

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 SP with Additional Transportation Electrification	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	
24593 MW_VINCNT_21 500 24592 MW_VINCNT_22 500 2 1	P1DC_PDCI_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		rely upon generation redispatch after the initial contingency, bypass series capacitors, and along with existing Path 26 and PDCI RASs curtailing generation as needed. Due to the Up to about 1500 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. Since the total net amount of generation tripped by RAS for a single contingency cannot exceed 1150 MW, significant amount of generation needs to be curtailed after the first contingency to eliminate the P6 overloads.
	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_PDCI_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_PDCI_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_WRLWIND_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		rely upon the planned Tehachapi cRAS to drop generation in the Tehachapi area, along with operational mitigation after the first contingency to curtail generation in the Wirlwind and Windhub area as needed. Since the total net amount of generation tripped by RAS for a single contingency cannot exceed 1150 MW, up to about 1500 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 overloads for the P2/P4 and P5 outages need to be investigated to make sure if or not the existing and planned cRAS can address the concerns.
	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		
29400 ANTELOPE 500 29402 WIRLWIND 500 1 1	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		
	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		
	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		

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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 SP with Additional Transportation Electrification	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	S3: 2024 OP Sensitivity	
	LP2_88102_Line MIDWAY 500.0 to WIRLWIND 500.0 Circuit 3 Line WIRLWIND 500.0 to VINCENT 500.0 Circuit 3	P2	Internal Breaker Fault								100.8		
	L_T_P4_008_Whirlwind - Vincent 500 kv line and Whirlwind - Midway 500 kv line	P4	stuck breaker								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		Operational mitigation to curtail generation in the Tehachapi area after the first contingency, and bypass series capacitors as needed.
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 market should be capable to dispatch available resources including energy storage and demand response (RDRR) after the first or second contingency by using the 1-hour short term emergency ratings. The use of storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed.
	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		
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		the market should be capable to dispatch available resources including energy storage and demand response (RDRR) after the first or second contingency by using the 1-hour short term emergency ratings. The use of storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed. However, further evaluation is needed to make sure if or not there are sufficient resources in the West LA basin to eliminate the overload concern
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	The long term or 1-hour short term emergency ratings of Serrano 500/230 kV banks should be used for the market to dispatch available resources including energy storage and demand response (RDRR) after the first or second contingency. The use of storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed. However, further evaluation is needed to make sure if or not there are sufficient resources in the West LA basin to eliminate the overload concern
	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	
	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	
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	

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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 SP with Additional Transportation Electrification	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	
	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	
	LP1_100093_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P1	Single Contingency				95.0	108.4			106.2	100.8	
24114 PARDEE 230 24217 WARNETAP 230 1 1	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	Reduce generation output from Pastoria Energy Facility to eliminate the P1 and P6 post-contingency overloads
	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										
	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	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	
24114 PARDEE 230 26098 SYLMAR220 230 #1 or #2	P1L_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	
24021 CENTER 230 24393 MESACALS 230 1 1	P5_ab_BD_001_Serrano 500 kv East Bus	P5	Non-Redundant Relay								104.8		Dispatch available resources including energy storage and demand response (RDRR) 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. However, further evaluation is needed to make sure if or not there are sufficient resources in the West LA basin to eliminate the overload concern; In addition, further investigation is recommended to evaluate the need for the P5 contingency to upgrade the Serrano 500 kv East bus protection.
	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	
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								124.51		Dispatch available resources including energy storage and demand response (RDRR) in the West LA Basin after the 1st contingency or pre-contingency for the P7 contingencies; and upgrade the Serrano 500 kv East bus protection. The use of storage is subject to verification that it has
	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								123.9		
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 contingency or pre-contingency for the P7 contingencies; and upgrade the Serrano 500 kv East bus protection. The use of storage is subject to verification that it has
	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		

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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 SP with Additional Transportation Electrification	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	
	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		storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed. However, further evaluation is needed to make sure if or not there are sufficient resources in the West LA basin to eliminate the overload concern
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		
	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		Dispatch available resources including energy storage and demand response (RDRR) for 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. However, further evaluation is needed to make sure if or not there are sufficient resources in the West LA basin to eliminate the overload concern
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	Internal Breaker Fault	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 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	P4	stuck breaker	144.0				97.3	138.0		127.5	112.5	

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 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		
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 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		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:

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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 SP with Additional Transportation Electrification	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
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-Vincent 500kV	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 MW_Wrlwind_32-Wirlwind 500kV	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 MW_Wrlwind_32-Wirlwind 500kV	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 Eldordo-Eld_Lugo_11 500kV	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 & Cap Bank	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 Bank	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
31_Vincent500kV_P2.3: 1PH 4 cycle fault at Vincent 500kV w/ loss of Mesa-Vincent 500kV & Midway-Vincent No.2 500kV w/ series cap bypass of MW_Vincent_12-Vincent500kV	P2	Internal Breaker Fault	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 SP with Additional Transportation Electrification	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity	
32_Vincent500kV_P2.3: 1PH 4 cycle fault at Vincent 500kV w/ loss of Antelope-Vincent No.1 500kV & Lugo-Vincent No.2 500kV w/ series cap bypass of MW_Vincnt_22-Vincent500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
33_Whirlwind500kV_P2.3: 1PH 4 cycle fault at Vincent 500kV w/ loss of Midway-Whirlwind 500kV & Vincent-Whirlwind 500kV w/ series cap bypass of MW_Vincent_12-Vincent500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
34_Lugo500kV_P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Rancho Vista 500kV & Lugo-Vincent No.1 500kV w/ series cap bypass of Eld_Lugo_14-Lugo500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
35_Lugo500kV_P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Vincent No.2 500kV & Lugo-Victorville 500kV w/ series cap bypass of Lugo-Lgo_Mohve_11_500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
36_Lugo500kV_P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Mira Loma No.2 500kV & Eldorado-Lugo 500kV w/ series cap bypass of Lugo-Lgo_Mohve_11_500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
37_Lugo500kV_P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Mira Loma No.3 500kV & Lugo-Mohave 500kV w/ series cap bypass of Eld_Lugo_14-Lugo500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
44_Devers500kV_P2.3: 1PH 4 cycle fault at Devers 500kV w/ loss of Devers-Red Bluff No.1 500kV & Devers-Valley No.1 500kV including loss of Devers SVCs & Cap Bank	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
45_MiraLoma500kV_P2.3: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mira Loma-Rancho Vista 500kV & Mira Loma-Serrano No.1 500kV including loss of Devers SVCs & Cap Bank	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
46_Sylmar230kV_P4: 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_P4: 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_P4: 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_P4: 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_P4: 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_P4: 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_P4: 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_P4: 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

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 SP with Additional Transportation Electrification	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity	
55_Lugo500kV_P4: 3Ph line fault on Lugo-Rancho Vista 500 kV with stuck breaker at Lugo followed by loss of Lugo-Vincent No.1 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
56_Lugo500kV_P4: 3Ph line fault on Lugo-Vincent No.2 500 kV with stuck breaker at Lugo followed by loss of Lugo-Victorville 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
57_MiraLoma500kV_P4: 3Ph line fault on Mira Loma-Rancho Vista 500 kV with stuck breaker at Mira Loma followed by loss of Mira Loma-Serrano No.1 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
59_MiraLoma230kV_P4: 3Ph line fault on Mira Loma-Olinda 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma No.3 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
60_MiraLoma230kV_P4: 3Ph line fault on Mira Loma-Rancho Vista No.1 230 kV with stuck breaker at Mira Loma followed by loss of Mira Loma-Vista No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
61_RanchoVista230kV_P4: 3Ph line fault on Etiwanda-Rancho Vista No.1 230 kV with stuck breaker at Rancho Vista followed by loss of Mira Loma-Rancho Vista No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
62_RanchoVista230kV_P4: 3Ph line fault on Padua-Rancho Vista No.1 230 kV with stuck breaker at Rancho Vista followed by loss of Etiwanda-Rancho Vista No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
63_Serrano230kV_P4: 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_P4: 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
67_Vincent230kV_P4: 3Ph line fault on Mesa-Vincent No.2 230 kV with stuck breaker at Vincent followed by loss of Santa Clara-Vincent 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
68_Vincent230kV_P4: 3Ph line fault on Pardee-Vincent No.1 230 kV with stuck breaker at Vincent followed by loss of Mesa-Vincent No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
69_Whirlwind500kV_P4: 3Ph line fault on Midway-Whirlwind 500 kV with stuck breaker at Whirlwind followed by loss of Vincent-Whirlwind 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
70_Chino230kV_P4: 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
73_Goodrich230kV_P4: 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_P4: 3Ph line fault on Hinson-Lighthipe 230 kV with stuck breaker at Hinson followed by loss of Hinson-Harborgren 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
75_Olinda230kV_P4: 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_P4: 3Ph line fault on Mesa-Rio Hondo No.2 230 kV with stuck breaker at Rio Hondo followed by loss of Rio Hondo-Vincent No.2 230 kV	P4	stuck breaker	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 SP with Additional Transportation Electrification	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity	
79_Santiago230kV_P4: 3Ph line fault on SONGS-Santiago No.2 230 kV with stuck breaker at Santiago followed by loss of Ellis-Santiago 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
80_Pardee230kV_P4: 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_P4: 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_P4: 3Ph line fault on Pardee-Santa Clara 230 kV with stuck breaker at Pardee followed by loss of Pardee-Pastoria-Warne 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
83_Pardee230kV_P4: 3Ph line fault on Moor Park-Pardee No.1 230 kV with stuck breaker at Pardee followed by loss of Pardee-Sylmar No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
84_Pardee230kV_P4: 3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Pardee followed by loss of Moor Park-Pardee No.3 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
85_VillaPark230kV_P4: 3Ph line fault on Barre-Villa Park 230 kV with stuck breaker at Villa Park followed by loss of Serrano-Villa Park No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
86_Lewis230kV_P4: 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_P4: 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
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
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

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 SP with Additional Transportation Electrification	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity	
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 Alamos-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
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

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 SP with Additional Transportation Electrification	S1: 2027 SP High CEC Forecast	S3: 2024 OP Sensitivity		
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	
P5_ab_BD_001_P5: Serrano 500 kv East Bus	P5	Delayed Clearing	Stable	Stable	Stable	Stable	Stable	Stable	criteria met
P5_ab_BD_027_P5: Rancho Vista 220 kv East Bus	P5	Delayed Clearing	Stable	Stable	Stable	Stable	Stable	Stable	criteria met
P5_ab_BD_029_P5: Viejo 220 kv North Bus	P5	Delayed Clearing	Stable	Stable	Stable	Stable	Stable	Stable	criteria met

Study Area: **Southern California Bulk**



**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 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 single contingency resulted in total load drop of more than 250 MW

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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 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 single source substation with more than 100 MW