKEWD-C 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.05	1.06	1.07	1.07	1.01	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
LAKEWD-M 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.05	1.06	1.07	1.07	1.01	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
LARKIN D 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	1.07	1.02	1.04	1.03	1.03	1.04	1.02	N/A	System adjustments or voltage support if needed
LARKIN E 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	1.07	1.02	1.04	1.02	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed
LARKIN F 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	1.07	1.02	1.04	1.02	1.01	1.03	1.01	N/A	System adjustments or voltage support if needed
LAS PLGS 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	1.08	1.03	1.02	1.00	1.02	1.04	1.01	N/A	System adjustments or voltage support if needed
LINDECT 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.01	1.03	1.01	N/A	System adjustments or voltage support if needed
LINDETP1 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
LINDETP2 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
LIVERMRE 60 kV	Basecase	P0	Normal	High	1.02	1.02	0.99	1.06	1.05	1.03	1.03	1.01	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed
LIVRMR_2 60 kV	Basecase	P0	Normal	High	1.02	1.02	0.99	1.05	1.05	1.03	1.03	1.01	1.03	1.04	1.05	N/A	System adjustments or voltage support if needed



Study Area: **PG&E Greater Bay Area**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
LKWD_JCT 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.05	1.06	1.07	1.07	1.01	1.03	1.04	1.05	N/A	System adjustments or voltage support if needed	
LLAGAS 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed	
LMEC 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.03	1.06	1.06	1.06	1.06	1.04	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed	
LOS ALTS 60 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.06	1.03	1.03	1.02	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed	
LOS GATS 60 kV	Basecase	P0	Normal	High	1.00	1.01	1.00	1.03	1.06	1.01	1.02	1.01	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed	
LOYOLA 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.03	1.06	1.03	1.03	1.03	1.03	1.04	1.02	N/A	System adjustments or voltage support if needed	
LPOSTAS 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.06	1.06	1.03	1.03	1.02	1.01	1.03	1.01	N/A	System adjustments or voltage support if needed	
LSPLGS&1 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	1.07	1.03	1.02	1.00	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed	
LSPLGSJT 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.07	1.03	1.03	1.01	1.00	1.05	1.02	N/A	System adjustments or voltage support if needed	
MABURY 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	1.07	1.04	1.03	1.00	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed	
MABURY 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	1.07	1.04	1.02	0.99	1.04	1.05	1.05	N/A	System adjustments or voltage support if needed	
MABURY J 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.99	1.04	1.06	1.04	1.03	1.00	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed	
MARKHAM 115 kV	Basecase	P0	Normal	High	0.99	0.98	0.99	1.04	1.05	1.03	1.02	1.00	1.00	1.05	1.02	N/A	System adjustments or voltage support if needed	
MARKHM J 115 kV	Basecase	P0	Normal	High	0.99	0.98	0.99	1.04	1.05	1.03	1.02	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed	
MARTIN C 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.07	1.02	1.04	1.02	1.04	1.05	1.05	N/A	System adjustments or voltage support if needed	
MCKEE 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.99	1.05	1.06	1.04	1.03	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed	
MDLRVRT 60 kV	Basecase	P0	Normal	High	1.05	1.04	1.03	1.05	1.07	1.05	1.05	1.04	1.00	1.05	1.02	N/A	System adjustments or voltage support if needed	
MEDW LNE 115 kV	Basecase	P0	Normal	High	1.02	1.02	0.99	1.05	1.06	1.07	1.07	1.01	0.98	1.04	1.02	N/A	System adjustments or voltage support if needed	
MILLBRAE 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.06	1.03	1.03	1.02	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed	
MILLBRAE 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.05	1.03	1.04	1.02	1.04	1.05	1.05	N/A	System adjustments or voltage support if needed	
MILPITAS 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	1.06	1.04	1.03	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed	
MISSION 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	1.07	1.02	1.04	1.02	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed	
MLLBREP 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.05	1.03	1.04	1.02	0.98	1.05	1.01	N/A	System adjustments or voltage support if needed	
MLLBTP97 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.07	1.03	1.03	1.01	0.99	1.05	1.01	N/A	System adjustments or voltage support if needed	
MNLOCT2 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.03	1.07	1.03	1.02	1.00	1.00	-1000.00	1.02	N/A	System adjustments or voltage support if needed	
MNTA VSA 60 kV	Basecase	P0	Normal	High	1.05	1.06	1.05	1.04	1.06	1.04	1.04	1.05	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed	
MONTAV&1 230 kV	Basecase	P0	Normal	High	1.02	1.03	1.01	1.04	1.06	1.04	1.03	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed	
MONTAVIS 230 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.05	1.07	1.05	1.04	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed	
MORGN J1 115 kV	Basecase	P0	Normal	High	1.01	1.00	1.02	1.05	1.08	1.05	1.04	1.01	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed	
MORGN J2 115 kV	Basecase	P0	Normal	High	1.01	1.00	1.02	1.05	1.08	1.05	1.04	1.01	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed	
MRGN HIL 115 kV	Basecase	P0	Normal	High	1.00	0.99	1.00	1.05	1.08	1.05	1.03	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed	
MTCALF D 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.07	1.08	1.07	1.06	1.03	1.00	1.05	1.02	N/A	System adjustments or voltage support if needed	
MTCALF E 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.07	1.08	1.07	1.06	1.03	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed	
OX_MTN60 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.02	1.04	1.07	1.03	1.04	1.01	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed	

Study Area: **PG&E Greater Bay Area**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
OXMTN_TP 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.02	1.04	1.07	1.03	1.04	1.01	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed	
PACIFICA 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.05	1.03	1.03	1.01	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed	
PARKS 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.01	1.03	1.03	1.03	N/A	System adjustments or voltage support if needed	
PARKS TP 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.01	1.05	1.04	1.05	N/A	System adjustments or voltage support if needed	
PIERCY 115 kV	Basecase	P0	Normal	High	1.01	1.01	1.01	1.05	1.07	1.05	1.04	1.02	1.05	1.04	1.05	N/A	System adjustments or voltage support if needed	
PITSBURG 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.03	1.06	1.06	1.06	1.06	1.04	1.01	1.03	1.00	N/A	System adjustments or voltage support if needed	
POT_SVC 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	1.07	1.03	1.04	1.03	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed	
POTRERO 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	1.07	1.03	1.04	1.03	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
PRAXAIR 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
PRMNT J3 60 kV	Basecase	P0	Normal	High	1.05	1.06	1.05	1.04	1.06	1.04	1.04	1.05	1.02	1.06	1.02	N/A	System adjustments or voltage support if needed	
Q1454 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.07	1.08	1.07	1.05	1.03	1.00	1.05	1.00	N/A	System adjustments or voltage support if needed	
RADUM 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.00	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
RALSTON 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.08	1.03	1.03	1.01	1.03	1.06	1.02	N/A	System adjustments or voltage support if needed	
RINGWOODSWST 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	1.06	1.04	1.03	1.00	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
RLSTN35 60 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.04	1.07	1.03	1.04	1.01	1.00	1.04	1.00	N/A	System adjustments or voltage support if needed	
RLSTN45 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.08	1.03	1.03	1.01	1.00	1.04	1.00	N/A	System adjustments or voltage support if needed	
RVNSWD D 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.02	1.05	1.05	1.04	1.04	1.03	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
RVNSWD E 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.02	1.05	1.05	1.04	1.04	1.03	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
S.L.A.C. 230 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.07	1.03	1.03	1.01	0.99	1.03	0.98	N/A	System adjustments or voltage support if needed	
S.L.A.C. 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.03	1.07	1.03	1.02	1.00	0.99	1.03	0.98	N/A	System adjustments or voltage support if needed	
SAN MATO 60 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.05	1.03	1.03	1.02	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
SAN RAMN 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.99	1.05	1.06	1.04	1.04	1.01	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
SANMATEO 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.03	1.05	1.02	1.03	1.02	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
SANPAULA 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.06	1.03	1.03	1.02	1.03	1.06	1.02	N/A	System adjustments or voltage support if needed	
SARATOGA 230 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	1.06	1.04	1.03	1.00	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed	
SENER 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	1.07	1.04	1.02	0.99	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed	
SENER J 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	1.07	1.04	1.02	0.99	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed	
SERRMTE 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.07	1.02	1.04	1.02	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed	
SFIA 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.06	1.02	1.03	1.02	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed	
SFIA-MA 115 kV	Basecase	P0	Normal	High	1.02	1.03	1.00	1.03	1.06	1.02	1.03	1.01	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed	
SHAWROAD 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.06	1.03	1.04	1.02	1.02	1.06	1.02	N/A	System adjustments or voltage support if needed	
SLAC TAP 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.03	1.07	1.03	1.02	1.00	1.00	1.05	1.01	N/A	System adjustments or voltage support if needed	
SLACTAP1 230 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.07	1.04	1.03	1.01	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed	
SLACTAP2 230 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	1.07	1.04	1.03	1.01	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed	

Study Area: **PG&E Greater Bay Area**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
SN BRNOT 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.05	1.03	1.03	1.02	1.03	1.06	1.02	N/A	System adjustments or voltage support if needed	
SNANDRES 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.05	1.03	1.04	1.02	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed	
SNRAMONJ 60 kV	Basecase	P0	Normal	High	1.02	1.02	0.99	1.05	1.05	1.03	1.03	1.01	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed	
SNTACLRAICT 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	1.06	1.03	1.03	1.02	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed	
SNTACLRAWIND 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	1.06	1.03	1.03	1.02	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed	
ST TRESA 115 kV	Basecase	P0	Normal	High	1.03	1.02	1.02	1.06	1.08	1.06	1.05	1.02	1.02	1.05	1.02	N/A	System adjustments or voltage support if needed	
STACK 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	1.06	1.04	1.03	1.00	1.01	1.05	1.02	N/A	System adjustments or voltage support if needed	
STANFORD 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.03	1.07	1.02	1.02	1.00	1.01	1.05	1.01	N/A	System adjustments or voltage support if needed	
STONE &1 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.99	1.04	1.06	1.04	1.02	1.00	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed	
STONE 115 kV	Basecase	P0	Normal	High	0.99	0.98	0.99	1.04	1.05	1.04	1.02	0.99	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed	
SUNOL 60 kV	Basecase	P0	Normal	High	1.02	1.02	0.98	1.05	1.06	1.03	1.02	1.00	1.02	1.06	1.02	N/A	System adjustments or voltage support if needed	
SWIFT 115 kV	Basecase	P0	Normal	High	1.00	1.00	1.00	1.05	1.06	1.05	1.04	1.00	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed	
TRAN230A 230 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.04	1.07	1.04	1.03	1.02	0.98	1.04	0.98	N/A	System adjustments or voltage support if needed	
TRAN230B 230 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.04	1.07	1.03	1.03	1.02	0.98	1.04	0.98	N/A	System adjustments or voltage support if needed	
TRAN-60 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.07	1.03	1.03	1.01	0.98	1.04	0.99	N/A	System adjustments or voltage support if needed	
UAL TAP 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.06	1.02	1.03	1.02	0.98	1.04	0.99	N/A	System adjustments or voltage support if needed	
UNITEDSP 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.98	1.04	0.99	N/A	System adjustments or voltage support if needed	
VALLCITJ 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.00	0.98	1.04	0.98	N/A	System adjustments or voltage support if needed	
VALLECTS 60 kV	Basecase	P0	Normal	High	1.02	1.02	0.98	1.06	1.06	1.03	1.02	1.00	0.96	1.04	0.97	N/A	System adjustments or voltage support if needed	
VASJCCT. 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.06	1.06	1.03	1.03	1.02	0.99	1.03	0.98	N/A	System adjustments or voltage support if needed	
VASCO 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.06	1.06	1.03	1.03	1.02	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
VASONA 230 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	1.06	1.04	1.03	1.00	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
VINEYARD 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.00	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed	
W.P.BART 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.05	1.05	1.06	1.03	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed	
WALNUTCR 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.05	1.06	1.07	1.07	1.01	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed	
WATRSHEd 60 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.04	1.07	1.03	1.04	1.01	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed	
WOODSIDE 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	1.08	1.03	1.02	1.00	1.02	1.03	1.02	N/A	System adjustments or voltage support if needed	
WTRSHDTP 60 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.04	1.07	1.03	1.04	1.01	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed	
AMAZONHYWD 230 kV	P1-2:A10:1: EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	Low	0.99	0.99	0.97	1.01	1.02	1.02	1.02	0.99	0.84	1.01	0.99	N/A	Sensitivity only	
AMAZONHYWD 230 kV	P1-2:A16:13: EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	Low	0.99	0.99	0.97	1.01	1.02	1.02	1.02	0.99	0.84	1.01	0.99	N/A	Sensitivity only	
SWIFT 115 kV	P1-2:A16:55: NEWARK F-RINGWOODSWST #1 115KV [0] & P1-2:A18:29: SWIFT-METCALF 115KV [3900]	P6	N-1-1	Low	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: San Jose area HVDC	
ALMADEN 60 kV	P1-2:A17:34: MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	Low	0.92	0.91	0.88	1.05	1.10	1.01	0.99	0.92	0.92	1.04	0.91	0.81	Continue to monitor	
LOS GATS 60 kV	P1-2:A17:34: MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	Low	0.89	0.88	0.84	1.04	1.10	0.99	0.98	0.89	0.89	1.03	0.88	0.77	Disable automatics	
MRGN HIL 115 kV	P1-2:A18:37: METCALF-MORGAN HILL 115KV [2570]	P1	N-1	Low	0.91	0.93	0.97	1.01	1.07	1.00	1.00	0.94	0.88	1.01	0.98	N/A	Continue to monitor	
AWSGILROY1 115 kV	P1-2:A18:38: MTCALF D-LLAGAS 115KV [0]	P1	N-1	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC	
AWSGILROY2 115 kV	P1-2:A18:38: MTCALF D-LLAGAS 115KV [0]	P1	N-1	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC	
GILROY F 115 kV	P1-2:A18:38: MTCALF D-LLAGAS 115KV [0]	P1	N-1	Low	0.97	0.90	1.00	1.01	1.07	1.00	0.98	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC	
LLAGAS 115 kV	P1-2:A18:38: MTCALF D-LLAGAS 115KV [0]	P1	N-1	Low	0.97	0.90	1.00	1.01	1.07	1.01	0.98	0.93	0.94	1.01	0.98	0.89	Project: San Jose area HVDC	

Study Area: **PG&E Greater Bay Area**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)							Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast		2035 ATE	
GILROY F 115 kV	P1-2:A18:38:_MTCALF D-LLAGAS 115KV [0] & P1-2:A18:37:_METCALF-MORGAN HILL 115KV [2570]	P6	N-1-1	Low	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: San Jose area HVDC
AWSGILROY1 115 kV	P1-2:A18:40:_MRGN HIL-AWSGILROYSS #1 115KV [0]	P1	N-1	Low	0.98	0.90	1.00	1.02	1.07	1.01	0.99	0.94	0.96	1.01	0.99	N/A	Project: San Jose area HVDC	
AWSGILROY2 115 kV	P1-2:A18:40:_MRGN HIL-AWSGILROYSS #1 115KV [0]	P1	N-1	Low	0.98	0.90	1.00	1.02	1.07	1.01	0.99	0.94	0.96	1.01	0.99	N/A	Project: San Jose area HVDC	
GILROY F 115 kV	P1-2:A18:40:_MRGN HIL-AWSGILROYSS #1 115KV [0]	P1	N-1	Low	0.98	0.90	1.01	1.02	1.07	1.01	0.99	0.94	0.96	1.01	0.99	N/A	Project: San Jose area HVDC	
LLAGAS 115 kV	P1-2:A18:40:_MRGN HIL-AWSGILROYSS #1 115KV [0]	P1	N-1	Low	0.98	0.90	1.01	1.02	1.07	1.01	0.99	0.94	0.96	1.01	0.99	N/A	Project: San Jose area HVDC	
LLAGAS 115 kV	P1-2:A18:40:_MRGN HIL-AWSGILROYSS #1 115KV [0] & P1-2:A18:41:_LLAGAS-GILROY F-GILROYENG-GILROYPK 115KV [0]	P6	N-1-1	Low	0.88	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: San Jose area HVDC
EDES 115 kV	P1-2:A7:2:_SAN LEANDRO-OAKLND J #1 115KV [3520] & P1-2:A16:29:_GRANT-STATIN J-EDES 115KV [0]	P6	N-1-1	Low	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor
STATIN J 115 kV	P1-2:A7:2:_SAN LEANDRO-OAKLND J #1 115KV [3520] & P1-2:A16:29:_GRANT-STATIN J-EDES 115KV [0]	P6	N-1-1	Low	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor
GILROY F 115 kV	P2-1:A18:29:_METCALF-GREEN VALLEY 115KV [2540] (MTCALF D-MORGN J1)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.01	1.07	1.01	0.98	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC	
LLAGAS 115 kV	P2-1:A18:29:_METCALF-GREEN VALLEY 115KV [2540] (MTCALF D-MORGN J1)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.89	Project: San Jose area HVDC	
AWSGILROY1 115 kV	P2-1:A18:31:_GREEN VALLEY-LLAGAS 115KV [1720] (LLAGAS-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC	
AWSGILROY2 115 kV	P2-1:A18:31:_GREEN VALLEY-LLAGAS 115KV [1720] (LLAGAS-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC	
GILROY F 115 kV	P2-1:A18:31:_GREEN VALLEY-LLAGAS 115KV [1720] (LLAGAS-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.01	1.07	1.01	0.98	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC	
LLAGAS 115 kV	P2-1:A18:31:_GREEN VALLEY-LLAGAS 115KV [1720] (LLAGAS-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.01	1.07	1.01	0.98	0.93	0.94	1.01	0.98	0.89	Project: San Jose area HVDC	
GILROY F 115 kV	P2-1:A18:34:_METCALF-GREEN VALLEY 115KV [2540] (MORGN J1-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.01	1.07	1.01	0.98	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC	
LLAGAS 115 kV	P2-1:A18:34:_METCALF-GREEN VALLEY 115KV [2540] (MORGN J1-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.89	Project: San Jose area HVDC	
BARTRC 115 kV	P2-2:A16:42:_NEWARK F 115KV SECTION 1F	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor	
MILPITAS 115 kV	P2-2:A16:42:_NEWARK F 115KV SECTION 1F	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor	
STACK 115 kV	P2-2:A16:42:_NEWARK F 115KV SECTION 1F	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.86	0.92	1.04	0.90	0.76	Continue to monitor	
AWSGILROY1 115 kV	P2-2:A18:45:_MRGN HIL 115KV SECTION 1D	P2	Bus/Breaker	Low	0.98	0.90	1.00	1.02	1.07	1.01	0.99	0.94	0.97	1.01	0.99	N/A	Project: San Jose area HVDC	
AWSGILROY2 115 kV	P2-2:A18:45:_MRGN HIL 115KV SECTION 1D	P2	Bus/Breaker	Low	0.98	0.90	1.00	1.02	1.07	1.01	0.99	0.94	0.97	1.01	0.99	N/A	Project: San Jose area HVDC	
GILROY F 115 kV	P2-2:A18:45:_MRGN HIL 115KV SECTION 1D	P2	Bus/Breaker	Low	0.98	0.90	1.01	1.02	1.07	1.01	0.99	0.94	0.97	1.01	0.99	N/A	Project: San Jose area HVDC	
LLAGAS 115 kV	P2-2:A18:45:_MRGN HIL 115KV SECTION 1D	P2	Bus/Breaker	Low	0.98	0.90	1.01	1.02	1.07	1.01	0.99	0.94	0.97	1.01	0.99	N/A	Project: San Jose area HVDC	
BARTRC 115 kV	P2-3:A16:15:_NEWARK F - 1F 115KV & NEWARK F-LAWRENCE-LOCKHD 1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor	
MILPITAS 115 kV	P2-3:A16:15:_NEWARK F - 1F 115KV & NEWARK F-LAWRENCE-LOCKHD 1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor	
STACK 115 kV	P2-3:A16:15:_NEWARK F - 1F 115KV & NEWARK F-LAWRENCE-LOCKHD 1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.86	0.92	1.04	0.90	0.76	Continue to monitor	
BARTRC 115 kV	P2-3:A16:16:_NEWARK F - 1F 115KV & NEWARK F-ZANKER-KRS LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor	
MILPITAS 115 kV	P2-3:A16:16:_NEWARK F - 1F 115KV & NEWARK F-ZANKER-KRS LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor	
STACK 115 kV	P2-3:A16:16:_NEWARK F - 1F 115KV & NEWARK F-ZANKER-KRS LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.86	0.92	1.04	0.90	0.76	Continue to monitor	
BARTRC 115 kV	P2-3:A16:17:_NEWARK F - 1F 115KV & NEWARK-MILPITAS #1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor	
MILPITAS 115 kV	P2-3:A16:17:_NEWARK F - 1F 115KV & NEWARK-MILPITAS #1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor	
STACK 115 kV	P2-3:A16:17:_NEWARK F - 1F 115KV & NEWARK-MILPITAS #1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.86	0.92	1.04	0.90	0.76	Continue to monitor	
BARTRC 115 kV	P2-4:A16:20:_NEWARK E SECTION 1E & NEWARK F SECTION 1F 115KV	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor	
MILPITAS 115 kV	P2-4:A16:20:_NEWARK E SECTION 1E & NEWARK F SECTION 1F 115KV	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor	
STACK 115 kV	P2-4:A16:20:_NEWARK E SECTION 1E & NEWARK F SECTION 1F 115KV	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.02	0.86	0.92	1.04	0.90	0.76	Continue to monitor	
CAROLDS 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.96	0.96	0.85	0.94	1.01	0.94	0.92	0.85	0.96	0.93	0.96	0.70	Install redundant relay	
CRVSTLSG 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.88	0.87	0.75	0.87	0.99	0.87	0.84	0.76	0.91	0.86	0.87	0.55	Install redundant relay	
EMRLD LE 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.89	0.89	0.76	0.88	0.99	0.88	0.85	0.76	0.91	0.87	0.88	0.57	Install redundant relay	

Study Area: **PG&E Greater Bay Area**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
HILLSIDE 60 kV	P5-5A:A10:1_ JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.98	0.98	0.89	0.97	1.02	0.97	0.95	0.89	0.97	0.96	0.97	0.77	Install redundant relay
HLF MNBY 60 kV	P5-5A:A10:1_ JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.99	0.99	0.87	0.96	1.03	0.95	0.93	0.84	0.97	0.95	0.98	0.70	Install redundant relay
LAS PLGS 60 kV	P5-5A:A10:1_ JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.87	0.87	0.74	0.88	0.99	0.87	0.84	0.74	0.90	0.87	0.86	0.54	Install redundant relay
RALSTON 60 kV	P5-5A:A10:1_ JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.88	0.88	0.75	0.87	0.99	0.87	0.84	0.76	0.91	0.86	0.87	0.55	Install redundant relay
STANFORD 60 kV	P5-5A:A10:1_ JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.87	0.87	0.74	0.87	0.98	0.86	0.83	0.74	0.90	0.86	0.86	0.54	Install redundant relay
WATRSHE 60 kV	P5-5A:A10:1_ JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.92	0.92	0.80	0.91	1.00	0.91	0.88	0.80	0.93	0.90	0.91	0.63	Install redundant relay
WOODSIDE 60 kV	P5-5A:A10:1_ JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.87	0.87	0.74	0.88	0.99	0.87	0.84	0.75	0.91	0.87	0.87	0.55	Install redundant relay
BAIR 115 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.80	0.77	0.74	0.85	0.85	0.86	0.85	0.79	0.79	0.85	0.77	0.69	Install redundant relay
BELMONT 115 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.85	0.83	0.80	0.90	0.90	0.90	0.89	0.84	0.84	0.90	0.83	0.75	Install redundant relay
BLLE HVN 60 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.53	0.51	0.46	0.64	0.63	0.65	0.61	0.54	0.54	0.64	0.51	0.41	Install redundant relay
GLENWOOD 60 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.49	0.47	0.41	0.61	0.60	0.62	0.58	0.49	0.50	0.61	0.47	0.35	Install redundant relay
LONESTAR 115 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.80	0.77	0.74	0.85	0.85	0.86	0.85	0.79	0.79	0.85	0.77	0.69	Install redundant relay
MENLO 60 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.49	0.47	0.40	0.61	0.60	0.61	0.58	0.49	0.50	0.61	0.46	0.35	Install redundant relay
MENLO G 60 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.49	0.47	0.40	0.61	0.60	0.61	0.58	0.49	0.50	0.61	0.46	0.35	Install redundant relay
NRTHGRUM 60 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.48	0.47	0.42	0.59	0.58	0.64	0.61	0.50	0.50	0.59	0.46	0.37	Install redundant relay
ORACLE60 60 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.79	0.77	0.73	0.85	0.84	0.85	0.84	0.78	0.79	0.85	0.77	0.68	Install redundant relay
REDWOOD 60 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.62	0.60	0.55	0.72	0.70	0.72	0.69	0.62	0.62	0.72	0.59	0.49	Install redundant relay
SAN CRLS 60 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.67	0.65	0.60	0.76	0.75	0.76	0.74	0.67	0.68	0.76	0.65	0.55	Install redundant relay
SHREDDER 115 kV	P5-5A:A10:9_ RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.80	0.77	0.74	0.85	0.85	0.86	0.85	0.79	0.79	0.85	0.77	0.69	Install redundant relay
SANRAMON 230 kV	P5-5A:A8:5_ PITTSBURG PP 230KV (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.97	0.97	0.90	1.02	1.04	1.01	1.00	0.93	0.92	1.00	0.96	NConv	Install redundant relay
BAIR 115 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.76	0.70	0.69	0.85	0.86	0.87	0.84	0.76	Diverge	0.85	0.70	NConv	Install redundant battery supply
BELMONT 115 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.82	0.76	0.75	0.89	0.90	0.91	0.89	0.80	Diverge	0.89	0.75	NConv	Install redundant battery supply
BERESFRD 60 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.96	0.91	0.90	1.00	1.01	1.00	0.99	0.92	Diverge	1.00	0.90	NConv	Install redundant battery supply
BLLE HVN 60 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.51	0.47	0.43	0.64	0.64	0.65	0.60	0.51	Diverge	0.64	0.46	NConv	Install redundant battery supply
CALTRAINSS 115 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.98	0.91	0.91	1.02	1.03	1.01	1.01	0.94	Diverge	1.02	0.90	N/A	Install redundant battery supply
EMBRCDRD 230 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.97	0.91	0.92	1.01	1.01	1.00	0.99	0.93	Diverge	1.01	0.90	N/A	Install redundant battery supply
EST GRND 115 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.98	0.91	0.91	1.02	1.03	1.01	1.01	0.94	Diverge	1.02	0.90	N/A	Install redundant battery supply
GLENWOOD 60 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.47	0.43	0.38	0.61	0.60	0.62	0.58	0.47	Diverge	0.60	0.42	NConv	Install redundant battery supply
MENLO 60 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.46	0.43	0.38	0.61	0.60	0.62	0.57	0.46	Diverge	0.60	0.42	NConv	Install redundant battery supply
MENLO G 60 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.46	0.43	0.38	0.61	0.60	0.62	0.57	0.46	Diverge	0.60	0.42	NConv	Install redundant battery supply
NRTHGRUM 60 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.46	0.43	0.39	0.58	0.58	0.65	0.60	0.47	Diverge	0.58	0.42	NConv	Install redundant battery supply
ORACLE60 60 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.76	0.71	0.68	0.84	0.84	0.86	0.83	0.74	Diverge	0.84	0.70	NConv	Install redundant battery supply
POTRERO 230 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.97	0.91	0.91	1.01	1.01	1.00	0.99	0.93	Diverge	1.01	0.89	N/A	Install redundant battery supply
REDWOOD 60 kV	P5-5C:A10:2_ RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.59	0.55	0.51	0.71	0.71	0.72	0.69	0.59	Diverge	0.71	0.53	NConv	Install redundant battery supply

Study Area: **PG&E Greater Bay Area**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
SAN CRLS 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.64	0.59	0.56	0.75	0.75	0.77	0.74	0.64	Diverge	0.75	0.58	NConv	Install redundant battery supply	
SAN MATO 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.90	0.89	1.00	1.00	1.00	0.99	0.92	Diverge	1.00	0.89	NConv	Install redundant battery supply	
SFIA-MA 115 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.91	0.91	1.02	1.02	1.02	1.00	0.94	Diverge	1.02	0.90	N/A	Install redundant battery supply	
BARTRC 115 kV	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.92	0.89	0.83	1.04	1.12	1.05	1.02	0.86	0.92	1.04	0.90	0.74	Install redundant battery supply	
MILPITAS 115 kV	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.92	0.89	0.83	1.04	1.12	1.05	1.02	0.86	0.92	1.04	0.90	0.74	Install redundant battery supply	
STACK 115 kV	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.92	0.89	0.82	1.04	1.11	1.05	1.02	0.86	0.92	1.04	0.90	0.74	Install redundant battery supply	
AGNEW 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.99	0.92	Diverge	1.03	1.02	1.03	1.01	0.99	Diverge	1.03	0.92	N/A	Install redundant battery supply	
ALMADEN 60 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.95	0.88	Diverge	1.04	1.07	1.02	1.00	0.96	Diverge	1.03	0.88	N/A	Install redundant battery supply	
AMAZONHYWD 230 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.99	0.96	Diverge	1.02	1.02	1.02	1.01	0.98	Diverge	1.01	0.96	N/A	Install redundant battery supply	
BARTLP 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.90	Diverge	1.03	1.05	1.02	1.00	0.97	Diverge	1.03	0.90	N/A	Install redundant battery supply	
BARTRC 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.91	Diverge	1.03	1.04	1.03	1.01	0.97	Diverge	1.02	0.91	N/A	Install redundant battery supply	
CALTRAINSSJ 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.88	Diverge	1.02	1.03	1.02	0.99	0.98	Diverge	1.02	0.88	N/A	Install redundant battery supply	
CP LECEF 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.99	0.92	Diverge	1.03	1.03	1.03	1.01	0.99	Diverge	1.03	0.92	N/A	Install redundant battery supply	
CRYOGEN 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.89	Diverge	1.01	1.03	1.00	0.98	0.96	Diverge	1.01	0.90	N/A	Install redundant battery supply	
DIXON LD 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.91	Diverge	1.03	1.04	1.02	1.00	0.97	Diverge	1.02	0.91	N/A	Install redundant battery supply	
EL PATIO 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.90	Diverge	1.03	1.04	1.03	1.00	0.99	Diverge	1.03	0.90	N/A	Install redundant battery supply	
EVGRN 1 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.90	Diverge	1.03	1.04	1.03	1.01	0.99	Diverge	1.03	0.90	N/A	Install redundant battery supply	
FMC 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.88	Diverge	1.02	1.03	1.02	0.99	0.98	Diverge	1.02	0.88	N/A	Install redundant battery supply	
JARVIS 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.89	Diverge	1.01	1.03	1.00	0.98	0.96	Diverge	1.01	0.90	N/A	Install redundant battery supply	
JV BART 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.89	Diverge	1.01	1.03	1.00	0.98	0.96	Diverge	1.01	0.90	N/A	Install redundant battery supply	
LOCKHD 1 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.92	Diverge	1.02	1.02	1.02	1.00	0.99	Diverge	1.02	0.92	N/A	Install redundant battery supply	
LOCKHD 2 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.92	Diverge	1.01	1.00	1.01	1.00	0.98	Diverge	1.01	0.92	N/A	Install redundant battery supply	
MABURY 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.90	Diverge	1.03	1.05	1.02	1.00	0.97	Diverge	1.03	0.90	N/A	Install redundant battery supply	
MABURY 60 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.89	Diverge	1.04	1.06	1.03	1.01	0.98	Diverge	1.03	0.90	N/A	Install redundant battery supply	
MCKEE 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.91	Diverge	1.03	1.04	1.03	1.01	0.98	Diverge	1.03	0.91	N/A	Install redundant battery supply	
MILPITAS 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.90	Diverge	1.03	1.04	1.03	1.01	0.96	Diverge	1.02	0.91	N/A	Install redundant battery supply	
MOFT.FLD 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.92	Diverge	1.02	1.02	1.02	1.00	0.99	Diverge	1.02	0.92	N/A	Install redundant battery supply	
MONTAGUE 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.91	Diverge	1.03	1.03	1.03	1.01	0.98	Diverge	1.02	0.91	N/A	Install redundant battery supply	
MSFTS/JDC 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.99	0.92	Diverge	1.03	1.03	1.03	1.01	0.99	Diverge	1.03	0.92	N/A	Install redundant battery supply	
NORTECH 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.99	0.89	Diverge	1.03	1.03	1.03	1.00	0.98	Diverge	1.03	0.90	N/A	Install redundant battery supply	
NWK DIST 230 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.90	Diverge	1.02	1.02	1.02	1.00	0.98	Diverge	1.01	0.90	N/A	Install redundant battery supply	
SN JSE A 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.89	Diverge	1.03	1.03	1.03	1.00	0.99	Diverge	1.02	0.89	N/A	Install redundant battery supply	
STACK 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.90	Diverge	1.03	1.04	1.03	1.01	0.96	Diverge	1.02	0.91	N/A	Install redundant battery supply	
STONE 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.89	Diverge	1.03	1.04	1.03	1.00	0.98	Diverge	1.02	0.89	N/A	Install redundant battery supply	

Study Area: **PG&E Greater Bay Area**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
SUNOL 60 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.99	0.95	Diverge	1.05	1.04	1.02	1.00	0.97	Diverge	1.03	0.95	N/A	Install redundant battery supply	
TRIMBLE 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.98	0.90	Diverge	1.03	1.02	1.03	1.00	0.98	Diverge	1.02	0.90	N/A	Install redundant battery supply	
WESTRN_D 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.98	0.91	Diverge	1.02	1.02	1.02	1.00	0.97	Diverge	1.02	0.91	N/A	Install redundant battery supply	
AWSGILROY1 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	Diverge	Diverge	Diverge	0.92	0.95	0.90	0.90	Diverge	Diverge	0.88	Diverge	N/A	Install redundant battery supply	
AWSGILROY2 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	Diverge	Diverge	Diverge	0.92	0.95	0.90	0.90	Diverge	Diverge	0.88	Diverge	N/A	Install redundant battery supply	
GILROY F 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	Diverge	Diverge	Diverge	0.92	0.95	0.90	0.90	Diverge	Diverge	0.88	Diverge	N/A	Install redundant battery supply	
LAGAS 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	Diverge	Diverge	Diverge	0.92	0.95	0.90	0.90	Diverge	Diverge	0.88	Diverge	N/A	Install redundant battery supply	
MRGN HIL 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	Diverge	Diverge	Diverge	0.93	0.94	0.91	0.91	Diverge	Diverge	0.89	Diverge	N/A	Install redundant battery supply	
ALMADEN 60 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.88	0.84	0.88	1.00	1.04	0.98	0.95	0.95	0.83	1.00	0.83	NConv	Install redundant battery supply	
AWSGILROY1 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	>0.9	0.51	0.98	>0.9	1.02	>0.9	0.83	0.72	>0.9	>0.9	0.85	NConv	Install redundant battery supply	
AWSGILROY2 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	>0.9	0.51	0.98	>0.9	1.02	>0.9	0.83	0.72	>0.9	>0.9	0.85	NConv	Install redundant battery supply	
BARTLP 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.93	0.91	0.90	1.02	1.03	1.00	0.99	0.95	0.91	1.02	0.90	NConv	Install redundant battery supply	
CALTRAINSSJ 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.93	0.89	0.95	1.00	1.01	0.99	0.97	1.00	0.89	1.00	0.88	N/A	Install redundant battery supply	
EL PATIO 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.92	0.88	0.94	1.00	1.01	0.99	0.97	0.99	0.88	1.00	0.87	N/A	Install redundant battery supply	
EVGRN 1 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.90	0.86	0.93	0.99	1.01	0.99	0.96	0.98	0.87	0.99	0.85	N/A	Install redundant battery supply	
FMC 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.93	0.89	0.95	1.00	1.01	0.99	0.97	1.00	0.89	1.00	0.88	N/A	Install redundant battery supply	
GILROY F 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	>0.9	>0.9	0.98	>0.9	1.02	>0.9	0.83	>0.9	>0.9	>0.9	0.86	N/A	Install redundant battery supply	
LLAGAS 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	>0.9	0.50	0.98	>0.9	1.02	>0.9	0.83	0.72	>0.9	>0.9	0.85	NConv	Install redundant battery supply	
MABURY 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.93	0.91	0.90	1.02	1.03	1.00	0.99	0.95	0.91	1.02	0.90	NConv	Install redundant battery supply	
MABURY 60 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.90	0.86	0.91	1.00	1.03	0.99	0.96	0.97	0.86	1.00	0.85	NConv	Install redundant battery supply	
MCKEE 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.93	0.91	0.89	1.02	1.02	1.00	0.99	0.94	0.91	1.02	0.90	NConv	Install redundant battery supply	
MRGN HIL 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	>0.9	0.61	0.96	>0.9	1.02	>0.9	0.87	0.77	>0.9	>0.9	0.87	NConv	Install redundant battery supply	
PIERCY 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.92	0.90	0.88	1.01	1.00	1.00	0.98	0.94	0.90	1.01	0.89	NConv	Install redundant battery supply	
SN JSE A 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.92	0.88	0.95	1.00	1.01	0.99	0.97	0.99	0.88	1.00	0.87	N/A	Install redundant battery supply	
STONE 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.90	0.86	0.92	0.99	1.00	0.98	0.96	0.97	0.86	0.99	0.85	N/A	Install redundant battery supply	
SWIFT 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.94	0.91	0.90	1.02	1.02	1.02	1.00	0.94	0.92	1.02	0.91	NConv	Install redundant battery supply	
ALMADEN 60 kV	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.95	0.90	0.93	1.03	1.07	1.01	0.99	0.97	0.90	1.03	0.90	0.83	Install redundant battery supply	
CALTRAINSSJ 115 kV	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.95	0.89	0.96	1.01	1.02	1.01	0.98	0.99	0.91	1.01	0.89	0.88	Install redundant battery supply	
FMC 115 kV	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.95	0.89	0.96	1.01	1.02	1.01	0.98	0.99	0.91	1.01	0.89	0.88	Install redundant battery supply	
MONTAGUE 115 kV	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.95	0.90	0.94	1.01	1.01	1.01	0.99	0.98	0.90	1.00	0.90	0.86	Install redundant battery supply	
NORTECH 115 kV	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.96	0.89	0.95	1.00	1.00	1.00	0.96	0.98	0.92	1.00	0.88	0.87	Install redundant battery supply	
CLAYTN 115 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.78	0.72	0.47	1.01	1.06	1.11	1.11	0.58	0.65	1.00	0.59	NConv	Install redundant battery supply	
LAKEWD-C 115 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.81	0.76	0.53	1.01	1.06	1.10	1.10	0.63	0.69	1.00	0.64	NConv	Install redundant battery supply	
LAKEWD-M 115 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	Low	0.81	0.76	0.53	1.01	1.06	1.10	1.10	0.64	0.70	1.00	0.64	NConv	Install redundant battery supply	

Study Area: **PG&E Greater Bay Area**



High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)							Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast		2035 ATE
MEDW LNE 115 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.77	0.71	0.45	1.01	1.06	1.11	1.11	0.57	0.63	1.00	0.57	NConv	Install redundant battery supply
SANRAMON 230 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.94	0.93	0.87	1.01	1.04	1.01	1.00	0.92	0.93	1.00	0.91	NConv	Install redundant battery supply
WALNUTCR 115 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.77	0.71	0.46	1.01	1.06	1.11	1.11	0.57	0.63	1.00	0.57	NConv	Install redundant battery supply
EL CRRO 115 kV	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.90	0.92	0.95	0.98	1.05	0.95	0.95	0.88	0.87	0.97	0.92	0.88	Install redundant battery supply
VALLY VW 115 kV	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.91	0.93	0.96	0.98	1.05	0.96	0.96	0.89	0.87	0.98	0.93	0.89	Install redundant battery supply
MORAGA.C 115 kV	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	>0.9	>0.9	>0.9	1.03	>0.9	1.01	>0.9	>0.9	0.89	1.02	>0.9	N/A	Install redundant battery supply
EMBRCDRD 230 kV	P5-5C:A9:2:_MARTIN (SF H) 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	Diverge	Diverge	0.98	1.07	0.92	0.90	0.94	1.00	0.97	Diverge	N/A	Install redundant battery supply
POTRERO 230 kV	P5-5C:A9:2:_MARTIN (SF H) 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.96	Diverge	Diverge	0.98	1.06	0.92	0.90	0.94	1.00	0.97	Diverge	N/A	Install redundant battery supply



Study Area: **PG&E Greater Bay Area**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)									Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
AMAZONHYWD 230 kV	P1-2:A10:1: EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	<8	<8	<8	<8	<8	<8	<8	<8	<8	11	<8	<8	N/A	Sensitivity only
AMAZONHYWD 230 kV	P1-2:A16:13: EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	<8	<8	<8	<8	<8	<8	<8	<8	<8	11	<8	<8	N/A	Sensitivity only
LOS GATS 60 kV	P1-2:A17:34: MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	11	13	15	<8	<8	<8	<8	<8	11	11	<8	12	23	Disable automatics
MIRGN HIL 115 kV	P1-2:A18:37: METCALF-MORGAN HILL 115KV [2570]	P1	N-1	<8	<8	<8	<8	<8	<8	<8	<8	<8	12	<8	<8	N/A	Sensitivity only

Study Area: **PG&E Greater Bay Area**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2027 SP High CEC Forecast	
Failure of non-redundant DC battery supplying MORAGA 230kV and 115 kV Buses	P5	Non-Redundant battery supply	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Install redundant battery supply
Failure of non-redundant DC battery supplying MISSION (SF X) 115 kV Bus	P5	Non-Redundant battery supply	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Install redundant battery supply
Failure of non-redundant DC battery supplying SAN JOSE A 115 kV Buses	P5	Non-Redundant battery supply	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Install redundant battery supply
Permanent fault on Contra Costa-Moraga Nos. CK 1 & 2 230 kV lines	P7	DCTL	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Temporary fault on Contra Costa-Moraga Nos. CK 1 & 2 230 kV lines	P7	DCTL	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Permanent fault on Tesla-Newark 230kV and Tesla-Ravenswood 230kV lines	P7	DCTL	No issue	No issue	No issue	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Temporary fault on Tesla-Newark 230kV and Tesla-Ravenswood 230kV lines	P7	DCTL	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 500/230 kV #13 Transformer 3Ø fault with normal clearing.	P1	N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Metcalf 500/230 kV #13 Transformer 3Ø fault with normal clearing with LMEC offline in the base case.	P3	G-1/N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Metcalf 500/230 kV #13 Transformer SLG fault with delayed clearing.	P5	Non-Redundant Relay	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Tesla-Newark 230 kV line 3Ø fault with normal clearing with Metcalf 500/230 kV #13 Transformer offline in the base case.	P6	N-1-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 230 kV bus 3Ø fault with normal clearing with Metcalf 500/230 kV #13 Transformer offline in the base case.	P6	N-1-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Contra Costa-Gateway 230 kV SLG fault with delayed clearing.	P5	Non-Redundant Relay	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Contra Costa-Gateway 230 kV SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
TBC SLG fault with normal clearing.	P1	N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
TBC SLG fault with normal clearing with LMEC offline in the base case.	P3	G-1/N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
TBC SLG fault with normal clearing with Tesla-Newark 230 kV line offline in the base case.	P6	N-1-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Newark 230 kV 3Ø fault with normal clearing.	P1	N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Tesla-Newark 230 kV line 3Ø fault with normal clearing with LMEC offline in the base case.	P3	G-1/N-1	No issue	No issue	No issue	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Monta Vista 230 kV SVD 3Ø fault with normal clearing.	P1	N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Monta Vista 230 kV SVD 3Ø fault with normal clearing with LMEC offline in the base case.	P3	G-1/N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Monta Vista 230 kV SVD SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Monta Vista 230 kV SVD SLG fault with delayed clearing.	P5	Non-Redundant Relay	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2027 SP High CEC Forecast	
Ravenswood 230 kV SVD 3 $\phi$ fault with normal clearing with Monta Vista 230 kV SVD offline in the base case.	P6	N-1-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Metcalf 230 kV bus SLG fault with normal clearing.	P2	Bus/Breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 230 kV line breaker SLG fault with normal clearing.	P2	Bus/Breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 230 kV bus-tie breaker SLG fault with normal clearing.	P2	Bus/Breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 500/230 kV #13 Transformer SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 230 kV bus SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Crocket 3 $\phi$ fault with normal clearing with LMEC offline in the base case.	P3	G-1/N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
LMEC 3 $\phi$ fault with normal clearing.	P1	N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
DEC 3 $\phi$ fault with normal clearing.	P1	N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Metcalf 115 kV bus-tie breaker SVD SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 115 kV bus SLG fault with delayed clearing.	P5	Non-Redundent Relay	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	PTO to provide actual clearing times and fault impedances
Los Esteros SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Los Esteros SLG fault with delayed clearing.	P5	Non-Redundent Relay	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required

Study Area: **PG&E Greater Bay Area**



**Single Contingency Load Drop**

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		2027 SP High CEC Forecast

No single contingency resulted in total load drop of more than 250 MW

Study Area: **PG&E Greater Bay Area**



**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)										Potential Mitigation Solutions	
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		2027 SP High CEC Forecast

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
34370 MC CALL 115 30877 MCCALL2M 115 2 1	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100	Monitor future forecast
Atwater-Merced 115 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	45	NConv	NA	NA	Project:Wilson 115kV Reinforcement
Atwater-Merced 115 kV Line	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NA	NA	NConv	NA	45	NConv	NA	NA	Install Redundant protection
Atwater-Merced 115 kV Line	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	NConv	NConv	NConv	NConv	40	42	NConv	NConv	NConv	Install Redundant protection
Atwater-Merced 115 kV Line	WILSON-ATWATER #2 115KV [4160] & EL CAPITAN-WILSON 115KV [1510]	P6	N-1-1	124	114	125	<100	<100	<100	<100	115	NA	Review existing Wilson 115kV Reinforcement
Barton-Airways-Sanger 115 kV Line	P1-2:A14:17:_MUSTANG SW STA-GREGG 230KV [4700]	P1	N-1	21	25	37	57	100	13	35	25	NA	Generation Re-dispatch
Barton-Airways-Sanger 115 kV Line	P2-1:A14:5:_MUSTANG SW STA-GREGG 230KV [4700] (GREGG-HENTAP1)	P2-1	Line Section w/o Fault	22	28	40	60	100	10	37	27	NA	Generation Re-dispatch
Barton-Airways-Sanger 115 kV Line	P2-3:A14:15:_HENRIETTA_D - 1D 230KV & MUSTANG SW STA-GREGG LINE	P2-3	Non-Bus-Tie Breaker	21	25	37	57	100	13	35	25	NA	Generation Re-dispatch
Barton-Airways-Sanger 115 kV Line	P2-3:A14:17:_MUSTANGSS 230KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie Breaker	21	25	37	57	100	13	35	25	NA	Generation Re-dispatch
Barton-Airways-Sanger 115 kV Line	P2-3:A14:4:_GREGG 230KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie Breaker	21	26	37	57	101	13	35	25	NA	Generation Re-dispatch
Barton-Airways-Sanger 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	19	9	16	NConv	NConv	2	16	9	NA	Install Redundant protection
Barton-Airways-Sanger 115 kV Line	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	137	<100	<100	<100	NA	Generation Re-dispatch
Barton-Airways-Sanger 115 kV Line	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	7	17	31	62	130	9	35	16	NA	Generation Re-dispatch
Barton-Airways-Sanger 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYS-MCMULLN1 #1 230KV [0]	P7	DCTL	17	22	38	66	133	8	39	21	NA	Generation Re-dispatch
Barton-Airways-Sanger 115 kV Line	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	23	35	53	74	141	2	46	34	NA	Generation Re-dispatch
Barton-Airways-Sanger 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYS-MCMULLN1 #1 230KV [0]	P7	DCTL	28	40	60	78	144	2	50	40	NA	Generation Re-dispatch
Borden 230/70 kV Transformer #1	P1-3:A13:10:_BORDEN 230/70KV TB 4	P1	N-1	113	76	82	53	23	31	53	71	NA	Project: Borden 230/70 kV Transformer Bank #1 Capacity Increase
Borden 230/70 kV Transformer #1	P2-3:A13:17:_BORDEN 230KV - MIDDLE BREAKER BAY 4	P2-3	Non-Bus-Tie Breaker	116	77	83	53	23	31	53	72	NA	Project: Borden 230/70 kV Transformer Bank #1 Capacity Increase
Borden 230/70 kV Transformer #1	P1-1-20002_Ext - Helms Unit #3 Out & P1-3:A13:10:_BORDEN 230/70KV TB 4	P3	G1/N1	115	<100	<100	<100	<100	<100	<100	<100	NA	Project: Borden 230/70 kV Transformer Bank #1 Capacity Increase
Borden 230/70 kV Transformer #1	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCGN 13.80KV & KINGSBUR 13.80KV & SANGERCGN 13.80KV GEN UNITS & P1-3:A13:10:_BORDEN 230/70KV TB 4	P3	G1/N1	113	<100	<100	<100	<100	<100	<100	<100	NA	Project: Borden 230/70 kV Transformer Bank #1 Capacity Increase
Borden-Coppermine 70 kV Line	Base Case	P0	Base Case	118	82	92	15	27	29	14	67	NA	Project: Coppermine reconditioning Project approved in TPP 2021-22
Borden-Storey 230kV Line No 1	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	63	9	NA	NConv	NConv	41	99	13	NA	Install Redundant protection
Borden-Storey 230kV Line No 1	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	100	<100	<100	<100	NA	Generation Re-dispatch
Borden-Storey 230kV Line No 1	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	17	17	NA	31	102	47	57	18	NA	Generation Re-dispatch
Borden-Storey 230kV Line No 1	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYS-MCMULLN1 #1 230KV [0]	P7	DCTL	21	23	NA	35	105	46	60	23	NA	Generation Re-dispatch
Borden-Storey 230kV Line No 2	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	55	7	NA	NConv	NConv	38	87	10	NA	Install Redundant protection
California Ave.-Sanger 115 kV Line	P7-1:A14:11:_CALIFORNIA AVE-MCCALL 115KV [2360] & MCCALL-WEST FRESNO #2 115KV [2370]	P7	DCTL	83	90	103	49	71	57	48	91	104	Generation Re-dispatch
Chowchilla-Kerckhoff #2 115 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	18	NConv	NA	NA	Project:Wilson 115kV Reinforcement
Chowchilla-Kerckhoff #2 115 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	16	NConv	NA	NA	Project:Wilson 115kV Reinforcement
Chowchilla-Kerckhoff #2 115 kV Line	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NA	NA	NConv	NA	18	NConv	NA	NA	Install Redundant protection
Chowchilla-Kerckhoff #2 115 kV Line	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	NConv	NConv	NConv	NConv	69	20	NConv	NConv	NConv	Install Redundant Battery
Chowchilla-Kerckhoff #2 115 kV Line	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NA	NA	NConv	NA	16	NConv	NA	NA	Install Redundant protection
Chowchilla-Kerckhoff #2 115 kV Line	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	NConv	NConv	NConv	NConv	65	57	NConv	NConv	NConv	Install Redundant Battery
Chowchilla-Kerckhoff #2 115 kV Line	WILSON-LE GRAND 115KV [4170] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	92	96	101	<100	101	136	<100	97	NA	monitor future forecast
Chowchilla-Kerckhoff #2 115 kV Line	KERCKHOFF-CLOVIS-SANGER #1 115KV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115KV [1900]	P6	N-1-1	<100	<100	<100	104	103	105	104	<100	NA	Generation Re-dispatch
Chowchilla-Kerckhoff #2 115 kV Line	WILSON-LE GRAND 115KV [4170] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	96	99	105	<100	97	132	<100	101	NA	monitor future forecast
Chowchilla-Kerckhoff #2 115 kV Line	KERCKHOFF-CLOVIS-SANGER #1 115KV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115KV [1900]	P6	N-1-1	<100	<100	<100	107	107	109	107	<100	NA	Generation Re-dispatch







Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
		Category	Category Description	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
Helm-Stroud Sw Station 70 kV Line	PANOCH-EXCELSIOR SW STA #2 115KV [3260] & PANOCH-EXCELSIOR SW STA #1 115KV [3260] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	<100	<100	<100	<100	124	<100	<100	<100	NA	Generation Re-dispatch
Helm-Stroud Sw Station 70 kV Line	P7-1:A13:14:_EXCELSIORSS-PANOCH1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7	DCTL	37	38	39	25	125	78	25	38	NA	Generation Re-dispatch
Helm-Stroud Sw Station 70 kV Line	P7-1:A14:10:_PANOCH-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7	DCTL	37	38	39	25	128	78	25	38	NA	Generation Re-dispatch
Helm-Stroud Sw Station 70 kV Line	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	37	38	39	25	117	78	25	38	NA	Generation Re-dispatch
Henrietta-GWF 115 kV Line	P2-4:A14:39:_MC CALL 230KV - SECTION 1D & 1E	P2-4	Bus-Tie-Breaker	NA	36	50	NA	106	NA	NA	38	NA	Generation Re-dispatch
Henrietta-GWF 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	19	7	25	NConv	NConv	11	18	7	NA	Install Redundant Battery
Henrietta-GWF 115 kV Line	HELM-MCCALL 230KV [4860] & CHSR09SWSTA-MUSTANGSS 230KV [0]	P6	N-1-1	<100	<100	<100	<100	117	<100	<100	<100	NA	Generation Re-dispatch
Henrietta-GWF 115 kV Line	P7-1:A14:17:_HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	10	39	57	26	117	28	2	40	NA	Generation Re-dispatch
Herndon 230/115kV Bank 1	HERNDON 230/115KV TB 2 & HERNDON 230/115KV TB 3	P6	N-1-1	101	105	109	<100	<100	<100	<100	107	NA	Adjust generation after first contingency
Herndon 230/115kV Bank 2	HERNDON 230/115KV TB 1 & HERNDON 230/115KV TB 3	P6	N-1-1	102	106	109	<100	<100	<100	<100	107	NA	Adjust generation after first contingency
Herndon 230/115 kV Transformer #3	HERNDON 230/115KV TB 1 & HERNDON 230/115KV TB 2	P6	N-1-1	101	104	108	<100	<100	<100	<100	106	NA	Adjust generation after first contingency
Herndon-Ashlan 230 kV Line	GREGG-HERNDON #2 230KV [4840] & GREGG-HERNDON #1 230KV [4830]	P6	N-1-1	117	109	98	<100	<100	<100	<100	111	NA	Review existing Ashlan SPS
Herndon-Barton 115 kV Line	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	84	96	NConv	34	71	38	33	98	NConv	Install Redundant Battery
Herndon-Bullard #1 115 kV Line	P2-1:A14:80:_HERNDON-BULLARD #1 115KV [1760] (HERNDON-PNDLJ1)	P2-1	Line Section w/o Fault	118	72	77	61	42	72	61	73	NA	Project: Herndon-Bullard reconductoring
Herndon-Bullard #1 115 kV Line	P2-2:A14:49:_HERNDON 115KV SECTION 1D	P2-2	Bus	118	72	77	61	42	72	61	73	NA	Project: Herndon-Bullard reconductoring
Herndon-Bullard #2 115 kV Line	P2-2:A14:50:_HERNDON 115KV SECTION 2D	P2-2	Bus	101	61	62	51	33	67	51	62	NA	Project: Herndon-Bullard reconductoring
Herndon-Bullard #2 115 kV Line	P2-3:A14:65:_HERNDON - 2D 115KV & HERNDON-WOODWARD LINE	P2-3	Non-Bus-Tie Breaker	101	61	62	51	33	67	51	62	NA	Project: Herndon-Bullard reconductoring
Herndon-Manchester 115 kV Line	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	84	96	NConv	36	69	41	35	97	NConv	Install Redundant Battery
Herndon-Woodward 115 kV Line	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	74	83	NConv	28	44	24	26	85	NConv	Install Redundant Battery
Herndon-Woodward 115 kV Line	P7-1:A14:16:_HERNDON-BARTON 115KV [1750] & HERNDON-MANCHESTER 115KV [1750]	P7	DCTL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100	Monitor future forecast
Jackson Sw Sta-Contadina 115kV Line	P2-4:A14:39:_MC CALL 230KV - SECTION 1D & 1E	P2-4	Bus-Tie-Breaker	NA	85	100	NA	103	NA	NA	86	105	monitor future forecast
Jackson Sw Sta-Contadina 115kV Line	P2-4:A14:6:_MC CALL 230KV - SECTION 2E & 1E	P2-4	Bus-Tie-Breaker	NA	89	103	NA	93	NA	NA	90	106	monitor future forecast
Jackson Sw Sta-Contadina 115kV Line	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100	Monitor future forecast
Jackson Sw Sta-Contadina 115kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	NA	54	82	NA	NConv	NA	NA	54	NA	Install Redundant Battery
Jackson Sw Sta-Contadina 115kV Line	CHSR09SWSTA-MUSTANGSS 230KV [0] & HELM-MCCALL 230KV [4860]	P6	N-1-1	<100	<100	104	<100	112	<100	<100	<100	NA	monitor future forecast
Jackson Sw Sta-Contadina 115kV Line	P7-1:A14:17:_HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	NA	86	105	NA	114	NA	NA	87	111	monitor future forecast
Kerkhoff - Clovis - Sanger #1 115 kV Line (Woodward-Shepherd)	TRANQUILITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	105	<100	<100	<100	NA	Generation Re-dispatch
Kerkhoff - Clovis - Sanger #1 115 kV Line (Woodward-Shepherd)	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	22	30	41	59	107	21	41	29	NA	Generation Re-dispatch
Kerkhoff - Clovis - Sanger #1 115 kV Line (Woodward-Shepherd)	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	25	34	45	62	109	20	44	34	NA	Generation Re-dispatch
Kingsburg E-Kingsburg D 115kV section	MCCALL-KINGSBURG #2 115KV [2300] & WAUKENA SW STA-CORCORAN 115KV [8773]	P6	N-1-1	107	<100	<100	<100	<100	<100	<100	<100	NA	Operating Solution
Kingsburg E-Kingsburg D 115kV section	MUSTANG SW STA-GREGG 230KV [4700] & MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_SUNMAIDJCT	P6	N-1-1	<100	<100	<100	<100	<100	148	<100	<100	NA	Sensitivity Only
Kingsriver-Sanger-Reedley 115 kV Line	SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	128	141	133	<100	110	<100	<100	142	NA	Operating Solution
Kingsriver-Sanger-Reedley 115 kV Line	MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE & SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY	P6	N-1-1	117	125	117	<100	<100	<100	<100	126	NA	Operating Solution
Kingsriver-Sanger-Reedley 115 kV Line	SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	113	123	113	<100	95	<100	<100	124	NA	Operating Solution
Kingsriver-Sanger-Reedley 115 kV Line	MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE & SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY	P6	N-1-1	112	122	113	<100	95	<100	<100	124	NA	Operating Solution
Las Aguilas-Panoche 230kV Line No 1	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	101	27	10	NConv	NConv	31	72	32	NA	Install Redundant Battery
Las Aguilas-Panoche 230kV Line No 2	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	101	27	10	NConv	NConv	32	73	32	NA	Install Redundant Battery
Legrand-Chowchilla 115kV	P2-2:A13:24:_PANOCH1 115KV SECTION 1D	P2-2	Bus	94	83	89	60	63	100	60	84	NA	Sensitivity Only
Legrand-Chowchilla 115kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH-CAL PEAK-STARWOOD LINE	P2-3	Non-Bus-Tie Breaker	94	83	89	60	63	100	60	84	NA	Sensitivity Only

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
		Category	Category Description	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
Legrand-Chowchilla 115kV	P2-3:A13:35:_PANOCHE1 - 1D 115kV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2-3	Non-Bus-Tie Breaker	94	83	89	60	63	100	60	84	NA	Sensitivity Only
Legrand-Chowchilla 115kV	P2-3:A13:36:_PANOCHE1 - 1D 115kV & PANOCHE-MENDOTA LINE	P2-3	Non-Bus-Tie Breaker	95	83	89	60	63	100	60	84	NA	Sensitivity Only
Legrand-Chowchilla 115kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	98	84	93	60	61	100	60	85	NA	Sensitivity Only
Legrand-Chowchilla 115kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	57	24	9	NConv	NConv	10	40	26	NA	Install Redundent Battery
Legrand-Dairyland 115kV(Legrand-chowchilla solar section)	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2-2	Bus	95	83	89	60	51	100	60	84	NA	Sensitivity Only
Legrand-Dairyland 115kV(Legrand-chowchilla solar section)	P2-3:A13:34:_PANOCHE1 - 1D 115kV & PANOCHE-CAL PEAK-STARWOOD LINE	P2-3	Non-Bus-Tie Breaker	95	83	89	60	51	100	60	84	NA	Sensitivity Only
Legrand-Dairyland 115kV(Legrand-chowchilla solar section)	P2-3:A13:35:_PANOCHE1 - 1D 115kV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2-3	Non-Bus-Tie Breaker	95	83	89	60	51	100	60	84	NA	Sensitivity Only
Legrand-Dairyland 115kV(Legrand-chowchilla solar section)	P2-3:A13:36:_PANOCHE1 - 1D 115kV & PANOCHE-MENDOTA LINE	P2-3	Non-Bus-Tie Breaker	95	83	89	60	51	100	60	84	NA	Sensitivity Only
Legrand-Dairyland 115kV(Legrand-chowchilla solar section)	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	98	84	92	60	49	100	60	84	NA	Sensitivity Only
Legrand-Dairyland 115kV(Legrand-chowchilla solar section)	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	57	24	9	NConv	NConv	9	40	26	NA	Install Redundant Battery
Legrand-Wilson 115kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-PANOCHE2)	P2-1	Line Section w/o Fault	135	98	148	78	23	50	78	100	161	Review existing Wilson-Oro Loma 115kV line reconducting
Legrand-Wilson 115kV	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2-1	Line Section w/o Fault	118	87	116	66	20	38	66	88	129	Review existing Wilson-Oro Loma 115kV line reconducting
Legrand-Wilson 115kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2-2	Bus	135	98	148	78	23	50	78	100	161	Review existing Wilson-Oro Loma 115kV line reconducting
Legrand-Wilson 115kV	P2-3:A13:41:_PANOCHE2 - 2D 115kV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	135	98	149	78	23	50	78	100	161	Review existing Wilson-Oro Loma 115kV line reconducting
Legrand-Wilson 115kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	140	99	151	78	25	50	78	101	161	Review existing Wilson-Oro Loma 115kV line reconducting
Legrand-Wilson 115kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	87	24	8	NConv	NConv	13	57	27	NA	Install Redundant Battery
Legrand-Wilson 115kV	PANOCHE 230/115KV TB 1 & PANOCHE 230/115KV TB 2	P6	N-1-1	<100	<100	<100	<100	111	<100	<100	<100	NA	Generation Re-dispatch
Legrand-Wilson 115kV	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	NA	6	18	NA	107	NA	NA	6	NA	Generation Re-dispatch
Legrand-Wilson 115kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	NA	7	21	NA	109	NA	NA	7	NA	Generation Re-dispatch
Los Banos 230/70 kV Transformer #3	P1-3:A13:7:_LOS BANOS 230/70KV TB 4	P1	N-1	100	103	105	55	69	57	55	104	112	Increase bank capacity
Los Banos 230/70 kV Transformer #3	P2-2:A13:2:_LOS BANOS 230KV SECTION 2D	P2-2	Bus	100	103	105	55	69	57	55	104	112	Increase bank capacity
Los Banos 230/70 kV Transformer #3	P1-1:A13:33:_ONEILPMP 9.11KV GEN UNIT 1 & P1-3:A13:7:_LOS BANOS 230/70KV TB 4	P3	G1/N1	105	111	113	<100	<100	<100	<100	112	NA	Increase bank capacity
Los Banos 230/70 kV Transformer #3	P1-1:A13:43:_STOREY1DIST 12.47KV GEN UNIT 1 & P1-3:A13:7:_LOS BANOS 230/70KV TB 4	P3	G1/N1	<100	<100	105	<100	<100	<100	<100	<100	NA	Increase bank capacity
Los Banos 230/70 kV Transformer #3	ONEILPMP 9.11KV GEN UNIT 1 & LOSBANOS 230/70KV TB 4	P6	N-1-1	93	98	103	<100	<100	<100	<100	99	NA	Increase bank capacity
Los Banos-Canal-Oro Loma 70 kV Line	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	195	Monitor future forecast
Los Banos-Canal-Oro Loma 70 kV Line	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	170	Monitor future forecast
Los Banos-Canal-Oro Loma 70 kV Line	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	158	Monitor future forecast
Los Banos-Canal-Oro Loma 70 kV Line	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	102	108	136	<100	<100	<100	<100	109	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Canal-Oro Loma 70 kV Line	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	135	142	170	<100	115	<100	<100	143	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Canal-Oro Loma 70 kV Line	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	118	124	148	<100	101	<100	<100	125	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Canal-Oro Loma 70 kV Line	P1-1:A13:21:_QUINTOSLRSPV 0.34KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	<100	100	118	<100	<100	<100	<100	102	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Canal-Oro Loma 70 kV Line	P1-1:A13:21:_QUINTOSLRSPV 0.34KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	125	132	150	<100	<100	<100	<100	134	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Canal-Oro Loma 70 kV Line	P1-1:A13:21:_QUINTOSLRSPV 0.34KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	109	116	131	<100	<100	<100	<100	117	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Canal-Oro Loma 70 kV Line (Arbur tap-wright)	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	95	100	118	42	62	32	42	101	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Canal-Oro Loma 70 kV Line(Losbanos-pnchowind)	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	126	132	150	54	89	51	54	134	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Canal-Oro Loma 70 kV Line(pnchowind-wright tap)	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	110	115	131	47	78	44	47	117	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	123	Monitor future forecast
Los Banos-Livingston Jct-Canal 70 kV Line	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	122	Monitor future forecast
Los Banos-Livingston Jct-Canal 70 kV Line	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	115	Monitor future forecast

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
		Category	Category Description	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
Los Banos-Livingston Jct-Canal 70 kV Line	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	114	Monitor future forecast
Los Banos-Livingston Jct-Canal 70 kV Line	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P3	G1/N1	118	97	107	<100	<100	<100	<100	98	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line	P1-1:A13:43:_STOREY DIST 12.47KV GEN UNIT 1 & P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P3	G1/N1	<100	<100	110	<100	<100	<100	<100	<100	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line	P1-1:A13:21:_QUINTOSLRSPV 0.34KV GEN UNIT 1 & P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P3	G1/N1	<100	100	110	<100	<100	<100	<100	101	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line	P7-1:A13:11:_LOS BANOS-PANOCHÉ #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	114	93	103	54	55	45	53	95	123	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line (canal-livingston section)	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	93	100	110	43	57	32	43	101	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line (chevpipe-losbanos section)	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	114	93	103	53	55	45	53	95	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line (chevpipe-santalla section)	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	113	93	102	53	54	43	52	94	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line (santalla-livingston section)	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	92	100	110	43	54	27	43	101	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Mercy Springs Sw Sta 70kV Line (Mercy Springs Sw Sta - Arburua Sub section)	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	105	111	131	44	69	34	44	113	176	Review existing Oro Loma 70kV Reinforcement
Los Banos-Mercy Springs Sw Sta 70kV Line (Mercy Springs Sw Sta - Arburua Sub section)	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	114	120	151	<100	93	<100	<100	122	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Mercy Springs Sw Sta 70kV Line (Mercy Springs Sw Sta - Arburua Sub section)	P1-1:A13:21:_QUINTOSLRSPV 0.34KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	105	112	131	<100	<100	<100	<100	113	NA	Review existing Oro Loma 70kV Reinforcement
Los Banos-Panoche #2 230 kV Line	P5-5c:A14:14:_Gates 230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	25	4	13	15	5	102	11	3	NA	Install Redundant Battery
Manchester - Airways - Sanger 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	24	5	13	NConv	NConv	4	18	3	NA	Install Redundant Battery
Manchester - Airways - Sanger 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	43	27	22	NConv	NConv	14	4	29	NA	Install Redundant Battery
Manchester - Airways - Sanger 115 kV Line	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	125	<100	<100	<100	NA	Generation Re-dispatch
Manchester - Airways - Sanger 115 kV Line	MUSTANG SW STA-GREGG 230KV [4700] & TRANQUILLITY SW STA-KEARNEY 230KV [5380]	P6	N-1-1	<100	<100	<100	<100	127	<100	<100	<100	NA	Generation Re-dispatch
Manchester - Airways - Sanger 115 kV Line	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	22	31	46	69	127	6	44	30	NA	Generation Re-dispatch
Manchester - Airways - Sanger 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	26	36	52	73	130	6	48	35	NA	Generation Re-dispatch
Manchester - Airways - Sanger 115 kV Line	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	6	9	22	61	125	45	32	8	NA	Generation Re-dispatch
Manchester - Airways - Sanger 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	8	15	29	65	128	44	36	14	NA	Generation Re-dispatch
Manchester-Airways-Sanger 115 kV Line	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	118	<100	<100	<100	NA	Generation Re-dispatch
Manchester-Airways-Sanger 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	15	21	33	63	117	11	38	23	NA	Generation Re-dispatch
Mc Call 230kV-115kV Bank No 2	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	79	89	103	72	99	42	73	89	105	monitor future forecast
Mc Call 230kV-115kV Bank No 2	MC CALL 230/115KV TB 1 & MC CALL 230/115KV TB 3	P6	N-1-1	<100	92	104	<100	122	<100	<100	93	NA	monitor future forecast
Mc Call 230kV-115kV Bank No 3	P2-3:A14:49:_MC CALL 115KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie Breaker	87	98	115	82	124	34	72	98	119	monitor future forecast
Mc Call 230kV-115kV Bank No 3	MC CALL 230/115KV TB 1 & MC CALL 230/115KV TB 2	P6	N-1-1	<100	94	106	<100	124	<100	<100	94	NA	monitor future forecast
Mccall 230-115kV Bank 1	MC CALL 230/115KV TB 3 & MC CALL 230/115KV TB 2	P6	N-1-1	<100	94	107	<100	125	<100	<100	95	NA	monitor future forecast
Mccall- Malaga 115kV	P1-1:A14:65:_RIOBRVVOFNO 12.47KV GEN UNIT 1 & P1-2:A14:51:_SANGER-MALAGA 115KV [3600]	P3	G1/N1	<100	<100	<100	<100	106	<100	<100	<100	NA	Generation Re-dispatch
McCall-Kingsburg #1 115 kV Line	MCCALL-KINGSBURG #2 115KV [2300] & JACKSONSWSTA-GWF_HEP 115KV [0]	P6	N-1-1	<100	113	121	<100	<100	<100	<100	114	NA	Operating Solution
McCall-Kingsburg #1 115 kV Line	MCCALL-KINGSBURG #2 115KV [2300] & GWF-KINGSBURG 115KV [1743]	P6	N-1-1	103	<100	<100	<100	<100	<100	<100	<100	NA	Operating Solution
McCall-Kingsburg #1 115 kV Line	MUSTANG SW STA-GREGG 230KV [4700] & MCCALL-KINGSBURG #2 115KV [2300]	P6	N-1-1	<100	<100	<100	<100	<100	143	<100	<100	NA	Sensitivity Only
Mccall-Kingsburg 115kV line No 2 (Guardian sub-Kingsburg section)	MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_SUNMAIDJCT & GWF-KINGSBURG 115KV [1743]	P6	N-1-1	103	<100	<100	<100	<100	<100	<100	<100	NA	Operating Solution
Mccall-Kingsburg 115kV line No 2 (Guardian sub-Kingsburg section)	MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_SUNMAIDJCT & JACKSONSWSTA-GWF_HEP 115KV [0]	P6	N-1-1	<100	113	121	<100	<100	<100	<100	114	NA	Operating Solution
Mccall-Kingsburg 115kV Line No 2 (Guardian sub-Mccall section)	MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_SUNMAIDJCT & GWF-KINGSBURG 115KV [1743]	P6	N-1-1	109	<100	<100	<100	<100	<100	<100	<100	NA	Operating Solution
Mccall-Kingsburg 115kV Line No 2 (Guardian sub-Mccall section)	MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_SUNMAIDJCT & JACKSONSWSTA-GWF_HEP 115KV [0]	P6	N-1-1	<100	119	127	<100	<100	<100	<100	120	NA	Operating Solution

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
		Category	Category Description	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
McCall-Readley 115 kV Line (Readley-Wahtoke)	P5-5c:A14:21:_Sanger 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	115	122	110	68	78	60	68	124	114	Install Redundant Battery
McCall-Readley 115 kV Line (Readley-Wahtoke)	SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & KINGS RIVER-SANGER-REEDLEY 115KV [2030]	P6	N-1-1	111	118	104	<100	<100	<100	<100	120	NA	Operating Solution
McCall-Sanger #1 115 kV Line	MCCALL-SANGER #2 115KV [2340] & MCCALL-SANGER #3 115KV [2350]	P6	N-1-1	<100	<100	<100	<100	102	<100	<100	<100	NA	Generation Re-dispatch
McCall-Sanger #1 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	32	43	57	49	101	17	31	42	NA	Generation Re-dispatch
McCall-Sanger #2 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	23	29	48	NConv	NConv	18	13	29	NA	Install Redundant Battery
McCall-Sanger #2 115 kV Line	MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #3 115KV [2350]	P6	N-1-1	<100	<100	<100	<100	116	<100	<100	<100	NA	Generation Re-dispatch
McCall-Sanger #2 115 kV Line	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	33	44	59	52	112	20	33	44	NA	Generation Re-dispatch
McCall-Sanger #2 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	37	48	64	55	114	19	35	48	NA	Generation Re-dispatch
McCall-Sanger #3 115 kV Line	P2-3:A14:50:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	56	68	82	62	110	28	47	68	NA	Generation Re-dispatch
McCall-Sanger #3 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	27	34	40	NConv	NConv	4	16	34	NA	Install Redundant Battery
McCall-Sanger #3 115 kV Line	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	106	Monitor future forecast
McCall-Sanger #3 115 kV Line	TRANQUILITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	133	<100	<100	<100	NA	Generation Re-dispatch
McCall-Sanger #3 115 kV Line	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	52	64	81	66	123	29	47	64	NA	Generation Re-dispatch
McCall-Sanger #3 115 kV Line	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	39	52	70	61	132	16	38	52	NA	Generation Re-dispatch
McCall-Sanger #3 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	43	56	75	64	134	16	41	56	NA	Generation Re-dispatch
Mendota-San Joaquin-Helm 70 kV Line	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	168	<100	<100	<100	NA	Generation Re-dispatch
Mendota-San Joaquin-Helm 70kV(Adams East Tap-Mendota Biomass section)	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	147	<100	<100	<100	NA	Generation Re-dispatch
Mendota-San Joaquin-Helm 70kV(Adams East-Westlands section)	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	161	<100	<100	<100	NA	Generation Re-dispatch
Mendota-San Joaquin-Helm 70kV(Adams East-Westlands section)	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	157	<100	<100	<100	NA	Generation Re-dispatch
Mendota-San Joaquin-Helm 70kV(Mendota sub-Mendota Biomass section)	P1-3:A14:10:_HELM 230/70KV TB 1	P1	N-1	3	3	3	3	101	3	3	3	NA	Generation Re-dispatch
Mendota-San Joaquin-Helm 70kV(Mendota sub-Mendota Biomass section)	P2-2:A14:14:_HELM 230KV SECTION 1D	P2-2	Bus	3	3	3	3	101	3	3	3	NA	Generation Re-dispatch
Mendota-San Joaquin-Helm 70kV(Mendota sub-Mendota Biomass section)	P1-1-20008_Holm Unit #1 out & P1-3:A14:10:_HELM 230/70KV TB 1	P3	G1/N1	<100	<100	<100	<100	100	<100	<100	<100	NA	Generation Re-dispatch
Mendota-San Joaquin-Helm 70kV(Mendota sub-Mendota Biomass section)	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	145	<100	<100	<100	NA	Generation Re-dispatch
Merced 115/70 kV Transformer #2	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	74	NConv	NA	NA	Project:Wilson 115kV Reinforcement
Merced 115/70 kV Transformer #2	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	74	NConv	NA	NA	Install Redundant protection
Merced 115/70 kV Transformer #2	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	85	74	NConv	NConv	NConv	Install Redundant Battery
Merced Falls-Exchequer 70 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	147	NConv	NA	NA	Project:Wilson 115kV Reinforcement
Merced Falls-Exchequer 70 kV Line	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	146	NConv	NA	NA	Install Redundant protection
Merced Falls-Exchequer 70 kV Line	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	136	145	NConv	NConv	NConv	Install Redundant Battery
Merced Falls-Exchequer 70 kV Line	EXCHEQUER-LE GRAND 115KV [1560] & MUSTANG3N4-MUSTANGSS #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	100	<100	<100	<100	NA	Generation Re-dispatch
Merced Falls-Exchequer 70 kV Line	PANOCHÉ-MENDOTA 115KV [3230] & WILSON-LE GRAND 115KV [4170]	P6	N-1-1	<100	<100	<100	<100	<100	102	<100	<100	NA	Sensitivity Only
Merced Falls-Exchequer 70 kV Line	EXCHEQUER-LE GRAND 115KV [1560] & HELMS-GREGG #1 230KV [4870]	P6	N-1-1	<100	<100	113	<100	<100	<100	<100	<100	NA	monitor future forecast
Merced-Merced Falls 70 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	146	NConv	NA	NA	Project:Wilson 115kV Reinforcement
Merced-Merced Falls 70 kV Line	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	146	NConv	NA	NA	Install Redundant protection
Merced-Merced Falls 70 kV Line	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	162	146	NConv	NConv	NConv	Install Redundant Battery
Merced-Merced Falls 70 kV Line	EXCHEQUER-LE GRAND 115KV [1560] & MUSTANG3N4-MUSTANGSS #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	106	<100	<100	<100	NA	Generation Re-dispatch
Merced-Merced Falls 70 kV Line	PANOCHÉ-MENDOTA 115KV [3230] & WILSON-LE GRAND 115KV [4170]	P6	N-1-1	<100	<100	<100	<100	<100	102	<100	<100	NA	Sensitivity Only
MERCED-MERCED M #2 115 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	38	NConv	NA	NA	Project:Wilson 115kV Reinforcement

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
		Category	Category Description	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast		2035 SP ATE
MERCED-MERCED M #2 115 kV	P5-5a:A13:5_ WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	38	NConv	NA	NA	Install Redundant protection
MERCED-MERCED M #2 115 kV	P5-5c:A13:2_ Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	43	39	NConv	NConv	NConv	Install Redundant Battery
Mercy Springs Sw Sta- Oro loma 70kV Line (Mercy Springs Sw Sta-Mercy springs sub section)	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	156	87	103	64	65	81	64	88	139	Review existing Oro Loma 70kV Reinforcement
Mercy Springs Sw Sta- Oro loma 70kV Line (Mercy Springs Sw Sta-Mercy springs sub section)	P1-1:A13:27_ WRIGHT D 12.47KV GEN UNIT QF & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	157	<100	<100	<100	<100	<100	<100	<100	NA	Review existing Oro Loma 70kV Reinforcement
Mercy Springs Sw Sta- Oro loma 70kV Line (Mercy Springs Sw Sta-Mercy springs sub section)	P1-1:A14:48_ HELMS 1 18.00KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	155	<100	<100	<100	<100	<100	<100	<100	NA	Review existing Oro Loma 70kV Reinforcement
Mercy Springs-Canal 70 kV Line #1	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	139	Monitor future forecast
Mercy Springs-Canal 70 kV Line #1	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	112	Monitor future forecast
Mercy Springs-Canal 70 kV Line #1	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	156	87	103	64	65	81	64	88	NA	Review existing Oro loma 70kV area reinforcement
Mercy Springs-Canal 70 kV Line #1	P1-1:A13:27_ WRIGHT D 12.47KV GEN UNIT QF & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	157	<100	<100	<100	<100	<100	<100	<100	NA	Project: Oro loma 70kV area reinforcement
Mercy Springs-Canal 70 kV Line #1	P1-1:A14:48_ HELMS 1 18.00KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	123	<100	<100	<100	<100	<100	<100	<100	NA	Project: Oro loma 70kV area reinforcement
Mercy Springs-Canal 70 kV Line #1	P1-1:A14:48_ HELMS 1 18.00KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	155	<100	<100	<100	<100	<100	<100	<100	NA	Project: Oro loma 70kV area reinforcement
Mosslanding- Las Aguilas 230kV	P5-5c:A13:1_ Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	135	26	3	NConv	NConv	66	97	33	NA	Install Redundant Battery
MustangSS-Gates 230kV Line No 1	P1-2:A14:25_ GATES-MUSTANG SW STA #2 230KV [2605]	P1	N-1	8	19	31	53	32	100	14	19	NA	Sensitivity Only
MustangSS-Gates 230kV Line No 1	P1-1:A14:35_ WESTLND5 0.48KV GEN UNIT 1 & P1-2:A14:25_ GATES-MUSTANG SW STA #2 230KV [2605]	P3	G1/N1	<100	<100	<100	<100	<100	<100	102	<100	NA	Sensitivity Only
MustangSS-Gates 230kV Line No 1	TRANQUILITY SW STA-HELM 230KV [5370] & GATES-MUSTANG SW STA #2 230KV [2605]	P6	N-1-1	<100	<100	<100	<100	<100	112	<100	<100	NA	Sensitivity Only
MustangSS-Gates 230kV Line No 2	P1-2:A14:24_ GATES-MUSTANG SW STA #1 230KV [2604]	P1	N-1	8	19	31	53	32	100	14	19	NA	Sensitivity Only
MustangSS-Gates 230kV Line No 2	P2-3:A14:27_ GATES F 230KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie Breaker	8	19	32	52	31	100	14	19	NA	Sensitivity only
MustangSS-Gates 230kV Line No 2	P1-1:A14:35_ WESTLND5 0.48KV GEN UNIT 1 & P1-2:A14:24_ GATES-MUSTANG SW STA #1 230KV [2604]	P3	G1/N1	<100	<100	<100	<100	<100	<100	102	<100	NA	Sensitivity Only
MustangSS-Gates 230kV Line No 2	TRANQUILITY SW STA-HELM 230KV [5370] & GATES-MUSTANG SW STA #1 230KV [2604]	P6	N-1-1	<100	<100	<100	<100	<100	112	<100	<100	NA	Sensitivity Only
(New)Oro Loma-Mendota 115kV Line	P1-2:A13:60_ PANOCHÉ-ORO LOMA 115KV [3240]	P1	N-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	106	Monitor future forecast
(New)Oro Loma-Mendota 115kV Line	P2-1:A13:48_ PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2-1	Line Section w/o Fault	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	215	Monitor future forecast
(New)Oro Loma-Mendota 115kV Line	P2-1:A13:49_ PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2-1	Line Section w/o Fault	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	168	Monitor future forecast
(New)Oro Loma-Mendota 115kV Line	P2-2:A13:25_ PANOCHÉ2 115KV SECTION 2D	P2-2	Bus	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	215	Monitor future forecast
(New)Oro Loma-Mendota 115kV Line	P2-3:A13:41_ PANOCHÉ2 - 2D 115KV & PANOCHÉ-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	215	Monitor future forecast
(New)Oro Loma-Mendota 115kV Line	P2-4:A13:13_ PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	215	Monitor future forecast
(New)Oro Loma-Mendota 115kV Line	P5-5c:A13:4_ Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	107	Monitor future forecast
(New)Oro Loma-Mendota 115kV Line	P5-5c:A13:23_ Hammonds 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	106	Monitor future forecast
(New)Oro Loma-Mendota 115kV Line	P7-1:A13:7_ LOS BANOS-PANOCHÉ #1 230KV [5030] & PANOCHÉ-ORO LOMA 115KV [3240]	P7	DCTL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	106	Monitor future forecast
Oro Loma-Mendota 115kV Line	P2-1:A13:48_ PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2-1	Line Section w/o Fault	119	126	198	68	50	45	68	128	NA	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	P2-1:A13:49_ PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2-1	Line Section w/o Fault	102	109	151	55	49	33	55	111	NA	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	P2-2:A13:25_ PANOCHÉ2 115KV SECTION 2D	P2-2	Bus	119	126	198	68	51	45	68	128	NA	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	P2-3:A13:41_ PANOCHÉ2 - 2D 115KV & PANOCHÉ-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	119	126	200	68	51	45	68	128	NA	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	P2-4:A13:13_ PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	124	127	202	68	54	45	68	129	NA	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	P5-5c:A13:1_ Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	71	14	14	NConv	NConv	7	43	18	NA	Install Redundant protection
Oro Loma-Mendota 115kV Line	WILSON 230/115KV TB 1 & WILSON 230/115KV TB 2	P6	N-1-1	103	<100	<100	<100	<100	<100	<100	<100	NA	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	PANOCHÉ 230/115KV TB 1 & PANOCHÉ 230/115KV TB 2	P6	N-1-1	102	<100	<100	<100	129	<100	<100	<100	NA	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	162	<100	<100	<100	NA	Generation Re-dispatch
Oro Loma-Mendota 115kV Line	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	153	<100	<100	<100	NA	Generation Re-dispatch

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
		Category	Category Description	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
Oro Loma-Mendota 115kV Line	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	7	23	50	59	131	19	14	22	NA	Generation Re-dispatch
Oro Loma-Mendota 115kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	3	29	56	63	134	18	18	28	NA	Generation Re-dispatch
Oro Loma-Mendota 70kV Line (Toma tek - Mendota section)	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	32	28	31	24	104	28	24	28	NA	Generation Re-dispatch
Oro Loma-Mendota 70kV Line (Toma tek - Mendota section)	P5-5c:A13:4:_Panoche 230-115KV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	32	28	31	25	102	28	24	28	NA	Install Redundant Battery
Oro Loma-Mendota 70kV Line (Toma tek - Mendota section)	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	184	<100	<100	<100	NA	Generation Re-dispatch
Oroloma-Mendota 70kV Line	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	69	72	78	33	101	36	33	73	NA	Generation Re-dispatch
Oroloma-Mendota 70kV Line	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-PANOCHE2)	P2-1	Line Section w/o Fault	73	75	108	30	98	36	30	76	113	Monitor future forecast
Oroloma-Mendota 70kV Line	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2-1	Line Section w/o Fault	70	72	101	33	91	36	33	73	114	Monitor future forecast
Oroloma-Mendota 70kV Line	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2-2	Bus	69	72	78	33	107	36	33	73	NA	Generation Re-dispatch
Oroloma-Mendota 70kV Line	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2-2	Bus	73	75	108	30	102	36	30	76	113	Monitor future forecast
Oroloma-Mendota 70kV Line	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2-3	Non-Bus-Tie Breaker	69	72	78	33	107	36	33	73	NA	Generation Re-dispatch
Oroloma-Mendota 70kV Line	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2-3	Non-Bus-Tie Breaker	69	72	78	33	107	36	33	73	NA	Generation Re-dispatch
Oroloma-Mendota 70kV Line	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2-3	Non-Bus-Tie Breaker	69	72	78	33	107	36	33	73	NA	Generation Re-dispatch
Oroloma-Mendota 70kV Line	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	73	75	108	30	102	36	30	76	113	Monitor future forecast, for off-peak generation re-dispatch
Oroloma-Mendota 70kV Line	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	77	75	108	30	114	36	30	76	113	Monitor future forecast, for off-peak generation re-dispatch
Oroloma-Mendota 70kV Line	P1-1-20008_Holm Unit #1 out & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G1/N1	<100	<100	<100	<100	100	<100	<100	<100	NA	Generation Re-dispatch
Oroloma-Mendota 70kV Line	P5-5c:A13:4:_Panoche 230-115KV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	71	71	85	33	115	33	33	72	NA	Install Redundant Battery
Oroloma-Mendota 70kV Line	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	211	<100	<100	<100	NA	Generation Re-dispatch
PANOCHE2-EXCELSIORSS 115kV Line	PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & GATES D 230/70KV TB 5	P6	N-1-1	186	186	<100	113	<100	<100	124	188	NA	Increase Bank/Line capacity
Panoche-Gates 230kV Line No 1	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	64	37	16	NConv	NConv	86	82	41	NA	Install Redundant Battery
Panoche-Gates 230kV Line No 1	P5-5c:A14:1:_Gates 500kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	27	33	16	35	125	21	53	34	NA	Install Redundant Battery
Panoche-Gates 230kV Line No 1	CHSR09SWSTA-MUSTANGSS 230KV [0] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	106	<100	<100	<100	NA	Generation Re-dispatch
Panoche-Gates 230kV Line No 1	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	17	9	5	70	107	52	15	9	NA	Generation Re-dispatch
Panoche-Gates 230kV Line No 2	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	68	39	17	NConv	NConv	91	87	44	NA	Install Redundant Battery
Panoche-Gates 230kV Line No 2	P5-5c:A14:12:_Mustang SW STA 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	18	10	6	74	103	62	16	10	NA	Install Redundant Battery
Panoche-Gates 230kV Line No 2	P5-5c:A14:1:_Gates 500kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	29	35	17	37	133	22	56	36	NA	Install Redundant Battery
Panoche-Gates 230kV Line No 2	CHSR09SWSTA-MUSTANGSS 230KV [0] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	112	<100	<100	<100	NA	Generation Re-dispatch
Panoche-Gates 230kV Line No 2	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	18	10	6	74	114	55	16	10	NA	Generation Re-dispatch
Panoche-Mendota 115 kV Line	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	NConv	NConv	NConv	60	44	82	NConv	NConv	NConv	Install Redundant Battery
Panoche-Oro Loma 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	22	41	60	NConv	NConv	13	8	40	NA	Install Redundant Battery
Panoche-Schindler #1 115 kV Line	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	105	104	35	63	47	9	71	105	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Panoche-Schindler #1 115 kV Line	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	106	105	33	63	47	11	72	106	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Panoche-Schindler #1 115 kV Line	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	109	108	29	66	50	10	79	109	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Panoche-Schindler #1 115 kV Line	P1-1:A14:26:_EXCLRSRSLRPV 0.38KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	106	106	<100	<100	<100	<100	<100	108	NA	Increase Bank/Line capacity
Panoche-Schindler #1 115 kV Line	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	105	102	<100	<100	<100	<100	<100	104	NA	Increase Bank/Line capacity
Panoche-Schindler #1 115 kV Line	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	109	107	29	60	53	3	79	109	NA	Project in progress
Panoche-Schindler #1 115 kV Line	PANOCHE-EXCELSIOR SW STA #2 115KV [3260] & GATES D 230/70KV TB 5	P6	N-1-1	199	198	<100	119	<100	<100	133	200	NA	Increase Bank/Line capacity
Panoche-Schindler #2 115 kV Line	P2-3:A14:58:_EXCELSIORSS 115KV - MIDDLE BREAKER BAY 2	P2-3	NOT BUS-TIE Breaker	14	56	55	50	59	108	2	54	NA	Sensitivity Only

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
		Category	Category Description	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
Panoche-Schindler #2 115 kV Line	PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & GATES D 230/70KV TB 5	P6	N-1-1	198	146	<100	<100	<100	<100	132	148	NA	Increase Bank/Line capacity
Reedley 115/70 kV Transformer #4	P1-3:A14:40:_REEDLEY 115/70KV TB 2	P1	N-1	94	100	82	58	58	50	58	101	NA	Project:Reedley 70 kV Area Reinforcement Project
Reedley 115/70 kV Transformer #4	P2-3:A14:139:_REEDLEY 115KV - RING R5 & R6	P2-3	Non-Bus-Tie Breaker	94	100	83	58	59	50	58	101	NA	Sensitivity Only
Reedley 115/70 kV Transformer #4	P2-3:A14:141:_REEDLEY 115KV - RING R1 & R6	P2-3	Non-Bus-Tie Breaker	94	100	83	58	58	50	58	101	NA	Sensitivity Only
Reedley-Dinuba 70 kV Line	P1-2:A14:114:_REEDLEY-OROSI 70KV [9060]	P1	N-1	73	115	80	47	73	38	47	115	NA	Project:Reedley 70 kV Area Reinforcement Project
Reedley-Dinuba 70 kV Line	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS & P1-2:A14:114:_REEDLEY-OROSI 70KV [9060]	P3	G1/N1	<100	115	<100	<100	<100	<100	<100	116	NA	Project:Reedley 70 kV Area Reinforcement Project
Reedley-Dinuba 70 kV Line	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-2:A14:114:_REEDLEY-OROSI 70KV [9060]	P3	G1/N1	<100	114	<100	<100	<100	<100	<100	115	NA	Project:Reedley 70 kV Area Reinforcement Project
Reedley-Orosi 70 kV Line	P1-2:A14:113:_REEDLEY-DINUBA #1 70KV [9050]	P1	N-1	46	114	102	27	70	32	27	114	106	Project:Reedley 70 kV Area Reinforcement Project
Reedley-Orosi 70 kV Line	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A14:113:_REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<100	114	102	<100	<100	<100	<100	115	NA	Project:Reedley 70 kV Area Reinforcement Project
Reedley-Orosi 70 kV Line	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-2:A14:113:_REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<100	114	101	<100	<100	<100	<100	114	NA	Project:Reedley 70 kV Area Reinforcement Project
Sanger-Reedley 115 kV Line	MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE & KINGS RIVER SANGER-REEDLEY 115KV [2030]	P6	N-1-1	101	108	103	<100	<100	<100	<100	109	NA	Operating Solution
Schindler 115/70 kV Transformer #1	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	129	130	11	81	16	47	94	132	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Schindler 115/70 kV Transformer #1	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	130	133	16	81	25	34	96	135	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Schindler 115/70 kV Transformer #1	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	79	25	26	10	68	102	49	24	122	Sensitivity Only
Schindler 115/70 kV Transformer #1	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	137	138	24	88	29	37	109	140	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Schindler 115/70 kV Transformer #1	P1-1:A14:35:_WESTLND 0.48KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	130	131	<100	<100	<100	94	<100	134	NA	Increase Bank/Line capacity
Schindler 115/70 kV Transformer #1	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	128	127	<100	<100	<100	<100	<100	129	NA	Increase Bank/Line capacity
Schindler 115/70 kV Transformer #1	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	135	136	24	77	33	53	110	138	NA	Project in progress
Schindler 115/70 kV Transformer #1	PANOCH 230/115KV TB 2 & PANOCH 230/115KV TB 1	P6	N-1-1	<100	<100	<100	<100	<100	115	<100	<100	NA	Sensitivity Only
Schindler-Coalinga #2 70 kV Line	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	110	116	1	71	21	84	84	118	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Schindler-Coalinga #2 70 kV Line	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	111	118	6	71	3	70	87	120	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Schindler-Coalinga #2 70 kV Line	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	72	39	28	19	59	119	30	37	104	Sensitivity Only
Schindler-Coalinga #2 70 kV Line	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	119	123	30	78	33	57	101	125	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Schindler-Coalinga #2 70 kV Line	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	122	129	<100	<100	<100	91	<100	131	NA	Increase Bank/Line capacity
Schindler-Coalinga #2 70 kV Line	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	110	112	<100	<100	<100	<100	<100	114	NA	Increase Bank/Line capacity
Schindler-Coalinga #2 70 kV Line	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	117	121	30	66	44	88	103	123	NA	Project in progress
Schindler-Coalinga #2 70 kV Line	P5-5c:A14:14:_Gates 230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	120	119	73	64	41	99	129	120	NA	Install Redundant Battery
Schindler-Coalinga #2 70 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	27	18	22	NConv	NConv	67	40	20	NA	Install Redundant Battery
Schindler-Coalinga #2 70 kV Line	PANOCH 230/115KV TB 1 & PANOCH 230/115KV TB 2	P6	N-1-1	<100	<100	<100	<100	<100	136	<100	<100	NA	Sensitivity Only
Schindler-Coalinga #2 70 kV Line (Schindler-Paige section)	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	108	111	1	72	16	35	85	113	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Schindler-Coalinga #2 70 kV Line (Schindler-Paige section)	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	109	114	5	72	31	27	88	116	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Schindler-Coalinga #2 70 kV Line (Schindler-Paige section)	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	117	119	16	79	39	16	102	121	NA	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Schindler-Coalinga #2 70 kV Line (Schindler-Paige section)	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	109	Monitor future forecast
Schindler-Coalinga #2 70 kV Line (Schindler-Paige section)	P1-1:A14:24:_PAIGESLRSPV 0.55KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	112	114	<100	<100	<100	<100	<100	116	NA	Increase Bank/Line capacity
Schindler-Coalinga #2 70 kV Line (Schindler-Paige section)	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	107	107	<100	<100	<100	<100	<100	109	NA	Increase Bank/Line capacity
Schindler-Coalinga #2 70 kV Line (Schindler-Paige section)	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	115	118	17	67	53	46	103	120	NA	Project in progress
Schindler-Coalinga #2 70 kV Line (Schindler-Paige section)	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	53	45	15	NConv	NConv	52	64	46	NA	Install Redundant Battery
Schindler-Coalinga #2 70 kV Line (Schindler-Paige section)	P5-5c:A14:14:_Gates 230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	118	116	66	65	48	58	130	117	NA	Install Redundant Battery
Schindler-Huron-Gates 70 kV Line	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	138	141	20	83	37	49	93	143	100	Utilize generic resource BESS+Solar on Gates Sub for mitigation
Schindler-Huron-Gates 70 kV Line	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	139	144	24	83	48	36	96	146	106	Utilize generic resource BESS+Solar on Gates Sub for mitigation

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
		Category	Category Description	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE		
Schindler-Huron-Gates 70 kV Line	P2-3:A14:135:_SCHINDLER 115KV - RING R1 & R3	P2-3	Non-Bus-Tie Breaker	147	149	152	92	41	41	93	149	36	Increase Line/Bank capacity	
Schindler-Huron-Gates 70 kV Line	P2-3:A14:58:_EXCELSIORSS 115KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	147	149	152	92	41	41	93	149	36	Increase Line/Bank capacity	
Schindler-Huron-Gates 70 kV Line	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	180	117	116	55	10	88	117	116	124	Increase Line/Bank capacity	
Schindler-Huron-Gates 70 kV Line	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	79	80	113	48	81	21	67	82	115	Monitor future forecast	
Schindler-Huron-Gates 70 kV Line	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	92	34	34	10	24	110	62	34	124	Sensitivity Only	
Schindler-Huron-Gates 70 kV Line	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	147	148	31	88	55	39	108	151	115	Utilize generic resource BESS+Solar on Gates Sub for mitigation	
Schindler-Huron-Gates 70 kV Line	P1-1:A14:23:_WHTNYPTSPV 0.55KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	142	144	<100	<100	<100	94	<100	146	NA	Increase Bank/Line capacity	
Schindler-Huron-Gates 70 kV Line	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	138	139	<100	<100	<100	<100	<100	141	NA	Increase Bank/Line capacity	
Schindler-Huron-Gates 70 kV Line	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	77	79	112	39	95	30	68	81	114	Project in progress	
Schindler-Huron-Gates 70 kV Line	P5-5c:A13:1:_Los Banos 500-230-70KV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	26	37	75	NConv	NConv	45	9	34	NA	Install Redundant Battery	
Schindler-Huron-Gates 70 kV Line	P5-5c:A13:4:_Panoche 230-115KV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	180	182	181	114	11	29	115	181	24	Install Redundant Battery	
Schindler-Huron-Gates 70 kV Line	P5-5c:A14:27:_Excelsior SW STA 115KV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	147	149	152	92	42	41	93	149	36	Install Redundant Battery	
Schindler-Huron-Gates 70 kV Line	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	145	147	31	79	67	54	109	149	114	Project in progress	
Schindler-Huron-Gates 70 kV Line	P5-5c:A13:1:_Los Banos 500-230-70KV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	48	39	4	NConv	NConv	71	53	42	NA	Install Redundant Battery	
Schindler-Huron-Gates 70 kV Line	PANOCHE-EXCELSIOR SW STA #2 115KV [3260] & PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	172	172	173	109	<100	<100	110	173	NA	Increase Line/Bank capacity	
Schindler-Huron-Gates 70 kV Line	PANOCHE 230/115KV TB 2 & PANOCHE 230/115KV TB 1	P6	N-1-1	160	<100	114	<100	<100	101	<100	<100	NA	Increase Line/Bank capacity	
Schindler-Huron-Gates 70 kV Line	P7-1:A13:14:_EXCELSIORSS-PANOCHE1 115KV [3250] & EXCELSIORSS-PANOCHE2 115KV [3231]	P7	DCTL	148	150	148	99	11	31	95	149	37	Increase Line/Bank capacity	
Schindler-Huron-Gates 70 kV Line	P7-1:A14:10:_PANOCHE-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOCHE2 115KV [3231]	P7	DCTL	180	182	181	115	11	29	116	181	24	Increase Line/Bank capacity	
Warnerville - Wilson 230 kV Line	P1-2:A13:29:_MELONES-WILSON 230KV [5080]	P1	N-1	77	66	56	21	38	48	112	69	NA	Sensitivity Only	
Warnerville - Wilson 230 kV Line	P2-2:A14:2:_HELMS PP2 230KV SECTION 1E	P2-2	Bus	100	92	80	12	22	16	94	94	NA	Adjust wilson reactor	
Warnerville - Wilson 230 kV Line	P2-3:A13:67:_WILSON 230KV - RING R4 & R3	P2-3	Non-Bus-Tie Breaker	76	NA	NA	NA	21	NA	51	103	NA	NA	sensitivity only
Warnerville - Wilson 230 kV Line	P2-3:A13:69:_STOREY 2 230KV - RING R3 & R2	P2-3	Non-Bus-Tie Breaker	75	NA	NA	20	NA	49	111	NA	NA	NA	sensitivity only
Warnerville - Wilson 230 kV Line	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie Breaker	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	105	Monitor future forecast	
Warnerville - Wilson 230 kV Line	P2-4:A14:34:_HELMS PP1 SECTION 1D & HELMS PP2 SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	102	94	82	12	22	15	94	96	NA	Adjust wilson reactor	
Warnerville - Wilson 230 kV Line	P2-4:A14:35:_HELMS PP2 SECTION 1E & HELMS PP3 SECTION 1F 230KV	P2-4	Bus-Tie-Breaker	126	118	103	12	38	2	94	120	108	Adjust wilson reactor	
Warnerville - Wilson 230 kV Line	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-2:A14:17:_MUSTANG SW STA-GREGG 230KV [4700]	P3	G1/N1	107	112	<100	<100	<100	<100	<100	111	NA	Adjust wilson reactor	
Warnerville - Wilson 230 kV Line	P5-5c:A13:1:_Los Banos 500-230-70KV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	186	86	54	NConv	NConv	38	192	96	60	Install Redundant Battery	
Warnerville - Wilson 230 kV Line	P5-5c:A13:4:_Panoche 230-115KV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	80	83	67	33	18	83	113	86	NA	Install Redundant Battery	
Warnerville - Wilson 230 kV Line	P5-5c:A14:2:_Gregg 230KV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	114	114	109	29	17	5	60	113	114	Install Redundant Battery	
Warnerville - Wilson 230 kV Line	HELMS-GREGG #2 230KV [4880] & HELMS-GREGG #1 230KV [4870]	P6	N-1-1	124	115	99	<100	<100	<100	<100	117	NA	Adjust wilson reactor to maximum level	
Warnerville - Wilson 230 kV Line	TRANQUILITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	104	<100	103	<100	NA	Generation Re-dispatch	
Warnerville - Wilson 230 kV Line	P7-1:A13:4:_MELONES-WILSON 230KV [5080] & COTTLE-MELONES 230KV [4530]	P7	DCTL	70	59	50	16	33	53	106	62	NA	Sensitivity Only	
Warnerville - Wilson 230 kV Line	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	81	81	81	44	107	41	99	82	NA	Generation Re-dispatch	
Warnerville - Wilson 230 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	86	86	89	48	110	41	103	88	101	Generation Re-dispatch	
Warnerville - Wilson 230 kV Line	P7-1:A14:8:_HELMS-GREGG #1 230KV [4870] & HELMS-GREGG #2 230KV [4880]	P7	DCTL	126	118	103	12	38	2	94	120	108	Adjust wilson reactor to maximum level	
Warnerville - Wilson 230 kV Line	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	105	Monitor future forecast	
Wilson 230kV reactor	P1-2:A13:29:_MELONES-WILSON 230KV [5080]	P1	N-1	76	66	56	21	38	NA	111	68	NA	Sensitivity Only	
Wilson 230kV reactor	P2-3:A13:67:_WILSON 230KV - RING R4 & R3	P2-3	Non-Bus-Tie Breaker	75	NA	NA	20	NA	NA	102	NA	NA	sensitivity only	
Wilson 230kV reactor	P2-3:A13:69:_STOREY 2 230KV - RING R3 & R2	P2-3	Non-Bus-Tie Breaker	75	NA	NA	20	NA	NA	110	NA	NA	sensitivity only	



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
		Category	Category Description	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
Wilson 230kV reactor	P2-3:A14:1: GREGG 230KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie Breaker	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	104	Monitor future forecast
Wilson 230kV reactor	P2-4:A14:34: HELMS PP1 SECTION 1D & HELMS PP2 SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	101	93	81	12	22	NA	94	95	NA	Adjust wilson reactor to maximum level
Wilson 230kV reactor	P2-4:A14:35: HELMS PP2 SECTION 1E & HELMS PP3 SECTION 1F 230KV	P2-4	Bus-Tie-Breaker	124	116	102	12	38	NA	94	118	107	Adjust wilson reactor to maximum level
Wilson 230kV reactor	P1-1:A14:48: HELMS 1 18.00KV GEN UNIT 1 & P1-2:A14:17: MUSTANG SW STA-GREGG 230KV [4700]	P3	G1/N1	106	111	<100	<100	<100	<100	<100	110	NA	Adjust wilson reactor to maximum level
Wilson 230kV reactor	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	185	85	54	NConv	NConv	NA	190	95	60	Install Redundant Battery
Wilson 230kV reactor	P5-5c:A13:4: Panoche 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	80	83	67	33	18	NA	112	85	NA	Install Redundant Battery
Wilson 230kV reactor	P5-5c:A14:2: Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	113	113	108	29	17	NA	60	112	113	Install Redundant Battery
Wilson 230kV reactor	HELMS-GREGG #2 230KV [4880] & HELMS-GREGG #1 230KV [4870]	P6	N-1-1	121	113	97	<100	<100	<100	<100	115	NA	Adjust wilson reactor to maximum level
Wilson 230kV reactor	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	103	<100	100	<100	NA	Generation Re-dispatch
Wilson 230kV reactor	P7-1:A13:4: MELONES-WILSON 230KV [5080] & COTTLE-MELONES 230KV [4530]	P7	DCTL	69	59	49	16	33	NA	104	61	NA	Sensitivity Only
Wilson 230kV reactor	P7-1:A14:22: HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	80	80	81	44	106	NA	98	81	NA	Generation Re-dispatch
Wilson 230kV reactor	P7-1:A14:26: HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	85	85	88	48	109	NA	102	87	100	Generation Re-dispatch
Wilson 230kV reactor	P7-1:A14:8: HELMS-GREGG #1 230KV [4870] & HELMS-GREGG #2 230KV [4880]	P7	DCTL	124	116	102	12	38	NA	94	118	107	Adjust wilson reactor to maximum level
Wilson 230kV reactor	P7-1:A13:13: BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	N/A	N/A	N/A	N/A	N/A	NA	N/A	N/A	104	Monitor future forecast
Wilson-Atwater #2 115 kV Line	EL CAPITAN-WILSON 115KV [1510] & ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR_J_MERCED	P6	N-1-1	115	125	137	<100	<100	<100	<100	126	NA	Operating Solution
Wilson-Le Grand 115 kV Line	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	46	21	11	NConv	NConv	17	25	24	NA	Install Redundant Battery
Wilson-Merced #1 115 kV Line	P2-2:A13:17: WILSON B 115KV SECTION 2D	P2-2	Bus	110	NA	NA	64	NA	49	66	NA	NA	Project:Wilson 115KV Reinforcement
Wilson-Merced #1 115 kV Line	P2-3:A13:30: WILSON B - 2D 115KV & WILSON-ORO LOMA LINE	P2-3	Non-Bus-Tie Breaker	110	NA	NA	64	NA	49	66	NA	NA	Project:Wilson 115KV Reinforcement
Wilson-Merced #1 115 kV Line	WILSON-ATWATER #2 115KV [4160] & EL CAPITAN-WILSON 115KV [1510]	P6	N-1-1	114	125	137	<100	<100	<100	<100	126	NA	Operating Solution
Wilson-Merced #1 115 kV Line	P7-1:A13:10: ATWATER-EL CAPITAN 115KV [1020] & WILSON-ATWATER #2 115KV [4160]	P7	DCTL	87	95	104	53	35	41	54	96	107	monitor future forecast
Wilson-Merced #1 115 kV Line	P7-1:A13:12: EL CAPITAN-WILSON 115KV [1510] & WILSON-ATWATER #2 115KV [4160]	P7	DCTL	87	95	104	73	35	56	74	96	107	monitor future forecast
Wilson-Merced #2 115 kV Line	P2-2:A13:16: WILSON A 115KV SECTION 1D	P2-2	Bus	108	NA	NA	55	NA	43	61	NA	NA	Project:Wilson 115KV Reinforcement
Wilson-Merced #2 115 kV Line	P2-3:A13:29: WILSON A - 1D 115KV & WILSONSTCOM-WILSON A #1 LINE	P2-3	Non-Bus-Tie Breaker	108	NA	NA	55	NA	43	61	NA	NA	Project:Wilson 115KV Reinforcement
Wilson-Merced #2 115 kV Line	WILSON-MERCED #1 115KV [4180] & EL CAPITAN-WILSON 115KV [1510]	P6	N-1-1	113	<100	<100	<100	<100	<100	<100	<100	NA	Operating Solution
Wilson-Merced #2 115 kV Line	WILSON-MERCED #1 115KV [4180] & EL CAPITAN-WILSON 115KV [1510]	P6	N-1-1	<100	123	135	<100	<100	<100	<100	125	NA	Operating Solution
Wilson-Merced #2 115 kV Line	P7-1:A13:10: ATWATER-EL CAPITAN 115KV [1020] & WILSON-ATWATER #2 115KV [4160]	P7	DCTL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	102	Monitor future forecast
Wilson-Merced #2 115 kV Line	P7-1:A13:12: EL CAPITAN-WILSON 115KV [1510] & WILSON-ATWATER #2 115KV [4160]	P7	DCTL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	101	Monitor future forecast
Wilson-Oro Loma 115 kV Line	P2-1:A13:48: PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-PANOCHE2)	P2-1	Line Section w/o Fault	134	98	148	77	23	50	77	100	161	Review existing Wilson-Oro Loma 115KV line reconductoring
Wilson-Oro Loma 115 kV Line	P2-1:A13:49: PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2-1	Line Section w/o Fault	117	87	116	66	20	38	66	88	129	Review existing Wilson-Oro Loma 115KV line reconductoring
Wilson-Oro Loma 115 kV Line	P2-2:A13:25: PANOCHE2 115KV SECTION 2D	P2-2	Bus	134	98	148	77	23	50	77	100	161	Review existing Wilson-Oro Loma 115KV line reconductoring
Wilson-Oro Loma 115 kV Line	P2-3:A13:41: PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	134	98	149	77	23	50	77	100	161	Review existing Wilson-Oro Loma 115KV line reconductoring
Wilson-Oro Loma 115 kV Line	P2-4:A13:13: PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	140	99	151	77	25	50	77	101	161	Review existing Wilson-Oro Loma 115KV line reconductoring
Wilson-Oro Loma 115 kV Line	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	87	24	8	NConv	NConv	13	56	27	NA	Install Redundant Battery
Wilson-Oro Loma 115 kV Line	PANOCH 230/115KV TB 1 & PANOCHE 230/115KV TB 2	P6	N-1-1	118	<100	<100	<100	111	<100	<100	<100	NA	Project:Wilson-Oro Loma 115 kV Line Reconductoring
Wilson-Oro Loma 115 kV Line	PANOCH 230/115KV TB 2 & PANOCHE 230/115KV TB 1	P6	N-1-1	118	<100	<100	<100	<100	<100	<100	<100	NA	Project:Wilson-Oro Loma 115 kV Line Reconductoring
Wilson-Oro Loma 115 kV Line	P7-1:A14:22: HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	25	6	18	39	107	24	8	6	NA	Generation Re-dispatch
Wilson-Oro Loma 115 kV Line	P7-1:A14:26: HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	20	8	21	43	109	23	7	7	NA	Generation Re-dispatch
Wilson-Storey 230kV Line No 1	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	78	20	NA	NConv	NConv	38	114	25	NA	Install Redundant Battery
Wilson-Storey 230kV Line No 1	P5-5c:A14:1: Gates 230-70kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	8	7	NA	40	60	100	58	8	NA	Install Redundant Battery
Wilson-Storey 230kV Line No 1	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	116	<100	<100	<100	NA	Generation Re-dispatch

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
		Category	Category Description	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
Wilson-Storey 230kV Line No 1	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	28	30	NA	42	117	78	69	30	NA	Generation Re-dispatch
Wilson-Storey 230kV Line No 1	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	33	36	NA	46	121	44	73	36	NA	Generation Re-dispatch
Wilson-Storey 230kV Line No 2	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	61	16	NA	NConv	NConv	30	89	20	NA	Install Redundant Battery





Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
GWF_HENR 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.04	1.04	1.05	1.04	NA	Generation Re-dispatch
BOSWELL 70 kV	Basecase	P0	BaseCase	High	1.02	1.03	1.01	1.05	1.04	1.05	1.04	1.03	NA	Sensitivity Only
HENRIETTAE 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.04	1.04	1.05	1.04	NA	Generation Re-dispatch
KENT SS 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.04	1.04	1.05	1.04	NA	Generation Re-dispatch
CRESCENTSS 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.07	1.05	1.05	1.04	NA	Generation Re-dispatch
STROUD 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.03	1.05	1.08	1.05	1.04	1.04	NA	Generation Re-dispatch
KENT_S 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.04	1.04	1.05	1.04	NA	Generation Re-dispatch
SCULPIN 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.07	1.05	1.05	1.04	NA	Generation Re-dispatch
Q1136 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.04	1.04	1.05	1.04	NA	Generation Re-dispatch
OAKHURST 115 kV	Basecase	P0	BaseCase	Low	0.98	0.98	0.94	1.03	1.04	1.00	1.02	0.97	NA	Monitor future forecast
CANAL 70 kV	Basecase	P0	BaseCase	Low	0.99	0.98	0.97	1.03	0.94	1.00	1.03	0.98	NA	Generation Re-dispatch
LVNGSTNT 70 kV	Basecase	P0	BaseCase	Low	0.99	0.99	0.98	1.03	0.95	1.00	1.03	0.99	NA	Generation Re-dispatch
ORTIGA 70 kV	Basecase	P0	BaseCase	Low	0.99	0.99	0.98	1.03	0.95	1.00	1.03	0.99	NA	Generation Re-dispatch
MARIPOS2 70 kV	Basecase	P0	BaseCase	Low	0.94	0.94	0.92	0.97	1.02	0.98	0.97	0.94	NA	Under review
BER VLLY 70 kV	Basecase	P0	BaseCase	Low	0.96	0.96	0.95	0.98	1.02	0.99	0.98	0.96	NA	monitor future forecast
BRCEBG J 70 kV	Basecase	P0	BaseCase	Low	0.96	0.96	0.94	0.97	1.02	0.98	0.97	0.96	NA	monitor future forecast
SAXONCRK 70 kV	Basecase	P0	BaseCase	Low	0.96	0.96	0.94	0.97	1.02	0.98	0.97	0.96	NA	monitor future forecast
INDN FLT 70 kV	Basecase	P0	BaseCase	Low	0.95	0.95	0.94	0.97	1.02	0.98	0.97	0.95	NA	Under review
YOSEMITE 70 kV	Basecase	P0	BaseCase	Low	0.95	0.94	0.93	0.97	1.02	0.97	0.97	0.94	NA	Under review
NRTHFORK 70 kV	Basecase	P0	BaseCase	Low	0.90	0.95	0.93	1.04	1.06	0.99	1.03	1.00	NA	Project: Coppermine reconducting approved in 2021-22 TPP
SJNO2 70 kV	Basecase	P0	BaseCase	Low	0.90	0.96	0.94	1.04	1.06	0.99	1.03	1.00	NA	Project: Coppermine reconducting approved in 2021-22 TPP
SJNO3 70 kV	Basecase	P0	BaseCase	Low	0.89	0.95	0.93	1.04	1.06	0.99	1.03	0.99	NA	Project: Coppermine reconducting approved in 2021-22 TPP
TOMATAK 70 kV	Basecase	P0	BaseCase	Low	0.88	0.89	0.88	0.89	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	Basecase	P0	BaseCase	Low	0.89	0.90	0.90	0.90	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	Basecase	P0	BaseCase	Low	0.89	0.90	0.90	0.90	0.97	0.90	0.90	0.90	NA	Under review
BIOMASS 70 kV	Basecase	P0	BaseCase	Low	0.89	0.90	0.90	0.90	0.97	0.90	0.90	0.90	NA	Under review
CALRENEW 70 kV	Basecase	P0	BaseCase	Low	0.89	0.90	0.90	0.90	0.97	0.90	0.90	0.90	NA	Under review
WISHON 70 kV	Basecase	P0	BaseCase	Low	0.91	0.97	0.95	1.04	1.07	1.00	1.04	1.01	NA	Project: Coppermine reconducting approved in 2021-22 TPP
GUERNSEY 70 kV	Basecase	P0	BaseCase	Low	0.95	0.95	0.99	1.02	1.00	0.99	1.01	0.95	NA	Sensitivity Only
GUR3TPT 70 kV	Basecase	P0	BaseCase	Low	0.95	0.95	0.99	1.02	1.00	0.99	1.01	0.95	NA	Sensitivity Only
COPPRMNE 70 kV	Basecase	P0	BaseCase	Low	0.95	1.00	0.99	1.04	1.05	1.01	1.04	1.04	NA	Project: Coppermine reconducting approved in 2021-22 TPP
AUBRYTP 70 kV	Basecase	P0	BaseCase	Low	0.92	0.97	0.95	1.04	1.07	1.00	1.04	1.01	NA	Project: Coppermine reconducting approved in 2021-22 TPP
AUBERRY 70 kV	Basecase	P0	BaseCase	Low	0.91	0.96	0.94	1.04	1.07	1.00	1.03	1.01	NA	Project: Coppermine reconducting approved in 2021-22 TPP
CAMDEN 70 kV	Basecase	P0	BaseCase	Low	0.95	0.94	0.92	1.01	1.06	0.98	1.01	0.94	NA	Under review
ARMSTRNG 70 kV	Basecase	P0	BaseCase	Low	0.95	0.95	0.98	1.02	1.00	0.99	1.01	0.95	NA	Sensitivity Only
RESERVE 70 kV	Basecase	P0	BaseCase	Low	0.95	0.95	0.98	1.02	1.00	0.99	1.01	0.95	NA	Sensitivity Only
AMSTG SW 70 kV	Basecase	P0	BaseCase	Low	0.95	0.95	0.98	1.02	1.00	0.99	1.01	0.95	NA	Sensitivity Only
FRIANTDAM 70 kV	Basecase	P0	BaseCase	Low	0.95	1.00	0.99	1.03	1.05	1.01	1.03	1.04	NA	Project: Coppermine reconducting approved in 2021-22 TPP
SJNO3 70 kV	P1-1:A14:49:_HELMS 2 18.00KV GEN UNIT 1	P1	N-1	Low	0.90	0.96	0.93	1.04	1.06	0.99	1.03	0.99	NA	Project: Coppermine reconducting approved in 2021-22 TPP
SJNO3 70 kV	P1-1:A14:51:_HELMS 3 18.00KV GEN UNIT 1	P1	N-1	Low	0.90	0.96	0.93	1.04	1.06	0.99	1.03	0.99	NA	Project: Coppermine reconducting approved in 2021-22 TPP
MENDOTA 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS	P1	N-1	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement









Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
SHARON 115 kV	P2-1:A13:14:_LE GRAND-CHOWCHILLA 115KV [2110] (CHWCHLLA-CERTAN T)	P2	Bus/Breaker	Low	0.94	0.93	0.88	0.97	1.10	0.99	0.97	0.93	0.88	Monitor Future forecast
SHARON T 115 kV	P2-1:A13:14:_LE GRAND-CHOWCHILLA 115KV [2110] (CHWCHLLA-CERTAN T)	P2	Bus/Breaker	Low	0.94	0.93	0.88	0.97	1.10	0.99	0.97	0.93	0.88	Monitor Future forecast
MENDOTA 70 kV	P2-1:A13:40:_DAIRYLAND-MENDOTA 115KV [1360] (NEWHALL-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.89	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P2-1:A13:40:_DAIRYLAND-MENDOTA 115KV [1360] (NEWHALL-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-1:A13:40:_DAIRYLAND-MENDOTA 115KV [1360] (NEWHALL-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-1:A13:40:_DAIRYLAND-MENDOTA 115KV [1360] (NEWHALL-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-1:A13:41:_DAIRYLAND-MENDOTA 115KV [1360] (GILLTAP-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.89	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P2-1:A13:41:_DAIRYLAND-MENDOTA 115KV [1360] (GILLTAP-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-1:A13:41:_DAIRYLAND-MENDOTA 115KV [1360] (GILLTAP-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-1:A13:41:_DAIRYLAND-MENDOTA 115KV [1360] (GILLTAP-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P2-1:A13:45:_DAIRYLAND-MENDOTA 115KV [1360] (MENDOTA-GILLTAP)	P2	Bus/Breaker	Low	0.89	0.89	0.88	0.89	0.97	0.89	0.90	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
NEWHALL 115 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	NA	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.86	1.00	0.99	0.95	1.05	0.99	0.95	1.00	NA	Project:Wilson 115kV Reinforcement
GILLTAP 115 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.95	1.05	0.99	0.96	1.01	NA	Project:Wilson 115kV Reinforcement
MENDOTA 115 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
PANOCHET 115 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	NA	Project:Wilson 115kV Reinforcement
MADERAPR 115 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	NA	Project: Panoche-Oro Loma 115kV reconducting
PMTFMPPJT 115 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	NA	Project:Wilson 115kV Reinforcement
PMTFMPP 115 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	NA	Project:Wilson 115kV Reinforcement
NORTHSTAR 115 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	NA	Project:Wilson 115kV Reinforcement
TOMATAK 70 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.70	0.88	0.88	0.81	0.97	0.88	0.81	0.88	0.87	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.94	0.89	0.82	0.90	0.89	Project:Wilson 115kV Reinforcement
BIOMSJCT 70 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.97	0.89	0.82	0.90	0.89	Project:Wilson 115kV Reinforcement
BIOMASS 70 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.97	0.89	0.82	0.89	0.89	Project:Wilson 115kV Reinforcement
CALRENEW 70 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	0.89	Project:Wilson 115kV Reinforcement
Q1028Q1029 115 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	NA	Project:Wilson 115kV Reinforcement
Q1127 115 kV	P2-1:A13:46:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-PANOCHÉ1)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.03	1.03	0.94	1.03	NA	Project:Wilson 115kV Reinforcement
NEWHALL 115 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	NA	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.86	1.00	0.99	0.95	1.05	0.99	0.95	1.00	NA	Project:Wilson 115kV Reinforcement

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
GILLTAP 115 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	NA	Project:Wilson 115kV Reinforcement
MENDOTA 115 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.95	1.05	0.99	0.96	1.01	NA	Project: Panoche-Oro Loma 115kV reconductoring
PMTFMPPJT 115 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	NA	Project:Wilson 115kV Reinforcement
PMTFMPP 115 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	NA	Project:Wilson 115kV Reinforcement
NORTHSTAR 115 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	NA	Project:Wilson 115kV Reinforcement
TOMATAK 70 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.70	0.88	0.88	0.81	0.97	0.88	0.81	0.88	0.87	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.94	0.89	0.82	0.89	0.89	Project:Wilson 115kV Reinforcement
BIOMSJCT 70 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.97	0.89	0.82	0.89	0.89	Project:Wilson 115kV Reinforcement
BIOMASS 70 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	0.89	Project:Wilson 115kV Reinforcement
CALRENEW 70 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	0.89	Project:Wilson 115kV Reinforcement
Q1028Q1029 115 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	NA	Project:Wilson 115kV Reinforcement
Q1127 115 kV	P2-1:A13:47:_PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.03	1.03	0.94	1.03	NA	Project:Wilson 115kV Reinforcement
LE GRNDJ 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.98	0.99	0.90	1.02	1.02	1.02	1.02	0.99	0.88	Monitor Future forecast
PANOCHÉJ 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.61	0.96	0.93	0.98	0.96	0.87	0.56	Project: Panoche-Oro Loma 115kV reconductoring
HAMMONDS 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.61	0.96	0.93	0.98	0.96	0.87	0.56	Project: Panoche-Oro Loma 115kV reconductoring
DFSTP 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.62	0.97	0.94	0.98	0.97	0.87	0.56	Project: Panoche-Oro Loma 115kV reconductoring
ORO LOMA 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.62	0.97	0.94	0.98	0.97	0.87	0.57	Project:Wilson-Oro Loma 115kV reconductoring
LUIS_#3 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	0.55	Project: Panoche-Oro Loma 115kV reconductoring
DFS 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.62	0.97	0.94	0.98	0.97	0.87	0.56	Project: Panoche-Oro Loma 115kV reconductoring
LUIS_#5 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	0.55	Project: Panoche-Oro Loma 115kV reconductoring
OXFORD 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	0.55	Project: Panoche-Oro Loma 115kV reconductoring
EL NIDO 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.95	0.97	0.84	1.01	1.01	1.01	1.01	0.97	0.82	Monitor Future forecast
OXFRDJCT 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.61	0.96	0.92	0.98	0.96	0.87	0.55	Project: Panoche-Oro Loma 115kV reconductoring
WSTLDJCT 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.61	0.96	0.92	0.98	0.96	0.87	0.55	Project: Panoche-Oro Loma 115kV reconductoring
WSTLD1RA 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	0.55	Project: Panoche-Oro Loma 115kV reconductoring
LUISJCT 115 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	0.55	Project: Panoche-Oro Loma 115kV reconductoring
ORO LOMA 70 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.89	0.90	0.70	1.00	0.97	1.01	1.00	0.90	0.70	Review Existing Oro Loma 70kV reinforcement project
SNTA RTA 70 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.86	0.87	0.66	0.99	0.97	1.00	0.99	0.87	0.66	Review Existing Oro Loma 70kV reinforcement project

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
DOS PALS 70 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.87	0.88	0.68	1.00	0.97	1.00	1.00	0.88	0.68	Review Existing Oro Loma 70kV reinforcement project
POSO J1 70 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.84	0.86	0.62	0.99	0.95	0.99	0.99	0.85	0.61	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-1:A13:48:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	Low	0.83	0.84	0.59	0.98	0.94	0.98	0.98	0.84	0.59	Review Existing Oro Loma 70kV reinforcement project
HAMMONDS 115 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2	Bus/Breaker	Low	0.90	0.91	0.73	0.99	0.94	1.00	0.99	0.91	0.68	Monitor Future forecast
DFSTP 115 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2	Bus/Breaker	Low	0.90	0.91	0.73	0.99	0.95	0.99	0.99	0.90	0.69	Project: Panoche-Oro Loma 115kV reconducting
ORO LOMA 115 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2	Bus/Breaker	Low	0.90	0.91	0.74	0.99	0.95	0.99	0.99	0.90	0.69	Project: Wilson-Oro Loma 115kV reconducting
DFS 115 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2	Bus/Breaker	Low	0.90	0.91	0.73	0.99	0.95	0.99	0.99	0.91	0.69	Project: Panoche-Oro Loma 115kV reconducting
EL NIDO 115 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2	Bus/Breaker	Low	0.97	0.98	0.89	1.02	1.02	1.01	1.02	0.98	0.87	Monitor Future forecast
ORO LOMA 70 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2	Bus/Breaker	Low	0.92	0.93	0.75	1.02	0.98	1.02	1.02	0.93	0.71	Monitor Future forecast
SNTA RTA 70 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2	Bus/Breaker	Low	0.89	0.90	0.72	1.01	0.98	1.01	1.01	0.90	0.67	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2	Bus/Breaker	Low	0.91	0.92	0.73	1.02	0.98	1.02	1.02	0.91	0.68	Review Existing Oro Loma 70kV reinforcement project
POSO J1 70 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2	Bus/Breaker	Low	0.88	0.89	0.68	1.01	0.96	1.00	1.01	0.88	0.62	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2	Bus/Breaker	Low	0.87	0.88	0.65	1.01	0.95	1.00	1.01	0.87	0.59	Review Existing Oro Loma 70kV reinforcement project
DFSTP 115 kV	P2-1:A13:51:_PANOCHÉ-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.91	0.93	0.83	1.01	0.99	0.99	1.01	0.92	0.82	Monitor Future forecast
ORO LOMA 115 kV	P2-1:A13:51:_PANOCHÉ-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.91	0.93	0.83	1.01	0.99	0.99	1.01	0.92	0.82	Monitor Future forecast
DFS 115 kV	P2-1:A13:51:_PANOCHÉ-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.91	0.93	0.83	1.01	0.99	0.99	1.01	0.92	0.82	Monitor Future forecast
ORO LOMA 70 kV	P2-1:A13:51:_PANOCHÉ-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.94	0.95	0.85	1.04	1.02	1.02	1.04	0.95	0.84	Monitor Future forecast
SNTA RTA 70 kV	P2-1:A13:51:_PANOCHÉ-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.91	0.92	0.82	1.03	1.01	1.01	1.03	0.92	0.80	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-1:A13:51:_PANOCHÉ-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.92	0.93	0.83	1.03	1.02	1.01	1.03	0.93	0.82	Review Existing Oro Loma 70kV reinforcement project
POSO J1 70 kV	P2-1:A13:51:_PANOCHÉ-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.90	0.91	0.79	1.02	0.98	1.00	1.02	0.90	0.77	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-1:A13:51:_PANOCHÉ-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.88	0.90	0.77	1.02	0.96	1.00	1.02	0.89	0.75	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 115 kV	P2-1:A13:52:_PANOCHÉ-ORO LOMA 115KV [3240] (DFSTP-ORO LOMA)	P2	Bus/Breaker	Low	0.91	0.92	0.84	1.00	0.99	0.99	1.00	0.92	0.82	Monitor Future forecast
ORO LOMA 70 kV	P2-1:A13:52:_PANOCHÉ-ORO LOMA 115KV [3240] (DFSTP-ORO LOMA)	P2	Bus/Breaker	Low	0.93	0.95	0.86	1.03	1.02	1.02	1.03	0.94	0.84	Monitor Future forecast
SNTA RTA 70 kV	P2-1:A13:52:_PANOCHÉ-ORO LOMA 115KV [3240] (DFSTP-ORO LOMA)	P2	Bus/Breaker	Low	0.91	0.92	0.83	1.03	1.02	1.00	1.03	0.91	0.81	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-1:A13:52:_PANOCHÉ-ORO LOMA 115KV [3240] (DFSTP-ORO LOMA)	P2	Bus/Breaker	Low	0.92	0.93	0.84	1.03	1.02	1.01	1.03	0.92	0.82	Review Existing Oro Loma 70kV reinforcement project
POSO J1 70 kV	P2-1:A13:52:_PANOCHÉ-ORO LOMA 115KV [3240] (DFSTP-ORO LOMA)	P2	Bus/Breaker	Low	0.89	0.90	0.79	1.02	0.98	1.00	1.02	0.90	0.77	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-1:A13:52:_PANOCHÉ-ORO LOMA 115KV [3240] (DFSTP-ORO LOMA)	P2	Bus/Breaker	Low	0.88	0.89	0.78	1.02	0.96	0.99	1.02	0.89	0.75	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P2-1:A13:53:_DE FRANCESCO TAP 115KV [3245] (DFSTP-DFS)	P2	Bus/Breaker	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P2-1:A13:62:_PARAMOUNT FARMS TAP 115KV [1744] (PMTFMPPJT-PMTFMPP)	P2	Bus/Breaker	Low	0.88	0.89	0.88	0.89	0.97	0.89	0.90	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P2-1:A14:2:_HELMS-GREGG #1 230KV [4870] (GREGG-HELMS PP1)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	Diverge	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P2-1:A14:2:_HELMS-GREGG #1 230KV [4870] (GREGG-HELMS PP1)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	Diverge	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement

Table with columns: Substation, Contingency (All and Worst P6), Category, Category Description, High/Low Voltage, Voltage PU (Baseline Scenarios), Voltage PU (Sensitivity Scenarios), and Project & Potential Mitigation Solutions. Rows include substations like CALRENEW 70 kV, BIOMASS 70 kV, TOMATAK 70 kV, etc.



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
NEWHALL 115 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	NA	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.86	1.00	0.99	0.95	1.05	0.99	0.95	1.00	NA	Project: Panoche-Oro Loma 115kV reconducting
GILLTAP 115 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.95	1.05	0.99	0.96	1.01	NA	Project: Panoche-Oro Loma 115kV reconducting
MENDOTA 115 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
PANOCHET 115 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
MADERAPR 115 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	NA	Project: Panoche-Oro Loma 115kV reconducting
PMTFMPPT 115 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	NA	Project: Panoche-Oro Loma 115kV reconducting
PMTFMPP 115 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	NA	Project: Panoche-Oro Loma 115kV reconducting
NORTHSTAR 115 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
TOMATAK 70 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.70	0.88	0.88	0.81	0.97	0.88	0.81	0.88	0.87	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.94	0.89	0.82	0.90	0.89	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.97	0.89	0.82	0.90	0.89	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.97	0.89	0.82	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
Q1028Q1029 115 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
Q1127 115 kV	P2-3:A13:34:_PANOCH1 - 1D 115KV & PANOCH1-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.03	1.03	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
NEWHALL 115 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	NA	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.86	1.00	0.99	0.95	1.05	0.99	0.95	1.00	NA	Project: Panoche-Oro Loma 115kV reconducting
GILLTAP 115 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.95	1.05	0.99	0.96	1.01	NA	Project: Panoche-Oro Loma 115kV reconducting
MENDOTA 115 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
PANOCHET 115 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
MADERAPR 115 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	NA	Project: Panoche-Oro Loma 115kV reconducting
PMTFMPPT 115 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	NA	Project: Panoche-Oro Loma 115kV reconducting
PMTFMPP 115 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	NA	Project: Panoche-Oro Loma 115kV reconducting
NORTHSTAR 115 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
TOMATAK 70 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.70	0.88	0.88	0.81	0.97	0.88	0.81	0.88	0.87	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.94	0.89	0.82	0.90	0.89	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.97	0.89	0.82	0.90	0.89	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-3:A13:35:_PANOCH1 - 1D 115KV & PANOCH1-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.97	0.89	0.82	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project







Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
MERCED 115 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.29	Diverge	NA	NA	Sensitivity Only
MERCED 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.55	Diverge	NA	NA	Project:Wilson 115KV Reinforcement
ELNIDOBMCT 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.57	Diverge	NA	NA	Project:Wilson 115KV Reinforcement
ELNIDOBM 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.57	Diverge	NA	NA	Project:Wilson 115KV Reinforcement
MC SWAIN 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.80	Diverge	NA	NA	Sensitivity Only
MARIPOS2 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.88	Diverge	NA	NA	Sensitivity Only
MRCDFLLS 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.80	Diverge	NA	NA	Sensitivity Only
EXCHEQUR 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.88	Diverge	NA	NA	Sensitivity Only
POSO J2 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.57	Diverge	NA	NA	Sensitivity Only
BER VLLY 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.87	Diverge	NA	NA	Sensitivity Only
BRCEBG J 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.86	Diverge	NA	NA	Sensitivity Only
SAXONCRK 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.86	Diverge	NA	NA	Sensitivity Only
INDN FLT 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.86	Diverge	NA	NA	Sensitivity Only
YOSEMITE 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.85	Diverge	NA	NA	Sensitivity Only
MCSWAINJ 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.80	Diverge	NA	NA	Sensitivity Only
LE GRNDJ 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.95	0.99	0.89	1.02	1.02	1.02	1.02	0.99	0.87	Monitor Future forecast
NEWHALL 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.84	1.00	0.98	0.96	1.05	0.99	0.96	1.00	NA	Project:Wilson 115KV Reinforcement
GILLRAN 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	1.00	0.98	0.95	1.05	0.99	0.95	1.00	NA	Project: Panoche-Oro Loma 115KV reconductoring
GILLTAP 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.84	1.00	0.98	0.95	1.05	0.99	0.96	1.00	NA	Project: Panoche-Oro Loma 115KV reconductoring
DAIRYLND 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.90	1.00	0.96	0.98	1.07	0.99	0.99	1.00	NA	Project: Panoche-Oro Loma 115KV reconductoring
MENDOTA 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.80	1.03	1.02	0.94	1.03	1.02	0.94	1.02	NA	Project: Panoche-Oro Loma 115KV reconductoring
PANOCHET 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.80	1.03	1.02	0.94	1.04	1.02	0.94	1.03	NA	Project: Panoche-Oro Loma 115KV reconductoring
PANOCH1 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.59	0.96	0.92	0.98	0.96	0.87	0.55	Project: Panoche-Oro Loma 115KV reconductoring
HAMMONDS 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.59	0.96	0.92	0.98	0.96	0.87	0.55	Project: Panoche-Oro Loma 115KV reconductoring
DFSTP 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.60	0.97	0.93	0.98	0.97	0.87	0.56	Project: Panoche-Oro Loma 115KV reconductoring
ORO LOMA 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.60	0.97	0.94	0.98	0.97	0.87	0.56	Project:Wilson-Oro Loma 115KV reconductoring
LUIS_#3 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.58	0.96	0.92	0.98	0.96	0.87	0.54	Project: Panoche-Oro Loma 115KV reconductoring
DFS 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.60	0.97	0.93	0.98	0.97	0.87	0.55	Project: Panoche-Oro Loma 115KV reconductoring
LUIS_#5 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.58	0.96	0.92	0.98	0.96	0.87	0.54	Project: Panoche-Oro Loma 115KV reconductoring

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
OXFORD 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.58	0.96	0.92	0.98	0.96	0.87	0.54	Project: Panoche-Oro Loma 115kV reconducting
EL NIDO 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.92	0.97	0.83	1.01	1.01	1.01	1.01	0.96	0.81	Monitor Future forecast
MADERAPR 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.84	1.00	0.98	0.95	1.05	0.99	0.96	1.00	NA	Project: Panoche-Oro Loma 115kV reconducting
OXFRDJCT 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.58	0.96	0.92	0.98	0.96	0.87	0.54	Project: Panoche-Oro Loma 115kV reconducting
WSTLDJCT 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.58	0.96	0.92	0.98	0.96	0.87	0.54	Project: Panoche-Oro Loma 115kV reconducting
WSTLD1RA 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.58	0.96	0.92	0.98	0.96	0.87	0.54	Project: Panoche-Oro Loma 115kV reconducting
LUISJCT 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.58	0.96	0.92	0.98	0.96	0.87	0.54	Project: Panoche-Oro Loma 115kV reconducting
PMTFMPPJT 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.84	1.00	0.98	0.95	1.05	0.99	0.95	1.00	NA	Project: Panoche-Oro Loma 115kV reconducting
PMTFMPP 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.84	1.00	0.98	0.95	1.05	0.99	0.95	1.00	NA	Project: Panoche-Oro Loma 115kV reconducting
NORTHSTAR 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.80	1.03	1.03	0.94	1.04	1.03	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
ORO LOMA 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.85	0.90	0.70	1.00	0.96	1.01	1.00	0.89	0.70	Review Existing Oro Loma 70kV reinforcement project
SNTA RTA 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.82	0.87	0.66	0.99	0.96	1.00	0.99	0.86	0.66	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.88	0.68	1.00	0.97	1.00	1.00	0.87	0.67	Review Existing Oro Loma 70kV reinforcement project
POSO J1 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.80	0.85	0.62	0.99	0.95	0.99	0.99	0.84	0.61	Review Existing Oro Loma 70kV reinforcement project
NRTHFORK 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.89	0.95	0.93	1.04	1.06	0.99	1.03	1.00	NA	Review Existing Oro Loma 70kV reinforcement project
SJNO2 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.90	0.96	0.94	1.04	1.06	0.99	1.03	1.00	NA	Review Existing Oro Loma 70kV reinforcement project
SJNO3 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.89	0.95	0.93	1.04	1.06	0.99	1.03	0.99	NA	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.79	0.84	0.59	0.98	0.94	0.98	0.98	0.83	0.59	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.68	0.88	0.87	0.81	0.94	0.88	0.81	0.88	0.87	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.70	0.89	0.89	0.82	0.93	0.89	0.82	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.69	0.89	0.89	0.82	0.96	0.89	0.82	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.69	0.89	0.89	0.82	0.96	0.89	0.82	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.69	0.89	0.89	0.82	0.96	0.89	0.82	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
AUBERRY 70 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.90	0.96	0.94	1.04	1.07	1.00	1.03	1.01	NA	Project: Coppermine reconducting approved in 2021-22 TPP
Q1028Q1029 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.80	1.03	1.03	0.94	1.04	1.03	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
Q1127 115 kV	P2-4:A13:13_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.80	1.03	1.03	0.94	1.03	1.03	0.94	1.03	NA	Project: Panoche-Oro Loma 115kV reconducting
TOMATAK 70 kV	P2-4:A13:3_PANOCH1 SECTION 2E & 2D	P2	Bus/Breaker	Low	0.87	0.89	NA	0.88	0.97	0.89	0.89	0.89	NA	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-4:A13:3_PANOCH1 SECTION 2E & 2D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P2-4:A13:3_PANOCH1 SECTION 2E & 2D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-4:A13:3_PANOCH1 SECTION 2E & 2D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-4:A13:3_PANOCH1 SECTION 2E & 2D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-4:A13:4_PANOCH1 SECTION 1E & 1D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P2-4:A13:4_PANOCH1 SECTION 1E & 1D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
ARBURUA 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.89	0.88	0.80	NA	0.83	NA	NA	0.88	NA	Review Existing Oro Loma 70kV reinforcement project
CANAL 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.80	0.81	0.69	NA	0.70	NA	NA	0.81	NA	Review Existing Oro Loma 70kV reinforcement project
MERCYSRNGSS 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.87	0.86	0.77	NA	0.80	NA	NA	0.86	NA	Review Existing Oro Loma 70kV reinforcement project
MRCYSPRS 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.87	0.85	0.76	NA	0.79	NA	NA	0.85	NA	Review Existing Oro Loma 70kV reinforcement project
ORTIGA 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.84	0.84	0.73	NA	0.76	NA	NA	0.83	NA	Review Existing Oro Loma 70kV reinforcement project
VEGA 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.87	0.86	0.77	NA	0.80	NA	NA	0.86	NA	Review Existing Oro Loma 70kV reinforcement project
ARBURU T 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOS BANOS 230/70KV TB 3	P3	G-1/N-1	Low	NA	NA	NA	NA	0.86	NA	NA	NA	NA	new Losbanos 230/70kV project
DINO JCT 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOS BANOS 230/70KV TB 3	P3	G-1/N-1	Low	0.88	0.88	NA	NA	NA	NA	NA	0.88	NA	new Losbanos 230/70kV project
INTL TUR 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOS BANOS 230/70KV TB 3	P3	G-1/N-1	Low	0.89	0.88	NA	NA	NA	NA	NA	0.88	NA	new Losbanos 230/70kV project
LIVNGSTN 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOS BANOS 230/70KV TB 3	P3	G-1/N-1	Low	NA	0.89	0.89	NA	0.85	NA	NA	0.89	NA	new Losbanos 230/70kV project
LVNGSTNT 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOS BANOS 230/70KV TB 3	P3	G-1/N-1	Low	0.90	0.89	0.89	NA	0.84	NA	NA	0.89	NA	new Losbanos 230/70kV project
PCHCO PP 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOS BANOS 230/70KV TB 3	P3	G-1/N-1	Low	0.88	0.87	NA	NA	NA	NA	0.90	0.87	NA	new Losbanos 230/70kV project
SNTA NLA 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOS BANOS 230/70KV TB 3	P3	G-1/N-1	Low	NA	NA	NA	NA	0.90	NA	NA	NA	NA	new Losbanos 230/70kV project
WRIGHT T 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOS BANOS 230/70KV TB 3	P3	G-1/N-1	Low	NA	NA	NA	NA	0.89	NA	NA	NA	NA	new Losbanos 230/70kV project
WRGHT PP 70 kV	P1-1:A13:27:_WRIGHT D 12.47KV GEN UNIT OF & P1-3:A13:6:_LOS BANOS 230/70KV TB 3	P3	G-1/N-1	Low	NA	NA	NA	NA	0.90	NA	NA	NA	NA	new Losbanos 230/70kV project
DAIRYLND 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P3	G-1/N-1	Low	NA	0.90	NA	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV recondotoring
GILLRAN 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.85	0.84	NA	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV recondotoring
GILLTAP 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.85	0.84	NA	NA	NA	NA	NA	NA	NA	Under Review
MADERAPR 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.86	0.84	NA	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV recondotoring
MENDOTA 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.82	0.80	NA	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV recondotoring
NEWHALL 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.86	0.84	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
NORTHSTAR 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.82	0.80	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
PMTFMPP 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.85	0.84	NA	NA	NA	NA	NA	NA	NA	Under Review
PMTFMPPJT 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.85	0.84	NA	NA	NA	NA	NA	NA	NA	Under Review
Q1028Q1029 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.82	0.80	NA	NA	NA	NA	NA	NA	NA	Under Review
Q1127 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.82	0.80	NA	NA	NA	NA	NA	NA	NA	Under Review
DOS PALS 70 kV	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-2:A13:60:_PANOCHERO LOMA 115KV [3240]	P3	G-1/N-1	Low	NA	NA	0.84	NA	NA	NA	NA	NA	NA	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 70 kV	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-2:A13:60:_PANOCHERO LOMA 115KV [3240]	P3	G-1/N-1	Low	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Review Existing Oro Loma 70kV reinforcement project
BER VLLY 70 kV	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-2:A13:87:_MERCED FALLS-EXCHEQUER 70KV [8990]	P3	G-1/N-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Under Review

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
BRCEBG J 70 kV	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-2:A13:87:_MERCED FALLS-EXCHEQUER 70KV [8990]	P3	G-1/N-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Under Review
INDN FLT 70 kV	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-2:A13:87:_MERCED FALLS-EXCHEQUER 70KV [8990]	P3	G-1/N-1	Low	NA	NA	0.88	NA	NA	NA	NA	NA	NA	monitor future forecast
SAXONCRK 70 kV	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-2:A13:87:_MERCED FALLS-EXCHEQUER 70KV [8990]	P3	G-1/N-1	Low	NA	NA	0.88	NA	NA	NA	NA	NA	NA	monitor future forecast
BIOMASS 70 kV	P1-1:A13:9:_Q1028Q1029PV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHER-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	NA	0.70	0.89	NA	NA	NA	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P1-1:A13:9:_Q1028Q1029PV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHER-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	NA	0.70	0.89	NA	NA	NA	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P1-1:A13:9:_Q1028Q1029PV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHER-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	NA	0.70	0.89	NA	NA	NA	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P1-1:A13:9:_Q1028Q1029PV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHER-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	NA	0.70	0.89	NA	NA	NA	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P1-1:A13:9:_Q1028Q1029PV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHER-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	NA	0.69	0.87	NA	NA	NA	0.87	0.88	NA	Review Existing Oro Loma 70kV reinforcement project
CERTANJ1 115 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	Low	NA	0.89	0.85	NA	NA	NA	NA	0.89	NA	Project:Wilson 115kV Reinforcement
CHWCHLLA 115 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	Low	NA	0.89	0.85	NA	NA	NA	NA	0.89	NA	Project:Wilson 115kV Reinforcement
SHARON 115 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	Low	NA	NA	0.86	NA	NA	NA	NA	0.90	NA	Project:Wilson 115kV Reinforcement
SHARON T 115 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	Low	NA	NA	0.86	NA	NA	NA	NA	0.90	NA	Project:Wilson 115kV Reinforcement
FIREBAGH 70 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:60:_PANOCHER-ORO LOMA 115KV [3240]	P3	G-1/N-1	Low	NA	0.88	0.77	NA	NA	NA	NA	0.88	NA	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 115 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:60:_PANOCHER-ORO LOMA 115KV [3240]	P3	G-1/N-1	Low	NA	NA	0.83	NA	NA	NA	NA	NA	NA	monitor future forecast
POSO J1 70 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:60:_PANOCHER-ORO LOMA 115KV [3240]	P3	G-1/N-1	Low	NA	0.90	0.79	NA	NA	NA	NA	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
SNTA RTA 70 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:60:_PANOCHER-ORO LOMA 115KV [3240]	P3	G-1/N-1	Low	NA	NA	0.83	NA	NA	NA	NA	NA	NA	Review Existing Oro Loma 70kV reinforcement project
HENRIETA 230 kV	P1-1:A14:47:_GWF_GT2 13.80KV GEN UNIT 1 & P1-2:A14:17:_MUSTANG SW STA-GREGG 230KV [4700]	P3	G-1/N-1	Low	NA	NA	NA	0.90	NA	NA	NA	NA	NA	generation re-dispatch
DINUBA 70 kV	P1-1:A14:57:_MCCALL1T 13.20KV GEN UNIT 1 & P1-2:A14:113:_REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	Low	NA	0.90	NA	NA	NA	NA	NA	NA	NA	Project: Coppermine reductoring approved in 2021-22 TPP
AVENAL 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.81	NA	New Gates 230/70kV transformer project
AVENAL T 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.81	NA	New Gates 230/70kV transformer project
AVNLPARK 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.81	NA	New Gates 230/70kV transformer project
CALFLAX 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.89	0.85	NA	NA	NA	NA	NA	0.85	NA	New Gates 230/70kV transformer project
CHEVPL T 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.80	NA	New Gates 230/70kV transformer project
CHEVPLIN 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.80	NA	New Gates 230/70kV transformer project
COLCGN T 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.81	NA	New Gates 230/70kV transformer project
COLNGA 1 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.81	NA	New Gates 230/70kV transformer project
COLNGA 2 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
DERRCK T 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
DERRICK 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
GATES 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.88	0.83	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
GATS2_TP 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.88	0.83	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
HURON 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.88	0.83	NA	NA	NA	NA	NA	0.83	NA	New Gates 230/70kV transformer project
HURONJ 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.88	0.83	NA	NA	NA	NA	NA	0.83	NA	New Gates 230/70kV transformer project
JACALITO 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.87	0.82	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
JAYNESWSTA 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.88	0.83	NA	NA	NA	NA	NA	0.83	NA	New Gates 230/70kV transformer project
KETLMN T 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.81	NA	New Gates 230/70kV transformer project
KETTLEMN 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.85	0.81	NA	NA	NA	NA	NA	0.80	NA	New Gates 230/70kV transformer project
OIL CITY 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
PENNZIER 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
PENZIR J 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
PLSNTVLY 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.89	0.85	NA	NA	NA	NA	NA	0.85	NA	New Gates 230/70kV transformer project
SUN CITY 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.81	NA	New Gates 230/70kV transformer project
TORNADO 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.81	NA	New Gates 230/70kV transformer project
TORND J 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.81	NA	New Gates 230/70kV transformer project
TORND T 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.81	NA	New Gates 230/70kV transformer project
WESTLND3_3 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.88	0.83	NA	NA	NA	NA	NA	0.83	NA	New Gates 230/70kV transformer project
CAMDEN 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS & P1-2:A14:144:_JACKSONSWSTA-GWF_HEP 115KV [0]	P3	G-1/N-1	Low	NA	NA	0.90	NA	NA	NA	NA	NA	NA	Review Existing Oro Loma 70kV reinforcement project
AUBERRY 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS & P1-4:A14:34:_COPPRMNE SVD=V	P3	G-1/N-1	Low	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Project: Coppermine reconducting approved in 2021-22 TPP
AUBRYTP 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS & P1-4:A14:34:_COPPRMNE SVD=V	P3	G-1/N-1	Low	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Project: Coppermine reconducting approved in 2021-22 TPP
NRTHFORK 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS & P1-4:A14:34:_COPPRMNE SVD=V	P3	G-1/N-1	Low	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Project: Coppermine reconducting approved in 2021-22 TPP
SJNO2 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS & P1-4:A14:34:_COPPRMNE SVD=V	P3	G-1/N-1	Low	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Project: Coppermine reconducting approved in 2021-22 TPP
SJNO3 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS & P1-4:A14:34:_COPPRMNE SVD=V	P3	G-1/N-1	Low	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Project: Coppermine reconducting approved in 2021-22 TPP
WISHON 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS & P1-4:A14:34:_COPPRMNE SVD=V	P3	G-1/N-1	Low	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Project: Coppermine reconducting approved in 2021-22 TPP
ATWATER 115 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	NA	Install Redundant protection
ATWATR J 115 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.26	Diverge	NA	NA	Install Redundant protection

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
LIVNGSTN 115 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	NA	Sensitivity Only
GALLO 115 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	NA	Sensitivity Only
EL CAPTN 115 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	NA	Sensitivity Only
CRESSEY 115 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	NA	Sensitivity Only
MERCED 115 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.29	Diverge	NA	NA	Sensitivity Only
MERCED 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.55	Diverge	NA	NA	Install Redundant protection
ELNIDOBMCT 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.57	Diverge	NA	NA	Install Redundant protection
ELNIDOBM 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.57	Diverge	NA	NA	Install Redundant protection
MC SWAIN 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.80	Diverge	NA	NA	Sensitivity Only
MARIPOS2 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.88	Diverge	NA	NA	Sensitivity Only
MRCDFLLS 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.80	Diverge	NA	NA	Sensitivity Only
EXCHEQU7 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.88	Diverge	NA	NA	Sensitivity Only
POSO J2 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.57	Diverge	NA	NA	Sensitivity Only
BER VLLY 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.87	Diverge	NA	NA	Sensitivity Only
BRCEBG J 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.86	Diverge	NA	NA	Sensitivity Only
SAXONCRK 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.86	Diverge	NA	NA	Sensitivity Only
INDN FLT 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.86	Diverge	NA	NA	Sensitivity Only
YOSEMITE 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.85	Diverge	NA	NA	Sensitivity Only
MCSWAINJ 70 kV	P5-5a:A13.5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.80	Diverge	NA	NA	Install Redundant protection
AVENAL T 70 kV	P5-5a:A14.1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.89	0.86	0.99	0.94	0.99	0.94	0.95	0.86	NA	Install Redundant protection
KETLMN T 70 kV	P5-5a:A14.1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.89	0.86	0.99	0.95	0.99	0.94	0.95	0.85	NA	Install Redundant protection
CHEVPL T 70 kV	P5-5a:A14.1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.89	0.86	0.99	0.94	0.99	0.93	0.95	0.85	NA	Install Redundant protection
TORND0 J 70 kV	P5-5a:A14.1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.99	0.96	0.98	0.95	0.96	0.86	NA	Install Redundant protection
TORND0 T 70 kV	P5-5a:A14.1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.99	0.96	0.98	0.95	0.96	0.86	NA	Install Redundant protection
COLCGN T 70 kV	P5-5a:A14.1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.99	0.96	0.98	0.95	0.96	0.86	NA	Install Redundant protection
PENZIR J 70 kV	P5-5a:A14.1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.99	0.96	0.98	0.96	0.96	0.87	NA	Install Redundant protection
DERRCK T 70 kV	P5-5a:A14.1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.91	0.88	0.99	0.96	0.98	0.96	0.96	0.87	NA	Install Redundant protection
OIL CITYT 70 kV	P5-5a:A14.1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.91	0.88	0.99	0.96	0.98	0.96	0.96	0.87	NA	Install Redundant protection
GATS2_TP 70 kV	P5-5a:A14.1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.91	0.88	1.00	0.95	0.97	0.96	0.95	0.87	NA	New Gates 230/70kV transformer project

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
PENNZIER 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.91	0.88	0.99	0.96	0.98	0.96	0.96	0.87	NA	Install Redundant protection
AVNLPARK 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.90	0.87	0.99	0.94	1.00	0.93	0.94	0.86	NA	Install Redundant protection
SUN CITY 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.90	0.87	0.99	0.94	1.00	0.93	0.94	0.86	NA	Install Redundant protection
AVENAL 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.90	0.87	0.99	0.94	1.00	0.93	0.94	0.86	NA	Install Redundant protection
KETTLEMN 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.89	0.86	0.99	0.94	0.98	0.93	0.94	0.85	NA	Install Redundant protection
CHEVPLIN 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.89	0.86	0.99	0.94	0.99	0.93	0.95	0.85	NA	Install Redundant protection
WESTLNDS_3 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.91	0.88	1.00	0.95	0.97	0.96	0.95	0.87	NA	Install Redundant protection
GATES 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.91	0.88	1.00	0.95	0.97	0.96	0.95	0.87	NA	New Gates 230/70kV Transformer project
JAYNESWSTA 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.91	0.88	1.00	0.95	0.97	0.96	0.95	0.87	NA	Install Redundant protection
HURON 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.92	0.88	0.99	0.95	0.97	0.96	0.95	0.87	NA	Install Redundant protection
HURONJ 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.92	0.88	0.99	0.95	0.97	0.96	0.95	0.87	NA	Install Redundant protection
CALFLAX 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.92	0.89	0.99	0.96	0.98	0.97	0.95	0.89	NA	Install Redundant protection
PLSNTVLY 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.92	0.89	0.99	0.97	0.99	0.96	0.96	0.89	NA	Install Redundant protection
COLNGA 2 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.90	0.87	0.99	0.96	0.98	0.96	0.96	0.87	NA	Install Redundant protection
DERRICK 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.91	0.88	0.99	0.97	0.98	0.96	0.96	0.87	NA	Install Redundant protection
TORNADO 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.90	0.87	0.99	0.96	0.98	0.95	0.96	0.86	NA	Install Redundant protection
COLNGA 1 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.90	0.87	0.98	0.96	0.97	0.95	0.96	0.86	NA	Install Redundant protection
JACALITO 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.90	0.87	0.99	0.95	0.97	0.96	0.96	0.87	NA	Install Redundant protection
CAMDEN 70 kV	P5-5a:A14:6:_HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Low	0.94	0.92	0.90	1.00	1.07	0.98	1.01	0.92	0.89	Monitor Future forecast
TOMATAK 70 kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	Low	0.86	0.89	0.88	Diverge	Diverge	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	Low	0.88	0.90	0.90	Diverge	Diverge	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	Low	0.88	0.90	0.90	Diverge	Diverge	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	Low	0.88	0.90	0.90	Diverge	Diverge	0.90	0.90	0.90	NA	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	Low	0.88	0.90	0.90	Diverge	Diverge	0.90	0.90	0.90	NA	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A13:10:_Chowchilla 115kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	Low	0.88	0.89	NA	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13:10:_Chowchilla 115kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	Low	0.89	0.90	NA	0.89	0.94	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A13:10:_Chowchilla 115kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:10:_Chowchilla 115kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:10:_Chowchilla 115kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
CHWCHLLA 115 kV	P5-5c:A13:11:_Le Grand 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	NA	NA	0.87	NA	NA	NA	NA	NA	0.86	Monitor Future forecast
CERTANJ1 115 kV	P5-5c:A13:11:_Le Grand 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	NA	NA	0.87	NA	NA	NA	NA	NA	0.87	Monitor Future forecast
SHARON 115 kV	P5-5c:A13:11:_Le Grand 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	NA	NA	0.88	NA	NA	NA	NA	NA	0.88	Monitor Future forecast
SHARON T 115 kV	P5-5c:A13:11:_Le Grand 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	NA	NA	0.88	NA	NA	NA	NA	NA	0.88	Monitor Future forecast
TOMATAK 70 kV	P5-5c:A13:12:_Le Grand 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.86	0.89	NA	0.88	0.97	0.89	0.88	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13:12:_Le Grand 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.88	0.90	NA	0.89	0.95	0.90	0.89	0.90	NA	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A13:12:_Le Grand 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.88	0.90	NA	0.89	0.97	0.90	0.89	0.90	NA	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:12:_Le Grand 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.88	0.90	NA	0.89	0.97	0.90	0.89	0.90	NA	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:12:_Le Grand 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.88	0.90	NA	0.89	0.97	0.90	0.89	0.90	NA	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A13:13:_Sharon 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.88	0.89	NA	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13:13:_Sharon 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.89	0.90	NA	0.89	0.94	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A13:13:_Sharon 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:13:_Sharon 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:13:_Sharon 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
ATWATER 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.26	0.26	Diverge	Diverge	NA	Install Redundant Battery
ATWATR J 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.26	0.26	Diverge	Diverge	NA	Install Redundant Battery
LIVNGSTN 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.25	0.26	Diverge	Diverge	NA	Project:Wilson 115kV Reinforcement
GALLO 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.25	0.25	Diverge	Diverge	NA	Install Redundant Battery
EL CAPTN 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.25	0.25	Diverge	Diverge	NA	Install Redundant Battery
CRESSEY 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.26	0.25	Diverge	Diverge	NA	Install Redundant Battery
MERCED 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.30	0.29	Diverge	Diverge	NA	Install Redundant Battery
MERCED 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.58	0.55	Diverge	Diverge	NA	Install Redundant Battery
ELNIDOBMCT 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.60	0.57	Diverge	Diverge	NA	Install Redundant Battery
ELNIDOBM 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.60	0.57	Diverge	Diverge	NA	Install Redundant Battery
MC SWAIN 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.86	0.80	Diverge	Diverge	NA	Install Redundant Battery
MARIPOS2 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.93	0.88	Diverge	Diverge	NA	Sensitivity Only
MRCDFLLS 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.86	0.80	Diverge	Diverge	NA	Install Redundant Battery
EXCHEQR 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.93	0.88	Diverge	Diverge	NA	Sensitivity Only
POSO J2 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	Diverge	Diverge	Diverge	Diverge	0.60	0.57	Diverge	Diverge	NA	Install Redundant Battery

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
BER VLLY 70 kV	P5-5c:A13.2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.92	0.87	Diverge	Diverge	NA	Sensitivity Only
BRCEBG J 70 kV	P5-5c:A13.2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.92	0.86	Diverge	Diverge	NA	Sensitivity Only
SAXONCRK 70 kV	P5-5c:A13.2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.92	0.86	Diverge	Diverge	NA	Sensitivity Only
INDN FLT 70 kV	P5-5c:A13.2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.92	0.86	Diverge	Diverge	NA	Sensitivity Only
YOSEMITE 70 kV	P5-5c:A13.2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.92	0.85	Diverge	Diverge	NA	Sensitivity Only
MCSWAINJ 70 kV	P5-5c:A13.2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.86	0.80	Diverge	Diverge	NA	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A13.21:_Newhall 115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.89	NA	0.89	0.97	0.89	0.90	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P5-5c:A13.22:_Dairyland 115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.89	NA	0.89	0.97	0.89	0.90	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 115 kV	P5-5c:A13.23:_Hammonds 115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	NA	NA	0.84	NA	NA	NA	NA	NA	0.82	Monitor Future forecast
ORO LOMA 70 kV	P5-5c:A13.23:_Hammonds 115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	NA	NA	0.86	NA	NA	NA	NA	NA	0.84	Monitor Future forecast
SNTA RTA 70 kV	P5-5c:A13.23:_Hammonds 115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	NA	NA	0.83	NA	NA	NA	NA	NA	0.81	Monitor Future forecast
DOS PALS 70 kV	P5-5c:A13.23:_Hammonds 115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	NA	NA	0.84	NA	NA	NA	NA	NA	0.82	Monitor Future forecast
POSO J1 70 kV	P5-5c:A13.23:_Hammonds 115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	NA	NA	0.79	NA	NA	NA	NA	NA	0.77	Monitor Future forecast
FIREBAGH 70 kV	P5-5c:A13.23:_Hammonds 115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	NA	NA	0.78	NA	NA	NA	NA	NA	0.75	Review Existing Oro Loma 70kV reinforcement project
POSO J1 70 kV	P5-5c:A13.24:_Hammonds 115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	1.02	0.98	1.00	1.02	0.90	NA	Install Redundant Battery
FIREBAGH 70 kV	P5-5c:A13.24:_Hammonds 115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	NA	1.02	0.96	0.99	1.02	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P5-5c:A13.25:_Oro Loma 115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	NA	0.88	0.91	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13.25:_Oro Loma 115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.92	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A13.25:_Oro Loma 115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.95	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13.25:_Oro Loma 115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.95	0.90	0.90	0.90	NA	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13.25:_Oro Loma 115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.95	0.90	0.90	0.90	NA	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A13.3:_Quinto SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13.3:_Quinto SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A13.3:_Quinto SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13.3:_Quinto SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13.3:_Quinto SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
NEWHALL 115 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.85	1.00	0.99	0.96	1.05	0.99	0.96	1.00	NA	Install Redundant Battery
GILLRAN 115 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.84	1.00	0.99	0.95	1.05	0.99	0.95	1.00	NA	Install Redundant Battery
GILLTAP 115 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.84	1.01	0.99	0.95	1.05	0.99	0.95	1.00	NA	Install Redundant Battery

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
MENDOTA 115 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.80	1.03	1.02	0.94	1.04	1.02	0.94	1.03	NA	Install Redundant Battery
ORO LOMA 115 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.91	0.83	1.00	0.98	0.97	1.00	0.91	0.82	Project:Wilson-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.85	1.01	0.99	0.95	1.05	0.99	0.96	1.00	NA	Install Redundant Battery
PMTFMPJT 115 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.84	1.00	0.99	0.95	1.05	0.99	0.95	1.00	NA	Install Redundant Battery
PMTFMP 115 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.84	1.00	0.99	0.95	1.05	0.99	0.95	1.00	NA	Install Redundant Battery
NORTHSTAR 115 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.80	1.03	1.03	0.94	NA	1.03	0.94	1.03	NA	Install Redundant Battery
ORO LOMA 70 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.91	0.94	0.85	1.03	1.01	1.00	1.03	0.93	0.84	Monitor Future forecast
SNTA RTA 70 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.91	0.82	1.03	1.01	0.99	1.03	0.90	0.80	Install Redundant Battery
DOS PALS 70 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.92	0.83	1.03	1.01	0.99	1.03	0.92	0.82	Install Redundant Battery
POSO J1 70 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.86	0.89	0.79	1.02	0.97	0.98	1.02	0.89	0.77	Install Redundant Battery
FIREBAGH 70 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.85	0.88	0.77	1.02	0.96	0.97	1.02	0.88	0.75	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.68	0.88	0.87	0.81	0.95	0.88	0.81	0.88	0.87	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.70	0.89	0.89	0.82	0.94	0.89	0.82	0.89	0.89	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.70	0.89	0.89	0.82	0.96	0.89	0.82	0.89	0.89	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.70	0.89	0.89	0.82	0.96	0.89	0.82	0.89	0.89	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.70	0.89	0.89	0.82	0.96	0.89	0.82	0.89	0.89	Install Redundant Battery
Q1028Q1029 115 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.80	1.03	1.03	0.94	1.04	1.03	0.94	1.03	NA	Install Redundant Battery
Q1127 115 kV	P5-5c:A13.4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.80	1.03	1.03	0.94	1.03	1.03	0.94	1.03	NA	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A13.5:_Tranquillity SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13.5:_Tranquillity SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A13.5:_Tranquillity SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13.5:_Tranquillity SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13.5:_Tranquillity SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
CANAL 70 kV	P5-5c:A14.1:_Gates 500kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.99	0.98	0.97	1.02	0.89	0.99	1.03	0.98	NA	Generation Re-dispatch
LVNGSTNT 70 kV	P5-5c:A14.1:_Gates 500kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.99	0.99	0.98	1.02	0.89	0.99	1.03	0.99	NA	Generation Re-dispatch
ORTIGA 70 kV	P5-5c:A14.1:_Gates 500kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.99	0.99	0.98	1.03	0.89	1.00	1.03	0.99	NA	Generation Re-dispatch
CLOVIS-2 115 kV	P5-5c:A14.10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.90	Diverge	1.03	0.96	0.98	1.03	0.90	NA	Sensitivity Only
REEDLEY 115 kV	P5-5c:A14.10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.85	Diverge	1.02	0.93	0.95	1.02	0.85	NA	Install Redundant Battery
WAHTOKE 115 kV	P5-5c:A14.10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.85	Diverge	1.02	0.93	0.95	1.01	0.84	NA	Install Redundant Battery

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
RAINBW 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.90	Diverge	1.03	0.98	0.97	1.03	0.89	NA	Install Redundant Battery
RAINBWP 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.90	Diverge	1.03	0.97	0.98	1.03	0.89	NA	Install Redundant Battery
PIEDRA 1 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.91	0.88	Diverge	1.02	0.95	0.97	1.02	0.87	NA	Install Redundant Battery
KNGSRVR1 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.90	Diverge	1.04	0.95	0.99	1.04	0.89	NA	Install Redundant Battery
SANGERCNGJCT 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.90	Diverge	1.03	0.96	0.98	1.03	0.90	NA	Sensitivity Only
SANGERCNG 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.90	Diverge	1.03	0.96	0.98	1.03	0.90	NA	Sensitivity Only
PARLIER 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.91	0.88	Diverge	1.02	0.94	0.97	1.02	0.87	NA	Install Redundant Battery
DUNLAP 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.92	0.87	Diverge	1.02	1.00	0.99	1.02	0.86	NA	Project: Reedley 70kV Reinforcement
SANDCRK 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.88	Diverge	1.02	1.01	1.00	1.02	0.87	NA	Project: Reedley 70kV Reinforcement
STCRRL J 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.94	0.90	Diverge	1.02	1.01	1.01	1.02	0.89	NA	Project: Reedley 70kV Reinforcement
STONCRRL 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.89	Diverge	1.02	1.00	1.00	1.02	0.88	NA	Project: Reedley 70kV Reinforcement
DINUBA 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.94	0.90	Diverge	1.01	1.01	1.02	1.01	0.89	NA	Project: Reedley 70kV Reinforcement
OROSI 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.94	0.90	Diverge	1.03	1.01	1.01	1.02	0.89	NA	Sensitivity Only
CAMDEN 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	Diverge	0.97	1.10	0.93	0.95	0.89	NA	Install Redundant Battery
ORSI JCT 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.94	0.90	Diverge	1.03	1.01	1.01	1.02	0.90	NA	Sensitivity Only
TOMATAK 70 kV	P5-5c:A14:11:_Henrietta 230-115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A14:11:_Henrietta 230-115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A14:11:_Henrietta 230-115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A14:11:_Henrietta 230-115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A14:11:_Henrietta 230-115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A14:13:_California Flats 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A14:13:_California Flats 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A14:13:_California Flats 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A14:13:_California Flats 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
CALRENEW 70 kV	P5-5c:A14:13:_California Flats 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Install Redundant Battery
KEARNEY 230 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.94	0.91	0.88	1.02	1.09	1.00	1.03	0.91	0.88	Monitor Future forecast
HERNDON 230 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.94	0.91	0.87	1.03	1.10	1.01	1.03	0.91	0.87	Monitor Future forecast
FGRDN T1 230 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.94	0.91	0.87	1.03	1.11	1.01	1.04	0.91	0.87	Monitor Future forecast
FIGRDN 1 230 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.94	0.91	0.86	1.03	1.11	1.01	1.04	0.91	0.87	Monitor Future forecast
FIGRDN 2 230 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.94	0.91	0.86	1.03	1.11	1.01	1.03	0.91	0.87	Monitor Future forecast
ASHLAN 230 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.94	0.92	0.87	1.04	1.11	1.02	1.04	0.91	0.87	Monitor Future forecast
NRTHFORK 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.88	0.95	0.88	1.03	1.06	0.99	1.03	0.99	0.85	Install Redundant Battery
SJNO2 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.89	0.95	0.89	1.03	1.06	0.99	1.03	0.99	0.85	Install Redundant Battery
SJNO3 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.88	0.94	0.88	1.03	1.06	0.98	1.03	0.98	0.84	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.86	0.89	0.88	0.88	0.97	0.89	0.89	0.89	0.88	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.88	0.90	0.90	0.89	0.94	0.90	0.90	0.90	0.89	Install Redundant Battery
BIOMSJCT 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.88	0.90	0.90	0.89	0.97	0.90	0.90	0.90	0.89	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.88	0.90	0.90	0.89	0.97	0.90	0.90	0.90	0.89	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.88	0.90	0.90	0.89	0.97	0.90	0.90	0.90	0.89	Install Redundant Battery
PNDLJ2 115 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.94	0.91	0.87	1.04	1.14	1.01	1.05	0.91	0.87	Monitor Future forecast
PNDLJ1 115 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.94	0.91	0.87	1.04	1.14	1.01	1.05	0.90	0.87	Monitor Future forecast
HERNDON 115 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.97	0.94	0.90	1.05	1.13	1.03	1.05	0.93	0.90	Monitor Future forecast
PNEDLE 115 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.94	0.91	0.87	1.04	1.15	1.01	1.05	0.90	0.87	Monitor Future forecast
PNEDLE2 115 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.94	0.91	0.87	1.04	1.14	1.01	1.05	0.90	0.87	Monitor Future forecast
BULLARD 115 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.93	0.90	0.86	1.04	1.14	1.01	1.05	0.90	0.87	Monitor Future forecast
CHLDHOSP 115 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.97	0.94	0.90	1.05	1.12	1.03	1.05	0.94	NA	Monitor Future forecast
WISHON 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.90	0.96	0.90	1.03	1.07	1.00	1.04	1.00	0.87	Project: Coppermine reconductoring approved in 2021-22 TPP
AUBERRY 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.89	0.95	0.89	1.03	1.07	0.99	1.03	1.00	0.86	Project: Coppermine reconductoring approved in 2021-22 TPP
CAMDEN 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.93	0.91	0.89	1.00	1.07	0.98	1.01	0.91	0.89	Monitor Future forecast
CAMDEN 70 kV	P5-5c:A14:5:_Herndon 230-115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant Battery	Low	0.94	0.93	0.90	1.01	1.07	0.98	1.01	0.92	0.89	Monitor Future forecast
CERTANJ1 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110] & P1-2:A14:45:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890]	P6	N-1-1	Low	0.90	0.88	0.85	NA	NA	NA	NA	0.87	NA	Under Review
CHWCHILLA 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110] & P1-2:A14:45:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890]	P6	N-1-1	Low	0.90	0.88	0.85	NA	NA	NA	NA	0.87	NA	Under Review
SHARON 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110] & P1-2:A14:45:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890]	P6	N-1-1	Low	NA	0.89	0.86	NA	NA	NA	NA	0.88	NA	Under Review

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast		2035 SP ATE
SHARON T 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110] & P1-2:A14:45:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890]	P6	N-1-1	Low	NA	0.89	0.86	NA	NA	NA	NA	0.88	NA	Under Review
BRCEBG J 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1	P6	N-1-1	Low	NA	NA	0.90	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
INDN FLT 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	NA	monitor future forecast
SAXONCRK 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1	P6	N-1-1	Low	NA	NA	0.90	NA	NA	NA	NA	NA	NA	monitor future forecast
BER VLLY 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.78	NA	NA	NA	NA	0.90	NA	NA	NA	Project:Wilson 115kV Reinforcement
BIOMASS 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.41	0.89	0.88	NA	NA	0.88	NA	0.89	NA	Project:Wilson 115kV Reinforcement
BIOMSJCT 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.41	0.89	0.88	NA	NA	0.88	NA	0.89	NA	Project:Wilson 115kV Reinforcement
CALRENEW 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.41	0.89	0.88	NA	NA	0.88	NA	0.89	NA	Project:Wilson 115kV Reinforcement
CERTAN T 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.67	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CERTANJ2 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.67	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CERTTEED 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.68	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CHWCGN 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.68	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CHWCGNJ2 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.68	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CHWCHLA2 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.68	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CHWCHLASLR 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.61	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CHWCHLASLRJT 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.61	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CORSGOLD 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.89	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
DAIRYLND 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.58	NA	NA	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV reconductoring
EXCHEQR 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.84	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
EXCHEQR 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.80	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.51	NA	NA	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV reconductoring
GILLTAP 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.52	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
LE GRAND 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.65	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MADERAPR 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.52	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MARIPOS2 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.80	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MC SWAIN 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.85	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MCSWAINJ 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.84	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MENDOTA 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.48	NA	NA	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV reconductoring
MENDOTA 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHEMENDOTA 115KV [3230]	P6	N-1-1	Low	0.41	0.89	0.88	NA	NA	0.88	NA	0.89	NA	Project:Wilson 115kV Reinforcement

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
MRCDFLLS 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCH-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.84	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
NEWHALL 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCH-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.52	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
NORTHSTAR 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCH-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.48	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
OAKH_JCT 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCH-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.90	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
OAKHURST 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCH-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
PMTFMPP 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCH-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.51	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
PMTFMPPJT 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCH-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.51	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
Q1028Q1029 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCH-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.48	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
Q1127 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCH-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.48	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
TOMATAK 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCH-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.40	0.87	0.87	NA	NA	0.87	NA	0.87	NA	Project:Wilson 115kV Reinforcement
CRESSEY 115 kV	P1-2:A13:53:_EL CAPITAN-WILSON 115KV [1510] & P1-2:A13:43:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	NA	monitor future forecast
EL CAPTN 115 kV	P1-2:A13:53:_EL CAPITAN-WILSON 115KV [1510] & P1-2:A13:43:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	NA	monitor future forecast
GALLO 115 kV	P1-2:A13:53:_EL CAPITAN-WILSON 115KV [1510] & P1-2:A13:43:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	Low	NA	NA	0.88	NA	NA	NA	NA	NA	NA	monitor future forecast
LIVNGSTN 115 kV	P1-2:A13:53:_EL CAPITAN-WILSON 115KV [1510] & P1-2:A13:43:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	Low	NA	NA	0.87	NA	NA	NA	NA	NA	NA	monitor future forecast
DOS PALS 70 kV	P1-2:A13:60:_PANOCH-ORO LOMA 115KV [3240] & P1-4:A14:27:_GREGG SVD=V	P6	N-1-1	Low	NA	NA	0.82	NA	NA	NA	NA	NA	NA	monitor future forecast
FIREBAGH 70 kV	P1-2:A13:60:_PANOCH-ORO LOMA 115KV [3240] & P1-4:A14:27:_GREGG SVD=V	P6	N-1-1	Low	0.87	0.88	0.76	NA	NA	NA	NA	0.87	NA	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 115 kV	P1-2:A13:60:_PANOCH-ORO LOMA 115KV [3240] & P1-4:A14:27:_GREGG SVD=V	P6	N-1-1	Low	0.90	NA	0.82	NA	NA	NA	NA	NA	NA	Project:Wilson-Oro Loma 115kV reconductoring
ORO LOMA 70 kV	P1-2:A13:60:_PANOCH-ORO LOMA 115KV [3240] & P1-4:A14:27:_GREGG SVD=V	P6	N-1-1	Low	NA	NA	0.84	NA	NA	NA	NA	NA	NA	monitor future forecast
POSO J1 70 kV	P1-2:A13:60:_PANOCH-ORO LOMA 115KV [3240] & P1-4:A14:27:_GREGG SVD=V	P6	N-1-1	Low	0.88	0.89	0.78	NA	NA	NA	NA	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
SNTA RTA 70 kV	P1-2:A13:60:_PANOCH-ORO LOMA 115KV [3240] & P1-4:A14:27:_GREGG SVD=V	P6	N-1-1	Low	0.89	NA	0.81	NA	NA	NA	NA	NA	NA	Review Existing Oro Loma 70kV reinforcement project
SJNO3 70 kV	P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082] & P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400]	P6	N-1-1	Low	NA	0.85	0.80	NA	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
STOREY 230 kV	P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082] & P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400]	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	NA	monitor future forecast
AUBERRY 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	0.87	0.82	NA	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
AUBRYTP 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	0.88	0.83	NA	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
BORDEN 230 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.88	NA	NA	NA	NA	NA	NA	monitor future forecast
CHSR08A 230 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	NA	monitor future forecast
CHSR08B 230 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	NA	monitor future forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast		2035 SP ATE
COPPRMNE 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.87	NA	NA	NA	NA	NA	NA	monitor future forecast
FRIANTDAM 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.87	NA	NA	NA	NA	NA	NA	monitor future forecast
NRTHFORK 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	0.86	0.81	NA	NA	NA	NA	NA	NA	Under Review
RIVERROC 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	NA	monitor future forecast
RVRCK T 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	NA	monitor future forecast
SJNO2 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	0.86	0.81	NA	NA	NA	NA	NA	NA	Project: Coppermine reconducting approved in 2021-22 TPP
WISHON 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	0.88	0.83	NA	NA	NA	NA	NA	NA	Project: Coppermine reconducting approved in 2021-22 TPP
CALFLAX 70 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.64	0.62	NA	NA	NA	NA	0.89	0.64	NA	New Gates 230/70kV transformer project
CANTUA 115 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.79	0.80	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
COLCGN T 70 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.61	0.59	NA	NA	NA	NA	0.90	0.61	NA	New Gates 230/70kV transformer project
COLNGA 1 70 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.61	0.59	NA	NA	NA	NA	NA	0.60	NA	New Gates 230/70kV transformer project
COLNGA 2 70 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.62	0.59	NA	NA	NA	NA	0.90	0.61	NA	New Gates 230/70kV transformer project
DERRCK T 70 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.62	0.60	NA	NA	NA	NA	0.90	0.62	NA	New Gates 230/70kV transformer project
DERRICK 70 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.62	0.60	NA	NA	NA	NA	NA	0.62	NA	New Gates 230/70kV transformer project
EXCELSIORSS 115 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.79	0.80	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
EXCLSRSLR 115 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.79	0.80	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
FIVEPOINTSSS 70 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.70	0.69	NA	NA	NA	NA	NA	0.71	NA	New Gates 230/70kV transformer project
KAMM 115 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.79	0.80	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
OIL CITYT 70 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.62	0.60	NA	NA	NA	NA	0.90	0.62	NA	New Gates 230/70kV transformer project
PAIGESLR 70 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.70	0.70	NA	NA	NA	NA	NA	0.72	NA	New Gates 230/70kV transformer project
PAIGESLRJCT 70 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.70	0.69	NA	NA	NA	NA	NA	0.72	NA	New Gates 230/70kV transformer project
PENNZIER 70 kV	P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.62	0.60	NA	NA	NA	NA	0.90	0.62	NA	New Gates 230/70kV transformer project



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast		2035 SP ATE
PENZIR J 70 kV	P1-2:A14:43:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.62	0.59	NA	NA	NA	NA	0.90	0.61	NA	New Gates 230/70kV transformer project
PLSNTVLY 70 kV	P1-2:A14:43:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.64	0.62	NA	NA	NA	NA	0.90	0.65	NA	New Gates 230/70kV transformer project
SCHINDLR 115 kV	P1-2:A14:43:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.77	0.78	NA	NA	NA	NA	NA	0.80	NA	New Gates 230/70kV transformer project
SCHLNDLR 70 kV	P1-2:A14:43:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.71	0.71	NA	NA	NA	NA	NA	0.73	NA	New Gates 230/70kV transformer project
TORNADO 70 kV	P1-2:A14:43:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.61	0.59	NA	NA	NA	NA	0.90	0.61	NA	New Gates 230/70kV transformer project
TORND J 70 kV	P1-2:A14:43:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.61	0.59	NA	NA	NA	NA	0.90	0.61	NA	New Gates 230/70kV transformer project
TORND T 70 kV	P1-2:A14:43:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.61	0.59	NA	NA	NA	NA	0.90	0.61	NA	New Gates 230/70kV transformer project
WESTLND S 115 kV	P1-2:A14:43:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.79	0.80	NA	NA	NA	NA	NA	0.82	NA	New Gates 230/70kV transformer project
WHTNYPT 70 kV	P1-2:A14:43:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.70	0.69	NA	NA	NA	NA	NA	0.72	NA	New Gates 230/70kV transformer project
DINUBA 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.82	0.78	0.75	NA	NA	NA	NA	0.78	NA	Project: Reedley 70kV Reinforcement
DNUBAEGY 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.84	0.81	0.78	NA	NA	NA	NA	0.80	NA	Project: Reedley 70kV Reinforcement
DNUBAJCT 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.84	0.81	0.78	NA	NA	NA	NA	0.80	NA	Project: Reedley 70kV Reinforcement
DUNLAP 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.79	0.75	0.72	NA	NA	NA	NA	0.75	NA	Project: Reedley 70kV Reinforcement
KNGSRVR1 115 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	NA	NA	0.87	NA	NA	NA	NA	NA	NA	monitor future forecast
OROSI 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.82	0.78	0.75	NA	NA	NA	NA	0.78	NA	Project: Reedley 70kV Reinforcement
ORSI JCT 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.83	0.79	0.75	NA	NA	NA	NA	0.78	NA	Project: Reedley 70kV Reinforcement
PIEDRA 1 115 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	NA	0.89	0.85	NA	NA	NA	NA	0.88	NA	Project: Reedley 70kV Reinforcement
REEDLEY 115 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.84	0.80	0.75	NA	NA	NA	NA	0.80	NA	Project: Reedley 70kV Reinforcement
REEDLEY 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.85	0.82	0.78	NA	NA	NA	NA	0.82	NA	Project: Reedley 70kV Reinforcement

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
SANDCRK 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.80	0.76	0.73	NA	NA	NA	NA	0.76	NA	Project: Reedley 70kV Reinforcement
STCRRLL J 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.82	0.78	0.75	NA	NA	NA	NA	0.78	NA	Project: Reedley 70kV Reinforcement
STONCRRLL 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.81	0.77	0.74	NA	NA	NA	NA	0.76	NA	Project: Reedley 70kV Reinforcement
TVY VLLY 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.85	0.81	0.77	NA	NA	NA	NA	0.81	NA	Project: Reedley 70kV Reinforcement
WAHTOKE 115 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.83	0.79	0.74	NA	NA	NA	NA	0.79	NA	Project: Reedley 70kV Reinforcement
WST FRSD 115 kV	P1-2:A14:63:_SANGER-CALIFORNIA AVE 115KV [9130] & P1-2:A14:65:_MCCALL-WEST FRESNO #2 115KV [2370]	P6	N-1-1	Low	NA	0.89	0.77	NA	NA	NA	NA	0.88	NA	Under Review
CAL AVE 115 kV	P1-2:A14:65:_MCCALL-WEST FRESNO #2 115KV [2370] & P1-2:A14:63:_SANGER-CALIFORNIA AVE 115KV [9130]	P6	N-1-1	Low	NA	0.90	0.78	NA	NA	NA	NA	0.89	NA	Under Review
DANISHCM 115 kV	P1-2:A14:65:_MCCALL-WEST FRESNO #2 115KV [2370] & P1-2:A14:63:_SANGER-CALIFORNIA AVE 115KV [9130]	P6	N-1-1	Low	NA	NA	0.80	NA	NA	NA	NA	NA	NA	monitor future forecast
CAMDEN 70 kV	P1-2:A14:75:_MCCALL-KINGSBURG #2 115KV [2300] & P1-2:A14:72:_MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_KINGS J2	P6	N-1-1	Low	0.88	0.89	0.87	NA	NA	NA	NA	0.89	NA	Under Review
ATWATER 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.77	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
ATWATR J 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.77	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
EL NIDO 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.83	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
ELNIDOBM 70 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.84	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
ELNIDOBMJCT 70 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.84	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
LE GRNDJ 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.82	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MERCED 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.78	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MERCED 70 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.83	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
POSO J2 70 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.84	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
WILSON A 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.79	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
WILSON B 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.79	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
WILSONSTCOM 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.79	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CALPEAKJCT 115 kV	P1-3:A13:5:_PANOCH 230/115KV TB 2 & P1-3:A13:4:_PANOCH 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
CALPEAKPNCH 115 kV	P1-3:A13:5:_PANOCH 230/115KV TB 2 & P1-3:A13:4:_PANOCH 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
CHENY 115 kV	P1-3:A13:5:_PANOCH 230/115KV TB 2 & P1-3:A13:4:_PANOCH 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
CHENYT 115 kV	P1-3:A13:5:_PANOCH 230/115KV TB 2 & P1-3:A13:4:_PANOCH 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
DFS 115 kV	P1-3:A13:5:_PANOCH 230/115KV TB 2 & P1-3:A13:4:_PANOCH 230/115KV TB 1	P6	N-1-1	Low	0.87	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
DFSTP 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.87	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
HAMMONDS 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
LUIS_#3 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.87	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
LUIS_#5 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.87	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
LUISJCT 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
OXFORD 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
OXFRDICT 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
PAN2_TAP 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
PANOCHÉ1 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
PANOCHÉ2 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
PANOCHÉJ 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
PANOCHÉT 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
STARWDPNCH 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
WSTLD1RA 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
WSTLDJCT 115 kV	P1-3:A13:5:_PANOCHÉ 230/115KV TB 2 & P1-3:A13:4:_PANOCHÉ 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
ARBURUA 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	NA	0.90	NA	NA	NA	NA	NA	0.90	NA	new Losbanos 230/70kV project
CANAL 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	0.89	0.89	0.88	NA	NA	NA	NA	0.89	NA	new Losbanos 230/70kV project
DINO JCT 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	0.88	0.88	NA	NA	NA	NA	NA	0.88	NA	new Losbanos 230/70kV project
INTL TUR 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	0.89	0.88	NA	NA	NA	NA	NA	0.88	NA	new Losbanos 230/70kV project
LIVNGSTN 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	NA	0.89	0.89	NA	NA	NA	NA	0.89	NA	new Losbanos 230/70kV project
LVNGSTNT 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	0.90	0.89	0.89	NA	NA	NA	NA	0.89	NA	new Losbanos 230/70kV project
MERCYSRNGSS 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	NA	0.90	NA	NA	NA	NA	NA	0.89	NA	new Losbanos 230/70kV project
MRCYSPRS 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	NA	0.89	0.90	NA	NA	NA	NA	0.89	NA	new Losbanos 230/70kV project
ORTIGA 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	0.90	0.89	0.89	NA	NA	NA	NA	0.89	NA	new Losbanos 230/70kV project
PCHCO PP 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	0.88	0.87	NA	NA	NA	0.90	NA	0.87	NA	new Losbanos 230/70kV project
VEGA 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	NA	0.90	NA	NA	NA	NA	NA	0.89	NA	new Losbanos 230/70kV project
AVENAL 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM	P6	N-1-1	Low	0.75	0.58	NA	NA	NA	NA	NA	0.57	NA	New Gates 230/70kV transformer project
AVENAL T 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM	P6	N-1-1	Low	0.75	0.57	NA	NA	NA	NA	NA	0.56	NA	New Gates 230/70kV transformer project

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
AVNLPARK 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.75	0.58	NA	NA	NA	NA	NA	0.57	NA	New Gates 230/70kV transformer project
CHEVPL T 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.74	0.57	NA	NA	NA	NA	NA	0.56	NA	New Gates 230/70kV transformer project
CHEVPLIN 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.74	0.57	NA	NA	NA	NA	NA	0.56	NA	New Gates 230/70kV transformer project
GATES 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.77	0.59	NA	NA	NA	NA	NA	0.59	NA	New Gates 230/70kV transformer project
GATS_TP 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.77	0.59	NA	NA	NA	NA	NA	0.59	NA	New Gates 230/70kV transformer project
HURON 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.77	0.60	NA	NA	NA	NA	NA	0.59	NA	New Gates 230/70kV transformer project
HURONJ 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.77	0.60	NA	NA	NA	NA	NA	0.59	NA	New Gates 230/70kV transformer project
JACALITO 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.76	0.59	NA	NA	NA	NA	NA	0.58	NA	New Gates 230/70kV transformer project
JAYNESWSTA 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.77	0.59	NA	NA	NA	NA	NA	0.59	NA	New Gates 230/70kV transformer project
KETLMN T 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.75	0.57	NA	NA	NA	NA	NA	0.56	NA	New Gates 230/70kV transformer project
KETTLEMN 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.74	0.56	NA	NA	NA	NA	NA	0.55	NA	New Gates 230/70kV transformer project
SUN CITY 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.75	0.58	NA	NA	NA	NA	NA	0.57	NA	New Gates 230/70kV transformer project
WESTLNDS_3 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	Low	0.77	0.60	NA	NA	NA	NA	NA	0.59	NA	New Gates 230/70kV transformer project
TOMATAK 70 kV	P7-1:A13:11:_LOS BANOS-PANOCH #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P7-1:A13:11:_LOS BANOS-PANOCH #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P7-1:A13:11:_LOS BANOS-PANOCH #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P7-1:A13:11:_LOS BANOS-PANOCH #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A13:11:_LOS BANOS-PANOCH #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
NRTHFORK 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	Low	0.89	0.95	0.90	1.03	1.06	0.99	1.03	0.99	0.86	Project: Coppermine reconducting approved in 2021-22 TPP
SJNO2 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	Low	0.90	0.95	0.90	1.03	1.06	0.99	1.03	0.99	0.87	Project: Coppermine reconducting approved in 2021-22 TPP
SJNO3 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	Low	0.89	0.94	0.89	1.03	1.06	0.99	1.03	0.98	0.86	Project: Coppermine reconducting approved in 2021-22 TPP
TOMATAK 70 kV	P7-1:A13:2:_MELONES-WILSON 230KV [5080] & WARNERVILLE-WILSON 230KV [5870]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.88	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A13:2:_MELONES-WILSON 230KV [5080] & WARNERVILLE-WILSON 230KV [5870]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.89	0.90	NA	Review Existing Oro Loma 70kV reinforcement project

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
BIOMSJCT 70 kV	P7-1:A13:2:_MELONES-WILSON 230KV [5080] & WARNERVILLE-WILSON 230KV [5870]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P7-1:A13:2:_MELONES-WILSON 230KV [5080] & WARNERVILLE-WILSON 230KV [5870]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A13:2:_MELONES-WILSON 230KV [5080] & WARNERVILLE-WILSON 230KV [5870]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	NA	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A13:6:_PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7	DCTL	Low	0.88	0.89	NA	0.88	0.97	0.89	0.89	0.89	NA	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P7-1:A13:6:_PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7	DCTL	Low	0.89	0.90	NA	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P7-1:A13:6:_PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7	DCTL	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P7-1:A13:6:_PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7	DCTL	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A13:6:_PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7	DCTL	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
ORO LOMA 115 kV	P7-1:A13:7:_LOS BANOS-PANOCHÉ #1 230KV [5030] & PANOCHÉ-ORO LOMA 115KV [3240]	P7	DCTL	Low	0.91	0.92	0.84	1.00	0.99	0.99	1.00	0.92	0.82	Project:Wilson-Oro Loma 115kV reconductoring
ORO LOMA 70 kV	P7-1:A13:7:_LOS BANOS-PANOCHÉ #1 230KV [5030] & PANOCHÉ-ORO LOMA 115KV [3240]	P7	DCTL	Low	0.93	0.95	0.86	1.03	1.02	1.02	1.03	0.94	0.84	Review Existing Oro Loma 70kV reinforcement project
SNTA RTA 70 kV	P7-1:A13:7:_LOS BANOS-PANOCHÉ #1 230KV [5030] & PANOCHÉ-ORO LOMA 115KV [3240]	P7	DCTL	Low	0.91	0.92	0.83	1.03	1.02	1.00	1.03	0.91	0.81	Monitor Future forecast
DOS PALS 70 kV	P7-1:A13:7:_LOS BANOS-PANOCHÉ #1 230KV [5030] & PANOCHÉ-ORO LOMA 115KV [3240]	P7	DCTL	Low	0.92	0.93	0.84	1.03	1.02	1.01	1.03	0.92	0.82	Monitor Future forecast
POSO J1 70 kV	P7-1:A13:7:_LOS BANOS-PANOCHÉ #1 230KV [5030] & PANOCHÉ-ORO LOMA 115KV [3240]	P7	DCTL	Low	0.89	0.90	0.79	1.02	0.98	1.00	1.02	0.90	0.77	Project: Oro Loma 70kV Reinforcement
FIREBAGH 70 kV	P7-1:A13:7:_LOS BANOS-PANOCHÉ #1 230KV [5030] & PANOCHÉ-ORO LOMA 115KV [3240]	P7	DCTL	Low	0.88	0.89	0.78	1.02	0.96	0.99	1.02	0.89	0.75	Review Existing Oro Loma 70kV reinforcement project
CAMDEN 70 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	Low	0.88	0.89	0.87	0.95	1.10	0.93	0.95	0.89	0.86	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
SJNO3 70 kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	Low	0.90	0.95	0.93	1.04	1.06	0.99	1.03	0.99	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
TOMATAK 70 kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.96	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE	
BIOMSJCT 70 kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:28:_GWF-KINGSBURG 115KV [1743] & GWF-HENRIETTA 70KV [8774]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
MENDOTA 70 kV	P7-1:A14:31:_ARCO-MIDWAY 230KV [4320] & GATES-MIDWAY 230KV [4891]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P7-1:A14:31:_ARCO-MIDWAY 230KV [4320] & GATES-MIDWAY 230KV [4891]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P7-1:A14:31:_ARCO-MIDWAY 230KV [4320] & GATES-MIDWAY 230KV [4891]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:31:_ARCO-MIDWAY 230KV [4320] & GATES-MIDWAY 230KV [4891]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.96	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.96	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.96	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
MENDOTA 70 kV	P7-1:A14:7:_BARTON-AIRWAYS-SANGER 115KV [1060] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
BIOMSJCT 70 kV	P7-1:A14:7:_BARTON-AIRWAYS-SANGER 115KV [1060] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P7-1:A14:7:_BARTON-AIRWAYS-SANGER 115KV [1060] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:7:_BARTON-AIRWAYS-SANGER 115KV [1060] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	NA	Project: Oro Loma 70kV Reinforcement

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	2035 SP ATE		
ARBURUA 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	<8	<8	13	<8	9	<8	<8	<8	24	Monitor future forecast	
CALFLAX 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	<8	11	<8	<8	<8	<8	<8	<8	12	NA	Under review
CANAL 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	14	12	20	<8	18	<8	<8	<8	13	36	Project:Oro Loma 70kV reinforcement
CHEVPLIN 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	9	13	<8	<8	<8	<8	<8	<8	14	NA	Under review
CHWCHLLA 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	<8	<8	12	<8	<8	<8	<8	<8	<8	12	Monitor future forecast
COLNGA 1 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	<8	11	<8	<8	<8	<8	<8	<8	13	NA	Under review
COLNGA 2 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	<8	11	<8	<8	<8	<8	<8	<8	12	NA	Under review
DOSPALS 70 kV	P1-2:A13:60:_PANOCHÉ-ORO LOMA 115KV [3240]	P1	N-1	<8	<8	19	<8	<8	<8	<8	<8	<8	20	Monitor future forecast
FIREBAGH 70 kV	P1-2:A13:60:_PANOCHÉ-ORO LOMA 115KV [3240]	P1	N-1	13	12	20	<8	<8	<8	<8	<8	13	21	Project:Oro Loma 70kV reinforcement
GILLRAN 115 kV	P1-2:A13:59:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	15	<8	<8	<8	<8	<8	<8	<8	<8	NA	Project:Wilson 115kV reinforcement
KETTLEMN 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	9	13	<8	<8	<8	<8	<8	<8	14	NA	Under review
LIVNGSTN 70 kV	P1-3:A13:6:_LOS BANOS 230/70KV TB 3	P1	N-1	<8	<8	<8	<8	9	<8	<8	<8	<8	NA	Generation Re-dispatch
MENDOTA 115 kV	P1-2:A13:59:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	20	<8	<8	<8	<8	<8	<8	<8	<8	NA	Project:Wilson 115kV reinforcement
NEWHALL 115 kV	P1-2:A13:59:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	14	<8	<8	<8	<8	<8	<8	<8	<8	NA	Project:Wilson 115kV reinforcement
ORO LOMA 115 kV	P1-2:A13:60:_PANOCHÉ-ORO LOMA 115KV [3240]	P1	N-1	<8	<8	18	<8	<8	<8	<8	<8	<8	18	Monitor future forecast
ORO LOMA 70 kV	P1-2:A13:60:_PANOCHÉ-ORO LOMA 115KV [3240]	P1	N-1	<8	<8	18	<8	<8	<8	<8	<8	<8	19	Monitor future forecast
ORTIGA 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	11	11	17	<8	14	<8	<8	<8	11	32	Project:Oro Loma 70kV reinforcement
PLSNTVLY 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	<8	9	<8	<8	<8	<8	<8	<8	10	NA	Under review
PMTFMPP 115 kV	P1-2:A13:59:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	15	<8	<8	<8	<8	<8	<8	<8	<8	NA	Project:Wilson 115kV reinforcement
SHARON 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	<8	<8	11	<8	<8	<8	<8	<8	<8	11	Monitor future forecast
SNTA RTA 70 kV	P1-2:A13:60:_PANOCHÉ-ORO LOMA 115KV [3240]	P1	N-1	<8	<8	19	<8	<8	<8	<8	<8	<8	20	Monitor future forecast
TOMATAK 70 kV	P1-2:A13:59:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	18	<8	<8	<8	<8	<8	<8	<8	<8	NA	Project:Oro Loma 70kV reinforcement
TORNADO 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	<8	11	<8	<8	<8	<8	<8	<8	13	NA	Under review

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Sensitivity	
Helms unit 1_P1-1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No issues
Gates 500/230kV Transformer #11 Fault, 6 cyc clearing_P1-3	P1	N-1	No issues	No issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Continue to Monitor
P2, P4 Moccasin 115kV Bus Fault, 6 cyc clearing	P2	Bus/Breaker	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Will review with exact clearing times
P2, P4 Moccasin 115kV Bus Fault, 6 cyc clearing	P2	Bus/Breaker	No issues	No issues	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	No issues	Continue to Monitor
P2, P4 Intake 230kV Bus Fault, 3 or 6 cyc clearing	P2	Bus/Breaker	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Continue to Monitor
P2, P4 Warnerville 230kV Bus Fault, 3 or 4 cyc clearing	P2	Bus/Breaker	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Will review with exact clearing times
P2, P4 Warnerville 115kV Bus Fault, 4 cyc clearing	P2	Bus/Breaker	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Will review with exact clearing times
P2, P4, P7 Westley 230kV Bus Fault, 6 cyc clearing	P2	Bus/Breaker	No issues	No issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Continue to Monitor
Gates 230kV Bus_P2-2	P2	Bus/Breaker	No issues	No issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Continue to Monitor
P3 Loss of Moccasin Generator + Transformer, 18 cyc clearing	P3	G-1/N-1	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Will review with exact clearing times
P3 Loss of Holm Generator + Transformer, 18 cyc clearing	P3	G-1/N-1	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Will review with exact clearing times
P3 Loss of Kirkwood Generator + Transformer, 18 cyc clearing	P3	G-1/N-1	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Will review with exact clearing times
P3 Loss of Holm Generator + Transmission Line, 18 cyc clearing	P3	G-1/N-1	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Will review with exact clearing times
P3 Loss of Kirkwood Generator + Transmission Line, 18 cyc clearing	P3	G-1/N-1	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Will review with exact clearing times
Helms units 1 and 2_P3-1	P3	G-1/N-1	No issues	No issues	No issues	No issues	No issues	No issues	No issues
P5-5c - Failure of non-redundant DC battery supplying Borden 230kV and 70kV Buse	P5	Non-Redundant Battery	Potential WECC/NERC criteria violation	No issues	No issues	No issues	No issues	Potential WECC/NERC criteria violation	Add Redundant Battery supply
P6,P7, Loss of Moccasin-Newark Lines #3 & #4, Fault @ Moccasin, 26 cyc clearing	P6	N-1-1	No issues	No issues	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	No issues	Continue to Monitor
Warnerville-Standiford 115kV Lines #7 & #8 (P6, P7, Warnerville-Standiford Lines #7 & #8 Fault @ Standiford, 24 cyc clearing)	P6	N-1-1	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Will review with exact clearing times
Borden 230kV Bus_P6-3	P6	N-1-1	No issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	No issues	Will review with exact clearing times
Permanent fault on Helms - Gregg #1 & #2 230 kV Lines_P7-	P7	DTCL	No issues	No issues	No issues	No issues	No issues	No issues	No issues
Temporary fault on Helms - Gregg #1 & #2 230 kV Lines_P7-1	P7	DTCL	No issues	No issues	No issues	No issues	No issues	No issues	No issues



Study Area: **PG&E Greater Fresno**



**Single Contingency Load Drop**

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	

No single contingency resulted in total load drop of more than 250 MW

2022-2023 ISO Reliability Assessment - Study Results

Study Area: **PG&E Greater Fresno**



*Single Source Substation with more than 100 MW Load*

Substation	Load Served (MW)									Potential Mitigation Solutions
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification	
24087 MAGUNDEN 230 24115 PASTORIA 230 1 1	line_P6_200164_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3	P6	N-1-1	119.4	< 100	< 100	137.2	Diverge	140.6	174.7	193.6	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200185_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	101.5	Diverge	101.9	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200186_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	102.5	Diverge	103.0	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200187_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	129.7	141.7	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200188_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line PARDEE 230.0 to VINCENT 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	109.2	121.4	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200191_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line PASTORIA 230.0 to PSTRIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	108.0	Diverge	111.8	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200203_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line PARDEE 230.0 to VINCNT2 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	110.2	122.4	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200213_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line NEENACH 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	108.8	120.9	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200264_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	101.9	Diverge	102.2	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200265_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	102.9	Diverge	103.2	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
line_P6_200266_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	100.2	130.3	142.2	< 100	Existing Big Creek/San Joaquin Valley RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification		
	line_P6_200267_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line PARDEE 230.0 to VINCENT 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.6	121.8	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200270_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line PASTORIA 230.0 to PSTRIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	108.5	Diverge	112.2	< 100	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200282_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line PARDEE 230.0 to VINCNT2 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.6	122.8	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200291_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.6	120.9	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200292_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line NEENACH 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.2	121.3	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200084_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3	P6	N-1-1	119.9	< 100	< 100	137.8	Diverge	141.1	175.3	194.3	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200105_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	102.1	Diverge	102.5	< 100	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200106_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	103.1	Diverge	103.6	< 100	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200107_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	100.5	130.5	142.5	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200108_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line PARDEE 230.0 to VINCENT 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.9	122.1	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200111_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line PASTORIA 230.0 to PSTRIA 230.0 Circuit 1	P6	N-1-1	100.1	< 100	< 100	108.7	Diverge	112.5	< 100	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification		
24087 MAGUNDEN 230 24115 PASTORIA 230 2 1	line_P6_200123_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line PARDEE 230.0 to VINCNT2 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.9	123.1	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200133_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line NEENACH 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.5	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200264_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	103.0	Diverge	103.3	< 100	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200265_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	104.0	Diverge	104.3	< 100	< 100	121.9	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200266_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	101.3	131.7	143.7	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200267_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line PARDEE 230.0 to VINCENT 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.7	123.0	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200270_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line PASTORIA 230.0 to PSTRIA 230.0 Circuit 1	P6	N-1-1	100.9	< 100	< 100	109.6	Diverge	113.4	< 100	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200282_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line PARDEE 230.0 to VINCNT2 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.8	124.1	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200291_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.7	122.1	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200292_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3 Line NEENACH 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.4	122.6	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200083_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	Diverge	< 100	123.2	136.6	< 100	Existing Big Creek/San Joaquin Valley RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification		
24087 MAGUNDEN 230 24115 PASTORIA 230 3 1	line_P6_200107_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.7	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200187_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.1	< 100	Existing Big Creek/San Joaquin Valley RAS
24087 MAGUNDEN 230 24153 VESTAL 230 1 1	line_P6_200325_Line MAGUNDEN 230.0 to SPRINGVL 230.0 Circuit 1 Line MAGUNDEN 230.0 to VESTAL 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.1	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200402_Line MAGUNDEN 230.0 to SPRINGVL 230.0 Circuit 2 Line MAGUNDEN 230.0 to VESTAL 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.1	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200554_Line MAGUNDEN 230.0 to VESTAL 230.0 Circuit 2 Line SPRINGVL 230.0 to BIG CRK4 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.1	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200564_Line MAGUNDEN 230.0 to VESTAL 230.0 Circuit 2 Line BIG CRK4 230.0 to BIG CRK3 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.3	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200568_Line MAGUNDEN 230.0 to VESTAL 230.0 Circuit 2 Line SPRINGVL 230.0 to RECTOR 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.7	< 100	Existing Big Creek/San Joaquin Valley RAS
24087 MAGUNDEN 230 24153 VESTAL 230 2 1	line_P6_200493_Line MAGUNDEN 230.0 to VESTAL 230.0 Circuit 1 Line SPRINGVL 230.0 to RECTOR 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.3	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_201699_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	103.0	< 100	< 100	< 100	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201756_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	103.8	Diverge	< 100	< 100	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201923_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	124.8	< 100	< 100	132.2	Diverge	139.4	< 100	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification	
24114 PARDEE 230 24115 PASTORIA 230 1 1	line_P6_201924_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line PASTORIA 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	121.1	< 100	< 100	128.5	Diverge	135.5	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201933_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line Pardee - Pastoria - Warne 230 kV line	P6	N-1-1	121.4	< 100	< 100	128.7	Diverge	135.8	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201974_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	105.2	< 100	109.9	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201976_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	104.4	< 100	109.4	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201977_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line PASTORIA 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	106.9	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201986_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line Pardee - Pastoria - Warne 230 kV line	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	107.1	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202079_Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	134.0	107.9	< 100	142.7	Diverge	148.6	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202080_Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1 Line PASTORIA 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	130.0	104.1	< 100	138.8	Diverge	144.5	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202089_Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1 Line Pardee - Pastoria - Warne 230 kV line	P6	N-1-1	130.4	104.4	< 100	139.1	Diverge	144.8	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
		line_P6_201699_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	107.1	< 100	< 100	118.3	Diverge	121.8	< 100	< 100	< 100
line_P6_201700_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1		P6	N-1-1	< 100	< 100	< 100	114.6	Diverge	119.0	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification	
24114 PARDEE 230 24217 WARNETAP 230 1 1	line_P6_201756_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	107.8	< 100	< 100	119.2	Diverge	122.7	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201757_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	115.4	Diverge	119.8	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201809_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line PARDEE 230.0 to BAILEY 230.0 Circuit 1	P6	N-1-1	105.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201812_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	109.4	< 100	< 100	111.9	< 100	118.7	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201813_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	108.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201919_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1	P6	N-1-1	109.0	< 100	< 100	114.1	< 100	120.4	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201922_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	139.8	108.7	< 100	147.9	Diverge	156.2	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201974_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	115.0	< 100	< 100	120.7	Diverge	126.1	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201975_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	112.5	< 100	< 100	117.8	Diverge	123.9	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202078_Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	149.9	121.2	< 100	159.7	Diverge	166.4	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201976_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	100.5	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification	
24114 PARDEE 230 24403 BAILEY 230 1 1	line_P6_202129_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	120.0	< 100	< 100	127.1	Diverge	134.3	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202130_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Line PASTORIA 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	116.4	< 100	< 100	123.4	Diverge	130.6	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202139_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Line Pardee - Pastoria - Warne 230 kV line	P6	N-1-1	116.7	< 100	< 100	123.7	Diverge	130.9	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
24115 PASTORIA 230 24217 WARNETAP 230 1 1	line_P6_201699_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	110.7	Diverge	113.9	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201700_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	107.1	Diverge	111.1	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201756_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	100.0	< 100	< 100	111.6	Diverge	114.8	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201757_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	107.9	Diverge	111.9	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201812_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	101.6	< 100	< 100	104.3	< 100	110.7	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201813_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	100.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201919_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1	P6	N-1-1	101.3	< 100	< 100	106.5	< 100	112.4	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201922_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	132.0	100.8	< 100	140.2	Diverge	148.2	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification	
	line_P6_201974_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	107.2	< 100	< 100	113.1	Diverge	118.1	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201975_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	104.7	< 100	< 100	110.2	Diverge	115.9	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202078_Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	142.0	113.3	< 100	152.0	Diverge	158.3	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
24141 SPRINGVL 230 24304 BIG CRK4 230 1 1	line_BC_P7_03_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 1	P7	DCTL	105.4	103.8	< 100	Diverge	Diverge	108.4	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200923_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK3 230.0 to RECTOR 230.0 Circuit 1	P6	N-1-1	105.4	103.8	< 100	Diverge	Diverge	108.4	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200929_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	101.7	< 100	< 100	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_201264_Line BIG CRK3 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 2	P6	N-1-1	102.9	101.9	< 100	109.8	Diverge	106.0	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
24235 RECTOR 230 24303 BIG CRK3 230 2 1	line_BC_P7_03_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 1	P7	DCTL	116.3	116.2	114.7	Diverge	Diverge	115.0	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200637_Line SPRINGVL 230.0 to BIG CRK4 230.0 Circuit 1 Line BIG CRK3 230.0 to RECTOR 230.0 Circuit 1	P6	N-1-1	100.1	< 100	< 100	< 100	< 100	101.0	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200923_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK3 230.0 to RECTOR 230.0 Circuit 1	P6	N-1-1	116.3	116.2	114.7	Diverge	Diverge	115.0	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200637_Line SPRINGVL 230.0 to BIG CRK4 230.0 Circuit 1 Line BIG CRK3 230.0 to RECTOR 230.0 Circuit 1	P6	N-1-1	122.2	121.5	115.7	Diverge	Diverge	123.3	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification	
24301 BIG CRK1 230 24235 RECTOR 230 1 1	line_P6_200643_Line SPRINGVL 230.0 to BIG CRK4 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 2	P6	N-1-1	112.0	111.7	106.0	116.1	Diverge	113.0	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS
	line_P6_201126_Line BIG CRK2 230.0 to BIG CRK3 230.0 Circuit 1 Line BIG CRK2 230.0 to BIG CRK8 230.0 Circuit 1	P6	N-1-1	111.0	113.4	101.6	114.7	Diverge	113.4	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS
	line_P6_201129_Line BIG CRK2 230.0 to BIG CRK3 230.0 Circuit 1 Line BIG CRK8 230.0 to BIG CRK3 230.0 Circuit 1	P6	N-1-1	128.2	130.7	115.3	132.4	Diverge	131.0	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS
	line_P6_201259_Line BIG CRK3 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK4 230.0 to BIG CRK3 230.0 Circuit 1	P6	N-1-1	108.0	108.0	102.9	111.2	Diverge	109.1	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS
	line_P6_201264_Line BIG CRK3 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 2	P6	N-1-1	137.7	138.3	134.2	137.6	Diverge	136.4	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS
	line_P6_201328_Line BIG CRK4 230.0 to BIG CRK3 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	102.6	Diverge	100.8	< 100	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS
	24302 BIG CRK2 230 24303 BIG CRK3 230 1 1	line_P6_200922_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK2 230.0 to BIG CRK8 230.0 Circuit 1	P6	N-1-1	109.3	111.0	100.8	112.8	Diverge	111.1	< 100	< 100	Diverge
line_P6_200925_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK8 230.0 to BIG CRK3 230.0 Circuit 1		P6	N-1-1	125.7	127.1	114.1	129.4	Diverge	127.4	< 100	< 100	Diverge	Reduce Big Creek generation after initial contingency
24302 BIG CRK2 230 24305 BIG CRK8 230 1 1	line_P6_200921_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK2 230.0 to BIG CRK3 230.0 Circuit 1	P6	N-1-1	115.6	117.3	106.6	119.3	Diverge	117.5	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200632_Line SPRINGVL 230.0 to BIG CRK4 230.0 Circuit 1 Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1	P6	N-1-1	129.9	129.0	123.2	Diverge	Diverge	131.1	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200643_Line SPRINGVL 230.0 to BIG CRK4 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 2	P6	N-1-1	127.1	126.7	120.7	131.5	Diverge	128.3	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification		
24303 BIG CRK3 230 24235 RECTOR 230 1 1	line_P6_200924_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK4 230.0 to BIG CRK3 230.0 Circuit 1	P6	N-1-1	114.5	113.8	109.4	117.8	Diverge	115.3	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS	
	line_P6_200929_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 2	P6	N-1-1	144.9	145.0	141.1	143.9	Diverge	143.2	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS	
	line_P6_201328_Line BIG CRK4 230.0 to BIG CRK3 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 2	P6	N-1-1	112.0	112.0	107.2	114.9	Diverge	113.1	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS	
24305 BIG CRK8 230 24303 BIG CRK3 230 1 1	line_P6_200921_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK2 230.0 to BIG CRK3 230.0 Circuit 1	P6	N-1-1	132.9	134.3	120.7	136.8	Diverge	134.6	< 100	< 100	Diverge	Existing Big Creek/San Joaquin Valley RAS	
24401 ANTELOPE 230 29698 BIG SKY 230 1 1	line_P6_200083_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.4	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200084_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.3	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200164_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.3	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200187_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.1	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200497_Line MAGUNDEN 230.0 to VESTAL 230.0 Circuit 1 Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200572_Line MAGUNDEN 230.0 to VESTAL 230.0 Circuit 2 Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_201832_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.1	< 100

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification		
	line_P6_201833_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line NEENACH 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_202129_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.1	< 100	Existing Big Creek/San Joaquin Valley RAS
	line_P6_202139_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Line Pardee - Pastoria - Warne 230 kV line	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.1	< 100	Existing Big Creek/San Joaquin Valley RAS
24402 ANTELOPE 66.0 24401 ANTELOPE 230 1 1	tran_P6_206008_Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 2 0.00 Tran ANTELOPE 66.00 to ANTELOPE	P6	N-1-1	114.5	141.3	169.5	110.7	< 100	< 100	< 100	< 100	< 100	Diverge	Energize existing spare after intial contingency
24402 ANTELOPE 66.0 24401 ANTELOPE 230 2 1	tran_P6_205979_Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 1 0.00 Tran ANTELOPE 66.00 to ANTELOPE	P6	N-1-1	114.8	141.6	170.1	110.7	< 100	< 100	< 100	< 100	< 100	Diverge	Energize existing spare after intial contingency
24402 ANTELOPE 66.0 24401 ANTELOPE 230 4 1	tran_P6_205977_Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 1 0.00 Tran ANTELOPE 66.00 to ANTELOPE	P6	N-1-1	114.8	141.6	170.0	110.7	< 100	< 100	< 100	< 100	< 100	Diverge	Energize existing spare after intial contingency
24402 ANTELOPE 66.0 24420 NEENACH 66.0 1 1	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	109.8	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Diverge	Split Antelope–Bailey 66 kV System per existing SCE operating procedure after initial contingency
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 100	109.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Split Antelope–Bailey 66 kV System per existing SCE operating procedure after initial contingency
	line_P6_201701_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	107.5	Diverge	109.5	< 100	< 100	< 100	< 100	Existing Pastoria Energy Faciity RAS
	line_P6_201757_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	106.6	Diverge	108.6	< 100	< 100	< 100	< 100	Existing Pastoria Energy Faciity RAS
	line_P6_201758_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	108.3	Diverge	110.3	< 100	< 100	< 100	< 100	Existing Pastoria Energy Faciity RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification	
24403 BAILEY 230 24115 PASTORIA 230 1 1	line_P6_201975_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	102.7	< 100	< 100	108.4	< 100	111.8	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201976_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	104.2	< 100	< 100	110.2	< 100	113.4	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201977_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line PASTORIA 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	101.8	< 100	< 100	107.7	< 100	110.9	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201986_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line Pardee - Pastoria - Warne 230 kV line	P6	N-1-1	102.0	< 100	< 100	107.8	< 100	111.0	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202129_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	134.9	111.1	< 100	143.8	Diverge	148.8	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202130_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Line PASTORIA 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	131.0	107.3	< 100	139.9	Diverge	144.8	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification	
ALAMO SC 66 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	Low	0.9 < V < 1.1	0.88	0.70	0.82	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	Low	0.9 < V < 1.1	0.89	0.70	0.84	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1
ALPINE 66 kV	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	Low	0.9 < V < 1.1	0.9 < V < 1.1	0.83	0.88	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
BAILEY 66 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	Low	0.9 < V < 1.1	0.87	0.69	0.82	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	Low	0.9 < V < 1.1	0.88	0.69	0.84	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
NEENACH 66 kV	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	Low	0.9 < V < 1.1	0.9 < V < 1.1	0.83	0.88	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
OSO 66 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	Low	0.9 < V < 1.1	0.87	0.69	0.82	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	Low	0.9 < V < 1.1	0.88	0.69	0.84	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
TAP 85 66 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	Low	0.9 < V < 1.1	0.87	0.70	0.82	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	Low	0.9 < V < 1.1	0.88	0.70	0.84	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
TAP 86 66 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	Low	0.9 < V < 1.1	0.87	0.69	0.82	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	Low	0.9 < V < 1.1	0.88	0.69	0.84	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
WESTPAC 66 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	Low	0.9 < V < 1.1	0.86	0.69	0.81	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	Low	0.9 < V < 1.1	0.87	0.69	0.83	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP with Additional Transportation Electrification	
BAILEY 230 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	Low	0.9 < V < 1.1	0.84	0.66	0.80	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
ALAMO SC 66 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	14.36	33.11	20.90	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	13.38	33.04	19.31	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
ALPINE 66 kV	line_P3_105185_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen ALPINE_G 0.5 Unit ID EQ	P3	G-1/N-1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	8.10	system adjustments after first contingency mitigates the issue
	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	8.32	20.57	14.60	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202927_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Line ALPINE_B 34.5 to ALPINE_C 34.5 Circuit 1	P6	N-1-1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	8.10	system adjustments after first contingency mitigates the issue
	line_P6_205009_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Tran ALPINE 66.00 to ALPINE_B 34.50 Circuit 1	P6	N-1-1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	8.10	system adjustments after first contingency mitigates the issue
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	< 8	20.46	13.41	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
BAILEY 66 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	15.37	34.30	20.90	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	14.38	34.23	19.31	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
NEENACH 66 kV	line_P3_105185_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen ALPINE_G 0.5 Unit ID EQ	P3	G-1/N-1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	8.09	system adjustments after first contingency mitigates the issue
	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	8.59	20.57	14.60	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202909_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Line NEENACH 66.0 to ALPINE 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	8.31	system adjustments after first contingency mitigates the issue
	line_P6_202927_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Line ALPINE_B 34.5 to ALPINE_C 34.5 Circuit 1	P6	N-1-1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	8.09	system adjustments after first contingency mitigates the issue
	line_P6_205009_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Tran ALPINE 66.00 to ALPINE_B 34.50 Circuit 1	P6	N-1-1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	8.09	system adjustments after first contingency mitigates the issue

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	< 8	20.46	13.41	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
OSO 66 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	14.78	33.60	20.90	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	13.79	33.53	19.31	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
	line_P3_105132_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen B CRK 4 11.5 Unit ID 42	P3	G-1/N-1	< 8	< 8	< 8	8.10	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
	line_P3_105135_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen MAMOTH1G 13.8 Unit ID 1	P3	G-1/N-1	< 8	< 8	< 8	8.06	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
	line_P3_105136_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen MAMOTH2G 13.8 Unit ID 2	P3	G-1/N-1	< 8	< 8	< 8	8.06	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
	line_P3_105142_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen WELLGEN 13.8 Unit ID 1	P3	G-1/N-1	< 8	< 8	< 8	8.10	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
	line_P3_105162_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen WDT1384_G 0.6 Unit ID 1	P3	G-1/N-1	< 8	< 8	< 8	8.09	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
	line_P3_105163_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen PSTRIAG1 18.0 Unit ID G1	P3	G-1/N-1	< 8	< 8	< 8	8.05	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
	line_P3_105164_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen PSTRIAG2 18.0 Unit ID G2	P3	G-1/N-1	< 8	< 8	< 8	8.05	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
	line_P3_105165_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen PSTRIAS1 18.0 Unit ID S1	P3	G-1/N-1	< 8	< 8	< 8	8.05	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
	line_P3_105166_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen PSTRIAG3 18.0 Unit ID G3	P3	G-1/N-1	< 8	< 8	< 8	8.10	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
	line_P3_105185_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen ALPINE_G 0.5 Unit ID EQ	P3	G-1/N-1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	9.18	11.30	system adjustments after first contingency mitigates the issue
	line_P6_201719_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.02	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
TAP 85 66 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	15.02	32.43	20.42	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202097_Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.53	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202147_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.52	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202196_Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.62	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202244_Line PASTORIA 230.0 to WARNETAP 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.51	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202631_Line Pardee - Pastoria - Warne 230 kV line Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.57	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202909_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Line NEENACH 66.0 to ALPINE 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	< 8	< 8	< 8	9.42	11.53	system adjustments after first contingency mitigates the issue
	line_P6_202927_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Line ALPINE_B 34.5 to ALPINE_C 34.5 Circuit 1	P6	N-1-1	< 8	< 8	< 8	< 8	< 8	< 8	9.18	11.30	system adjustments after first contingency mitigates the issue
	line_P6_204985_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 1	P6	N-1-1	< 8	< 8	< 8	9.12	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_204986_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 2	P6	N-1-1	< 8	< 8	< 8	9.17	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_204988_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 4	P6	N-1-1	< 8	< 8	< 8	9.16	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_205009_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Tran ALPINE 66.00 to ALPINE_B 34.50 Circuit 1	P6	N-1-1	< 8	< 8	< 8	< 8	< 8	< 8	9.18	11.30	system adjustments after first contingency mitigates the issue
tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	14.05	32.36	18.85	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue	
TAP 86 66 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	14.78	33.60	20.90	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
TRM 66 kV	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	13.79	33.53	19.31	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
WESTPAC 66 kV	line_P3_105135_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen MAMOTH1G 13.8 Unit ID 1	P3	G-1/N-1	< 8	< 8	< 8	8.13	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P3_105136_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen MAMOTH2G 13.8 Unit ID 2	P3	G-1/N-1	< 8	< 8	< 8	8.12	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P3_105159_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen TOT896_G1ST 0.6 Unit ID 1	P3	G-1/N-1	< 8	< 8	< 8	8.05	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P3_105161_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen TOT896_G2ST 0.6 Unit ID 1	P3	G-1/N-1	< 8	< 8	< 8	8.05	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P3_105163_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen PSTRIAG1 18.0 Unit ID G1	P3	G-1/N-1	< 8	< 8	< 8	8.12	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P3_105164_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen PSTRIAG2 18.0 Unit ID G2	P3	G-1/N-1	< 8	< 8	< 8	8.12	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P3_105165_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen PSTRIAS1 18.0 Unit ID S1	P3	G-1/N-1	< 8	< 8	< 8	8.12	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P3_105185_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Gen ALPINE_G 0.5 Unit ID EQ	P3	G-1/N-1	< 8	< 8	< 8	< 8	< 8	< 8	9.28	11.40	system adjustments after first contingency mitigates the issue
	line_P6_201481_Line MAMMOTH 230.0 to BIG CRK3 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.03	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_201719_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.08	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	15.19	32.55	20.62	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202046_Line PASTORIA 230.0 to PSTRIA 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.02	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202097_Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.61	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
	line_P6_202147_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.59	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202196_Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.69	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202244_Line PASTORIA 230.0 to WARNETAP 230.0 Circuit 1 Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.59	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202631_Line Pardee - Pastoria - Warne 230 kV line Line BAILEY 66.0 to TAP 85 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	8.65	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_202909_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Line NEENACH 66.0 to ALPINE 66.0 Circuit 1	P6	N-1-1	< 8	< 8	< 8	< 8	< 8	< 8	9.53	11.64	system adjustments after first contingency mitigates the issue
	line_P6_202927_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Line ALPINE_B 34.5 to ALPINE_C 34.5 Circuit 1	P6	N-1-1	< 8	< 8	< 8	< 8	< 8	< 8	9.28	11.40	system adjustments after first contingency mitigates the issue
	line_P6_204985_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 1	P6	N-1-1	< 8	< 8	< 8	9.19	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_204986_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 2	P6	N-1-1	< 8	< 8	< 8	9.25	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_204988_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 4	P6	N-1-1	< 8	< 8	< 8	9.24	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	line_P6_205009_Line BAILEY 66.0 to TAP 85 66.0 Circuit 1 Tran ALPINE 66.00 to ALPINE_B 34.50 Circuit 1	P6	N-1-1	< 8	< 8	< 8	< 8	< 8	< 8	9.28	11.40	system adjustments after first contingency mitigates the issue
	tran_P6_206091_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	14.21	32.47	19.02	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
BAILEY 230 kV	line_P6_201921_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	13.92	33.06	19.66	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
BIG CRK4 230 kV	line_BC_P7_03_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 1	P7	DCTL	< 8	< 8	8.01	< 8	< 8	< 8	< 8	< 8	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200923_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK3 230.0 to RECTOR 230.0 Circuit 1	P6	N-1-1	< 8	< 8	8.01	< 8	< 8	< 8	< 8	< 8	Existing Big Creek/San Joaquin Valley RAS

Study Area: **SCE Tehachapi & Big Creek Corridor**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
RECTOR 230 kV	line_BC_P7_03_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 1	P7	DCTL	< 8	< 8	8.70	< 8	< 8	< 8	< 8	< 8	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200923_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK3 230.0 to RECTOR 230.0 Circuit 1	P6	N-1-1	< 8	< 8	8.70	< 8	< 8	< 8	< 8	< 8	Existing Big Creek/San Joaquin Valley RAS
RECTRSVC 230 kV	line_BC_P7_03_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 1	P7	DCTL	< 8	< 8	8.67	< 8	< 8	< 8	< 8	< 8	Existing Big Creek/San Joaquin Valley RAS
	line_P6_200923_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK3 230.0 to RECTOR 230.0 Circuit 1	P6	N-1-1	< 8	< 8	8.67	< 8	< 8	< 8	< 8	< 8	Existing Big Creek/San Joaquin Valley RAS

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Study Area: **SCE Tehachapi & Big Creek Corridor**

**Transient Stability**

Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					2027 SP High CEC Forecast
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	
Magunden-Springville No. 1 230 Kv	P1	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Springville No. 2 230 Kv	P1	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Vestal No. 1 230 Kv	P1	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Vestal No. 2 230 Kv	P1	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Pardee-Sylmar No. 2 And Pardee-Moorpark No. 3 220 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Pardee-Sylmar No. 1 And Pardee-Moorpark No. 2 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Pardee-Saugus 1A And Pardee-Moorpark No. 4 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Pardee Leg Of The Pardee-Pastoria-Warne And Pardee-Santa Clara 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Pardee-Vincent No.1 And Pardee-Pastoria 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Pardee-Bailey And Pardee-Vincent No. 2 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 3 - Rector No.1 And Rector-Vestal No.2 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 1 - Rector And Rector-Vestal No.1 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria-Lebec And Pastoria-Edmonston 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria-Magunden No.1 And Pastoria-Bailey 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria-Magunden No.2 And Pastoria-Pardee 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria-Pardee-Warne And Pastoria-Magunden No.3 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 4 - Springville And Magunden - Springville No. 2 230 Kv	P4	N-1	Stable	Stable	Stable	Stable	Stable	Stable
Bailey 66 kv East Bus	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Neenach - Bailey-Westpac (Neenach-Bailey) Ckt 1 66 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Neenach - Bailey-Westpac (Neenach-Westpac) Ckt 1 66 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Bailey - Neenach-Westpac (Bailey-Neenach) Ckt 1 66 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Bailey - Neenach-Westpac (Bailey-Westpac) Ckt 1 66 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Westpac - Neenach-Bailey (Westpac-Bailey) Ckt 1 66 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Westpac - Neenach-Bailey (Westpac-Neenach) Ckt 1 66 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Antelope - Neenach Ckt 1 66 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Neenach - Antelope Ckt 1 66 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Vestal - Magunden Ckt 2 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Vestal - Magunden Ckt 1 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Springville - Magunden Ckt 2 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Springville - Magunden Ckt 1 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria - Pardee - Warne (Pastoria-Pardee) 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria - Pardee - Warne (Pastoria-Warne) 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Pardee - Pastoria - Warne (Pardee-Pastoria) 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Pardee - Pastoria - Warne (Pardee-Warne) 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Warne - Pastoria - Pardee (Warne-Pastoria) 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Warne - Pastoria - Pardee (Warne-Pardee) 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria - Pardee Ckt 1 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria - Edmonston 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Pardee - Pastoria Ckt 1 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Magunden - Vestal Ckt 2 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable

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**Transient Stability**

Magunden - Vestal Ckt 1 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Magunden - Springville Ckt 2 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Magunden - Springville Ckt 1 230 kV	P5	Non-Redundant Relay	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 1-Rector And Big Creek 3-Rector No. 1	P6	N-1-1	Unstable	Unstable	Unstable	Stable	Stable	Unstable
Big Creek 1-Rector And Big Creek 3-Rector No. 1 W/ Mitigations	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 3-Rector No. 2 & Big Creek 1-Rector	P6	N-1-1	Stable	Unstable	Unstable	Stable	Stable	Unstable
Big Creek 3-Rector No. 2 & Big Creek 1-Rector With Ras	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 3-Rector No.2 And Big Creek 4-Springville	P6	N-1-1	Stable	Unstable	Unstable	Stable	Stable	Unstable
Big Creek 3-Rector No.2 And Big Creek 4-Springville W/ Mitigations	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 4-Springville And Rector-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 4-Springville And Rector-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector-Vestal Nos. 1 & 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector-Vestal Nos. 1 & 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Springville Nos. 1 & 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Springville Nos. 1 & 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Vestal Nos. 1 & 2	P6	N-1-1	Stable	Stable	Stable	Stable	Unstable	Stable
Magunden-Vestal Nos. 1 & 2 W/ Mitigations	P6	N-1-1	Stable	Stable	Stable	Unstable	Stable	Stable
Big Creek 1-Rector & Big Creek 3-Big Creek 8	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Vestal No. 1 & Rector-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Vestal No. 2 & Rector-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector-Vestal No. 1 & Magunden-Springville No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector-Vestal No. 2 & Magunden-Springville No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Vestal No. 1 & Magunden-Springville No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Vestal No. 2 & Magunden-Springville No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector-Vestal No. 1 & Rector-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector-Vestal No. 2 & Rector-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 3-Rector No. 1 & Rector-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Pastoria Nos. 1 & 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Pastoria Nos. 1 & 3	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Pastoria Nos. 2 & 3	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Bailey-Pastoria And Pardee-Pastoria	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Bailey-Pastoria And Pardee-Pastoria-Warne	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Pardee-Pastoria And Pardee-Pastoria-Warne	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Pardee-Pastoria And Bailey-Pardee	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Bailey-Pardee And Pardee-Pastoria-Warne	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Antelope-Magunden Nos. 1 And 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Antelope-Magunden No. 1 & Pardee-Pastoria-Warne	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Antelope-Magunden No. 2 & Pardee-Pastoria-Warne	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Antelope-Pardee & Pardee-Pastoria-Warne	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Bailey-Pastoria & Bailey-Pardee	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 1-Rector & Big Creek 2-Big Creek 8	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Antelope-Pardee & Bailey-Pastoria	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Bailey-Pardee & Pastoria-Edmonston	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Bailey-Pardee & Pastoria-Edmonston With Mitigation	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Bailey-Pastoria & Pastoria-Edmonston	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Bailey-Pastoria & Pastoria-Edmonston With Mitigation	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable



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Study Area:

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**Transient Stability**

Pardee-Vincent And Pardee-Vincent2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector Svc And Magunden-Vestal No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector Svc And Magunden-Vestal No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector Svc And Magunden-Springville No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector Svc And Magunden-Springville No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector Svc And Magunden-Pastoria No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector Svc And Magunden-Pastoria No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector Svc And Magunden-Pastoria No. 3	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Rector Svc And Antelope-Magunden No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Antelope-Magunden No.2 & Rector-Vestal No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Pastoria No. 1 & Magunden-Springville No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 4-Springville & Big Creek 1-Rector	P6	N-1-1	Unstable	Unstable	Unstable	Stable	Stable	Unstable
Magunden-Springville No. 1 & Antelope-Magunden No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Springville No. 1 & Big Creek 4-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Bailey 1A & 2A	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Omar & Rector-Vestal No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Omar & Magunden-Pastoria No. 3	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Omar & Magunden-Springville No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Omar & Antelope-Magunden No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Omar & Rector-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Omar & Big Creek 4-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Omar & Big Creek 3-Rector No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Omar & Big Creek 3-Rector No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Omar & Big Creek 3-Big Creek 4	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Omar & Rector Svc	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Antelope-Magunden No. 2 & Rector-Vestal No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Pastoria No. 1 & Magunden-Springville No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Omar & Pastoria-Lebec	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria-Lebec & Magunden-Springville No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria-Lebec & Magunden-Springville No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria-Lebec & Magunden-Vestal No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria-Lebec & Magunden-Vestal No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria-Lebec & Rector-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria-Lebec & Rector-Vestal No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Pastoria-Lebec & Rector-Vestal No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Springville No. 1 & Rector-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Springville No. 1 & Big Creek 4-Springville	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Magunden-Springville No. 1 & Big Creek 3-Rector No. 2	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 4-Springville & Rector-Vestal No. 1	P6	N-1-1	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 3 - Rector No.2 And Rector - Springville 230 Kv	P7	DCTL	Stable	Stable	Stable	Stable	Stable	Stable
Big Creek 3 - Rector No.1 And Big Creek 1 - Rector 230 Kv	P7	DCTL	Stable	Stable	Stable	Stable	Unstable	Stable
Magunden - Omar And Magunden - Vestal No.1 230 Kv	P7	DCTL	Stable	Stable	Stable	Stable	Stable	Stable



Stable	Stable	No violation
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Unstable	Stable	Existing Big Creek/San Joaquin Valley RAS
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Stable	Stable	Existing Big Creek/San Joaquin Valley RAS
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Stable	Stable	Existing Big Creek/San Joaquin Valley RAS
Stable	Unstable	Existing Big Creek/San Joaquin Valley RAS
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Unstable	Stable	Existing Big Creek/San Joaquin Valley RAS
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Stable	Stable	No violation
Stable	Stable	Existing Big Creek/San Joaquin Valley RAS
Stable	Stable	No violation

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Study Area: **SCE Tehachapi & Big Creek Corridor**

**Single Contingency Load Drop**

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)												
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2032 SP with Additional Transportation Electrification

No single contingency resulted in total load drop of more than 250 MW

Potential Mitigation Solutions



**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)												Potential Mitigation Solutions	
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		2032 SP with Additional Transportation Electrification

No single source substation with more than 100 MW





Study Area:

PG&E Kern



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Kern PP-Seventh Standard 115 kV Line	P2-2:A15:44_MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	126	continue to monitor	
Kern PP-Seventh Standard 115 kV Line	P2-4:A15:14_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	126	continue to monitor	
Kern PP-Seventh Standard 115 kV Line	P2-4:A15:15_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	126	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P1-2:A15:100_SEMITROPIC-WASCO 70KV [9170]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	106	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P1-3:A15:53_SEMITROPIC_D 115/70KV TB 2	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	105	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P1-2:A15:100_SEMITROPIC-WASCO 70KV [9170]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	102	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P1-3:A15:53_SEMITROPIC_D 115/70KV TB 2	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	102	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-2:A15:44_MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	284	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-4:A15:14_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	284	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-4:A15:15_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	283	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-2:A15:44_MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	267	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-4:A15:14_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	266	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-4:A15:15_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	266	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-2:A15:44_MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	260	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-4:A15:14_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	259	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-4:A15:15_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	259	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-3:A15:64_MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	209	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-3:A15:64_MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	197	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-2:A15:44_MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	196	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-4:A15:14_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	195	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-4:A15:15_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	195	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-3:A15:64_MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	191	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-3:A15:64_MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	145	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-3:A15:30_SEMITROPIC_D - 1D 115KV & SEMITROPIC-MIDWAY #2 LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	106	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P2-2:A15:17_SEMITROPIC_D 115KV SECTION 1D	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	103	continue to monitor	
Kern-Kern Oil-Famoso 70 kV Line	P5-5C(DC):A15:4_KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	<100	NConv	57	83	93	58	NConv	NConv	Install redundant battery supply	
Kern-Kern Oil-Famoso 70 kV Line	P5-2D(NBF):A15:2_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	121	continue to monitor
Kern-Kern Oil-Famoso 70 kV Line	P5-5C(DC):A15:26_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	continue to monitor
Kern-Kern Oil-Famoso 70 kV Line	P5-2D(NBF):A15:2_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	continue to monitor
Kern-Kern Oil-Famoso 70 kV Line	P5-5C(DC):A15:26_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	continue to monitor
Kern-Kern Oil-Famoso 70 kV Line	P5-2D(NBF):A15:1_SEMITROPIC 115KV CB 122	P5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	continue to monitor
Kern-Kern Oil-Famoso 70 kV Line	P5-5A(NDR):A15:2_SEMITROPIC 115KV BUS (FAILURE OF NON-REDUNDANT RELAY ACTUAL)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	continue to monitor
Kern-Kern Oil-Famoso 70 kV Line	P5-2D(NBF):A15:1_SEMITROPIC 115KV CB 122	P5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	continue to monitor
Kern-Kern Oil-Famoso 70 kV Line	P5-5A(NDR):A15:2_SEMITROPIC 115KV BUS (FAILURE OF NON-REDUNDANT RELAY ACTUAL)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	continue to monitor
Kern-Kern Oil-Famoso 70 kV Line	P5-5C(DC):A15:12_SEMITROPIC 115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	continue to monitor
Kern-Kern Oil-Famoso 70 kV Line	P5-2D(NBF):A15:2_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	continue to monitor
Kern-Lamont 115 kV Line	P1-2:A15:27_STOCKDLE-LAMONT-KERN PWR-TEVIS 115KV [0]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	continue to monitor
Kern-Lamont 115 kV Line	P2-1:A15:75_KERN-STOCKDALE-LAMONT #1 (21KV) 115KV [1990] (KERN PWR-TEVISJ1)	P2	Line Section w/o Fault	<100	94	101	<100	58	<100	<100	95	118	Project: Lamont BESS	
Kern-Lamont 115 kV Line	P2-3:A15:44_STOCKDLE - 1D 115KV & STOCKDLE-LAMONT-KERN PWR-TEVIS LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	continue to monitor
Kern-Lamont 115 kV Line	P2-3:A15:54_TEVIS - 1D 115KV & STOCKDLE-LAMONT-KERN PWR-TEVIS LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	continue to monitor
Kern-Lamont 115 kV Line	P2-3:A15:142_KERN PWR 115KV - MIDDLE BREAKER BAY 1	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	continue to monitor
Kern-Lamont 115 kV Line	P2-3:A15:56_LAMONT 115KV - MIDDLE BREAKER BAY 4	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	continue to monitor
Kern-Lamont 115 kV Line	P5-5C(DC):A15:22_STOCKDALE 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	continue to monitor
Kern-Lamont 115 kV Line	P5-5C(DC):A15:27_TEVIS 115KV BATT #1(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	continue to monitor
Kern-Live Oak 115 kV Line	KERN OIL-WITCO 115KV [1920] & 7TH STANDARD-KERN 115KV [1981]	P6	N-1-1	93	113	<100	<100	<100	<100	<100	<100	106	NA	
Kern-Magunden 70 kV Line	P1-2:A15:107_BITTERWATRSS-MIDWAY-D 230KV [0]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	108	continue to monitor
Kern-Magunden 70 kV Line	P2-1:A15:228_MIDWAY-WHEELER RIDGE #1 230KV [5190] (BUENAVJ1-MIDWAY-D)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	123	continue to monitor
Kern-Magunden 70 kV Line	P2-1:A15:229_MIDWAY-WHEELER RIDGE #2 230KV [5200] (BUENAVJ2-MIDWAY-D)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	123	continue to monitor
Kern-Magunden 70 kV Line	P2-1:A15:223_BITTERWATRSS-WHLR R12 230KV [0] NO FAULT	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	continue to monitor
Kern-Magunden 70 kV Line	P2-3:A15:135_MIDWAY-D 230KV - MIDDLE BREAKER BAY 4	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	continue to monitor
Kern-Magunden 70 kV Line	P2-1:A15:224_BUENAVJ2-BITTERWATRSS 230KV [0] NO FAULT	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	108	continue to monitor
Kern-Magunden 70 kV Line	P2-1:A15:228_MIDWAY-WHEELER RIDGE #1 230KV [5190] (BUENAVJ1-MIDWAY-D)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	continue to monitor
Kern-Magunden 70 kV Line	P2-1:A15:228_MIDWAY-WHEELER RIDGE #1 230KV [5190] (BUENAVJ1-MIDWAY-D)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	continue to monitor
Kern-Magunden 70 kV Line	P2-1:A15:228_MIDWAY-WHEELER RIDGE #2 230KV [5200] (BUENAVJ2-MIDWAY-D)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	continue to monitor
Kern-Magunden 70 kV Line	P2-1:A15:229_MIDWAY-WHEELER RIDGE #2 230KV [5200] (BUENAVJ2-MIDWAY-D)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	continue to monitor
Kern-Magunden 70 kV Line	P5-5C(DC):A15:4_KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	<100	NConv	32	85	75	32	NConv	NConv	Install redundant battery supply	

Study Area: PG&E Kern  
 Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Kern-Magunden 70 kV Line	P5-5C(DC)A15:8_ WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	19	19	19	125	75	136	125	202	251	Install redundant battery supply	
Kern-Magunden 70 kV Line	P5-2D(NBF)A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	NA	NA	NA	57	6	43	57	151	183	Install redundant battery supply	
Kern-Magunden 70 kV Line	P5-5C(DC)A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NA	NA	NA	57	6	43	57	151	183	Install redundant battery supply	
Kern-Magunden 70 kV Line	P5-5C(DC)A15:8_ WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NA	NA	NA	139	81	153	140	236	251	Install redundant battery supply	
Kern-Magunden 70 kV Line	P7-1:A15:17_ MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor	
Kern-Magunden 70 kV Line	P7-1:A15:17_ MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor	
Kern-Magunden 70 kV Line	P7-1:A15:17_ MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor	
Kern-Magunden 70kV Line	P1-2:A15:107_ BITTERWATRSS-MIDWAY-D 230KV [0]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	108	continue to monitor
Kern-Magunden 70kV Line	P2-1:A15:228_ MIDWAY-WHEELER RIDGE #1 230KV [5190] (BUENAVJ1-MIDWAY-D)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	123	continue to monitor
Kern-Magunden 70kV Line	P2-1:A15:229_ MIDWAY-WHEELER RIDGE #2 230KV [5200] (BUENAVJ2-MIDWAY-D)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	123	continue to monitor
Kern-Magunden 70kV Line	P2-1:A15:223_ BITTERWATRSS-WHLR RJ2 230KV [0] NO FAULT	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	continue to monitor
Kern-Magunden 70kV Line	P2-3:A15:135_ MIDWAY-D 230KV - MIDDLE BREAKER BAY 4	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	continue to monitor
Kern-Magunden 70kV Line	P2-1:A15:224_ BUENAVJ2-BITTERWATRSS 230KV [0] NO FAULT	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	108	continue to monitor
Kern-Magunden 70kV Line	P5-5C(DC)A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
Kern-Magunden 70kV Line	P5-5C(DC)A15:8_ WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	251	continue to monitor
Kern-Magunden 70kV Line	P5-2D(NBF)A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	183	continue to monitor
Kern-Magunden 70kV Line	P5-5C(DC)A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	183	continue to monitor
Kern-Magunden 70kV Line	P7-1:A15:17_ MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
Kern-Stockdale 115 kV Line	P1-2:A15:53_ KERN-STOCKDALE-LAMONT #2 115KV [1940]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	continue to monitor
Kern-Stockdale 115 kV Line	P2-1:A15:76_ KERN-STOCKDALE-LAMONT #2 115KV [1940] (KERN PWR-TEVISI2)	P2	Line Section w/o Fault	<100	93	100	<100	50	<100	<100	94	116	Project: Lamont BESS	
Kern-Stockdale 115 kV Line	P2-3:A15:143_ KERN PWR 115KV - MIDDLE BREAKER BAY 2	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	continue to monitor
Kern-Stockdale 115 kV Line	P2-3:A15:55_ TEVIS2 - 1E 115KV & KERN-STOCKDALE-LAMONT #2 LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	continue to monitor
Kern-Stockdale 115 kV Line	P2-3:A15:57_ LAMONT 115KV - MIDDLE BREAKER BAY 3	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	continue to monitor
Kern-Stockdale 115 kV Line	P5-5C(DC)A15:28_ TEVIS 115KV BATT #2(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	continue to monitor
Lerdo-Famoso 115 kV Line	P2-2:A15:44_ MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	280	continue to monitor
Lerdo-Famoso 115 kV Line	P2-4:A15:14_ MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	280	continue to monitor
Lerdo-Famoso 115 kV Line	P2-4:A15:15_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	279	continue to monitor
Lerdo-Famoso 115 kV Line	P2-2:A15:44_ MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	275	continue to monitor
Lerdo-Famoso 115 kV Line	P2-4:A15:14_ MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	275	continue to monitor
Lerdo-Famoso 115 kV Line	P2-4:A15:15_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	274	continue to monitor
Lerdo-Famoso 115 kV Line	P2-2:A15:44_ MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	230	continue to monitor
Lerdo-Famoso 115 kV Line	P2-4:A15:14_ MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	229	continue to monitor
Lerdo-Famoso 115 kV Line	P2-4:A15:15_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	228	continue to monitor
Lerdo-Famoso 115 kV Line	P2-3:A15:64_ MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	192	continue to monitor
Lerdo-Famoso 115 kV Line	P2-3:A15:64_ MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	190	continue to monitor
Lerdo-Famoso 115 kV Line	P2-3:A15:64_ MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	147	continue to monitor
Lerdo-Famoso 115 kV Line	P5-2D(NBF)A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	<100	<100	<100	59	41	32	59	130	116	Install redundant battery supply	
Lerdo-Famoso 115 kV Line	P5-5C(DC)A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	<100	<100	<100	59	41	32	59	130	116	Install redundant battery supply	
Lerdo-Famoso 115 kV Line	P5-5C(DC)A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	<100	NConv	102	111	113	102	NConv	NConv	Install redundant battery supply	
Lerdo-Kern Oil-7th Standard 115 kV Line	P1-2:A15:116_ CHSR12SWSTA-SEMITROPIC D 115KV [0]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P1-2:A15:115_ CHSR12SWSTA-CHARKA #1 115KV [0]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P2-2:A15:44_ MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	304	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P2-4:A15:14_ MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	303	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P2-4:A15:15_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	303	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P2-3:A15:64_ MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	216	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P2-2:A15:44_ MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	168	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P2-4:A15:14_ MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	168	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P2-4:A15:15_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	167	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P2-3:A15:64_ MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	121	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P2-3:A15:30_ SEMITROPIC - D - 1D 115KV & SEMITROPIC-MIDWAY #2 LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P1-1:A15:37_ MT POSO 13.80KV GEN UNIT 1 & P1-2:A15:37_ 7TH STANDARD-KERN 115KV [1981]	P3	G-1/N-1	111	120	116	<100	<100	<100	<100	<100	<100	NA	Line Capacity Increase
Lerdo-Kern Oil-7th Standard 115 kV Line	P5-5C(DC)A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	<100	NConv	80	94	106	80	NConv	NConv	Install redundant battery supply	
Lerdo-Kern Oil-7th Standard 115 kV Line	P5-2D(NBF)A15:1_ SEMITROPIC 115KV CB 122	P5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P5-5A(NDR)A15:2_ SEMITROPIC 115KV BUS (FAILURE OF NON-REDUNDANT RELAY ACTUAL)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	P5-5C(DC)A15:12_ SEMITROPIC 115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	continue to monitor
Lerdo-Kern Oil-7th Standard 115 kV Line	OGLE TAP 115/13.8KV TB 1 & 7TH STANDARD-KERN 115KV [1981]	P6	N-1-1	98	108	104	<100	<100	<100	<100	<100	109	NA	Line Capacity Increase
Lerdo-Kern Oil 115 kV Line	P5-2D(NBF)A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	<100	<100	<100	78	75	97	78	107	102	Install redundant battery supply	
Live Oak-Kern Oil 115 kV Line	P5-5C(DC)A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	<100	<100	<100	78	75	97	78	107	102	Install redundant battery supply	
Live Oak-Kern Oil 115 kV Line	KERN OIL-WITCO 115KV [1920] & 7TH STANDARD-KERN 115KV [1981]	P6	N-1-1	94	107	<100	<100	<100	<100	<100	<100	102	NA	Project: Kern PP 115 kV Area Reinforcement

Study Area: PG&E Kern  
Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE			
Maricopa-Copus 70 kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	253	continue to monitor	
Maricopa-Copus 70 kV Line	P5-2D(NBF):A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 232 262 272 OR 312	P5	Non-Redundant Battery	275	21	280	93	43	35	94	175	222	222	Install redundant battery supply	
Maricopa-Copus 70 kV Line	P5-5C(DC):A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	275	21	280	93	43	35	94	175	222	222	Install redundant battery supply	
Maricopa-Copus 70 kV Line	P5-5C(DC):A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	21	NConv	99	121	112	99	NConv	NConv	NConv	Install redundant battery supply	
Maricopa-Copus 70 kV Line	P7-1:A15:1_ KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	201	continue to monitor	
Maricopa-Copus 70kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	250	continue to monitor	
Maricopa-Copus 70kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	246	continue to monitor	
Maricopa-Copus 70kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	226	continue to monitor	
Maricopa-Copus 70kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	continue to monitor	
Maricopa-Copus 70kV Line	P5-5C(DC):A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor	
Maricopa-Copus 70kV Line	P5-5C(DC):A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor	
Maricopa-Copus 70kV Line	P5-5C(DC):A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor	
Maricopa-Copus 70kV Line	P5-5C(DC):A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor	
Maricopa-Copus 70kV Line	P5-2D(NBF):A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	218	continue to monitor	
Maricopa-Copus 70kV Line	P5-5C(DC):A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	218	continue to monitor	
Maricopa-Copus 70kV Line	P5-2D(NBF):A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	216	continue to monitor	
Maricopa-Copus 70kV Line	P5-5C(DC):A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	216	continue to monitor	
Maricopa-Copus 70kV Line	P5-2D(NBF):A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	196	continue to monitor	
Maricopa-Copus 70kV Line	P5-5C(DC):A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	196	continue to monitor	
Maricopa-Copus 70kV Line	P7-1:A15:1_ KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	197	continue to monitor	
Maricopa-Copus 70kV Line	P7-1:A15:1_ KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	194	continue to monitor	
Maricopa-Copus 70kV Line	P7-1:A15:1_ KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	174	continue to monitor	
Midsum-Midway 115 kV Line	P5-5C(DC):A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	20	NConv	13	44	47	14	NConv	NA	NA	Install redundant battery supply	
Midway 230/115 kV Transformer #2	P2-4:A15:17_ MIDWAY 115KV - SECTION 1E & 1D	P2	Bus-Tie-Breaker	Mon Branch Invalid	100	93	Mon Branch Invalid	32	Mon Branch Invalid	Mon Branch Invalid	89	NA	NA	continue to monitor	
Midway 230/115 kV Transformer #3	P2-3:A15:20_ MIDWAY-DBSB - 2D 230KV & MIDWAY-DBSB-MIDWAY-R12 #1 LINE	P2	Non-Bus-Tie Breaker	108	NA	NA	78	NA	102	52	NA	NA	NA	PGE Maintenance Project	
Midway 230/115 kV Transformer #3	P2-4:A15:16_ MIDWAY 115KV - SECTION 2D & 1D	P2	Bus-Tie-Breaker	<100	102	109	<100	11	<100	<100	92	105	105	Line Capacity Increase	
Midway-Kern #4 230 kV Line	MIDWAY-KERN #3 230KV [5160] & KERN PP-MIDWAY-F 230KV [0]	P6	N-1-1	113	<100	<100	<100	<100	<100	<100	<100	<100	NA	Project: Midway-Kern PP 230 kV #2 Line Project	
Midway-Kern #4 230 kV Line	P7-1:A15:12_ MIDWAY-KERN NO. 3 & MIDWAY-KERN NO. 1 230 KV LINES	P7	DCTL	113	NA	NA	55	NA	33	55	NA	NA	NA	Project: Midway-Kern PP 230 kV #2 Line Project	
Midway-Kern 230kV Line No 3	P2-4:A15:21_ MIDWAY-DBSB SECTION 2D & MIDWAY-E SECTION 2E 230KV	P2	Bus-Tie-Breaker	94	<100	<100	222	<100	17	24	<100	NA	NA	Project: Midway-Kern PP 230 kV #2 Line Project	
Midway-Kern 230kV Line No 3	P2-4:A15:22_ MIDWAY-DBSB SECTION 1D & MIDWAY-E SECTION 1E 230KV	P2	Bus-Tie-Breaker	41	<100	<100	100	<100	14	24	<100	NA	NA	Project: Midway-Kern PP 230 kV #2 Line Project	
Midway-Shafter 115 kV Line	P1-2:A15:50_ MIDWAY-RENFRO-TUPMAN 115KV [2590]	P1	N-1	<100	101	103	<100	51	<100	<100	102	113	113	Line Capacity Increase	
Midway-Shafter 115 kV Line	P1-2:A15:55_ MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115KV [2600]	P1	N-1	134	139	143	55	91	90	55	140	NA	NA	Line Capacity Increase	
Midway-Shafter 115 kV Line	P1-2:A15:52_ MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115KV [2600]	P1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	158	continue to monitor	
Midway-Shafter 115 kV Line	P2-1:A15:76_ MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115KV [2600] (TPMNTP2-RENFRICT)	P2	Line Section w/o Fault	159	165	173	71	103	78	71	167	NA	NA	Line Capacity Increase	
Midway-Shafter 115 kV Line	P2-1:A15:95_ MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115KV [2600] (RENFRICT-RIO BRVO)	P2	Line Section w/o Fault	133	139	143	55	91	90	55	140	NA	NA	Line Capacity Increase	
Midway-Shafter 115 kV Line	P2-3:A15:51_ TUPMAN - 1E 115KV & MIDWAY-TUPMAN-RIO BRAVO-RENFRO LINE	P2	Non-Bus-Tie Breaker	133	139	142	55	91	90	55	140	NA	NA	Line Capacity Increase	
Midway-Shafter 115 kV Line	P2-3:A15:66_ RENFRO2 - 1F 115KV & MIDWAY-TUPMAN-RIO BRAVO-RENFRO LINE	P2	Non-Bus-Tie Breaker	134	139	143	55	91	90	55	140	NA	NA	Line Capacity Increase	
Midway-Shafter 115 kV Line	P2-3:A15:70_ MIDWAY - 1E 115KV & MIDWAY-TUPMAN-RIO BRAVO-RENFRO LINE	P2	Non-Bus-Tie Breaker	134	140	144	55	91	91	55	141	NA	NA	Line Capacity Increase	
Midway-Shafter 115 kV Line	P2-1:A15:74_ MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115KV [2600] (TPMNTP2-RENFRICT)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	193	continue to monitor	
Midway-Shafter 115 kV Line	P2-3:A15:67_ MIDWAY - 1E 115KV & MIDWAY-TUPMAN-RIO BRAVO-RENFRO LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	158	continue to monitor	
Midway-Shafter 115 kV Line	P2-3:A15:63_ RENFRO2 - 1F 115KV & MIDWAY-TUPMAN-RIO BRAVO-RENFRO LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	158	continue to monitor	
Midway-Shafter 115 kV Line	P2-1:A15:93_ MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115KV [2600] (RENFRICT-RIO BRVO)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	158	continue to monitor	
Midway-Shafter 115 kV Line	P2-3:A15:48_ TUPMAN - 1E 115KV & MIDWAY-TUPMAN-RIO BRAVO-RENFRO LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	157	continue to monitor	
Midway-Shafter 115 kV Line	P1-1:A15:48_ PSE-BEAR 13.80KV GEN UNIT 1 & P1-2:A15:52_ MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115KV [2600]	P3	G-1/N-1	134	139	143	<100	<100	<100	<100	140	NA	NA	Line Capacity Increase	
Midway-Shafter 115 kV Line	P1-1:A15:8_ Q744P5G5 0.60KV GEN UNIT 5 & P1-2:A15:55_ MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115KV [2600]	P3	G-1/N-1	134	<100	<100	<100	<100	<100	<100	<100	<100	NA	NA	Line Capacity Increase
Midway-Shafter 115 kV Line	P5-5A(NRDR):A15:15_ TUPMAN 115KV BUS 1D (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	133	138	142	55	91	90	55	139	157	157	Install redundant battery supply	
Midway-Shafter 115 kV Line	P5-5A(NRDR):A15:7_ RENFRO 115KV (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	133	138	142	55	91	90	55	139	157	157	Install redundant battery supply	
Midway-Shafter 115 kV Line	P5-5C(DC):A15:25_ TUPMAN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	133	138	142	55	91	90	55	139	157	157	Install redundant battery supply	
Midway-Shafter 115 kV Line	P5-5C(DC):A15:31_ RENFRO 115KV BATT #1(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	99	101	103	44	51	53	44	102	113	113	Install redundant battery supply	
Midway-Shafter 115 kV Line	P5-5C(DC):A15:34_ RENFRO 115KV BATT #2(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	134	139	143	55	91	90	55	140	158	158	Install redundant battery supply	
Midway-Shafter 115 kV Line	P7-1:A15:7_ MIDWAY-TUPMAN-RENFRO & MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115 KV LINES	P7	DCTL	133	138	142	55	91	90	55	139	157	157	Line Capacity Increase	
Midway-Tupman-Renfro 115 kV Line	P2-1:A15:92_ MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115KV [2600] (MIDWAY-RIOBRVTM)	P2	Line Section w/o Fault	<100	100	104	<100	49	<100	<100	101	113	113	Line Capacity Increase	
Midway-Tupman-Renfro 115 kV Line	P2-2:A15:46_ MIDWAY 115KV SECTION 1E	P2	Bus	99	101	105	41	49	63	42	101	113	113	Line Capacity Increase	
Midway-Tupman-Renfro 115 kV Line	P2-4:A15:12_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	194	198	208	80	89	112	80	201	NA	NA	Line Capacity Increase	
Midway-Tupman-Renfro 115 kV Line	P2-4:A15:17_ MIDWAY 115KV - SECTION 1E & 1D	P2	Bus-Tie-Breaker	<100	101	106	<100	49	<100	<100	102	113	113	Line Capacity Increase	
Midway-Tupman-Renfro 115 kV Line	P2-4:A15:15_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	232	continue to monitor	

Study Area: **PG&E Kern**  
Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE		
Midway-Tupman-Renfro 115 kV Line	P2-4:A15:16_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	120	continue to monitor
Midway-Tupman-Renfro 115 kV Line	P2-4:A15:115_ MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115KV [2600] (RIOBRVTM-FRTLYTP)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	continue to monitor
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	P1-2:A15:61_ MIDWAY-SHAFTER 115KV [2610]	P1	N-1	131	136	139	54	91	89	54	137	NA	NA	Line Capacity Increase
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	P1-2:A15:58_ MIDWAY-SHAFTER 115KV [2610]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	153	continue to monitor
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	P2-2:A15:44_ MIDWAY 115KV SECTION 2E	P2	Bus	131	135	138	54	90	89	54	138	154	NA	Line Capacity Increase
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	P2-3:A15:125_ SHAFTER 115KV - RING R4 & R3	P2	Non-Bus-Tie Breaker	106	110	115	44	75	76	44	111	NA	NA	Line Capacity Increase
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	P2-3:A15:67_ MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	131	135	138	54	90	89	54	137	NA	NA	Line Capacity Increase
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	P2-4:A15:12_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	133	138	146	62	75	68	63	140	NA	NA	Line Capacity Increase
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	P2-4:A15:14_ MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	136	141	144	54	89	90	55	144	161	NA	Line Capacity Increase
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	P2-4:A15:15_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	140	146	151	55	88	92	55	148	170	NA	Line Capacity Increase
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	P2-3:A15:64_ MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	154	continue to monitor
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	P2-3:A15:123_ SHAFTER 115KV - RING R4 & R3	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	124	continue to monitor
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	P1-1:A15:42_ FRITOLAY 9.11KV GEN UNIT 1 & P1-2:A15:58_ MIDWAY-SHAFTER 115KV [2610]	P3	G-1/N-1	<100	136	139	<100	<100	<100	<100	<100	<100	NA	Line Capacity Increase
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	MIDWAY-SHAFTER 115KV [2610] & MIDWAY-RENFRO-TUPMAN 115KV [2590]	P6	N-1-1	98	100	104	<100	<100	<100	<100	101	NA	NA	Line Capacity Increase
Midway-Wheeler Ridge #1 230 kV Line	P1-2:A15:107_ BITTERWATRSS-MIDWAY-D 230KV [0]	P1	N-1	NA	129	118	NA	9	NA	NA	118	116	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #1 230 kV Line	P1-2:A15:4_ BITTERWATRSS-MIDWAY-D BAAH 230KV [0]	P1	N-1	129	NA	NA	98	NA	15	99	NA	NA	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #1 230 kV Line	P2-1:A15:1_ BITTERWATRSS-WHLR RJ2 230KV [0] NO FAULT	P2	Line Section w/o Fault	129	128	117	97	26	29	97	118	NA	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #1 230 kV Line	P2-1:A15:16_ MIDWAY-WHEELER RIDGE #2 230KV [5200] (BUENAVJ2-MIDWAY-D BAAH)	P2	Line Section w/o Fault	139	NA	NA	106	NA	10	107	NA	NA	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #1 230 kV Line	P2-1:A15:224_ BUENAVJ2-BITTERWATRSS 230KV [0] NO FAULT	P2	Line Section w/o Fault	129	129	118	98	9	15	99	118	116	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #1 230 kV Line	P2-1:A15:229_ MIDWAY-WHEELER RIDGE #2 230KV [5200] (BUENAVJ2-MIDWAY-D)	P2	Line Section w/o Fault	NA	139	129	NA	17	NA	NA	127	127	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #1 230 kV Line	P2-3:A15:135_ MIDWAY-D 230KV - MIDDLE BREAKER BAY 4	P2	Non-Bus-Tie Breaker	NA	129	118	NA	9	NA	NA	118	116	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #1 230 kV Line	P2-3:A15:21_ MIDWAY-D BAAH 230KV - MIDDLE BREAKER BAY 6	P2	Non-Bus-Tie Breaker	127	NA	NA	98	NA	13	98	NA	NA	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #1 230 kV Line	P2-1:A15:23_ BITTERWATRSS-WHLR RJ2 230KV [0] NO FAULT	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	116	continue to monitor
Midway-Wheeler Ridge #1 230 kV Line	P2-1:A15:223_ BITTERWATRSS-WHLR RJ2 230KV [0] NO FAULT	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	continue to monitor
Midway-Wheeler Ridge #1 230 kV Line	WHEELER 115/70KV TB 2 & BITTERWATRSS-MIDWAY-D 230KV [0]	P6	N-1-1	<100	<100	132	<100	<100	<100	<100	<100	<100	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #1 230kV Line	P1-2:A15:107_ BITTERWATRSS-MIDWAY-D 230KV [0]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	127	continue to monitor
Midway-Wheeler Ridge #1 230kV Line	P2-1:A15:229_ MIDWAY-WHEELER RIDGE #2 230KV [5200] (BUENAVJ2-MIDWAY-D)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	138	continue to monitor
Midway-Wheeler Ridge #1 230kV Line	P2-3:A15:135_ MIDWAY-D 230KV - MIDDLE BREAKER BAY 4	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	127	continue to monitor
Midway-Wheeler Ridge #1 230kV Line	P2-1:A15:224_ BUENAVJ2-BITTERWATRSS 230KV [0] NO FAULT	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	127	continue to monitor
Midway-Wheeler Ridge #1 230kV Line	P2-1:A15:223_ BITTERWATRSS-WHLR RJ2 230KV [0] NO FAULT	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	127	continue to monitor
Midway-Wheeler Ridge #2 230 kV Line	P2-1:A15:15_ MIDWAY-WHEELER RIDGE #1 230KV [5190] (BUENAVJ1-MIDWAY-D BAAH)	P2	Line Section w/o Fault	115	NA	NA	84	NA	18	84	NA	NA	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #2 230 kV Line	P2-1:A15:228_ MIDWAY-WHEELER RIDGE #1 230KV [5190] (BUENAVJ1-MIDWAY-D)	P2	Line Section w/o Fault	NA	116	106	NA	12	NA	NA	105	114	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #2 230 kV Line	P2-1:A15:15_ MIDWAY-WHEELER RIDGE #1 230KV [5190] (BUENAVJ1-MIDWAY-D BAAH)	P2	Line Section w/o Fault	139	NA	NA	106	NA	19	107	NA	NA	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #2 230 kV Line	P2-1:A15:228_ MIDWAY-WHEELER RIDGE #1 230KV [5190] (BUENAVJ1-MIDWAY-D)	P2	Line Section w/o Fault	NA	139	129	NA	17	NA	NA	128	114	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #2 230 kV Line	WHEELER RIDGE-ADOBE SW STA 115KV [1982] & MIDWAY-WHEELER RIDGE #1 230KV [5190]	P6	N-1-1	<100	<100	102	<100	<100	<100	<100	<100	<100	NA	Project: Wheeler Ridge Junction
Midway-Wheeler Ridge #2 230kV Line	P2-1:A15:228_ MIDWAY-WHEELER RIDGE #1 230KV [5190] (BUENAVJ1-MIDWAY-D)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	138	continue to monitor
Midway-Wheeler Ridge #2 230kV Line	P2-1:A15:228_ MIDWAY-WHEELER RIDGE #1 230KV [5190] (BUENAVJ1-MIDWAY-D)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	127	continue to monitor
Midway-Wheeler Ridge #2 230kV Line	P2-3:A15:17_ WHEELER 230KV - MIDDLE BREAKER BAY 1	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	continue to monitor
OLD RIVR-OLD_RVR1_7P 70 kV	P5-5C(DC):A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	<100	NConv	4	13	16	4	NConv	NA	NA	Install redundant battery supply
SEMITROPIC_D-SEMITROPIC_E 115 kV	P2-1:A15:68_ SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] (SEMITRPI-GANSO)	P2	Line Section w/o Fault	<100	95	100	<100	47	<100	<100	69	NA	NA	Line Capacity Increase
SEMITROPIC_D-SEMITROPIC_E 115 kV	P2-1:A15:69_ SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] (GANSO-MIDWAY)	P2	Line Section w/o Fault	<100	105	111	<100	46	<100	<100	76	NA	NA	Line Capacity Increase
SEMITROPIC_D-SEMITROPIC_E 115 kV	P5-5C(DC):A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	52	NConv	53	61	52	53	NConv	NConv	NA	Install redundant battery supply
Semitropic-Famoso 115 kV Line	P1-2:A15:41_ LERDO-KERN OIL-7TH STANDARD 115KV [1950]	P1	N-1	<100	83	90	<100	31	<100	<100	105	112	NA	Sensitivity Only
Semitropic-Famoso 115 kV Line	P2-2:A15:44_ MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	164	continue to monitor
Semitropic-Famoso 115 kV Line	P2-4:A15:14_ MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	163	continue to monitor
Semitropic-Famoso 115 kV Line	P2-4:A15:15_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	163	continue to monitor
Semitropic-Famoso 115 kV Line	P2-1:A15:43_ LERDO-KERN OIL-7TH STANDARD 115KV [1950] (LERDO-LRDO JCT)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	112	continue to monitor
Semitropic-Famoso 115 kV Line	P2-1:A15:35_ KERN OIL - 1D 115KV & LERDO-KERN OIL-7TH STANDARD 115KV	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	112	continue to monitor
Semitropic-Famoso 115 kV Line	P5-2D(NBF):A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	82	83	90	59	39	60	60	173	170	NA	Install redundant battery supply
Semitropic-Famoso 115 kV Line	P5-2D(NBF):A15:3_ KERN OIL 115KV CB 132 OR 142	P5	Non-Redundant Battery	82	83	90	20	31	67	20	105	112	NA	Install redundant battery supply
Semitropic-Famoso 115 kV Line	P5-5C(DC):A15:14_ 7TH STANDARD 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	82	83	90	20	31	67	20	105	NA	NA	Install redundant battery supply
Semitropic-Famoso 115 kV Line	P5-5C(DC):A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	82	83	90	59	39	60	60	173	170	NA	Install redundant battery supply
Semitropic-Famoso 115 kV Line	P5-5C(DC):A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	83	NConv	102	73	71	103	NConv	NConv	NA	Install redundant battery supply
Semitropic-Famoso 115 kV Line	P5-5A(NDR):A15:3_ KERN OIL 115KV BUS (FAILURE OF NON-REDUNDANT RELAY ACTUALLY &	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	112	continue to monitor
Semitropic-Famoso 115 kV Line	P5-5C(DC):A15:18_ KERN OIL 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	<100	112	continue to monitor
Semitropic-Famoso 115 kV Line	P7-1:A15:2_ LIVE OAK-KERN OIL & LERDO-KERN OIL-7TH STANDARD 115 kV LINE	P7	DCTL	82	83	90	20	31	67	20	105	112	NA	Line Capacity Increase
Semitropic-Famoso 115 kV Line	P7-1:A15:3_ LERDO-KERN OIL-7TH STANDARD 115 kV LINE & KERN-LIVE OAK 115 kV LINES	P7	DCTL	82	83	90	20	31	67	20	105	112	NA	Line Capacity Increase
Semitropic-Midway #1 115kV Line	P2-1:A15:70_ SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] (SEMITRPI-GANSO)	P2	Line Section w/o Fault	106	112	118	39	41	29	39	86	NA	NA	Line Capacity Increase
Semitropic-Midway #1 115kV Line	P2-1:A15:71_ SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] (GANSO-MIDWAY)	P2	Line Section w/o Fault	116	122	129	42	39	42	92	NA	NA	NA	Line Capacity Increase
Semitropic-Midway #1 115kV Line	P2-1:A15:69_ SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] (GANSO-MIDWAY)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	continue to monitor
Semitropic-Midway #1 115kV Line	P5-2D(NBF):A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	67	71	75	46	14	2	47	111	119	NA	Install redundant battery supply

Study Area: **PG&E Kern**  
Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
Semitropic-Midway #1 115kV Line	P5-5C(DC);A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	67	71	75	46	14	2	47	111	119	Install redundant battery supply
Semitropic-Midway #1 115kV Line	P5-5C(DC);A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	71	NConv	59	54	44	59	NConv	NConv	Install redundant battery supply
Semitropic-Wasco 70 kV Line	P2-2:A15:44_ MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	133	continue to monitor
Semitropic-Wasco 70 kV Line	P2-4:A15:14_ MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	133	continue to monitor
Semitropic-Wasco 70 kV Line	P2-4:A15:15_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	133	continue to monitor
Semitropic-Wasco 70 kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	105	continue to monitor
Semitropic-Wasco 70 kV Line	P5-2D(NBF);A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	27	30	33	89	14	32	90	171	225	Install redundant battery supply
Semitropic-Wasco 70 kV Line	P5-5C(DC);A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	27	30	33	89	14	32	90	171	225	Install redundant relay
Semitropic-Wasco 70 kV Line	P5-5C(DC);A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	30	33	103	55	41	103	NConv	NConv	Install redundant relay
Shafter-Rio Bravo 115 kV Line	P2-1:A15:74_ MIDWAY-TUPMAN-RIO BRAVO-RENFO 115KV [260] (TPMINT2-RENFRJCT)	P2	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	134	continue to monitor
Smyrna-Semitropic-Midway 115 kV Line	P1-2:A15:52_ SEMITROPIC-MIDWAY #1 115KV [3630]	P1	N-1	115	121	129	40	43	32	41	87	NA	Line Capacity Increase
Smyrna-Semitropic-Midway 115 kV Line	P2-2:A15:28_ SEMITROPIC_E 115KV SECTION 1E	P2	Bus	98	104	109	36	46	36	37	77	NA	Line Capacity Increase
Smyrna-Semitropic-Midway 115 kV Line	P5-5C(DC);A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	69	NConv	50	57	48	50	NConv	NConv	Install redundant relay
Smyrna-Semitropic-Midway 115 kV Line	SEMITROPIC-MIDWAY #1 115KV [3630] & 230KV [1] [2]	P6	N-1-1	<100	<100	130	<100	<100	<100	<100	<100	NA	Line Capacity Increase
Taft 115/70 kV Transformer #1	P5-5C(DC);A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	48	NConv	42	55	56	41	NConv	NA	Install redundant relay
Taft 115/70 kV Transformer #2	P5-5C(DC);A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	59	NConv	71	42	41	71	NConv	NA	Install redundant relay
Taft-Elk Hills 70 kV Line	P0	Base Case	Basecase	90	89	104	69	63	62	69	90	112	continue to monitor
Taft-Elk Hills 70 kV Line	P1-3:A15:49_ TAFT 115/70KV TB 1	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	101	continue to monitor
Taft-Elk Hills 70 kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	105	continue to monitor
Taft-Elk Hills 70 kV Line	P2-3:A15:126_ TAFT 115KV - RING R2 & R3	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	102	continue to monitor
Taft-Elk Hills 70 kV Line	P2-3:A15:128_ TAFT 115KV - RING R4 & R3	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	101	continue to monitor
Taft-Elk Hills 70 kV Line	P5-2D(NBF);A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	102	continue to monitor
Taft-Elk Hills 70 kV Line	P5-5C(DC);A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	102	continue to monitor
Taft-Elk Hills 70 kV Line	P7-1:A15:1_ KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	101	continue to monitor
Taft-Maricopa 70 kV Line	P1-2:A15:96_ KERN-OLD RIVER #1 70KV [889]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	102	continue to monitor
Taft-Maricopa 70 kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	264	continue to monitor
Taft-Maricopa 70 kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	187	continue to monitor
Taft-Maricopa 70 kV Line	P2-2:A15:44_ MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	101	continue to monitor
Taft-Maricopa 70 kV Line	P5-2D(NBF);A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	274	44	287	104	24	25	105	185	235	Install redundant relay
Taft-Maricopa 70 kV Line	P5-5C(DC);A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	274	44	287	104	24	25	105	185	235	Install redundant relay
Taft-Maricopa 70 kV Line	P5-5C(DC);A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	44	NConv	106	97	88	107	NConv	NConv	Install redundant relay
Taft-Maricopa 70 kV Line	P7-1:A15:1_ KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	214	continue to monitor
Taft-Maricopa 70 kV Line	P7-1:A15:1_ KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	150	continue to monitor
Taft-Maricopa 70kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	248	continue to monitor
Taft-Maricopa 70kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	234	continue to monitor
Taft-Maricopa 70kV Line	P2-4:A15:29_ KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	234	continue to monitor
Taft-Maricopa 70kV Line	P5-5C(DC);A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
Taft-Maricopa 70kV Line	P5-5C(DC);A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
Taft-Maricopa 70kV Line	P5-5C(DC);A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
Taft-Maricopa 70kV Line	P5-2D(NBF);A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	218	continue to monitor
Taft-Maricopa 70kV Line	P5-5C(DC);A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	218	continue to monitor
Taft-Maricopa 70kV Line	P5-2D(NBF);A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	206	continue to monitor
Taft-Maricopa 70kV Line	P5-5C(DC);A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	206	continue to monitor
Taft-Maricopa 70kV Line	P5-2D(NBF);A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	206	continue to monitor
Taft-Maricopa 70kV Line	P5-5C(DC);A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	206	continue to monitor
Taft-Maricopa 70kV Line	P7-1:A15:1_ KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	197	continue to monitor
Taft-Maricopa 70kV Line	P7-1:A15:1_ KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	185	continue to monitor
Taft-Maricopa 70kV Line	P7-1:A15:1_ KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	185	continue to monitor
Tejon-Sn Brnd 70 kV Line	P5-5C(DC);A15:8_ WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	<100	<100	<100	55	50	104	55	88	NA	Install redundant relay
Temblos-San Luis Obispo 115 kV Line	P5-5C(DC);A15:1_ MIDWAY 500KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NConv	46	NConv	NConv	NConv	NConv	NConv	NConv	NA	Install redundant relay
Wasco-Famoso 70 kV Line	P2-2:A15:44_ MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	115	continue to monitor
Wasco-Famoso 70 kV Line	P2-4:A15:14_ MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	115	continue to monitor
Wasco-Famoso 70 kV Line	P2-4:A15:15_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	114	continue to monitor
Wasco-Famoso 70 kV Line	P2-3:A15:64_ MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	110	continue to monitor
Wasco-Famoso 70 kV Line	P5-2D(NBF);A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	107	continue to monitor
Wasco-Famoso 70 kV Line	P5-5C(DC);A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	107	continue to monitor
Wasco-Famoso 70kV Line	P2-2:A15:44_ MIDWAY 115KV SECTION 2E	P2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	175	continue to monitor
Wasco-Famoso 70kV Line	P2-4:A15:14_ MIDWAY 115KV - SECTION 2E & 2D	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	175	continue to monitor
Wasco-Famoso 70kV Line	P2-4:A15:15_ MIDWAY 115KV - SECTION 2E & 1E	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	175	continue to monitor
Wasco-Famoso 70kV Line	P2-3:A15:64_ MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	109	continue to monitor
Wasco-Famoso 70kV Line	P5-2D(NBF);A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	NA	NA	NA	71	5	26	72	145	189	Install redundant relay
Wasco-Famoso 70kV Line	P5-5C(DC);A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NA	NA	NA	71	5	26	72	145	189	Install redundant relay
Wasco-Famoso 70kV Line	P5-5C(DC);A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NA	NA	NA	81	73	53	82	NConv	NConv	Install redundant relay
Weedpatch-San Bernard 70 kV Line	P5-2D(NBF);A15:2_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	44	44	45	50	23	18	50	118	159	Install redundant relay
Weedpatch-San Bernard 70 kV Line	P5-5C(DC);A15:26_ KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	44	44	45	50	23	18	50	118	159	Install redundant relay
Weedpatch-San Bernard 70 kV Line	P5-5C(DC);A15:4_ KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	44	44	45	52	83	81				

Study Area: PG&E Kern  
Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
Weedpatch-San Bernard 70 kV Line	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	<100	<100	<100	135	126	248	136	215	213	Install redundant relay
Weedpatch-San Bernard 70 kV Line	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	NA	NA	NA	153	98	212	154	262	213	Install redundant relay
Weedpatch-San Bernard 70 kV Line	P7-1:A15:17:_MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
weedpatch-san bernard 70kV Line	P5-5C(DC):A15:4:_KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
weedpatch-san bernard 70kV Line	P5-5C(DC):A15:4:_KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
weedpatch-san bernard 70kV Line	P5-5C(DC):A15:4:_KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
weedpatch-san bernard 70kV Line	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	259	continue to monitor
weedpatch-san bernard 70kV Line	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	214	continue to monitor
weedpatch-san bernard 70kV Line	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	212	continue to monitor
weedpatch-san bernard 70kV Line	P5-2D(NBF):A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	161	continue to monitor
weedpatch-san bernard 70kV Line	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	161	continue to monitor
weedpatch-san bernard 70kV Line	P5-2D(NBF):A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	160	continue to monitor
weedpatch-san bernard 70kV Line	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	160	continue to monitor
weedpatch-san bernard 70kV Line	P5-2D(NBF):A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	116	continue to monitor
weedpatch-san bernard 70kV Line	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	<100	<100	<100	<100	<100	<100	<100	<100	116	continue to monitor
weedpatch-san bernard 70kV Line	P7-1:A15:17:_MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
weedpatch-san bernard 70kV Line	P7-1:A15:17:_MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
weedpatch-san bernard 70kV Line	P7-1:A15:17:_MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor
Wheeler Ridge 115/70 kV Transformer #2	Base Case	P0	Basecase	0	0	100	0	31	33	0	0	NA	Generation Redispatch
Wheeler ridge-Lakeview 70kV Line	P2-4:A15:29:_KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	222	continue to monitor
Wheeler ridge-Lakeview 70kV Line	P5-2D(NBF):A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	255	<100	253	77	50	58	78	156	191	Install redundant relay
Wheeler ridge-Lakeview 70kV Line	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	255	<100	253	77	50	58	78	156	191	Install redundant relay
Wheeler ridge-Lakeview 70kV Line	P5-5C(DC):A15:4:_KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery	NConv	<100	NConv	84	29	21	84	NConv	NConv	Install redundant relay
Wheeler ridge-Lakeview 70kV Line	P7-1:A15:11:_KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	171	continue to monitor
Wheeler Ridge-San Bernard 70 kV Line	P1-2:A15:90:_WHEELER RIDGE-TEJON 70KV [9310]	P1	N-1	109	112	122	44	38	59	44	89	NA	Operating Solution
Wheeler Ridge-San Bernard 70 kV Line	P1-2:A15:87:_WHEELER RIDGE-TEJON 70KV [9310]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	110	continue to monitor
Wheeler Ridge-San Bernard 70 kV Line	P1-1:A15:30:_KERN CNYN 11.00KV GEN UNIT 1 & P1-2:A15:87:_WHEELER RIDGE-TEJON 70KV [9310]	P3	G-1/N-1	<100	112	122	<100	<100	<100	<100	93	NA	Operating Solution
Wheeler Ridge-Tejon 70 kV Line	P1-2:A15:91:_WHEELER RIDGE-SAN BERNARD 70KV [9300]	P1	N-1	102	104	113	44	41	59	44	86	NA	Operating Solution
Wheeler Ridge-Tejon 70 kV Line	P1-2:A15:88:_WHEELER RIDGE-SAN BERNARD 70KV [9300]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	104	continue to monitor
Wheeler Ridge-Tejon 70 kV Line	P1-2:A15:88:_WHEELER RIDGE-SAN BERNARD 70KV [9300]	P1	N-1	<100	<100	<100	<100	<100	<100	<100	<100	101	continue to monitor
Wheeler Ridge-Tejon 70 kV Line	P1-1:A15:11:_RIDBRAVO 6.90KV GEN UNIT 2 & P1-2:A15:91:_WHEELER RIDGE-SAN BERNARD 70KV [9300]	P3	G-1/N-1	102	<100	<100	<100	<100	<100	<100	<100	NA	Operating Solution
Wheeler Ridge-Tejon 70 kV Line	P1-1:A15:30:_KERN CNYN 11.00KV GEN UNIT 1 & P1-2:A15:88:_WHEELER RIDGE-SAN BERNARD 70KV [9300]	P3	G-1/N-1	<100	<100	110	<100	<100	<100	<100	<100	NA	Operating Solution
Wheeler Ridge-Weedpatch 70 kV Line	P7-1:A15:17:_MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	NConv	continue to monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
LOSTHL T 70 kV	Base Case	P0	Base Case	High Voltage	1.04	1.04	1.04	1.05	1.03	1.04	1.04	1.05	N/A	System adjustments or voltage support if needed
TWSL J1 70 kV	Base Case	P0	Base Case	High Voltage	1.04	1.04	1.04	1.05	1.03	1.04	1.04	1.05	N/A	System adjustments or voltage support if needed
ARCO 70 kV	Base Case	P0	Base Case	High Voltage	1.04	1.04	1.05	1.06	1.04	1.04	1.04	1.05	N/A	System adjustments or voltage support if needed
DEVLS DN 70 kV	Base Case	P0	Base Case	High Voltage	1.04	1.04	1.04	1.05	1.04	1.04	1.04	1.05	N/A	System adjustments or voltage support if needed
TPMNTP1 115 kV	Base Case	P0	Base Case	High Voltage	1.02	1.02	1.02	1.05	1.05	1.04	1.04	1.02	N/A	System adjustments or voltage support if needed
TUPMAN 115 kV	Base Case	P0	Base Case	High Voltage	1.02	1.01	1.02	1.04	1.05	1.04	1.04	1.01	N/A	System adjustments or voltage support if needed
TPMNTP2 115 kV	Base Case	P0	Base Case	High Voltage	1.02	1.01	1.02	1.05	1.06	1.04	1.04	1.02	N/A	System adjustments or voltage support if needed
KERN PWR 115 kV	Base Case	P0	Base Case	High Voltage	1.03	1.03	1.01	1.05	1.04	1.02	1.05	1.03	N/A	System adjustments or voltage support if needed
RIO BRVO 115 kV	Base Case	P0	Base Case	High Voltage	1.01	1.01	1.01	1.05	1.06	1.03	1.04	1.01	N/A	System adjustments or voltage support if needed
RNFROTP1 115 kV	Base Case	P0	Base Case	High Voltage	1.01	1.01	1.02	1.04	1.05	1.04	1.04	1.01	N/A	System adjustments or voltage support if needed
RENFRO 115 kV	Base Case	P0	Base Case	High Voltage	1.01	1.01	1.02	1.04	1.05	1.04	1.04	1.01	N/A	System adjustments or voltage support if needed
RNFROTP2 115 kV	Base Case	P0	Base Case	High Voltage	1.02	1.01	1.02	1.05	1.06	1.04	1.04	1.01	N/A	System adjustments or voltage support if needed
SHAFTER 115 kV	Base Case	P0	Base Case	High Voltage	1.02	1.01	1.02	1.05	1.06	1.04	1.04	1.02	N/A	System adjustments or voltage support if needed
RENFRO2 115 kV	Base Case	P0	Base Case	High Voltage	1.01	1.01	1.02	1.05	1.06	1.04	1.04	1.01	N/A	System adjustments or voltage support if needed
MIDWAY 115 kV	Base Case	P0	Base Case	High Voltage	1.04	1.04	1.05	1.05	1.04	1.06	1.04	1.04	N/A	System adjustments or voltage support if needed
RENFRJCT 115 kV	Base Case	P0	Base Case	High Voltage	1.02	1.01	1.02	1.05	1.06	1.04	1.04	1.01	N/A	System adjustments or voltage support if needed
NORCO_TA 115 kV	Base Case	P0	Base Case	High Voltage	1.02	1.01	1.02	1.04	1.05	1.04	1.04	1.01	N/A	System adjustments or voltage support if needed
NORCO 115 kV	Base Case	P0	Base Case	High Voltage	1.02	1.01	1.02	1.04	1.05	1.04	1.04	1.01	N/A	System adjustments or voltage support if needed
INERGY 115 kV	Base Case	P0	Base Case	High Voltage	1.01	1.01	1.02	1.04	1.05	1.03	1.03	1.01	N/A	System adjustments or voltage support if needed
ARVIN_ED 115 kV	Base Case	P0	Base Case	High Voltage	1.02	1.03	1.00	1.05	1.03	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
ARVINJ2 115 kV	Base Case	P0	Base Case	High Voltage	1.02	1.03	1.00	1.05	1.04	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
ROSEDAL 115 kV	Base Case	P0	Base Case	High Voltage	1.03	1.03	1.01	1.05	1.05	1.02	1.05	1.03	N/A	System adjustments or voltage support if needed
TX_ROSDL 115 kV	Base Case	P0	Base Case	High Voltage	1.03	1.03	1.01	1.05	1.05	1.02	1.05	1.03	N/A	System adjustments or voltage support if needed
RIOBRVTM 115 kV	Base Case	P0	Base Case	High Voltage	1.04	1.03	1.04	1.05	1.04	1.05	1.04	1.04	N/A	System adjustments or voltage support if needed
FRTLTP 115 kV	Base Case	P0	Base Case	High Voltage	1.03	1.02	1.03	1.05	1.05	1.04	1.04	1.02	N/A	System adjustments or voltage support if needed
FRITO LY 115 kV	Base Case	P0	Base Case	High Voltage	1.03	1.02	1.03	1.05	1.05	1.04	1.04	1.02	N/A	System adjustments or voltage support if needed
WESTPLAT 115 kV	Base Case	P0	Base Case	High Voltage	1.03	1.02	1.03	1.05	1.05	1.04	1.04	1.02	N/A	System adjustments or voltage support if needed
SW85 J1 70 kV	Base Case	P0	Base Case	High Voltage	1.03	1.03	1.02	1.05	1.04	1.03	1.04	1.04	N/A	System adjustments or voltage support if needed
UNIONJCT 70 kV	Base Case	P0	Base Case	High Voltage	1.02	1.02	1.02	1.03	1.06	1.03	1.03	1.02	N/A	System adjustments or voltage support if needed
PANAMA 70 kV	Base Case	P0	Base Case	High Voltage	1.02	1.02	1.02	1.03	1.06	1.03	1.03	1.02	N/A	System adjustments or voltage support if needed
PANMJCT2 70 kV	Base Case	P0	Base Case	High Voltage	1.03	1.03	1.03	1.04	1.05	1.03	1.03	1.03	N/A	System adjustments or voltage support if needed
MC FRLND 70 kV	Base Case	P0	Base Case	High Voltage	0.96	0.96	0.95	1.02	1.00	0.98	1.02	0.95	N/A	System adjustments or voltage support if needed
CHLME JT 70 kV	Base Case	P0	Base Case	High Voltage	1.03	1.03	1.02	1.05	1.04	1.04	1.04	1.04	N/A	System adjustments or voltage support if needed
Q1493 70 kV	Base Case	P0	Base Case	High Voltage	1.04	1.04	1.05	1.06	1.04	1.04	1.04	1.05	N/A	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
MC FRLND 70 kV	Base Case	P0	Base Case	Low Voltage	0.96	0.96	0.95	1.02	1.00	0.98	1.02	0.95	N/A	Continue to Monitor
WHEELER 230 kV	P2-3:A15:17: WHEELER 230KV - MIDDLE BREAKER BAY 1	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	0.93	0.89	>0.9	1.03	>0.9	>0.9	0.93	0.86	Review Project: Wheeler Ridge Junction
Q1398 230 kV	P2-3:A15:17: WHEELER 230KV - MIDDLE BREAKER BAY 1	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	0.93	0.89	>0.9	1.03	>0.9	>0.9	0.93	0.86	Review Project: Wheeler Ridge Junction
WHLR RJ2 230 kV	P2-3:A15:17: WHEELER 230KV - MIDDLE BREAKER BAY 1	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	0.94	0.90	>0.9	1.02	>0.9	>0.9	0.94	0.86	Review Project: Wheeler Ridge Junction
WHLR RT2 230 kV	P2-3:A15:17: WHEELER 230KV - MIDDLE BREAKER BAY 1	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	0.94	0.90	>0.9	1.02	>0.9	>0.9	0.94	0.86	Review Project: Wheeler Ridge Junction
WND GPJ2 230 kV	P2-3:A15:17: WHEELER 230KV - MIDDLE BREAKER BAY 1	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	0.94	0.89	>0.9	1.02	>0.9	>0.9	0.94	0.86	Review Project: Wheeler Ridge Junction
WND GPT2 230 kV	P2-3:A15:17: WHEELER 230KV - MIDDLE BREAKER BAY 1	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	0.93	0.89	>0.9	1.02	>0.9	>0.9	0.94	0.86	Review Project: Wheeler Ridge Junction
ELKHIL_G 230 kV	P2-3:A15:25: MIDWAY-F - 1F 230KV & MIDWAY-F-MIDWAY-R13 #1 LINE	P2	Non-Bus-Tie Breaker	Low Voltage	0.98	>0.9	>0.9	0.99	>0.9	0.87	0.99	>0.9	N/A	Sensitivity Only
MIDWAY-F 230 kV	P2-3:A15:25: MIDWAY-F - 1F 230KV & MIDWAY-F-MIDWAY-R13 #1 LINE	P2	Non-Bus-Tie Breaker	Low Voltage	0.98	>0.9	>0.9	0.99	>0.9	0.90	0.99	>0.9	N/A	Sensitivity Only
MCFRLD T 70 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	0.98	0.98	>0.9	1.01	>0.9	>0.9	0.84	0.74	Sensitivity Only
SEMI_TAP 115 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.04	>0.9	>0.9	0.82	0.71	Sensitivity Only
GOSE LKE 115 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.04	>0.9	>0.9	0.80	0.69	Sensitivity Only
SMTRPCWS 115 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.04	>0.9	>0.9	0.82	0.71	Sensitivity Only
SEMITROPIC_D 115 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.04	>0.9	>0.9	0.83	0.71	Sensitivity Only
WSCOPRSN 115 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.04	>0.9	>0.9	0.83	0.72	Sensitivity Only
CHARKA 115 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.04	>0.9	>0.9	0.84	0.74	Sensitivity Only
FAMOSO 115 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.03	>0.9	>0.9	0.87	0.77	Sensitivity Only
SEMITROPIC_E 115 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.04	>0.9	>0.9	0.83	0.71	Sensitivity Only
WILDWOOD2 115 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.04	>0.9	>0.9	0.81	0.70	Sensitivity Only
FAMOSO 70 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	0.99	0.99	>0.9	1.02	>0.9	>0.9	0.87	0.79	Sensitivity Only
MC FRLND 70 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	0.96	0.95	>0.9	1.00	>0.9	>0.9	0.81	0.70	Sensitivity Only
WASCO 70 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.01	>0.9	>0.9	0.82	0.72	Sensitivity Only
SEMITRPC 70 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.00	>0.9	>0.9	0.80	0.69	Sensitivity Only
WILDWOOD1TP 115 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.04	>0.9	>0.9	0.81	0.69	Sensitivity Only
WILDWOOD1 115 kV	P2-3:A15:64: MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus-Tie Breaker	Low Voltage	>0.9	NCONV	NCONV	>0.9	1.04	>0.9	>0.9	0.81	0.69	Sensitivity Only
SHAFTER 115 kV	P2-4:A15:15: MIDWAY 115KV - SECTION 2E & 1E	P2	Line Section w/o Fault	Low Voltage	>0.9	0.92	0.90	>0.9	1.11	>0.9	>0.9	0.91	0.86	Continue to Monitor
CARRIZO 115 kV	P1-1:A15:19: KERNRDG332G3 13.80KV GEN UNIT 3 & P1-2:A15:34: MIDWAY-TEMBLOR 115KV [2630]	P3	G-1/N-1	Low Voltage	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	0.89	>0.9	N/A	Generation Redispatch
KERNRDGE 115 kV	P1-1:A15:19: KERNRDG332G3 13.80KV GEN UNIT 3 & P1-2:A15:34: MIDWAY-TEMBLOR 115KV [2630]	P3	G-1/N-1	Low Voltage	>0.9	>0.9	>0.9	0.82	>0.9	>0.9	0.82	>0.9	N/A	Generation Redispatch
TEMBLOR 115 kV	P1-1:A15:19: KERNRDG332G3 13.80KV GEN UNIT 3 & P1-2:A15:34: MIDWAY-TEMBLOR 115KV [2630]	P3	G-1/N-1	Low Voltage	>0.9	>0.9	>0.9	0.83	>0.9	>0.9	0.83	>0.9	N/A	Generation Redispatch
MCFRLD T 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	Low Voltage	0.24	NCONV	0.22	0.98	1.00	0.96	0.98	0.83	0.76	Install redundant battery supply
CAWLOB T 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	Low Voltage	0.27	NCONV	0.24	0.94	1.02	0.96	0.94	0.76	0.66	Install redundant battery supply
CARNAT T 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	Low Voltage	0.28	NCONV	0.26	0.92	1.03	0.96	0.92	0.71	0.59	Install redundant battery supply
BSCSCH T 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	Low Voltage	0.72	1.03	0.70	0.99	1.04	1.03	0.99	0.89	0.81	Install redundant battery supply
7STNDRD 115 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.85	0.82	Install redundant battery supply
FAMOSO 115 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	Low Voltage	1.00	1.00	0.99	1.03	1.02	1.00	1.03	0.90	0.88	Install redundant battery supply
OGLE TAP 115 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.88	0.86	Install redundant battery supply
LERDO 115 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundant Battery	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	0.99	1.01	0.85	0.83	Install redundant battery supply



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
OGLE JCT 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.88	0.86	Install redundant battery supply
LRDO JCT 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.85	0.83	Install redundant battery supply
DEXZEL 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.86	0.83	Install redundant battery supply
KERN OIL 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.86	0.83	Install redundant battery supply
POSMOJCT 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.85	0.83	Install redundant battery supply
DSCVRYTP 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.86	0.83	Install redundant battery supply
RASMSNTP 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.86	0.84	Install redundant battery supply
RASMUSEN 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.86	0.84	Install redundant battery supply
DISCOVER 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.86	0.84	Install redundant battery supply
PTRL JCT 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.01	1.01	1.00	1.01	0.86	0.84	Install redundant battery supply
LIVE OAK 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.01	1.02	0.86	0.84	Install redundant battery supply
GODN_BER 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.86	0.83	Install redundant battery supply
KRNFRNTT 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.85	0.83	Install redundant battery supply
CAWELC C 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.88	0.86	Install redundant battery supply
KERNFRNT 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	0.99	1.01	0.84	0.82	Install redundant battery supply
POSO MT 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.00	1.00	0.98	1.00	0.83	0.82	Install redundant battery supply
VEDDER 115 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	NCONV	NCONV	NCONV	1.00	1.00	0.98	1.00	0.83	0.82	Install redundant battery supply
MARICOPA 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.88	1.03	0.86	1.03	1.03	1.03	1.02	0.97	N/A	Install redundant battery supply
MOCO_JCT 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.89	1.03	0.87	1.03	1.03	1.03	1.03	0.97	N/A	Install redundant battery supply
GARDNER 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.81	1.03	0.79	1.01	1.03	1.03	1.01	0.93	0.87	Install redundant battery supply
BSQL_PLD 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.72	1.03	0.70	0.99	1.04	1.03	0.99	0.89	0.81	Install redundant battery supply
GARDNR T 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.81	1.03	0.79	1.01	1.03	1.03	1.01	0.93	0.87	Install redundant battery supply
COPUS_D 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.72	1.03	0.70	0.99	1.04	1.03	0.99	0.89	0.81	Install redundant battery supply
COPUS_E 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.72	1.03	0.70	0.99	1.04	1.03	0.99	0.89	0.81	Install redundant battery supply
MRCPAWSTJCT 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.79	1.03	0.77	1.01	1.03	1.03	1.00	0.92	0.86	Install redundant battery supply
MRCPAWST 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.79	1.03	0.77	1.01	1.03	1.03	1.00	0.92	0.86	Install redundant battery supply
SAN EMDO 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.49	NCONV	0.47	0.95	1.03	1.00	0.95	0.78	0.67	Install redundant battery supply
S_KERN 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.64	NCONV	0.62	0.98	1.04	1.02	0.98	0.85	0.76	Install redundant battery supply
MAGNDN J 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	1.02	1.02	1.03	0.99	1.03	1.02	0.98	0.89	0.81	Install redundant battery supply
S_KERN_TP 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.64	NCONV	0.62	0.98	1.04	1.02	0.98	0.85	0.76	Install redundant battery supply
KRN CNYN 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	1.03	1.03	1.03	0.99	1.03	1.02	0.99	0.90	0.82	Install redundant battery supply
RIOBRVQF 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	1.02	1.02	1.03	0.99	1.03	1.02	0.99	0.90	0.82	Install redundant battery supply
FRIUITAP 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.28	NCONV	0.25	0.94	1.03	0.98	0.94	0.77	0.66	Install redundant battery supply
BAKRSFLD 70 kV	P5-2D(NBF):A15:2;_ KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.28	NCONV	0.25	0.94	1.03	0.98	0.94	0.79	0.68	Install redundant battery supply



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
EISENTP 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.27	NCONV	0.25	0.94	1.02	0.97	0.94	0.78	0.67	Install redundant battery supply
EISEN 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.27	NCONV	0.24	0.93	1.01	0.97	0.93	0.77	0.66	Install redundant battery supply
MAGUNDEN 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.28	NCONV	0.25	0.98	1.03	1.01	0.97	0.86	0.78	Install redundant battery supply
PANMJCT1 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.30	NCONV	0.28	0.92	1.03	0.97	0.92	0.72	0.60	Install redundant battery supply
OLD RIVR 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.33	NCONV	0.31	0.92	1.03	0.97	0.92	0.71	0.58	Install redundant battery supply
UNIONJCT 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.29	NCONV	0.27	0.92	1.04	0.96	0.91	0.70	0.57	Install redundant battery supply
PANAMA 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.29	NCONV	0.26	0.92	1.04	0.96	0.91	0.70	0.57	Install redundant battery supply
CARNATIO 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.28	NCONV	0.26	0.92	1.03	0.96	0.92	0.71	0.59	Install redundant battery supply
FRUITVLE 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.28	NCONV	0.26	0.93	1.03	0.97	0.92	0.73	0.61	Install redundant battery supply
PANMJCT2 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.29	NCONV	0.26	0.92	1.04	0.96	0.92	0.71	0.58	Install redundant battery supply
KERN PW1 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.28	NCONV	0.26	0.93	1.03	0.97	0.92	0.73	0.61	Install redundant battery supply
MOCO 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.89	1.03	0.87	1.03	1.03	1.03	1.02	0.97	N/A	Install redundant battery supply
CADET 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.89	1.03	0.87	1.03	1.03	1.03	1.03	0.97	N/A	Install redundant battery supply
KERN PW2 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.28	NCONV	0.26	0.93	1.03	0.97	0.92	0.73	0.61	Install redundant battery supply
KRN OLJ 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.27	NCONV	0.25	0.94	1.02	0.96	0.93	0.75	0.64	Install redundant battery supply
FAMOSO 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.25	NCONV	0.23	0.97	1.01	0.96	0.96	0.81	0.73	Install redundant battery supply
CAWELO B 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.27	NCONV	0.24	0.94	1.02	0.96	0.94	0.76	0.66	Install redundant battery supply
MC FRLND 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.23	NCONV	0.21	0.98	0.99	0.95	0.98	0.80	0.73	Install redundant battery supply
WASCO 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.98	0.97	0.97	0.98	1.01	0.97	0.98	0.86	0.80	Install redundant battery supply
OLD_RVR1_TP 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.33	NCONV	0.30	0.92	1.03	0.97	0.92	0.71	0.58	Install redundant battery supply
OLD_RVR1 70 kV	P5-2D(NBF):A15:2: KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P5	Non-Redundent Battery	Low Voltage	0.33	NCONV	0.30	0.92	1.03	0.97	0.92	0.71	0.58	Install redundant battery supply
MCFRLD T 70 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.24	NCONV	0.22	0.98	1.00	0.96	0.98	0.83	0.76	Install redundant relay
CAWLOB T 70 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.27	NCONV	0.24	0.94	1.02	0.96	0.94	0.76	0.66	Install redundant relay
CARNAT T 70 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.28	NCONV	0.26	0.92	1.03	0.96	0.92	0.71	0.59	Install redundant relay
BSCSCH T 70 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.72	1.03	0.70	0.99	1.04	1.03	0.99	0.89	0.81	Install redundant relay
75TNDRD 115 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.85	0.82	Install redundant relay
FAMOSO 115 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	1.00	1.00	0.99	1.03	1.02	1.00	1.03	0.90	0.88	Install redundant relay
OGLE TAP 115 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.88	0.86	Install redundant relay
LERDO 115 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	0.99	1.01	0.85	0.83	Install redundant relay
OGLE JCT 115 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.88	0.86	Install redundant relay
LRDO JCT 115 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.85	0.83	Install redundant relay
DEXZEL 115 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.86	0.83	Install redundant relay
KERN OIL 115 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.86	0.83	Install redundant relay
POSOMTJT 115 kV	P5-5C(DC):A15:26: KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.85	0.83	Install redundant relay

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
DSCVRYTP 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.86	0.83	Install redundant relay
RASMSNTP 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.86	0.84	Install redundant relay
RASMUSEN 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.86	0.84	Install redundant relay
DISCOVER 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.86	0.84	Install redundant relay
PTRL JCT 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.01	1.01	1.00	1.01	0.86	0.84	Install redundant relay
LIVE OAK 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.01	1.02	0.86	0.84	Install redundant relay
GODN_BER 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.86	0.83	Install redundant relay
KRNFRNTT 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	1.00	1.01	0.85	0.83	Install redundant relay
CAWELO C 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.02	1.01	1.00	1.02	0.88	0.86	Install redundant relay
KERNFRNT 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.01	1.00	0.99	1.01	0.84	0.82	Install redundant relay
POSO MT 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.00	1.00	0.98	1.00	0.83	0.82	Install redundant relay
VEDDER 115 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	1.00	1.00	0.98	1.00	0.83	0.82	Install redundant relay
MARICOPA 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.88	1.03	0.86	1.03	1.03	1.03	1.02	0.97	N/A	Install redundant relay
MOCO_JCT 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.89	1.03	0.87	1.03	1.03	1.03	1.03	0.97	N/A	Install redundant relay
GARDNER 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.81	1.03	0.79	1.01	1.03	1.03	1.01	0.93	0.87	Install redundant relay
BSCL_PLD 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.72	1.03	0.70	0.99	1.04	1.03	0.99	0.89	0.81	Install redundant relay
GARDNR T 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.81	1.03	0.79	1.01	1.03	1.03	1.01	0.93	0.87	Install redundant relay
COPUS_D 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.72	1.03	0.70	0.99	1.04	1.03	0.99	0.89	0.81	Install redundant relay
COPUS_E 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.72	1.03	0.70	0.99	1.04	1.03	0.99	0.89	0.81	Install redundant relay
MRCPAWSTJCT 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.79	1.03	0.77	1.01	1.03	1.03	1.00	0.92	0.86	Install redundant relay
MRCPAWST 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.79	1.03	0.77	1.01	1.03	1.03	1.00	0.92	0.86	Install redundant relay
SAN EMDO 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.49	NCONV	0.47	0.95	1.03	1.00	0.95	0.78	0.67	Install redundant relay
S_KERN 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.64	NCONV	0.62	0.98	1.04	1.02	0.98	0.85	0.76	Install redundant relay
MAGNDN J 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	1.02	1.02	1.03	0.99	1.03	1.02	0.98	0.89	0.81	Install redundant relay
S_KERN_TP 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.64	NCONV	0.62	0.98	1.04	1.02	0.98	0.85	0.76	Install redundant relay
KRN CNYN 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	1.03	1.03	1.03	0.99	1.03	1.02	0.99	0.90	0.82	Install redundant relay
RIORBVQF 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	1.02	1.02	1.03	0.99	1.03	1.02	0.99	0.90	0.82	Install redundant relay
FRUITTAP 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.28	NCONV	0.25	0.94	1.03	0.98	0.94	0.77	0.66	Install redundant relay
BAKRSFLD 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.28	NCONV	0.25	0.94	1.03	0.98	0.94	0.79	0.68	Install redundant relay
EISENTP 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.27	NCONV	0.25	0.94	1.02	0.97	0.94	0.78	0.67	Install redundant relay
EISEN 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.27	NCONV	0.24	0.93	1.01	0.97	0.93	0.77	0.66	Install redundant relay
MAGUNDEN 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.28	NCONV	0.25	0.98	1.03	1.01	0.97	0.86	0.78	Install redundant relay
PANMJCT1 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.30	NCONV	0.28	0.92	1.03	0.97	0.92	0.72	0.60	Install redundant relay
OLD RIVR 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.33	NCONV	0.31	0.92	1.03	0.97	0.92	0.71	0.58	Install redundant relay

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
UNIONJCT 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.29	NCONV	0.27	0.92	1.04	0.96	0.91	0.70	0.57	Install redundant relay
PANAMA 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.29	NCONV	0.26	0.92	1.04	0.96	0.91	0.70	0.57	Install redundant relay
CARNATIO 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.28	NCONV	0.26	0.92	1.03	0.96	0.92	0.71	0.59	Install redundant relay
FRUITVLE 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.28	NCONV	0.26	0.93	1.03	0.97	0.92	0.73	0.61	Install redundant relay
PANMUCT2 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.29	NCONV	0.26	0.92	1.04	0.96	0.92	0.71	0.58	Install redundant relay
KERN PW1 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.28	NCONV	0.26	0.93	1.03	0.97	0.92	0.73	0.61	Install redundant relay
MOCO 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.89	1.03	0.87	1.03	1.03	1.03	1.02	0.97	N/A	Install redundant relay
CADET 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.89	1.03	0.87	1.03	1.03	1.03	1.03	0.97	N/A	Install redundant relay
KERN PW2 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.28	NCONV	0.26	0.93	1.03	0.97	0.92	0.73	0.61	Install redundant relay
KRN OL J 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.27	NCONV	0.25	0.94	1.02	0.96	0.93	0.75	0.64	Install redundant relay
FAMOSO 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.25	NCONV	0.23	0.97	1.01	0.96	0.96	0.81	0.73	Install redundant relay
CAWEL0 B 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.27	NCONV	0.24	0.94	1.02	0.96	0.94	0.76	0.66	Install redundant relay
MC FRLND 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.23	NCONV	0.21	0.98	0.99	0.95	0.98	0.80	0.73	Install redundant relay
WASCO 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.98	0.97	0.97	0.98	1.01	0.97	0.98	0.86	0.80	Install redundant relay
OLD_RVR1_TP 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.33	NCONV	0.30	0.92	1.03	0.97	0.92	0.71	0.58	Install redundant relay
OLD_RVR1 70 kV	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	0.33	NCONV	0.30	0.92	1.03	0.97	0.92	0.71	0.58	Install redundant relay
GRMMWY T 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.82	0.99	0.72	0.82	0.57	0.51	Install redundant relay
TEJON 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.73	0.95	0.57	0.73	0.42	0.35	Install redundant relay
ORIONTP 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.78	0.98	0.66	0.77	0.49	0.43	Install redundant relay
ORION 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.78	0.98	0.66	0.77	0.49	0.43	Install redundant relay
SN BRNRD 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.75	0.96	0.60	0.74	0.45	0.38	Install redundant relay
MAGNDN J 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.92	1.02	0.86	0.91	0.76	0.71	Install redundant relay
ARVIN 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.78	0.98	0.66	0.78	0.50	0.43	Install redundant relay
WEEDPTCH 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.83	0.99	0.73	0.82	0.58	0.52	Install redundant relay
KRN CNYN 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.92	1.02	0.87	0.92	0.77	0.72	Install redundant relay
RIORBVQF 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.92	1.02	0.87	0.92	0.76	0.72	Install redundant relay
MAGUNDEN 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	1.04	1.04	1.04	0.93	1.02	0.89	0.93	0.80	0.75	Install redundant relay
GRMWY_SM 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.82	0.99	0.72	0.82	0.57	0.50	Install redundant relay
WELLFIELD 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.82	0.99	0.72	0.82	0.57	0.50	Install redundant relay
ROSE 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.72	0.95	0.56	0.72	0.41	0.34	Install redundant relay
PACI_PIP 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.71	0.94	0.55	0.70	0.40	0.33	Install redundant relay
GRAPEVNE 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.70	0.94	0.55	0.70	0.40	0.33	Install redundant relay
STALLION 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.76	0.97	0.63	0.76	0.47	0.40	Install redundant relay
TALONJ 70 kV	P5-5C(DC):A15:8:_WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.76	0.97	0.63	0.76	0.47	0.40	Install redundant relay

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
LEBEC 70 kV	P5-5C(DC):A15:8: WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.70	0.93	0.54	0.69	0.39	0.33	Install redundant relay
CASCAST 70 kV	P5-5C(DC):A15:8: WHEELER RIDGE 230-115-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Relay	Low Voltage	NCONV	NCONV	NCONV	0.70	0.94	0.54	0.69	0.40	0.33	Install redundant relay
Q1398 230 kV	P1-2:A15:104: BITTERWATRSS-WHEELER 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	>.9	>.9	0.90	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WHEELER 230 kV	P1-2:A15:104: BITTERWATRSS-WHEELER 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	>.9	>.9	0.90	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
BITTERWATRSS 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.86	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
Q1398 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.86	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
Q946 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.86	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WHEELER 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.86	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WHLR R1 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.87	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WHLR R2 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.86	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WHLR RT1 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.87	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WHLR RT2 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.86	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WND GPJ1 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.87	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WND GPJ2 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.86	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WND GPT1 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.87	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WND GPT2 230 kV	P1-2:A15:107: BITTERWATRSS-MIDWAY-D 230KV [0] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	NA	NA	0.86	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WHEELER 230 kV	P1-2:A15:23: MIDWAY-WHEELER RIDGE #1 230KV [5190] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	>.9	>.9	0.89	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WHLR R2 230 kV	P1-2:A15:23: MIDWAY-WHEELER RIDGE #1 230KV [5190] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	>.9	>.9	0.90	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WHLR RT2 230 kV	P1-2:A15:23: MIDWAY-WHEELER RIDGE #1 230KV [5190] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	>.9	>.9	0.90	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
WND GPJ2 230 kV	P1-2:A15:23: MIDWAY-WHEELER RIDGE #1 230KV [5190] & P1-4:A15:5: WHEELER SVD=V	P6	N-1-1	Low Voltage	>.9	>.9	0.89	>.9	>.9	>.9	>.9	>.9	N/A	Review Project: Wheeler Ridge Junction
ADOBESLR 115 kV	P1-2:A15:27: MIDWAY-WHEELER RIDGE #1 230KV [5190] & P1-2:A15:3: BITTERWATRSS-WHEELER 230KV [0]	P6	N-1-1	Low Voltage	>.9	>.9	>.9	0.55	>.9	>.9	0.56	>.9	N/A	Review Project: Wheeler Ridge Junction
ADOBESWSTA 115 kV	P1-2:A15:27: MIDWAY-WHEELER RIDGE #1 230KV [5190] & P1-2:A15:3: BITTERWATRSS-WHEELER 230KV [0]	P6	N-1-1	Low Voltage	>.9	>.9	>.9	0.55	>.9	>.9	0.56	>.9	N/A	Review Project: Wheeler Ridge Junction
CARRIZO 115 kV	P1-2:A15:34: MIDWAY-TEMBLOR 115KV [2630] & P1-3:A15:82: KERNRDGE32G1 13.8/115KV TB 1	P6	N-1-1	Low Voltage	>.9	>.9	>.9	0.89	>.9	>.9	0.89	>.9	N/A	Continue to Monitor
KERNRDGE 115 kV	P1-2:A15:34: MIDWAY-TEMBLOR 115KV [2630] & P1-3:A15:82: KERNRDGE32G1 13.8/115KV TB 1	P6	N-1-1	Low Voltage	>.9	>.9	>.9	0.82	>.9	>.9	0.82	>.9	N/A	Continue to Monitor
TEMBLOR 115 kV	P1-2:A15:34: MIDWAY-TEMBLOR 115KV [2630] & P1-3:A15:82: KERNRDGE32G1 13.8/115KV TB 1	P6	N-1-1	Low Voltage	>.9	>.9	>.9	0.83	>.9	>.9	0.83	>.9	N/A	Continue to Monitor
BITTERWATRSS 230 kV	P1-2:A15:4: BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7: WHEELER SVD=V	P6	N-1-1	Low Voltage	0.88	0.88	NA	>.9	>.9	>.9	>.9	0.89	N/A	Review Project: Wheeler Ridge Junction
Q1398 230 kV	P1-2:A15:4: BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7: WHEELER SVD=V	P6	N-1-1	Low Voltage	0.87	0.87	NA	>.9	>.9	>.9	>.9	0.88	N/A	Review Project: Wheeler Ridge Junction
Q946 230 kV	P1-2:A15:4: BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7: WHEELER SVD=V	P6	N-1-1	Low Voltage	0.88	0.88	NA	>.9	>.9	>.9	>.9	0.89	N/A	Review Project: Wheeler Ridge Junction
WHEELER 230 kV	P1-2:A15:4: BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7: WHEELER SVD=V	P6	N-1-1	Low Voltage	0.87	0.87	NA	>.9	>.9	>.9	>.9	0.88	N/A	Review Project: Wheeler Ridge Junction
WHLR R1 230 kV	P1-2:A15:4: BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7: WHEELER SVD=V	P6	N-1-1	Low Voltage	0.88	0.88	NA	>.9	>.9	>.9	>.9	0.89	N/A	Review Project: Wheeler Ridge Junction
WHLR R2 230 kV	P1-2:A15:4: BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7: WHEELER SVD=V	P6	N-1-1	Low Voltage	0.87	0.87	NA	>.9	>.9	>.9	>.9	0.88	N/A	Review Project: Wheeler Ridge Junction
WHLR RT1 230 kV	P1-2:A15:4: BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7: WHEELER SVD=V	P6	N-1-1	Low Voltage	0.88	0.88	NA	>.9	>.9	>.9	>.9	0.89	N/A	Review Project: Wheeler Ridge Junction
WHLR RT2 230 kV	P1-2:A15:4: BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7: WHEELER SVD=V	P6	N-1-1	Low Voltage	0.87	0.87	NA	>.9	>.9	>.9	>.9	0.88	N/A	Review Project: Wheeler Ridge Junction
WND GPJ1 230 kV	P1-2:A15:4: BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7: WHEELER SVD=V	P6	N-1-1	Low Voltage	0.88	0.88	NA	>.9	>.9	>.9	>.9	0.88	N/A	Review Project: Wheeler Ridge Junction

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
WND GPJ2 230 kV	P1-2:A15:4; BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7; WHEELER SVD=V	P6	N-1-1	Low Voltage	0.87	0.87	NA	>.9	>.9	>.9	>.9	0.88	N/A	Review Project: Wheeler Ridge Junction
WND GPT1 230 kV	P1-2:A15:4; BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7; WHEELER SVD=V	P6	N-1-1	Low Voltage	0.87	0.88	NA	>.9	>.9	>.9	>.9	0.88	N/A	Review Project: Wheeler Ridge Junction
WND GPT2 230 kV	P1-2:A15:4; BITTERWATRSS-MIDWAY-DBAAH 230KV [0] & P1-4:A15:7; WHEELER SVD=V	P6	N-1-1	Low Voltage	0.87	0.87	NA	>.9	>.9	>.9	>.9	0.88	N/A	Review Project: Wheeler Ridge Junction
WASCO 70 kV	P1-2:A15:46; OLIVE SW STA-SMYRNA 115KV [1923] & P1-2:A15:49; SEMITROPIC-MIDWAY #1 115KV [3630]	P6	N-1-1	Low Voltage	>.9	>.9	0.89	>.9	>.9	>.9	>.9	>.9	N/A	Continue to Monitor
WASCO 70 kV	P1-2:A15:49; SEMITROPIC-MIDWAY #1 115KV [3630] & P1-2:A15:46; OLIVE SW STA-SMYRNA 115KV [1923]	P6	N-1-1	Low Voltage	>.9	>.9	0.89	>.9	>.9	>.9	>.9	>.9	N/A	Continue to Monitor
WHEELER 230 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.54	1.03	1.03	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
TECUYA T 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.40	1.02	1.02	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
GRMMWY T 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.28	0.91	0.89	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
WHEELER 115 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.40	1.03	1.03	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
ADOBESWSTA 115 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.40	1.03	1.03	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
LAKEVIEW 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.41	1.04	1.03	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
WHEELER 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.41	1.04	1.04	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
TEION 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.39	1.02	1.02	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
ORIONTP 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.33	0.98	0.97	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
ORION 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.33	0.98	0.97	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
SN BRNRD 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.37	1.02	1.01	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
MAGNDN J 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.16	0.83	0.82	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
ARVIN 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.33	0.98	0.96	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
WEEDPTCH 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.29	0.91	0.90	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
KRN CNYN 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.16	0.84	0.83	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
RIORVQF 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.16	0.84	0.82	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
FRUITTAP 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	1.04	1.04	1.04	1.06	0.92	0.90	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
BAKRSFLD 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	1.04	1.04	1.04	1.08	0.89	0.87	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
EISENTP 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	1.03	1.03	1.03	1.07	0.88	0.86	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
EISEN 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	1.02	1.03	1.03	1.06	0.88	0.86	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
MAGUNDEN 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	1.04	1.04	1.04	1.14	0.83	0.81	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
GRMWY_SM 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.28	0.91	0.89	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
WELLFILD 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.28	0.91	0.89	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
3EMIDIO 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.41	1.03	1.02	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
VALPREDO 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.41	1.03	1.03	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
ROSE 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.39	1.02	1.01	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
PACI_PIP 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.38	1.01	1.00	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
TECUYA 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.40	1.02	1.02	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
GRAPEVNE 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.38	1.01	1.00	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
STALLION 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.35	1.00	0.99	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
STALIONJ 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.35	1.00	0.99	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
LEBEC 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.38	1.00	1.00	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
EMDO JCT 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.41	1.04	1.03	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
CASTAC 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.38	1.01	1.00	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
KELLEY 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.40	1.02	1.02	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
ADOBESLR 115 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.40	1.03	1.03	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
Q1397 70 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.42	1.03	1.04	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction
Q1398 230 kV	P7-1:A15:17; MIDWAY-WHEELER RIDGE #1 & #2 230 KV LINES	P7	DCTL	Low Voltage	NConv	NConv	NConv	1.54	1.03	1.03	NConv	NConv	N/A	Review Project: Wheeler Ridge Junction

Study Area: **PG&E Kern**

**Voltage Deviation**



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	
None												

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Sensitivity	
Internal fault at Bus-tie Breaker 302 at MIDWAY 115 kV Bus 1D	P2-4	Bus-Tie-Breaker	No Issue	No Issue	No Issue	No Issue	No Issue	No Issue	None
Stuck Breaker Gates CB 4512 protecting Line GATES F to MIDWAY 230 kV ckt 1	P4-2	Stuck Breaker	No Issue	No Issue	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	No Issue	Under Review with PTO
Stuck Breaker 552 protecting Tran MIDWAY 500/230 kV bk 12	P4-3	Stuck Breaker	WECC Criteria Violation	No Issue	No Issue	No Issue	No Issue	WECC Criteria Violation	Under Review with PTO
Stuck non-Bus-tie Breaker 242 protecting Substation Bus MIDWAY 230 kV Section F	P4-5	Stuck Breaker	WECC Criteria Violation	No Issue	No Issue	No Issue	No Issue	WECC Criteria Violation	Under Review with PTO
Failure of Kern 115 kV CB 142 non-redundant DC CB control circuit (with no Breaker Fail relay) for Tran KERN PWR 115 / KERN PP 230 kV bk #4 (ALL 115 kV clears remotely)	P5-3	Non-redundant DC CB control circuit	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	Under Review with PTO
Failure of non-redundant relay protecting Substation Bus Westpark 115 kV (ALL 115kV elements clear remotely)	P5-5	Non-Redundant Relay	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	Under Review with PTO
Failure of non-redundant DC battery supplying Kern Oil Sub 115kV Buses for SLG fault at Kern Oil Sub 115kV Bus Sec D (All 115 kV elements clear remotely)	P5-5	Non-Redundant Battery	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	WECC Criteria Violation	Under Review with PTO
Fault on Line HELMS-GREGG 230 kV ckt 1 with Loss of Line MustangSS-Henrietta-Gregg 230 kV ckt with RAS	P6-1	N-1-1	No Issue	No Issue	No Issue	No Issue	No Issue	No Issue	None
Fault on Line Midway*-Wheeler Ridge #1 230 kV ckt 1 with Loss of Line Midway-Wheeler Ridge 230 kV ckt 2	P7-2	DCTL	No Issue	No Issue	No Issue	No Issue	No Issue	No Issue	None



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)													Potential Mitigation Solutions	
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2032 SP with Additional Transportation Electrification		

No single contingency resulted in total load drop of more than 250 MW

Study Area: **PG&E Kern**

**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)													Potential Mitigation Solutions
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2032 SP with Additional Transportation Electrification	

No single source substation with more than 100 MW

Study Area: **Southern California Bulk**



**Thermal Overloads**

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	
24593 MW_VINCNT_21 500 24592 MW_VINCNT_22 500 2 1	P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 or #2 -AND- LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1	P6*	Overlapping singles	112.82							126.05			The P6 overloads could be mitigated by operational mitigation, such as dispatching generation, reducing import/export via Path 26, and bypassing series capacitors after initial contingency, together with existing Path 26 and PDCI RASs curtailing generation as needed.
	LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1 -AND- LP1_100134_Line MIDWAY 500.0 to WIRLWIND 500.0 Circuit 3	P6*	Overlapping singles	117.3				101.14			117.07			
	LP1_100116_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 -AND- LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1	P6*	Overlapping singles	95.17							108.77			
	LP1_100176_Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1 -AND- LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1	P6*	Overlapping singles	94.7							106.83			
	P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 or #2 -AND- LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2	P6*	Overlapping singles	109.56							122.67			
24591 MW_VINCNT_11 500 24590 MW_VINCNT_12 500 1 1	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2 -AND- LP1_100134_Line MIDWAY 500.0 to WIRLWIND 500.0 Circuit 3	P6*	Overlapping singles	115.02				99.18			114.82			
	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2 -AND- P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 or #2	P6*	Overlapping singles	108.48							121.23			
	LP1_100116_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 -AND- LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2	P6*	Overlapping singles	92.47							105.73			
24594 MW_WRLWND_32 500 29402 WIRLWIND 500 3 1	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2 -AND- LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1	P6*	Overlapping singles	153.4				138.36	104.98		152.27			
29400 ANTELOPE 500 24156 VINCENT 500 #1 or #2	LP1_100116_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 -AND- LP1_100174_Line ANTELOPE 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles	95.52							140.99			
	LP1_100131_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 -AND- LP1_100174_Line ANTELOPE 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles								110.67			
	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2 -AND- LP1_100174_Line ANTELOPE 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles								110.62			
	LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1 -AND- LP1_100174_Line ANTELOPE 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles								110.1			
	LP1_100177_Line WIRLWIND 500.0 to WINDHUB 500.0 Circuit 1 -AND- LP1_100174_Line ANTELOPE 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles								105.51			
LP1_100175_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1 -AND- LP1_100116_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3	P6*	Overlapping singles	102.54								144.12			

Study Area:

Southern California Bulk



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	
29400 ANTELOPE 500 29402 WIRLWIND 500 1 1	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 #2 or #1 -AND- LP1_100175_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1	P6*	Overlapping singles								111.1			The P6 overloads could be eliminated by operational mitigation curtailing generation in the Wirlwind and Windhub area after the first contingency as needed, and along with the planned Tehachapi cRAS to drop generation in the Tehachapi area. Since the total net amount of generation tripped by RAS for a single contingency cannot exceed 1150 MW based on the ISO planning criteria, up to about 1600 MW of generation in the Windhub area need to be curtailed after the first contingency of losing either Whirlwind - Windhub or Windhub - Antelope 500 kV line. The mitigation for the P2/P4/P5 overloads that are identified in the sensitivity case needs to coordinate with potential policy and economic transmission needs in the area.
	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2 -AND- LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1	P6*	Overlapping singles								109.54			
	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 #2 or #1 -AND- LP1_100116_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3	P6*	Overlapping singles								109.95			
	P1DC_PDCI_PDCI CONVERTER MONOPOLE #1 or #2 -AND- LP1_100175_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1	P6*	Overlapping singles								109.21			
	LP2_88102_Line MIDWAY 500.0 to WIRLWIND 500.0 Circuit 3 Line WIRLWIND 500.0 to VINCENT 500.0 Circuit 3	P2/P4	internal CB fault/stuck CB								100.8			
	L_T_P4_008_Whirlwind - Vincent 500 kV line and Whirlwind - Midway 500 kV line	P2/P4	internal CB fault/stuck CB								100.8			
	P5_d_TC_004_Midway - Whirlwind 500 kv Line (Non Redundant Trip Coil Whirlwind CB# 8012)	P5	Non-Redundant Relay								100.8			
	P5_d_TC_005_Vincent - Whirlwind 500 kv Line (Non Redundant Trip Coil Whirlwind CB# 8012)	P5	Non-Redundant Relay								100.8			
24156 VINCENT 500 29402 WIRLWIND 500 3 1	LP1_100176_Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1 -AND- LP1_100175_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1	P6*	Overlapping singles								104.25			
24156 VINCENT 500 24386 MESA CAL 500 #1	LP1_100076_Line LUGO 500.0 to VINCENT 500.0 Circuit 1 -AND- LP1_100077_Line LUGO 500.0 to VINCENT 500.0 Circuit 2	P6*	Overlapping singles								117.82			
24086 LUGO 500 24156 VINCENT 500 # or #2	LP1_100115_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 -AND- LP1_100077_Line LUGO 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles	96.93							137.47			
24156 VINCENT 500/230 kV Bank #1, #2, #3, or #4	LP1_100115_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 -AND- TP1_100219_Tran VINCENT 500.00 to VINCNT2 230.00 Circuit 4 VINCEN4T 13.80	P6*	Overlapping singles								113.25			The P6 overloads could be eliminated by dispatching available resources including energy storage and demand response (RDRR) after the first contingency. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed in the West LA basin.
	LP1_100115_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 -AND- TP1_100217_Tran VINCENT 500.00 to VINCENT 230.00 Circuit 3 0.00	P6*	Overlapping singles	98.46							117.88			
	LP1_100115_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 -AND- TP1_100216_Tran VINCENT 500.00 to VINCENT 230.00 Circuit 2 VINCEN2T 13.80	P6*	Overlapping singles	98.46							117.88			
	LP1_100115_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 -AND- TP1_100218_Tran VINCENT 500.00 to VINCNT2 230.00 Circuit 1 VINCEN1T 13.80	P6*	Overlapping singles								113.25			

Study Area:

Southern California Bulk



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE		
MESA CAL 500/230 kV Bank #3 or #4	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- TP1_100225_Tran MESA CAL 500.00 to MESACALS 230.00 #4 or #3	P6*	Overlapping singles								93.91	106.48			
24138 SERRANO 500/230 kV Bank #1, #2, or #3	TP1_100209_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 2 SERRAN2T 13.80 -AND- TP1_100210_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 3 0.00	P6*	Overlapping singles		95.08	99.58					100.76	118.16		109.75	The P6 overloads could be eliminated in the 10-year planning horizon by available resources including energy storage procured as RA and dispatchable demand response in Western LA basin and the SDG&E area after the first contingency. However, under the 2035 ATE sensitivity scenario with addition of the 2180 MW of ATE load in Western LA Basin, a reliability-driven transmission mitigation is needed for the Serrano bank overload issue, which will coordinate with the policy and economic transmission needs in the area. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed in the Western LA Basin and the SDG&E area. In addition, the load growth, gas generation retirement, and implementation of the portfolio energy storage resources in Western LA Basin and the SDG&E area need to be watched over, as they affect the timing for the need of mitigation.
	TP1_100210_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 3 0.00 -AND- TP1_100208_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 1 SERRAN1T 13.80	P6*	Overlapping singles		96.9	101.48					102.7	120.36		111.83	
	TP1_100209_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 2 SERRAN2T 13.80 -AND- TP1_100208_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 1 SERRAN1T 13.80	P6*	Overlapping singles		96.82	98.46					102.43	116.83		108.52	
24114 PARDEE 230 24115 PASTORIA 230 1 1	LP1_100101_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 -AND- LP1_100100_Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6*	Overlapping singles			95.48	127.24	143.02	102.57		138.62	137.02			The P1 and P6 overloads could be eliminated by reducing generation output from Pastoria Energy Facility
	LP1_100131_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 -AND- LP1_100100_Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6*	Overlapping singles				93.49	100.09			104.99	102.9			
24114 PARDEE 230 24217 WARNETAP 230 1 1	LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P1	Single Contingency				95.0	108.4			106.2	100.8			
	LP1_100101_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 -AND- LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6*	Overlapping singles	96.39	95.3	108.63	140.62	161.16	113.41	92.13	156.3	152.14			
	LP1_100131_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 -AND- LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6*	Overlapping singles				103.48	114.63			119.98	114.29			
	P1G_DIABLO1_Diablo Canyon PP No.1 -AND- LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6*	Overlapping singles												
24114 PARDEE 230 24403 BAILEY 230 1 1	P1G_DIABLO1_Diablo Canyon PP No.1 -AND- LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6*	Overlapping singles												
	LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 -AND- LP1_100100_Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6*	Overlapping singles			90.76	122.21	139.64	100.42		134.03	133.15			

Study Area: **Southern California Bulk**



**Thermal Overloads**

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	
24114 PARDEE 230 26098 SYLMAR220 230 #1 or #2	P1_LDWP03_Line ADELANTO 500.0 to TOLUCA 500.0 Ckt 1 -AND-LP1_100184_Line PARDEE 230.0 to SYLMAR220 230.0 #2 or #1	P6*	Overlapping singles									109.11		
24040 EL NIDO 230 24082 LCIENEGA 230 1 1	LP1_100071_Line LCIENEGA 230.0 to LA FRESA 230.0 Circuit 1	P1	Single Contingency										100.93	The available resources in the area would be inadequate to eliminate the overloads for P1/P2/P4/P5/P6/P7 contingencies on La Cienega–La Fresa and El Nido–La Cienega 230 kV lines in the 2035 SP ATE sensitivity case. The reliability concerns are local reliability concerns due to the ATE load addition in the 2035 sensitivity case and therefore need to be watched over in the next planning cycle.
	LP2_48_Line LCIENEGA 230.0 to LA FRESA 230.0 Circuit 1 svd LCIENEGA 230.00 ei	P2/P4	internal CB fault/stuck CB										100.90	
	P5_ab_TL_038_La Fresa - La Cienega No. 1 230 kv Line	P5	Non-Redundant Relay										100.90	
	P5_d_TC_098_La Cienega - La Fresa 220 kv Line (Non Redundant Trip Coil La Cienega CB# 422)	P5	Non-Redundant Relay										100.90	
	P5_d_TC_108_La Cienega - La Fresa 220 kv Line (Non Redundant Trip Coil La Fresa CB# 4042)	P5	Non-Redundant Relay										100.90	
24082 LCIENEGA 230 24074 LA FRESA 230 1 1	LP1_100049_Line EL NIDO 230.0 to LCIENEGA 230.0 Circuit 1	P1	Single Contingency										101.63	
	LP2_564_Line EL NIDO 230.0 to LCIENEGA 230.0 Circuit 1 Tran EL NIDO .00 to EL NIDO .00 Circuit 3	P2/P4	internal CB fault/stuck CB										101.91	
	LP2_563_Line EL NIDO 230.0 to LCIENEGA 230.0 Circuit 1 Tran EL NIDO .00 to EL NIDO .00 Circuit 1 svd EL NIDO	P2/P4	internal CB fault/stuck CB										101.91	
	LP2_47_Line EL NIDO 230.0 to LCIENEGA 230.0 Circuit 1 Tran LCIENEGA .00 to LCIENEGA .00 Circuit 2	P2/P4	internal CB fault/stuck CB										102.97	
	P5_d_TC_097_El Nido - La Cienega 220 kv Line (Non Redundant Trip Coil La Cienega CB# 532)	P5	Non-Redundant Relay										102.97	
	LP1_100047_Line EL NIDO 230.0 to LA FRESA 230.0 Circuit 3-AND-LP1_100048_Line EL NIDO 230.0 to LA FRESA 230.0 Circuit 4	P6*	Overlapping singles									124.51	105.51	
	LP1_100049_Line EL NIDO 230.0 to LCIENEGA 230.0 Circuit 1-AND-LP1_100066_Line LA FRESA 230.0 to HINSON 230.0 Circuit 1	P6*	Overlapping singles										100.77	
	LP1_100115_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1-AND-LP1_100049_Line EL NIDO 230.0 to LCIENEGA 230.0 Circuit 1	P6*	Overlapping singles										100.77	
	LP1_100049_Line EL NIDO 230.0 to LCIENEGA 230.0 Circuit 1-AND-LP1_100067_Line LA FRESA 230.0 to LAGUBELL 230.0 Circuit 1	P6*	Overlapping singles										100.70	
L_M_P7_0041_Line LA FRESA 230.0 to EL NIDO 230.0 Circuit 3 Line LA FRESA 230.0 to EL NIDO 230.0 Circuit 4	P7	common structure									123.90	105.72		

Study Area: **Southern California Bulk**



**Thermal Overloads**

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	
24021 CENTER 230 24393 MESACALS 230 1 1	P5_ab_BD_001_Serrano 500 kv East Bus	P5	Redundant								104.8			Dispatch available resources including energy storage and demand response in the West LA Basin after the 1st contingency. The use of storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed. The P5 overload is identified in the sensitivity case and could be mitigated by upgrading the Serrano 500 kV East bus protection, which needs further investigation.
	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100127_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2	P6*	Overlapping singles								112.28			
	LP1_100127_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2 -AND- TP1_100224_Tran MESA CAL 500.00 to MESA CAL 230.00 Circuit 2 MESA2T 13.80	P6*	Overlapping singles								106.8			
	LP1_100130_Line MESACALS 230.0 to WALNUT 230.0 Circuit 1 -AND- LP1_100127_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2	P6*	Overlapping singles								103.74			
	LP1_100044_Line DELAMO 230.0 to LAGUBELL 230.0 Circuit 1 -AND- LP1_100073_Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1	P6*	Overlapping singles								101.28			
	L_M_P7_0012_Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1 Line DELAMO 230.0 to LAGUBELL 230.0 Circuit 1	P7	common structure								100.5			
24084 LITEHIPE 230 24091 MESA CAL 230 1 1	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100081_Line MESA CAL 230.0 to REDONDO 230.0 Circuit 1	P6*	Overlapping singles								111.52			Dispatch available resources including energy storage and demand response (RDRR) in the West LA Basin after the 1st event of P6 contingency or pre-contingency for the P7 contingencies; The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed in the West LA basin.
	LP1_100067_Line LA FRESA 230.0 to LAGUBELL 230.0 Circuit 1 -AND- LP1_100081_Line MESA CAL 230.0 to REDONDO 230.0 Circuit 1	P6*	Overlapping singles								105.39			
	L_M_P7_0013_Line REDONDO 230.0 to MESA CAL 230.0 Circuit 1 Line LAGUBELL 230.0 to MESACAL 230.0 Circuit 1	P7	common structure								110.6			
	L_M_P7_0011_Line REDONDO 230.0 to MESA CAL 230.0 Circuit 1 Line LA FRESA 230.0 to LAGUBELL 230.0 Circuit 1	P7	common structure								104.6			
24393 MESACALS 230 24076 LAGUBELL 230 2 1	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100073_Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1	P6*	Overlapping singles								113.14			Dispatch available resources including energy storage and demand response (RDRR) in the West LA Basin after the 1st event of P6 contingency or pre-contingency for the P7 contingencies; The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed in the West LA basin.
	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100037_Line CENTER 230.0 to MESACALS 230.0 Circuit 1	P6*	Overlapping singles								112.72			
	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100081_Line MESA CAL 230.0 to REDONDO 230.0 Circuit 1	P6*	Overlapping singles								107.12			
	L_M_P7_0013_Line REDONDO 230.0 to MESA CAL 230.0 Circuit 1 Line LAGUBELL 230.0 to MESACAL 230.0 Circuit 1	P7	common structure								106.3			
24091 MESA CAL 230 24125 REDONDO 230 1 1	LP1_100073_Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1	P6*	Overlapping singles								104.15			
26094 SYLMAR 230 26098 SYLMAR220 230 E or F	LP2_8849_Line SYLMAR 230.0 to SYLMAR220 230.0 Circuit G Tran SYLMAR .00 to SYLMAR220 .00 F or E	P2/P4	internal CB fault/stuck CB	144.0				97.3	138.0		127.5	112.5	Upgrade the Sylmar banks E and F, and develop operation procedure to restrict power flow via Path	

Study Area: **Southern California Bulk**



**Thermal Overloads**

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	
26094 SYLMAR 230 26098 SYLMAR220 230 E or F	L_M_P4_0059_Line SYLMAR 230.0 to SYLMAR220 230.0 Circuit G Tran SYLMAR 230.0 to SYLMAR220 230.0 F or E	P2/P4	internal CB fault/stuck CB	144.0				97.3	138.0		127.5	112.5		operation procedure to restrict power flow via fault 41 for pre-contingency as an interim solution

Note (\*): P6 results are reported without System adjustment between the two single P1 events



Study Area: **Southern California Bulk**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Light Load	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE		
PISGAH 230	TP1_100202_Tran LUGO 500.00 to LUGO 230.00 Circuit 1 LUGO 1T 13.80 -AND- TP1_100203_Tran LUGO 500.00 to LUGO 230.00 Circuit 2 LUGO 2T 13.80	P6	Overlapping singles		0.88	0.79	0.80				0.84				North of Lugo CRAS tripping generation
Mohave 500 kV	LP1_100087_Line MOHAVE 500.0 to ELDORDO 500.0 Circuit 1 -AND- LP1_100080_Line LUGO 500.0 to MOHAVE 500.0 Circuit 1	P6	Overlapping singles	0.43	0.47		0.51	0.58			0.46	0.39	0.52		Exiting NVE RAS to protect its 69 kV system



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)						Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	Post Cont. Voltage Deviation % (Baseline Scenarios)						Post Cont. Voltage Deviation % (Sensitivity Scenarios)				
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Light Load	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE		B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 SP with Additional Transportation Electrification	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Light Load	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity		

No high or low voltage violation identified

Study Area: **Southern California Bulk**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity	
01_Lugo500kV_P1.3: 3PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Victorville 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
02_IV500kV_P1.3: 3PH 4 cycle fault at Imperial Valley 500kV w/ loss of Imperial Valley-North Gila 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
03_PV500kV_P1.1: 3PH 4 cycle fault at Palo Verde w/ loss of Palo Verde Unit No.1	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
04_Sant230kV_P1.1: 3PH 4 cycle fault at Santiago 230 kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
05_Eldorado230kV_P1.3: 3PH 4 cycle fault at Eldorado 230 kV w/ loss of Cima-Eldorado-Pisgah No.1 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
06_Pisgah230kV_P1.3: 3PH 4 cycle fault at Pisgah 230 kV w/ loss of Cima-Eldorado-Pisgah No.1 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
07_Lugo230kV_P1.3: 3PH 4 cycle fault at Lugo 230 kV w/ loss of Lugo-Pisgah No.2 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
08_Pisgah230kV_P1.3: 3PH 4 cycle fault at Pisgah 230 kV w/ loss of Lugo-Pisgah No.2 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
09_Vincent500kV_P1.2: 3PH 4 cycle fault at Vincent 500kV w/ loss of Vincent-Whirlwind 500kV & series cap bypass of MW_Vincent_12-	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
10_Whirlwind500kV_P1.2: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Windhub-Whirlwind 500kV & series cap bypass of	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
11_Whirlwind500kV_P1.2: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Antelope-Whirlwind 500kV & series cap bypass of	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
12_Eldorado500kV_P1.2: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Mohave 500kV & series cap bypass of Eldorado-	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
13_Eldorado500kV_P1.2: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Mohave 500kV & Lugo-Mohave 500kV line shunt	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
14_Miraloma500kV_P1.2: 3PH 4 cycle fault at Miraloma 500kV w/ loss of Miraloma-Serrano No.2 500kV & EastTS-MiraLoma 500kV line	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
15_Valley500kV_P1.2: 3PH 4 cycle fault at Valley 500kV w/ loss of Alberhill-Valley 500kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
16_RanchoVista500kV_P1.2: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Rancho Vista-Serrano 500kV w/ loss of Santiago	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
17_Serrano500kV_P1.2: 3PH 4 cycle fault at Serrano 500kV w/ loss of Mira Loma-Serrano 500kV w/ loss of Santiago Synchronous	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
18_Santiago230kV_P1.2: 3PH 4 cycle fault at Santiago 230kV w/ loss of San Onofre-Santiago No.1 230kV w/ loss of Santiago Synchronous	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
19_SanOnofre230kV_P1.2: 3PH 4 cycle fault at San Onofre 230kV w/ loss of San Onofre-Santiago No.2 230kV w/ loss of Santiago	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
20_Johanna230kV_P1.2: 3PH 4 cycle fault at Johanna 230kV w/ loss of Johanna-Santiago 230kV w/ loss of Santiago Synchronous	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
21_Ellis230kV_P1.2: 3PH 4 cycle fault at Ellis 230kV w/ loss of Ellis-Santiago 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
22_SanOnofre230kV_P1.2: 3PH 4 cycle fault at San Onofre 230kV w/ loss of San Onofre-Viejo 230kV w/ loss of Santiago Synchronous	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
23_Viejo230kV_P1.2: 3PH 4 cycle fault at Viejo 230kV w/ loss of Chino-Viejo 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
24_N.Gila500kV_P1.2: 3PH 4 cycle fault at N.Gila 500kV w/ loss of Hoodoo Wash-N.Gila 500kV w/ loss of Santiago Synchronous	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met

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Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity	
25_Valley500kV_P1.2: 3PH 4 cycle fault at Valley 500kV w/ loss of Alberhill-Valley 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
26_RanchoVista500kV_P1.2: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Rancho Vista-Serrano 500kV including loss of Devers SVCs	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
27_Serrano500kV_P1.2: 3PH 4 cycle fault at Serrano 500kV w/ loss of Mira Loma-Serrano 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
28_Devers500kV_P1.2: 3PH 4 cycle fault at Devers 230kV w/ loss of Devers-Valley No.2 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
29_Devers500kV_P1.2: 3PH 4 cycle fault at Devers 500kV w/ loss of Devers-Red Bluff No.2 500kV including loss of Devers SVCs & Cap	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
30_N.Gila500kV_P1.2: 3PH 4 cycle fault at N.Gila 500kV w/ loss of Hoodoo Wash-N.Gila 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
88_Pisgah230kV_P1.3: 3PH 4 cycle fault at Eldorado 230 kV w/ loss of Cima-Eldorado-Pisgah 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
89_Lugo230kV_P1.3: 3PH 4 cycle fault at Lugo 230 kV w/ loss of Lugo-Pisgah 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	stable	criteria met
31_Vincent500kV_P2.3_LLT: 1PH 4 cycle fault at Vincent 500kV w/ loss of Mesa-Vincent 500kV & Midway-Vincent No.2 500kV w/ series	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
32_Vincent500kV_P2.3_LLT: 1PH 4 cycle fault at Vincent 500kV w/ loss of Antelope-Vincent No.1 500kV & Lugo-Vincent No.2 500kV w/	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
33_Whirlwind500kV_P2.3_LLT: 1PH 4 cycle fault at Vincent 500kV w/ loss of Midway-Whirlwind 500kV & Vincent-Whirlwind 500kV w/	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
34_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Rancho Vista 500kV & Lugo-Vincent No.1 500kV w/ series cap	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
35_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Vincent No.2 500kV & Lugo-Victorville 500kV w/ series cap	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
36_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Mira Loma No.2 500kV & Eldorado-Lugo 500kV w/ series cap	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
37_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Mira Loma No.3 500kV & Lugo-Mohave 500kV w/ series cap	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
38_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Rancho Vista 500kV & Lugo-Vincent No.1 500kV w/ loss of	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
39_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Vincent No.2 500kV & Lugo-Victorville 500kV w/ loss of Lugo-	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
40_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Miraloma No.2 500kV & Eldorado-Lugo 500kV w/ loss of Lugo-	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
41_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Miraloma No.3 500kV & Lugo-Mohave 500kV w/ loss of	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
42_Miraloma500kV_P2.3_LLT: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mira Loma-Rancho Vista 500kV & Mira Loma-Serrano No.1	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
43_Santiago230kV_P2.3_LLT: 1PH 4 cycle fault at Santiago 230kV w/ loss of Ellis-Santiago 230kV & San Onofre-Santiago No.2 230kV & loss	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
44_Devers500kV_P2.3_LLT: 1PH 4 cycle fault at Devers 500kV w/ loss of Devers-Red Bluff No.1 500kV & Devers-Valley No.1 500kV including	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
45_MiraLoma500kV_P2.3_LLT: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mira Loma-Rancho Vista 500kV & Mira Loma-Serrano No.1	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	stable	criteria met
46_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Gould-Sylmar 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met

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Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity	
47_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.2 230 kV with stuck breaker at Sylmar followed by loss of Eagle Rock-Sylmar 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
48_Sylmar230kV_3Ph line fault on Gould-Sylmar 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
49_Sylmar230kV_3Ph line fault on Eagle Rock-Sylmar 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
50_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
51_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.2 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
52_Sylmar230kV_1-Ph fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
53_Sylmar230kV_1-Ph line fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
54_Devers500kV_3Ph line fault on Devers-Red Bluff No.1 500 kV with stuck breaker at Devers followed by loss of Devers-Valley No.1 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
58_MiraLoma230kV_3Ph line fault on Mira Loma-Walnut 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma No.2	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
59_MiraLoma230kV_3Ph line fault on Mira Loma-Olinda 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma No.3	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
60_MiraLoma230kV_3Ph line fault on Mira Loma-Rancho Vista No.1 230 kV with stuck breaker at Mira Loma followed by loss of Mira	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
61_RanchoVista230kV_3Ph line fault on Etiwanda-Rancho Vista No.1 230 kV with stuck breaker at Rancho Vista followed by loss of Mira	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
62_RanchoVista230kV_3Ph line fault on Padua-Rancho Vista No.1 230 kV with stuck breaker at Rancho Vista followed by loss of	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
63_Serrano230kV_3Ph line fault on Chino-Serrano 230 kV with stuck breaker at Serrano followed by loss of Lewis-Serrano No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
64_Serrano230kV_3Ph line fault on Lewis-Serrano No.2 230 kV with stuck breaker at Serrano followed by loss of SONGS-Serrano 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
67_Vincent230kV_3Ph line fault on Mesa-Vincent No.2 230 kV with stuck breaker at Vincent followed by loss of Santa Clara-Vincent 230	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
68_Vincent230kV_3Ph line fault on Pardee-Vincent No.1 230 kV with stuck breaker at Vincent followed by loss of Mesa-Vincent No.1 230	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
69_Whirlwind500kV_3Ph line fault on Midway-Whirlwind 500 kV with stuck breaker at Whirlwind followed by loss of Vincent-	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
70_Chino230kV_3Ph line fault on Chino-Viejo 230 kV with stuck breaker at Chino followed by loss of Chino-Serrano 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
71_Ellis230kV_3Ph line fault on Barre-Ellis No.2 230 kV with stuck breaker at Ellis followed by loss of Ellis-Santiago 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
72_Ellis230kV_3Ph line fault on Ellis-Johanna 230 kV with stuck breaker at Ellis followed by loss of Barre-Ellis No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
73_Goodrich230kV_3Ph line fault on Goodrich-Gould 230 kV with stuck breaker at Goodrich followed by loss of Goodrich-Mesa 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
74_Hinson230kV_3Ph line fault on Hinson-Lighthipe 230 kV with stuck breaker at Hinson followed by loss of Hinson-Harborgen 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
75_Olinda230kV_3Ph line fault on Olinda-Walnut 230 kV with stuck breaker at Olinda followed by loss of Mira Loma-Olinda 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met

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Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity	
76_RioHondo230kV_3Ph line fault on Mesa-Rio Hondo No.2 230 kV with stuck breaker at Rio Hondo followed by loss of Rio Hondo-	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
77_SantaClara230kV_3Ph line fault on Moorpark-Santa Clara No.1 230 kV with stuck breaker at Santa Clara followed by loss of Goleta-	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
78_SantaClara230kV_3Ph line fault on Goleta-Santa Clara No.2 230 kV with stuck breaker at Santa Clara followed by loss of Moorpark-	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
79_Santiago230kV_3Ph line fault on SONGS-Santiago No.2 230 kV with stuck breaker at Santiago followed by loss of Ellis-Santiago 230	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
80_Pardee230kV_3Ph line fault on Bailey-Pardee 230 kV with stuck breaker at Pardee followed by loss of Pardee-Vincent No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
81_Pardee230kV_3Ph line fault on Pardee-Vincent No.2 230 kV with stuck breaker at Pardee followed by loss of Pardee-Pastoria 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
82_Pardee230kV_3Ph line fault on Pardee-Santa Clara 230 kV with stuck breaker at Pardee followed by loss of Pardee-Pastoria-Warne	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
83_Pardee230kV_3Ph line fault on Moor Park-Pardee No.2 230 kV with stuck breaker at Pardee followed by loss of Pardee-Sylmar No.2	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
84_Pardee230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Pardee followed by loss of Moor Park-Pardee No.3	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
85_VillaPark230kV_3Ph line fault on Barre-Villa Park 230 kV with stuck breaker at Villa Park followed by loss of Serrano-Villa Park No.1	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
86_Lewis230kV_3Ph line fault on Barre-Lewis 230 kV with stuck breaker at Lewis followed by loss of Lewis-Serrano No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
87_Lewis230kV_3Ph line fault on Lewis-Serrano No.1 230 kV with stuck breaker at Lewis followed by loss of Lewis-Villa Park 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_001_Serrano 500 kv East Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_003_Alamitos 220 kv North Bus Sec A	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_004_Alamitos 220 kv North Bus Sec B	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_007_Barre 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_009_Center 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_011_Chevmain 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_013_Eagle Rock 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_015_Hinson 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_017_Laguna Bell 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_019_Lewis 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_021_Lighthipe 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_023_Olinda 220 kv East Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met

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Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity	
P5_ab_BD_025_Padua 220 kv East Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_027_Rancho Vista 220 kv East Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_029_Viejo 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	stable	criteria met
106_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Antelope-Whirlwind and Antelope-Vincent No.1	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
107_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Antelope-Whirlwind and Antelope-Windhub	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
108_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Antelope-Windhub and Antelope-Vincent No.1	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
109_Eldorado500kV_P6.1: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Lugo and Eldorado-Mohave	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
110_Lugo500kV_P6.1: 3PH 4 cycle fault at Lugo 500kV w/ Eldorado-Lugo and Lugo-Mohave	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
111_Devers500kV_P6.1: 3PH 4 cycle fault at Devers 500kV w/ loss of Devers-RedBluff No.1 & No.2 500 kV	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
112_Devers500kV_P6.1: 3PH 4 cycle fault at Devers 500kV w/ loss of Devers-Valley No.1 & No.2 500 kV	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
113_ECO500kV_P6.1: 3PH 4 cycle fault at ECO 500 w/ loss of ECO-Miguel & Ocotillo-Suncrest 500 kV	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
114_MiraLoma500kV_P6.1: 3PH 4 cycle fault at Mira Loma 500kV w/ loss of Mesa-Mira Loma 500kV & Mira Loma 4AA Bank	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
115_MiraLoma500kV_P6.1: 3PH 4 cycle fault at Mira Loma 500kV w/ loss of Mira Loma-Serrano No.2 & Mira Loma 4AA Bank	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
116_Mohave500kV_P6.1: 3PH 4 cycle fault at Mohave 500kV w/ loss of Eldorado-Mohave and Lugo-Mohave	P6	Overlapping singles	Diverged	Diverged	Diverged	Diverged	Diverged	Diverged	Exiting NVE RAS to protect its 69 kV system
117_RanchoVista500kV_P6.1: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Lugo-Rancho Vista & Rancho Vista-Serrano No.1	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
118_RanchoVista500kV_P6.1: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Rancho Vista 3AA & 4AA Banks	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
119_Serrano500kV_P6.1: 3PH 4 cycle fault at Serrano 500kV w/ loss of Alberhill-Serrano & Rancho Vista-Serrano No.1	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
120_Serrano500kV_P6.1: 3PH 4 cycle fault at Serrano 500kV w/ loss of Alberhill-Serrano & Mira Loma-Serrano No.2	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
121_Serrano500kV_P6.1: 3PH 4 cycle fault at Serrano 500kV w/ loss of Serrano 2AA & 3AA Banks	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
122_Midway500kV_P6.1: 3PH 4 cycle fault at Midway 500 kV w/ loss of Midway-Vincent No.1 & Midway-Whirlwind No.3 + No RAS	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
123_SONGS230kV_P6.1: 3PH 4 cycle fault at SONGS 230 kV w/ loss of SONGS-San Luis Rey No.1 & No.2 230kV	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
124_Vincent500kV_P6.1: 3PH 4 cycle fault at Vincent 500kV w/ loss of Lugo-Vincent No.1 & No.2	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
125_Whirlwind500kV_P6.1: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Midway-Whirlwind No.3 & Windhub-Whirlwind	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
126_Whirlwind500kV_P6.1: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Whirlwind-Windhub & Antelope-Whirlwind	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met

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Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity	
127_Mesa500kV_P6.1: 3PH 4 cycle fault at Mesa 500kV w/ loss of Mesa-Vincent 500kV & Mesa-Miraloma	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
200_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Windhub-Whirlwind and Antelope-Windhub	P6	Overlapping singles	stable	stable	stable	stable	stable	stable	criteria met
128_IPPDC_bipole_P7.2: SLG fault at Adelanto 500kV followed by loss of IPP Bipole Converters with North-to-South flow	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
129_PDCI_bipole_SPS_P7.2: SLG fault at Sylmar SCE followed by loss of PDCI Bipole with North-to-South flow	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
130_Center230kV_P7.1: 1PH 4 cycle fault at Center 230kV w/ loss of Alamitos-Center and Center-Del Amo	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
131_Center230kV_P7.1: 1PH 4 cycle fault at Center 230kV w/ loss of Center-Mesa and Center-Olinda	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
132_Johanna230kV_P7.1: 1PH 4 cycle fault at Johanna 230kV w/ loss of Ellis-Santiago & Ellis-Johanna	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
133_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Center-Mesa & Mesa-Walnut	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
134_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Vincent No.1 230kV & Mesa-Goodrich	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
135_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Walnut & Center-Olinda	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
136_Redondo230kV_P7.1: 1PH 4 cycle fault at Redondo 230kV w/ loss of La Fresa-Redondo No.1 & No.2	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
137_Redondo230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Redondo & Lighthipe-Redondo	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
138_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Redondo & La Fresa-Laguna Bell	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
139_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Litehipe-Mesa & Del Amo-Laguna Bell	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
140_Mesa230kV_P7.1 1PH 4 cycle fault at Mesa 230kV w/Mesa-Redondo 230 kV & Laguna Bell-Mesa No.1 230 kV	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
141_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Litehipe-Mesa & Laguna Bell-Mesa No.2	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
142_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Rio Hondo No.1 & No.2	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
143_Mesa230kV_P7.1 1PH 4 cycle fault at Mesa 230kV w/Goodrich-Gould 230 kV & Mesa-Vincent No.1 230 kV	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
144_MiraLoma500kV_P7.1: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mesa-Mira Loma 500kV & Chino-Mira Loma No.3 230kV	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
145_MiraLoma230kV_P7.1: 1PH 4 cycle fault at Mira Loma 230kV w/ loss of Mira Loma-Walnut 230kV & Mira Loma-Olinda	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
146_RanchoVista230kV_P7.1: 1PH 4 cycle fault at Rancho Vista 230kV w/ loss of Mira Loma-Rancho Vista No.1 & No.2 230kV	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
147_Santiago230kV_P7.1: 1PH 4 cycle fault at Santiago 230kV w/ loss of Ellis-Santiago & Johanna-Santiago	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
148_Serrano230kV_P7.1: 1PH 4 cycle fault at Serrano 230kV w/ loss of Serrano-Villa Park No.1 & No.2 230kV	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met
149_Viejo230kV_P7.1: 1PH 4 cycle fault at Viejo 230kV w/ loss of San Onofre-Serrano 230kV & Chino-Viejo 230kV	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met



Study Area: **Southern California Bulk**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	B6: 2032 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity	
150_Serrano230kV_P7.1: 1PH 4 cycle fault at Serrano 230kV w/ Lewis Serrano No.1 & No.2 230 kV	P7	common structure	stable	stable	stable	stable	stable	stable	criteria met

**Single Contingency Load Drop**

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Light Load	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE		

No single contingency resulted in total load drop of more than 250 MW

Study Area: **Southern California Bulk**



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)										Potential Mitigation Solutions
	B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Light Load	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	

No single source substation with more than 100 MW

Study Area:

SCE Main



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	
24593 MW_VINCNT_21 500 24592 MW_VINCNT_22 500 2 1	P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 or #2 -AND- LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1	P6*	Overlapping singles	112.71					90.17	127.72			The P6 overloads could be mitigated by operational mitigation, such as dispatching generation, reducing import/export via Path 26, and bypassing series capacitors after initial contingency, together with existing Path 26 and PDCI RASs curtailing generation as needed.
	LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1 -AND- LP1_100134_Line MIDWAY 500.0 to WIRLWIND 500.0 Circuit 3	P6*	Overlapping singles	118.79	101.92			91.22	103.45	119.63			
	LP1_100116_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 -AND- LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1	P6*	Overlapping singles	94.91						110.39			
	LP1_100176_Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1 -AND- LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1	P6*	Overlapping singles	94.12						108.68			
	P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 or #2 -AND- LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2	P6*	Overlapping singles	109.46						124.14			
24591 MW_VINCNT_11 500 24590 MW_VINCNT_12 500 1 1	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2 -AND- LP1_100134_Line MIDWAY 500.0 to WIRLWIND 500.0 Circuit 3	P6*	Overlapping singles	116.47	99.93				101.44	117.33			
	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2 -AND- P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 or #2	P6*	Overlapping singles	108.4						122.8			
	LP1_100116_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 -AND- LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2	P6*	Overlapping singles	92.23						107.32			
24594 MW_WRLWND_32 500 29402 WIRLWIND 500 3 1	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2 -AND- LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1	P6*	Overlapping singles	155.57	135.84			124.81	137.65	155.85			
29400 ANTELOPE 500 24156 VINCENT 500 #1 or #2	LP1_100116_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 -AND- LP1_100174_Line ANTELOPE 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles	95.41						139.69			
	LP1_100131_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 -AND- LP1_100174_Line ANTELOPE 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles							109.77			
	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2 -AND- LP1_100174_Line ANTELOPE 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles							109.71			
	LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1 -AND- LP1_100174_Line ANTELOPE 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles							109.18			
	LP1_100177_Line WIRLWIND 500.0 to WINDHUB 500.0 Circuit 1 -AND- LP1_100174_Line ANTELOPE 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles							104.23			
	LP1_100175_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1 -AND- LP1_100116_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3	P6*	Overlapping singles	97.14						145.56			

Study Area:

SCE Main



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE		
29400 ANTELOPE 500 29402 WIRLWIND 500 1 1	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 #2 or #1 -AND- LP1_100175_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1	P6*	Overlapping singles								112.65			The P6 overloads could be eliminated by operational mitigation curtailing generation in the Wirlwind and Windhub area after the first contingency as needed, and along with the planned Tehachapi cRAS to drop generation in the Tehachapi area. Since the total net amount of generation tripped by RAS for a single contingency cannot exceed 1150 MW based on the ISO planning criteria, up to about 1600 MW of generation in the Windhub area need to be curtailed after the first contingency of losing either Whirlwind - Windhub or Windhub - Antelope 500 kV line. The mitigation for the P2/P4/P5 overloads that are identified in the sensitivity case needs to coordinate with potential policy and economic transmission needs in the area.
	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2 -AND- LP1_100132_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1	P6*	Overlapping singles								111.5			
	LP1_100133_Line MIDWAY 500.0 to VINCENT 500.0 #2 or #1 -AND- LP1_100116_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3	P6*	Overlapping singles								111.27			
	P1DC_PDCI_PDCI CONVERTER MONOPOLE #1 or #2 -AND- LP1_100175_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1	P6*	Overlapping singles								110.62			
	LP2_88102_Line MIDWAY 500.0 to WIRLWIND 500.0 Circuit 3 Line WIRLWIND 500.0 to VINCENT 500.0 Circuit 3	P2/P4	internal CB fault/stuck CB								101.1			
	L_T_P4_008_Whirlwind - Vincent 500 kV line and Whirlwind - Midway 500 kV line	P2/P4	internal CB fault/stuck CB								101.1			
	P5_d_TC_004_Midway - Whirlwind 500 kv Line (Non Redundant Trip Coil Whirlwind CB# 8012)	P5	Non-Redundant Relay								101.1			
P5_d_TC_005_Vincent - Whirlwind 500 kv Line (Non Redundant Trip Coil Whirlwind CB# 8012)	P5	Non-Redundant Relay								101.1				
24156 VINCENT 500 29402 WIRLWIND 500 3 1	LP1_100176_Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1 -AND- LP1_100175_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1	P6*	Overlapping singles								105.14			
24156 VINCENT 500 24386 MESA CAL 500 #1	LP1_100076_Line LUGO 500.0 to VINCENT 500.0 Circuit 1 -AND- LP1_100077_Line LUGO 500.0 to VINCENT 500.0 Circuit 2	P6*	Overlapping singles								117.63			
24086 LUGO 500 24156 VINCENT 500 # or #2	LP1_100115_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 -AND- LP1_100077_Line LUGO 500.0 to VINCENT 500.0 #2 or #1	P6*	Overlapping singles	97.12							135.85			
24156 VINCENT 500/230 kV Bank #1, #2, #3, or #4	LP1_100115_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 -AND- TP1_100219_Tran VINCENT 500.00 to VINCNT2 230.00 Circuit 4 VINCEN4T 13.80	P6*	Overlapping singles								115.13			The P6 overloads could be eliminated by dispatching available resources including energy storage and demand response after the first contingency. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed in the West LA basin.
	LP1_100115_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 -AND- TP1_100217_Tran VINCENT 500.00 to VINCENT 230.00 Circuit 3 0.00	P6*	Overlapping singles	97.94							119.38			
	LP1_100115_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 -AND- TP1_100216_Tran VINCENT 500.00 to VINCENT 230.00 Circuit 2 VINCEN2T 13.80	P6*	Overlapping singles	97.94							119.38			
	LP1_100115_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 -AND- TP1_100218_Tran VINCENT 500.00 to VINCNT2 230.00 Circuit 1 VINCEN1T 13.80	P6*	Overlapping singles								115.13			

Study Area:

SCE Main



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	
MESA CAL 500/230 kV Bank #3 or #4	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- TP1_100225_Tran MESA CAL 500.00 to MESACALS 230.00 #4 or #3	P6*	Overlapping singles						98.18	106.68			
24138 SERRANO 500/230 kV Bank #1, #2, or #3	TP1_100209_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 2 SERRAN2T 13.80 -AND- TP1_100210_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 3 0.00	P6*	Overlapping singles		91.9	105			100.35	106.11		102.57	The P6 overloads could be eliminated in the 10-year planning horizon and the 2035 sensitivity case by available resources including energy storage procured as RA and dispatchable demand response in Western LA basin and the SDG&E area after the first contingency, along with OP7590 as needed in short term. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed in the Western LA Basin and the SDG&E area. In addition, the load growth, gas generation retirement, and implementation of the portfolio energy storage resources in Western LA Basin and the SDG&E area need to be watched, as they play a big role in eliminating the Serrano banks overloads
	TP1_100210_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 3 0.00 -AND- TP1_100208_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 1 SERRAN1T 13.80	P6*	Overlapping singles		93.64	107			102.28	108.13		104.52	
	TP1_100209_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 2 SERRAN2T 13.80 -AND- TP1_100208_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 1 SERRAN1T 13.80	P6*	Overlapping singles		94.04	103.81			102.01	104.98		101.40	
24114 PARDEE 230 24115 PASTORIA 230 1 1	LP1_100101_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 -AND- LP1_100100_Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6*	Overlapping singles	119.49			125.96	145.12		121.47	101.04		The P1 and P6 overloads could be eliminated by reducing generation output from Pastoria Energy Facility.
	LP1_100131_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 -AND- LP1_100100_Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6*	Overlapping singles	90.45			92.33	101.87		93.87			
24114 PARDEE 230 24217 WARNETAP 230 1 1	LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P1	Single Contingency	92.9			94.1	110.0		93.7			
	LP1_100101_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 -AND- LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6*	Overlapping singles	134.77			139.17	163.57		137.24	111.82		
	LP1_100131_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 -AND- LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6*	Overlapping singles	103.67			102.16	116.63		107.49			
	P1G_DIABLO1_Diablo Canyon PP No.1 -AND- LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6*	Overlapping singles					111.71					
	P1G_DIABLO1_Diablo Canyon PP No.1 -AND- LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6*	Overlapping singles					111.71					
24114 PARDEE 230 24403 BAILEY 230 1 1	LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 -AND- LP1_100100_Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6*	Overlapping singles	114.69			120.93	141.71		117.41	98.02		

Study Area:

SCE Main

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	
24021 CENTER 230 24393 MESACALS 230 1 1	P5_ab_BD_001_Serrano 500 kv East Bus	P5	Non-Redundant Relays							98.6			Dispatch available resources including energy storage and demand response in the West LA Basin after the 1st event of P6 contingency or pre-contingency for the P7 contingencies; The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed in the West LA basin.
	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100127_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2	P6*	Overlapping singles							109.17			
	LP1_100127_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2 -AND- TP1_100224_Tran MESA CAL 500.00 to MESA CAL 230.00 Circuit 2 MESA2T 13.80	P6*	Overlapping singles							103.82			
	LP1_100130_Line MESACALS 230.0 to WALNUT 230.0 Circuit 1 -AND- LP1_100127_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2	P6*	Overlapping singles							101.77			
	LP1_100044_Line DELAMO 230.0 to LAGUBELL 230.0 Circuit 1 -AND- LP1_100073_Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1	P6*	Overlapping singles							97.15			
	L_M_P7_0012_Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1 Line DELAMO 230.0 to LAGUBELL 230.0 Circuit 1	P7	common structure							96.4			
24082 LCIENEGA 230 24074 LA FRESA 230 1 1	LP1_100047_Line EL NIDO 230.0 to LA FRESA 230.0 Circuit 3 -AND- LP1_100048_Line EL NIDO 230.0 to LA FRESA 230.0 Circuit 4	P6*	Overlapping singles							128.89			
	L_M_P7_0041_Line LA FRESA 230.0 to EL NIDO 230.0 Circuit 3 Line LA FRESA 230.0 to EL NIDO 230.0 Circuit 4	P7	common structure							128.2			
24084 LITEHIPE 230 24091 MESA CAL 230 1 1	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100081_Line MESA CAL 230.0 to REDONDO 230.0 Circuit 1	P6*	Overlapping singles							110.91			
	LP1_100067_Line LA FRESA 230.0 to LAGUBELL 230.0 Circuit 1 -AND- LP1_100081_Line MESA CAL 230.0 to REDONDO 230.0 Circuit 1	P6*	Overlapping singles							104.74			
	L_M_P7_0013_Line REDONDO 230.0 to MESA CAL 230.0 Circuit 1 Line LAGUBELL 230.0 to MESACAL 230.0 Circuit 1	P7	common structure							109.8			
	L_M_P7_0011_Line REDONDO 230.0 to MESA CAL 230.0 Circuit 1 Line LA FRESA 230.0 to LAGUBELL 230.0 Circuit 1	P7	common structure							103.9			
24393 MESACALS 230 24076 LAGUBELL 230 2 1	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100073_Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1	P6*	Overlapping singles							112.24			
	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100037_Line CENTER 230.0 to MESACALS 230.0 Circuit 1	P6*	Overlapping singles							111.32			
	LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100081_Line MESA CAL 230.0 to REDONDO 230.0 Circuit 1	P6*	Overlapping singles							106.56			

Study Area:

SCE Main



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	
	L_M_P7_0013_Line REDONDO 230.0 to MESA CAL 230.0 Circuit 1 Line LAGUBELL 230.0 to MESACAL 230.0 Circuit 1	P7	common structure							105.6			
24091 MESA CAL 230 24125 REDONDO 230 1 1	LP1_100073_Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1 -AND- LP1_100070_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1	P6*	Overlapping singles							104.2			
26094 SYLMAR 230 26098 SYLMAR220 230 E or F	LP2_8849_Line SYLMAR 230.0 to SYLMAR220 230.0 Circuit G Tran SYLMAR .00 to SYLMAR220 .00 F or E	P2/P4	internal CB fault/stuck CB	127.0	104.2			112.1	110.4	112.5			Upgrade the Sylmar banks E and F, and develop operation procedure to restrict power flow via Path 41 for pre-contingency as an interim solution
26094 SYLMAR 230 26098 SYLMAR220 230 E or F	L_M_P4_0059_Line SYLMAR 230.0 to SYLMAR220 230.0 Circuit G Tran SYLMAR 230.0 to SYLMAR220 230.0 F or E	P2/P4	internal CB fault/stuck CB	127.0	104.2			112.1	110.4	112.5			

Note (\*): P6 results are reported without System adjustment between the two single P1 events



Study Area: **SCE Main**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Light Load	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	
PISGAH 230	TP1_100202_Tran LUGO 500.00 to LUGO 230.00 Circuit 1 LUGO 1T 13.80 -AND- TP1_100203_Tran LUGO 500.00 to LUGO 230.00 Circuit 2 LUGO 2T 13.80	P6	Overlapping singles	NConv	0.93	0.92	NConv				NConv	NConv		North of Lugo CRAS tripping generation
Mohave 500 kV	LP1_100087_Line MOHAVE 500.0 to ELDORDO 500.0 Circuit 1 -AND- LP1_100080_Line LUGO 500.0 to MOHAVE 500.0 Circuit 1	P6	Overlapping singles	0.43	0.48		0.55	0.44		0.42	0.38	0.52		Exiting NVE RAS to protect its 69 kV system

Study Area: **SCE Main**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)						Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Light Load	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	

No high or low voltage violation identified

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance				Potential Mitigation Solutions	
			Baseline Scenarios		Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	S1: 2027 SP High CEC Forecast		S3: 2024 OP Sensitivity
01_Lugo500kV_P1.3: 3PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Victorville 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
02_IV500kV_P1.3: 3PH 4 cycle fault at Imperial Valley 500kV w/ loss of Imperial Valley-North Gila 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
03_PV500kV_P1.1: 3PH 4 cycle fault at Palo Verde w/ loss of Palo Verde Unit No.1	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
04_Sant230kV_P1.1: 3PH 4 cycle fault at Santiago 230 kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
05_Eldorado230kV_P1.3: 3PH 4 cycle fault at Eldorado 230 kV w/ loss of Cima-Eldorado-Pisgah No.1 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
06_Pisgah230kV_P1.3: 3PH 4 cycle fault at Pisgah 230 kV w/ loss of Cima-Eldorado-Pisgah No.1 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
07_Lugo230kV_P1.3: 3PH 4 cycle fault at Lugo 230 kV w/ loss of Lugo-Pisgah No.2 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
08_Pisgah230kV_P1.3: 3PH 4 cycle fault at Pisgah 230 kV w/ loss of Lugo-Pisgah No.2 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
09_Vincent500kV_P1.2: 3PH 4 cycle fault at Vincent 500kV w/ loss of Vincent-Whirlwind 500kV & series cap bypass of MW_Vincent_12-	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
10_Whirlwind500kV_P1.2: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Windhub-Whirlwind 500kV & series cap bypass of	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
11_Whirlwind500kV_P1.2: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Antelope-Whirlwind 500kV & series cap bypass of	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
12_Eldorado500kV_P1.2: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Mohave 500kV & series cap bypass of Eldorado-	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
13_Eldorado500kV_P1.2: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Mohave 500kV & Lugo-Mohave 500kV line shunt	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
14_Miraloma500kV_P1.2: 3PH 4 cycle fault at Miraloma 500kV w/ loss of Miraloma-Serrano No.2 500kV & EastTS-MiraLoma 500kV line	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
15_Valley500kV_P1.2: 3PH 4 cycle fault at Valley 500kV w/ loss of Alberhill-Valley 500kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
16_RanchoVista500kV_P1.2: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Rancho Vista-Serrano 500kV w/ loss of Santiago	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
17_Serrano500kV_P1.2: 3PH 4 cycle fault at Serrano 500kV w/ loss of Mira Loma-Serrano 500kV w/ loss of Santiago Synchronous	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
18_Santiago230kV_P1.2: 3PH 4 cycle fault at Santiago 230kV w/ loss of San Onofre-Santiago No.1 230kV w/ loss of Santiago Synchronous	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
19_SanOnofre230kV_P1.2: 3PH 4 cycle fault at San Onofre 230kV w/ loss of San Onofre-Santiago No.2 230kV w/ loss of Santiago	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
20_Johanna230kV_P1.2: 3PH 4 cycle fault at Johanna 230kV w/ loss of Johanna-Santiago 230kV w/ loss of Santiago Synchronous	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
21_Ellis230kV_P1.2: 3PH 4 cycle fault at Ellis 230kV w/ loss of Ellis-Santiago 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met

Study Area:

SCE Main

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance				Potential Mitigation Solutions	
			Baseline Scenarios		Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	S1: 2027 SP High CEC Forecast		S3: 2024 OP Sensitivity
22_SanOnofre230kV_P1.2: 3PH 4 cycle fault at San Onofre 230kV w/ loss of San Onofre-Viejo 230kV w/ loss of Santiago Synchronous	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
23_Viejo230kV_P1.2: 3PH 4 cycle fault at Viejo 230kV w/ loss of Chino-Viejo 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
24_N.Gila500kV_P1.2: 3PH 4 cycle fault at N.Gila 500kV w/ loss of Hoodoo Wash-N.Gila 500kV w/ loss of Santiago Synchronous	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
25_Valley500kV_P1.2: 3PH 4 cycle fault at Valley 500kV w/ loss of Alberhill-Valley 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
26_RanchoVista500kV_P1.2: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Rancho Vista-Serrano 500kV including loss of Devers SVCs	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
27_Serrano500kV_P1.2: 3PH 4 cycle fault at Serrano 500kV w/ loss of Mira Loma-Serrano 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
28_Devers500kV_P1.2: 3PH 4 cycle fault at Devers 230kV w/ loss of Devers-Valley No.2 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
29_Devers500kV_P1.2: 3PH 4 cycle fault at Devers 500kV w/ loss of Devers-Red Bluff No.2 500kV including loss of Devers SVCs & Cap	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
30_N.Gila500kV_P1.2: 3PH 4 cycle fault at N.Gila 500kV w/ loss of Hoodoo Wash-N.Gila 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
88_Pisgah230kV_P1.3: 3PH 4 cycle fault at Eldorado 230 kV w/ loss of Cima-Eldorado-Pisgah 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
89_Lugo230kV_P1.3: 3PH 4 cycle fault at Lugo 230 kV w/ loss of Lugo-Pisgah 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
31_Vincent500kV_P2.3_LLT: 1PH 4 cycle fault at Vincent 500kV w/ loss of Mesa-Vincent 500kV & Midway-Vincent No.2 500kV w/ series	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
32_Vincent500kV_P2.3_LLT: 1PH 4 cycle fault at Vincent 500kV w/ loss of Antelope-Vincent No.1 500kV & Lugo-Vincent No.2 500kV w/	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
33_Whirlwind500kV_P2.3_LLT: 1PH 4 cycle fault at Vincent 500kV w/ loss of Midway-Whirlwind 500kV & Vincent-Whirlwind 500kV w/	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
34_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Rancho Vista 500kV & Lugo-Vincent No.1 500kV w/ series cap	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
35_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Vincent No.2 500kV & Lugo-Victorville 500kV w/ series cap	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
36_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Mira Loma No.2 500kV & Eldorado-Lugo 500kV w/ series cap	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
37_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Mira Loma No.3 500kV & Lugo-Mohave 500kV w/ series cap	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
38_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Rancho Vista 500kV & Lugo-Vincent No.1 500kV w/ loss of	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
39_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Vincent No.2 500kV & Lugo-Victorville 500kV w/ loss of Lugo-	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
40_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Miraloma No.2 500kV & Eldorado-Lugo 500kV w/ loss of Lugo-	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance				Potential Mitigation Solutions	
			Baseline Scenarios		Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	S1: 2027 SP High CEC Forecast		S3: 2024 OP Sensitivity
41_Lugo500kV_P2.3_LLT: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Miraloma No.3 500kV & Lugo-Mohave 500kV w/ loss of	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
42_Miraloma500kV_P2.3_LLT: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mira Loma-Rancho Vista 500kV & Mira Loma-Serrano No.1	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
43_Santiago230kV_P2.3_LLT: 1PH 4 cycle fault at Santiago 230kV w/ loss of Ellis-Santiago 230kV & San Onofre-Santiago No.2 230kV & loss	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
44_Devers500kV_P2.3_LLT: 1PH 4 cycle fault at Devers 500kV w/ loss of Devers-Red Bluff No.1 500kV & Devers-Valley No.1 500kV including	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
45_MiraLoma500kV_P2.3_LLT: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mira Loma-Rancho Vista 500kV & Mira Loma-Serrano No.1	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
46_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Gould-Sylmar 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
47_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.2 230 kV with stuck breaker at Sylmar followed by loss of Eagle Rock-Sylmar 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
48_Sylmar230kV_3Ph line fault on Gould-Sylmar 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
49_Sylmar230kV_3Ph line fault on Eagle Rock-Sylmar 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
50_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
51_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.2 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
52_Sylmar230kV_1-Ph fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
53_Sylmar230kV_1-Ph line fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
54_Devers500kV_3Ph line fault on Devers-Red Bluff No.1 500 kV with stuck breaker at Devers followed by loss of Devers-Valley No.1 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
58_MiraLoma230kV_3Ph line fault on Mira Loma-Walnut 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
59_MiraLoma230kV_3Ph line fault on Mira Loma-Olinda 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
60_MiraLoma230kV_3Ph line fault on Mira Loma-Rancho Vista No.1 230 kV with stuck breaker at Mira Loma followed by loss of Mira	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
61_RanchoVista230kV_3Ph line fault on Etiwanda-Rancho Vista No.1 230 kV with stuck breaker at Rancho Vista followed by loss of Mira	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
62_RanchoVista230kV_3Ph line fault on Padua-Rancho Vista No.1 230 kV with stuck breaker at Rancho Vista followed by loss of	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
63_Serrano230kV_3Ph line fault on Chino-Serrano 230 kV with stuck breaker at Serrano followed by loss of Lewis-Serrano No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
64_Serrano230kV_3Ph line fault on Lewis-Serrano No.2 230 kV with stuck breaker at Serrano followed by loss of SONGS-Serrano 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance				Potential Mitigation Solutions	
			Baseline Scenarios		Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	S1: 2027 SP High CEC Forecast		S3: 2024 OP Sensitivity
67_Vincent230kV_3Ph line fault on Mesa-Vincent No.2 230 kV with stuck breaker at Vincent followed by loss of Santa Clara-Vincent 230	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
68_Vincent230kV_3Ph line fault on Pardee-Vincent No.1 230 kV with stuck breaker at Vincent followed by loss of Mesa-Vincent No.1 230	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
69_Whirlwind500kV_3Ph line fault on Midway-Whirlwind 500 kV with stuck breaker at Whirlwind followed by loss of Vincent-	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
70_Chino230kV_3Ph line fault on Chino-Viejo 230 kV with stuck breaker at Chino followed by loss of Chino-Serrano 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
71_Ellis230kV_3Ph line fault on Barre-Ellis No.2 230 kV with stuck breaker at Ellis followed by loss of Ellis-Santiago 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
72_Ellis230kV_3Ph line fault on Ellis-Johanna 230 kV with stuck breaker at Ellis followed by loss of Barre-Ellis No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
73_Goodrich230kV_3Ph line fault on Goodrich-Gould 230 kV with stuck breaker at Goodrich followed by loss of Goodrich-Mesa 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
74_Hinson230kV_3Ph line fault on Hinson-Lighthipe 230 kV with stuck breaker at Hinson followed by loss of Hinson-Harborgen 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
75_Olinda230kV_3Ph line fault on Olinda-Walnut 230 kV with stuck breaker at Olinda followed by loss of Mira Loma-Olinda 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
76_RioHondo230kV_3Ph line fault on Mesa-Rio Hondo No.2 230 kV with stuck breaker at Rio Hondo followed by loss of Rio Hondo-	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
77_SantaClara230kV_3Ph line fault on Moorpark-Santa Clara No.1 230 kV with stuck breaker at Santa Clara followed by loss of Goleta-	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
78_SantaClara230kV_3Ph line fault on Goleta-Santa Clara No.2 230 kV with stuck breaker at Santa Clara followed by loss of Moorpark-	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
79_Santiago230kV_3Ph line fault on SONGS-Santiago No.2 230 kV with stuck breaker at Santiago followed by loss of Ellis-Santiago 230	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
80_Pardee230kV_3Ph line fault on Bailey-Pardee 230 kV with stuck breaker at Pardee followed by loss of Pardee-Vincent No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
81_Pardee230kV_3Ph line fault on Pardee-Vincent No.2 230 kV with stuck breaker at Pardee followed by loss of Pardee-Pastoria 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
82_Pardee230kV_3Ph line fault on Pardee-Santa Clara 230 kV with stuck breaker at Pardee followed by loss of Pardee-Pastoria-Warne	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
83_Pardee230kV_3Ph line fault on Moor Park-Pardee No.2 230 kV with stuck breaker at Pardee followed by loss of Pardee-Sylmar No.2	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
84_Pardee230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Pardee followed by loss of Moor Park-Pardee No.3	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
85_VillaPark230kV_3Ph line fault on Barre-Villa Park 230 kV with stuck breaker at Villa Park followed by loss of Serrano-Villa Park No.1	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
86_Lewis230kV_3Ph line fault on Barre-Lewis 230 kV with stuck breaker at Lewis followed by loss of Lewis-Serrano No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
87_Lewis230kV_3Ph line fault on Lewis-Serrano No.1 230 kV with stuck breaker at Lewis followed by loss of Lewis-Villa Park 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance				Potential Mitigation Solutions	
			Baseline Scenarios		Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	S1: 2027 SP High CEC Forecast		S3: 2024 OP Sensitivity
P5_ab_BD_001_Serrano 500 kv East Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_003_Alamitos 220 kv North Bus Sec A	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_004_Alamitos 220 kv North Bus Sec B	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_007_Barre 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_009_Center 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_011_Chevmain 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_013_Eagle Rock 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_015_Hinson 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_017_Laguna Bell 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_019_Lewis 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_021_Lighthipe 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_023_Olinda 220 kv East Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_025_Padua 220 kv East Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_027_Rancho Vista 220 kv East Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
P5_ab_BD_029_Viejo 220 kv North Bus	P5	Non-Redundant Relay	stable	stable	stable	stable	stable	criteria met
106_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Antelope-Whirlwind and Antelope-Vincent No.1	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
107_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Antelope-Whirlwind and Antelope-Windhub	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
108_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Antelope-Windhub and Antelope-Vincent No.1	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
109_Eldorado500kV_P6.1: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Lugo and Eldorado-Mohave	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
110_Lugo500kV_P6.1: 3PH 4 cycle fault at Lugo 500kV w/ Eldorado-Lugo and Lugo-Mohave	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
111_Devers500kV_P6.1: 3PH 4 cycle fault at Devers 500kV w/ loss of Devers-RedBluff No.1 & No.2 500 kV	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance				Potential Mitigation Solutions	
			Baseline Scenarios		Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	S1: 2027 SP High CEC Forecast		S3: 2024 OP Sensitivity
112_Devers500kV_P6.1: 3PH 4 cycle fault at Devers 500kV w/ loss of Devers-Valley No.1 & No.2 500 kV	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
113_ECO500kV_P6.1: 3PH 4 cycle fault at ECO 500 w/ loss of ECO-Miguel & Ocotillo-Suncrest 500 kV	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
114_MiraLoma500kV_P6.1: 3PH 4 cycle fault at Mira Loma 500kV w/ loss of Mesa-Mira Loma 500kV & Mira Loma 4AA Bank	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
115_MiraLoma500kV_P6.1: 3PH 4 cycle fault at Mira Loma 500kV w/ loss of Mira Loma-Serrano No.2 & Mira Loma 4AA Bank	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
116_Mohave500kV_P6.1: 3PH 4 cycle fault at Mohave 500kV w/ loss of Eldorado-Mohave and Lugo-Mohave	P6	Overlapping singles	Diverged	Diverged	Diverged	Diverged	Diverged	Exiting NVE RAS to protect its 69 kV system
117_RanchoVista500kV_P6.1: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Lugo-Rancho Vista & Rancho Vista-Serrano No.1	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
118_RanchoVista500kV_P6.1: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Rancho Vista 3AA & 4AA Banks	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
119_Serrano500kV_P6.1: 3PH 4 cycle fault at Serrano 500kV w/ loss of Alberhill-Serrano & Rancho Vista-Serrano No.1	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
120_Serrano500kV_P6.1: 3PH 4 cycle fault at Serrano 500kV w/ loss of Alberhill-Serrano & Mira Loma-Serrano No.2	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
121_Serrano500kV_P6.1: 3PH 4 cycle fault at Serrano 500kV w/ loss of Serrano 2AA & 3AA Banks	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
122_Midway500kV_P6.1: 3PH 4 cycle fault at Midway 500 kV w/ loss of Midway-Vincent No.1 & Midway-Whirlwind No.3 + No RAS	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
123_SONGS230kV_P6.1: 3PH 4 cycle fault at SONGS 230 kV w/ loss of SONGS-San Luis Rey No.1 & No.2 230kV	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
124_Vincent500kV_P6.1: 3PH 4 cycle fault at Vincent 500kV w/ loss of Lugo-Vincent No.1 & No.2	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
125_Whirlwind500kV_P6.1: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Midway-Whirlwind No.3 & Windhub-Whirlwind	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
126_Whirlwind500kV_P6.1: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Whirlwind-Windhub & Antelope-Whirlwind	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
127_Mesa500kV_P6.1: 3PH 4 cycle fault at Mesa 500kV w/ loss of Mesa-Vincent 500kV & Mesa-Miraloma	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
200_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Windhub-Whirlwind and Antelope-Windhub	P6	Overlapping singles	stable	stable	stable	stable	stable	criteria met
128_IPPDC_bipole_P7.2: SLG fault at Adelanto 500kV followed by loss of IPP Bipole Converters with North-to-South flow	P7	common structure	stable	stable	stable	stable	stable	criteria met
129_PDCI_bipole_SPS_P7.2: SLG fault at Sylmar SCE followed by loss of PDCI Bipole with North-to-South flow	P7	common structure	stable	stable	stable	stable	stable	criteria met
130_Center230kV_P7.1: 1PH 4 cycle fault at Center 230kV w/ loss of Alamitos-Center and Center-Del Amo	P7	common structure	stable	stable	stable	stable	stable	criteria met
131_Center230kV_P7.1: 1PH 4 cycle fault at Center 230kV w/ loss of Center-Mesa and Center-Olinda	P7	common structure	stable	stable	stable	stable	stable	criteria met



Study Area:

SCE Main

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance				Potential Mitigation Solutions	
			Baseline Scenarios		Sensitivity Scenarios			
			B4: 2024 Spring Off-Peak	B2: 2027 Summer Peak	B3: 2032 Summer Peak ATE	S1: 2027 SP High CEC Forecast		S3: 2024 OP Sensitivity
132_Johanna230kV_P7.1: 1PH 4 cycle fault at Johanna 230kV w/ loss of Ellis-Santiago & Ellis-Johanna	P7	common structure	stable	stable	stable	stable	stable	criteria met
133_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Center-Mesa & Mesa-Walnut	P7	common structure	stable	stable	stable	stable	stable	criteria met
134_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Vincent No.1 230kV & Mesa-Goodrich	P7	common structure	stable	stable	stable	stable	stable	criteria met
135_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Walnut & Center-Olinda	P7	common structure	stable	stable	stable	stable	stable	criteria met
136_Redondo230kV_P7.1: 1PH 4 cycle fault at Redondo 230kV w/ loss of La Fresa-Redondo No.1 & No.2	P7	common structure	stable	stable	stable	stable	stable	criteria met
137_Redondo230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Redondo & Lighthipe-Redondo	P7	common structure	stable	stable	stable	stable	stable	criteria met
138_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Redondo & La Fresa-Laguna Bell	P7	common structure	stable	stable	stable	stable	stable	criteria met
139_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Litehipe-Mesa & Del Amo-Laguna Bell	P7	common structure	stable	stable	stable	stable	stable	criteria met
140_Mesa230kV_P7.1 1PH 4 cycle fault at Mesa 230kV w/Mesa-Redondo 230 kV & Laguna Bell-Mesa No.1 230 kV	P7	common structure	stable	stable	stable	stable	stable	criteria met
141_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Litehipe-Mesa & Laguna Bell-Mesa No.2	P7	common structure	stable	stable	stable	stable	stable	criteria met
142_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Rio Hondo No.1 & No.2	P7	common structure	stable	stable	stable	stable	stable	criteria met
143_Mesa230kV_P7.1 1PH 4 cycle fault at Mesa 230kV w/Goodrich-Gould 230 kV & Mesa-Vincent No.1 230 kV	P7	common structure	stable	stable	stable	stable	stable	criteria met
144_MiraLoma500kV_P7.1: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mesa-Mira Loma 500kV & Chino-Mira Loma No.3 230kV	P7	common structure	stable	stable	stable	stable	stable	criteria met
145_MiraLoma230kV_P7.1: 1PH 4 cycle fault at Mira Loma 230kV w/ loss of Mira Loma-Walnut 230kV & Mira Loma-Olinda	P7	common structure	stable	stable	stable	stable	stable	criteria met
146_RanchoVista230kV_P7.1: 1PH 4 cycle fault at Rancho Vista 230kV w/ loss of Mira Loma-Rancho Vista No.1 & No.2 230kV	P7	common structure	stable	stable	stable	stable	stable	criteria met
147_Santiago230kV_P7.1: 1PH 4 cycle fault at Santiago 230kV w/ loss of Ellis-Santiago & Johanna-Santiago	P7	common structure	stable	stable	stable	stable	stable	criteria met
148_Serrano230kV_P7.1: 1PH 4 cycle fault at Serrano 230kV w/ loss of Serrano-Villa Park No.1 & No.2 230kV	P7	common structure	stable	stable	stable	stable	stable	criteria met
149_Viejo230kV_P7.1: 1PH 4 cycle fault at Viejo 230kV w/ loss of San Onofre-Serrano 230kV & Chino-Viejo 230kV	P7	common structure	stable	stable	stable	stable	stable	criteria met
150_Serrano230kV_P7.1: 1PH 4 cycle fault at Serrano 230kV w/ Lewis-Serrano No.1 & No.2 230 kV	P7	common structure	stable	stable	stable	stable	stable	criteria met

Study Area: **SCE Main**



**Single Contingency Load Drop**

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Light Load	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE		

No single contingency resulted in total load drop of more than 250 MW

Study Area: **SCE Main**



**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)										Potential Mitigation Solutions
	B1: 2024 Summer Peak	2027 Summer Peak	B3: 2032 Summer Peak ATE	B4: 2024 Spring Off-Peak	B5: 2027 Spring Off-Peak	B6: 2032 Spring Light Load	S1: 2027 SP High CEC Forecast	S2: 2024 SP Heavy Renewable & Min Gas Gen	S3: 2024 OP Sensitivity	S4: 2035 SP ATE	

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP ATE	
Lugo 500/230kV Transformer No.1	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.4	< 100	< 100	Congestion management New Lugo 500/230kV transformer No.3
	line_202857_Line COLWATER-DUNN-BAK-MNTPS-IVANPAH 115 ck 1 Tran LUGO 500 to LUGO 230 ck 2	P6	N-1-1	117.2	< 100	< 100	< 100	110.0	149.3	< 100	174.2	123.1	< 100	HDPP RAS, Mojave Desert RAS
Lugo 500/230kV Transformer No.2	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.2	< 100	< 100	Congestion management New Lugo 500/230kV transformer No.3
	line_202856_Line COLWATER-DUNN-BAK-MNTPS-IVANPAH 115 ck 1 Tran LUGO 500 to LUGO 230 ck 1	P6	N-1-1	117.3	< 100	< 100	< 100	110.6	149.3	< 100	174.3	123.2	< 100	HDPP RAS, Mojave Desert RAS
Pisgah - Lugo 230kV Line No.2	line_203403_Tran LUGO 500 to LUGO 230 ck 1 Tran LUGO 500 to LUGO 230 ck 2	P6	N-1-1	NotConv	103.6	NotConv	< 100	NotConv	NotConv	< 100	NotConv	NotConv	< 100	HDPP RAS, Mojave Desert RAS New Lugo 500/230kV transformer No.3
Eldorado - Cima - Pisgah 230kV Line No.1	line_203403_Tran LUGO 500 to LUGO 230 ck 1 Tran LUGO 500 to LUGO 230 ck 2	P6	N-1-1	NotConv	102.5	NotConv	< 100	NotConv	NotConv	< 100	NotConv	NotConv	< 100	HDPP RAS, Mojave Desert RAS New Lugo 500/230kV transformer No.3
Eldorado - Cima - Pisgah 230kV Line No.2	line_203403_Tran LUGO 500 to LUGO 230 ck 1 Tran LUGO 500 to LUGO 230 ck 2	P6	N-1-1	NotConv	102.7	NotConv	< 100	NotConv	NotConv	< 100	NotConv	NotConv	< 100	HDPP RAS, Mojave Desert RAS New Lugo 500/230kV transformer No.3
Victor - Lugo 230kV Line No.1	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	101.6	< 100	118.9	< 100	< 100	Congestion management Lugo-Victor 230kV line reconductoring
	line_200180_Line VICTOR - LUGO 230 ck 2 line VICTOR - LUGO 230 ck 3	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_4_P7-4:Line VICTOR - LUGO 230 ck 3 line VICTOR - LUGO 230 ck 4	P7	DCTL	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	Loss of any one of the remaining three Victor - Lugo 230kV lines	P1	N-1	< 100	< 100	< 100	< 100	< 100	100.7	< 100	117.7	< 100	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
Victor - Lugo 230kV Line No.2	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	101.6	< 100	118.9	< 100	< 100	Congestion management Lugo-Victor 230kV line reconductoring
	line_200112_Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 3	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_200113_Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 4	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_4_P7-4:Line VICTOR - LUGO 230 ck 3 line VICTOR - LUGO 230 ck 4	P7	DCTL	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	Loss of any one of the remaining three Victor - Lugo 230kV lines	P1	N-1	< 100	< 100	< 100	< 100	< 100	100.7	< 100	117.7	< 100	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
Victor - Lugo 230kV Line No.3	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	101.6	< 100	118.9	< 100	< 100	Congestion management Lugo-Victor 230kV line reconductoring
	line_200113_Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 4	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_200181_Line VICTOR - LUGO 230 ck 2 line VICTOR - LUGO 230 ck 4	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_5_P7-5:Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 2	P7	DCTL	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP ATE	
	Loss of any one of the remaining three Victor - Lugo 230kV lines	P1	N-1	< 100	< 100	< 100	< 100	< 100	100.7	< 100	117.7	< 100	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
Victor - Lugo 230kV Line No.4	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	101.6	< 100	118.9	< 100	< 100	Congestion management Lugo-Victor 230kV line reconductoring
	line_200112_Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 3	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_200180_Line VICTOR - LUGO 230 ck 2 line VICTOR - LUGO 230 ck 3	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_5_P7-5:Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 2	P7	DCTL	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	Loss of any one of the remaining three Victor - Lugo 230kV lines	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	100.7	< 100	117.7	< 100	< 100
Victor 230/115kV Transformer No.2	line_203398_Tran VICTOR 230/115 #3 Tran VICTOR 230/115 #4	P6	N-1-1	< 100	< 100	105.3	131.3	< 100	< 100	< 100	< 100	< 100	114.3	Utilize existing spare transformer; Limit Coolwater BESS charging
Victor 230/115kV Transformer No.3	line_203395_Tran VICTOR 230/115 #2 Tran VICTOR 230/115 #4	P6	N-1-1	< 100	< 100	104.9	130.8	< 100	< 100	< 100	< 100	< 100	114.0	Utilize existing spare transformer; Limit Coolwater BESS charging
	line_P5_BD_005_Victor 115 kV North Bus SecAB	P5.5	Non-redundant Relay	< 100	< 100	104.9	130.8	< 100	< 100	< 100	< 100	< 100	114.0	Utilize existing spare transformer; Limit Coolwater BESS charging
Victor 230/115kV Transformer No.4	line_203394_Tran VICTOR 230/115 #2 Tran VICTOR 230/115 #3	P6	N-1-1	< 100	< 100	104.9	130.8	< 100	< 100	< 100	< 100	< 100	114.0	Utilize existing spare transformer; Limit Coolwater BESS charging
Victor - Roadway 115kV Line	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.8	< 100	< 100	Congestion management Victor-Roadway 115kV line reconductoring
	line_200210_Line VICTOR - KRAMER 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 1	P6	N-1-1	< 100	< 100	< 100	100.9	< 100	< 100	< 100	136.3	< 100	< 100	Limit BESS charging following first contingency under off peak scenario Generation redispatch after the first contingency
	line_6_P7-6:Line KRAMER - VICTOR 230.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P7	DCTL	NotConv	NotConv	< 100	NotConv	136.6	157.0	162.9	NotConv	113.1	< 100	Mojave Desert RAS; Limit BESS charging under off peak scenario
	Kramer - Victor No. 1 or No.2 230 kV Line	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	113.4	< 100	< 100	North of Lugo CRAS Line reconductoring
Victor - Kramer 115kV Line	line_200277:Line VICTOR - ROADWAY 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	129.2	< 100	< 100	Generation redispatch following the first contingency
	line_6_P7-6:Line KRAMER - VICTOR 230.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P7	DCTL	NotConv	NotConv	< 100	NotConv	159.8	168.8	165.6	NotConv	129.9	< 100	Mojave Desert RAS; Limit BESS charging under off peak scenario
Roadway - Kramer 115kV Line	line_200210_Line VICTOR - KRAMER 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.8	< 100	< 100	Generation redispatch after the first contingency
	line_200306_Line VICTOR - ROADWAY 115.0 ck 1 line CAL GEN - INYOKERN 115 ck 1	P6	N-1-1	< 100	< 100	< 100	102.8	< 100	< 100	< 100	< 100	< 100	< 100	Limit BESS charging
	line_6_P7-6:Line KRAMER - VICTOR 230.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P7	DCTL	NotConv	NotConv	< 100	NotConv	161.3	169.0	163.3	NotConv	130.4	< 100	Mojave Desert RAS; Limit BESS charging under off peak scenario
Ivanpah - Mountain Pass 115kV Line	line_202021_Line IVANPAH - ELDORDO2 230.0 ck 1 Line PRIMM - IVANPAH 230.0 ck 1	P6	N-1-1	NotConv	125.4	< 100	< 100	NotConv	NotConv	125.4	NotConv	< 100	< 100	Ivanpah RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP ATE	
Kramer - Victor 230kV Line No.1	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	< 100	< 100	124.1	< 100	< 100	Congestion management Kramer-Victor 230kV Line reconductoring
	Line VICTOR - ROADWAY 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P6	N-1-1	122.3	114.6	< 100	NotConv	106.0	115.5	111.9	199.9	< 100	< 100	Generation redispatch following the first contingency
	Line ROADWAY - KRAMER 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P6	N-1-1	109.5	105.2	< 100	< 100	103.2	108.1	102.9	181.0	< 100	< 100	Generation redispatch following the first contingency
	Kramer - Victor No. 2 230 kV Line	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	161.0	< 100	< 100	North of Lugo CRAS
Kramer - Victor 230kV Line No.2	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	< 100	< 100	124.1	< 100	< 100	Congestion management Kramer-Victor 230kV Line reconductoring
	line_200276_Line VICTOR - ROADWAY 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 1	P6	N-1-1	122.3	114.6	< 100	NotConv	106.0	115.5	111.9	199.9	< 100	< 100	Generation redispatch following the first contingency
	Kramer - Victor No. 1 230 kV Line	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	161.0	< 100	< 100	North of Lugo CRAS
Kramer - Coolwater 230kV Line No.2	line_100009_Line SANDLOT - KRAMER 230.0 ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	138.0	< 100	< 100	North of Lugo CRAS
Kramer 230/115kV Transformer No.1	line_202559_Line KRAMER - VICTOR 230.0 ck 1 Tran KRAMER 230/115 #2	P6	N-1-1	< 100	115.5	< 100	< 100	< 100	< 100	119.8	100.5	< 100	< 100	Generation redispatch following the first contingency
	line_6_P7-6:Line KRAMER - VICTOR 230.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P7	DCTL	NotConv	NotConv	< 100	NotConv	111.2	113.7	193.8	NotConv	< 100	< 100	Mojave Desert RAS; Limit BESS charging under off peak scenario
Kramer 230/115kV Transformer No.2	line_202558_Line KRAMER - VICTOR 230.0 ck 1 Tran KRAMER 230/115 #1	P6	N-1-1	< 100	115.5	< 100	< 100	< 100	< 100	119.8	100.5	< 100	< 100	Generation redispatch following the first contingency
	line_6_P7-6:Line KRAMER - VICTOR 230.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P7	DCTL	NotConv	NotConv	< 100	NotConv	111.2	113.7	193.8	NotConv	< 100	< 100	Mojave Desert RAS; Limit BESS charging under off peak scenario
Coolwater-Baker-Dunnsiding-Mountain Pass 115kV Line	line_202021_Line IVANPAH - ELDORDO2 230.0 ck 1 Line PRIMM - IVANPAH 230.0 ck 1	P6	N-1-1	NotConv	118.6	< 100	< 100	NotConv	NotConv	118.3	NotConv	< 100	< 100	Ivanpah RAS
Sandlot-Kramer 230kV Line	line_120011_P2_KRAMER 230 kV: CAP #2 KRAMER-COLWATER 230 kV	P2	Bus	< 100	< 100	< 100	< 100	< 100	< 100	< 100	131.6	< 100	< 100	North of Lugo CRAS
	line_130009_P2L_KRAMER 230 kV: Shunt Cap CAP #2 KRAMER-COLWATER 230 kV	P2	Bus+Long Lead Time	< 100	< 100	< 100	< 100	< 100	< 100	< 100	133.4	< 100	< 100	North of Lugo CRAS
	line_200279_Line VICTOR - ROADWAY 115.0 ck 1 Line KRAMER - COLWATER 230.0 ck 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	131.9	< 100	< 100	North of Lugo CRAS
Control - Inyokern 115kV	P5_TC_Control-Inyo_W bus breaker	P5	Non-redundant Trip Coil	< 100	< 100	< 100	110.6	121.7	124.1	< 100	< 100	110.9	< 100	Install redundant trip coil
	P5_TC_Control-Inyo_E bus breaker	P5	Non-redundant Trip Coil	< 100	< 100	< 100	110.1	120.9	123.2	< 100	< 100	110.7	< 100	Install redundant trip coil
Control-Coso-Inyokern 115kV Line	line_202706_Line CONTROL - INYOKERN 115.0 ck 1 Tran INYO 115/INYO PS 115 #1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	101.6	< 100	< 100	< 100	< 100	Operating Procedure 7690 would redispatch generation
	line_120002_P2_Control EAST BUS: INYO PHASE SHIFTER (CONTROL-INYO) CONTROL-CASA DIABLO 115 kV CONTROL-COSO-INYOKREN CONTROL	P2	Bus	< 100	< 100	< 100	< 100	120.9	123.2	< 100	< 100	< 100	< 100	Bishop RAS Reduce generation at Oxbow B or Casa Diablo

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP ATE	
Inyokern - Control 115kV Line	line_130002_P2L_KRAMER 230 kV Shunt Control EAST BUS: INYO PHASE SHIFTER (CONTROL-INYO) CONTROL-CASA DIABLO 115 kV CONTROL-CO	P2	Bus+Long Lead Time	< 100	< 100	< 100	< 100	120.9	123.1	< 100	< 100	< 100	< 100	Bishop RAS Reduce generation at Oxbow B or Casa Diablo
	line_202946_Line CONTROL - TAP710 115.0 ck 1 Tran INYO 115/INYO PS 115 #1	P6	N-1-1	< 100	< 100	< 100	110.6	119.8	122.5	< 100	< 100	111.3	< 100	Bishop RAS Reduce generation at Oxbow B or Casa Diablo
System	DC_Victor230	P5	Non-redundant DC Supply	NotConv	NotConv	NotConv	NotConv	NotConv	NotConv	NotConv	NotConv	NotConv	NotConv	Install redundant DC
System	DC_Control115	P5	Non-redundant DC Supply	NotConv	NotConv	< 100	< 100	< 100	< 100	< 100	NotConv	< 100	< 100	Install redundant DC
Kramer-Victor 230kV No.1 and No.2	DC_Kramer115	P5	Non-redundant DC Supply	< 100	< 100	< 100	< 100	NotConv	NotConv	< 100	104.2	NotConv	< 100	Install redundant DC
Kramer-Victor 230kV No.1 and No.2	DC_Victor115	P5	Non-redundant DC Supply	< 100	< 100	< 100	< 100	< 100	< 100	< 100	121.2	< 100	< 100	Install redundant DC



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP ATE	
COLWATER - DUNNSIDE - BAKER - TORTILLA - TIEFORT 115 kV	line_200657_Line KRAMER - COLWATER 115.0 ck 1 Line KRAMER - TORTILLA 115.0 ck 1	P6	N-1-1	0.70	0.65	0.9 < V < 1.05	0.63	0.9 < V < 1.05	0.9 < V < 1.05	0.54	0.9 < V < 1.05	1.47	0.9 < V < 1.05	Short-term: OP-127 redialize system Long-term: New 230/115kV transformer at Coolwater
	line_200661_Line KRAMER - COLWATER 115.0 ck 1 line COLWATER-SEG2-TORTILLA 115 ck 1	P6	N-1-1	0.74	0.74	0.9 < V < 1.05	0.84	0.9 < V < 1.05	0.9 < V < 1.05	0.74	0.78	0.9 < V < 1.05	0.9 < V < 1.05	Short-term: OP-127 redialize system Long-term: New 230/115kV transformer at Coolwater
	line_300001_P5_Cool Water 115 kV WEST BUS	P5	Non-redundant Relay	0.64	0.73	0.9 < V < 1.05	0.84	0.9 < V < 1.05	0.9 < V < 1.05	0.64	0.72	0.9 < V < 1.05	0.9 < V < 1.05	Short-term: OP-127 redialize system Long-term: New 230/115kV transformer at Coolwater
	line_P5_BD_003_Kramer 115 kv East Bus	P5	Non-redundant Relay	0.74	0.59	0.9 < V < 1.05	0.67	0.9 < V < 1.05	0.9 < V < 1.05	0.63	0.9 < V < 1.1	0.9 < V < 1.05	0.9 < V < 1.05	Short-term: OP-127 redialize system Long-term: New 230/115kV transformer at Coolwater
IVANPAH 230kV, IVANPAH-MTN PASS-BAKER-DUNNSIDE-BAKER-COLWATER 115 kV	line_202021_Line IVANPAH - ELDORDO2 230.0 ck 1 Line PRIMM - IVANPAH 230.0 ck 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.81	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	1.13	0.9 < V < 1.1	Ivanpah RAS
	line_202022_Line IVANPAH - ELDORDO2 230.0 ck 1 Line PRIMM - ELDORDO2 230.0 ck 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	1.20	1.43	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	1.48	0.9 < V < 1.1	
INYOKERN, SEARLES, DOWNS, COSO 115 kV	line_201323_Line INYOKERN - KRAMER 115.0 ck 1 line CAL GEN - INYOKERN 115 ck 1	P6	N-1-1	0.85	0.86	0.77	0.89	0.9 < V < 1.05	0.89	0.85	0.86	0.9 < V < 1.05	0.76	Install shunt capacitors
	Base case	P0	Base case	0.95 < V < 1.05	0.95 < V < 1.05	0.92	0.95 < V < 1.05	0.95 < V < 1.05	0.95 < V < 1.05	0.95 < V < 1.05	0.95 < V < 1.05	0.95 < V < 1.05	0.91	
CONTROL, INYO 115kV	Base case	P0	Base case	0.99	1.00	0.98	1.00	1.00	0.99	1.00	0.99	1.01	0.98	Monitor voltage profile
	line_201310_Line INYOKERN - KRAMER 115.0 ck 1 Line TAP701 - KRAMER 115.0 ck 1	P6	N-1-1	0.996 < V < 1.052	0.996 < V < 1.052	0.90	0.996 < V < 1.052	0.996 < V < 1.052	0.996 < V < 1.052	0.996 < V < 1.052	0.92	0.996 < V < 1.052	0.90	Monitor voltage profile
	line_201252_Line CSA DIAB - CONTROL 115.0 ck 1 line TAP704 - CONTROL 115 ck 1	P6	N-1-1	1.08	1.08	0.996 < V < 1.052	1.10	1.10	1.09	1.08	1.08	0.996 < V < 1.052	0.996 < V < 1.052	Install shunt reactor at Control



Study Area: SCE North of Lugo

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)						Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		2035 SP ATE

No P1 or P3 contingencies resulted in voltage deviation greater than 8%

Study Area:

SCE North of Lugo

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance				
			Baseline Scenarios			Sensitivity Scenarios	
			2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Sensitivity
Control-Casa Diablo 1150kV (1PH fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Casa Diablo 1150kV (1PH fault at Casa Diablo)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Coso-Inyokern 115kV (1PH fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Coso-Inyokern 115kV (1PH fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Inyokern (Fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Inyokern (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Inyo 115kV (Fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Inyokern-Downs 115kV (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Inyokern-Searles 15kV (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Roadway 115kV (Fault at Kramer)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Roadway 115kV (Fault at Roadway)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Victor 115kV (Fault at Kramer)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Victor 115kV (Fault at Victor)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control 115/55kV Transforemer Banks	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer 230/115kV Transformer Banks	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Lugo 500/230kV Transformer Banks no RAS	P6	Normal clearing	Unstable	Unstable	Stable/WECC criteria met	WECC criteria not met	Unstable
Lugo 500/230kV Transformer Banks RAS	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Inyokern-Randsburg Nos.1 & 3 115kV	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Unstable	Stable/WECC criteria met	Unstable
Coolwater-Kramer & Coolwater-SEGS-Tortilla 115kV (Fault at Coolwater)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Coolwater-Kramer & Coolwater-SEGS-Tortilla 115kV_OP (Fault at Coolwater)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Coolwater-Kramer & Kramer-Tortilla 115kV (Fault at Kramer)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Coolwater-Kramer & Kramer-Tortilla 115kV_OP (Fault at Kramer)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Victor 230kV Nos.1 & 2 no RAS	P7	Normal clearing	Unstable	Unstable	Unstable	Unstable	Stable/WECC criteria met
Kramer-Victor 230kV Nos.1 & 2 RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Lugo-Victor 230kV Nos.1 & 2 no RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Lugo-Victor 230kV Nos.1 & 2 RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Coso-Inyokern & Control-Inyokern 115kV no RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Coso-Inyokern & Control-Inyokern 115kV RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Victor & Roadway-Victor 115kV	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Victor & Kramer-Roadway 115kV	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Cool Water 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Unstable	Stable/WECC criteria met	Unstable
Tortilla 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Victor 115kV North Bus SecAB	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control 55kV Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Inyokern 115kV Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TL_BLM-Kramer 230kV (fault at BLM)	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TL_BLM-Kramer 230kV (fault at Kramer)	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TL_LUZ-Kramer 230kV (fault at LUZ)	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met



Study Area:

SCE North of Lugo

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance				
			Baseline Scenarios			Sensitivity Scenarios	
			2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Sensitivity
TC_Kramer_Kramer-Victor 115kV No.1	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TC_Tortilla_Tortilla-SEGS-Coolwater 115kV	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TC_Tortilla_Tortilla-Kramer 115kV	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TC_Victor_Victor-Kramer 115kV No.1	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TC_Victor_Victor-Roadway 115kV	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
DC_Kramer 230	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Sandlot 230	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Victor 230	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Control 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Coolwater 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Inyokem 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Kramer 115	P5	Non-Redundant Relay	Unstable	Diverge	Unstable	Diverge	Diverge
DC_Tortilla 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Victor 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge

Potential Mitigation Solutions
No Issues
No Issues
No Issues
No Issues
No Issues
No Issues
No Issues
No Issues
No Issues
No Issues
No Issues
No Issues
No Issues
No Issues
No Issues
No Issues
HDPP RAS, Mojave Desert RAS
No Issues
OP 7690
No Issues
No Issues
No Issues
No Issues
Mojave Desert RAS;
No Issues
No Issues
No Issues
No Issues
No Issues
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No Issues
No Issues
No Issues
No Issues
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No Issues
OP 7690
No Issues
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Potential Mitigation Solutions
No Issues
No Issues
No Issues
No Issues
No Issues
Install Redundant DC
Install Redundant DC
Install Redundant DC
Install Redundant DC
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Install Redundant DC
Install Redundant DC
Install Redundant DC
Install Redundant DC
Install Redundant DC

Study Area: **SCE North of Lugo**



**Single Contingency Load Drop**

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP ATE		

No single contingency resulted in total load drop of more than 250 MW



Study Area: **SCE North of Lugo**



**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)									Potential Mitigation Solutions	
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity		2035 SP ATE

No single source substation with more than 100 MW

Study Area: SCE Eastern area

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP with Forecasted Load Addition	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Heavy Renewable & Min Gas Gen	2035 SP with Additional Transportation Electrification	
J.HINDS - MIRAGE 230 kV #1	CAMINO - GENE - IRON MTN - MEAD 230 KV (4 terminal line)	P1	N-1	<100	<100	<100	107.1	<100	<100	<100	<100	<100	Blythe RAS
	JHINDMWD - EAGLEMTN 230 kV	P1	N-1	135.4	<100	136.4	140.0	<100	<100	<100	<100	<100	Blythe RAS
	CBs-J.HindsMWD   J.HindMWD portion & EagleMTN-J.Hinds Jh & Eagle Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	135.4	<100	136.4	140.0	<100	<100	<100	<100	138	Blythe RAS
	CBs-EagleMTN   loss EagleMTN sub. Jh & Eagle Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	114.1	<100	114.7	140.0	<100	<100	<100	<100	116	Blythe RAS
	CB405 EagleMTN   loss EagleMTN sub and J.Hind MWD portion Jh & Eagle Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	135.2	<100	136.2	140.0	<100	<100	<100	<100	138	Blythe RAS
	CB407 EagleMTN   loss EagleMTN sub and EagleMT-IronMTN Jh & Eagle Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	114.0	<100	114.6	140.0	<100	<100	<100	<100	116	Blythe RAS
	CB307 Eagle   Iron-Camino-Gen-Mead 230KV-loss Iron Jh Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	<100	<100	<100	107.7	<100	<100	<100	<100	<100	Blythe RAS
	CB405 Eagle   Iron-Camino-Gen-Mead 230KV-loss Iron Eagle Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	<100	<100	<100	107.7	<100	<100	<100	<100	<100	Blythe RAS
	CB208 Iron   Camino-Gen-Mead-Parker 230KV-loss Gene Jh Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	<100	<100	<100	107.1	<100	<100	<100	<100	<100	Blythe RAS
	CB208 Iron   Camino-Gen-Mead-Parker 230KV-loss Gene Eagle Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	<100	<100	<100	107.1	<100	<100	<100	<100	<100	Blythe RAS
	CB405-EagleMT   Line JHINDMWD - EAGLEMTN 230 kV Jh Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	114.2	<100	114.9	140.0	<100	<100	<100	<100	116	Blythe RAS
	CB405-EagleMT   Line JHINDMWD - EAGLEMTN 230 kV Eagle Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	114.2	<100	114.9	140.0	<100	<100	<100	<100	116	Blythe RAS
	CB407-EagleMT   Line EAGLEMTN - IRON MTN 230 kV Jh Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	<100	<100	<100	108	<100	<100	<100	<100	<100	Blythe RAS
	CB407-EagleMT   Line EAGLEMTN - IRON MTN 230 kV Eagle Shunt Reactor (P2 with long lead time equipment loss)	P2	Bus-Tie Breaker	<100	<100	<100	108	<100	<100	<100	<100	<100	Blythe RAS
J.HINDS MWD - EAGLE MTN 230 kV #1	J.HINDS - MIRAGE 230 kV and BLYTHESC - EAGLEMTN 161 kV	P6	N-1-1	122	<100	120	<100	<100	<100	<100	<100	121	Curtail Blythe area generation after the first contingency
	DEVERS - MIRAGE 230 kV #1 and DEVERS - MIRAGE 230 kV #2	P7	DCTL	111	<100	181	153	127	<100	<100	<100	<100	Blythe RAS, Path 42 RAS
	J.HINDS - MIRAGE 230 kV	P1	N-1	116	<100	116	148	<100	<100	<100	<100	116	Blythe RAS
J.HIND MWD - J.HINDS 230 kV #1	DEVERS - MIRAGE 230 kV #1 and DEVERS - MIRAGE 230 kV #2	P7	DCTL	133	<100	205	153	127	<100	<100	<100	105	Blythe RAS, Path 42 RAS
	J.HINDS - MIRAGE 230 kV	P1	N-1	138	<100	138	148	<100	<100	<100	<100	138	Blythe RAS
RED BLUFF 500/230/13.8 kV #1	RED BLUFF 500/230/13.8 kV #2	P1	N-1	<100	<100	<100	<100	<100	<100	134	<100	<100	Colorado River CRAS
RED BLUFF 500/230/13.8 kV #2	RED BLUFF 500/230/13.8 kV #1	P1	N-1	<100	<100	<100	<100	<100	<100	134	<100	<100	Colorado River CRAS
COL. RIVER 500/230/13.8 kV #1	COLRIVER 500/230/13.8 kV #2	P1	N-1	123	118	<100	<100	<100	118	143	<100	<100	Colorado River CRAS
COL. RIVER 500/230/13.8 kV #2	COLRIVER 500/230/13.8 kV #1	P1	N-1	123	118	<100	<100	<100	118	143	<100	<100	Colorado River CRAS
EAGLE MTN - IRON MTN 230 kV #1	J.HINDS - MIRAGE 230 kV and BLYTHESC - EAGLEMTN 161 kV	P6	N-1-1	141	<100	139	<100	<100	<100	<100	<100	139	Curtail Blythe area generation after the first contingency
	DEVERS - MIRAGE 230 kV #1 and DEVERS - MIRAGE 230 kV #2	P7	DCTL	<100	<100	154	158	136	<100	<100	<100	<100	Blythe RAS, Path 42 RAS
	J.HINDS - MIRAGE 230 kV	P1	N-1	<100	<100	<100	141	<100	<100	<100	<100	<100	Blythe RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP with Forecasted Load Addition	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Heavy Renewable & Min Gas Gen	2035 SP with Additional Transportation Electrification	
IRON MTN - CAMINO 230kV	J.HINDS - MIRAGE 230 kV and BLYTHESC - EAGLEMTN 161 kV	P6	N-1-1	107	<100	104	<100	<100	<100	<100	<100	105	Curtail Blythe area generation after the first contingency
	DEVERS - MIRAGE 230 kV #1 and DEVERS - MIRAGE 230 kV #2	P7	DCTL	<100	<100	<100	130	<100	<100	<100	<100	<100	Blythe RAS, Path 42 RAS
	J.HINDS - MIRAGE 230 kV	P1	N-1	<100	<100	<100	116	<100	<100	<100	<100	<100	Blythe RAS
VEGA_3_SS - NILAND 161kV	RAMON - MIRAGE #1 and CVSUB - MIRAGE 230kV #1	P6	N-1-1	106	<100	<100	<100	<100	<100	<100	110	<100	Path 42 RAS
RAMON - MIRAGE 230 kV # 2	RAMON - MIRAGE 230kV and CVSUB - RAMON 230kV	P6	N-1-1	<100	<100	132	<100	117	<100	<100	<100	163	Curtail IID area generation after the first contingency



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP with Forecasted Load Addition	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Heavy Renewable & Min Gas Gen	2035 SP with Additional Transportation Electrification	
EAGLEMTN	DEVERS - MIRAGE 230 kV #1 and DEVERS - MIRAGE 230 kV #2	P6	N-1-1	Low Voltage	>0.90	>0.90	0.83	>0.90	0.86	>0.90	>0.90	>0.90	>0.90	Curtail Blythe area generation after the first contingency
RAMON	RAMON - MIRAGE 230kV and CVSUB - RAMON 230kV	P6	N-1-1	High Voltage	1.16	<1.10	<1.10	1.43	<1.10	<1.10	1.15	1.43	<1.10	Switching off shunt capacitor at Vega substation
EAGLEMTN	J.HINDS - MIRAGE 230 kV and EAGLEMTN-IRON MTN 230 kV	P6	N-1-1	High Voltage	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.22	<1.10	Switching on shunt reactor at Eagle Mtn. substation

2022-2023 ISO Reliability Assessment - Preliminary Study Results

Study Area: SCE Eastern area

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP with Forecasted Load Addition	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Heavy Renewable & Min Gas Gen	2035 SP with Additional Transportation Electrification	

NO issues found

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Heavy Renewable & Min Gas Gen*	
EagleMTN-BlytheSCE 161 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-BlytheSCE 161 kV & Blythe 1CT	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV & Blythe 1CT trip (RAS)	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV	P1	N-1	No Issues	No Issues	Unstable	No Issues	No Issues	Blythe RAS
Julian Hinds-Mirage 230 kV & Blythe 1CT trip (RAS)	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Palo Verde 500 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Palo Verde 500 kV, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River - Red Bluff 500 kV #1	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River - Red Bluff 500 kV #1, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #1	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #1, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Valley 500 kV #1	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Valley 500 kV #1, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Valley-Serrano/Alberhill 500 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Valley-Serrano/Alberhill 500 kV, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers 500/230 AA #2	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers 500/230 AA #2, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds Bus tie CB fault, loss Julian Hinds	P2.4	Bus-Tie-Breaker	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers Middle CB fault, loss of Devers - Red Bluff 500 kV #1 and Devers-Valley 500 kV #1, no Devers SVC	P2.3	Non-Bus-Tie Breaker	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers Middle CB fault, loss of Devers - Red Bluff 500 kV #2 and Devers 1AA Bank, no Devers SVC	P2.3	Non-Bus-Tie Breaker	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 872 stuck at BlytheSCE	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 872 stuck at BlytheSCE & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 70 stuck at EagleMTN	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 70 stuck at EagleMTN & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, CB 407 stuck at EagleMTN	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, CB 407 stuck at EagleMTN & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, CB 307 stuck (close to Iron)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV, CB 405 stuck at EagleMTN	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV, CB 405 stuck at EagleMTN & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV, Stuck CB 509 at J.Hinds	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN 230/161 kV Transformer #5, Stuck CB432 at EagleMTN	P4.3	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN 230/161 kV Transformer #5, Stuck CB432 at EagleMTN & Blythe 1CT trip (RAS)	P4.3	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Valley-Serrano/Alberhill 500 kV with stuck breaker followed by Valley 4AA Bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #1 with stuck breaker followed by Devers-Valley 500 kV #1	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #2 with stuck breaker followed by Devers 1AA bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Mirage 230 kV with stuck breaker followed by Coachell Valley-Mirage 230 kV	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Vista 230 kV with stuck breaker followed by Devers 3A bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Vista 230 kV #2 with stuck breaker followed by Devers-San Bernardino 230 kV	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - El Casco 230 kV with stuck breaker followed by El Casco 2A bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Mirage-J.Hinds 230 kV with stuck breaker followed by Mirage-Ramon 230 kV	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Mirage-J.Hinds 230 kV with stuck breaker followed by Mirage-Ramon 230 kV Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, non-redundant pilot relay fail (20% Blythe)	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, non-redundant pilot relay fail (20% EagleMTN)	P5.2	Non-Redundant Relay	No Issues	No Issues	Diverge	No Issues	No Issues	Add redundant pilot relay
EagleMTN-IronMTN 230 kV, non-redundant pilot relay fail (20% EagleMTN)	P5.2	Non-Redundant Relay	No Issues	No Issues	Diverge	No Issues	No Issues	Add redundant pilot relay
EagleMTN-IronMTN 230 kV, non-redundant pilot relay fail (20% IronMTN)	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV, non-redundant pilot relay fail (20% EagleMTN)	P5.2	Non-Redundant Relay	No Issues	No Issues	Diverge	No Issues	No Issues	Add redundant pilot relay
Julian Hinds-EagleMTN 230 kV & Blythe 1CT trip (RAS), non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	Diverge	No Issues	No Issues	Add redundant pilot relay
Julian Hinds-EagleMTN 230 kV, non-redundant pilot relay fail (20% Julian Hinds)	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV & Blythe 1CT trip (RAS), non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	Diverge	No Issues	No Issues	Add redundant pilot relay
Julian Hinds-Mirage 230 kV, non-redundant pilot relay fail (20% Julian Hinds)	P5.2	Non-Redundant Relay	No Issues	No Issues	Unstable	No Issues	No Issues	Add redundant pilot relay
Julian Hinds-Mirage 230 kV & Blythe 1CT trip (RAS), non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	Diverge	No Issues	No Issues	Add redundant pilot relay
Julian Hinds-Mirage 230 kV, non-redundant pilot relay fail (20% Mirage)	P5.2	Non-Redundant Relay	No Issues	No Issues	Diverge	No Issues	No Issues	Add redundant pilot relay
Julian Hinds-Mirage 230 kV & Blythe 1CT trip (RAS), non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	Diverge	No Issues	No Issues	Add redundant pilot relay
Julian Hinds-Mirage & EagleMTN-IronMTN 230 kV	P6.1	N-1-1	Diverge	Diverge	Unstable	Diverge	No Issues	ISO7720 (OP) with system adjustments after the first contingency
Julian Hinds-Mirage & EagleMTN-IronMTN 230 kV & ISO7720 (OP)	P6.1	N-1-1	Diverge	No Issues	Diverge	Diverge	No Issues	ISO7720 (OP) with system adjustments after the first contingency
Colorado River - Red Bluff 500 kV #1 & #2	P6.1	N-1-1	No Issues	No Issues	No Issues	Diverge	No Issues	Colorado River CRAS

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Heavy Renewable & Min Gas Gen*		
Devers - Red Bluff 500 kV #1 & #2	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers - Valley 500 kV #1 & #2	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues		
Etiwanda - San Bernardino & El Casco-San Bernardino 230kV	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues		
San Bernardino - Vista & Devers - San Bernardino 230kV	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues		
Colorado River - Palo Verde & Colorado River - Delaney 500 kV	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues		
Mirage-Ramon & Coachella Valley-Mirage 230 kV	P6.1	N-1-1	Diverge	No Issues	Diverge	Diverge	Diverge	System adjustments after the first contingency	
Mirage-Ramon & Coachella Valley-Mirage 230 kV with RAS	P6.1	N-1-1	Diverge	No Issues	Diverge	Diverge	Diverge	System adjustments after the first contingency	
Devers - Mirage 230 kV #1 & #2	P7.1	DCTL	No Issues	Diverge	Diverge	No Issues	No Issues	Path 42 RAS, Blythe RAS	
Devers - Mirage 230 kV #1 & #2 with RAS	P7.1	DCTL	No Issues	Diverge	No Issues	No Issues	No Issues	Path 42 RAS, Blythe RAS	
Devers-Glimmer & Devers-El Casco 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues		
Glimmer-San Bernardino & San Bernardino-El Casco 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers - Vista 230 kV #1 & #2	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues		
Etiwanda-San Bernardino & San Bernardino-Vista 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues		
Mira Loma-Vista #2 & Mira Loma-Vista #1/Vista-Wildlife 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues		
Coachella Valley-Ramon & Coachella Valley-Mirage 230 kV	P7.1	DCTL	Diverge	No Issues	Diverge	Diverge	Diverge	Path 42 RAS	
Coachella Valley-Ramon & Coachella Valley-Mirage 230 kV with RAS	P7.1	DCTL	Diverge	No Issues	Diverge	Diverge	Diverge	Path 42 RAS	
Devers Substation 500 kV Bus & AA Banks	Extreme	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues		
Valley Substation 500 kV Bus & AA Banks	Extreme	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues		
Loss of Mountainview Generation Station	Extreme	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues		
<b>Non Redundant DC Supply</b>									
EagleMTN 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant DC Supply	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply	
Julian Hinds 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant DC Supply	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply	
BlytheSCE 161 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant DC Supply	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply	
Mirage 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant DC Supply	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply	
Devers 500 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant DC Supply	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply	
El Casco 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant DC Supply	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply	
San Bernardino 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant DC Supply	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply	
Vista 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant DC Supply	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply	
Etiwanda 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant DC Supply	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply	
Valley 500 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant DC Supply	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply	
<b>Non Redundant Trip Coils</b>									
Colorado River-Palo Verde 500 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Colorado River-Red Bluff 500 kV #1, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Colorado River 1AA Bank, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Colorado River-Genesis 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Colorado River-Black Creek 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Colorado River-Dracker 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Colorado River-Suncatcher 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Colorado River-Crimson 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Colorado River-Centipede 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Colorado River-Filippi 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Colorado River-Red Bluff 500 kV #1, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Red Bluff 1AA Bank, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers-Red Bluff 500 kV No. 2, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Desert Sunlight-Red Bluff 230 kV, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Black Ranch-Red Bluff 230 kV, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Almasol-Red Bluff 230 kV, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers-Red Bluff 500 kV No. 2, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers-Valley 500 kV No. 1, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers 1AA Bank, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers-El Casco 230 kV, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers-Mirage 230 kV No. 1, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers-Glimmer 230 kV, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers-Sentinel 230 kV, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers-Vista 230 kV No. 2, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
Devers-El Casco 230 kV, non-Redundant Trip Coil fail at El Casco	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
El Casco-San Bernardino 230 kV, non-Redundant Trip Coil fail at El Casco	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		
El Casco-San Bernardino 230 kV, non-Redundant Trip Coil fail at San Bernardino	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues		

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Heavy Renewable & Min Gas Gen*	
Glimmer-San Bernardino 230 kV, non-Redundant Trip Coil fail at San Bernardino	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda-San Bernardino 230 kV, non-Redundant Trip Coil fail at San Bernardino	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Mountainview-San Bernardino 230 kV No. 3, non-Redundant Trip Coil fail at San Bernardino	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
San Bernardino-Vista 230 kV, non-Redundant Trip Coil fail at San Bernardino	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
San Bernardino-Vista 230 kV, non-Redundant Trip Coil fail at Vista	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Vista 230 kV No. 1, non-Redundant Trip Coil fail at Vista	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda-Vista 230 kV, non-Redundant Trip Coil fail at Vista	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Mira Loma-Vista 230 kV No. 1, non-Redundant Trip Coil fail at Vista	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Mira Loma-Vista 230 kV No. 2, non-Redundant Trip Coil fail at Vista	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda-San Bernardino 230 kV, non-Redundant Trip Coil fail at Etiwanda	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda-Vista 230 kV, non-Redundant Trip Coil fail at Etiwanda	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Valley 500 kV No. 1, non-Redundant Trip Coil fail at Valley	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Serrano-Valley 500 kV, non-Redundant Trip Coil fail at Valley	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Valley 1AA Bank, non-Redundant Trip Coil fail at Valley	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Valley 4AA Bank, non-Redundant Trip Coil fail at Valley	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Mirage 230 kV No. 1, non-Redundant Trip Coil fail at Mirage	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV, non-Redundant Trip Coil fail at Mirage	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Mirage-Ramon 230 kV, non-Redundant Trip Coil fail at Mirage	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Coachella Valley-Mirage 230 kV, non-Redundant Trip Coil fail at Mirage	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV, non-Redundant Trip Coil fail at Julian Hinds	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Buck Blvd-Julian Hinds 230 kV, non-Redundant Trip Coil fail at Julian Hinds	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	
Eagle Mtn-Julian Hinds (MWD), non-Redundant Trip Coil fail at Julian Hinds	P5.4.13d	Non-Redundant TC	No Issues	No Issues	No Issues	No Issues	No Issues	



Worst Contingency	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Potential Mitigation Solutions
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP with Forecasted Load Addition	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Heavy Renewable & Min Gas Gen	2035 SP with Additional Transportation Electrification	

No issues found

No single contingency resulted in total load drop of more than 250 MW

2022-2023 ISO Reliability Assessment - Preliminary Study Results

Study Area: SCE Eastern area

Single Source Substation with more than 100 MW Load



Worst Contingency	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)				Potential Mitigation Solutions
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2027 Spring Off-Peak	2027 Spring Off-Peak	2027 SP with Forecasted Load Addition	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Heavy Renewable & Min Gas Gen	2035 SP with Additional Transportation Electrification	

No issues found

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
22886 SUNCREST 230 22832 SYCAMORE 230 1 1	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL23055_Line SCR-SX 230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.1	104.5	Rely on the existing TL23054/ TL23055 RAS, along with the 30-minute short-term emergency ratings of the 230 kV lines (30% higher than their continuous ratings), to allow the market and operators to bring down the overloads that do not exceed 130% for the P6 contingencies within the continuous ratings in 30 minutes as operational mitigation measures. The remaining P6 overloads that exceed 130% can be eliminated by additional system adjustments between the overlapping P1 events. The system adjustments could involve operational actions, such as reducing generation output in the greater Imperial Valley area, dispatching conventional gas generation, preferred resources, battery energy storage and/or pumped hydro storage in the San Diego area, adjusting the Imperial Valley phase shifting transformers, and bypassing the series capacitor banks in the 500 kV transmission lines between Hassayampa and North Gila as needed.  The use of energy storage is marginally adequate to mitigate the reliability concern in the ten-year horizon, as there would be sufficient energy capability (MWh) and could be fully charged to serve the peak load which lasts around four hours.
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND TL23055_Line SCR-SX 230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.5	
	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND TL50001_Line ECO-ML 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.1	< 100	102.2	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL50001_Line ECO-ML 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.2	
	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND TL23055_Line SCR-SX 230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.6	
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND TL50001_Line ECO-ML 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.5	
	TL50001_Line ECO-ML 500kV ck 1 AND TL23055_Line SCR-SX 230kV ck 2	P6	N-1-1		150.7	173.1	166.7	133.4	< 100	< 100	151.5	168.3	176.3	187.0	
TL50001_Line ECO-ML 500kV ck 1 AND TL23055+GEN_DROP_RAS_Line SCR-SX 230kV ck 2	P6	N-1-1		118.7	141.8	134.3	< 100	< 100	< 100	121.1	132.9	145.4	152.3		
22886 SUNCREST 230 22832 SYCAMORE 230 2 1	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL23054_Line SCR-SX 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.1	104.6	Load growth, continued development of renewable resources flowing through the SDG&E system and rapid storage resource growth needed to meet load, the operational actions described above are increasing in magnitude and complexity. Therefore, there is a risk that the necessary operational actions could not be implemented under 30 minutes per ISO Planning Standards.  For the 2035 Summer Peak Sensitivity Case, there would be charging restrictions due to the forecasted load increase, thus the energy storage resources needed to mitigate the thermal overloads would not have sufficient state-of-charge to serve the peak load.  The ISO has evaluated the first section of SDG&E BES Project Proposal to reduce the need of the before mentioned operational actions that are required to mitigate the reliability concerns, along with long-term transmission alternatives, aligned with the policy assessment, which combined would solve these reliability issues.  For the 2024 Spring-Off Peak Sensitivity Case, charging of the battery energy storage in the San Diego area would need to be curtailed for P6 contingencies.
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND TL23054_Line SCR-SX 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.5	
	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND TL50001_Line ECO-ML 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.1	< 100	102.2	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL50001_Line ECO-ML 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.2	
	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND TL23054_Line SCR-SX 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.7	
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND TL50001_Line ECO-ML 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.5	
	TL50001_Line ECO-ML 500kV ck 1 AND TL23054_Line SCR-SX 230kV ck 1	P6	N-1-1		150.7	173.1	166.7	133.5	< 100	< 100	151.5	168.3	176.3	187.0	
TL50001_Line ECO-ML 500kV ck 1 AND TL23054+GEN_DROP_RAS_Line SCR-SX 230kV ck 1	P6	N-1-1		118.7	141.8	134.3	< 100	< 100	< 100	121.1	132.9	145.5	152.3		
22886 SUNCREST 230 22888 SNCRSMP1 500 1 1	TL50001_Line ECO-ML 500kV ck 1 AND SCR_BK81_Tran SCR 500/230kV ck 2	P6	N-1-1	113.5	129.8	124.6	100.9	< 100	< 100	115.0	127.7	131.7	137.3	Rely on the 24-hr emergency ratings of the Suncrest banks (if necessary, the 30-min emergency rating may also be utilized). If this is not enough to mitigate the overloads, congestion management and additional system adjustments can be used after the first contingency for the P6 events. The system adjustments and mitigation solutions would be similar to the ones described above for the TL23054/TL23055 Suncrest – Sycamore Canyon overload issues.	
22886 SUNCREST 230 22889 SNCRSMP2 500 1 1	TL50001_Line ECO-ML 500kV ck 1 AND SCR_BK80_Tran SCR 500/230kV ck 1	P6	N-1-1	113.6	129.9	124.7	100.7	< 100	< 100	115.0	127.5	131.8	137.3		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
22886 SUNCREST 230 22893 SNCRS SVC HV 230 1 1	TL50004_Line IV-ECO 500kV ck 1 AND TL50005_Line IV-OCO 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.4	System adjustments can be used after the first contingency for the P6 events. The system adjustments and mitigation solutions would be similar to the ones described above for the TL23054/TL23055 overload issues.	
	TL50004+GEN_DROP_RAS_Line IV-ECO 500kV ck 1 + GEN DROP RAS AND TL50005_Line IV-OCO 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.9		
22464 MIGUEL 230 22468 MIGUEL 500 2 1	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND ML_BK80_Tran ML 500/230kV ck 1	P3	G-1/N-1	< 100	101.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.9	109.7	Rely on the existing Miguel BK 80/81 RAS, along with the use of the 24-hr emergency ratings of the Miguel banks (if necessary, the 30-min emergency rating may also be utilized). If this is not enough to mitigate the overloads, congestion management and additional system adjustments can be used after the first contingency for the P6 events. The system adjustments and mitigation solutions would be similar to the ones described above for the TL23054/23055 overload issues.
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND ML_BK80_Tran ML 500/230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.2	105.2	
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND ML_BK80_Tran ML 500/230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.2	104.2	
	PSH_Gen PSH ID 1 AND ML_BK80_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.1	100.1	
	TL50003_Line OCO-SCR 500kV ck 1 AND ML_BK80_Tran ML 500/230kV ck 1	P6	N-1-1	121.4	137.9	133.8	104.6	< 100	< 100	< 100	124.4	132.2	140.8	148.8	
	TL50003_Line OCO-SCR 500kV ck 1 AND ML_BK80+GEN_DROP_RAS_Tran ML 500/230kV ck 1	P6	N-1-1	< 100	113.6	108.1	< 100	< 100	< 100	< 100	< 100	105.0	116.7	122.2	
22464 MIGUEL 230 22472 MIGUELMP 500 1 1	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	103.4	101.1	< 100	< 100	< 100	< 100	< 100	< 100	105.5	111.6	For the 2024 Spring-Off Peak Sensitivity Case, charging of the battery energy storage in the San Diego area would need to be curtailed for P6 contingencies.
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.4	106.9	
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.7	106.0	
	PSH_Gen PSH ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.9	101.9	
	PPEC_1A_Gen PIO PICO 1A ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.8	101.8	
	PPEC_1B_Gen PIO PICO 1B ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.8	101.8	
	PPEC_1C_Gen PIO PICO 1C ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.8	101.8	
	BD_GEN3_Gen CALPK_BD ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.4	100.4	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.4	100.4	
	BD_GEN2_Gen LRKSPBD2 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.4	100.4	
	EC GEN2_Gen EC GEN2 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.4	100.4	
	EC GEN1_Gen EC GEN1 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.3	100.3	
	MEF_UNIT1_Gen MEF MR1 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2	100.2	
MEF_UNIT2_Gen MEF MR2 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2	100.2		
OY_GEN_Gen OY GEN ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2	100.2		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
	ES_GEN1_Gen ES GEN ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2		
	PA_GEN1_Gen PA GEN1 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2		
	PA_GEN2_Gen PA GEN2 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2		
	ES_GEN2_Gen CALPK_ES ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2		
	TL50003_Line OCO-SCR 500kV ck 1 AND ML_BK81_Tran ML 500/230kV ck 2	P6	N-1-1		122.6	140.3	136.1	106.7	< 100	< 100	126.1	135.0	143.2		151.3
	TL50003_Line OCO-SCR 500kV ck 1 AND ML_BK81+GEN_DROP_RAS_Tran ML 500/230kV ck 2	P6	N-1-1		< 100	115.2	109.9	< 100	< 100	< 100	101.1	107.6	118.4		124.3
22430 SILVERGT 230 22596 OLD TOWN 230 1 1	TL23028_Line SG-MS-OT 230kV ck 1 AND TL23071_Line SX-PQ 230kV ck 1	P6	N-1-1	101.2	110.0	120.3	114.1	< 100	< 100	< 100	< 100	109.5	123.8	Rely on 2-hr short-term emergency ratings for TL23028A and TL23029 (29% higher than their normal ratings), giving the market and operators enough time to eliminate the identified thermal overloads. The system adjustments that can be implemented are to reduce generation output in Otay Mesa, Otay, and Border substations, while dispatching battery energy storage connected north of Old Town substation.	
22430 SILVERGT 230 22597 OLDTWNT 230 1 1	SG-2T_SILVERGATE 230 kV 2T CB	P4	Fault + Stuck Breaker	< 100	< 100	100.9	< 100	< 100	< 100	< 100	< 100	< 100	101.1		
	TL23029_Line SG-OT 230kV ck 1 AND TL23071_Line SX-PQ 230kV ck 1	P6	N-1-1	< 100	108.6	118.5	113.3	< 100	< 100	< 100	< 100	108.0	121.5		
	TL23029_Line SG-OT 230kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	< 100	109.1	117.6	111.7	< 100	< 100	< 100	< 100	108.1	119.8		
	TL23071_Line SX-PQ 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.7		
	TL50003_Line OCO-SCR 500kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.2		
	TL50005_Line IV-OCO 500kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.6		
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	103.8	< 100	< 100	< 100	< 100	< 100	< 100	110.8		
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	103.3	< 100	< 100	< 100	< 100	101.0	< 100	110.0		
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	102.8	< 100	< 100	< 100	< 100	< 100	< 100	109.6		
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND TL50005_Line IV-OCO 500kV ck 1	P3	G-1/N-1	< 100	< 100	101.7	< 100	< 100	< 100	< 100	< 100	< 100	108.3		
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL50005_Line IV-OCO 500kV ck 1	P3	G-1/N-1	< 100	< 100	101.0	< 100	< 100	< 100	< 100	< 100	< 100	107.9		
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	100.4	< 100	< 100	< 100	< 100	< 100	< 100	107.4		
	MEF_UNIT1_Gen MEF MR1 ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.2		
	PSH_Gen PSH ID 1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.0		
ECO GEN1_Gen ECO GEN1 G1 ID G1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.9			
PSH_Gen PSH ID 1 AND TL50005_Line IV-OCO 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.7			

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
22430 SILVERGT 230 22771 BAY BLVD 230 1 1	BUE_GEN1_Gen BUE GEN 1 ID G1/G2/G3/G4 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.7	Rely on 2-hr short-term emergency rating for TL23026 (29% higher than its normal rating), giving the market and operators enough time to eliminate the identified thermal overloads. The system adjustments that can be implemented are to reduce generation output in Otay Mesa substation or greater Imperial Valley area, while dispatching battery energy storage connected north of Bay Boulevard substation.  2024 Spring Off-Peak sensitivity case overloads can be eliminated by system adjustments, such as curtailing the charging of battery energy storage in San Diego area.
	OCO_GEN1_Gen OCO GEN ID G1/G2 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.7	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.7	
	BD_GEN2_Gen LRKSPBD2 ID 1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.7	
	SD_GIP_31_Gen SD_GIP_31_GEN ID 2 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.6	
	ECO_GEN1_Gen ECO GEN1 G1 ID G1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.4	
	OCO_GEN1_Gen OCO GEN ID G1/G2 AND TL50005_Line IV-OCO 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.3	
	MEF_UNIT1_Gen MEF MR1 ID 1 AND TL50005_Line IV-OCO 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.2	
	MEF_UNIT2_Gen MEF MR2 ID 1 AND TL50005_Line IV-OCO 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.2	
	BUE_GEN1_Gen BUE GEN 1 ID G1/G2/G3/G4 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.2	
	PSH_Gen PSH ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.2	
	OCO_GEN1_Gen OCO GEN ID G1/G2 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.1	
	PV_UNIT1_Gen PALOVRD1 ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.9	
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND TL23023_Line ML-MS 230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.3	
	PV_UNIT1_Gen PALOVRD1 ID 1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.1	
	PPEC_1A_Gen PIO PICO 1A ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.1	
	PPEC_1B_Gen PIO PICO 1B ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.1	
	PPEC_1C_Gen PIO PICO 1C ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.1	
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND TL23022_Line ML-MS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.0	
	BUE_GEN1_Gen BUE GEN 1 ID G1/G2/G3/G4 AND TL50005_Line IV-OCO 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.9	
PPEC_1A_Gen PIO PICO 1A ID 1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.9		
PPEC_1B_Gen PIO PICO 1B ID 1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.9		
PPEC_1C_Gen PIO PICO 1C ID 1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.9		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
	ECO W _Gen ECO W1/W2 ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.7		
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL23023_Line ML-MS 230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.3		
	ECO W _Gen ECO W1/W2 ID 1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.2		
	PV_UNIT1_Gen PALOVRD1 ID 1 AND TL50005_Line IV-OCO 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.9		
	IV_GEN2_ALL_Gen INTBST ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.9		
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL23022_Line ML-MS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.9		
	PPEC_1A_Gen PIO PICO 1A ID 1 AND TL50005_Line IV-OCO 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.5		
	PPEC_1B_Gen PIO PICO 1B ID 1 AND TL50005_Line IV-OCO 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.5		
	PPEC_1C_Gen PIO PICO 1C ID 1 AND TL50005_Line IV-OCO 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.5		
	IV_GEN2_ALL_Gen INTBST ID 1 AND TL50003_Line OCO-SCR 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2		
	MS-230-5T_CB MISSION 230KV 5T	P4	Fault + Stuck Breaker	< 100	< 100	107.9	< 100	< 100	< 100	< 100	< 100	101.1	< 100	113.8	
	SX-230-26T_CB SYCAMORE CANYON 230KV 26T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.1	
	SCR-500-2T_CB SUNCREST 500KV 2T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.2	
	OCO-500-2W_CB OCOTILLO 500KV 2W	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.0	
	OCO-500-2T_CB OCOTILLO 500KV 2T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.0	
	OCO-500-1E_CB OCOTILLO 500KV 1E	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.9	
	ML-8T_Miguel 230 kV 8T CB	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.0	
	ML-6T_Miguel 230 kV 6T CB	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.6	
	TL23023_Line ML-MS 230kV ck 2 AND TL23071_Line SX-PQ 230kV ck 1	P6	N-1-1	< 100	101.9	111.9	< 100	< 100	< 100	< 100	< 100	104.0	102.9	120.0	
	TL23023_Line ML-MS 230kV ck 2 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	< 100	102.0	111.0	< 100	< 100	< 100	< 100	< 100	107.1	102.6	118.5	
	TL23041_Line SX-OM-ML 230kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	< 100	101.8	110.7	< 100	< 100	< 100	< 100	< 100	107.9	102.2	117.7	
	TL23022+23023_Lines ML-MS 230kV ck 1 + ML-MS 230kV ck 2	P7	DCTL	< 100	< 100	107.9	< 100	< 100	< 100	< 100	< 100	101.1	< 100	113.8	
22464 MIGUEL 230 22466 MLMS3TAP 230 1 1	TL23041_Line SX-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	< 100	107.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.2	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
22464 MIGUEL 230 22467 MLSXTAP 230 1 1	TL23042_Line BB-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	104.6	105.1	132.5	106.7	< 100	< 100	< 100	< 100	102.6	106.5	142.5	Rely on existing TL23041/TL23042 RAS (if necessary, the 30-min emergency rating may also be utilized). If this is not enough to mitigate the overloads, congestion management and additional system adjustments can be used after the first contingency for P6 events, such as reducing remaining generation output in Otay Mesa.
22609 OTAYMESA 230 22466 MLMS3TAP 230 1 1	TL23041_Line SX-OM-ML 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.4	
	TL23041B_TL23041B OTAYMESA-MLSXTAP ck 1	P2.1	Line Section w/o Fault	< 100	< 100	100.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.9	
	PV_UNIT1_Gen PALOVRD1 ID 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P3	G-1/N-1	< 100	< 100	100.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.5	
	IV_GEN1_ALL_Gen IV GEN1 STG ID 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P3	G-1/N-1	< 100	< 100	100.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.9	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P3	G-1/N-1	< 100	< 100	100.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.9	
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.9	
	SX-23T_SYCAMORE 230 kV 23T CB	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.5	
	ML-4T_Miguel 230 kV 4T CB	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.3	
	TL23041_Line SX-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	103.9	102.8	135.1	111.1	< 100	< 100	< 100	< 100	102.3	103.3	142.0	
TL23021+23041_Lines SX-ML 230kV ck 1 + SX-OM-ML 230kV ck 1	P7	DCTL	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.6		
22609 OTAYMESA 230 22467 MLSXTAP 230 1 1	TL23042_Line BB-OM-ML 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.2	
	TL23042B_TL23042B OTAYMESA-MLMS3TAP ck 1	P2.1	Line Section w/o Fault	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.7	
	PV_UNIT1_Gen PALOVRD1 ID 1 AND TL23042_Line BB-OM-ML 230kV ck 1	P3	G-1/N-1	< 100	< 100	100.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.3	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL23042_Line BB-OM-ML 230kV ck 1	P3	G-1/N-1	< 100	< 100	100.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.8	
	IV_GEN1_ALL_Gen IV GEN1 STG ID 1 AND TL23042_Line BB-OM-ML 230kV ck 1	P3	G-1/N-1	< 100	< 100	100.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.7	
	EA_ALL_Gen EAGEN1U6/U7/U8/U9/U10 ID 1 AND TL23042_Line BB-OM-ML 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.7	
	BB-230-4T_CB BAY BOULEVARD 230KV 4T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.3	
	ML-7T_Miguel 230 kV 7T CB	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.9	
	TL23042_Line BB-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	103.0	101.8	134.3	110.5	< 100	< 100	< 100	< 100	101.6	102.3	140.7	
TL23042+13815_TC-GHL + ML-SG-OM	P7	DCTL	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.0		



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				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load			
22832 SYCAMORE 230 22831 SYCAMORE 138 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL23071_Line SX-PQ 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.4	< 100	101.2	For the 2024 Spring Off-Peak Sensitivity Case, battery energy storage curtailment after the first contingency for the P6 event or propose a new RAS to trip the battery energy storage (under charging mode) in Sycamore Canyon connected to the 138 kV bus.  For the 2035 Summer Peak Sensitivity Case, rely on system adjustments after the first contingency for the P6 event, such as dispatching battery energy storage in Sycamore Canyon connected to the 138 kV bus or reducing generation output of Sycamore Canyon pumped hydro storage connected to the 230 kV bus.	
22500 MISSION 138 22120 CARLTNHS 138 1 1	TL13819_Line LC-SN 138kV ck 1 AND SX_BK60_Tran SX 230/138kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.6	< 100	< 100	For the 2024 Spring Off-Peak Sensitivity Case, battery energy storage curtailment after the first contingency for the P6 event or propose a new RAS to trip the battery energy storage (under charging mode) in Sycamore Canyon connected to the 138 kV bus.	
19020 BLYTHE 161 21731 VEGA_3_SS 161 1 1	TL50002_Line NG-IV 500kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	102.3	< 100	< 100	< 100	< 100	Rely on congestion management to protect against the loss of TL50002 North Gila - Imperial Valley.	
	S-LINE1_Line IV-WIXOM_SS 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	115.4	< 100	< 100	< 100	< 100	Since there is a high export from IID area, IID would need to rely on congestion management.	
	S-LINE2_Line WIXOM_SS-ELC 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	105.1	< 100	< 100	< 100	< 100		
	SX BESSG_Gen SX BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.9	< 100	< 100	< 100	< 100	Rely on congestion management to protect against the loss of IV-500-8022 stuck breaker. Additional system adjustments can be used after the first contingency for P3 events, such as the reduction or curtailment of renewable energy connected at Imperial Valley substation.
	PV_UNIT1_Gen PALOVRD1 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.0	< 100	< 100	< 100	< 100	
	SG BESSG_Gen SG BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.4	< 100	< 100	< 100	< 100	
	ES BESS_Gen ES BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.9	< 100	< 100	< 100	< 100	
	OM_GEN4_Gen OM GEN4_BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.8	< 100	< 100	< 100	< 100	
	IV-500-8022_CB IMPERIAL VALLEY 500KV 8022	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
S-LINE1_Line IV-WIXOM_SS 230kV ck 1 AND CVSUB-MRG_CVSB230 to MIRAGE ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Since there is a high export from IID area, IID would need to rely on congestion management and system adjustments after the first contingency for the P6 event.	
TL50002_Line NG-IV 500kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Rely on congestion management to protect against the loss of TL50002 North Gila - Imperial Valley.	
S-LINE1_Line IV-WIXOM_SS 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Since there is a high export from IID area, IID would need to rely on congestion management.	
S-LINE2_Line WIXOM_SS-ELC 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100		
PV_UNIT1_Gen PALOVRD1 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100		
SX BESSG_Gen SX BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100		
SG BESSG_Gen SG BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load	
21331 ELCENTSW 161 21059 PILOTKNB 161 1 1	ES BESS_Gen ES BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	130.0	< 100	< 100	< 100	< 100	Rely on system adjustments after the first contingency for P3 events, such as the reduction or curtailment of renewable energy connected at Imperial Valley substation.
	OM_GEN4_Gen OM GEN4_BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	129.9	< 100	< 100	< 100	< 100	
	CP BESSG_Gen CP BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	129.1	< 100	< 100	< 100	< 100	
	VC GEN_Gen VC GEN1/GEN2 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	128.3	< 100	< 100	< 100	< 100	
	OCO_GEN1_Gen OCO GEN ID G1/G2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	124.0	< 100	< 100	< 100	< 100	
	DW GEN5_Gen DW GEN5 ID G1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	122.5	< 100	< 100	< 100	< 100	
	IV_GEN3_Gen IV GEN3 ID G1/G2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	121.7	< 100	< 100	< 100	< 100	
	DW GEN1_Gen DW GEN1 ID G1/G2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	121.5	< 100	< 100	< 100	< 100	
	DU_GEN1_Gen DU GEN1 ID G1/G2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	121.1	< 100	< 100	< 100	< 100	
	DW GEN6_Gen DW GEN6 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	120.8	< 100	< 100	< 100	< 100	
	ECO W_Gen ECO W1/W2 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	120.8	< 100	< 100	< 100	< 100	
	DW GEN3_Gen DW GEN3 ID 1/2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	120.1	< 100	< 100	< 100	< 100	
	DW GEN2_Gen DW GEN2 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	118.8	< 100	< 100	< 100	< 100	
	DW GEN4_Gen DW GEN2 ID 1/2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	117.2	< 100	< 100	< 100	< 100	
	IV PVG_Gen IV PV ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	115.3	< 100	< 100	< 100	< 100	
PV_UNIT1_Gen PALOVRD1 ID 1 AND S-LINE1_Line IV-WIXOM_SS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	143.7	< 100	< 100	< 100	< 100	Since there is a high export from IID area, IID would need to rely on congestion management and system adjustments after the first contingency for P3 events.	
PV_UNIT1_Gen PALOVRD1 ID 1 AND S-LINE2_Line WIXOM_SS-ELC 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	127.3	< 100	< 100	< 100	< 100	Rely on congestion management to protect against the loss of IV-500-8022 stuck breaker.	
IV-500-8022_CB IMPERIAL VALLEY 500KV 8022	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	127.6	< 100	< 100	< 100	< 100	Rely on system adjustments after the first contingency for P6 events, such as the reduction or curtailment of renewable energy connected at Imperial Valley substation and IID area.	
TL50002_Line NG-IV 500kV ck 1 AND S-LINE1_Line IV-WIXOM_SS 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	149.7	< 100	< 100	< 100	< 100	500 kV Gen Drop RAS should not be enabled for this P6 contingency. An erroneous operation of the RAS would create these overloads in IID area.	
TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.2		
TL50002_Line NG-IV 500kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	106.3	< 100	< 100	< 100	< 100	Rely on congestion management to protect against the loss of TL50002 North Gila - Imperial Valley.
S-LINE1_Line IV-WIXOM_SS 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	107.0	< 100	< 100	< 100	< 100	Since there is a high export from IID area, IID would need to rely on congestion management.
PV_UNIT1_Gen PALOVRD1 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	114.2	< 100	< 100	< 100	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
21072 YUCCA161 161 21059 PILOTKNB 161 1 1	SX BESSG_Gen SX BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	110.6	< 100	< 100	< 100	< 100	Rely on system adjustments after the first contingency for P3 events, such as the reduction or curtailment of renewable energy connected at Imperial Valley substation.	
	SG BESSG_Gen SG BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	109.3	< 100	< 100	< 100	< 100		
	ES BESS_Gen ES BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	108.8	< 100	< 100	< 100	< 100		
	OM_GEN4_Gen OM GEN4_BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	108.6	< 100	< 100	< 100	< 100		
	DW GEN5_Gen DW GEN5 ID G1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	104.1	< 100	< 100	< 100	< 100		
	IV_GEN3_Gen IV GEN3 ID G1/G2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	103.6	< 100	< 100	< 100	< 100		
	DW GEN1_Gen DW GEN1 ID G1/G2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	103.5	< 100	< 100	< 100	< 100		
	DU_GEN1_Gen DU GEN1 ID G1/G2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	103.2	< 100	< 100	< 100	< 100		
	DW GEN6_Gen DW GEN6 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	103.1	< 100	< 100	< 100	< 100		
	ECO W _Gen ECO W1/W2 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	103.0	< 100	< 100	< 100	< 100		
	DW GEN3_Gen DW GEN3 ID 1/2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	102.6	< 100	< 100	< 100	< 100		
	DW GEN2_Gen DW GEN2 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	101.8	< 100	< 100	< 100	< 100		
	DW GEN4_Gen DW GEN2 ID 1/2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	100.9	< 100	< 100	< 100	< 100		
	PV_UNIT1_Gen PALOVRD1 ID 1 AND S-LINE1_Line IV-WIXOM_SS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	111.0	< 100	< 100	< 100	< 100		Since there is a high export from IID area, IID would need to rely on congestion management and system adjustments after the first contingency for P3 events.
	IV-500-8022_CB IMPERIAL VALLEY 500KV 8022	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	107.2	< 100	< 100	< 100	< 100		Rely on congestion management to protect against the loss of IV-500-8022 stuck breaker.
TL50002_Line NG-IV 500kV ck 1 AND S-LINE1_Line IV-WIXOM_SS 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	120.0	< 100	< 100	< 100	< 100	Rely on system adjustments after the first contingency for P6 events, such as the reduction or curtailment of renewable energy connected at Imperial Valley substation and IID area.		
TL50002_Line NG-IV 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.3	500 kV Gen Drop RAS should not be enabled for this P6 contingency. An erroneous operation of the RAS would create these overloads in IID area.		
TL50002_Line NG-IV 500kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	109.5	< 100	< 100	< 100	< 100	Rely on congestion management to protect against the loss of TL50002 North Gila - Imperial Valley.		
S-LINE1_Line IV-WIXOM_SS 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	109.6	< 100	< 100	< 100	< 100	Since there is a high export from IID area, IID would need to rely on congestion management.		
S-LINE2_Line WIXOM_SS-ELC 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	100.9	< 100	< 100	< 100	< 100			
PV_UNIT1_Gen PALOVRD1 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	115.8	< 100	< 100	< 100	< 100			
SX BESSG_Gen SX BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	113.0	< 100	< 100	< 100	< 100			

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load	
21072 YUCCA161 161 84846 YUCCA W 69.0 1 1	SG BESSG_Gen SG BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	111.9	< 100	< 100	< 100	< 100	Rely on system adjustments after the first contingency for P3 events, such as the reduction or curtailment of renewable energy connected at Imperial Valley substation.
	ES BESS_Gen ES BESS ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	111.5	< 100	< 100	< 100	< 100	
	IV_GEN3_Gen IV GEN3 ID G1/G2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	107.3	< 100	< 100	< 100	< 100	
	DW_GEN1_Gen DW GEN1 ID G1/G2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	107.2	< 100	< 100	< 100	< 100	
	DU_GEN1_Gen DU GEN1 ID G1/G2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	106.9	< 100	< 100	< 100	< 100	
	DW_GEN6_Gen DW GEN6 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	106.8	< 100	< 100	< 100	< 100	
	ECO W _Gen ECO W1/W2 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	106.7	< 100	< 100	< 100	< 100	
	DW_GEN3_Gen DW GEN3 ID 1/2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	106.4	< 100	< 100	< 100	< 100	
	DW_GEN2_Gen DW GEN2 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	105.7	< 100	< 100	< 100	< 100	
	DW_GEN4_Gen DW GEN2 ID 1/2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	104.9	< 100	< 100	< 100	< 100	
	IV_PVG _Gen IV PV ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	103.9	< 100	< 100	< 100	< 100	
	PV_UNIT1_Gen PALOVRD1 ID 1 AND S-LINE1_Line IV-WIXOM_SS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	112.6	< 100	< 100	< 100	< 100	Since there is a high export from IID area, IID would need to rely on congestion management and system adjustments after the first contingency for P3 events.
	IV-500-8022_CB IMPERIAL VALLEY 500KV 8022	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	110.2	< 100	< 100	< 100	< 100	Rely on congestion management to protect against the loss of IV-500-8022 stuck breaker.
TL50002_Line NG-IV 500kV ck 1 AND S-LINE1_Line IV-WIXOM_SS 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	120.4	< 100	< 100	< 100	< 100	Rely on system adjustments after the first contingency for P6 events, such as the reduction or curtailment of renewable energy connected at Imperial Valley substation and IID area.	
TL50002_Line NG-IV 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.3	500 kV Gen Drop RAS should not be enabled for this P6 contingency. An erroneous operation of the RAS would create these overloads in IID area.	
HAA-NG_Line HAA-NG 500kV ck 1 AND HAA-HDWSH_HASSYAMP to HDWSH 500 ck 1	P6	N-1-1	< 100	105.3	< 100	< 100	< 100	< 100	< 100	< 100	107.6	< 100	Rely on system adjustments after the first contingency of the P6 event, such as dispatching battery energy storage connected at the Imperial Valley substation.	
21072 YUCCA161 161 84846 YUCCA W 69.0 2 1	TL50002_Line NG-IV 500kV ck 1 AND S-LINE1_Line IV-WIXOM_SS 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	101.1	< 100	< 100	< 100	< 100	Rely on system adjustments after the first contingency for P6 events, such as the reduction or curtailment of renewable energy connected at Imperial Valley substation and IID area.
21361 NILAND 92.0 21809 PRITP1 92.0 1 1	TL50002_Line NG-IV 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.3	500 kV Gen Drop RAS should not be enabled for this P6 contingency. An erroneous operation of the RAS would create these overloads in IID area.
21642 CALPTTAP 92.0 21697 CALIPAT 92.0 1 1	TL50002_Line NG-IV 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.9	
21642 CALPTTAP 92.0 21870 CSF_TAP 92.0 1 1	TL50002_Line NG-IV 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.9	
21809 PRITP1 92.0 21810 PRISON 92.0 1 1	TL50002_Line NG-IV 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.2	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
21810 PRISON 92.0 21811 PRITP2 92.0 1 1	TL50002_Line NG-IV 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.9	
21870 CSF_TAP 92.0 21811 PRITP2 92.0 1 1	TL50002_Line NG-IV 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.9	
20017 MEP-230 230 20238 HRA-230 230 1 1	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	144.9	< 100	< 100	Use of existing 230 kV Otay Mesa Gen Drop RAS or rely on congestion management after the first contingency for the P6 events.
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	145.0	< 100	< 100	
20017 MEP-230 230 20392 TOY-230 230 1 1	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	125.1	< 100	< 100	
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	125.2	< 100	< 100	
20238 HRA-230 230 20392 TOY-230 230 1 1	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	123.2	< 100	< 100	
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	123.2	< 100	< 100	
20102 RUM-230 230 20118 ROA-230 230 1 1	ROA-HRA_ROA-230 to HRA-230 ck 1	P1	N-1	< 100	< 100	< 100	< 100	136.5	< 100	< 100	< 100	< 100	< 100	< 100	For the 2024 Summer Peak Base and Sensitivity Cases, rely on existing TL 23040 IV 500kV N-1 RAS or system adjustments after the first contingency of CENACE's TL La Rosita - Herradura ck 1 or ck 2, such as adjusting Imperial Valley phase shifting transformers or reducing generation output in the greater Imperial Valley area as needed to limit southbound flow from SDGE to CENACE through TL23050 (Imperial Valley - La Rosita).  Since the WECC Seed Case used for the 2027 Spring Off-Peak Base Case is the WECC 2024 Light Spring 1 Case, it doesn't include TL La Rosita - Herradura ck 2, which is included in the WECC 2025 Heavy Summer 3 Case used for the 2024 Summer Peak Base Case. Thus, overloads for the 2027 Spring Off-Peak Base Case will not be present if TL La Rosita - Herradura ck 2 is in operation.
	TL50001_Line ECO-ML 500kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	112.4	< 100	< 100	< 100	< 100	< 100	< 100	
	TL50004_Line IV-ECO 500kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	109.4	< 100	< 100	< 100	< 100	< 100	< 100	
	ECO-4T_ECO 4T BK83 & TL50004	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	111.3	< 100	< 100	< 100	< 100	< 100	< 100	
	IV-500-8022_CB IMPERIAL VALLEY 500KV 8022	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	105.3	< 100	< 100	< 100	< 100	< 100	< 100	
	IV-500-8032_CB IMPERIAL VALLEY 500KV 8032	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	111.3	< 100	< 100	< 100	< 100	< 100	< 100	
	ML7013_ML 7013 CB - BK 80&81	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	112.4	< 100	< 100	< 100	< 100	< 100	< 100	
	ML8013_ML 8013 CB - BK 80&TL50001	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	112.6	< 100	< 100	< 100	< 100	< 100	< 100	
	ML8023_ML 8023 CB - BK 81&TL50001	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	112.5	< 100	< 100	< 100	< 100	< 100	< 100	
	OCO-1E_OCO 1E TL50003 & TL50005	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	104.6	< 100	< 100	< 100	< 100	< 100	< 100	
	OCO-2T_OCO 2T TL50003 & TL50006	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	104.6	< 100	< 100	< 100	< 100	< 100	< 100	
	SCR-2T_SUNCREST 2T BK81 & TL50003	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	105.0	< 100	< 100	< 100	< 100	< 100	< 100	
	ROA-HRA_ROA-230 to HRA-230 ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	171.9	< 100	100.5	< 100	< 100	< 100	
ROA-HRA2_ROA-230 to HRA-230 ck 2 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	109.7	< 100	< 100	< 100	< 100	< 100	< 100	111.5	< 100	< 100	< 100		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
	TL23082_Line IV-IV PST 230kV ck 1 OR TL23050_Line IV PST-ROA 230kV ck 1 AND ROA-HRA_ROA-230 to HRA-230 ck 1	P6	N-1-1	< 100	< 100	< 100	110.5	105.6	< 100	< 100	110.4	< 100	< 100	CENACE would need to rely on system adjustments in their system after the first contingency for P6 events of TL's 23082/23050 Imperial Valley - La Rosita and TL La Rosita - Herradura ck 1 even if TL 23040 Otay Mesa - Tijuana is disconnected.	
	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	144.1	< 100	< 100	Use of existing 230 kV Otay Mesa Gen Drop RAS or rely on congestion management after the first contingency for the P6 events.	
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	144.2	< 100	< 100		
20238 HRA-230 230 20102 RUM-230 230 1 1	ROA-HRA_ROA-230 to HRA-230 ck 1	P1	N-1	< 100	< 100	< 100	< 100	115.2	< 100	< 100	< 100	< 100	< 100	For the 2024 and 2027 Summer Peak Base and Sensitivity Cases, rely on existing TL 23040 IV 500kV N-1 RAS or system adjustments after the first contingency of CENACE's TL La Rosita - Herradura ck 2 or TL 50003 Ocotillo - Suncrest, such as adjusting Imperial Valley phase shifting transformers or reducing generation output in the greater Imperial Valley area as needed to limit southbound flow from SDGE to CENACE through TL23050 (Imperial Valley - La Rosita).	
	ROA-HRA_ROA-230 to HRA-230 ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	150.1	< 100	< 100	< 100	< 100	< 100		
	ROA-HRA2_ROA-230 to HRA-230 ck 2 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	103.3	< 100	< 100	< 100	< 100	< 100	< 100	105.1	< 100	< 100	Since the WECC Seed Case used for the 2027 Spring Off-Peak Base Case is the WECC 2024 Light Spring 1 Case, it doesn't include TL La Rosita - Herradura ck 2, which is included in the WECC 2025 Heavy Summer 3 Case used for the 2024 Summer Peak Base Case. Thus, overloads for the 2027 Spring Off-Peak Base Case will not be present if TL La Rosita - Herradura ck 2 is in operation.	
	TL50003_Line OCO-SCR 500kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	100.7	< 100	< 100	< 100	117.4	< 100	< 100	101.4	< 100	100.6	< 100	
	TL23082_Line IV-IV PST 230kV ck 1 OR TL23050_Line IV PST-ROA 230kV ck 1 AND ROA-HRA_ROA-230 to HRA-230 ck 1	P6	N-1-1	< 100	< 100	< 100	123.2	< 100	< 100	< 100	< 100	123.1	< 100	< 100	CENACE would need to rely on system adjustments in their system after the first contingency for P6 events of TL's 23082/23050 Imperial Valley - La Rosita and TL La Rosita - Herradura ck 1 even if TL 23040 Otay Mesa - Tijuana is disconnected.
	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	157.4	< 100	< 100	Use of existing 230 kV Otay Mesa Gen Drop RAS or rely on congestion management after the first contingency for the P6 events.
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	157.6	< 100	< 100	
20238 HRA-230 230 20118 ROA-230 230 1 1	ROA-RUM_ROA-230 to RUM-230 ck 1	P1	N-1	< 100	< 100	< 100	< 100	128.4	< 100	< 100	< 100	< 100	< 100	For the 2024 Summer Peak Base and Sensitivity Cases, rely on existing TL 23040 IV 500kV N-1 RAS or system adjustments after the first contingency of CENACE's TL La Rosita - Herradura ck 2, such as adjusting Imperial Valley phase shifting transformers or reducing generation output in the greater Imperial Valley area as needed to limit southbound flow from SDGE to CENACE through TL23050 (Imperial Valley - La Rosita).	
	RUM-HRA_RUM-230 to HRA-230 ck 1	P1	N-1	< 100	< 100	< 100	< 100	119.2	< 100	< 100	< 100	< 100	< 100		
	ROA-RUM_ROA-230 to RUM-230 ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	164.6	< 100	< 100	< 100	< 100	< 100	Since the WECC Seed Case used for the 2027 Spring Off-Peak Base Case is the WECC 2024 Light Spring 1 Case, it doesn't include TL La Rosita - Herradura ck 2, which is included in the WECC 2025 Heavy Summer 3 Case used for the 2024 Summer Peak Base Case. Thus, overloads for the 2027 Spring Off-Peak Base Case will not be present if TL La Rosita - Herradura ck 2 is in operation.	
	ROA-HRA2_ROA-230 to HRA-230 ck 2 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	106.5	< 100	< 100	< 100	< 100	< 100	< 100	108.3	< 100	< 100	< 100	
	TL23082_Line IV-IV PST 230kV ck 1 OR TL23050_Line IV PST-ROA 230kV ck 1 AND RUM-HRA_RUM-230 to HRA-230 ck 1	P6	N-1-1	< 100	< 100	< 100	123.0	< 100	< 100	< 100	< 100	122.9	< 100	< 100	CENACE would need to rely on system adjustments in their system after the first contingency for P6 events of TL's 23082/23050 Imperial Valley - La Rosita and TL La Rosita - Herradura ck 1 even if TL 23040 Otay Mesa - Tijuana is disconnected.
	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	156.7	< 100	< 100	Use of existing 230 kV Otay Mesa Gen Drop RAS or rely on congestion

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load	
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	156.9	< 100	< 100	management after the first contingency for the P6 events.
22609 OTAYMESA 230 20149 TJI-230 230 1 1	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	102.2	< 100	102.4	Diverge	< 100	< 100	< 100	< 100	< 100	104.8	Use of existing 230 kV Otay Mesa Gen Drop RAS or rely on congestion management after the first contingency for the P6 events.
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	102.2	< 100	102.4	Diverge	< 100	< 100	< 100	< 100	< 100	104.8	
	TL50003_Line OCO-SCR 500kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	103.0	144.9	< 100	< 100	< 100	< 100	108.8	105.0	158.1	Rely on existing TL50003 Gen Drop RAS or TL50001 Gen Drop RAS. If this is not enough to mitigate the overloads, congestion management and additional system adjustments can be used after the first contingency for the P6 events, such as reducing generation output in the greater Imperial Valley area while dispatching conventional gas units, preferred resources, and energy storage in the San Diego area, adjusting the Imperial Valley phase shifting transformers, and bypassing the series capacitor banks in the 500 kV transmission lines between Hassayampa and North Gila as needed.
22356 IMPRLVLY 230 22357 IV PFC1 230 1 1	TL50003_Line OCO-SCR 500kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	< 100	109.5	< 100	< 100	< 100	< 100	< 100	< 100	120.4	The use of energy storage is marginally adequate to mitigate the reliability concerns in the ten-year horizon, as there would be sufficient energy capability (MWh) and could be fully charged to serve the peak load in San Diego Area which lasts around four hours. For the 2035 Summer Peak Sensitivity Case, there would be charging restrictions due to the forecasted load increase, thus the energy storage resources needed to mitigate the thermal overloads in Path 45 would not have sufficient state-of-charge to serve the peak load in San Diego Area.
22357 IV PFC1 230 22358 IV PFC 230 1 1	TL50003_Line OCO-SCR 500kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	110.9	< 100	124.9	< 100	< 100	< 100	110.3	101.3	< 100	138.3	The ISO has evaluated long-term transmission alternatives, aligned with the policy assessment, which combined would solve these reliability issues.
22357 IV PFC1 230 22358 IV PFC 230 2 1	TL50003_Line OCO-SCR 500kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	110.9	< 100	124.9	< 100	< 100	< 100	110.3	101.8	< 100	138.3	
22358 IV PFC 230 20118 ROA-230 230 1 1	TL50003_Line OCO-SCR 500kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	< 100	109.5	< 100	< 100	< 100	< 100	< 100	< 100	120.4	
22024 B 69.0 22420 SILVERGT 69.0 1 1	Bus_OT230_NS_Old Town 230kV N+S Bus	P5	Non-Redundant Relay	100.6	102.7	117.8	< 100	< 100	< 100	< 100	< 100	105.5	135.1	Installation of a redundant bus differential relay to Old Town 230kV buses.
22024 B 69.0 22420 SILVERGT 69.0 2 1	Bus_OT230_NS_Old Town 230kV N+S Bus	P5	Non-Redundant Relay	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.0	
22380 KETTNER 69.0 22024 B 69.0 1 1	Bus_OT230_NS_Old Town 230kV N+S Bus	P5	Non-Redundant Relay	108.9	112.7	132.2	< 100	< 100	< 100	< 100	< 100	116.4	151.0	
22420 SILVERGT 69.0 22868 URBAN 69.0 1 1	Bus_OT230_NS_Old Town 230kV N+S Bus	P5	Non-Redundant Relay	< 100	< 100	114.1	< 100	< 100	< 100	< 100	< 100	102.1	130.4	
22871 VINE SUB 69.0 22380 KETTNER 69.0 1 1	Bus_OT230_NS_Old Town 230kV N+S Bus	P5	Non-Redundant Relay	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.1	
22556 NAVSTMTR 69.0 22824 SWTWTRTP 69.0 1 1	Bus_SG230_SILVERGATE-SG 230kV Bus	P5	Non-Redundant Relay	101.0	103.9	< 100	< 100	< 100	< 100	< 100	< 100	105.8	< 100	
22820 SWEETWTR 69.0 22824 SWTWTRTP 69.0 1 1	Bus_SG230_SILVERGATE-SG 230kV Bus	P5	Non-Redundant Relay	106.8	110.2	< 100	< 100	< 100	< 100	< 100	< 100	112.3	< 100	
22592 OLD TOWN 69.0 22871 VINE SUB 69.0 1 1	Bus_SG230_SILVERGATE-SG 230kV Bus	P5	Non-Redundant Relay	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.0	Sweetwater Reliability Enhancement project (ISD December 2027) would also help mitigate these overloads for the 2032 Summer Peak base case, but additional overloads would appear in 2035 Summer Peak even with this project.
22556 NAVSTMTR 69.0 22820 SWEETWTR 69.0 1 1	Bus_SG230_SILVERGATE-SG 230kV Bus	P5	Non-Redundant Relay	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.4	

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				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
22046 BASILONE 69.0 22848 TALEGATP 69.0 1 1	TL23052_TALEGA - S.ONOFRE ck 1 AND TL23007_TL23007 CAPSTRNO - SONGS ck 1	P6	N-1-1	< 100	< 100	< 100	107.2	< 100	< 100	< 100	< 100	193.8	< 100	< 100	Rely on system adjustments after the first contingency for the P6 event, such as opening any segment of the 69 kV transmission lines from Oceanside Tap to Talega in the short-term.  TL695B Japanese Mesa-Talega Tap Reconnector project (ISD October 2025) mitigates the overload in the long term.
22808 STUARTTP 69.0 22400 LASPULGS 69.0 1 1	TL23052_TALEGA - S.ONOFRE ck 1 AND TL23007_TL23007 CAPSTRNO - SONGS ck 1	P6	N-1-1	151.3	< 100	< 100	102.5	< 100	< 100	< 100	< 100	167.8	< 100	< 100	Rely on system adjustments after the first contingency for the P6 event, such as opening any segment of the 69 kV transmission lines from Oceanside Tap to Talega in the short-term.  TL690E Stuart Tap-Las Pulgas 69 kV Reconnector project (ISD November 2026) mitigates the overload in the long term.
22208 EL CAJON 69.0 22408 LOSCOCHS 69.0 1 1	TL632_TL632 GR-LC ck 2	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	115.2	< 100	< 100	< 100	Rely on pre-contingency congestion management by dispatching an El Cajon gas fired unit.
	KU_GEN_Gen KUMEYAAY ID 1 AND TL632_TL632 GR-LC ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.7	< 100	< 100	< 100	
	EC GEN1_Gen EC GEN1 ID 1 AND TL632_TL632 GR-LC ck 2	P3	G-1/N-1	106.1	108.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	113.7	< 100	Rely on system adjustments after the first contingency for the P3 events by dispatching El Cajon battery energy storage.
	EC GEN2_Gen EC GEN2 ID 1 AND TL632_TL632 GR-LC ck 2	P3	G-1/N-1	106.5	107.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.9	< 100	TL632 Granite Loop-In and TL6914 Reconfiguration project (ISD May 2026) mitigates the overload in the long-term.
22604 OTAY 69.0 22616 OTAYLKTP 69.0 1 1	TL0649D_TL0649D OTAYLKTP-SANYSYRO ck 1	P2.1	Line Section w/o Fault	102.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Rely on existing TL649 RAS to curtail Border gas generation unit 3.
	BD_GEN3_Gen CALPK_BD ID 1 AND TL6935_Line BD-BD GEN1&2 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.4	Rely on system adjustments after the first contingency for the P3 event, such as curtailing gas generation in Otay substation.
22740 SANYSYRO 69.0 22616 OTAYLKTP 69.0 1 1	TL623_Line OY-IB-SYO 69kV ck 1	P1	N-1	102.8	< 100	111.2	< 100	< 100	< 100	< 100	< 100	< 100	103.4	127.9	Model the ISO approved "Reconnector TL649D and TL623C (San Ysidro - Otay Lake Tap - Otay)" project (ISD August 2024).
	TL6910_Line BD-SLT 69kV ck 1	P1	N-1	101.0	< 100	100.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.6	
	TL0623A_TL0623A OTAY-OTAY TP ck 1	P2.1	Line Section w/o Fault	104.1	101.1	108.7	< 100	< 100	< 100	< 100	< 100	< 100	103.9	121.1	
	TL0623C_TL0623C OTAY TP-SANYSYRO ck 1	P2.1	Line Section w/o Fault	102.8	< 100	111.2	< 100	< 100	< 100	< 100	< 100	< 100	103.4	128.0	
	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23020_Line BB-ML 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22740 SANYSYRO 69.0 22608 OTAY TP 69.0 1 1	TL649_Line OY-OL-SYO-BD 69kV ck 1	P1	N-1	103.4	< 100	111.6	< 100	< 100	< 100	< 100	< 100	< 100	103.9	128.9	
	TL0649D_TL0649D OTAYLKTP-SANYSYRO ck 1	P2.1	Line Section w/o Fault	103.4	< 100	111.7	< 100	< 100	< 100	< 100	< 100	< 100	103.9	128.7	
22612 OTAYLAKE 69.0 22080 BORDERTP 69.0 1 1	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.4	Change 50 amp fuse at Otay Lakes substation.
22768 BAY BLVD 69.0 22352 IMPRLBCH 69.0 1 1	TL0623A_TL0623A OTAY-OTAY TP ck 1	P2.1	Line Section w/o Fault	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.4	Reconnector LT647 Bay Boulevard - Imperial Beach.
22768 BAY BLVD 69.0 22516 MONTGMRY 69.0 1 1	TL0642A_TL0642A MONTGYTP-BAY BLVD ck 1	P2.1	Line Section w/o Fault	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.4	New RAS to open TL642B and TL642C after TL642A contingency.
22884 WARNERS 69.0 22688 RINCON 69.0 1 1	TL637_Line ST-CRE 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.2	Change Current Transformer at Warners substation.
	TL681_Line AS-VC-FE 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.5	< 100	< 100	



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				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
22688 RINCON 69.0 22404 LILAC 69.0 1 1	TL0681B_TL0681B ASH TP-VALCNTR ck 1	P2.1	Line Section w/o Fault	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.5	< 100	< 100	Congestion management, limiting the charging of Valley Center battery energy storage, to protect against the overloading of TL683 Rincon - Lilac which currently is not monitored by the existing Valley Center RAS.
	PA_GEN1_Gen PA GEN1 ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.8	< 100	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.8	< 100	< 100	
22688 RINCON 69.0 22870 VALCNTR 69.0 1 1	TL681_Line AS-VC-FE 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	120.4	< 100	< 100	Use existing Valley Center RAS to trip the battery energy storage (under charging mode) at Valley Center.
	TL0681B_TL0681B ASH TP-VALCNTR ck 1	P2.1	Line Section w/o Fault	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	120.4	< 100	< 100	
22870 VALCNTR 69.0 22012 ASH TP 69.0 1 1	TL683_Line RIN-LI 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	118.1	< 100	< 100	
	TL6926_Line RIN-VC 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	119.0	< 100	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL637_Line ST-CRE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.7	< 100	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL685_Line WR-ST 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.1	< 100	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL688_Line ES-LI 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.1	< 100	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL637_Line ST-CRE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.7	< 100	< 100	
22256 ESCNDIDO 69.0 22260 ESCNDIDO 230 2 1	ES2-2N_ESCNDIDO 230KV 2N CB	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.8	Rely on congestion management to protect against the P4 contingency by dispatching battery energy storage installed in the 69 kV grid of San Diego area or reducing the generation output of Palomar Energy Center.
	OT_BK71_Tran OT 230/69kV ck 2	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.5	Add a third 230/69 kV transformer in Old Town substation.
22592 OLD TOWN 69.0 22596 OLD TOWN 230 1 1	OT-2S_OLD TOWN 230 kV 2S CB	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.7	
	OT-1S_OLD TOWN 230 kV 1S CB	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.3	
22592 OLD TOWN 69.0 22596 OLD TOWN 230 2 1	OT_BK70_Tran OT 230/69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.5	
	OT-2N_OLD TOWN 230 kV 2N CB	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.6	
	OT-1N_OLD TOWN 230 kV 1N CB	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.0	
22672 PRCTRVLY 138 22460 MIGUEL 138 1 1	TL23026_Line SG-BB 230kV ck 1 AND ML_BK60_Tran ML 230/138kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.3	Rely on system adjustments after the first contingency for the P6 event (if necessary, the 30-min emergency rating may also be utilized), such as reducing generation output in Otay Mesa.

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
22408 LOSCOCHS 69.0 22216 ELLIOTT 69.0 1 1	TL13821_Line SX-SN 138kV ck 1 AND TL13824_Line ML-TC-LC 138kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.5	Rely on system adjustments after the first contingency for the P6 event, such as dispatching battery energy storage in El Cajon, Otay Mesa, and Valley Center substations and curtailing gas generation in Miramar GT substation.
22708 SANLUSRY 69.0 22582 OCEAN RANCH 69.0 1 1	TL693_Line ME-SA 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.0	Rely on congestion management to protect against the P1 contingency. Additional system adjustments can be used after the first contingency for P3 events, like dispatching battery energy storage in Melrose and Avocado substations.
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.3	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.2	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.2	
	ES_GEN1_Gen ES GEN ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.0	
	ES_GEN2_Gen CALPK_ES ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.0	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.1	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.1	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.2	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL680_Line SA-ME-SM 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.0	
PA_GEN2_Gen PA GEN2 ID 1 AND TL680_Line SA-ME-SM 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.0		
22708 SANLUSRY 69.0 22584 OCEANSDE 69.0 1 1	TL23007_TL23007 CAPSTRNO - SONGS ck 1 AND TL23052_TALEGA - S.ONOFRE ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.6	Rely on system adjustments after the first contingency for the P3 and P6 events, such as dispatching battery energy storage in San Diego area, mainly in Capistrano, Talega, and Escondido substations.
22588 OCNSDETP 69.0 22808 STUARTTP 69.0 1 1	TL23007_TL23007 CAPSTRNO - SONGS ck 1 AND TL23052_TALEGA - S.ONOFRE ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.9	
22844 TALEGA 230 24131 S.ONOFRE 230 1 1	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL23007_TL23007 CAPSTRNO - SONGS ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.3	
	TL23007_TL23007 CAPSTRNO - SONGS ck 1 AND TL50002_Line NG-IV 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.6	
22840 TALEGA 138 22656 PICO 138 1 1	TL23007_TL23007 CAPSTRNO - SONGS ck 1 AND TL23030_TL23030 ESCNDIDO-TALEGA-CAPSTR ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	120.0	Rely on congestion management to protect against the P4 contingency. Additional system adjustments can be used after the first contingency for the P6 events, such as dispatching battery energy storage in Capistrano substation.
22840 TALEGA 138 22720 SANMATEO 138 1 1	TA1-8T_TALEGA 138KV 8T CB	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.7	
	TL13831_Line TA-RMV 138kV ck 1 AND TL13836_Line TA-PI 138kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.7	
22476 MIGUELTP 69.0 22456 MIGUEL 69.0 1 1	OY_GEN_Gen OY GEN ID 1 AND TL621_Line PD-ML 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.1	Rely on system adjustments after the first contingency for the P3 event, such curtailing gas generation in Border and El Cajon substations.

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load	
22828 SYCAMORE 69.0 22756 SCRIPPS 69.0 1 1	MEF_UNIT1_Gen MEF MR1 ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.9	Rely on congestion management to protect against the P7 contingency (if necessary, the 30-min emergency rating may also be utilized). Additional system adjustments can be used after the first contingency for the P3 and P6 events, such as dispatching battery energy storage in Miramar GT, Kearny West, Encina, and Silvergate substations and reducing gas generation output in Escondido substation, pumped hydro storage in Sycamore Canyon substation, or renewable and gas generation in the greater Imperial Valley area.
	MEF_UNIT2_Gen MEF MR2 ID 1 AND TL23071_Line SX-PQ 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.8	
	TL23071_Line SX-PQ 230kV ck 1 AND TL23026_Line SG-BB 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.7	
	TL23013+23071_Lines PQ-OT 230kV ck 1 + SX-PQ 230kV ck 1	P7	DCTL	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.6	

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
RUM-230 230 kV	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	Low	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	Diverge	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.88	0.9 < V < 1.1	0.9 < V < 1.1	Use of existing 230 kV Otay Mesa Gen Drop RAS or rely on congestion management after the first contingency for the P6 events.
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	Low	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	Diverge	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.88	0.9 < V < 1.1	0.9 < V < 1.1	

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)						Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		
HRA-230 230 kV	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	< 8	< 8	< 8	Diverge	< 8	< 8	< 8	< 8	10.17	< 8	< 8	Use of existing 230 kV Otay Mesa Gen Drop RAS or rely on congestion management after the first contingency for the P6 events.
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	< 8	< 8	< 8	Diverge	< 8	< 8	< 8	< 8	10.20	< 8	< 8	
RUM-230 230 kV	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	< 8	< 8	< 8	Diverge	< 8	< 8	< 8	< 8	11.34	< 8	< 8	
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	< 8	< 8	< 8	Diverge	< 8	< 8	< 8	< 8	11.42	< 8	< 8	
TOY-230 230 kV	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	< 8	< 8	< 8	Diverge	< 8	< 8	< 8	< 8	9.12	< 8	< 8	
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	< 8	< 8	< 8	Diverge	< 8	< 8	< 8	< 8	9.14	< 8	< 8	
BARRETT 69 kV	KU_GEN_Gen KUMEYAAY ID 1 AND TL6957_Line BAR-LL 69kV ck 1	P3	G-1/N-1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	8.05	Add a switched shunt capacitor at Crestwood 69 kV bus.

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2032 Spring Off-Peak	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	
SLO Fault at DEVERS 500, trip DEVERS to VALLEYSC 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO Fault at PALO VERDE 500kV, trip PALO VERDE to COLRIVER 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at IV 500kV, trip IMPRLVLY to ECO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at IV 500kV, trip IMPRLVLY to N.GILA 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at HAA 500kV, trip HAA - HDWSH 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at NG 500kV, trip NG - HAA 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at HDWSH 500kV, trip HDWSH-NG 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO at MIGUEL 500kV, trip MIGUEL to ECO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at IV 500kV, trip IMPRLVLY to OCOTILLO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO Fault at PEN 230kV, trip PEN to ES 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at PQ 230kV, trip PQ to OLD TOWN 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at SANLUSRY 230kV, trip SA to EA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at TALEGA 230kV, trip S.ONOFRE to TALEGA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO Fault at PQ 230kV, trip PQ to SX 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at SILVERGT 230kV, trip SILVERGT to BAY BLVD 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO Fault at IV 230kV, trip IMPRLVLY PFC to ROA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO Fault at TA 230kV, trip TA-ESC-CP 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at MIGUEL 230, trip MIGUEL to BAY BLVD to OTAY MESA 230kV	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at OLD TOWN 230kV, trip OT-MS-SG 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at ML230, trip ML230 bus	P2	Bus	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BQ-138 Bus BATIQUITOS 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUE-138 BUS BUE 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
CAN-138 BUS CANNON 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
CP-138 Bus CAPISTRANO 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
ECO-138 BUS EAST COUNTY 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
FR-138 BUS FRIARS 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
GHL-138 BUS GRANT HILL 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
MS-230 Bus MISSION 230kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
MS-138 Bus MISSION 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
PAR-138 BUS PALOMAR AIRPORT 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
PEN-230 BUS PALOMAR ENERGY 230kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
PI-138 BUS PICO 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
PV-138 BUS PROCTAR VALLEY 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
RMV-138 BUS RANCHO MISSION VIEJO 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SA-230 BUS SAN LUIS REY 230KV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SN-138 BUS SANTEE 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SH-138 BUS SHADOW RIDGE 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SG-230 BUS SILVERGATE 230KV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SX-138 BUS SYCAMORE CANYON 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2032 Spring Off-Peak	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	
TA-138 BUS TALEGA 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
TC-138 BUS TELEGRAPH CANYON 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at MIGUEL 230, trip both lines MIGUEL to MISSION 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO Fault at SANLUSRY 230, trip TL23002 AND TL23006 SANLUSRY to S.ONOFRE 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO Fault at S.ONOFRE 230, trip SO-SANTIAGO 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
3PH Fault at SANLUSRY 230kV, trip SANLUSRY to MISSION 230kV 1 & 2	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
Fault at OTAYMESA 230kV, trip TL23041 AND TL23042	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO Fault at MIGUEL 230, trip MIGUEL to SYCAMORE and MIGUEL to SYCAMORE to OTAYMESA 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO Fault at SANLUSRY 230kV, trip SA-EA AND SA-EATAP 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO Fault at PEN230, trip PEN-AR 230kV AND PEN-ENCINATP 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load	2035 Summer Peak with ATE load		

No single contingency resulted in total load drop of more than 250 MW



Substation	Load Served (MW)									Potential Mitigation Solutions	
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 Summer Peak Heavy Renewable & Minimum Gas Generation	2024 Spring Off-Peak Storage charging in load pockets	2027 Summer Peak High CEC forecasted load		2035 Summer Peak with ATE load

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 SP High Forecasted Load	2027 SP High Forecasted Load	2024 OP Heavy Renewable Output	
18003 AMARGOSA 230 189001 AMARGOSA 138 1 1	line_1_Line NWest 230.0 to DESERT VIEW 230.0 Circuit 1 AND line_32_Line TROUT CANYON 230.0 to SLOAN CANYON 230.0 Circuit 1	P6	N-1-1	< 100	116.6	< 100	< 100	140.2	< 100	< 100	133.3	< 100	Short term: Sloan Canyon RAS and existing UVLS Long term: GLW Upgrade
	line_18_Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 AND line_23_Line GAMEBIRD 230.0 to TROUT CANYON 230.0 Circuit 1	P6	N-1-1	108.2	145.4	< 100	< 100	< 100	< 100	121.1	166.6	< 100	Short term: existing UVLS Long term: GLW Upgrade
18073 IS TAP 138 189101 MERCRYSW 138 1 1	line_1_Line NWest 230.0 to DESERT VIEW 230.0 Circuit 1 AND line_23_Line GAMEBIRD 230.0 to TROUT CANYON 230.0 Circuit 1	P6	N-1-1	< 100	139.4	< 100	< 100	< 100	< 100	112.7	165.2	< 100	Short term: existing UVLS Long term: GLW Upgrade
	line_18_Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 AND line_11_Line PAHRUMP 138.0 to VISTA 138.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	114.9	< 100	< 100	< 100	< 100	Generation redispatch following the first contingency
	line_32_Line TROUT CANYON 230.0 to SLOAN CANYON 230.0 Circuit 1 AND line_18_Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1	P6	N-1-1	< 100	106.3	< 100	< 100	210.2	< 100	< 100	124.9	< 100	Short term: Sloan Canyon RAS and existing UVLS Long term: GLW Upgrade
189000 PAHRUMP 230 189007 PAHRUMP 138 1 1	tran_37_Tran GAMEBIRD 230.00 to GAMEBIRD 138.00 Circuit 1 0.00 AND tran_35_Tran PAHRUMP 230.00 to PAHRUMP 138.00 Circuit 2 0.00	P6	N-1-1	< 100	< 100	106.6	< 100	< 100	< 100	< 100	109.4	< 100	UVLS Rely on 30 minutes emergency rating
189000 PAHRUMP 230 189007 PAHRUMP 138 2 1	tran_37_Tran GAMEBIRD 230.00 to GAMEBIRD 138.00 Circuit 1 0.00 AND tran_34_Tran PAHRUMP 230.00 to PAHRUMP 138.00 Circuit 1 0.00	P6	N-1-1	< 100	< 100	101.9	< 100	< 100	< 100	< 100	107.7	< 100	UVLS Rely on 30 minutes emergency rating
189001 AMARGOSA 138 189008 SANDY 138 1 1	line_18_Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 AND line_23_Line GAMEBIRD 230.0 to TROUT CANYON 230.0 Circuit 1	P6	N-1-1	< 100	103.7	< 100	< 100	< 100	< 100	< 100	119.5	< 100	Short term: existing UVLS Long term: GLW Upgrade
	line_32_Line TROUT CANYON 230.0 to SLOAN CANYON 230.0 Circuit 1 AND line_5_Line PAHRUMP 230.0 to INNOVATION 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	110.5	< 100	< 100	< 100	< 100	Sloan Canyon RAS
189016 INNOVATION 230 189021 DESERT VIEW 230 1 1	gen_54_Gen TROUT CANYON 230.0 Unit ID VE AND line_35_Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	103.8	< 100	< 100	< 100	Generation redispatch following the first contingency
	line_31_Line TROUT CANYON 230.0 to SLOAN CANYON 230.0 Circuit 1 AND line_35_Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	104.2	< 100	< 100	< 100	Generation redispatch following the first contingency
189020 GAMEBIRD 138 189007 PAHRUMP 138 1 1	line_6_Line PAHRUMP 230.0 to GAMEBIRD 230.0 Circuit 1 AND line_32_Line TROUT CANYON 230.0 to SLOAN CANYON 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	102.6	< 100	< 100	< 100	< 100	Sloan Canyon RAS
189043 GAMEBIRD 230 189020 GAMEBIRD 138 1 1	line_32_Line TROUT CANYON 230.0 to SLOAN CANYON 230.0 Circuit 1 AND line_6_Line PAHRUMP 230.0 to GAMEBIRD 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	124.3	< 100	< 100	< 100	< 100	Sloan Canyon RAS
189043 GAMEBIRD 230 189160 TROUT CANYON 230 1 1	line_3_Line MEAD S 230.0 to SLOAN CANYON 230.0 Circuit 1 AND P1-3-16_Eldorado2 230/500-kV Tran Bnk 5	P6	N-1-1	NotConv	116.1	< 100	< 100	NotConv	< 100	NotConv	116.9	NotConv	Short term: Ivanpah RAS and congestion management Long term: GLW Upgrade

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 SP High Forecasted Load	2027 SP High Forecasted Load	2024 OP Heavy Renewable Output	
189100 JACKASSF 138 189101 MERCYSW 138 1 1	line_14_Line VALLEYTP 138.0 to LTHRPWLS 138.0 Circuit 1	P1	N-1	< 100	< 100	106.8	< 100	< 100	< 100	< 100	< 100	< 100	New RAS to trip generation at Beatty Substation Transmission upgrade will be further evaluated in Policy Study
	line_16_Line VALLEYTP 138.0 to VISTA 138.0 Circuit 1 AND line_24_Line JACKASSF 138.0 to STOCK-WASH 138.0 Circuit 1	P6	N-1-1	< 100	< 100	117.1	< 100	< 100	110.6	< 100	< 100	< 100	Generation redispatch following the first contingency
	line_24_Line JACKASSF 138.0 to STOCK-WASH 138.0 Circuit 1 AND line_11_Line PAHRUMP 138.0 to VISTA 138.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	126.1	< 100	< 100	< 100	Generation redispatch following the first contingency
	line_31_Line TROUT CANYON 230.0 to SLOAN CANYON 230.0 Circuit 1 AND line_5_Line PAHRUMP 230.0 to INNOVATION 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	123.0	101.2	< 100	< 100	< 100	Generation redispatch following the first contingency
	P1-3-16_Eldorado2 230/500-kV Tran Bnk 5 AND line_3_Line MEAD S 230.0 to SLOAN CANYON 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	NotConv	< 100	< 100	< 100	NotConv	Ivanpah RAS and Congestion management
	P4-2-3_VALLEYTP-LTHRPWLS 138 & VALLEYTP-VALLEYVE 138 & VALLEYTP-JOHNIE 138	P4	Stuck breaker	< 100	< 100	106.8	< 100	< 100	< 100	< 100	< 100	< 100	New RAS to trip generation at Beatty Substation Transmission upgrade will be further evaluated in Policy Study
	P5-1-21_VALLEYTP SUBSTATION 138-kV	P5	Non-redundant Relay	< 100	< 100	106.8	< 100	< 100	< 100	< 100	< 100	< 100	Install redundant relay New RAS to trip generation at Beatty Substation Transmission upgrade will be further evaluated in Policy Study
STOCKWASH - VALLEY_NTS - TWEEZER - FRENCH FLAT - MERC DIST - MERCURY SW 138	line_11_Line PAHRUMP 138.0 to VISTA 138.0 Circuit 1 AND line_23_Line JACKASSF 138.0 to MERCYSW 138.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	128.9	< 100	< 100	< 100	Generation redispatch following the first contingency
	line_23_Line JACKASSF 138.0 to MERCYSW 138.0 Circuit 1 AND line_14_Line VALLEYTP 138.0 to LTHRPWLS 138.0 Circuit 1	P6	N-1-1	< 100	< 100	136.2	< 100	< 100	< 100	< 100	< 100	< 100	Generation redispatch following the first contingency
	line_23_Line JACKASSF 138.0 to MERCYSW 138.0 Circuit 1 AND line_16_Line VALLEYTP 138.0 to VISTA 138.0 Circuit 1	P6	N-1-1	< 100	< 100	117.8	< 100	< 100	114.9	< 100	< 100	< 100	Generation redispatch following the first contingency
189160 TROUT CANYON 230 189040 SLOAN CANYON 230 1 1	line_3_Line MEAD S 230.0 to SLOAN CANYON 230.0 Circuit 1 AND P1-3-16_Eldorado2 230/500-kV Tran Bnk 5	P6	N-1-1	NotConv	106.8	< 100	< 100	NotConv	< 100	NotConv	107.5	NotConv	Short term: Ivanpah RAS and congestion management Long term: GLW Upgrade
18073 IS TAP 138 18091 RADAR 138 1 1	NWEST 230.0 to DESERT VIEW 230.0 Circuit 1 and 2	P7	DCTL	N/A	N/A	105.4	N/A	N/A	105.4	N/A	N/A	N/A	Innovation RAS Upgrade will be further evaluated in Policy Study

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 SP High Forecasted Load	2027 SP High Forecasted Load	2024 OP Heavy Renewable Output	
Charleston-Thousandair-Gamebird-Sandy 138kV	tran_46_Tran GAMEBIRD 230.00 to GAMEBIRD 138.00 Circuit 1 0.00 AND line_20_Line GAMEBIRD 138.0 to PAHRUMP 138.0 Circuit 1	P6	N-1-1	L	0.83	0.82	0.83	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.76	0.72	0.9 < V < 1.1	Existing UVLS
Gamebird-Pahrump-Innovation 230kV	line_18_Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 AND line_23_Line GAMEBIRD 230.0 to TROUT CANYON 230.0 Circuit 1	P6	N-1-1	L	0.80	0.75	0.9 < V < 1.1	0.81	0.88	0.9 < V < 1.1	0.77	0.67	0.88	Short term: existing UVLS Long term: GLW Upgrade
Pahrump-Gamebird-Charleston-Thousandair-Sandy-Vista 138kV	line_18_Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 AND line_23_Line GAMEBIRD 230.0 to TROUT CANYON 230.0 Circuit 1	P6	N-1-1	L	0.88	0.83	0.9 < V < 1.1	0.89	0.9 < V < 1.1	0.9 < V < 1.1	0.84	0.73	0.9 < V < 1.1	Short term: existing UVLS Long term: GLW Upgrade

2022-2023 ISO Reliability Assessment - Study Results

Study Area: **Valley Electric Association**

*Voltage Deviation*



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage Deviation % (Baseline Scenarios)						Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 SP High Forecasted Load	2027 SP High Forecasted Load	2024 OP Heavy Renewable Output	

No voltage deviation greater than 8% following P1 and P3 contingencies



Study Area: **Valley Electric Association**



**Single Contingency Load Drop**

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions
			2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 SP High Forecasted Load	2027 SP High Forecasted Load	2024 OP Heavy Renewable Output	

No single contingency resulted in total load drop of more than 250 MW

Study Area: **Valley Electric Association**



**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)									Potential Mitigation Solutions
	2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2032 Spring Off-Peak	2024 SP High Forecasted Load	2027 SP High Forecasted Load	2024 OP Heavy Renewable Output	

No single source substation with more than 100 MW