

2023-2024 ISO Reliability Assessment - Preliminary Study Results

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: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew	
24042 ELDORDO 500 26048 MCCULLGH 500 1 1	L-P2LL_3043_Line LUGO 500.0 to MOHAVE 500.0 Circuit 1 Line ELDORDO 500.0 to LUGO 500.0 Circuit 1	P2LL	P2 with LL Equipment out			112.64									The P6 overloads could be eliminated by operational mitigation actions, such as generation curtailment and import reduction, as system adjustment after the first contingency. Stay informed on the future transmission projects to interconnect the out-of-state wind resources and modify the Lugo-Victorville RAS as needed
	L-P6_207692_Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 Line LUGO 500.0 to MOHAVE 500.0 Circuit 1	P6*	overlapping singles			112.78		123.15			113.18				
	L-P6_207699_Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 Line MOHAVE 500.0 to ELDORDO 500.0 Circuit 1	P6*	overlapping singles			96.07		113.46			102.02				
24086 LUGO 500 24156 VINCENT 500 #1 or #2	L-P6_211431_Line LUGO 500.0 to VINCENT 500.0 Circuit 2/1 Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1	P6*	overlapping singles	97.78									123.18		The P7 and P6 overloads in the sensitivity case could be eliminated by operational mitigation, such as curtailing generation in the Tehachapi area and reducing import via Path 26 prior to the P7 contingency and after the first contingency of the P6 events
24156 VINCENT 500 24386 MESA CAL 500 #1 and #2	L-P6_211254_Line LUGO 500.0 to VINCENT 500.0 Circuit 1 Line LUGO 500.0 to VINCENT 500.0 Circuit 2	P6*	overlapping singles	94.34									111.07		
	L-P6_210980_Line LUGO 500.0 to MIRALOMA 500.0 Circuit 2 Line LUGO 500.0 to RANCHVST 500.0 Circuit 1	P6*	overlapping singles			90.2							94.36		
	L-M_P7_0052_Line LUGO 500.0 to MIRALOMA 500.0 Circuit 2 Line LUGO 500.0 to MIRALOMA 500.0 Circuit 3	P7	common structure			90.93							94.72		
24156 VINCENT 500 29402 WIRLWIND 500 3 1	L-P6_220041_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1 Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1	P6*	overlapping singles				90.52						98.45		
	L-P6_219966_Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 1 Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2	P6*	overlapping singles												The P6 overloads with heavy Path 26 flow from north to south could be eliminated by operational mitigation actions including curtailing generation in the Tehachapi area, reducing import via Path 26, and bypassing series cap banks as needed after the first contingency of the P3/P6 events.
24591 MW_VINCNT_11 500 24590 MW_VINCNT_12 500 1 1	L-P6_201792_Line MIDWAY 500.0 to Vincent 500.0 Circuit 2 Line MIDWAY 500.0 to Whirlwind 500.0 Circuit 3	P6*	overlapping singles	127.3							92.4		128.1		
	L-P6_201891_Line MIDWAY 500.0 to Vincent 500.0 Circuit 2 Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3	P6*	overlapping singles	102.22074									107.08		
	L-P6_201950_Line MIDWAY 500.0 to Vincent 500.0 Circuit 2 Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1	P6*	overlapping singles	101.84577									105.3		
24593 MW_VINCNT_21 500 24592 MW_VINCNT_22 500 2 1	L-P6_201598_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line MIDWAY 500.0 to Whirlwind 500.0 Circuit 3	P6*	overlapping singles	129.7							94.36		130.5		
	L-P6_201697_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3	P6*	overlapping singles	105.16234									110.15		
	L-P6_201756_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1	P6*	overlapping singles	104.76994									108.32		
	L-P6_219966_Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 1 Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2	P6*	overlapping singles								101.93				The P6 overloads could be eliminated by operational mitigation actions including curtailing generation in the Tehachapi area, reducing import via Path 26, and bypassing

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				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew	
24594 MW_WRLWIND_32 500 29402 WIRLWIND 500 3 1	L-P6_201597_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line MIDWAY 500.0 to Vincent 500.0 Circuit 2	P6*	overlapping singles	171.7							131.96		173.7		Import or export via Path 26, and bypassing series cap banks as needed after the first contingency of the P6 events. The existing Path 26 RAS could eliminate the power flow divergence for the simultaneous outage of Midway-Vincent #1 and #2 500 kV lines (N-2) under operating scenarios with heavy Path 26 flow from north to south (B1 and S2). However, the overload for the N-2 outage under operating scenario with heavy Path 26 flow from south to north (B8) requires further discussion.
	L_M_P7_P26_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line MIDWAY 500.0 to Vincent 500.0 Circuit 2	N-2	Always Credible Common Corridor	171.7							131.96		173.7		
29400 ANTELOPE 500 24156 VINCENT 500 #1 or #2	L-P6_216298_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2 or 1	P6*	overlapping singles	107.17	113.28	93	113.39					107.41	129.78		The P6 overloads could be eliminated by operational mitigation actions including curtailing generation in the Tehachapi area and reducing import via Path 26 after the first contingency of the P6 events
	L-P6_220006_Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2 or 1 Line WIRLWIND 500.0 to WINDHUB 500.0 Circuit 1	P6*	overlapping singles		90.1								102.29		
	L-P6_217588_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2 or 1	P6*	overlapping singles										104.48		
29400 ANTELOPE 500 29402 WIRLWIND 500 1 1	L-P6_216299_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1	P6*	overlapping singles	121.98	94.05	93.18	99.97						136.8		The P6 overloads will be eliminated by the Antelope-Whirlwind 500 kV line upgrade project approved in the ISO 2022-23 TP
24801 DEVERS 500 29252 DVRS_RB_11 500 #1 or #2	L-P6_216172_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Line DEVERS 500.0 to REDBLUFF 500.0 Circuit 2 or 1	P6*	overlapping singles										105.6		The P6 overloads could be eliminated by operational mitigation actions including curtailing generation in the Eastern area and reducing import via Path 46 after the first contingency of the P6 events
	L-P6_200134_Line PALOVRDE 500.0 to Colorado 500.0 Circuit 1 Line DEVERS 500.0 to REDBLUFF 500.0 Circuit 2 or 1	P6*	overlapping singles										113.09		
	L-P6_218349_Line DEVERS 500.0 to REDBLUFF 500.0 Circuit 2 Line N.GILA 500.0 to IMPRLVLY 500.0 Circuit 1	P6*	overlapping singles	91.22									116.36		
24138 SERRANO 500 24184 serran1i 13.8 1 1	T-P6_245220_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 2SERRAN2T 13.80 Tran SERRANO 500.00 to SERRANO	P6*	overlapping singles	140.06			91.12						128.29		Previously approved 4th Serrano bank project mitigates the P6 overloads
24138 SERRANO 500 24186 serran2i 13.8 2 1	T-P6_245161_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 1SERRAN1T 13.80 Tran SERRANO 500.00 to SERRANO	P6*	overlapping singles	142.7			93.42						130.74		
24156 VINCENT 500 29518 vincer1i 13.8 1 1	L-P6_228287_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Tran VINCENT 500.00 to VINCNT2 230.00 Circuit 4VINC	P6*	overlapping singles	116.04		91.23	94.52						117.5		
24156 VINCENT 500 24190 vincer2i 13.8 2 1	L-P6_228285_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Tran VINCENT 500.00 to VINCENT 230.00 Circuit 3	P6*	overlapping singles	112.9			91.71						120.75		



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				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew	
24016 BARRE 230 24154 VILLA PK 230 1 1	L-P6_203949_Line BARRE 230.0 to LEWIS 230.0 Circuit 1 Line S.ONOFRE 230.0 to SERRANO 230.0 Circuit 1	P6*	overlapping singles	105.19											The P6 and all P7 overloads except the LA CIENEGA - LA FRESA 230 kV line overload could be eliminated by dispatching available resources including energy storage and demand response in the West LA Basin after the 1st event of P6 contingency and 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. Further coordination with SCE protection engineer is required to address the P5 overloads. Approved transmission projects mitigate these concerns in the long-term. The existing El Nido RAS can eliminate the LA CIENEGA - LA FRESA 230 kV line overload for the P7 contingency.
24021 CENTER 230 24393 MESACALS 230 1 1	L_P5_ab_BD_001_Serrano 500 kv East Bus	P5	non-redundant component	111.95			111.13						103.53		
	L_P5_ab_BD_017_Laguna Bell 220 kv North Bus	P5	non-redundant component	97.41			94.02								
	L-P6_210327_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2	P6*	overlapping singles	110.46			109.67						103.05		
	L-P6_217223_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2 Line MESACALS 230.0 to WALNUT 230.0 Circuit 1	P6*	overlapping singles	102.7			99.48						104.56		
	L-P6_229132_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2 Tran MESA CAL 500.00 to MESA CAL 230.00 Circuit 2 MESA	P6*	overlapping singles	106.27			105.76						98.43		
	L-P6_206030_Line DELAMO 230.0 to LAGUBELL 230.0 Circuit 1 Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1	P6*	overlapping singles	101.06											
	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	101.06											
24025 CHINO 230 25656 MIRALOME 230 #3	L-P6_204597_Line CHINO 230.0 to MIRALOMW 230.0 Circuit 1 Line CHINO 230.0 to MIRALOMW 230.0 Circuit 2	P6*	overlapping singles	108.36									92.33		
	L_M_P7_0047_Line CHINO 230.0 to MIRALOMW 230.0 Circuit 1 Line CHINO 230.0 to MIRALOMW 230.0 Circuit 2	P7	common structure	108.36									92.33		
24030 BARRE-W 230 24044 ELLIS 230 #1 or #2	L-P6_204028_Line BARRE 230.0 to LEWIS 230.0 Circuit 1 Line BARRE-W 230.0 to ELLIS 230.0 Circuit 2 or 1	P6*	overlapping singles		108.15		124.54					103.49			
24029 DELAMO 230 24016 BARRE 230 1 1	L_P5_ab_BD_001_Serrano 500 kv East Bus	P5	non-redundant component	107.29									91.04		
24044 ELLIS 230 24134 SANTIAGO 230 1 1	L-P6_207975_Line ELLIS 230.0 to JOHANNA 230.0 Circuit 1 Line N.GILA 500.0 to IMPRLVLY 500.0 Circuit 1	P6*	overlapping singles	111.99	94.76								109.57		
	L-P6_207941_Line ELLIS 230.0 to JOHANNA 230.0 Circuit 1 Line VIEJO 230.0 to CHINO 230.0 Circuit 1	P6*	overlapping singles	111.21									97.46		
	L-P6_207882_Line ELLIS 230.0 to JOHANNA 230.0 Circuit 1 Line S.ONOFRE 230.0 to SERRANO 230.0 Circuit 1	P6*	overlapping singles	111.04									97.25		
24082 LCIENEGA 230 24074 LA FRESA	L-P6_206679_Line EL NIDO 230.0 to LA FRESA 230.0 Circuit 3 Line EL NIDO 230.0 to LA FRESA 230.0 Circuit 4	P6*	overlapping singles		92.31		124.12	101.33				95.03			

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Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLo ad	S2: 2025 SP Sensitivity_HIRe new	S3: 2025 OP Sensitivity_HIRe new	



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: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew	

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
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-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
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 shunt	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 Synchronous Condensers	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 Condensers	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 Condensers	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 Synchronous Condensers	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 Condensers	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



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
22_SanOnofre230kV--P1.2: 3PH 4 cycle fault at San Onofre 230kV w/ loss of San Onofre-Viejo 230kV w/ loss of Santiago Synchronous Condensers	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 Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
25A_Valley500kV--P1.2: 3PH 4 cycle fault at Valley 500kV w/ loss of Serrano-Valley 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
25B_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
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_Vincent_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
38_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Rancho Vista 500kV & Lugo-Vincent No.1 500kV w/ loss of Eld_Lugo_14-Lugo500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
39_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Vincent No.2 500kV & Lugo-Victorville 500kV w/ loss of Lugo-Lgo_Mohve_11 500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
40_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Miraloma No.2 500kV & Eldorado-Lugo 500kV w/ loss of Lugo-Lgo_Mohve_11 500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
41_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Miraloma No.3 500kV & Lugo-Mohave 500kV w/ loss of Eld_Lugo_14-Lugo500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
42_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 w/ loss of EastTS-MiraLoma 500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
43_Santiago230kV--P2.3: 1PH 4 cycle fault at Santiago 230kV w/ loss of Ellis-Santiago 230kV & San Onofre-Santiago No.2 230kV & loss of Santiago Synchronous Condensers	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
54_Devers500kV--P4: 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
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
58_MiraLoma230kV--P4: 3Ph line fault on Mira Loma-Walnut 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma No.2 230 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

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
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
65_Vincent500kV--P4: 3Ph line fault on Mesa-Vincent 500 kV with stuck breaker at Vincent followed by loss of Midway-Vincent No.2 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
66_Vincent500kV--P4: 3Ph line fault on Antelope-Vincent No.1 500 kV with stuck breaker at Vincent followed by loss of Lugo-Vincent No.2 500 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
71_Ellis230kV--P4: 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--P4: 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--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
77_SantaClara230kV--P4: 3Ph line fault on Moorpark-Santa Clara No.1 230 kV with stuck breaker at Santa Clara followed by loss of Goleta-Santa Clara No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
78_SantaClara230kV--P4: 3Ph line fault on Goleta-Santa Clara No.2 230 kV with stuck breaker at Santa Clara followed by loss of Moorpark-Santa Clara No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met

[illegible]



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)											Potential Mitigation Solutions
			B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiL oad	S2: 2025 SP Sensitivity_HiR enew	S3: 2025 OP Sensitivity_HiR enew	

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

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



Substation	Load Served (MW)											Potential Mitigation Solutions
	B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew	

No single source substation with more than 100 MW