2026-2027 ISO Reliability Assessment - Final Study Results
Study Area: Southern Bulk
Thermal Overloads

California ISO

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)							Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1 2028 Summer Peak	B2 2031 Summer Peak	B3 2036 Summer Peak	B4 2041 Summer Peak	B5 2036 Summer-Off Peak	B7 2028 Spring Off-Peak	B8 2031 Spring Off-Peak	S1 2031 SP High CEC Load	S2 2028 SP High Renewable	S3 2028 SprOP ES-Charging	
30060 MIDWAY 500 24591 MW_VINCNT_11 500 1 1	P1L26_2_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2	P1	Single Contingency	136.0	< 100	< 100	117.5	< 100	< 100	< 100	< 100	101.1	< 100	
	P1L26_2_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2 AND P1L26_3_Line MIDWAY 500.0 to WIRLWIND 500.0 Circuit 3	P6	overlapping singles	176.8	126.2	126.5	175.5	< 100	< 100	124.5	< 100	< 100	< 100	
24592 MW_VINCNT_22 500 24156 VINCENT 500 2 1	P1L26_1_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1	P1	Single Contingency	136.3	< 100	< 100	116.5	< 100	< 100	< 100	< 100	101.8	< 100	1. Coordinate with Policy and Economic Studies to evaluate capital projects and operational mitigation measures including a new RAS, to address the severe P1 and P6 overloads under high Path 26 north-to-south flows (up to the 4,000 MW limit in B1/B4). The 4-hour ratings, rather than the 30-minute ratings, of the Midway–Vincent #1 and #2 500 kV lines were applied in the assessment, to comply with FAC-014 and maintain consistency with ISO Operating Procedure OP6410. 2. Credible N-2 overloads under high Path 26 north-to-south flows in B1/B4 can be mitigated through the PG&E Path 26 RAS curtailing generation and the SCE Path 26 RAS shedding load; 3. P6 overloads under high Path 26 flows at the -3,000 MW S2N limit (B2/B3) can be mitigated through post-contingency operational actions that reduce Path 26 flow S2N after the 1st contingency.
	P1L26_1_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1 AND P1L26_3_Line MIDWAY 500.0 to WIRLWIND 500.0 Circuit 3	P6	overlapping singles	175.8	126.6	126.8	173.9	< 100	< 100	125.1	< 100	< 100	< 100	
30060 MIDWAY 500 24595 MW_WRLWND_31 500 3 1	P1L26_1_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 1 AND P1L26_2_Line MIDWAY 500.0 to VINCENT 500.0 Circuit 2	P6	overlapping singles	114.1	< 100	< 100	113.3	< 100	< 100	< 100	< 100	< 100	< 100	
24594 MW_WRLWND_32 500 29402 WIRLWIND 500 3 1	N2_1P26_N2S_NoRAS_MIDWAY-Vincent 500kV N-2 W/O Path26 RAS or OP	N2	Credible Common Corridor	114.0	< 100	< 100	112.9	< 100	< 100	< 100	< 100	< 100	< 100	
	N2_2P26_N2S_PGE-RAS_MIDWAY-Vincent 500kV N-2 WITH Path26 PGE N2S RAS	N2	Credible Common Corridor	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	N2_3P26_N2S_SCE-RAS_MIDWAY-Vincent 500kV N-2 WITH Path26 SCE N2S RAS	N2	Credible Common Corridor	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	N2_4P26_N2S_RAS1_MIDWAY-Vincent 500kV N-2 WITH Path26 N2S RAS	N2	Credible Common Corridor	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	N2_6P26_S2N_OP_MIDWAY-Vincent 500kV N-2 WITH Path26 S2N OP	N2	Credible Common Corridor	107.6	< 100	< 100	100.8	< 100	< 100	< 100	< 100	< 100	< 100	
24156 VINCENT 500 29402 WIRLWIND 500 3 1	P1L_156_P1.2 Loss of Antelope-Windhub No.1 500 kV line AND P1L_157_P1.2 Loss of Antelope-Wirlwind No.1 500 kV line	P6	overlapping singles	115.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	150.7	< 100	
29402 WIRLWIND 500 29401 WINDHUB 500 1 1	P1L_156_P1.2 Loss of Antelope-Windhub No.1 500 kV line	P1	Single Contingency	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	134.8	< 100	
29400 ANTELOPE 500 24156 VINCENT 500 1 1	P1L_155_P1.2 Loss of Antelope-Vincent No.2 500 kV line	P1	Single Contingency	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.4	< 100	
	P1L_104_P1.2 Loss of Vincent-Wirlwind No.3 500 kV line AND P1L_155_P1.2 Loss of Antelope-Vincent No.2 500 kV line	P6	overlapping singles	128.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	160.1	< 100	
29400 ANTELOPE 500 24156 VINCENT 500 2 1	P1L_154_P1.2 Loss of Antelope-Vincent No.1 500 kV line	P1	Single Contingency	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.4	< 100	Rely on operational mitigation measures to eliminate P1, P2, P4, and P6 overloads, such as operational mitigation actions including Tehachapi CRAS and congestion management curtaining generation in the Northern area prior to or after the first contingency. The P4 overload of the Antelope-Whirlwind 500 kV T/L in the high renewable sensitivity scenario could be mitigated by relocating the 500 kV lines at Whirlwind 500 kV substation
	P1L_104_P1.2 Loss of Vincent-Wirlwind No.3 500 kV line AND P1L_154_P1.2 Loss of Antelope-Vincent No.1 500 kV line	P6	overlapping singles	128.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	160.1	< 100	
29400 ANTELOPE 500 29401 WINDHUB 500 1 1	P1L_158_P1.2 Loss of Wirlwind-Windhub No.1 500 kV line	P1	Single Contingency	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	135.7	< 100	
	line_T_P4_11_Windhub 1AA bank and Windhub-Whirlwind 500 kV line	P2/P4	Internal Breaker Fault /stuck breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	140.0	< 100	
	P1L_104_P1.2 Loss of Vincent-Wirlwind No.3 500 kV line AND P1L_157_P1.2 Loss of Antelope-Wirlwind No.1 500 kV line	P6	overlapping singles	110.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	136.6	< 100	
29400 ANTELOPE 500 29402 WIRLWIND 500 1 1	line_T_P4_8_Whirlwind - Vincent 500 kV line and Whirlwind - Midway 500 kV line	P2/P4	Internal Breaker Fault /stuck breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.5	< 100	
	P1L_156_P1.2 Loss of Antelope-Windhub No.1 500 kV line AND P1L_104_P1.2 Loss of Vincent-Wirlwind No.3 500 kV line	P6	overlapping singles	127.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	156.1	< 100	
24042 ELDORDO 500 26048 MCCULLGH 500 1 1	P1L_181_P1.2 Loss of Moen-Eld Sc3-Eldordo No.1 500 kV line AND P1L_318_P1.2 Loss of H Allen-Mead No.1 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	With the completion of the Trout Canyon - Lugo 500 kV project, the P6 overloads of Eldorado-McCullough 500 kV tie with LADWP would be significantly reduced (e.g. from 160% in the last TPP to less than 120%) , which could be eliminated by modifying the Lugo-Victorville RAS. Further evaluation is needed while interconnecting additional out-of-state wind resources as they are materialized.
	P1L_181_P1.2 Loss of Moen-Eld Sc3-Eldordo No.1 500 kV line AND P1L_5_P1.2 Loss of Lugo-Mohave No.1 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	P1L_186_P1.2 Loss of Lugo-Trout Canyon No.1 500 kV line AND P1L_318_P1.2 Loss of H Allen-Mead No.1 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	P1L_186_P1.2 Loss of Lugo-Trout Canyon No.1 500 kV line AND P1L_5_P1.2 Loss of Lugo-Mohave No.1 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	P1L_186_P1.2 Loss of Lugo-Trout Canyon No.1 500 kV line AND P1L_6_P1.2 Loss of Eldordo-Lugo No.1 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	102.8	< 100	< 100	< 100	< 100	< 100	
	P1L_6_P1.2 Loss of Eldordo-Lugo No.1 500 kV line AND P1L_5_P1.2 Loss of Lugo-Mohave No.1 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	106.4	< 100	< 100	< 100	< 100	< 100	
29253 DVRS_RB_12 500 24374 REDBLUFF 500 1 1	P1L_9_P1.2 Loss of Devers-Redbluff No.2 500 kV line	P1	Single Contingency	123.9	100.0	< 100	< 100	< 100	< 100	< 100	102.8	147.7	< 100	
	P1G_253_P1.1 Loss of Mountainview Block 1 AND P1L_9_P1.2 Loss of Devers-Redbluff No.2 500 kV line	P3	G-1/L-1	127.8	101.7	< 100	< 100	< 100	< 100	< 100	104.5	151.8	< 100	
	P1L_1_P1.2 Loss of Palovrde-Colriver No.1 500 kV line AND P1L_9_P1.2 Loss of Devers-Redbluff No.2 500 kV line	P6	overlapping singles	133.9	102.8	< 100	< 100	< 100	< 100	< 100	105.1	163.6	< 100	
	P1L_342_P1.2 Loss of Delaney-Cielo Azul No.1 500 kV line AND P1L_9_P1.2 Loss of Devers-Redbluff No.2 500 kV line	P6	overlapping singles	148.2	111.0	< 100	< 100	< 100	< 100	< 100	113.3	NotConv	< 100	
	P1L_9_P1.2 Loss of Devers-Redbluff No.2 500 kV line AND P1L_170_P1.2 Loss of N.Gila-Imprlvly No.1 500 kV line	P6	overlapping singles	138.8	106.5	< 100	< 100	< 100	< 100	< 100	110.5	166.0	< 100	

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				B1 2028 Summer Peak	B2 2031 Summer Peak	B3 2036 Summer Peak	B4 2041 Summer Peak	B5 2036 Summer-Off Peak	B7 2028 Spring Off-Peak	B8 2031 Spring Off-Peak	S1 2031 SP High CEC Load	S2 2028 SP High Renewable	S3 2028 SprOP ES-Charging	
	P1L_314_P1.2 Loss of Delaney-Snvly No.1 500 kV line AND P1L_9_P1.2 Loss of Devers-Redbluff No.2 500 kV line	P7	common structure	129.9	104.9	< 100	< 100	< 100	< 100	< 100	107.5	154.9	< 100	
29255 DVRS_RB_22 500 24374 REDBLUFF 500 2 1	P1L_8_P1.2 Loss of Devers-Redbluff No.1 500 kV line	P1	Single Contingency	121.6	< 100	< 100	< 100	< 100	< 100	< 100	102.7	144.9	< 100	
	P1L_342_P1.2 Loss of Delaney-Cielo Azul No.1 500 kV line AND P1L_8_P1.2 Loss of Devers-Redbluff No.1 500 kV line	P6	overlapping singles	145.2	110.8	< 100	< 100	< 100	< 100	< 100	113.1	NotConv	< 100	
	P1L_8_P1.2 Loss of Devers-Redbluff No.1 500 kV line AND P1L_170_P1.2 Loss of N.Gila-Imprlvly No.1 500 kV line	P6	overlapping singles	136.0	106.4	< 100	< 100	< 100	< 100	< 100	110.4	162.8	< 100	The P1, P3, P6, and P7 overloads could be mitigated by existing RAS and operational mitigation actions, such as curtailing generation in the SCE Eastern, MWD, IID, and the DCRT systems
24801 DEVERS 500 29252 DVRS_RB_11 500 1 1	P1L_9_P1.2 Loss of Devers-Redbluff No.2 500 kV line	P1	Single Contingency	125.2	101.1	< 100	< 100	< 100	< 100	< 100	103.9	149.2	< 100	
	P1L_170_P1.2 Loss of N.Gila-Imprlvly No.1 500 kV line AND P1L_9_P1.2 Loss of Devers-Redbluff No.2 500 kV line	P6	overlapping singles	140.4	107.8	< 100	< 100	< 100	< 100	< 100	111.7	168.3	< 100	
	P1L_342_P1.2 Loss of Delaney-Cielo Azul No.1 500 kV line AND P1L_9_P1.2 Loss of Devers-Redbluff No.2 500 kV line	P6	overlapping singles	149.8	112.2	< 100	< 100	< 100	< 100	< 100	114.5	NotConv	< 100	
	P1L_9_P1.2 Loss of Devers-Redbluff No.2 500 kV line AND P1L_314_P1.2 Loss of Delaney-Snvly No.1 500 kV line	P6	overlapping singles	131.0	105.8	< 100	< 100	< 100	< 100	< 100	108.4	155.7	< 100	
	P1L_9_P1.2 Loss of Devers-Redbluff No.2 500 kV line AND P1L_1_P1.2 Loss of Palovrde-Colriver No.1 500 kV line	P6	overlapping singles	135.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	164.8	< 100	
	P1L_8_P1.2 Loss of Devers-Redbluff No.1 500 kV line AND P1L_342_P1.2 Loss of Delaney-Cielo Azul No.1 500 kV line	P6	overlapping singles	145.1	110.6	< 100	< 100	< 100	< 100	< 100	112.9	NotConv	< 100	
24801 DEVERS 500 24151 VALLEYSC 500 1 1	P1L_126_P1.2 Loss of Devers-Valleysc No.2 500 kV line	P1	Single Contingency	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	P1L_126_P1.2 Loss of Devers-Valleysc No.2 500 kV line AND P1L_342_P1.2 Loss of Delaney-Cielo Azul No.1 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.4	< 100	
24086 LUGO 500 24092 MIRALOMA 500 2 1	P1L_71_P1.2 Loss of Lugo-Miraloma No.3 500 kV line AND P1L_74_P1.2 Loss of Lugo-Ranchvst No.1 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	100.8	< 100	< 100	< 100	< 100	< 100	
24086 LUGO 500 24092 MIRALOMA 500 3 1	P1L_70_P1.2 Loss of Lugo-Miraloma No.2 500 kV line AND P1L_74_P1.2 Loss of Lugo-Ranchvst No.1 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
24086 LUGO 500 24236 RANCHVST 500 1 1	line_M_P7_49_Line LUGO 500.0 to MIRALOMA 500.0 Circuit 2 Line LUGO 500.0 to MIRALOMA 500.0 Circuit 3	P7	common structure	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
24086 LUGO 500 24156 VINCENT 500 1 1	P1L_103_P1.2 Loss of Vincent-Mesa Cal No.1 500 kV line AND P1L_73_P1.2 Loss of Lugo-Vincent No.2 500 kV line	P6	overlapping singles	140.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	151.4	< 100	
24086 LUGO 500 24156 VINCENT 500 2 1	P1L_72_P1.2 Loss of Lugo-Vincent No.1 500 kV line AND P1L_103_P1.2 Loss of Vincent-Mesa Cal No.1 500 kV line	P6	overlapping singles	140.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	NotConv	< 100	
24156 VINCENT 500 24386 MESA CAL 500 1 1	P1L_71_P1.2 Loss of Lugo-Miraloma No.3 500 kV line AND P1L_70_P1.2 Loss of Lugo-Miraloma No.2 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged in order address the P6 and P7 overloads. If the energy storage resources in the Western LA Basin are insufficient or limited to be charged, the need for the following mitigation will be evaluate as alternative and the need date with and without planned storage will be evaluated: 1. Convert the Vincent - Riohondo-Mesa 230 kV line that was built to 500 kV specification to a new Vincent - Mesa 500 kV line
	P1L_73_P1.2 Loss of Lugo-Vincent No.2 500 kV line AND P1L_72_P1.2 Loss of Lugo-Vincent No.1 500 kV line	P6	overlapping singles	119.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	126.8	< 100	
	P1L_74_P1.2 Loss of Lugo-Ranchvst No.1 500 kV line AND P1L_70_P1.2 Loss of Lugo-Miraloma No.2 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	line_M_P7_49_Line LUGO 500.0 to MIRALOMA 500.0 Circuit 2 Line LUGO 500.0 to MIRALOMA 500.0 Circuit 3	P7	common structure	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22357 IV PFC1 230 22358 IV PFC 230 1 1	P1L_167_P1.2 Loss of Imprlvly-Ocotillo No.1 500 kV line AND P1L_176_P1.2 Loss of Eco-Miguel No.1 500 kV line	P6	overlapping singles	155.0	145.1	< 100	< 100	120.5	< 100	< 100	153.6	NotConv	102.3	
22609 OTAYMESA 230 20149 TJI-230 230 1 1	P1L_299_P1.2 Loss of Eco-Miguel No.1 500 kV line AND P1L_167_P1.2 Loss of Imprlvly-Ocotillo No.1 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22930 ECO 500 22468 MIGUEL 500 1 2	P1L_175_P1.2 Loss of Suncrest-Gr1304_Poi No.1 500 kV line AND P1L_306_P1.2 Loss of Imprlvly-Nsongs No.1 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	109.5	< 100	< 100	< 100	< 100	< 100	Reply on the existing operational mitigations including RAS in the SDG&E system
230391 GR1414_POI 500 22360 IMPRLVLY 500 1 1	P1L_134_P1.2 Loss of Alberhil-Valleysc No.1 500 kV line AND P1L_303_P1.2 Loss of N.Gila-Imprlvly No.2 500 kV line	P6	overlapping singles	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
65385 J BRIDGER 345 69997 BRIDG3MIKNL1 345 1 1	N2_5P26_N2S_RAS-OP_MIDWAY-Vincent 500kV N-2 WITH Path26 N2S RAS and OP	N2	Credible Common Corridor	< 100	< 100	101.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Work with TWE for further evaluation

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

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Loading % (Baseline Scenarios)							Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					B1 2028 Summer Peak	B2 2031 Summer Peak	B3 2036 Summer Peak	B4 2041 Summer Peak	B5 2036 Summer-Off Peak	B7 2028 Spring Off-Peak	B8 2031 Spring Off-Peak	S1 2031 SP High CEC Load	S2 2028 SP High Renewable	S3 2028 SprOP ES-Charging	
189161 TROUT CANYON 500 kV	Base Case	P0	Normal System	Low voltage	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.0418	1.04<V<1.08	
24138 SERRANO 500 kV	Base Case	P0	Normal System	Low voltage	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.0393	1.04<V<1.08	
24151 VALLEYSC 500 kV	Base Case	P0	Normal System	Low voltage	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.0410	1.04<V<1.08	
24156 VINCENT 500 kV	Base Case	P0	Normal System	Low voltage	1.04<V<1.08	1.0761	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.0389	1.04<V<1.08	1. Upon completion of the Lugo 500 kV Reactive Power Reinforcement Project which includes a ±300 Mvar STATCOM and three 200 Mvar switchable capacitor banks to provide a total dynamic reactive power support capability of up to 1,200 Mvar, no significant voltage performance concerns were identified in the SCE 500 kV bulk system surrounding the Lugo 500 kV substationin. 2. The policy-driven Trout Canyon–Lugo 500 kV transmission line project is not expected to materially affect the need for the reactive reinforcement. 3. Further evaluations are required to address the identified voltage performance concerns related to low voltage and/or slow voltage recovery in the Harry Allen, Trout Canyon, Vincent, Mesa, Valley, Denver, and/or Red Bluff areas, along with the excessive high voltage condition that was observed at the Mohave 500 kV bus in real time operation.
24236 RANCHVST 500 kV	Base Case	P0	Normal System	Low voltage	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.0446	1.04<V<1.08	
24374 REDBLUFF 500 kV	Base Case	P0	Normal System	Low voltage	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.0376	1.04<V<1.08	
24386 MESA CAL 500 kV	Base Case	P0	Normal System	Low voltage	1.04<V<1.08	1.0814	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.0763	1.0380	1.04<V<1.08	
24573 HAE SVCL 500 kV	Base Case	P0	Normal System	Low voltage	**1.0295**	**1.0272**	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	**1.0194**	1.0439	**1.0316**	**1.0327**	**1.0207**	
24801 DEVERS 500 kV	Base Case	P0	Normal System	Low voltage	1.04<V<1.08	1.0440	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.0440	**1.0349**	1.04<V<1.08	
24845 ALBERHIL 500 kV	Base Case	P0	Normal System	Low voltage	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	
24900 COLRIVER 500 kV	Base Case	P0	Normal System	Low voltage	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	1.04<V<1.08	
69116 FERRIS 500 kV	P7DC_364_RAS1_P7 Loss TWE DC BIPOLE RAS2	P1	Single Contingency	High Voltage	0.9<V<1.1	0.9<V<1.1	**1.1209**	**1.1179**	**1.1090**	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	Work with TWE for further evaluation

Substation	Contingency	Category	Category Description	Loading % (Baseline Scenarios)							Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1 2028 Summer Peak	B2 2031 Summer Peak	B3 2036 Summer Peak	B4 2041 Summer Peak	B5 2036 Summer-Off Peak	B7 2028 Spring Off-Peak	B8 2031 Spring Off-Peak	S1 2031 SP High CEC Load	S2 2028 SP High Renewable	S3 2028 SprOP ES-Charging	

No voltage deviation more than 8% for P1 contingency

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			B7 2028 Spring Off-Peak	B2 2031 Summer Peak	B3 2036 Summer Peak	B5 2036 Summer Off-Peak	S1 2031 SP High CEC Load	S3 2028 SprOP ES-Charging	
01P1_Lugo500kV: P1.3: 3PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Victorville 500kV	P1	3PG+4Cycle Clear Fault	stable	Valley 115 kV load bus voltage remains below 80% for over 20 seconds	stable	Diverged	Valley 115 kV load bus voltage remains below 80% for over 20 seconds	stable	Potential TPL-001-WECC-CRT R1.3 criteria concern. Further evaluation
1P1_Devers500kV: P1.2: 3PH 4 cycle fault at Devers 230 kV w/ loss of Devers-Valley No.2 500 kV including loss of Devers SVCs & Cap Bank	P1	3PG+4Cycle Clear Fault	stable	Valley 115 kV load bus voltage remains below 80% for over 20 seconds	stable	Valley 115 kV load bus voltage remains below 80% for over 20 seconds	Valley 115 kV load bus voltage remains below 80% for over 20 seconds	stable	Potential TPL-001-WECC-CRT R1.3 criteria concern. Further evaluation
02P1_IV500kV: P1.3: 3PH 4 cycle fault at Imperial Valley 500kV w/ loss of Imperial Valley-North Gila 500kV	P1	3PG+4Cycle Clear Fault	stable	stable	stable	stable	stable	stable	WECC and CAISO criteria met
48P4_Vincent500kV: P4.2: SLG 15 cycle fault on Mesa-Vincent 500 kV w/ stuck breaker at Vincent followed by loss of Midway-Vincent No.2 500 kV	P4	SLG+Stuck Breaker	stable	Valley 115 kV load bus voltage remains below 80% for over 20 seconds	Diverged	Diverged	Valley 115 kV load bus voltage remains below 80% for over 20 seconds	stable	Potential TPL-001-WECC-CRT R1.3 criteria concern. Further evaluation
37P4_Lugo500kV: P4.2: SLG 15 cycle fault on Lugo-Vincent No.2 500 kV w/ stuck breaker at Lugo followed by loss of Lugo-Victorville 500 kV	P4	SLG+Stuck Breaker	stable	stable	stable	Diverged	Valley 115 kV load bus voltage remains below 80% for over 20 seconds	stable	Potential TPL-001-WECC-CRT R1.3 criteria concern. Further evaluation
1P5_ab_BD_017: P5: Laguna Bell 220 kv North Bus	P5	SLG+Delayed Fault Clearing	stable	stable	stable	stable	stable	stable	WECC and CAISO criteria met
72P7_EagleRock230kV: P7.1: SLG 4 cycle fault at Eagle Rock 230 kV w/ loss of Eagle Rock-Mesa & Eagle Rock-Sylmar 230 kV	P7	SLG+4Cycle Clear Fault	stable	stable	stable	stable	stable	stable	WECC and CAISO criteria met
78P7_Mesa500kV: P7.1: SLG 4 cycle fault at Mesa 500 kV w/ loss of Mesa-Vincent 500 kV & Rio Hondo-Vincent No. 2 230 kV	P7	SLG+4Cycle Clear Fault	stable	stable	stable	stable	stable	stable	WECC and CAISO criteria met
79P7_MiraLoma500kV: P7.1: SLG 4 cycle fault at Mira Loma 500 kV w/ loss of Mesa-Mira Loma 500 kV & Chino-Mira Loma No.3 230kV	P7	SLG+4Cycle Clear Fault	stable	stable	stable	Diverged	stable	stable	Further Evaluation
80P7_MiraLoma500kV: P7.1: SLG 4 cycle fault at Mira Loma 500 kV w/ loss of Mira Loma - Serrano No. 1 & No. 2 500 kV w/o RAS	P7	SLG+4Cycle Clear Fault	stable	stable	stable	Diverged	stable	stable	Further Evaluation
81P7_Moorpark230kV: P7.1: SLG 4 cycle fault at Moorpark 230 kV w/ loss of Moorpark-Santa Clara No.1 & No.2 230 kV	P7	SLG+4Cycle Clear Fault	stable	stable	stable	stable	stable	stable	WECC and CAISO criteria met
83P7_SantaClara230kV: P7.1: SLG 4 cycle fault at Santa Clara 230 kV w/ loss of Pardee-Santa Clara & Santa Clara-Vincent 230 kV	P7	SLG+4Cycle Clear Fault	stable	stable	stable	stable	stable	stable	WECC and CAISO criteria met
87P7_PDCI_bipole_SPS: P7.2: SLG fault at Sylmar SCE followed by loss of PDCI Bipole w/ North-to-South flow	P7	SLG+4Cycle Clear Fault	stable	stable	stable	stable	stable	stable	WECC and CAISO criteria met
89P7_Mohave500kV: P7.1: SLG 4 cycle fault at Mohave 500 kV w/ loss of Eldorado-Mohave 500 kV & Lugo-Mohave 500 kV	P7	SLG+4Cycle Clear Fault	stable	stable	Diverged	Diverged	stable	stable	Further Evaluation

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
			B1 2028 Summer Peak	B2 2031 Summer Peak	B3 2036 Summer Peak	B4 2041 Summer Peak	B5 2036 Summer-Off Peak	B7 2028 Spring Off-Peak	B8 2031 Spring Off-Peak	S1 2031 SP High CEC Load	S2 2028 SP High Renewable	S3 2028 SprOP ES-Charging	

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

Substation	Load Served (MW)										Potential Mitigation Solutions
	B1 2028 Summer Peak	B2 2031 Summer Peak	B3 2036 Summer Peak	B4 2041 Summer Peak	B5 2036 Summer-Off Peak	B7 2028 Spring Off-Peak	B8 2031 Spring Off-Peak	S1 2031 SP High CEC Load	S2 2028 SP High Renewable	S3 2028 SprOP ES-Charging	

No single source substation with more than 100 MW