

APPENDIX C: Reliability Assessment Study Results

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Control - Inyo 115kV line	INYOKERN - KRAMER 115.0 ck 1 line KRAMER-INYOKERN-RANDSB 115 ck 1	P6	N-1-1	128.24	111.43	Diverge	Diverge	Diverge	117.14	<100	129.22	Diverge	Operating Procedure 7690 would redispatch generation as needed.
Remaining Victor 230/115kV transformer	Loss of the other two Victor 230/115kV transformers	P6	N-1-1	<100	<100	100.41	<100	<100	<100	<100	<100	<100	Monitor load growth; utilize the existing spare transformer
Ivanpah - Mountain Pass 115kV line	KRAMER - COLWATER 115.0 ck 1 Line KRAMER - TORTILLA 115.0 ck 1	P6	N-1-1	<100	<100	Diverge	<100	<100	<100	<100	<100	<100	Operating Procedure 127 would radialize the system at Mountain Pass after the first outage

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Baker, Coolwater, Tortilla 115kV	KRAMER - COLWATER 115.0 ck 1 Line KRAMER - TORTILLA 115.0 ck 1	P6	N-1-1	1.126	1.1338	Diverge	1.1045	1.1383	1.4992	1.1574	1.3163	1.4256	Operating procedure 127 would radialize the system at Mountain Pass; reduce generation output after the first outage

Study Area: **SCE North of Lugo**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)									Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		
None																	

Study Area: **SCE North of Lugo**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Control-Casa Diablo 1150kV (1PH fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Control-Casa Diablo 1150kV (1PH fault at Casa Diablo)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Control-Coso-Haiwee-Inyokern 115kV (1PH fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Control-Coso-Haiwee-Inyokern 115kV (1PH fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Control-Haiwee-Inyokern (Fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Control-Haiwee-Inyokern (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Control-Inyo 115kV (Fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Control-SilverPeak 55kV (Fault at Silver Peak)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Inyokern-Downs 115kV (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Inyokern-McGen-Searles 15kV (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Kramer-Roadway 115kV (Fault at Kramer)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Kramer-Roadway 115kV (Fault at Roadway)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Kramer-Victor 115kV (Fault at Kramer)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Kramer-Victor 115kV (Fault at Victor)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Victor 115kV bus	P5.5	No Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Inyo 115kV bus	P5.5	No Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Control 115/55kV Transforemer Banks	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Kramer 230/115kV Transformer Banks	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Lugo 500/230kV Transformer Banks no RAS	P6	Normal clearing	Unstable	Unstable	Stable/WECC criteria met	WECC criteria not met	Stable/WECC criteria met	Stable/WECC criteria met	HDPP RAS
Lugo 500/230kV Transformer Banks RAS	P6	Normal clearing	WECC criteria not met	WECC criteria not met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Generation redispatch after the first contingency and existing RAS
Kramer-Inyokern-Randsburg Nos.1 & 3 115kV	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Coolwater-Kramer & Coolwater-Seg2-Tortilla 115kV (Fault at Coolwater)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Coolwater-Kramer & Coolwater-Seg2-Tortilla 115kV_OP (Fault at Coolwater)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Coolwater-Kramer & Kramer-Tortilla 115kV (Fault at Kramer)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Coolwater-Kramer & Kramer-Tortilla 115kV_OP (Fault at Kramer)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Kramer-Victor 230kV Nos.1 & 2 no RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Kramer-Victor 230kV Nos.1 & 2 RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Lugo-Victor 230kV Nos.1 & 2 no RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Lugo-Victor 230kV Nos.1 & 2 RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Control-Coso-Inyokern & Control-Inyokern 115kV no RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation

Study Area: **SCE North of Lugo**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Control-Coso-Inyokern & Control-Inyokern 115kV RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Kramer-Victor & Roadway-Victor 115kV	P7	Normal clearing	WECC criteria not met	Stable/WECC criteria met	Stable/WECC criteria met	WECC criteria not met	Stable/WECC criteria met	Stable/WECC criteria met	Mojave RAS
Kramer-Victor & Kramer-Roadway 115kV	P7	Normal clearing	WECC criteria not met	Stable/WECC criteria met	Stable/WECC criteria met	WECC criteria not met	Stable/WECC criteria met	Stable/WECC criteria met	Mojave RAS

Study Area: **SCE North of Lugo**



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions	
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		

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

Study Area: **SCE North of Lugo**



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)									Potential Mitigation Solutions
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Pisgah - Calcite 230kV	Calcite - Lugo 230kV and ES-CALCITE-S	P3	G-1/L-1	NA	NA	<100	NA	NA	109.58	NA	NA	NA	Generation redispatch following first contingency

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
None																

Study Area: **SCE East of Lugo**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)									Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		
None																	

Study Area: **SCE East of Lugo**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Cima-Eldorado-Pisgah No.1 230 kV (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Cima-Eldorado-Pisgah No.1 230 kV (fault at Pisgah)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Lugo-Pisgah No.2 230 kV (fault at Lugo)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Lugo-Pisgah No.2 230 kV (fault at Pisgah)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Eldorado-Mohave 500kV & series cap bypass of Eldorado-Eld_Lugo_11 500kV	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Eldorado-Mohave 500kV & Lugo-Mohave 500kV line shunt	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Eldorado-Lugo and Eldorado-Mohave	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Eldorado-Lugo and Lugo-Mohave	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Eldorado-Mohave and Lugo-Mohave	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation

Study Area: **SCE East of Lugo**



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions	
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		

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

Study Area: **SCE East of Lugo**



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)								Potential Mitigation Solutions	
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

No single source substation with more than 100 MW

Study Area: **SCE Eastern area**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
BLYTHE 161 kV	Open CB372 BLYTHE 161 kV Bus Tie (WALC - SCE), Jh Shunt Reactor	P2/P4	Bus-Tie-Breaker	<1.05	<1.05	<1.05	<1.05	1.11	<1.05	<1.05	<1.05	Reactive device switching
	Open CB372 BLYTHE 161 kV Bus Tie (WALC - SCE), Eagle Shunt Reactor	P2/P4	Bus-Tie-Breaker	<1.05	<1.05	<1.05	<1.05	1.11	<1.05	<1.05	<1.05	Reactive device switching
EAGLE Mtn 161 kV	DEVERS - RED BLUFF 500 kV #1 and DEVERS - RED BLUFF 500 kV #2	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	>0.9	System adjustments after the first contingency

Study Area:

SCE Eastern area



Transient Stability

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
10-Second No-Fault Run	P0	Base Case	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-BlytheSCE 161 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-BlytheSCE 161 kV & Blythe 1CT	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV & Blythe 1CT trip (RAS)	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV	P1	N-1	No Issues	No Issues	WECC criteria not met	No Issues	Diverge	Rely on existing Blythe RAS
Julian Hinds-Mirage 230 kV & Blythe 1CT trip (RAS)	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	Rely on existing Blythe RAS
Colorado River-Palo Verde 500 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River - Red Bluff 500 kV #1	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #1	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Valley 500 kV #1	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Valley-Serrano/Alberhill 500 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers 500/230 AA #2	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds Bus tie CB fail, loss Julian Hinds	P2.4	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 872 stuck at BlytheSCE	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 872 stuck at BlytheSCE & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 70 stuck at EagleMTN	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 70 stuck at EagleMTN & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, CB 407 stuck at EagleMTN	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, CB 407 stuck at EagleMTN & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, CB 307 stuck (close to Iron)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV, CB 405 stuck at EagleMTN	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV, CB 405 stuck at EagleMTN & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV, Stuck CB 509 at J.Hinds	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN 230/161 kV Transformer #5, Stuck CB432 at EagleMTN	P4.3	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN 230/161 kV Transformer #5, Stuck CB432 at EagleMTN & Blythe 1CT trip (RAS)	P4.3	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Valley-Serrano/Alberhill 500 kV with stuck breaker followed by Valley 4AA Bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #1 with stuck breaker followed by Devers-Valley 500 kV #1	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #2 with stuck breaker followed by Devers 1AA bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Mirage 230 kV with stuck breaker followed by Coachell Valley-Mirage 230 kV	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Vista 230 kV #1 with stuck breaker followed by Devers 3A bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Vista 230 kV #2 with stuck breaker followed by Devers-San Bernardino 230 kV	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - El Casco 230 kV with stuck breaker followed by El Casco 2A bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	
Mirage-J.Hinds 230 kV with stuck breaker followed by Mirage-Ramon 230 kV	P4.2	Breaker Failure	No Issues	No Issues	WECC criteria not met	No Issues	Diverge	Rely on existing Blythe RAS
Mirage-J.Hinds 230 kV with stuck breaker followed by Mirage-Ramon 230 kV Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	Rely on existing Blythe RAS
BlytheSCE-EagleMTN 161 kV, non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN Bus, non-redundant relayfail	P5.5	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN Bus & Blythe 1CT trip, non-redundant relay fail	P5.5	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV, non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV & Blythe 1CT trip (RAS), non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV, non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	WECC criteria not met	No Issues	Diverge	Rely on existing Blythe RAS
Julian Hinds-Mirage 230 kV & Blythe 1CT trip (RAS),non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	Rely on existing Blythe RAS
Julian Hinds-Mirage 230 kV, , non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwata 230 kV Bus, non-redundant relay fail	P5.5	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage & EagleMTN-IronMTN 230 kV	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage & EagleMTN-IronMTN 230 kV & ISO7720 (OP)	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River - Red Bluff 500 kV #1 & #2	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River - Red Bluff 500 kV #1 & #2 (RAS)	P6.1	N-1-1	No Issues	No Issues	x	No Issues	x	

Study Area:

SCE Eastern area



Transient Stability

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Devers - Red Bluff 500 kV #1 & #2	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #1 & #2 (RAS)	P6.1	N-1-1	No Issues	No Issues	x	No Issues	x	
Devers - Valley 500 kV #1 & #2	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda - San Bernardino & El Casco-San Bernardino 230kV	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	
San Bernardino - Vista & Devers - San Bernardino 230kV	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River - Palo Verde & Colorado River - Delaney 500 kV	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Mirage 230 kV #1 & #2	P7.1	DCTL	No Issues	Unstable	No Issues	No Issues	No Issues	Path 42 RAS
Devers - Mirage 230 kV #1 & #2 with RAS	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	Path 42 RAS
Devers-San Bernardino & Devers-El Casco 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-San Bernardino & San Bernardino-El Casco 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Glimmer & Devers-Vista #2 230kV lines	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda-San Bernardino & San Bernardino-Vista 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	
Mira Loma-Vista #2 & Mira Loma-Vista #1/Vista-Wildlife 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	
Mirage-Ramon & Coachella Valley-Mirage 230 kV	P6.1	DCTL	No Issues	No Issues	Diverge	No Issues	No Issues	System adjustments after the first contingency
Mirage-Ramon & Coachella Valley-Mirage 230 kV with RAS	P6.1	DCTL	No Issues	No Issues	Diverge	No Issues	No Issues	

Study Area: **SCE Eastern area**



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)											Potential Mitigation Solutions	
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

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

Study Area: **SCE Eastern area**



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)											Potential Mitigation Solutions	
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Neenack — Bailey/Westpack Tap 66 kV	All elements in service	P0	N-0	<100%	<100%	<100%	N/A	N/A	N/A	<100%	106.8	N/A	<100%	<100%	<100%	Congestion management
	Bailey – Pardee & Baily – Pastoria 230 kV lines or Bailey 230/66 kV transformers	P6	L-1/L-1 or T-1/T-1	<100%	<100%	<100%	N/A	N/A	N/A	<100%	<100%	N/A	103.4	<100%	103.8	Split Antelope–Bailey 66 kV System per existing SCE operating procedure after initial contingency
Big Creek 3 – Rector 230 kV No. 1	Big Creek 1 – Rector 230 kV line	P1	L-1	<100%	<100%	100.9	N/A	N/A	N/A	<100%	<100%	N/A	<100%	<100%	<100%	Existing Big Creek RAS
Windhub 500/230 kV Transformer No. 3 or No. 4	Remaining Windhub 500/230 kV Transformer No. 3 or No. 4	P1	T-1	<100%	<100%	117.1	N/A	N/A	N/A	<100%	<100%	N/A	<100%	107.1	<100%	Congestion management; Planned Windhub CRAS identified in GIP
Windhub 500/230 kV Transformer No. 1 or No. 2	Remaining Windhub 500/230 kV Transformer No. 1 or No. 2	P1	T-1	<100%	<100%	<100%	N/A	N/A	N/A	<100%	<100%	N/A	<100%	141.1	<100%	
Whirlwind 500/230 kV Transformers	Loss of one Whirlwind 500/230 kV Transformer	P1	T-1	<100%	<100%	<100%	N/A	N/A	N/A	<100%	<100%	N/A	<100%	120.4	106.39	Existing Whirlwind RAS
	Loss of two Whirlwind 500/230 kV Transformers	P6	T-1/T-1	121.8	121.5	<100%	N/A	N/A	N/A	<100%	166.7	N/A	121.5	249.6	217	
Antelope 230 kV/66 kV transformers	Loss of two Antelope 230 kV/66 kV transformers	P6	T-1/T-1	123.3	123	179.7	N/A	N/A	N/A	115.8	<100%	N/A	139.3	<100%	<100%	Energize existing spare after intial contingency

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Big Creek 2 – Big Creek 3 230 kV	Big Creek 1–Rector & Big Creek 8–Big Creek 3 230 kV lines	P6	L-1/L-1	126.6	126.0	132.7	N/A	N/A	N/A	114.37	<100%	N/A	125.66	126.2	114.64	Reduce Big Creek generation after initial contingency
	Big Creek 1–Rector & Big Creek 8–Big Creek 2 230 kV lines	P6	L-1/L-1	110.7	110.6	115.6	N/A	N/A	N/A	<100%	<100%	N/A	110.37	110.4	<100%	
Big Creek 3 – Rector 230 kV No. 1	Big Creek 3 – Rector No. 2 and Big Creek 1 – Rector 230 kV lines	P6	L-1/L-1	149.1	148.4	Diverged	N/A	N/A	N/A	141.1	<100%	N/A	150.3	144.7	134.5	Existing Big Creek RAS
Big Creek 3 – Rector 230 kV No. 2	Big Creek 3 – Rector No. 1 and Big Creek 1 – Rector 230 kV lines	P6	L-1/L-1	120.4	119.4	Diverged	N/A	N/A	N/A	Diverged	<100%	N/A	120.4	115.9	108.1	
Big Creek 1 – Rector 230 kV	Big Creek 3 – Rector No. 1 and No. 2 230 kV lines	P7	L-2	142.8	141.1	Diverged	N/A	N/A	N/A	134	<100%	N/A	142.8	137.9	127.7	
Springville–Big Creek 4 230 kV	Big Creek 3 – Rector No. 1 and Big Creek 1 – Rector 230 kV lines	P6	L-1/L-1	101.6	101.2	<100%	N/A	N/A	N/A	<100%	<100%	N/A	<100%	102.1	105.6	
Big Creek 8 –Big Creek 3 230 kV	Big Creek 2 – Big Creek 3 and Big Creek 1 – Rector 230 kV lines	P6	L-1/L-1	133.8	133.1	140.4	N/A	N/A	N/A	120.9	<100%	N/A	132.8	133.4	121.2	
Big Creek 8 –Big Creek 2 230 kV		P6	L-1/L-1	117.0	117.0	122.7	N/A	N/A	N/A	103.9	<100%	N/A	116.7	116.7	104.2	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Magunden–Pastoria No. 1 or No. 2 230 kV lines	Magunden–Pastoria No. 1 or No. 2 and No. 3 230 kV lines	P6	L-1/L-1	<100%	<100%	<100%	N/A	N/A	N/A	104.9	<100%	N/A	<100%	<100%	123.1	
Pardee–Warne Tap 230 kV line	Pardee–Patoria and Bailey–Pastoria 230 kV lines	P6	L-1/L-1	116.2	103.2	<100%	N/A	N/A	N/A	<100%	<100%	N/A	<100%	117.9	<100%	Existing Pastoria Energy Facility RAS
Warne Tap–Pastoria 230 kv line		P6	L-1/L-1	108.11	<100%	<100%	N/A	N/A	N/A	<100%	<100%	N/A	<100%	109.8	<100%	
Bailey–Pastoria 230 kV line		Pardee–Pastoria and Pardee–Warne Tap-Pastoria 230 kV lines	P6	L-1/L-1	101.7	<100%	<100%	N/A	N/A	N/A	<100%	<100%	N/A	<100%	101.6	
Pardee–Pastoria 230 kV line	Bailey–Pastoria and Pardee–Warne Tap-Pastoria 230 kV lines	P6	L-1/L-1	<100%	<100%	<100%	N/A	N/A	N/A	<100%	<100%	N/A	<100%	101.5	<100%	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Bailey – Antelope 66 kV system	Bailey–Pardee & Bailey–Pastoria 230 kV lines or Bailey 230/66 kV transformers	P6	L-1/L-1 or T-1/T-1	> 0.9	> 0.9	Diverged	N/A	N/A	N/A	Diverged	> 0.9	N/A	> 0.9	> 0.9	> 0.9	Split Antelope–Bailey 66 kV System per existing SCE operating procedure after initial contingency

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

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)									Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		

No voltage deviation related violations identified

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

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Magunden-Springville No. 1, 3-PH Fault on Magunden, Normal Clearing (5 Cycles)	P1	N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Vestal No. 1, 3-PH Fault on Magunden, Normal Clearing (5 Cycles)	P1	N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Vestal No. 2, 3-PH Fault on Magunden, Normal Clearing (5 Cycles)	P1	N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Big Creek 1-Rector & Rector-Vestal No. 1, SLG Fault on Big Creek 1, Delayed Clearing (15 Cycles)	P4	Stuck Breaker	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Big Creek 3-Rector No. 1 & Rector-Vestal No. 2, SLG Fault on Big Creek 1, Delayed Clearing (15 Cycles)	P4	Stuck Breaker	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Big Creek 4-Springville & Magunden-Springville No. 2, SLG Fault on Big Creek 4, Delayed Clearing (15 Cycles)	P4	Stuck Breaker	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Pastoria No. 1 & Bailey-Pastoria, SLG Fault on Pastoria, Delayed Clearing (15 Cycles)	P4	Stuck Breaker	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Pastoria No. 2 & Pardee-Pastoria, SLG Fault on Pastoria, Delayed Clearing (15 Cycles)	P4	Stuck Breaker	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Pastoria No. 3 & Pardee-Pastoria-Warne, SLG Fault on Pastoria, Delayed Clearing (15 Cycles)	P4	Stuck Breaker	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Pardee-Pastoria & Pardee-Vincent, SLG Fault on Pardee, Delayed Clearing (15 Cycles)	P4	Stuck Breaker	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Bailey-Pardee & Pardee-Vincent No. 1, SLG Fault on Pardee, Delayed Clearing (15 Cycles)	P4	Stuck Breaker	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Pardee-Pastoria-Warne & Pardee-Santa Clara, SLG Fault on Pardee, Delayed Clearing (15 Cycles)	P4	Stuck Breaker	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Mesa-Vincent2 No.2 & Vincent2-Santa Clara, SLG Fault on Vincent 2, Delayed Clearing (15 Cycles)	P4	Stuck Breaker	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Big Creek 1-Rector & Big Creek 3-Rector No. 1, 3PH Fault on Big Creek 1	P6	N-1/N-1	Unstable	Unstable	No Issues	N/A	No Issues	No Issues	Existing Big Cig Creek RAS
Big Creek 3-Rector No. 2 & Big Creek 1-Rector, 3PH Fault on Rector, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	Unstable	No Issues	N/A	WECC criteria not met	No Issues	Existing Big Cig Creek RAS
Big Creek 3-Rector No.2 & Big Creek 4-Springville, 3PH Fault on Big Creek 3, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	Unstable	No Issues	N/A	No Issues	No Issues	Existing Big Cig Creek RAS
Big Creek 4-Springville & Rector-Springville, 3PH Fault on Big Creek 4, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector-Vestal Nos. 1 & 2, 3PH Fault on Rector, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Springville Nos. 1 & 2, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Vestal Nos. 1 & 2, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Vestal Nos. 1 & 2, 3PH Fault on Magunden, Normal Clearing (5 Cycles)- With BC RAS	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation

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

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Big Creek 1-Rector & Big Creek 3-Big Creek 8, 3PH Fault on Rector, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Vestal No. 1 & Rector-Springville, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Vestal No. 2 & Rector-Springville, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector-Vestal No. 1 & Magunden-Springville No. 1, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector-Vestal No. 2 & Magunden-Springville No. 1, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Vestal No. 1 & Magunden-Springville No. 1, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Vestal No. 2 & Magunden-Springville No. 1, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector-Vestal No. 1 & Rector-Springville, 3PH Fault on Rector, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector-Vestal No. 2 & Rector-Springville, 3PH Fault on Rector, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Big Creek 3-Rector No. 1 & Rector-Springville, 3PH Fault on Rector, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Pastoria Nos. 1 & 2, 3PH Fault on Magunden	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Pastoria Nos. 1 & 3, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Magunden-Pastoria Nos. 2 & 3, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Bailey-Pastoria & Pardee-Pastoria, 3PH Fault on Pastoria, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Bailey-Pastoria & Pardee-Pastoria-Warne, 3PH Fault on Pastoria, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Pardee-Pastoria & Pardee-Pastoria-Warne, 3PH Fault on Pastoria, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Pardee-Pastoria & Bailey-Pardee, 3PH Fault on Pardee, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Bailey-Pardee & Pardee-Pastoria-Warne, 3PH Fault on Pardee, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Antelope-Magunden Nos. 1 & 2, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Antelope-Magunden No. 1 & Pardee-Pastoria-Warne, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Antelope-Magunden No. 2 & Pardee-Pastoria-Warne, 3PH Fault on Magunden	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation

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

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Antelope-Pardee & Pardee-Pastoria-Warne, 3PH Fault on Pardee, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Bailey-Pastoria & Bailey-Pardee, 3PH Fault on Pardee, Normal Clearing (5 Cycles)	P6	N-1/N-1	WECC criteria not met	WECC criteria not met	No Issues	N/A	WECC criteria not met	No Issues	Split Antelope-Bailey 66 kV System per existing SCE operating procedure after initial contingency
Big Creek 1-Rector & Big Creek 2-Big Creek 8, 3PH Fault on Rector, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Antelope-Pardee & Bailey-Pastoria, 3PH Fault on Pardee, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Bailey-Pardee & Pastoria-Edmonston, 3PH Fault on Pardee, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Bailey-Pastoria & Pastoria-Edmonston, 3PH Fault on Pastoria, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Pardee-Vincent & Pardee-Vincent2, 3PH Fault on Pardee, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector SVC & Magunden-Vestal No. 1, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector SVC & Magunden-Vestal No. 2, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector SVC & Magunden-Springville No. 1, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector SVC & Magunden-Springville No. 2, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector SVC & Magunden-Pastoria No. 1, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector SVC & Magunden-Pastoria No. 2, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector SVC & Magunden-Pastoria No. 3, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Rector SVC & Antelope-Magunden No. 2, 3PH Fault on Magunden, Normal Clearing (5 Cycles)	P6	N-1/N-1	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Loss of Springville Substation, SLG Fault on Springville 230kV Bus, N-RBD Relay Failure, Delayed Clearing (30 cycles)	P5	Non-Redundant Relay	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Loss of Big Creek 1 Substation, SLG Fault on Big Creek 1 230kV Bus, N-RBD Relay Failure, Delayed Clearing (30 cycles)	P5	Non-Redundant Relay	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Loss of Big Creek 2 Substation, SLG Fault on Big Creek 2 230kV Bus, N-RBD Relay Failure, Delayed Clearing (30 cycles)	P5	Non-Redundant Relay	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Loss of Big Creek 4 Substation, SLG Fault on Big Creek 4 230kV Bus, N-RBD Relay Failure, Delayed Clearing (30 cycles)	P5	Non-Redundant Relay	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation

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

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Loss of Big Creek 8 Substation, SLG Fault on Big Creek 8 230kV Bus, N-RBD Relay Failure, Delayed Clearing (30 cycles)	P5	Non-Redundant Relay	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation
Big Creek 3-Rector No. 2 & Rector-Springville, 3PH Fault on Big Creek 3, Normal Clearing (5 Cycles)	P7	DCTL	No Issues	No Issues	No Issues	N/A	No Issues	No Issues	No violation



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)											Potential Mitigation Solutions	
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

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

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



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)											Potential Mitigation Solutions	
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
29253 DVRS_RB_12 500 24374 REDBLUFF 500 Ckt 1 or 2	P1L-SDGE2_22536 N.GILA-22360 IMPRLVLY 500KV &1 -AND- P1L_50511RAS0_Line DEVERS 500.0 to REDBLUFF 500.0 Ckt 2 or 1	P6	Two overlapping singles	<90	91.93	<90	<90	<90	92.08	97.19	113.26	Colorado River Corridor RAS to trip generating facilities connected to Colorado River and Red Bluff Substations
	P1L_50511RAS1_Line DEVERS 500.0 to REDBLUFF 500.0 Ckt 2 or 1 -AND- P1L-SDGE2_22536 N.GILA-22360 IMPRLVLY 500KV &1 with RAS taking action	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	<90	98.66	
29400 ANTELOPE 500 29402 WIRLWIND 500 1 1	P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1	P1	Single Contingency	<90	<90	<90	<90	<90	<90	101.35	<90	modify the planned Tehachapi cRAS to cover the P1/P2/P4 contingencies
	P2_33_Whirlwind500kV_SLG at Vincent 500kV w/ loss of Midway-Whirlwind 500kV & Vincent-Whirlwind 500kV w/ series cap bypass of MW_	P2	Internal Breaker Fault	<90	<90	<90	<90	<90	<90	119.97	<90	
	P4_69_Whirlwind_3Ph line fault on Midway-Whirlwind 500 kV with stuck breaker at Whirlwind followed by loss of Vincent-Whirlwind 5	P4	stuck breaker	<90	<90	<90	<90	<90	<90	119.7	<90	
	P1L-50023_Line VINCENT 500.0 to WIRLWIND 500.0 Ckt 3 -AND- P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	151.93	102.97	
	P1L_50506_Line MIDWAY 500.0 to WIRLWIND 500.0 Ckt 3 -AND- P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	120.54	<90	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
	P1DC_PDC1_PDCI CONVERTER MONOPOLE #1 -AND- P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	113.21	<90	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
	P1L-22001_Line SYLMAR1 230.0 to SYLMAR S 230.0 Ckt 1 -AND- P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	113.2	<90	
29400 ANTELOPE 500 24156 VINCENT 500 1 1	P1L-50023_Line VINCENT 500.0 to WIRLWIND 500.0 Ckt 3 -AND- P1L-50062_Line ANTELOPE 500.0 to VINCENT 500.0 Ckt 2	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	140.71	<90	
	P1L-50023_Line VINCENT 500.0 to WIRLWIND 500.0 Ckt 3 -AND- P1L-50061_Line ANTELOPE 500.0 to VINCENT 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	140.66	<90	
24594 MW_WRLWND_32 500 29402 WIRLWIND 500 3 1	P1L-50023_Line VINCENT 500.0 to WIRLWIND 500.0 Ckt 3 -AND- P1L-50064_Line ANTELOPE 500.0 to WIRLWIND 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	112.21	<90	rely upon operational mitigation to curtail generation as system adjustment in the Wirlwind and Windhub areas after the first contingency, and bypass series capacitors as needed
	P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1 -AND- P1L-50064_Line ANTELOPE 500.0 to WIRLWIND 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	108.1	<90	
24594 MW_WRLWND_32 500 29402 WIRLWIND 500 3 1	P1L_50505_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 2 -AND- P1L_50504_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 1	P6	Two overlapping singles	162.02	92.59	92.49	<90	<90	93.43	<90	<90	generation redispatch after the initial contingency, bypass series capacitors, and along with existing Path 26 RAS curtailing generation as needed

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
24591 MW_VINCNT_11 500 24590 MW_VINCNT_12 500 1 1	P1L_50505_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 2 -AND- P1L_50506_Line MIDWAY 500.0 to WIRLWIND 500.0 Ckt 3	P6	Two overlapping singles	120.47	<90	<90	<90	<90	<90	<90	<90	generation redispatch after the initial contingency, bypass series capacitors, and along with existing Path 26 and PDCI RASs curtailing generation as needed
	P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 -AND- P1L_50505_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 2	P6	Two overlapping singles	108.1	<90	<90	<90	<90	<90	<90	<90	
	P1DC_PDCI2_PDCI CONVERTER MONOPOLE #2 -AND- P1L_50505_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 2	P6	Two overlapping singles	108.09	<90	<90	<90	<90	<90	<90	<90	
24593 MW_VINCNT_21 500 24592 MW_VINCNT_22 500 2 1	P1L_50504_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 1 -AND- P1L_50506_Line MIDWAY 500.0 to WIRLWIND 500.0 Ckt 3	P6	Two overlapping singles	122.98	<90	<90	<90	<90	<90	<90	<90	
	P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 -AND- P1L_50504_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 1	P6	Two overlapping singles	111.45	<90	<90	<90	<90	<90	<90	<90	
	P1DC_PDCI2_PDCI CONVERTER MONOPOLE #2 -AND- P1L_50504_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 1	P6	Two overlapping singles	111.44	<90	<90	<90	<90	<90	<90	<90	
24594 MW_WRLWIND_32 500 29402 WIRLWIND 500 3 1	P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1 -AND- P1L-50064_Line ANTELOPE 500.0 to WIRLWIND 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	108.1	<90	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
24086 LUGO 500 24156 VINCENT 500 1 1	P1L-50022_Line VINCENT 500.0 to MESA CAL 500.0 Ckt 1 -AND- P1L-50014_Line LUGO 500.0 to VINCENT 500.0 Ckt 2	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	106.43	<90	Operational mitigation to curtail generation in the Tehachapi area after the first contingency, and bypass series capacitors as needed.
24138 SERRANO 500 24184 serran1i 13.8 1 1	P1T-52025_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 2 SERRAN2T 13.80 -AND- P1T-52026_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 3 0.00	P6	Two overlapping singles	102.48	104.89	104.07	<90	<90	102.27	113.24	115.24	The long term or 30-minute short term emergency ratings of Serrano 500/230 kV banks should be adequate to dispatch available resources including energy storage and demand response (RDRR) after the first or second contingency
24138 SERRANO 500 24186 serran2i 13.8 2 1	P1T-52024_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 1 SERRAN1T 13.80 -AND- P1T-52026_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 3 0.00	P6	Two overlapping singles	104.4	106.86	106.03	<90	<90	104.19	115.37	117.4	
24138 SERRANO 500 24137 SERRANO 230 3 1	P1T-52025_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 2 SERRAN2T 13.80 -AND- P1T-52024_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 1 SERRAN1T 13.80	P6	Two overlapping singles	101.34	103.73	103.46	<90	<90	101.14	111.99	113.96	
24076 LAGUBELL 230 24091 MESA CAL 230 1 1	P1G_24060_Gen ALAMT CTG1/CTG2/STG -AND- P1L-22058_Line LITEHIPE 230.0 to MESA CAL 230.0 Ckt 1	P3	G-1 followed by L-1	95.97	<90	103.11	<90	<90	100.87	101.73	<90	Dispatch available resources including energy storage and demand response for pre-contingency, or reconductor Laguna-Bell Mesa No.1 line
	P1T-52036_Tran MESA CAL 500.00 to MESACALS 230.00 Ckt 3 MESA3T 13.80 -AND- P1T-52037_Tran MESA CAL 500.00 to MESACALS 230.00 Ckt 4 MESA4T 13.80	P6	Two overlapping singles	103.48	102.46	109.82	<90	<90	110.16	109.22	97.38	
P1L-50010_Line LUGO 500.0 to VICTORVL 500.0 Ckt 1 -AND- P1L-22058_Line LITEHIPE 230.0 to MESA CAL 230.0 Ckt 1	P6	Two overlapping singles	93.75	90.56	103.82	<90	<90	98.9	98.66	<90		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
	P1L-22058_Line LITEHIPE 230.0 to MESA CAL 230.0 Ckt 1 -AND- P1L-22059_Line MESA CAL 230.0 to REDONDO 230.0 Ckt 1	P6	Two overlapping singles/common structure	113.39	109.19	120.56	<90	<90	118.98	120.25	106.38	
	P1L-22093_Line MESACALS 230.0 to LAGUBELL 230.0 Ckt 2 -AND- P1L-22058_Line LITEHIPE 230.0 to MESA CAL 230.0 Ckt 1	P6/P7	Two overlapping singles/common structure	105.72	101.49	109.58	<90	<90	109.49	113.64	105.96	
24114 PARDEE 230 24128 S.CLARA 230 1 1	P1L-22913_Line S.CLARA 230.0 to MOORPARK 230.0 Ckt 1 -AND- P1L-22914_Line S.CLARA 230.0 to MOORPARK 230.0 Ckt 2	P6/P7	Two overlapping singles/common structure	<90	<90	101.71	<90	<90	104.38	109.53	<90	Dispatch available resources including energy storage and demand response (RDRR) in the Ventura/Santa Barbara pre-contingency
24114 PARDEE 230 24217 WARNETAP 230 1 1	P1L-22071_Line PARDEE 230.0 to PASTORIA 230.0 Ckt 1 -AND- P1L-22079_Line PARDEE 230.0 to BAILEY 230.0 Ckt 1	P6	Two overlapping singles	106.61	93.89	<90	<90	<90	<90	111.43	<90	Reduce generation output from Pastoria Energy Facility after the first contingency
24128 S.CLARA 230 24099 MOORPARK 230 2 1	P1L-22072_Line PARDEE 230.0 to S.CLARA 230.0 Ckt 1 -AND- P1L-22913_Line S.CLARA 230.0 to MOORPARK 230.0 Ckt 1	P6	Two overlapping singles	<90	<90	96.16	<90	<90	98.84	101.56	<90	Dispatch available resources including energy storage and/or demand response (RDRR) in the Ventura/Santa Barbara area after the first contingency
24044 ELLIS 230 24134 SANTIAGO 230 1 1	P1L-22035_Line ELLIS 230.0 to JOHANNA 230.0 Ckt 1 -AND- P1L-SDGE2_22536 N.GILA-22360 IMPRLVLY 500KV &1	P6	Two overlapping singles	99.41	<90	98.52	<90	<90	<90	107.21	104.19	Reduce the San Diego import by dispatching available resources in the San Diego-Imperial Valley area after the first contingency
	P1L_SDGE1RAS1A-P1_22930 ECO-22468 MIGUEL 500KV &1 -AND- P1L-22035_Line ELLIS 230.0 to JOHANNA 230.0 Ckt 1	P6	Two overlapping singles	101.71	<90	92.25	<90	<90	<90	109.55	<90	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
26094 SYLMARLA 230 24147 SYLMAR S 230 bank 'E' or 'F'	P4_53_Sylmar_SLG line fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F' or 'E'	P4	stuck breaker	<90	<90	103.45	<90	<90	98.41	<90	<90	Develop operation procedure or short-term emergency ratings to manage power flow via the banks (Path 41) for pre- or post- contingency; Re-configure the switchyard by adding one-and-half breaker schemes if possible; Remove the three banks between LADWP and SCE along with other facility upgrade; Upgrade the banks E and F
	P1T-22013_Tran SYLMARLA 230.00 to SYLMAR S 230.00 Ckt 'F' or 'E' -AND- P1T-22014_Tran SYLMARLA 230.00 to SYLMAR S 230.00 Ckt G	P6	Two overlapping singles	<90	<90	103.46	<90	<90	98.42	<90	<90	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
MOHAVE 500 kV	P1L_50508_Line LUGO 500.0 to MOHAVE 500.0 Ckt 1 -AND- P1L-50018_Line MOHAVE 500.0 to ELDORDO 500.0 Ckt 1	P6	Two overlapping singles	0.44	0.46	no issue	0.56	0.55	0.47	0.41	0.55	Exiting NVE RAS to protect its 69 kV system
GOLETA 230 kV	P1L-22909_Line S.CLARA 230.0 to GOLETA 230.0 Ckt 1 -AND- P1SVD_24321_SVD S.CLARA 230	P6	Two overlapping singles	no issue	no issue	no issue	no issue	no issue	no issue	0.86	no issue	Dispatch available resources including energy storage and demand response (RDRR) in the Goleta/S.Clara area after the first contingency
GOLETA 230 kV	P1SVD_24321_SVD S.CLARA 230 -AND- P1L-22909_Line S.CLARA 230.0 to GOLETA 230.0 Ckt 1	P6	Two overlapping singles	no issue	no issue	no issue	no issue	no issue	no issue	0.86	no issue	

Study Area: **SCE Main**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	

No voltage deviation issues were identified

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen	
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	WECC 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	WECC 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	WECC 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	WECC 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	WECC 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	WECC 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	WECC 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	WECC 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	WECC 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	WECC Criteria met

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen	
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	WECC 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	WECC Criteria met
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	WECC 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	WECC 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	WECC Criteria met
46_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Gould-Sylmar 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met
48_Sylmar230kV_3Ph line fault on Gould-Sylmar 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met
50_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met
52_Sylmar230kV_1-Ph fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met
54_Devers500kV_3Ph line fault on Devers-Red Bluff No.1 500 kV with stuck breaker at Devers followed by loss of Devers-Valley No.1 500 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen	
55_Lugo500kV_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	WECC Criteria met
56_Lugo500kV_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	WECC Criteria met
57_MiraLoma500kV_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	WECC Criteria met
59_MiraLoma230kV_3Ph line fault on Mira Loma-Olinda 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma No.3 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met
61_RanchoVista230kV_3Ph line fault on Etiwanda-Rancho Vista No.1 230 kV with stuck breaker at Rancho Vista followed by loss of Mira Loma-Rancho Vista No.2 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met. However, dynamic models (repc_a and repc_b) of some IBR resources need to be tuned
63_Serrano230kV_3Ph line fault on Chino-Serrano 230 kV with stuck breaker at Serrano followed by loss of Lewis-Serrano No.1 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met
65_Vincent500kV_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	WECC Criteria met. However, dynamic models (repc_a and repc_b) of some IBR resources need to be tuned
67_Vincent230kV_3Ph line fault on Mesa-Vincent No.2 230 kV with stuck breaker at Vincent followed by loss of Santa Clara-Vincent 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met
69_Whirlwind230kV_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	WECC Criteria met
70_Chino230kV_3Ph line fault on Chino-Viejo 230 kV with stuck breaker at Chino followed by loss of Chino-Serrano 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen	
71_Ellis230kV_3Ph line fault on Barre-Ellis No.2 230 kV with stuck breaker at Ellis followed by loss of Ellis-Santiago 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met. However, dynamic models (repc_a and repc_b) of some IBR resources need to be tuned
75_Olinda230kV_3Ph line fault on Olinda-Walnut 230 kV with stuck breaker at Olinda followed by loss of Mira Loma-Olinda 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met. However, dynamic models (repc_a and repc_b) of some IBR resources need to be tuned
76_RioHondo230kV_3Ph line fault on Mesa-Rio Hondo No.2 230 kV with stuck breaker at Rio Hondo followed by loss of Rio Hondo-Vincent No.2 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met. However, dynamic models (repc_a and repc_b) of some IBR resources need to be tuned
77_SantaClara230kV_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	WECC Criteria met. However, dynamic models (repc_a and repc_b) of some IBR resources need to be tuned
79_Santiago230kV_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	WECC Criteria met
80_Pardee230kV_3Ph line fault on Bailey-Pardee 230 kV with stuck breaker at Pardee followed by loss of Pardee-Vincent No.1 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met
82_Pardee230kV_3Ph line fault on Pardee-Santa Clara 230 kV with stuck breaker at Pardee followed by loss of Pardee-Pastoria-Warne 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met
84_Pardee230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Pardee followed by loss of Moor Park-Pardee No.3 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met
85_VillaPark230kV_3Ph line fault on Barre-Villa Park 230 kV with stuck breaker at Villa Park followed by loss of Serrano-Villa Park No.1 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met
86_Lewis230kV_3Ph line fault on Barre-Lewis 230 kV with stuck breaker at Lewis followed by loss of Lewis-Serrano No.2 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	WECC Criteria met

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen	
101_Lighthipe_NR230kV_P5 1-PH Fault on Lighthipe Bus, N-RBD Relay, delayed clearing 29 cycles	P5.5	non-redundant relay	stable	stable	stable	stable	stable	WECC Criteria met
99_P5_LagunaBell_NR230kV_P5 1-PH Fault on Laguna Bell Bus, N-RBD Relay, delayed clearing 29 cycles	P5.5	non-redundant relay	stable	stable	stable	stable	stable	WECC Criteria met
106_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Antelope-Whirlwind and Antelope-Vincent No.1	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met
107_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Antelope-Whirlwind and Antelope-Windhub	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met
109_Eldorado500kV_P6.1: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Lugo and Eldorado-Mohave	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met
110_Lugo500kV_P6.1: 3PH 4 cycle fault at Lugo 500kV w/ Eldorado-Lugo and Lugo-Mohave	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC 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	Two overlapping singles	stable	stable	stable	stable	stable	WECC 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	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met
113_ECO500kV_P6.1: 3PH 4 cycle fault at ECO 500 w/ loss of ECO-Miguel & Ocotillo-Suncrest 500 kV	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC 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	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met
116_Mohave500kV_P6.1: 3PH 4 cycle fault at Mohave 500kV w/ loss of Eldorado-Mohave and Lugo-Mohave	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met. However, dynamic models (repc_a and repc_b) of some IBR resources need to be tuned
117_RanchoVista500kV_P6.1: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Lugo-Rancho Vista & Rancho Vista-Serrano No.1	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen	
119_Serrano500kV_P6.1: 3PH 4 cycle fault at Serrano 500kV w/ loss of Alberhill-Serrano & Rancho Vista-Serrano No.1	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met
120_Serrano500kV_P6.1: 3PH 4 cycle fault at Serrano 500kV w/ loss of Alberhill-Serrano & Mira Loma-Serrano No.2	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC 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	Two overlapping singles	stable	stable	stable	stable	stable	WECC 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	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met
124_Vincent500kV_P6.1: 3PH 4 cycle fault at Vincent 500kV w/ loss of Lugo-Vincent No.1 & No.2	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met
125_Whirlwind500kV_P6.1: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Midway-Whirlwind No.3 & Windhub-Whirlwind	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met
126_Whirlwind500kV_P6.1: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Whirlwind-Windhub & Antelope-Whirlwind	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC Criteria met
127_Mesa500kV_P6.1: 3PH 4 cycle fault at Mesa 500kV w/ loss of Mesa-Vincent 500kV & Mesa-Miraloma	p6	Two overlapping singles	stable	stable	stable	stable	stable	WECC 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	WECC 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	WECC Criteria met
130_Center230kV_P7.1: 1PH 4 cycle fault at Center 230kV w/ loss of Alamitos-Center and Center-Del Amo	p7	common structure	stable	stable	stable	stable	stable	WECC 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	WECC Criteria met

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Transient Stability



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen	
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	WECC 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	WECC Criteria met
135_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Walnut & Center-Olinda	p7	common structure	stable	stable	stable	stable	stable	WECC 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	WECC 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	WECC 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	WECC Criteria met
140_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	WECC Criteria met
142_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	WECC Criteria met
143_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	WECC Criteria met
144_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Vincent No.2 230kV & Goodrich-Gould	p7	common structure	stable	stable	stable	stable	stable	WECC Criteria met
145_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Vincent No.1 & Goodrich-Mesa	p7	common structure	stable	stable	stable	stable	stable	WECC Criteria met
146_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	WECC Criteria met

Study Area: **SCE Main**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen	
147_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	WECC Criteria met
148_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	WECC Criteria met
149_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	WECC Criteria met
150_Serrano500kV_P7.1: 1PH 4 cycle fault at Serrano 500kV w/ loss of Mira Loma-Serrano No.2 500kV & Rancho Vista-Serrano No.1 500kV	p7	common structure	stable	stable	stable	stable	stable	WECC Criteria met
151_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	WECC Criteria met
152_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	WECC Criteria met
153_Vincent230kV_P7.1: 1PH 4 cycle fault at Vincent 230kV w/ Rio Hondo-Vincent No.1 & No.2 230kV	p7	common structure	stable	stable	stable	stable	stable	WECC Criteria met

Study Area: **SCE Main**



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)							Potential Mitigation Solutions	
			B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen		S3_2023 OP Heavy Renewable & Min Gas Gen

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

Study Area: **SCE Main**



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)								Potential Mitigation Solutions
	B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
29253 DVRS_RB_12 500 24374 REDBLUFF 500 Ckt 1 or 2	P1L_50511RAS0_Line DEVERS 500.0 to REDBLUFF 500.0 Ckt 2 or 1	P1	Single Contingency	<90	<90	<90	<90	<90	<90	<90	102.38	<90	Colorado River Corridor RAS to trip generating facilities connected to Colorado River and Red Bluff Substations
	P1G_24060_Gen ALAMT CTG1/CTG2/STG -AND- P1L_50511RAS0_Line DEVERS 500.0 to REDBLUFF 500.0 Ckt 2 or 1	P3	G-1 followed by L-1	<90	<90	<90	<90	<90	<90	<90	105.7	<90	
	P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 -AND- P1L_50511RAS0_Line DEVERS 500.0 to REDBLUFF 500.0 Ckt 2 or 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	<90	105.58	<90	
	P1L-SDGE2_22536 N.GILA-22360 IMPRLVLY 500KV & 1 -AND- P1L_50511RAS0_Line DEVERS 500.0 to REDBLUFF 500.0 Ckt 2 or 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	<90	117.97	102.64	
	P1L_50511RAS1_Line DEVERS 500.0 to REDBLUFF 500.0 Ckt 2or 1 -AND- P1L-SDGE2_22536 N.GILA-22360 IMPRLVLY 500KV & 1 with RAS taking action	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	<90	98.07	<90	
P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1	P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1	P1	Single Contingency	<90	<90	<90	<90	<90	<90	<90	101.41	<90	modify the planned Tehachapi cRAS to cover the P1/P2/P4 contingencies
	P2_33_Whirlwind500kV_SLG at Vincent 500kV w/ loss of Midway-Whirlwind 500kV & Vincent-Whirlwind 500kV w/ series cap bypass of MW_	P2	Internal Breaker Fault	<90	<90	<90	<90	<90	<90	<90	113.47	<90	
	P4_69_Whirlwind_3Ph line fault on Midway-Whirlwind 500 kV with stuck breaker at Whirlwind followed by loss of Vincent-Whirlwind 5	P4	stuck breaker	<90	<90	<90	<90	<90	<90	<90	113.2	<90	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
29400 ANTELOPE 500 29402 WIRLWIND 500 1 1	P1L-50023_Line VINCENT 500.0 to WIRLWIND 500.0 Ckt 3 -AND- P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	101.54	<90	150.15	102.73	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
	P1L_50506_Line MIDWAY 500.0 to WIRLWIND 500.0 Ckt 3 -AND- P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	<90	113.52	<90	
	P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 -AND- P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	<90	113.62	<90	
	P1L-22001_Line SYLMAR1 230.0 to SYLMAR S 230.0 Ckt 1 -AND- P1L-50063_Line ANTELOPE 500.0 to WINDHUB 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	<90	<90	113.62	<90	
29400 ANTELOPE 500 24156 VINCENT 500 1 1	P1L-50023_Line VINCENT 500.0 to WIRLWIND 500.0 Ckt 3 -AND- P1L-50062_Line ANTELOPE 500.0 to VINCENT 500.0 Ckt 2	P6	Two overlapping singles	<90	<90	<90	<90	<90	91.74	<90	129.81	<90	
	P1L-50023_Line VINCENT 500.0 to WIRLWIND 500.0 Ckt 3 -AND- P1L-50061_Line ANTELOPE 500.0 to VINCENT 500.0 Ckt 1	P6	Two overlapping singles	<90	<90	<90	<90	<90	91.68	<90	129.76	<90	
24594 MW_WRLWND_32 500 29402 WIRLWIND 500 3 1	P1L_50505_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 2 -AND- P1L_50504_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 1	P6	Two overlapping singles	161.82	91.21	<90	<90	<90	138.99	90.7	97.77	<90	generation redispatch after the initial contingency, bypass series capacitors, and along with existing Path 26 RAS curtailing generation as needed
	P1L_50505_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 2 -AND- P1L_50506_Line MIDWAY 500.0 to WIRLWIND 500.0 Ckt 3	P6	Two overlapping singles	120.33	<90	<90	<90	<90	105.17	<90	<90	<90	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
24591 MW_VINCNT_11 500 24590 MW_VINCNT_12 500 1 1	P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 -AND- P1L_50505_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 2	P6	Two overlapping singles	108.29	<90	<90	<90	<90	<90	<90	98.33	<90	generation redispatch after the initial contingency, bypass series capacitors, and along with existing Path 26 and PDCI RASs curtailing generation as needed
	P1DC_PDCI2_PDCI CONVERTER MONOPOLE #2 -AND- P1L_50505_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 2	P6	Two overlapping singles	108.31	<90	<90	<90	<90	<90	<90	98.39	<90	
24593 MW_VINCNT_21 500 24592 MW_VINCNT_22 500 2 1	P1L_50504_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 1 -AND- P1L_50506_Line MIDWAY 500.0 to WIRLWIND 500.0 Ckt 3	P6	Two overlapping singles	122.83	<90	<90	<90	<90	107.33	<90	<90	<90	
	P1DC_PDCI1_PDCI CONVERTER MONOPOLE #1 -AND- P1L_50504_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 1	P6	Two overlapping singles	111.65	<90	<90	<90	<90	<90	<90	101.37	<90	
	P1DC_PDCI2_PDCI CONVERTER MONOPOLE #2 -AND- P1L_50504_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 1	P6	Two overlapping singles	111.67	<90	<90	<90	<90	<90	<90	101.43	<90	
24086 LUGO 500 24156 VINCENT 500 1 1	P1L-50022_Line VINCENT 500.0 to MESA CAL 500.0 Ckt 1 -AND- P1L-50014_Line LUGO 500.0 to VINCENT 500.0 Ckt 2	P6	Two overlapping singles	<90	<90	<90	<90	<90	96.75	<90	106.71	<90	
24138 SERRANO 500 24184 serran1i 13.8 1 1	P1T-52025_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 2 SERRAN2T 13.80 -AND- P1T-52026_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 3 0.00	P6	Two overlapping singles	100.3	<90	107.07	<90	<90	<90	<90	122.79	111.46	The long term or 30-minute short term emergency ratings of Serrano 500/230 kV banks should be adequate to dispatch available resources including energy storage and demand response (RDRR) after the first or second contingency
24138 SERRANO 500 24186 serran2i 13.8 2 1	P1T-52024_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 1 SERRAN1T 13.80 -AND- P1T-52026_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 3 0.00	P6	Two overlapping singles	102.18	<90	109.09	<90	<90	<90	<90	125.09	113.55	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen		
24138 SERRANO 500 24137 SERRANO 230 3 1	P1T-52025_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 2 SERRAN2T 13.80 -AND- P1T-52024_Tran SERRANO 500.00 to SERRANO 230.00 Ckt 1 SERRAN1T 13.80	P6	Two overlapping singles	99.19	<90	106.25	<90	<90	<90	<90	<90	121.41	110.22	
24076 LAGUBELL 230 24091 MESA CAL 230 1 1	P1G_24060_Gen ALAMT CTG1/CTG2/STG -AND- P1L-22058_Line LITEHIPE 230.0 to MESA CAL 230.0 Ckt 1	P3	G-1 followed by L-1	92.91	<90	<90	<90	<90	<90	<90	90.77	100.85	<90	Dispatch available resources including energy storage and demand response for pre-contingency, or reconductor Laguna-Bell Mesa No.1 line with high temperature cobductor
	P1T-52036_Tran MESA CAL 500.00 to MESACALS 230.00 Ckt 3 MESA3T 13.80 -AND- P1T-52037_Tran MESA CAL 500.00 to MESACALS 230.00 Ckt 4 MESA4T 13.80	P6	Two overlapping singles	99.1	92.77	110.98	<90	<90	<90	98.08	108.11	95.81		
	P1L-50010_Line LUGO 500.0 to VICTORVL 500.0 Ckt 1 -AND- P1L-22058_Line LITEHIPE 230.0 to MESA CAL 230.0 Ckt 1	P6	Two overlapping singles	90.35	<90	104.55	<90	<90	<90	<90	97.44	<90		
	P1L-22058_Line LITEHIPE 230.0 to MESA CAL 230.0 Ckt 1 -AND- P1L-22059_Line MESA CAL 230.0 to REDONDO 230.0 Ckt 1	P6	Two overlapping singles/common structure	109.1	99.3	118.85	<90	<90	<90	105.37	119.01	104.55		
	P1L-22093_Line MESACALS 230.0 to LAGUBELL 230.0 Ckt 2 -AND- P1L-22058_Line LITEHIPE 230.0 to MESA CAL 230.0 Ckt 1	P6/P7	Two overlapping singles/common structure	101.42	<90	107.24	<90	<90	<90	95.52	114.22	104.11		
24114 PARDEE 230 24217 WARNETAP 230 1 1	P1L-22071_Line PARDEE 230.0 to PASTORIA 230.0 Ckt 1 -AND- P1L-22079_Line PARDEE 230.0 to BAILEY 230.0 Ckt 1	P6	Two overlapping singles	110.53	<90	<90	<90	<90	<90	<90	<90	<90	<90	Reduce generation output from Pastoria Energy Facility after the first contingency
24044 ELLIS 230 24134 SANTIAGO	P1L-22035_Line ELLIS 230.0 to JOHANNA 230.0 Ckt 1 -AND- P1L-SDGE2_22536 N.GILA-22360 IMPRLVLY 500KV &1	P6	Two overlapping singles	105.51	<90	91.78	<90	<90	<90	<90	<90	<90	<90	Reduce the San Diego import by dispatching available resources in the San Diego-Imperial Valley area after the

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
230 1 1	P1L_SDGE1RAS1A-P1_22930 ECO-22468 MIGUEL 500KV &1 -AND- P1L-22035_Line ELLIS 230.0 to JOHANNA 230.0 Ckt 1	P6	Two overlapping singles	107.61	<90	<90	<90	<90	<90	<90	116.77	<90	resources in the San Diego-Imperial valley area after the first contingency
26094 SYLMARLA 230 24147 SYLMAR S 230 bank 'E' or 'F'	P4_53_Sylmar_SLG line fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F' or 'E'	P4	stuck breaker	<90	<90	96.5	<90	<90	149.7	<90	<90	<90	Develop operation procedure or short-term emergency ratings to manage power flow via the banks (Path 41) for pre- or post- contingency; Re-configure the switchyard by adding one-and-half breaker schemes if possible; Remove the three banks between LADWP and SCE along with other facility upgrade; Upgrade the banks E and F
	P1T-22013_Tran SYLMARLA 230.00 to SYLMAR S 230.00 Ckt 'F' or 'E' -AND- P1T-22014_Tran SYLMARLA 230.00 to SYLMAR S 230.00 Ckt G	P6	Two overlapping singles	<90	<90	96.5	<90	<90	149.69	<90	<90	<90	
	P1L-50010_Line LUGO 500.0 to VICTORVL 500.0 Ckt 1 -AND- P1T-22014_Tran SYLMARLA 230.00 to SYLMAR S 230.00 Ckt G 0.00	P6	Two overlapping singles	<90	<90	96.38	<90	<90	105.16	<90	<90	<90	
26094 SYLMARLA 230 24147 SYLMAR S 230 G 1	P1T-22012_Tran SYLMARLA 230.00 to SYLMAR S 230.00 Ckt E 0.00 -AND- P1T-22013_Tran SYLMARLA 230.00 to SYLMAR S 230.00 Ckt F 0.00	P6	Two overlapping singles	<90	<90	<90	<90	<90	108.4	<90	<90	<90	Rely on the market congestion management or operation procedure after the 1st contingency to eliminate the P6 overload

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S_B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	
MOHAVE 500 kV	P1L_50508_Line LUGO 500.0 to MOHAVE 500.0 Ckt 1 -AND- P1L-50018_Line MOHAVE 500.0 to ELDORDO 500.0 Ckt 1	P6	Two overlapping singles	0.44	0.47	no issue	0.56	0.53	no issue	0.47	0.40	0.55	Exiting NVE RAS to protect its 69 kV system
MW_VINCNT_12 500 kV	P1L_50505_Line MIDWAY 500.0 to VINCENT 500.0 Ckt 2 -AND- P1L_50506_Line MIDWAY 500.0 to WIRLWIND 500.0 Ckt 3	P6	Two overlapping singles	1.16	no issue	no issue	no issue	no issue	1.13	no issue	no issue	no issue	Existing Midway-Vincent RAS and PGAE Path 26 RAS

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Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen		

No voltage deviation issues were identified

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Contingency	Category	Category Description	Transient Stability Performance					
			Baseline Scenarios				Sensitivity Scenarios	
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen
01_Lugo500kV_P1.3: 3PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Victorville 500kV	p1	Single Contingency	stable	stable	stable	stable	stable	stable
02_IV500kV_P1.3: 3PH 4 cycle fault at Imperial Valley 500kV w/ loss of Imperial Valley-North Gila 500kV	p1	Single Contingency	stable	stable	stable	stable	stable	stable
03_PV500kV_P1.1: 3PH 4 cycle fault at Palo Verde w/ loss of Palo Verde Unit No.1	p1	Single Contingency	stable	stable	stable	stable	stable	stable
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	stable
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	stable
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	stable
30_N.Gila500kV_P1.2: 3PH 4 cycle fault at N.Gila 500kV w/ loss of Hoodoo Wash-N.Gila 500kV including loss of Devers SVCs & Cap Bank	p1	Single Contingency	stable	stable	stable	stable	stable	stable
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	stable
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	stable
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	stable

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Contingency	Category	Category Description	Transient Stability Performance					
			Baseline Scenarios				Sensitivity Scenarios	
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen
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	stable
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	stable
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	stable
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	stable
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	stable
46_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Gould-Sylmar 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable
48_Sylmar230kV_3Ph line fault on Gould-Sylmar 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	p4	stuck breaker	stable	stable	stable	stable	stable	stable
50_Sylmar230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	p4	stuck breaker	stable	stable	stable	stable	stable	stable
52_Sylmar230kV_1-Ph fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	p4	stuck breaker	stable	stable	stable	stable	stable	stable

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Contingency	Category	Category Description	Transient Stability Performance					
			Baseline Scenarios				Sensitivity Scenarios	
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen
54_Devers500kV_3Ph line fault on Devers-Red Bluff No.1 500 kV with stuck breaker at Devers followed by loss of Devers-Valley No.1 500 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable
55_Lugo500kV_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	stable
56_Lugo500kV_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	stable
57_MiraLoma500kV_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	stable
59_MiraLoma230kV_3Ph line fault on Mira Loma-Olinda 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma No.3 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable
61_RanchoVista230kV_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	stable
63_Serrano230kV_3Ph line fault on Chino-Serrano 230 kV with stuck breaker at Serrano followed by loss of Lewis-Serrano No.1 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable
65_Vincent500kV_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	stable
67_Vincent230kV_3Ph line fault on Mesa-Vincent No.2 230 kV with stuck breaker at Vincent followed by loss of Santa Clara-Vincent 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable

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Contingency	Category	Category Description	Transient Stability Performance					
			Baseline Scenarios				Sensitivity Scenarios	
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen
69_Whirlwind230kV_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	stable
70_Chino230kV_3Ph line fault on Chino-Viejo 230 kV with stuck breaker at Chino followed by loss of Chino-Serrano 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable
71_Ellis230kV_3Ph line fault on Barre-Ellis No.2 230 kV with stuck breaker at Ellis followed by loss of Ellis-Santiago 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable
75_Olinda230kV_3Ph line fault on Olinda-Walnut 230 kV with stuck breaker at Olinda followed by loss of Mira Loma-Olinda 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable
76_RioHondo230kV_3Ph line fault on Mesa-Rio Hondo No.2 230 kV with stuck breaker at Rio Hondo followed by loss of Rio Hondo-Vincent No.2 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable
77_SantaClara230kV_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	stable
79_Santiago230kV_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	stable
80_Pardee230kV_3Ph line fault on Bailey-Pardee 230 kV with stuck breaker at Pardee followed by loss of Pardee-Vincent No.1 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable
82_Pardee230kV_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	stable
84_Pardee230kV_3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Pardee followed by loss of Moor Park-Pardee No.3 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable

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Contingency	Category	Category Description	Transient Stability Performance					
			Baseline Scenarios				Sensitivity Scenarios	
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen
85_VillaPark230kV_3Ph line fault on Barre-Villa Park 230 kV with stuck breaker at Villa Park followed by loss of Serrano-Villa Park No.1 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable
86_Lewis230kV_3Ph line fault on Barre-Lewis 230 kV with stuck breaker at Lewis followed by loss of Lewis-Serrano No.2 230 kV	p4	stuck breaker	stable	stable	stable	stable	stable	stable
101_Lighthipe_NR230kV_P5 1-PH Fault on Lighthipe Bus, N-RBD Relay, delayed clearing 29 cycles	P5.5	non-redundant relay	stable	stable	stable	stable	stable	stable
99_P5_LagunaBell_NR230kV_P5 1-PH Fault on Laguna Bell Bus, N-RBD Relay, delayed clearing 29 cycles	P5.5	non-redundant relay	stable	stable	stable	stable	stable	stable
106_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Antelope-Whirlwind and Antelope-Vincent No.1	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
107_Antelope500kV_P6.1: 3PH 4 cycle fault at Antelope 500kV w/ loss of Antelope-Whirlwind and Antelope-Windhub	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
109_Eldorado500kV_P6.1: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Lugo and Eldorado-Mohave	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
110_Lugo500kV_P6.1: 3PH 4 cycle fault at Lugo 500kV w/ Eldorado-Lugo and Lugo-Mohave	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
111_Devers500kV_P6.1: 3PH 4 cycle fault at Devers 500kV w/ loss of Devers-RedBluff No.1 & No.2 500 kV	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
112_Devers500kV_P6.1: 3PH 4 cycle fault at Devers 500kV w/ loss of Devers-Valley No.1 & No.2 500 kV	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
113_ECO500kV_P6.1: 3PH 4 cycle fault at ECO 500 w/ loss of ECO-Miguel & Ocotillo-Suncrest 500 kV	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable

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Contingency	Category	Category Description	Transient Stability Performance					
			Baseline Scenarios				Sensitivity Scenarios	
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen
114_MiraLoma500kV_P6.1: 3PH 4 cycle fault at Mira Loma 500kV w/ loss of Mesa-Mira Loma 500kV & Mira Loma 4AA Bank	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
116_Mohave500kV_P6.1: 3PH 4 cycle fault at Mohave 500kV w/ loss of Eldorado-Mohave and Lugo-Mohave	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
117_RanchoVista500kV_P6.1: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Lugo-Rancho Vista & Rancho Vista-Serrano No.1	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
119_Serrano500kV_P6.1: 3PH 4 cycle fault at Serrano 500kV w/ loss of Alberhill-Serrano & Rancho Vista-Serrano No.1	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
120_Serrano500kV_P6.1: 3PH 4 cycle fault at Serrano 500kV w/ loss of Alberhill-Serrano & Mira Loma-Serrano No.2	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
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	Two overlapping singles	stable	stable	stable	stable	stable	stable
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	Two overlapping singles	stable	stable	stable	stable	stable	stable
124_Vincent500kV_P6.1: 3PH 4 cycle fault at Vincent 500kV w/ loss of Lugo-Vincent No.1 & No.2	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
125_Whirlwind500kV_P6.1: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Midway-Whirlwind No.3 & Windhub-Whirlwind	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
126_Whirlwind500kV_P6.1: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Whirlwind-Windhub & Antelope-Whirlwind	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
127_Mesa500kV_P6.1: 3PH 4 cycle fault at Mesa 500kV w/ loss of Mesa-Vincent 500kV & Mesa-Miraloma	p6	Two overlapping singles	stable	stable	stable	stable	stable	stable
128_IPPDC_bipole_P7.2: SLG fault at Adelanto 500kV followed by loss of IPP Bipole Converters with North-to-South flow	p7	common structure	stable	stable	stable	stable	stable	stable

Study Area: **Southern California Bulk**

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance					
			Baseline Scenarios				Sensitivity Scenarios	
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen
129_PDCI_bipole_SPS_P7.2: SLG fault at Sylmar SCE followed by loss of PDCI Bipole with North-to-South flow	p7	common structure	stable	stable	stable	stable	stable	stable
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	stable
131_Center230kV_P7.1: 1PH 4 cycle fault at Center 230kV w/ loss of Center-Mesa and Center-Olinda	p7	common structure	stable	stable	stable	stable	stable	stable
132_Johanna230kV_P7.1: 1PH 4 cycle fault at Johanna 230kV w/ loss of Ellis-Santiago & Ellis-Johanna	p7	common structure	stable	stable	stable	stable	stable	stable
133_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Center-Mesa & Mesa-Walnut	p7	common structure	stable	stable	stable	stable	stable	stable
135_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Walnut & Center-Olinda	p7	common structure	stable	stable	stable	stable	stable	stable
136_Redondo230kV_P7.1: 1PH 4 cycle fault at Redondo 230kV w/ loss of La Fresa-Redondo No.1 & No.2	p7	common structure	stable	stable	stable	stable	stable	stable
137_Redondo230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Redondo & Lighthipe-Redondo	p7	common structure	stable	stable	stable	stable	stable	stable
138_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Redondo & La Fresa-Laguna Bell	p7	common structure	stable	stable	stable	stable	stable	stable
140_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Lighthipe-Mesa & Del Amo-Laguna Bell	p7	common structure	stable	stable	stable	stable	stable	stable
142_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Lighthipe-Mesa & Laguna Bell-Mesa No.2	p7	common structure	stable	stable	stable	stable	stable	stable
143_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Rio Hondo No.1 & No.2	p7	common structure	stable	stable	stable	stable	stable	stable

Study Area:

Southern California Bulk

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance					
			Baseline Scenarios				Sensitivity Scenarios	
			B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S3_2023 OP Heavy Renewable & Min Gas Gen
144_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Vincent No.2 230kV & Goodrich-Gould	p7	common structure	stable	stable	stable	stable	stable	stable
145_Mesa230kV_P7.1: 1PH 4 cycle fault at Mesa 230kV w/ loss of Mesa-Vincent No.1 & Goodrich-Mesa	p7	common structure	stable	stable	stable	stable	stable	stable
146_MiraLoma500kV_P7.1: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mesa-Mira Loma 500kV & Chino-Mira Loma No.3 230kV	p7	common structure	stable	stable	stable	stable	stable	stable
147_MiraLoma230kV_P7.1: 1PH 4 cycle fault at Mira Loma 230kV w/ loss of Mira Loma-Walnut 230kV & Mira Loma-Olinda	p7	common structure	stable	stable	stable	stable	stable	stable
148_RanchoVista230kV_P7.1: 1PH 4 cycle fault at Rancho Vista 230kV w/ loss of Mira Loma-Rancho Vista No.1 & No.2 230kV	p7	common structure	stable	stable	stable	stable	stable	stable
149_Santiago230kV_P7.1: 1PH 4 cycle fault at Santiago 230kV w/ loss of Ellis-Santiago & Johanna-Santiago	p7	common structure	stable	stable	stable	stable	stable	stable
150_Serrano500kV_P7.1: 1PH 4 cycle fault at Serrano 500kV w/ loss of Mira Loma-Serrano No.2 500kV & Rancho Vista-Serrano No.1 500kV	p7	common structure	stable	stable	stable	stable	stable	stable
151_Serrano230kV_P7.1: 1PH 4 cycle fault at Serrano 230kV w/ loss of Serrano-Villa Park No.1 & No.2 230kV	p7	common structure	stable	stable	stable	stable	stable	stable
152_Viejo230kV_P7.1: 1PH 4 cycle fault at Viejo 230kV w/ loss of San Onofre-Serrano 230kV & Chino-Viejo 230kV	p7	common structure	stable	stable	stable	stable	stable	stable
153_Vincent230kV_P7.1: 1PH 4 cycle fault at Vincent 230kV w/ Rio Hondo-Vincent No.1 & No.2 230kV	p7	common structure	stable	stable	stable	stable	stable	stable

Potential Mitigation Solutions
WECC Criteria met. However, dynamic models (repc_a and repc_b) of some IBR resources need to be tuned
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Potential Mitigation Solutions
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Potential Mitigation Solutions
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Study Area: **Southern California Bulk**



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions
			B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	

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

Study Area: **Southern California Bulk**



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)									Potential Mitigation Solutions
	B1_2023 Summer Peak	B2_2026 Summer Peak	B3_2031 Summer Peak	B4_2023 Spring Off-Peak	B5_2026 Spring Off-Peak	B6_2031 Spring Off-Peak	S1_2026 SP High CEC Forecast	S2_2023 SP Heavy Renewable & Min Gas Gen	S3_2023 OP Heavy Renewable & Min Gas Gen	

No single source substation with more than 100 MW

2021-2022 ISO Reliability Assessment - Study Results

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

Thermal Overloads **PG&E Los Padres**

In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies for the year 5 and year 10 studies from the 2020-21 Transmission Planning Process.

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



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Project & Potential Mitigation Solutions
				2023 Summer Peak	2023 Winter Peak	2023 Spring Off-Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Atascadero-Cayucos 70 kV Line (36358 36362)	P5-5:A20:24:_MORRO BAY 230kV Bus (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	19	Add Redundant Relay
Atascadero-Cayucos 70 kV Line (36362 36364)	P5-5:A20:24:_MORRO BAY 230kV Bus (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	19	Add Redundant Relay
Atascadero-San Luis Obispo 70 kV Line (36358 36376)	P5-5:A20:24:_MORRO BAY 230kV Bus (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	12	Add Redundant Relay
Callender Sw. Sta-Mesa 115 kV Line (36256 36280)	P2-4:A20:6:_MORROBAY 230kV - Section 1E & 2E	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	91	94	19	Project: North Of Mesa Upgrades Short term: Action plan
	MORRO BAY-MESA 230kV [5290] & MORRO BAY-DIABLO 230kV [5260]	P6	N-1-1	140	105	<100	<100	<100	Project: North Of Mesa Upgrades Short term: Action plan
	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7	DCTL	148	115	87	93	18	Project: North Of Mesa Upgrades Short term: Action plan
	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7	DCTL	142	109	83	89	14	Project: North Of Mesa Upgrades Short term: Action plan
Crazy Horse-Natividad #1 115 kV Line (35910 35914)	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	124	70	82	78	37	Project: RAS Proposed in 2018-2019 In-service date: TBD Short term: Action plan
Crazy Horse-Natividad #1 115 kV Line (35914 35920)	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	119	72	75	81	37	Project: RAS Proposed in 2018-2019 In-service date: TBD Short term: Action plan
Crazy Horse-Soledad 115 kV Line (35910 35913)	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	124	70	82	78	37	Project: RAS Proposed in 2018-2019 In-service date: TBD Short term: Action plan
Crazy Horse-Soledad 115 kV Line (35913 35920)	P7-1:A19:4:_Moss Landing - Salinas #1 and #2 115 kV Lines	P7	DCTL	119	72	75	81	37	Project: RAS Proposed in 2018-2019 In-service date: TBD Short term: Action plan
Green Valley 115/60 Transformer #1 (36008 35901)	P5-5:A19:2:_Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	212	209	208	169	Add Redundant Relay
	P5-5:A19:1:_Salinas 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-Redundent Relay	207	198	191	197	154	Add Redundant Relay
	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Diverge	Diverge	36	65	30	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
Green Valley-Watsonville 60 kV (36008 36013)	P5-5:A19:2:_Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	132	163	164	130	Add Redundant Relay
	P5-5:A19:1:_Salinas 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-Redundent Relay	164	123	149	155	118	Add Redundant Relay

2021-2022 ISO Reliability Assessment - Study Results

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

Thermal Overloads **PG&E Los Padres**

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



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Project & Potential Mitigation Solutions
				2023 Summer Peak	2023 Winter Peak	2023 Spring Off-Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Diverge	Diverge	27	137	22	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
Green Valley-Watsonville 60 kV (36011 36013)	P5-5:A19:2:_Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	132	162	162	129	Add Redundant Relay
	P5-5:A19:1:_Salinas 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-Redundent Relay	161	123	148	153	117	Add Redundant Relay
	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Diverge	Diverge	27	139	22	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
Green Valley-Watsonville 60 kV (36011 36016)	P5-5:A19:2:_Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	132	162	162	129	Add Redundant Relay
	P5-5:A19:1:_Salinas 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-Redundent Relay	161	123	148	153	117	Add Redundant Relay
	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Diverge	Diverge	27	139	22	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
Green Valley-Watsonville 60 kV (36012 36016)	P5-5:A19:2:_Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	132	161	161	129	Add Redundant Relay
	P5-5:A19:1:_Salinas 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-Redundent Relay	161	123	147	153	117	Add Redundant Relay
	MOSS LANDING-GREEN VALLEY #2 115kV [2860] & MOSS LANDING-GREEN VALLEY #1 115kV [2850]	P6	N-1-1	NA	NA	<100	132	<100	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Diverge	Diverge	27	140	22	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
Lagunitas 60 kV Tap (36022 36025)	P5-5:A19:2:_Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	177	207	221	160	Add Redundant Relay
	P5-5:A19:1:_Salinas 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-Redundent Relay	221	160	185	206	145	Add Redundant Relay
	MOSS LANDING-GREEN VALLEY #1 115kV [2850] & MOSS LANDING-GREEN VALLEY #2 115kV [2860]	P6	N-1-1	NA	NA	<100	245	<100	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Diverge	Diverge	67	255	41	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
Mesa-Santa Maria 115 kV Line (36256 36267)	MORROBAY 230/115kV TB 6 & TEMPLETN 230/70kV TB 1	P6	N-1-1	100	<100	<100	<100	<100	Project: North Of Mesa Upgrades Short term: Action plan

2021-2022 ISO Reliability Assessment - Study Results

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

Thermal Overloads **PG&E Los Padres**

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



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Project & Potential Mitigation Solutions
				2023 Summer Peak	2023 Winter Peak	2023 Spring Off-Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Morro Bay 230/115 Transformer No. 6 (36252 30915)	P2-4:A20:4:_MESA_PGE 115kV - Section 2D & 1D	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	32	91	26	Project: North Of Mesa Upgrades Short term: Action plan
	P2-4:A20:6:_MORROBAY 230kV - Section 1E & 2E	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	74	85	19	Project: North Of Mesa Upgrades Short term: Action plan
	MORRO BAY-DIABLO 230kV [5260] & MORRO BAY-MESA 230kV [5290]	P6	N-1-1	143	112	<100	<100	<100	Project: North Of Mesa Upgrades Short term: Action plan
	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7	DCTL	152	118	87	93	26	Project: North Of Mesa Upgrades Short term: Action plan
	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7	DCTL	151	118	85	91	25	Project: North Of Mesa Upgrades Short term: Action plan
Oceano-Callender Sw. Sta 115 kV Line (36278 36280)	P2-4:A20:6:_MORROBAY 230kV - Section 1E & 2E	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	94	93	22	Project: North Of Mesa Upgrades Short term: Action plan
	MORRO BAY-MESA 230kV [5290] & MORRO BAY-DIABLO 230kV [5260]	P6	N-1-1	139	106	<100	<100	<100	Project: North Of Mesa Upgrades Short term: Action plan
	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7	DCTL	147	115	90	89	21	Project: North Of Mesa Upgrades Short term: Action plan
	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7	DCTL	142	109	86	86	18	Project: North Of Mesa Upgrades Short term: Action plan
Salinas-Firestone #1 60 kV Line (36027 36046)	MOSS LANDING-SALINAS #2 115kV [2890] & SALINAS-FIRESTONE #2 60kV [7910] COPY1	P6	N-1-1	101	<100	<100	<100	<100	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
San Luis Obispo-Oceano 115 kV Line (36254 36278)	P2-4:A20:6:_MORROBAY 230kV - Section 1E & 2E	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	88	81	14	Project: North Of Mesa Upgrades Short term: Action plan
San Luis Obispo-Oceano 115 kV Line (36254 36278)	MORRO BAY-MESA 230kV [5290] & MORRO BAY-DIABLO 230kV [5260]	P6	N-1-1	139	116	<100	<100	<100	Project: North Of Mesa Upgrades Short term: Action plan
San Luis Obispo-Oceano 115 kV Line (36254 36278)	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7	DCTL	145	124	85	78	14	Project: North Of Mesa Upgrades Short term: Action plan
San Luis Obispo-Oceano 115 kV Line (36254 36278)	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7	DCTL	143	121	82	75	12	Project: North Of Mesa Upgrades Short term: Action plan
San Luis Obispo-Santa Maria 115 kV Line (36254 36266)	P2-4:A20:4:_MESA_PGE 115kV - Section 2D & 1D	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	NA	175	34	Project: North Of Mesa Upgrades Short term: Action plan
San Luis Obispo-Santa Maria 115 kV Line (36254 36266)	P2-4:A20:6:_MORROBAY 230kV - Section 1E & 2E	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	120	114	24	Project: North Of Mesa Upgrades Short term: Action plan
San Luis Obispo-Santa Maria 115 kV Line (36254 36266)	P5-5:A20:24:_MORRO BAY 230kV Bus (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	47	Add Redundant Relay
San Luis Obispo-Santa Maria 115 kV Line (36254 36266)	MORRO BAY-DIABLO 230kV [5260] & MORRO BAY-MESA 230kV [5290]	P6	N-1-1	183	139	116	<100	<100	Project: North Of Mesa Upgrades Short term: Action plan

2021-2022 ISO Reliability Assessment - Study Results

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

Thermal Overloads **PG&E Los Padres**

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Project & Potential Mitigation Solutions
				2023 Summer Peak	2023 Winter Peak	2023 Spring Off-Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
San Luis Obispo-Santa Maria 115 kV Line (36254 36266)	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7	DCTL	191	150	116	111	24	Project: North Of Mesa Upgrades Short term: Action plan
San Luis Obispo-Santa Maria 115 kV Line (36254 36266)	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7	DCTL	188	146	112	107	20	Project: North Of Mesa Upgrades Short term: Action plan
San Miguel-Paso Robles 70 kV Line (36356 36354)	MORRO BAY-TEMPLETON 230kV [5933] & SN LS OB 115/70kV TB 3	P6	N-1-1	<100	<100	<100	<100	132	Sensitivity Only
Santa Maria-Sisquoc 115 kV Line (36266 36269)	P2-4:A20:4:_MESA_PGE 115kV - Section 2D & 1D	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	NA	82	7	Project: South Of Mesa Upgrades In-service date: 2027 Short term: Action plan
Sisquoc-Santa Ynez 115 kV (36286 36287)	P2-4:A20:4:_MESA_PGE 115kV - Section 2D & 1D	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	NA	83	8	Project: South Of Mesa Upgrades In-service date: 2027 Short term: Action plan
Sisquoc-Santa Ynez 115 kV (36286 36287)	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7	DCTL	106	102	83	68	17	Project: South Of Mesa Upgrades In-service date: 2027 Short term: Action plan
Sisquoc-Santa Ynez Sw.Sta. 115 kV Line (36260 36286)	P2-4:A20:4:_MESA_PGE 115kV - Section 2D & 1D	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	NA	88	5	Project: South Of Mesa Upgrades In-service date: 2027 Short term: Action plan
Sisquoc-Santa Ynez Sw.Sta. 115 kV Line (36260 36286)	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7	DCTL	111	105	86	71	16	Project: South Of Mesa Upgrades In-service date: 2027 Short term: Action plan
Sisquoc-Santa Ynez Sw.Sta. 115 kV Line (36264 36288)	P2-4:A20:4:_MESA_PGE 115kV - Section 2D & 1D	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	<100	76	<100	Project: South Of Mesa Upgrades In-service date: 2027 Short term: Action plan
Sisquoc-Santa Ynez Sw.Sta. 115 kV Line (36264 36288)	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7	DCTL	98	102	<100	57	<100	Project: South Of Mesa Upgrades In-service date: 2027 Short term: Action plan
Temblor-San Luis Obispo 115 kV Line (36254 34796)	P2-4:A20:6:_MORROBAY 230kV - Section 1E & 2E	P2-4	Internal Breaker Fault(Bus Tie Fault)	Diverge	Diverge	100	55	25	Project: North Of Mesa Upgrades Short term: Action plan
Temblor-San Luis Obispo 115 kV Line (36254 34796)	P5-5:A20:24:_MORRO BAY 230kV Bus (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	51	Add Redundant Relay
Templeton 230/70 kV Transformer (36310 30905)	P5-5:A20:24:_MORRO BAY 230kV Bus (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	17	Add Redundant Relay
Templeton-Atascadero 70 kV Line (36310 36316)	P5-5:A20:24:_MORRO BAY 230kV Bus (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	21	Add Redundant Relay
Templeton-Atascadero 70 kV Line (36316 36358)	P5-5:A20:24:_MORRO BAY 230kV Bus (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	21	Add Redundant Relay
	P5-5:A19:2:_Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	183	219	220	175	Add Redundant Relay

2021-2022 ISO Reliability Assessment - Study Results

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

Thermal Overloads **PG&E Los Padres**

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Project & Potential Mitigation Solutions
				2023 Summer Peak	2023 Winter Peak	2023 Spring Off-Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Watsonville-Salinas 60 kV (36012 36014)	P5-5:A19:1:_Salinas 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-Redundent Relay	218	171	200	208	159	Add Redundant Relay
	MOSS LANDING-GREEN VALLEY #2 115kV [2860] & MOSS LANDING-GREEN VALLEY #1 115kV [2850]	P6	N-1-1	NA	NA	<100	182	<100	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Diverge	Diverge	46	191	30	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
Watsonville-Salinas 60 kV (36018 36014)	P5-5:A19:2:_Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	170	186	211	144	Add Redundant Relay
	P5-5:A19:1:_Salinas 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-Redundent Relay	209	155	166	196	130	Add Redundant Relay
	MOSS LANDING-GREEN VALLEY #2 115kV [2860] & MOSS LANDING-GREEN VALLEY #1 115kV [2850]	P6	N-1-1	NA	NA	<100	228	<100	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Diverge	Diverge	54	238	32	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
Watsonville-Salinas 60 kV (36018 36022)	P5-5:A19:2:_Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-Redundent Relay	Diverge	176	207	221	160	Add Redundant Relay
	P5-5:A19:1:_Salinas 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-Redundent Relay	220	160	185	206	145	Add Redundant Relay
	MOSS LANDING-GREEN VALLEY #2 115kV [2860] & MOSS LANDING-GREEN VALLEY #1 115kV [2850]	P6	N-1-1	NA	NA	<100	247	<100	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
	P7-1:A19:1:_Moss Landing - Green Valley #1 and #2 115 kV Lines	P7	DCTL	Diverge	Diverge	67	257	41	Project: Morgan Hill Area Reinforcement In-service date: 2026 Short term: Action plan
Salinas-Firestone #1 60 kV Line (36048 36050)	P1-2:A19:45:_SALINAS-FIRESTONE #2 60kV [7910] COPY1	P1	N-1	134	73	50	129	46	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
Salinas-Firestone #2 60 kV Line (36050 36052)	P1-2:A19:45:_SALINAS-FIRESTONE #2 60kV [7910] COPY1	P1	N-1	119	63	40	114	35	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
Salinas-Firestone #2 60 kV Line (36051 36053)	P1-2:A19:46:_SALINAS-FIRESTONE #2 60kV [7910] COPY2	P1	N-1	127	68	42	122	38	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan

2021-2022 ISO Reliability Assessment - Study Results

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

Thermal Overloads **PG&E Los Padres**

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Project & Potential Mitigation Solutions
				2023 Summer Peak	2023 Winter Peak	2023 Spring Off-Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Salinas-Firestone #2 60 kV Line (36051 36053)	P1-2:A19:52:_SALINAS1-FIRESTONE 60kV [0]	P1	N-1	136	73	51	131	46	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
Salinas-Firestone #2 60 kV Line (36051 36054)	P1-2:A19:46:_SALINAS-FIRESTONE #2 60kV [7910] COPY2	P1	N-1	127	68	42	122	38	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
	P1-2:A19:52:_SALINAS1-FIRESTONE 60kV [0]	P1	N-1	136	73	51	131	46	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
Salinas-Firestone #2 60 kV Line (36052 36053)	P1-2:A19:45:_SALINAS-FIRESTONE #2 60kV [7910] COPY1	P1	N-1	126	67	42	121	38	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P1-3:A20:101:_TEMPLETN 230/70kV TB 1	P1	N-1	102	57	51	53	25	Project: Estrella In-service date: 2026 Short term: Action plan
Salinas-Firestone #1 60 kV Line (36027 36046)	P1-1:A19:6:_DUKMOSS1 18.00kV & DUKMOSS2 18.00kV & DUKMOSS3 18.00kV Gen Units & P1-2:A19:4	P3	G-1/N-1	100.05	<100	<100	91.43	<100	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan

2021-2022 ISO Reliability Assessment - Study Results

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

High/Low Voltages

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Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)		Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2023 Winter Peak	2023 Spring Off-Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
BNA VSTA 60	P2-1:A19:71:_SALINAS-FIRESTONE #1 60kV [7900] (FREXP JT-B.VSTA J)	P2-1	Line Section w/o Fault	0.85	0.96	0.93	0.85	0.95	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
BNA VSTA 60	P2-1:A19:72:_SALINAS-FIRESTONE #1 60kV [7900] (SALINAS1-FREXP JT)	P2-1	Line Section w/o Fault	0.81	0.94	0.91	0.82	0.93	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
FIRESTONE 60	P2-1:A19:71:_SALINAS-FIRESTONE #1 60kV [7900] (FREXP JT-B.VSTA J)	P2-1	Line Section w/o Fault	0.86	0.97	0.94	0.87	0.96	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
FIRESTONE 60	P2-1:A19:72:_SALINAS-FIRESTONE #1 60kV [7900] (SALINAS1-FREXP JT)	P2-1	Line Section w/o Fault	0.83	0.95	0.93	0.84	0.94	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
FRSHXPRS 60	P2-1:A19:72:_SALINAS-FIRESTONE #1 60kV [7900] (SALINAS1-FREXP JT)	P2-1	Line Section w/o Fault	0.81	0.94	0.91	0.82	0.93	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
SAN MIGL 70	P2-2:A20:21:_PSA RBL5 70kV Section 1D	P2-2	Bus	0.89	0.94	1.02	0.94	1.07	Project: Estrella In-service date: 2026 Short term: Action plan
SAN MIGL 70	P2-3:A20:23:_PSA RBL5 - 1D 70kV & PASO ROBLES-TEMPLETON line	P2-3	Non-Bus Tie Breaker	0.89	0.94	1.02	0.94	1.07	Project: Estrella In-service date: 2026 Short term: Action plan
SPENCE 60	P2-1:A19:71:_SALINAS-FIRESTONE #1 60kV [7900] (FREXP JT-B.VSTA J)	P2-1	Line Section w/o Fault	0.87	0.97	0.95	0.87	0.97	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
SPENCE 60	P2-1:A19:72:_SALINAS-FIRESTONE #1 60kV [7900] (SALINAS1-FREXP JT)	P2-1	Line Section w/o Fault	0.85	0.96	0.94	0.85	0.95	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
AGRILINK 60	P1-3:A19:23:_SALINAS 115/60kV TB 2 & P1-3:A19:24:_SALINAS 115/60kV TB 3	P6	N-1-1	0.80	0.80	0.83	0.82	0.89	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
ATASCDRO 70	P1-2:A20:2:_ATASCADERO-SAN LUIS OBISPO 70kV [8490] & P1-2:A20:47:_TEMPLETON-ATASCADERO 70kV [9410]	P6	N-1-1	0.89	>0.9	>0.9	>0.9	>0.9	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
BAYWOOD 70	P1-3:A20:101:_TEMPLETN 230/70kV TB 1 & P1-2:A20:2:_ATASCADERO-SAN LUIS OBISPO 70kV [8490]	P6	N-1-1	0.80	>0.9	>0.9	>0.9	>0.9	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
CAMBRIA 70	P1-2:A20:2:_ATASCADERO-SAN LUIS OBISPO 70kV [8490] & P1-3:A20:101:_TEMPLETN 230/70kV TB 1	P6	N-1-1	0.72	>0.9	0.89	>0.9	>0.9	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
CAYUCOS 70	P1-3:A20:101:_TEMPLETN 230/70kV TB 1 & P1-2:A20:2:_ATASCADERO-SAN LUIS OBISPO 70kV [8490]	P6	N-1-1	0.73	>0.9	0.89	>0.9	>0.9	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
ERTA 60	P1-3:A19:23:_SALINAS 115/60kV TB 2 & P1-3:A19:24:_SALINAS 115/60kV TB 3	P6	N-1-1	0.85	0.85	0.87	0.86	>0.9	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
PERRY 70	P1-2:A20:2:_ATASCADERO-SAN LUIS OBISPO 70kV [8490] & P1-3:A20:101:_TEMPLETN 230/70kV TB 1	P6	N-1-1	0.72	>0.9	0.89	>0.9	>0.9	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan

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

High/Low Voltages

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Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)		Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2023 Winter Peak	2023 Spring Off-Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
PSA RBLS 70	P1-2:A20:32:_SAN LUIS OBISPO-CAYUCOS 70kV [9090] MOAS OPENED on CAYUCOS_BAYWOOD COPY1 & P1-3:A20:101:_TEMPLETN 230/70kV TB 1	P6	N-1-1	0.90	>0.9	>0.9	>0.9	>0.9	Project: Estrella In-service date: 2026 Short term: Action plan
SAN MIGL 70	P1-2:A20:48:_TEMPLETON-GATES 230kV [5934] & P1-2:A20:37:_SAN MIGUEL-PASO ROBLES 70kV [9390]	P6	N-1-1	0.88	>0.9	>0.9	>0.9	>0.9	Project: Estrella In-service date: 2026 Short term: Action plan
WTSNVLL 60	P1-3:A19:23:_SALINAS 115/60kV TB 2 & P1-3:A19:24:_SALINAS 115/60kV TB 3	P6	N-1-1	0.79	0.80	0.82	0.81	0.88	Project: Salinas- Firestone #1 and #2 reconductor In-service date: 2026 Short term: Action plan
SAN MIGL 70	P1-2:A20:37:_SAN MIGUEL-PASO ROBLES 70kV [9390]	P1	N-1	0.89	0.94	1.02	0.94	1.07	Project: Estrella In-service date: 2026 Short term: Action plan

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Voltage Deviation

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)			2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	Project & Potential Mitigation Solutions
				2023 Summer Peak	2023 Winter Peak	2023 Spring Off-Peak			
SAN MIGL 70 kV	SAN MIGUEL-PASO ROBLES 70kV [9390]	P1	N-1	11	7	<8	8	<8	Project: Estrella In-service date: 2026 Short term: Action plan

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

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	

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

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



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	

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

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



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)									Potential Mitigation Solutions
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Vaca-Plainfield 60 kV line (32088 32090)	Base Case	P0	N-0	122	115	111	72	19	117	60	11	System Upgrade/ Preferred Resources/Operating Solution as needed
Vaca-Plainfield 60 kV line (32082 32090)	Base Case	P0	N-0	130	122	116	72	20	124	62	13	
Vaca-Plainfield 60 kV line (32082 32092)	Base Case	P0	N-0	131	121	116	72	19	123	62	13	
Weber - Morman Jct. 60 kV Line (33650 33646)	Base Case	P0	N-0	118	119	121	<100	<100	120	<100	<100	System Upgrade/ Preferred Resources/Operating Solution as needed
Rio Oso - Lockeford 230 kV Line (30330 30482)	LOCKFORD 230kV - Ring R3 & R4	P2-3	Non-Bus Tie Breaker Fault	108	<100	<100	36	<100	<100	66	32	- Lockeford - Lodi 230 kV Project - Expected ISD: Dec. 2025 - Short term: Action Plan
	LOCKFORD 230kV - Ring R3 & R2	P2-3	Non-Bus Tie Breaker Fault	108	<100	<100	36	<100	<100	66	32	- Lockeford - Lodi 230 kV Project - Expected ISD: Dec. 2025 - Short term: Action Plan
	LOCKFORD 230/60kV TB 2 & LOCKEFORD-BELLOTA 230kV	P6	N-1-1	108	<100	<100	<100	<100	<100	<100	<100	- Lockeford - Lodi 230 kV Project - Expected ISD: Dec. 2025 - Short term: Action Plan
	LOCKFORD 230/60kV TB 3 & LOCKEFORD-BELLOTA 230kV	P6	N-1-1	108	<100	<100	<100	<100	<100	<100	<100	- Lockeford - Lodi 230 kV Project - Expected ISD: Dec. 2025 - Short term: Action Plan
Woodland - Davis 115 kV Line (31962 31970)	BRIGHTN 115KV SECTION ME	P2-2	Bus Fault	110	68	74	67	1	69	85	17	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
	BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	139	80	92	77	3	81	98	21	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
	RIO OSO-BRIGHTON 230KV & BRIGHTON-BELLOTA 230KV	P6	N-1-1	142	<100	<100	<100	<100	<100	<100	<100	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
	Rio Oso-Brighton 230 kV Line & Rio Oso-Lockeford 230 kV Line	P7	DCTL	102	73	82	45	13	73	59	19	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
Woodland - Davis 115 kV Line (31962 36593)	BRIGHTN 115KV SECTION ME	P2-2	Bus Fault	107	67	72	65	15	67	82	29	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
	BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	136	78	90	75	15	79	95	33	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
	RIO OSO-BRIGHTON 230KV & BRIGHTON-BELLOTA 230KV	P6	N-1-1	139	<100	<100	<100	<100	<100	<100	<100	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
Woodland - Davis 115 kV Line (36593 31990)	BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	110	78	90	75	11	79	77	40	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
	RIO OSO-BRIGHTON 230KV & BRIGHTON-BELLOTA 230KV	P6	N-1-1	112	<100	<100	<100	<100	<100	<100	<100	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
West Sacramento - Brighton 115 kV Line (31978 31984)	RIO OSO 115kV - Section 2D & 1D	P2-4	Bus Tie Breaker Fault	103	101	98	78	4	102	64	28	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
Brighton - Davis 115 kV Line (31984 31983)	BRIGHTN-W.SCRMNO 115KV	P1	N-1	108	87	88	77	11	88	47	38	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
	RIO OSO 115kV - Section 2D & 1D	P2-4	Bus Tie Breaker Fault	145	142	131	110	6	144	88	34	SPS recommended in 2017-2018 TPP
	W.SCRMNO - DE 115KV & BRIGHTN-W.SCRMNO LINE	P2-3	Non-Bus Tie Breaker Fault	119	103	108	86	12	105	54	37	
	RIO OSO 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	133	133	116	103	5	134	83	33	
	WOODLAND-DAVIS 115KV & WEST SACRAMENTO-DAVIS 115KV	P6	N-1-1	<100	138	178	107	<100	139	<100	<100	
	Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	119	103	108	45	11	103	26	22	
Brighton - Davis 115 kV Line (31983 31993)	BRIGHTN-W.SCRMNO 115KV	P1	N-1	108	87	88	78	11	88	47	39	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
	RIO OSO 115kV - Section 2D & 1D	P2-4	Bus Tie Breaker Fault	145	142	131	110	6	144	88	35	SPS recommended in 2017-2018 TPP
	RIO OSO 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	133	133	116	103	4	134	83	33	
	Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	120	103	108	46	11	103	26	23	
Brighton - Davis 115 kV Line (31993 31992)	RIO OSO 115kV - Section 2D & 1D	P2-4	Bus Tie Breaker Fault	122	120	110	93	3	121	74	29	SPS recommended in 2017-2018 TPP
	RIO OSO 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	112	112	98	86	2	113	69	28	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Brighton-Davis 115 kV Line (31993 32001)	WOODLAND-DAVIS 115KV & WEST SACRAMENTO-DAVIS 115KV	P6	N-1-1	118	116	151	<100	<100	117	<100	<100	
	Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	101	86	90	45	7	87	25	24	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
Rio Oso 230/115 kV Bank No. 1 (32214 30330)	BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2-3	Non-Bus Tie Breaker Fault	112	<100	<100	30	<100	<100	68	5	- Rio Oso Transformer Upgrade Project - Expected ISD: Jun. 2024 - Short term: Action Plan
Rio Oso 230/115 kV Bank No. 1 (32214 30330)	FREC 13.80kV Gen Unit 1 & RIO OSO-BRIGHTON 230KV	P3	N-G-1	100	<100	<100	<100	<100	<100	<100	<100	- Rio Oso Transformer Upgrade Project - Expected ISD: Jun. 2024 - Short term: Action Plan
Rio Oso 230/115 kV Bank No. 1 (32214 30330)	BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	103	46	53	33	12	46	79	6	- Rio Oso Transformer Upgrade Project - Expected ISD: Jun. 2024 - Short term: Action Plan
Rio Oso 230/115 kV Bank No. 1 (32214 30330)	BRIGHTON 230/115KV TB 9 & BRIGHTON 230/115KV TB 10	P6	N-1-1	121	<100	<100	<100	<100	<100	<100	<100	- Rio Oso Transformer Upgrade Project - Expected ISD: Jun. 2024 - Short term: Action Plan
Rio Oso 230/115 kV Bank No. 1 (32214 30330)	Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	125	48	65	82	13	49	52	14	- Rio Oso Transformer Upgrade Project - Expected ISD: Jun. 2024 - Short term: Action Plan
Rio Oso 230/115 kV Bank No. 1 (32214 30330)	Rio Oso-Brighton 230 kV Line & Rio Oso-Lockeford 230 kV Line	P7	DCTL	113	43	54	82	12	43	52	14	- Rio Oso Transformer Upgrade Project - Expected ISD: Jun. 2024 - Short term: Action Plan
Rio Oso 230/115 kV Bank No. 2 (32214 30330)	Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	105	48	65	82	13	49	36	14	- Rio Oso Transformer Upgrade Project - Expected ISD: Jun. 2024 - Short term: Action Plan
Rio Oso - West Sacramento 115 kV Line (32214 31986)	BRIGHTN 115KV - SECTION ME & MD	P2-4	Bus Tie Breaker Fault	100	79	84	77	6	79	76	30	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
	BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	102	91	103	87	9	92	84	33	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
	BRIGHTON 230/115KV TB 9 & BRIGHTON 230/115KV TB 10	P6	N-1-1	121	<100	101	<100	<100	<100	<100	<100	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
Vaca 115/60 kV transformer #5 (32088 31998)	VACA-DIX 115/60KV TB 9	P1	N-1	108	44	46	31	5	45	64	14	- Vaca Davis Area Reinforcement Project - Expected ISD: Dec. 2025 - Short term: Action Plan

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Dixon-Vaca #2 60 kV (32100 32101)	VACA-DXN-DIXON-J1-TRAVIS 60KV MOAS OPENED ON TRAVIS_TRAVISJT	P1	N-1	124	52	57	37	5	52	75	12	- Vaca Davis Area Reinforcement Project - Expected ISD: Dec. 2025 - Short term: Action Plan
Table Mountain-Pease 60 kV Line (Peachton-Gridley) (32326 32332)	PEASE 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	131	126	42	24	39	125	6	6	- East Marysville 115/60 kV Transformer Project - Expected ISD: Dec. 2025 - Short term: Action Plan
Table Mountain-Pease 60 kV Line (Peachton-Gridley) (32326 32334)	PEASE 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	130	125	41	25	38	124	5	7	
Table Mountain-Pease 60 kV Line (Peachton-Gridley) (38054 32334)	PEASE 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	107	102	17	40	44	100	7	8	
Tesla - Salado - Manteca 115 kV Line (33514 33970)	KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	191	179	69	37	68	181	158	14	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	SCHULTE SW STA-LAMMERS 115kV & SCHULTE SW STA-KASSON-MANTECA 115kV	P6	N-1-1	215	234	<100	<100	<100	234	157	<100	
	TESLA-SCHULTE SW STA #2 115KV & TESLA-SCHULTE SW STA #1 115KV	P7	DCTL	119	105	20	23	49	116	61	10	
Bellota-Riverbank-Melones 115 kV Line (33562 33950)	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	105	<100	<100	31	<100	<100	102	38	
	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	96	109	86	87	16	108	76	31	
	KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	104	87	38	31	73	90	102	42	
	SCHULTE SW STA-LAMMERS 115kV & SCHULTE SW STA-KASSON-MANTECA 115kV	P6	N-1-1	118	123	<100	<100	<100	125	<100	<100	
Lockeford - Industrial 60 kV Line (33724 38060)	LOCKFORD 230kV - Ring R3 & R4	P2-3	Non-Bus Tie Breaker Fault	104	<100	<100	40	<100	<100	66	36	- Lockeford - Lodi Area 230 kV Project - Expected ISD: Dec. 2025 - Short term: Action Plan
	LOCKFORD 230kV - Ring R3 & R2	P2-3	Non-Bus Tie Breaker Fault	104	<100	<100	40	<100	<100	67	36	
	LOCKEFORD-LODI #2 60kV (LOCKEFRD-VICTOR)	P2-1	Line Section w/o Fault	103	<100	<100	63	<100	<100	95	55	
	LOCKEFRD-INDUSTRL 60kV & LODI-INDUSTRIAL 60kV	P6	N-1-1	141	<100	<100	<100	<100	<100	141	<100	
Lockeford - Lodi 60 kV Line No. 2 (33735 38060)	LOCKEFORD-INDUSTRIAL 60kV & LODI-INDUSTRIAL 60kV	P6	N-1-1	141	<100	<100	<100	<100	<100	141	<100	
Lodi - Industrial 60 kV Line (38060 33728)	LOCKEFORD-INDUSTRIAL 60kV & LOCKEFRD-INDUSTRL 60kV	P6	N-1-1	176	<100	<100	102	<100	<100	174	102	
Cortina 230/115/60 kV Transformer No. 1 (32056 30451)	CORTINA 230/115KV TB 4	P1	N-1	138	110	103	73	100	117	43	48	Existing operating procedure
	Brighton-Bellota 230 kV Line & Rio Oso-Lockeford 230 kV Line	P7	DCTL	72	91	96	23	7	91	222	171	Sensitivity only

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Poe-Rio Oso 230 kV Line (30280 30330)	GOLD HILL-EIGHT MILE ROAD 230KV & GOLD HILL-LODI STIG 230KV	P7	DCTL	71	91	96	23	7	91	222	171	Sensitivity only
	Rio Oso-Brighton 230 kV Line & Rio Oso-Lockeford 230 kV Line	P7	DCTL	71	91	95	23	7	91	222	171	Sensitivity only
Rio Oso - Atlantic 230 kV Line No. 1 (30330 30335)	RIO OSO-GOLD HILL 230kV	P1	N-1	80	79	105	21	14	79	66	17	Continue to monitor future forecast
	GOLDHILL - 2D 230kV & MIDDLE FORK-GOLD HILL line	P2-3	Non-Bus Tie Breaker Fault	99	97	114	39	15	97	81	29	Continue to monitor future forecast
	GOLDHILL 230kV Section 2D	P2-2	Bus Fault	99	97	114	39	15	97	81	29	Continue to monitor future forecast
Vaca - Lambie 230 kV Line (30460 30 30)	BDLSWSTA 230KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus Tie Breaker Fault	<100	91	102	<100	26	91	<100	<100	Continue to monitor future forecast
Rio Oso - Woodland 115 kV No. 2 (31964 31968)	WEST SACRAMENTO-DAVIS 115KV & RIO OSO-WOODLAND #1 115KV	P6	N-1-1	<100	<100	110	<100	<100	<100	<100	<100	Continue to monitor future forecast
Rio Oso - Woodland 115 kV No. 1 (31965 31966)	WEST SACRAMENTO-DAVIS 115KV & RIO OSO-WOODLAND #2 115KV	P6	N-1-1	<100	<100	102	<100	<100	<100	<100	<100	Continue to monitor future forecast
Rio Oso - Woodland 115 kV No. 2 (31968 31970)	WEST SACRAMENTO-DAVIS 115KV & RIO OSO-WOODLAND #1 115KV	P6	N-1-1	<100	<100	102	<100	<100	<100	<100	<100	Continue to monitor future forecast
West Sacramento - Davis 115 kV Line (31980 31986)	BRIGHTON-DAVIS 115KV MOAS OPENED ON HOWARDJCT3_BRKRJCT & WOODLAND-DAVIS 115KV	P6	N-1-1	<100	<100	110	<100	<100	<100	<100	<100	Continue to monitor future forecast
West Sacramento - Davis 115 kV Line (31980 31990)	BRIGHTON-DAVIS 115KV MOAS OPENED ON HOWARDJCT3_BRKRJCT & WOODLAND-DAVIS 115KV	P6	N-1-1	<100	<100	108	<100	<100	<100	<100	<100	Continue to monitor future forecast
Brighton - Davis 115 kV Line (32001 31990)	WOODLAND-DAVIS 115KV & WEST SACRAMENTO-DAVIS 115KV	P6	N-1-1	<100	<100	122	<100	<100	<100	<100	<100	Continue to monitor future forecast
Vaca - Suisun - Jameson 115 kV Line (31998 31997)	VACA-VACAVILLE-JAMESON-NORTH TOWER 115KV MOAS OPENED ON HALE J1_HALE & VACA-SUISUN 115KV MOAS OPENED ON VACA-DIX_WEC (2)	P6	N-1-1	<100	<100	116	<100	<100	103	<100	<100	Continue to monitor future forecast
Placer - Gold Hill 115 kV Line No. 2 (32018 32231)	PLACER-GOLD HILL #1 115kV & DRUM-HIGGINS 115KV MOAS OPENED on CHCGO PK_HIGGINS	P6	N-1-1	<100	<100	113	<100	<100	<100	<100	<100	Continue to monitor future forecast
Dixon-Vaca #2 60 kV (32101 32109)	DIXON-VACA #1 60KV (VACA-DXN-VACA-JT1)	P2-1	Line Section w/o Fault	<100	101	107	<100	27	101	<100	<100	Continue to monitor future forecast
Dixon-Vaca #2 60 kV (32109 32094)	DIXON-VACA #1 60KV (VACA-DXN-VACA-JT1)	P2-1	Line Section w/o Fault	96	100	106	59	27	102	63	33	Continue to monitor future forecast
Rio Oso - Woodland 115 kV No. 2 (32214 31964)	RIO OSO-BRIGHTON 230KV & RIO OSO-WOODLAND #1 115KV	P6	N-1-1	<100	<100	111	<100	<100	<100	<100	<100	Continue to monitor future forecast
Rio Oso - Woodland 115 kV No. 1 (32214 31965)	RIO OSO-BRIGHTON 230KV & RIO OSO-WOODLAND #2 115KV	P6	N-1-1	<100	<100	100	<100	<100	<100	<100	<100	Continue to monitor future forecast

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Drum - Higgins 115 kV Line (32218 32220)	GOLDHILL - 2D 230kV & MIDDLE FORK-GOLD HILL line	P2-3	Non-Bus Tie Breaker Fault	98	93	110	16	12	93	60	27	Continue to monitor future forecast
	GOLDHILL 230kV Section 2D	P2-2	Bus Fault	98	93	110	16	12	93	60	27	Continue to monitor future forecast
	Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	123	123	186	26	31	127	35	19	System Upgrade/ Preferred Resources/Operating Solution as needed
	Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	<100	98	124	26	9	98	35	19	Continue to monitor future forecast
Drum - Higgins 115 kV Line (32220 32224)	Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	80	80	116	8	17	82	56	35	Continue to monitor future forecast
Drum - Higgins 115 kV Line (32224 32232)	Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	93	104	137	42	17	106	83	74	System Upgrade/ Preferred Resources/Operating Solution as needed
	Atlantic-Gold Hill 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	78	88	101	42	3	88	83	74	Continue to monitor future forecast
Placer - Bell 115 kV Line (32228 32238)	Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	70	84	113	5	18	86	38	59	Continue to monitor future forecast
Higgins - Bell 115 kV Line (32232 32238)	Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	84	96	128	22	17	98	60	67	Continue to monitor future forecast
Eldorado - Missouri Flat 115 kV No. 1 Line (32250 32482)	MISSOURI FLAT-GOLD HILL #1 115kV (SHPRING1-CLRKSVLT)	P2-1	Line Section w/o Fault	94	92	102	56	23	93	43	10	Continue to monitor future forecast
	MISSOURI FLAT-GOLD HILL #1 115kV (GOLDHILL-CPM TAP)	P2-1	Line Section w/o Fault	94	91	101	56	23	93	43	10	Continue to monitor future forecast
Eldorado - Missouri Flat 115 kV No. 2 Line (32250 32481)	MISSOURI FLAT-GOLD HILL #1 115kV (SHPRING1-CLRKSVLT)	P2-1	Line Section w/o Fault	94	99	107	49	27	101	33	11	Continue to monitor future forecast
	MISSOURI FLAT-GOLD HILL #1 115kV (GOLDHILL-CPM TAP)	P2-1	Line Section w/o Fault	93	99	107	49	28	101	33	11	Continue to monitor future forecast
Eldorado - Missouri Flat 115 kV No. 2 Line (32481 32257)	MISSOURI FLAT-GOLD HILL #1 115kV (SHPRING1-CLRKSVLT)	P2-1	Line Section w/o Fault	94	99	107	49	27	101	33	11	Continue to monitor future forecast
	MISSOURI FLAT-GOLD HILL #1 115kV (GOLDHILL-CPM TAP)	P2-1	Line Section w/o Fault	93	99	107	49	28	101	33	11	Continue to monitor future forecast
Colgate - Smartville 60 kV Line No. 2 (32308 32313)	RIO OSO-WOODLAND #2 115kV & COLGATE-SMARTVILLE #1 60kV MOAS OPENED on COLGATE_NRRWS1TP	P6	N-1-1	<100	<100	103	<100	<100	<100	<100	<100	Continue to monitor future forecast
Masysville-Plumas 60 kV Line (32320 32344)	PEASE-MARYSVILLE-HARTER 60kV	P1	N-1	104	105	<100	35	14	105	60	15	Disable Automatics
	E.MRYSVE-MRYSVLE #1 60kV	P1	N-1	<100	<100	121	<100	<100	<100	<100	<100	Disable Automatics
Pease - Marysville - Harter 60 kV Line (32332 32333)	RIO OSO-NICOLAUS 115kV & PALERMO-NICOLAUS 115kV MOAS OPENED on PALERMO_E.MRY J2	P6	N-1-1	<100	<100	123	<100	<100	<100	<100	<100	Continue to monitor future forecast
Pease - Marysville - Harter 60 kV Line (32333 32325)	PEASE 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	<100	<100	117	24	<100	<100	<100	13	Continue to monitor future forecast

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

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Nicolaus - Marysville 60 kV Line (Plumas-East Nicolaus) (32342 32344)	E.MRYSVE-MRYSVLE #1 60kV	P1	N-1	<100	<100	191	<100	<100	<100	<100	<100	Continue to monitor future forecast
	PEASE-MARYSVILLE-HARTER 60kV	P1	N-1	167	168	<100	29	25	170	76	22	Disable Automatics
Lincoln - Pleasant Grove 115 kV Line (32356 32398)	RIO OSO-ATLANTIC 230kV & ATLANTIC-GOLD HILL 230kV	P6	N-1-1	<100	<100	119	<100	<100	<100	<100	<100	Continue to monitor future forecast
	Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	64	81	115	4	12	81	25	14	Continue to monitor future forecast
Lincoln - Pleasant Grove 115 kV Line (32356 32404)	ATLANTIC-GOLD HILL 230kV & RIO OSO-ATLANTIC 230kV	P6	N-1-1	128	121	145	<100	<100	122	<100	<100	Operating Procedure
	Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	91	109	146	33	19	110	46	17	Continue to monitor future forecast
Lincoln - Pleasant Grove 115 kV Line (32398 32408)	ATLANTIC-GOLD HILL 230kV & RIO OSO-ATLANTIC 230kV	P6	N-1-1	111	105	127	<100	<100	105	<100	<100	Operating Procedure
	Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	75	93	128	6	15	93	47	35	Continue to monitor future forecast
RIO OSO-SPI JCT 115 kV (32214 32404)	ATLANTIC-GOLD HILL 230kV & RIO OSO-ATLANTIC 230kV	P6	N-1-1	125	119	141	<100	<100	120	<100	<100	Operating Procedure
RIO OSO-SPI JCT 115 kV (32214 32404)	Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	90	107	144	40	19	108	40	10	Continue to monitor future forecast
Spaulding - Summit 60 kV Line (32365 30993)	BRNSWALT 115kV - Ring R5 & R6	P2-3	Non-Bus Tie Breaker Fault	101	102	104	46	12	99	56	120	Continue to monitor future forecast
	BRNSWALT 115kV - Ring R7 & R6	P2-3	Non-Bus Tie Breaker Fault	101	102	104	46	12	99	56	120	Continue to monitor future forecast
64109 SUMMIT 3 60.0 30993 SUMMIT 60.0 1 1	BRNSWALT 115kV - Ring R5 & R6	P2-3	Non-Bus Tie Breaker Fault	<100	99	103	43	12	95	<100	117	Continue to monitor future forecast
	BRNSWALT 115kV - Ring R7 & R6	P2-3	Non-Bus Tie Breaker Fault	<100	99	103	43	12	95	<100	117	Continue to monitor future forecast
Drum - Grass Valley - Weimar 60 kV Line (32367 32369)	ROLLINSF 6.60kV Gen Unit 1 & COLGATE-GRASS VALLEY 60kV	P3	N-G-1	<100	<100	100	<100	<100	<100	<100	<100	Continue to monitor future forecast
Drum - Grass Valley - Weimar 60 kV Line (32374 32376)	ROLLINSF 6.60kV Gen Unit 1 & COLGATE-GRASS VALLEY 60kV	P3	N-G-1	108	106	114	<100	<100	109	<100	<100	Disable Automatics
Drum - Grass Valley - Weimar 60 kV Line (32376 32367)	ROLLINSF 6.60kV Gen Unit 1 & COLGATE-GRASS VALLEY 60kV	P3	N-G-1	102	101	110	<100	<100	103	<100	<100	Disable Automatics
Drum 115/60 kV Transformer No. 1 (32374 32242)	RIO OSO-DRUM-BRUNSWCK 115kV & DRUM-HIGGINS 115kV MOAS OPENED on CHCGO PK_HIGGINS	P6	N-1-1	102	104	106	<100	<100	102	<100	121	Disable Automatics
BRDSLY J-SPRNG GJ 115 kV (33902 33912)	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	98	86	104	<100	30	87	<100	71	SPS recommended in 2019-2020 TPP
	BELLOTA 230/115kV TB 1 & BELLOTA 230/115kV TB 2	P6	N-1-1	<100	<100	102	<100	<100	<100	<100	<100	Continue to monitor future forecast
	Base Case	P0	N-0	100	100	100	<100	54	100	<100	89	Continue to monitor future forecast

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Spring Gap-MI-WUK 115 kV Line (33912 33914)	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	124	109	130	<100	49	110	<100	78	SPS recommended in 2019-2020 TPP
	KASSON 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	104	94	90	<100	47	94	<100	78	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	BELLOTA 230/115kV TB 1 & BELLOTA 230/115kV TB 2	P6	N-1-1	122	110	<100	<100	<100	110	<100	<100	SPS recommended in 2019-2020 TPP
MI-WUK-FBERBORD 115 kV (33914 33917)	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	115	102	121	9	50	102	<100	74	SPS recommended in 2019-2020 TPP
	BELLOTA 230/115kV TB 1 & BELLOTA 230/115kV TB 2	P6	N-1-1	112	102	119	<100	<100	102	<100	<100	SPS recommended in 2019-2020 TPP
CURTISS-MI-WUK 115 kV (33916 33917)	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	116	104	122	6	52	105	8	77	SPS recommended in 2019-2020 TPP
	BELLOTA 230/115kV TB 1 & BELLOTA 230/115kV TB 2	P6	N-1-1	114	104	120	<100	<100	104	<100	<100	SPS recommended in 2019-2020 TPP
Stanislaus-Melones-Manteca 115 kV Line No. 1 (33932 33500)	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	149	140	<100	33	36	142	91	25	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	102	103	123	191	100	102	133	38	SPS recommended in 2019-2020 TPP
	KASSON 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	148	139	63	34	13	142	91	21	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	BELLOTA 230/115kV TB 1 & BELLOTA 230/115kV TB 2	P6	N-1-1	101	102	122	<100	<100	103	<100	<100	SPS recommended in 2019-2020 TPP
Bellota-Riverbank-Melones 115 kV Line (33932 33934)	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	155	125	<100	23	39	129	134	41	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	145	175	132	163	49	173	130	28	SPS recommended in 2019-2020 TPP
	KASSON 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	154	124	55	22	71	128	134	46	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	BELLOTA 230/115kV TB 1 & BELLOTA 230/115kV TB 2	P6	N-1-1	145	174	134	100	<100	174	<100	<100	SPS recommended in 2019-2020 TPP
Stanislaus - Melones Sw 115 kV Line (33932 33936)	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	146	137	<100	33	33	140	88	26	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	100	100	119	199	97	100	131	39	SPS recommended in 2019-2020 TPP
	STANISLS 13.80kV Gen Unit 1 & MANTECA-RIPON 115kV	P3	N-G-1	101	104	107	<100	<100	107	<100	<100	Continue to monitor future forecast

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
	KASSON 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	145	137	60	34	9	139	88	22	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	BELLOTA 230/115kV TB 1 & BELLOTA 230/115kV TB 2	P6	N-1-1	<100	<100	117	100	<100	101	<100	<100	SPS recommended in 2019-2020 TPP
Stanislaus - Melones Sw 115 kV Line (33936 33947)	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	155	149	<100	14	56	152	68	59	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	60	50	96	129	105	50	104	69	SPS recommended in 2019-2020 TPP
	KASSON 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	154	149	83	14	37	151	68	56	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	TESLA-SCHULTE SW STA #2 115KV & TESLA-SCHULTE SW STA #1 115KV	P7	DCTL	105	96	54	2	46	102	14	39	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
Riverbank Jct - Manteca 115 kV Line (33947 33951)	MANTECA-RIPON 115kV	P1	N-1	109	120	117	56	23	121	67	13	Operating Procedure
	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	149	143	<100	13	53	145	65	56	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	RPNJ2-RIPON 115kV No Fault	P2-1	Line Section w/o Fault	108	120	117	56	23	121	67	13	Reconductor overloaded line
	RIPON-MANTECA 115kV (RPNJ2-MANTECA)	P2-1	Line Section w/o Fault	108	119	117	56	22	121	67	13	Reconductor overloaded line
	MANTECA 115kV - Ring R4 & R5	P2-3	Non-Bus Tie Breaker Fault	107	<100	117	56	<100	<100	66	13	Reconductor overloaded line
	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	57	46	91	123	100	46	99	65	SPS recommended in 2019-2020 TPP
	MANTECA 115kV - Ring R6 & R5	P2-3	Non-Bus Tie Breaker Fault	<100	120	117	<100	22	121	<100	<100	Reconductor overloaded line
	KASSON 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	148	143	80	13	35	145	66	53	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
Bellota Riverbank Melones 115 kV Line	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	187	213	172	163	33	212	130	46	SPS recommended in 2019-2020 TPP
	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	126	95	<100	22	62	100	134	57	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Belota-Riverbank-Meriones 115 kV Line (33950 33934)	KASSON 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	125	95	36	22	94	99	134	62	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	BELLOTA 230/115kV TB 1 & BELLOTA 230/115kV TB 2	P6	N-1-1	186	213	174	107	<100	212	<100	<100	SPS recommended in 2019-2020 TPP
	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Fault	91	104	87	77	17	104	55	16	SPS recommended in 2019-2020 TPP
Tesla - Salado - Manteca 115 kV Line (33959 33970)	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	174	158	<100	44	49	160	128	23	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
	KASSON 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	173	157	72	44	86	159	128	29	
	SCHULTE SW STA-LAMMERS 115kV & SCHULTE SW STA-KASSON-MANTECA 115kV	P6	N-1-1	197	204	<100	<100	<100	205	138	<100	
	TESLA-SCHULTE SW STA #2 115KV & TESLA-SCHULTE SW STA #1 115KV	P7	DCTL	118	99	32	27	70	110	27	25	
Tesla - Salado 115 kV Line No. 1 (33962 33964)	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	124	108	<100	27	33	109	95	2	
	KASSON 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	124	107	58	27	57	109	95	6	
	LAMMERS-KASSON 115kV & SCHULTE SW STA-KASSON-MANTECA 115kV	P6	N-1-1	128	127	<100	<100	<100	128	<100	<100	
Tesla - Salado - Manteca 115 kV Line (33965 33964)	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	113	110	<100	11	28	112	116	34	
	KASSON 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	113	110	34	11	6	111	116	30	
Tesla - Salado - Manteca 115 kV Line (33970 33965)	TESLA-SALADO #1 115kV (TCHRT_T1-MDSTO CN)	P2-1	Line Section w/o Fault	Cont not found	4	Cont not found	Cont not found	105	5	Cont not found	Cont not found	
	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	121	117	<100	12	30	119	123	36	
	KASSON 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	120	117	37	12	7	119	123	32	
	SCHULTE SW STA-LAMMERS 115kV & SCHULTE SW STA-KASSON-MANTECA 115kV	P6	N-1-1	127	152	<100	<100	<100	152	<100	<100	
SALADO-NEWMAN #2 60kV MOAS OPENED on CRWS LDG_CRWS LDJ	SALADO-NEWMAN #2 60kV (PATTERSN-CRWS LDJ)	P2-1	Line Section w/o Fault	102	103	113	66	29	107	41	16	
	SALADO-NEWMAN #2 60kV (SALADO-PATTERSN)	P2-1	Line Section w/o Fault	102	103	113	66	28	107	41	16	
	SALADO-NEWMAN #2 60kV (SALADO-PATTERSN)	P2-1	Line Section w/o Fault	102	103	113	66	28	107	41	16	

0530SS.MEDI IN 160 KV (34000 34016)

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
34005 MEDLIN 60 kV (34005-34016)	SALADO-NEWMAN #2 60kV (CRWS LDJ-GUSTN JT)	P2-1	Line Section w/o Fault	93	95	104	61	27	97	37	15	Existing operating procedure
	SALADO-NEWMAN #2 60kV (GUSTN JT-NEWMAN)	P2-1	Line Section w/o Fault	93	95	104	61	27	97	37	15	
	SALADO-CROW CREEK SW STA 60kV (SALADO-STNSLSRP)	P2-1	Line Section w/o Fault	47	106	49	35	80	106	94	73	
Crow Creek Sw St-Newman 60 kV Line (34014 34018)	SALADO-CROW CREEK SW STA 60kV (SALADO-STNSLSRP)	P2-1	Line Section w/o Fault	14	83	12	14	106	82	90	88	
Lawrence Lab 115 kV Tap #1 (37649 33574)	TESLA D 230kV Section 2D	P2-2	Bus Fault	36	31	15	28	100	37	33	103	Sensitivity only
NA	TESLA 115kV - Section 2D & 1D	P2-4	Bus Tie Breaker Fault	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	System Upgrade/ Preferred Resources/Operating Solution as needed
NA	GOLDHILL 230/115kV TB 1 & GOLDHILL 230/115kV TB 2	P6	N-1-1	Diverge	Diverge	<100	Diverge	<100	Diverge	<100	<100	- Gold Hill 230/115 kV Transformer Additoin Project - Expected ISD: Dec. 2026 - Short term: Action Plan
NA	TESLA 115kV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	System Upgrade/ Preferred Resources/Operating Solution as needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
BRKR SLG 115 kV	BRIGHTN 115KV SECTION ME	P2-2	Bus Fault	0.89	0.99	0.92	0.99	1.06	0.99	0.95	1.03	- Rio Oso Transformer Upgrade and SVC Projects - Expected ISD: Jun. 2024 - Short term: Action Plan - Continue to monitor the long term issue
DAVIS 115 kV		P2-2	Bus Fault	0.89	0.99	0.92	0.99	1.06	0.99	0.95	1.02	
DEEPWATR 115 kV		P2-2	Bus Fault	0.90	1.00	0.93	1.00	1.06	1.00	0.96	1.03	
POST 115 kV		P2-2	Bus Fault	0.90	1.00	0.93	1.00	1.06	1.00	0.96	1.03	
DEEPWATR 115 kV	BRIGHTON 230/115KV TB 10 & BRIGHTON 230/115KV TB 9	P6	N-1-1	0.84	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	
ZAMORA 115 kV		P6	N-1-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	
BRKR SLG 115 kV		P6	N-1-1	0.84	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	
DAVIS 115 kV		P6	N-1-1	0.84	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	
GRAND IS 115 kV		P6	N-1-1	0.81	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	
POST 115 kV		P6	N-1-1	0.84	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	
W.SCRMNO 115 kV		P6	N-1-1	0.84	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	
WOODLD 115 kV		P6	N-1-1	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	
ZAMORA 115 kV	P6	N-1-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9		
DEEPWATR 115 kV	BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.89	1.00	0.86	0.98	1.07	1.00	0.93	1.03	
GRAND IS 115 kV		P5	Non-Redundant Relay	0.87	1.02	0.84	0.96	1.08	1.01	0.92	1.02	
POST 115 kV		P5	Non-Redundant Relay	0.90	1.01	0.87	0.98	1.07	1.00	0.93	1.03	
W.SCRMNO 115 kV		P5	Non-Redundant Relay	0.90	1.01	0.87	0.98	1.07	1.00	0.93	1.03	
MOBILCHE 115 kV	BRIGHTON-DAVIS 115KV MOAS OPENED ON HOWARDJCT3_BRKRJCT & WEST SACRAMENTO-DAVIS 115KV	P6	N-1-1	0.89	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	
DIST2047 60 kV	CORTINA 115/60KV TB 5	P1	N-1	0.91	0.91	0.88	0.95	0.96	0.91	0.94	0.97	Continue to monitor future forecast
WILKINS 60 kV		P1	N-1	0.93	0.93	0.90	0.96	0.99	0.93	0.96	0.98	
MERIDIAN 60 kV	CORTINA 115/60KV TB 5 & CORTINA #4 60KV	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
DUNNIGAN 60 kV	CORTINA 230KV - RING R2 & R3	P2-3	Non-Bus Tie Breaker Fault	>0.9	0.98	0.90	>0.9	1.06	0.99	>0.9	>0.9	Continue to monitor future forecast
DUNNIGAN 60 kV	CORTINA 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.97	0.99	0.90	0.99	1.06	0.99	1.02	1.05	Continue to monitor future forecast
GUSTINE 60 kV	CROW CREEK SW STA-FRONTIER SOLAR PV 60KV	P1	N-1	>0.9	0.96	0.86	>0.9	1.07	0.96	>0.9	>0.9	Continue to monitor future forecast
NEWMAN 60 kV		P1	N-1	>0.9	0.98	0.89	>0.9	1.07	0.98	>0.9	>0.9	
NEWMAN 60 kV	CROW CREEK SW STA-NEWMAN 60KV (MEDLIN J-NWMN JCT)	P2-1	Line Section w/o Fault	0.96	0.97	0.89	0.97	1.06	0.96	1.03	1.02	Continue to monitor future forecast
MRYSVLLE 60 kV	E.MRYSVLLE-MRYSVLLE #1 60KV	P1	N-1	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
INGRM C. 115 kV	KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA line	P2-3	Non-Bus Tie Breaker Fault	0.80	0.86	>0.9	>0.9	1.04	0.85	>0.9	>0.9	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
WESTLEY 60 kV	KASSON 115/60KV TB 1	P1	N-1	0.77	0.82	0.75	0.96	1.03	0.81	0.89	0.98	Kasson SPS
CH.STN 115 kV	KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.81	0.90	0.96	1.00	1.04	0.90	0.85	1.03	- Vierra Looping in Project - Expected ISD: Dec. 2026
INGRM C. 115 kV		P5	Non-Redundant Relay	0.80	0.86	0.93	1.03	1.04	0.86	0.88	1.04	
PEORIA 115 kV		P5	Non-Redundant Relay	0.81	0.90	0.95	1.01	1.04	0.89	0.85	1.03	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
R.TRACK 115 kV	RANCHO SECO 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.80	0.88	0.95	1.01	1.04	0.88	0.84	1.03	- Short term: Action Plan - Continue to monitor the long term issue
SPRNG GP 115 kV		P5	Non-Redundant Relay	0.88	0.98	1.01	1.00	1.05	0.98	0.84	1.04	
VALLY HM 115 kV		P5	Non-Redundant Relay	0.63	0.73	0.87	1.01	1.03	0.72	0.75	1.02	
DEL MAR 60 kV	MIDDLE FORK-GOLD HILL 230kV	P1	N-1	0.95	0.98	0.87	1.05	1.10	0.98	0.99	1.06	Continue to monitor future forecast
ROCKLIN 60 kV		P1	N-1	0.97	0.99	0.90	1.05	1.09	0.99	0.99	1.06	
SIERRAPI 60 kV		P1	N-1	0.95	0.98	0.87	1.05	1.10	0.98	0.99	1.06	
CPM 115 kV	MISSOURI FLAT-GOLD HILL #1 115kV (GOLDHILL-CPM TAP)	P2-1	Line Section w/o Fault	0.93	0.95	0.87	0.99	1.08	0.94	0.99	1.03	Continue to monitor future forecast
SHPRING 115 kV	MISSOURI FLAT-GOLD HILL #1 115kV (SHPRING1-CLRKSFLT)	P2-1	Line Section w/o Fault	0.93	0.95	0.87	0.99	1.08	0.94	0.99	1.03	Continue to monitor future forecast
E.MRYSVE 115 kV	PALERMO-NICOLAUS 115kV (E.MRYSVE-E.MRY J2)	P2-1	Line Section w/o Fault	>0.9	>0.9	0.87	1.06	>0.9	>0.9	>0.9	1.12	Continue to monitor future forecast
BARRY 60 kV	PALERMO-NICOLAUS 115kV MOAS OPENED on PALERMO_E.MRY J2 & RIO OSO-NICOLAUS 115kV	P6	N-1-1	>0.9	>0.9	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
CATLETT 60 kV		P6	N-1-1	>0.9	>0.9	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	
DIST1500 60 kV		P6	N-1-1	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	
E.MRYSVE 115 kV		P6	N-1-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	
E.NICOLS 115 kV		P6	N-1-1	>0.9	>0.9	0.73	>0.9	>0.9	>0.9	>0.9	>0.9	
TUDOR 60 kV		P6	N-1-1	>0.9	>0.9	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	
ENCINAL 60 kV	PEACHTON-PEASE 60kV (ENCL TAP-PEASE)	P2-1	Line Section w/o Fault	0.94	0.99	0.88	0.99	1.01	0.99	0.99	1.01	Continue to monitor future forecast
LIVE OAK 60 kV		P2-1	Line Section w/o Fault	0.94	0.99	0.88	0.99	1.01	0.99	0.99	1.01	
BELL PGE 115 kV	PLACER-GOLD HILL #1 115kV & DRUM-HIGGINS 115kV MOAS OPENED on CHCGO PK_HIGGINS	P6	N-1-1	>0.9	>0.9	0.83	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
FLINT 115 kV		P6	N-1-1	>0.9	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	
HIGGINS 115 kV		P6	N-1-1	>0.9	>0.9	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	
PLACER 115 kV	PLACER-GOLD HILL #1 115kV & PLACER-GOLD HILL #2 115kV	P6	N-1-1	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
AUBURN 60 kV		P6	N-1-1	>0.9	>0.9	0.83	>0.9	>0.9	>0.9	>0.9	>0.9	
HALSEY 60 kV		P6	N-1-1	>0.9	>0.9	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	
PLACER 115 kV	Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.89	0.86	0.82	0.99	>0.9	>0.9	0.99	1.04	System Upgrade/ Preferred Resources/Operating Solution as needed
DEL MAR 60 kV	RANCHO SECO-BELLOTA #1 230KV & RANCHO SECO-BELLOTA #2 230KV	P7	DCTL	0.96	>0.9	>0.9	1.05	>0.9	>0.9	0.71	1.06	Sensitivity Only
BRKR SLG 115 kV	RIO OSO 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.98	0.99	0.89	1.02	1.05	0.99	1.01	1.07	Continue to monitor future forecast
WOODLD 115 kV		P5	Non-Redundant Relay	0.95	0.96	0.87	0.99	1.06	0.96	0.99	1.05	
BRKR SLG 115 kV	RIO OSO 115kV - Section 2D & 1D	P2-4	Bus Tie Breaker Falut	0.96	0.99	0.86	1.01	1.06	0.98	1.00	1.07	Continue to monitor future forecast
KNIGHTLD 115 kV		P2-4	Bus Tie Breaker Falut	0.94	0.97	0.83	0.97	1.07	0.96	0.99	1.05	
MOBILCHE 115 kV		P2-4	Bus Tie Breaker Falut	0.94	0.97	0.83	0.97	1.06	0.96	0.99	1.05	
W.SCRMNO 115 kV		P2-4	Bus Tie Breaker Falut	1.00	1.02	0.89	1.02	1.06	1.02	1.03	1.07	
WOODLD 115 kV		P2-4	Bus Tie Breaker Falut	0.94	0.97	0.83	0.97	1.06	0.96	0.99	1.05	
PLUMAS 60 kV	RIO OSO 230.00kV Gen Unit VW & E.MRYSVE-MRYSVLE #1 60kV	P3	N-G-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
PLSNT GR 115 kV	RIO OSO 230.00kV Gen Unit VW & RIO OSO-LINCLN-SPI-LINC 115kV	P3	N-G-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
NA	RIO OSO 230kV - Section 2D & 1D	P2-4	Bus Tie Breaker Falut	0.93	0.95	Diverge	1.00	1.08	0.95	0.96	1.04	Continue to monitor future forecast
LINCLN 115 kV	RIO OSO-LINCLN-SPI-LINC 115kV	P1	N-1	0.95	0.98	0.90	1.03	1.06	0.98	0.98	1.04	Continue to monitor future forecast
TAYLOR 60 kV		P1	N-1	0.97	1.00	0.90	1.05	1.09	0.99	1.00	1.06	
BANGOR 60 kV	RIO OSO-WOODLAND #1 115kV & COLGATE2 13.80kV Gen Unit 1	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
PIKE CTY 60 kV		P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	
BEALE_1 60 kV	RIO OSO-WOODLAND #1 115kV & COLGATE-SMARTVILLE #1 60kV MOAS OPENED on COLGATE_NRRWS1TP	P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
BEALE_2 60 kV		P6	N-1-1	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	
BRWNS VY 60 kV		P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	
NARRWS 1 60 kV		P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	
SMRTVLE 60 kV		P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	
YUBAGOLD 60 kV		P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	
ELDORAD 115 kV		P6	N-1-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	
PLCRVLB2 115 kV	RIO OSO-WOODLAND #1 115kV & MISSOURI FLAT-GOLD HILL #2 115kV	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
PLCRVLB3 115 kV		P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	
BONNIE N 60 kV	RIO OSO-WOODLAND #1 115kV & ROLLINS 60/6.6kV TB 1	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
CAPEHORN 60 kV		P6	N-1-1	>0.9	>0.9	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	
SHADYGLN 60 kV		P6	N-1-1	>0.9	>0.9	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	
CAPEHORN 60 kV	ROLLINSF 6.60kV Gen Unit 1 & COLGATE-GRASS VALLEY 60kV	P3	N-G-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
GRSS VLY 60 kV		P3	N-G-1	0.90	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	
SHADYGLN 60 kV		P3	N-G-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	
WEMR SWS 60 kV		P3	N-G-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	
GUSTINE 60 kV	SCHULTE SW STA-KASSON-MANTECA 115kV & LAMMERS-KASSON 115kV	P6	N-1-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	
GUSTINE 60 kV	SCHULTE SW STA-KASSON-MANTECA 115kV & SCHULTE SW STA-LAMMERS 115kV	P6	N-1-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	
CRWS LDG 60 kV	SCHULTE SW STA-LAMMERS 115kV & SCHULTE SW STA-KASSON-MANTECA 115kV	P6	N-1-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	- Vierra Looping in Project - Expected ISD: Dec. 2026 - Short term: Action Plan
GUSTINE 60 kV		P6	N-1-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	
INGRM C. 115 kV		P6	N-1-1	0.76	0.77	>0.9	>0.9	>0.9	0.77	0.85	>0.9	
MILLER 115 kV		P6	N-1-1	0.86	0.89	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	
VALLY HM 115 kV		P6	N-1-1	0.56	0.59	0.87	>0.9	>0.9	0.59	0.70	>0.9	
CURTISS 115 kV	STANISLS 13.80kV Gen Unit 1 & BELLOTA-RIVERBANK-MELONES SW STA 115kV	P3	N-G-1	>0.9	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
MI-WUK 115 kV		P3	N-G-1	>0.9	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	
SPRNG GP 115 kV		P3	N-G-1	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
VALLY HM 115 kV	STANISLS 13.80kV Gen Unit 1 & MANTECA-RIPON 115kV	P3	N-G-1	0.84	0.80	0.76	>0.9	>0.9	0.79	>0.9	>0.9	Operating Procedure
PLAINFLD 60 kV	VACA-DIX 115/60KV TB 9	P1	N-1	0.81	0.99	0.88	1.05	1.08	0.98	0.94	1.06	- Vaca Davis Area Reinforcement Project - Expected ISD: Dec. 2025 - Short term: Action Plan - Continue to monitor the long term issue
FORST HL 60 kV	WEIMAR #1 60kV (ENVRO_HY-FORST HL)	P2-1	Line Section w/o Fault	0.93	0.95	0.90	0.93	1.02	0.94	0.97	0.99	Continue to monitor future forecast
BRKR SLG 115 kV	WEST SACRAMENTO-DAVIS 115KV & WOODLAND-DAVIS 115KV	P6	N-1-1	>0.9	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to monitor future forecast
NA	TESLA 115kV - Section 2D & 1D	P2-4	Bus Tie Breaker Falut	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	System Upgrade/ Preferred Resources/Operating Solution as needed
DEL MAR 60 kV	ATLANTIC-GOLD HILL 230kV & RIO OSO-ATLANTIC 230kV	P6	N-1-1	0.85	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	Operating Procedure
PLSNT GR 115 kV				0.88	>0.9	0.87	>0.9	>0.9	>0.9	>0.9		
ROCKLIN 60 kV				0.86	>0.9	0.81	>0.9	>0.9	>0.9	>0.9		
SIERRAPI 60 kV				0.85	>0.9	0.78	>0.9	>0.9	>0.9	>0.9		
TAYLOR 60 kV				0.86	>0.9	0.81	>0.9	>0.9	>0.9	>0.9		
RVRBANK 115 kV	BELLOTA 230/115kV TB 1 & BELLOTA 230/115kV TB 2	P6	N-1-1	0.52	0.57	0.48	0.88	>0.9	0.57	0.82	>0.9	Operating Procedure
CH.STN 115 kV				0.68	0.76	0.66	0.00		0.75	0.88		
CURTISS 115 kV				0.69	0.77	0.65	>0.9	>0.9	0.76	0.89		
MI-WUK 115 kV				0.71	0.79	0.66	>0.9	>0.9	0.79	>0.9		
PEORIA 115 kV				0.68	0.75	0.66	>0.9	>0.9	0.74	0.88		
R.TRACK 115 kV				0.68	0.74	0.66	>0.9	>0.9	0.74	0.87		
SPRNG GP 115 kV				0.74	0.83	0.70	>0.9	>0.9	0.82	>0.9		
CH.STN 115 kV	BELLOTA 230kV - Section 1E & 2E	P2-4	Bus Tie Breaker Falut	0.68	0.76	0.65	0.69	1.07	0.75	0.66	1.03	SPS recommended in 2019-2020 TPP
CURTISS 115 kV				0.68	0.77	0.64	0.67	1.07	0.76	0.65	1.03	
GRAND IS 115 kV				0.98	1.04	0.89	1.07	1.05	1.04	1.03	1.08	
MI-WUK 115 kV				0.70	0.79	0.65	0.67	1.07	0.79	0.65	1.03	
PEORIA 115 kV				0.67	0.75	0.65	0.69	1.07	0.74	0.65	1.03	
R.TRACK 115 kV				0.67	0.74	0.65	0.69	1.08	0.74	0.65	1.03	
RVRBANK 115 kV				0.52	0.57	0.47	0.55	1.12	0.57	0.55	1.02	
SPRNG GP 115 kV				0.73	0.83	0.68	0.67	1.06	0.82	0.65	1.04	
VALLY HM 115 kV				0.75	0.82	0.76	0.86	1.03	0.81	0.77	1.03	
BELL PGE 115 kV				P5	Non-Redundant Relay	0.90	0.91	0.74	0.99	1.08	0.90	
HALSEY 60 kV	P5	Non-Redundant Relay	0.95	0.97	0.75	1.02	1.03	0.96	1.02	1.03		
HIGGINS 115 kV	P5	Non-Redundant Relay	0.92	0.93	0.78	1.00	1.07	0.92	1.00	1.04		
MTN_QUAR 60 kV	P5	Non-Redundant Relay	0.95	0.97	0.74	1.02	1.03	0.97	1.02	1.03		
PENRYN 60 kV	P5	Non-Redundant Relay	0.94	0.97	0.72	1.01	1.04	0.96	1.01	1.03		
PLACER 115 kV	P5	Non-Redundant Relay	0.89	0.91	0.73	0.99	1.08	0.90	0.99	1.04		

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
NA		P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	
BELL PGE 115 kV		P2-4	Bus Tie Breaker Falut	0.83	0.57	0.53	0.96	1.12	0.56	1.00	1.04	
BONNIE N 60 kV		P2-4	Bus Tie Breaker Falut	0.96	0.90	0.87	0.98	1.03	0.89	1.01	1.01	
CAPEHORN 60 kV		P2-4	Bus Tie Breaker Falut	0.95	0.90	0.86	0.95	1.04	0.89	1.00	1.01	
DRUM 60 kV		P2-4	Bus Tie Breaker Falut	0.96	0.90	0.88	0.99	1.02	0.89	1.01	1.01	
FLINT 115 kV		P2-4	Bus Tie Breaker Falut	0.82	0.56	0.52	0.96	1.12	0.55	0.99	1.04	
HALSEY 60 kV		P2-4	Bus Tie Breaker Falut	0.88	0.58	0.52	1.02	1.04	0.57	1.02	1.03	
HIGGINS 115 kV		P2-4	Bus Tie Breaker Falut	0.86	0.61	0.59	0.98	1.11	0.61	1.00	1.04	
HORSESHE 115 kV		P2-4	Bus Tie Breaker Falut	0.82	0.55	0.50	0.95	1.13	0.54	1.00	1.04	
MTN_QUAR 60 kV		P2-4	Bus Tie Breaker Falut	0.87	0.58	0.51	1.02	1.04	0.57	1.02	1.03	
PENRYN 60 kV		P2-4	Bus Tie Breaker Falut	0.87	0.57	0.49	1.01	1.04	0.56	1.02	1.03	
PLACER 115 kV		P2-4	Bus Tie Breaker Falut	0.82	0.56	0.52	0.96	1.12	0.55	0.99	1.04	
SHADYGLN 60 kV		P2-4	Bus Tie Breaker Falut	0.96	0.90	0.86	0.95	1.04	0.89	1.00	1.01	
WEMR SWS 60 kV		P2-4	Bus Tie Breaker Falut	0.96	0.90	0.85	0.94	1.04	0.89	1.01	1.01	

2021-2022 ISO Reliability Assessment - Study Results

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

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
CH.STN 115 kV	STANISLS 13.80kV Gen Unit 1 & BELLOTA-RIVERBANK-MELONES SW STA 115kV	P3	N-G-1	<8	<8	10	<8	<8	<8	<8	<8	Continue to monitor future forecast
CURTISS 115 kV		P3	N-G-1	<8	<8	10	<8	<8	<8	<8	<8	Continue to monitor future forecast
PEORIA 115 kV		P3	N-G-1	<8	<8	10	<8	<8	<8	<8	<8	Continue to monitor future forecast
R.TRACK 115 kV		P3	N-G-1	<8	<8	10	<8	<8	<8	<8	<8	Continue to monitor future forecast
SPRNG GP 115 kV		P3	N-G-1	<8	<8	10	<8	<8	<8	<8	<8	Continue to monitor future forecast
MI-WUK 115 kV		P3	N-G-1	<8	<8	10	<8	<8	<8	<8	<8	Continue to monitor future forecast
VALLY HM 115 kV	STANISLS 13.80kV Gen Unit 1 & MANTECA-RIPON 115kV	P3	N-G-1	12	17	18	<8	<8	18	<8	<8	Operating procedure
E.NICOLS 115 kV	RIO OSO-NICOLAUS 115kV	P1	N-1	5	5	10	<8	<8	6	2	<8	Continue to monitor future forecast
LINCLN 115 kV	RIO OSO-LINCLN-SPI-LINC 115kV	P1	N-1	3	4	8	1	<8	4	3	1	Continue to monitor future forecast
GRSS VLY 60 kV	ROLLINSF 6.60kV Gen Unit 1 & COLGATE-GRASS VALLEY 60kV	P3	N-G-1	10	<8	12	<8	<8	<8	<8	<8	Disable automatics
GUSTINE 60 kV	CROW CREEK SW STA-FRONTIER SOLAR PV 60kV	P1	N-1	<8	2	10	<8	<8	2	<8	<8	Continue to monitor future forecast
NEWMAN 60 kV		P1	N-1	<8	1	8	<8	<8	2	<8	<8	Continue to monitor future forecast
MRYSVLLE 60 kV	E.MRYSVE-MRYSVLLE #1 60kV	P1	N-1	<8	<8	15	<8	<8	<8	<8	<8	Continue to monitor future forecast
MRYSVLLE 60 kV	PEASE-MARYSVILLE-HARTER 60kV	P1	N-1	11	10	<8	1	<8	10	6	<8	- East Marysville 115/60 kV Transformer Project - Expected ISD: Dec. 2026 - Short term: Action Plan
WESTLEY 60 kV	KASSON 115/60kV TB 1	P1	N-1	20	16	22	1	<8	17	11	<8	Kasson SPS

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

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2019-20 Transmission Planning Process for transient stability studies:									
http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf									

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



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	

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

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



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)									Potential Mitigation Solutions
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	

No single source substation with more than 100 MW



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)							Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast		2031 Summer Peak with High SJ Load
AMES-Mountain View 115 kV	MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	137	141	176	94	41	92	98	117	107	59	142	186	Project: Monta Vista 115kV BAAH Bus #1&2 redundant relay
AMES-Whisman 115 kV	MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	145	155	187	100	46	83	90	112	117	67	156	205	Project: Monta Vista 115kV BAAH Bus #1&2 redundant relay
Bair 115/60kV Transformer #1	CLY LND 115/60KV TB 1 & CLY LND2 115/60KV TB 2	P6	N-1-1	164	164	189	117	<100	140	149	0	129	<100	167	188	Operating solution
Bair-Cooley Landing #1 60kV Line	CLY LND 115/60KV TB 1 & CLY LND2 115/60KV TB 2	P6	N-1-1	143	144	180	<100	<100	111	119	0	109	<100	147	181	Operating solution
Bair-Cooley Landing #2 60kV Line	CLY LND 115/60KV TB 1 & CLY LND2 115/60KV TB 2	P6	N-1-1	130	129	163	<100	<100	<100	<100	0	107	<100	132	164	Operating solution
Birds Landing - Contra Costa Sub 230 kV Line	C.COSTAPPD 230KV SECTION 1D	P2	Bus/Breaker	82	91	88	66	16	70	52	61	85	52	93	110	Sensitivity only
	C.COSTAPPD - 1D 230KV & MARSHLD1-C.COSTAPPD #1 LINE	P2	Bus/Breaker	82	91	88	66	16	70	52	61	85	52	93	110	Sensitivity only
Britton-Monta Vista 115 kV Line	LAWRENCE-MONTA VISTA 115KV [2090]	P1	N-1	56	59	72	30	37	43	49	50	52	25	59	100	Sensitivity only
	NEWARK F 115KV SECTION 2Z	P2	Bus/Breaker	80	86	105	39	40	60	68	75	75	32	87	135	Continue to monitor future load forecast
Cayetano-Lone Tree (Lone Tree-USWP) 230kV Line	Base Case	P0	Normal	87	98	87	57	15	44	61	70	51	25	98	100	Sensitivity only
	CONTRA COSTA-LAS POSITAS 230KV [4510]	P1	N-1	91	101	91	59	16	49	68	78	54	27	101	104	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Bus/Breaker	98	111	113	66	20	62	77	94	65	34	112	124	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	NEWARK D 230KV SECTION 1D	P2	Bus/Breaker	93	105	107	59	19	59	73	90	59	32	106	122	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPF 230KV SECTION 1F	P2	Bus/Breaker	95	104	88	62	10	43	70	78	50	26	103	105	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPF - 2F 230KV & CONTRA COSTA-DELTA SWITCHYARD LINE	P2	Bus/Breaker	94	103	87	62	9	42	69	77	50	25	103	104	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPF - 2F 230KV & CONTRA COSTA-MORAGA #2 LINE	P2	Bus/Breaker	94	103	87	62	9	42	69	77	50	25	103	104	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	MORAGA 230KV - SECTION 2D & 1D	P2	Bus/Breaker	101	112	84	67	23	55	78	72	58	34	114	97	Project: Moraga 230 kV bus upgrade
	MORAGA 230kV Bus #1 & 2(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	103	114	102	68	24	56	79	89	59	35	115	118	Project: Moraga 230 kV bus upgrade
	P7-1:A16:5_Tesla-Newark No.1 and Tesla-Ravenswood 230 kV lines	P7	DCTL	92	104	95	60	24	55	72	81	56	32	105	108	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
P7-1:A8:4_Contra Costa-Moraga Nos. 1 & 2 230 kV lines	P7	DCTL	96	107	94	63	21	51	74	83	52	31	107	109	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch	
P7-1:A16:7_Tesla - Newark No.2 and Metcalf - Los Esteros 230 kV lines	P7	DCTL	89	99	91	58	18	51	67	76	56	27	99	104	Sensitivity only	
CONTRA COSTA-LAS POSITAS 230KV [4510]	CONTRA COSTA-LAS POSITAS 230KV [4510]	P1	N-1	99	101	90	63	21	51	70	80	65	40	101	104	Contra Coasta area generation redispatch
	NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Bus/Breaker	106	111	113	69	25	65	79	96	77	45	112	124	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	NEWARK D 230KV SECTION 1D	P2	Bus/Breaker	101	105	107	63	24	61	75	92	71	43	106	122	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
Cayetano-Lone Tree (USWP-Cayetano) 230kV Line	C.COSTAPPF 230KV SECTION 1F	P2	Bus/Breaker	103	104	87	66	15	45	72	80	62	38	103	105	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPF - 2F 230KV & CONTRA COSTA-DELTA SWITCHYARD LINE	P2	Bus/Breaker	103	103	87	66	14	44	71	79	62	38	103	104	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPF - 2F 230KV & CONTRA COSTA-MORAGA #2 LINE	P2	Bus/Breaker	103	103	87	66	14	44	71	79	62	38	103	104	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	MORAGA 230KV - SECTION 2D & 1D	P2	Bus/Breaker	110	112	83	71	28	58	80	74	70	46	114	96	Project: Moraga 230 kV bus upgrade
	MORAGA 230kV Bus #1 & 2(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	111	114	102	72	28	59	81	91	71	47	115	118	Project: Moraga 230 kV bus upgrade
	P7-1:A16:5_Tesla-Newark No.1 and Tesla-Ravenswood 230 kV lines	P7	DCTL	100	104	95	64	28	58	74	83	68	44	104	108	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	P7-1:A8:4_Contra Costa-Moraga Nos. 1 & 2 230 kV lines	P7	DCTL	105	107	94	67	25	54	76	85	64	44	107	109	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
P7-1:A16:7_Tesla - Newark No.2 and Metcalf - Los Esteros 230 kV lines	P7	DCTL	97	99	91	62	23	54	70	78	68	40	99	104	Sensitivity only	
Christie-Sobrante (Oleum-Sobrante)	P7-1:A7:3_Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	130	127	79	37	44	99	107	56	87	43	128	76	Project: Christie-Sobrante 115 kV line reconductoring
Contra Costa-Las Positas 230kV Line	C.COSTAPPE SECTION 1E & C.COSTAPPF SECTION 1F 230KV	P2	Bus/Breaker	104	110	93	80	17	64	86	95	64	40	111	120	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPE 230KV - SECTION 2E & 1E	P2	Bus/Breaker	104	110	93	80	17	64	86	95	64	40	111	120	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPE 230KV SECTION 1E	P2	Bus/Breaker	104	110	93	80	17	64	86	95	64	40	111	120	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPE - 1E 230KV & ROSSMOOR-MORAGA-C.COSTAPPE LINE	P2	Bus/Breaker	104	110	93	80	17	64	86	95	64	40	111	120	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPE 230KV SECTION 2E	P2	Bus/Breaker	101	106	87	73	13	56	85	93	55	32	107	112	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
Cooley Landing 115 kV Bus Tie	RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	137	138	150	97	82	99	95	Diverge	126	86	139	Diverge	Protection upgrade
Eastshore 230/115kV Transformer #1	E. SHORE 230KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	105	62	92	21	8	105	65	77	105	9	63	91	Project: East Shore 230 kV Bus Terminals Reconfiguration
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & E. SHORE 230/115KV TB 2	P3	G-1/N-1	<100	<100	105	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor future load forecast
	NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & E. SHORE 230/115KV TB 2	P6	N-1-1	<100	<100	109	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor future load forecast
Eastshore 230/115kV Transformer #2	E. SHORE 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	63	105	92	17	1	66	103	76	57	10	105	91	Continue to monitor future load forecast
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & E. SHORE 230/115KV TB 1	P3	G-1/N-1	<100	<100	105	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor future load forecast
	NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & E. SHORE 230/115KV TB 1	P6	N-1-1	<100	<100	107	<100	<100	<100	<100	<100	<100	<100	<100	106	Continue to monitor future load forecast
Base Case	Base Case	P0	Normal	67	80	87	36	47	43	61	55	62	30	81	105	Sensitivity only
	SAN JOSE B-STONE-EVERGREEN 115KV [1550]	P1	N-1	73	89	96	37	57	54	77	68	71	35	90	117	Sensitivity only

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)							Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast		2031 Summer Peak with High SJ Load
El Patio-San Jose Sta. 'A' 115 kV Line	METCALF-EVERGREEN #1 115KV [2520]	P1	N-1	73	86	94	40	48	53	73	68	67	32	87	112	Sensitivity only
	LOS ESTEROS-METCALF 230KV [5353]	P1	N-1	70	83	90	38	50	52	72	65	64	31	83	108	Sensitivity only
	LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	63	78	89	39	46	43	61	65	55	34	79	109	Sensitivity only
	NEWARK E-F BUS TIE 230KV [4640]	P1	N-1	69	82	88	36	46	52	71	65	65	30	83	107	Sensitivity only
	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	102	126	123	51	79	75	118	110	97	45	126	139	Project: SVP breaker upgrade project
	LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	<100	116	<100	<100	<100	<100	<100	<100	<100	<100	<100	San Jose area mitigation
	LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	108	Sensitivity only
	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	82	102	141	50	52	55	79	89	71	41	103	163	San Jose area mitigation
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	96	113	125	48	63	76	100	90	91	38	114	167	San Jose area mitigation
	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	80	96	119	49	47	55	74	81	69	41	97	157	San Jose area mitigation
	MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	76	87	103	42	49	55	74	72	68	33	88	128	San Jose area mitigation
	NEWARK E-F BUS TIE 230KV [4640] & LOS ESTEROS-METCALF 230KV [5353]	P6	N-1-1	<100	123	134	<100	<100	<100	<100	106	<100	<100	124	<100	San Jose area mitigation
	NEWARK-LOS ESTEROS 230KV [2970] & LOS ESTEROS-METCALF 230KV [5353]	P6	N-1-1	<100	114	122	<100	<100	<100	<100	0	<100	<100	115	<100	San Jose area mitigation
	NEWARK E-F BUS TIE 230KV [4640] & LOS ESTEROS-METCALF 230KV [5353]	P6	N-1-1	<100	<100	100	<100	<100	<100	<100	<100	<100	<100	<100	135	San Jose area mitigation
	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	103	119	133	59	61	76	99	96	91	45	120	156	San Jose area mitigation
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	100	115	126	50	66	79	103	93	94	41	116	161	San Jose area mitigation
	P7-1:A16:7_Tesla - Newark No.2 and Metcalf - Los Esteros 230 kV lines	P7	DCTL	79	92	101	44	53	60	79	73	72	34	92	120	San Jose area mitigation
	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	77	89	99	44	45	44	57	55	68	34	90	117	Sensitivity only
	P7-1:A18:6_Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	75	87	97	42	48	55	74	70	67	33	87	116	Sensitivity only
	P7-1:A18:26_Evergreen - San Jose B & Evergreen-Mabury 60 kV Line	P7	DCTL	73	89	96	37	56	54	76	68	71	34	90	117	Sensitivity only
P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	75	86	94	38	50	45	59	53	70	31	87	120	Sensitivity only	
Evergreen-Almaden 60 kV Line	MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	101	102	120	80	17	74	77	91	66	40	103	124	Disable automatics

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
FMC-San Jose 'B' 115 kV Line	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	137	205	192	60	132	97	182	179	135	59	204	192	Project: SVP breaker upgrade project	
	NRS 300 115 kV bus	P2	Bus/Breaker	49	96	126	19	55	34	63	76	48	19	95	122	San Jose area mitigation	
	SRS 115 kV bus	P2	Bus/Breaker	64	114	106	14	56	47	64	Diverge	64	14	114	108	Project: SVP SRS bus upgrade	
	NRS 400 115 kV bus	P2	Bus/Breaker	55	76	105	21	59	43	61	62	57	23	76	105	San Jose area mitigation	
	KRS-DUANE 115kV (SVP) & NEWARK F-ZANKER-KRS 115KV [0]	P6	N-1-1	<100	109	127	<100	<100	<100	<100	0	<100	<100	109	167	San Jose area mitigation	
Jefferson-Hillsdale JCT 60kV Line	JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	263	270	263	168	127	147	220	221	176	110	275	263	Project: Jefferson 230 kV Bus Upgrade	
	JEFFERSON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	261	269	263	163	123	145	219	223	171	107	273	262	Project: Jefferson 230 kV Bus Upgrade	
	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	263	62	56	168	28	147	45	Diverge	175	110	63	55	Project: Jefferson 230 kV Bus Upgrade	
Jefferson-Stanford #1 60kV Line	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	<100	102	<100	<100	<100	<100	<100	<100	<100	<100	103	Project: Jefferson 230 kV Bus Upgrade	
	JEFFERSON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	145	144	136	125	104	75	141	129	112	102	143	135	Project: Jefferson 230 kV Bus Upgrade	
	JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	145	143	135	127	106	76	140	127	115	104	141	134	Project: Jefferson 230 kV Bus Upgrade	
	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	93	92	100	93	86	61	91	95	86	86	92	102	Continue to monitor future load forecast	
	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	142	93	94	127	86	76	93	Diverge	115	104	93	94	Project: Jefferson 230 kV Bus Upgrade	
Kifer-Duane 115 kV Line	FMC-SAN JOSE B 115KV [2021]	P1	N-1	72	83	95	43	59	62	70	83	69	41	83	106	Sensitivity only	
	NEWARK F-ZANKER-KRS 115KV [0]	P1	N-1	70	78	93	40	45	59	62	80	67	37	79	106	Sensitivity only	
	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	82	130	120	<100	70	59	122	121	82	<100	130	117	Project: SVP breaker upgrade project	
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NRS-AGNEW 60kV (SVP)	P3	G-1/N-1	<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	San Jose area mitigation	
	FMC-SAN JOSE B 115KV [2021] & NEWARK F-ZANKER-KRS 115KV [0]	P6	N-1-1	<100	123	<100	<100	<100	<100	0	115	<100	<100	123	<100	Sensitivity only	
	P7-1:A18:14_Newark - Kifer & FMC - Kifer 115 kV Lines	P7	DCTL	83	107	123	36	69	69	87	102	83	36	108	125	San Jose area mitigation	
	P7-1:A16:17_Newark-Kifer 115 kV and Newark-Trimble 115 kV lines	P7	DCTL	71	80	95	40	46	60	63	80	68	37	80	108	Sensitivity only	
	P7-1:A18:7_Newark - Kifer & Newark - Trimble 115 kV Lines	P7	DCTL	71	80	95	40	46	60	63	80	68	37	80	108	Sensitivity only	
	P7-1:A18:11_Trimble - San Jose B & FMC - San Jose B 115 kV Lines	P7	DCTL	72	83	94	43	58	62	69	83	69	41	83	106	Sensitivity only	
P7-1:A18:8_Los Esteros - Trimble & Los Esteros - Montague 115 kV	P7	DCTL	70	69	83	50	38	58	53	73	61	46	69	105	Sensitivity only		
Kifer-FMC 115 kV Line	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	191	307	279	74	198	145	293	282	190	75	306	261	Project: SVP breaker upgrade project	
	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	117	188	171	46	121	84	170	163	117	46	188	160	Project: SVP breaker upgrade project	
	NRS 300 115 kV bus	P2	Bus/Breaker	31	78	105	6	45	22	49	61	31	6	77	91	San Jose area mitigation	
	KRS-DUANE 115kV (SVP) & NEWARK F-ZANKER-KRS 115KV [0]	P6	N-1-1	<100	146	169	<100	<100	<100	106	0	<100	<100	146	208	San Jose area mitigation	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
	SSS-NRS 230kV (SVP) & LOS ESTEROS-NORTECH 115KV [4032]	P6	N-1-1	<100	<100	114	<100	<100	<100	<100	<100	<100	<100	<100	104	San Jose area mitigation
Las Positas-Newark 230kV Line	C.COSTAPPE - 1E 230KV & ROSSMOOR-MORAGA-C.COSTAPPE LINE	P2	Bus/Breaker	142	151	120	113	25	60	86	97	89	63	153	168	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPE 230KV SECTION 1E	P2	Bus/Breaker	142	151	120	113	25	60	86	97	89	63	153	168	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPE 230KV - SECTION 2E & 1E	P2	Bus/Breaker	142	151	120	113	25	60	86	97	89	63	153	168	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPE SECTION 1E & C.COSTAPPE SECTION 1F 230KV	P2	Bus/Breaker	142	151	120	113	25	60	86	97	89	63	153	168	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	C.COSTAPPE 230KV SECTION 2E	P2	Bus/Breaker	139	147	111	102	20	50	86	96	75	50	147	155	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	MORAGA 230kV Bus #1 & 2(Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	106	112	95	71	33	43	68	78	67	52	112	118	Project: Moraga 230 kV bus upgrade
	P7-1:A16:5_Tesla-Newark No.1 and Tesla-Ravenswood 230 kV lines	P7	DCTL	93	100	88	61	35	44	62	71	66	50	100	106	Contra Coasta area generation redispatch
	P7-1:A8:4_Contra Costa-Moraga Nos. 1 & 2 230 kV lines	P7	DCTL	98	103	85	65	30	38	63	72	59	48	103	107	Contra Coasta area generation redispatch
Lawrence - Monta Vista 115 kV	P7-1:A16:7_Tesla - Newark No.2 and Metcalf - Los Esteros 230 kV lines	P7	DCTL	89	95	82	59	28	38	57	64	66	44	95	101	Contra Coasta area generation redispatch
	Base Case	P0	Normal	53	56	71	32	35	30	34	34	49	27	56	106	Sensitivity only
	BRITTON-MONTA VISTA 115KV [1170]	P1	N-1	55	58	74	33	36	33	37	38	51	28	58	123	Sensitivity only
	NEWARK F-LAWRENCE-LOCKHD 1 115KV [0]	P1	N-1	66	66	69	42	28	38	39	42	63	40	66	122	Sensitivity only
	NEWARK F-LOCKHD 2-APP MAT 115KV [0]	P1	N-1	44	47	61	26	30	26	30	30	40	22	47	112	Sensitivity only
	NEWARK F 115KV SECTION 2Z	P2	Bus/Breaker	82	90	113	44	39	48	54	60	78	37	90	164	Continue to monitor future load forecast
Lockheed #2 115 kV Tap	NEWARK F 115KV SECTION 2Z	P2	Bus/Breaker	58	63	79	31	28	42	48	52	55	26	64	115	Sensitivity only
	LAWRENCE-MONTA VISTA 115KV [2090]	P1	N-1	0	0	0	0	0	0	0	0	0	0	0	111	Sensitivity only
Los Esteros 230/115 kV Trans No. 3	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & LS ESTRS 230/115KV TB 4	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Sensitivity only
	SSS-NRS 230kV (SVP) & LS ESTRS 230/115KV TB 4	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Sensitivity only
Los Esteros 230/115 kV Trans No. 4	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & LS ESTRS 230/115KV TB 3	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Sensitivity only
	SSS-NRS 230kV (SVP) & LS ESTRS 230/115KV TB 3	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Sensitivity only
Los Esteros-Metcalf 230 kV Line	NEWARK E-F BUS TIE 230KV [4640]	P1	N-1	81	88	93	33	52	71	82	74	76	26	88	104	Sensitivity only
	NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Bus/Breaker	90	97	103	47	55	80	90	83	84	36	98	112	San Jose area mitigation
	NEWARK E 230KV - SECTION 1E & 2E	P2	Bus/Breaker	89	96	102	36	53	78	89	81	84	28	97	112	San Jose area mitigation
	NEWARK E 230KV SECTION 1E	P2	Bus/Breaker	83	89	94	43	51	73	83	75	78	32	89	105	Sensitivity only
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	<100	121	<100	<100	<100	<100	<100	<100	<100	<100	<100	San Jose area mitigation

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
Los Esteros-Montague 115 kV Line	MEC CTG1 18.00KV & MEC CTG2 18.00KV & MEC STG1 18.00KV GEN UNITS & LOS ESTEROS-TRIMBLE 115KV [2550]	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Sensitivity only
	LOS ESTEROS-NORTECH 115KV [4032] & LOS ESTEROS-TRIMBLE 115KV [2550]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	149	Sensitivity only
Los Esteros-Nortech 115 kV Line	Base Case	P0	Normal	60	99	122	48	35	24	43	73	49	40	100	118	San Jose area mitigation
	SSS 230/230KV TB 1	P1	N-1	100	136	160	71	75	60	79	111	113	63	137	163	San Jose area mitigation
	FMC-SAN JOSE B 115KV [2021]	P1	N-1	64	106	127	45	46	31	55	83	66	39	106	125	San Jose area mitigation
	NEWARK-NORTHERN RECEIVING STATION #1 115KV [3100]	P1	N-1	59	100	124	43	36	27	50	80	61	37	100	126	San Jose area mitigation
	NEWARK F-ZANKER-KRS 115KV [0]	P1	N-1	59	98	121	43	35	27	48	78	59	36	99	119	San Jose area mitigation
	NEWARK-NORTHERN RECEIVING STATION #2 115KV [3110]	P1	N-1	57	99	121	42	35	26	49	78	58	35	100	118	San Jose area mitigation
	KIFER-FMC 115KV [2020]	P1	N-1	56	99	118	40	42	26	51	77	57	34	99	109	San Jose area mitigation
	NRS 400 115 kV bus	P2	Bus/Breaker	109	160	232	73	86	66	93	129	129	67	160	232	San Jose area mitigation
Los Esteros-Silicon Switching Station 230 kV Line	LOS ESTEROS-NORTECH 115KV [4032]	P1	N-1	95	103	108	59	87	88	94	106	92	57	103	118	San Jose area mitigation
	NORTECH-NORTHERN RECEIVING STATION 115KV [1551]	P1	N-1	92	100	104	56	86	87	92	104	89	55	100	115	San Jose area mitigation
	LS ESTRS 230/115KV TB 3	P1	N-1	89	91	92	52	82	86	89	93	89	51	91	105	Sensitivity only
	LS ESTRS 230/115KV TB 4	P1	N-1	89	91	92	52	82	86	89	93	89	51	91	105	Sensitivity only
	NEWARK-NORTHERN RECEIVING STATION #1 115KV [3100]	P1	N-1	87	91	92	51	83	85	88	93	88	51	90	104	Sensitivity only
Los Esteros-Trimble 115 kV Line	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	66	71	85	<100	27	45	53	76	52	<100	72	105	Sensitivity only
	LOS ESTEROS-NORTECH 115KV [4032] & LOS ESTEROS-MONTAGUE 115KV [2380]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	128	Sensitivity only
Loyola-Monta Vista 60 kV Line	MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	85	84	102	55	17	71	69	82	59	26	85	108	Continue to monitor future load forecast
Martinez-Oleum 115kV Line	PITSBG D SECTION 1D & PITSBG E SECTION 1E 230KV	P2	Bus/Breaker	31	29	10	47	87	38	53	59	42	124	29	33	Sensitivity only
	PITSBG D 230KV SECTION 1D	P2	Bus/Breaker	30	25	9	47	86	37	52	58	43	124	25	32	Sensitivity only
Mckee-Piercy 115 kV Line	NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	NA	NA	104	NA	NA	NA	NA	75	NA	NA	NA	106	San Jose area mitigation
Metcalf 230/115 kV Trans No. 1	METCALF 230KV - SECTION 2D & 2E	P2	Bus/Breaker	111	104	113	82	45	107	89	103	84	56	105	129	San Jose area mitigation
	METCALF 230/115KV TB 2 & METCALF 230/115KV TB 4	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	0	<100	<100	<100	106	Sensitivity only
Metcalf 230/115 kV Trans No. 2	METCALF 230/115KV TB 1 & METCALF 230/115KV TB 4	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	0	<100	<100	<100	107	Sensitivity only
Metcalf 230/115 kV Trans No. 3	METCALF 230/115KV TB 2 & METCALF 230/115KV TB 4	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	0	<100	<100	<100	105	Sensitivity only
Metcalf 230/115 kV Trans No. 4	METCALF 230KV - SECTION 1D & 1E	P2	Bus/Breaker	104	96	104	81	38	101	85	95	75	51	97	120	San Jose area mitigation
	MTCALF D 115KV SECTION 2Y	P2	Bus/Breaker	85	77	82	75	20	102	63	80	55	47	78	99	Sensitivity only
	METCALF 230/115KV TB 1 & METCALF 230/115KV TB 2	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	0	<100	<100	<100	106	Sensitivity only
Metcalf 500/230 kV Trans No. 11	METCALF 500/230KV TB 12 & METCALF 500/230KV TB 13	P6	N-1-1	<100	<100	101	<100	<100	<100	<100	0	<100	<100	<100	112	San Jose area mitigation

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
Metcalfe 500/230 kV Trans No. 12	METCALF 500/230KV TB 11 & METCALF 500/230KV TB 13	P6	N-1-1	<100	<100	104	<100	<100	<100	<100	<100	0	<100	<100	<100	115	San Jose area mitigation
Metcalfe 500/230 kV Trans No. 13	METCALF 500/230KV TB 11 & METCALF 500/230KV TB 12	P6	N-1-1	101	100	106	<100	<100	<100	<100	<100	0	<100	<100	101	117	San Jose area mitigation
Metcalfe-El Patio No. 1 115 kV Line	METCALF-EL PATIO #2 115KV [2510]	P1	N-1	77	85	94	46	40	53	65	66	68	36	86	107	Sensitivity only	
	METCALF-EL PATIO #2 115KV [2510]	P1	N-1	77	85	94	46	40	53	65	65	68	36	86	107	Sensitivity only	
	MTCALF D SECTION 2D & MTCALF E SECTION 2E 115KV	P2	Bus/Breaker	96	105	119	56	51	61	82	81	85	43	105	134	San Jose area mitigation	
	MTCALF D SECTION 2D & MTCALF E SECTION 2E 115KV	P2	Bus/Breaker	96	105	119	56	51	61	82	81	85	43	105	134	San Jose area mitigation	
	MTCALF D - 2D 115KV & METCALF-EL PATIO #2 LINE	P2	Bus/Breaker	85	93	104	49	47	53	73	72	77	38	93	116	San Jose area mitigation	
	MTCALF D 115KV SECTION 2D	P2	Bus/Breaker	85	93	104	49	47	53	73	72	77	38	93	116	San Jose area mitigation	
	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	80	89	96	<100	48	55	74	77	73	<100	89	106	Sensitivity only	
	METCALF-EL PATIO #2 115KV [2510] (EL PATIO-BAILY J3)	P2	Bus/Breaker	77	85	94	46	40	53	65	66	68	36	86	107	Sensitivity only	
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & METCALF-EL PATIO #2 115KV [2510]	P3	G-1/N-1	<100	<100	101	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	San Jose area mitigation
	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	69	80	109	44	35	45	57	66	59	35	81	122	San Jose area mitigation	
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	77	86	96	42	41	56	69	66	70	33	87	123	Sensitivity only	
	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	68	77	95	43	32	45	55	62	58	34	77	117	Sensitivity only	
	METCALF-EL PATIO #2 115KV [2510] & SAN JOSE B-STONE-EVERGREEN 115KV [1550]	P6	N-1-1	<100	<100	105	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	San Jose area mitigation
	P7-1:A18:17_Metcalfe - Evergreen #1 and #2 115 kV Lines	P7	DCTL	80	89	100	48	40	55	68	68	70	36	89	113	San Jose area mitigation	
P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalfe 230 kV Lines	P7	DCTL	79	87	96	44	43	57	70	67	72	34	88	118	Sensitivity only		
METCALF-EL PATIO #1 115KV [2500]	P1	N-1	77	85	94	46	40	54	67	67	68	36	86	107	Sensitivity only		
METCALF-EL PATIO #1 115KV [2500]	P1	N-1	77	85	94	46	40	53	65	65	68	36	86	107	Sensitivity only		
MTCALF D SECTION 1D & MTCALF E SECTION 1E 115KV	P2	Bus/Breaker	102	111	124	61	55	69	88	89	89	47	111	142	San Jose area mitigation		
MTCALF D SECTION 1D & MTCALF E SECTION 1E 115KV	P2	Bus/Breaker	102	111	124	61	55	67	86	87	89	47	111	142	San Jose area mitigation		
MTCALF D - 1D 115KV & ST TRESA-MTCALF D LINE	P2	Bus/Breaker	92	100	111	56	52	62	81	81	82	43	101	126	San Jose area mitigation		
LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & METCALF-EL PATIO #1 115KV [2500]	P3	G-1/N-1	<100	<100	101	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	San Jose area mitigation	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
Metcalf-El Patio No. 2 115 kV Line	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	69	80	108	44	35	45	57	66	59	34	81	122	San Jose area mitigation
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	77	86	96	42	41	57	70	67	70	33	86	123	Sensitivity only
	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	68	77	95	43	32	45	55	62	58	34	77	117	Sensitivity only
	METCALF-EL PATIO #1 115KV [2500] & SAN JOSE B-STONE-EVERGREEN 115KV [1550]	P6	N-1-1	<100	<100	105	<100	<100	<100	<100	<100	<100	<100	<100	<100	San Jose area mitigation
	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	80	89	100	48	40	55	68	68	70	36	89	113	San Jose area mitigation
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	79	87	96	44	43	58	71	68	72	34	88	118	Sensitivity only
Metcalf-Evergreen No. 1 115 kV Line	MTCALF D SECTION 2D & MTCALF E SECTION 2E 115KV	P2	Bus/Breaker	<100	<100	102	<100	<100	<100	<100	76	<100	<100	<100	114	San Jose area mitigation
	MTCALF E 115KV SECTION 2E	P2	Bus/Breaker	<100	<100	94	<100	<100	<100	<100	66	<100	<100	<100	105	Sensitivity only
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & METCALF-EVERGREEN #1 115KV [2520] (2)	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Sensitivity only
	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	<100	<100	93	<100	<100	<100	<100	57	<100	<100	<100	103	Sensitivity only
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	NA	NA	83	NA	NA	NA	NA	57	NA	NA	NA	103	Sensitivity only
	EL PATIO-SAN JOSE A 115KV [1520] & METCALF-EVERGREEN #1 115KV [2520] (2)	P6	N-1-1	<100	<100	107	<100	<100	<100	<100	<100	<100	<100	<100	123	San Jose area mitigation
	EL PATIO-SAN JOSE A 115KV [1520] & METCALF-EVERGREEN #1 115KV [2520] (2)	P6	N-1-1	<100	<100	102	<100	<100	<100	<100	<100	<100	<100	<100	117	San Jose area mitigation
	P7-1:A18:16_Metcalf - El Patio No. 1 & 2 115 kV Lines	P7	DCTL	<100	<100	91	<100	<100	<100	<100	62	<100	<100	<100	102	Sensitivity only
P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	NA	NA	83	NA	NA	NA	NA	57	NA	NA	NA	99	Sensitivity only	
Metcalf-Evergreen No. 2 115 kV Line	MTCALF D SECTION 1D & MTCALF E SECTION 1E 115KV	P2	Bus/Breaker	<100	<100	104	NA	<100	<100	<100	74	<100	NA	<100	117	San Jose area mitigation
	MTCALF D SECTION 1D & MTCALF E SECTION 1E 115KV	P2	Bus/Breaker	<100	<100	99	<100	<100	<100	<100	75	<100	<100	<100	112	Sensitivity only
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & METCALF-EVERGREEN #1 115KV [2520]	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Sensitivity only
	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	<100	<100	94	<100	<100	<100	<100	58	<100	<100	<100	103	Sensitivity only
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	<100	<100	83	NA	<100	<100	<100	57	<100	NA	<100	104	Sensitivity only
	EL PATIO-SAN JOSE A 115KV [1520] & METCALF-EVERGREEN #1 115KV [2520]	P6	N-1-1	<100	<100	108	<100	<100	<100	<100	<100	<100	<100	<100	123	San Jose area mitigation

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
EL PATIO-SAN JOSE A 115KV [1520] & METCALF-EVERGREEN #1 115KV [2520]	P6	N-1-1		<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	118	San Jose area mitigation
	P7	DCTL		<100	<100	91	<100	<100	<100	<100	63	<100	<100	<100	102	Sensitivity only
	P7	DCTL		<100	<100	83	NA	<100	<100	<100	58	<100	NA	<100	99	Sensitivity only
Metcalfe-Hicks 230 kV Line	P2	Bus/Breaker		90	93	98	65	39	71	80	82	70	43	94	105	Sensitivity only
	P7	DCTL		90	94	97	64	41	71	81	81	70	43	95	104	Sensitivity only
Metcalfe-Llagas 115 kV Line	P6	N-1-1		155	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Morgan Hill Area Reinforcement
Metcalfe-Morgan Hill 115 kV Line	P6	N-1-1		130	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Morgan Hill Area Reinforcement
Monta Vista 230/115 kV Trans No. 2	P2	Bus/Breaker		87	94	117	57	51	72	81	88	72	39	95	127	Continue to monitor future load forecast
	P3	G-1/N-1		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Sensitivity only
	P6	N-1-1		<100	<100	124	<100	<100	<100	<100	0	<100	<100	101	137	Continue to monitor future load forecast
Monta Vista 230/115 kV Trans No. 3	P2	Bus/Breaker		86	94	111	57	47	70	80	89	71	38	94	122	Continue to monitor future load forecast
Monta Vista 230/115 kV Trans No. 4	P3	G-1/N-1		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Sensitivity only
Monta Vista-Hicks 230 kV Line	P2	Bus/Breaker		94	94	100	63	47	76	88	88	77	44	95	110	San Jose area mitigation
	P2	Bus/Breaker		94	94	100	63	47	76	88	88	77	44	95	110	San Jose area mitigation
	P7	DCTL		93	95	99	63	49	75	89	88	77	44	96	108	Sensitivity only
	P7	DCTL		93	95	99	63	50	75	89	88	77	44	96	108	Sensitivity only
Monta Vista-Wolfe 115 kV Line	P1	N-1		95	102	119	65	22	59	64	77	66	31	103	120	San Jose area mitigation
	P2	Bus/Breaker		95	102	119	65	22	59	64	77	66	31	103	120	Continue to monitor future load forecast
Moraga-Castro Valley 230kV Line	P2	Bus/Breaker		104	100	97	48	20	87	68	71	106	34	100	104	Project: Moraga-Castro Valley 230 kV line capacity increase
	P2	Bus/Breaker		97	94	90	45	18	82	64	66	100	31	94	102	Continue to monitor future load forecast
	P2	Bus/Breaker		97	93	90	45	18	82	64	66	100	31	94	102	Continue to monitor future load forecast
Moraga-Clairemont #1 115kV Line	P2	Bus/Breaker		97	106	54	62	65	90	105	55	82	47	107	54	Project: Northern Oakland Area Reinforcement Project
	P2	Bus/Breaker		97	106	54	62	65	90	105	55	82	47	107	54	Project: Northern Oakland Area Reinforcement Project
	P2	Bus/Breaker		97	106	54	62	65	90	105	55	82	47	107	54	Project: Northern Oakland Area Reinforcement Project
Moraga-Oakland X #1 115kV Line	P2	Bus/Breaker		109	50	53	70	34	85	49	53	95	56	50	52	Project: Northern Oakland Area Reinforcement Project
	P6	N-1-1		109	50	53	71	34	85	49	53	95	56	50	53	Project: Northern Oakland Area Reinforcement Project



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
Moraga-Oakland X #2 115kV Line	CLARMNT 115KV - SECTION 2D & 1D	P2	Bus/Breaker	109	50	53	70	34	85	49	53	95	56	50	52	Project: Northern Oakland Area Reinforcement Project
	K-D #1 115KV [9966] & K-D #2 115KV [9967]	P6	N-1-1	109	50	53	71	34	85	49	53	95	56	50	53	Project: Northern Oakland Area Reinforcement Project
Moraga-Oakland X #3 115kV Line	CLARMNT 115KV - SECTION 2D & 1D	P2	Bus/Breaker	109	50	53	70	34	85	49	53	95	56	50	52	Project: Northern Oakland Area Reinforcement Project
	K-D #1 115KV [9966] & K-D #2 115KV [9967]	P6	N-1-1	109	50	53	71	34	85	49	53	95	56	50	53	Project: Northern Oakland Area Reinforcement Project
Moraga-Oakland X #4 115kV Line	CLARMNT 115KV - SECTION 2D & 1D	P2	Bus/Breaker	109	<100	<100	70	<100	85	<100	<100	95	56	<100	<100	Project: Northern Oakland Area Reinforcement Project
	K-D #1 115KV [9966] & K-D #2 115KV [9967]	P6	N-1-1	109	<100	<100	71	<100	85	<100	<100	95	56	<100	<100	Project: Northern Oakland Area Reinforcement Project
Mountain View-Monta Vista 115 kV Line	WHISMAN-MONTA VISTA 115KV [1010]	P1	N-1	80	88	94	54	61	65	74	62	69	42	88	103	Sensitivity only
	RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & WHISMAN-MONTA VISTA 115KV [1010]	P3	G-1/N-1	<100	<100	104	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor future load forecast
	RAVENSWOOD 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	79	84	100	51	50	61	69	73	67	38	84	104	Continue to monitor future load forecast
	NEWARK D 230/115KV TB 7 & WHISMAN-MONTA VISTA 115KV [1010]	P6	N-1-1	<100	102	111	<100	<100	<100	<100	<100	<100	<100	104	<100	Continue to monitor future load forecast
	P7-1:A17:10_Britton-Monta Vista & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	81	88	101	53	58	66	74	65	71	42	89	117	Continue to monitor future load forecast
	P7-1:A17:11_Lawrence - Monta Vista & Applied Materials-Britton 115 kV Lines	P7	DCTL	70	77	86	46	54	58	66	55	61	36	78	101	Sensitivity only
	P7-1:A17:12_Newark-Applied Materials & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	68	75	84	45	52	56	65	54	59	35	75	100	Sensitivity only
NEWARK E-F BUS TIE 230KV [4640]	NEWARK E-F BUS TIE 230KV [4640]	P1	N-1	83	92	88	49	29	72	79	82	79	41	93	104	Sensitivity only
	NEWARK D 230/115KV TB 7	P1	N-1	81	89	87	53	27	68	74	82	72	42	90	101	Sensitivity only
	NEWARK E-F BUS TIE 230KV [4640]	P1	N-1	83	92	87	49	29	72	78	81	78	41	92	100	Sensitivity only
	NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Bus/Breaker	123	134	125	76	34	112	112	115	121	58	135	132	Project: Newark 230/115 kV Transformer Bank #7 Circuit Breaker Addition
	NEWARK E 230KV SECTION 1E	P2	Bus/Breaker	102	112	105	63	23	92	91	96	104	45	113	116	Project: Newark 230/115 kV Transformer Bank #7 Circuit Breaker Addition
	NEWARK D SECTION 1D & NEWARK E SECTION 1E 115KV	P2	Bus/Breaker	80	91	94	45	25	64	73	81	75	36	91	119	Sensitivity only
	NEWARK D SECTION 1D & NEWARK E SECTION 1E 115KV	P2	Bus/Breaker	78	90	90	44	25	63	71	78	74	36	90	111	Sensitivity only
	NEWARK E 115KV SECTION 2Y	P2	Bus/Breaker	80	89	89	47	25	65	72	79	74	38	89	110	Sensitivity only
	NEWARK E 115KV SECTION 2Y	P2	Bus/Breaker	78	88	86	47	25	65	71	77	72	38	88	104	Sensitivity only
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	<100	111	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
Newark 230/115kV Transformer #11	LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	<100	104	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor future load forecast
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	90	99	98	52	35	79	86	89	85	43	101	121	Sensitivity only
	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	78	88	96	51	27	62	70	82	68	41	89	106	Sensitivity only
	MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	84	91	95	55	31	69	76	84	73	42	91	112	Sensitivity only
	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	76	85	89	50	24	61	67	78	66	40	85	103	Sensitivity only
	NEWARK D 230/115KV TB 7 & NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	104	107	109	<100	<100	<100	<100	<100	<100	<100	108	<100	Project: Newark 230/115 kV Transformer Bank #7 Circuit Breaker Addition
	NEWARK D 230/115KV TB 7 & NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	102	106	106	<100	<100	<100	<100	<100	<100	<100	106	<100	Project: Newark 230/115 kV Transformer Bank #7 Circuit Breaker Addition
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	88	98	95	51	35	77	84	87	83	42	98	116	Sensitivity only
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	88	97	93	51	35	76	84	85	83	42	98	109	Sensitivity only
Newark 230/115kV Transformer #7	NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Bus/Breaker	88	98	98	51	38	80	86	90	77	45	98	106	Sensitivity only
	NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Bus/Breaker	87	97	94	51	38	79	84	88	76	45	97	102	Sensitivity only
	LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Sensitivity only
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	76	84	83	44	30	66	73	75	72	36	85	102	Sensitivity only
	NEWARK E-F BUS TIE 230KV [4640] & NEWARK E 230/115KV TB 11	P6	N-1-1	<100	<100	101	<100	<100	<100	<100	<100	<100	<100	<100	113	continue to monitor future load forecast
	NEWARK E 230/115KV TB 11 & NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	<100	100	100	<100	<100	<100	<100	0	<100	<100	102	112	continue to monitor future load forecast
Newark-Ames Dist 115kV Line	AMES BS2 115KV SECTION 2D	P2	Bus/Breaker	70	72	75	63	59	54	61	60	69	61	72	110	Sensitivity only
Newark-Dixon Landing 115kV Line	PIERCY-METCALF 115KV [4318]	P1	N-1	117	122	93	51	26	76	79	66	86	27	123	94	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade
	MCKEE-PIERCY 115KV [2379]	P1	N-1	98	100	76	42	25	66	68	56	74	24	101	77	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade
	MTCALF D SECTION 2D & MTCALF E SECTION 2E 115KV	P2	Bus/Breaker	117	122	94	51	26	77	79	66	86	27	123	96	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade
	MTCALF E 115KV SECTION 2E	P2	Bus/Breaker	117	122	93	51	26	77	79	66	85	27	123	95	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade
	PIERCY 115KV SECTION 1D	P2	Bus/Breaker	98	100	76	42	25	66	68	56	74	24	101	77	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade
	P7-1:A18:6_Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	118	122	94	51	26	77	79	66	86	27	123	96	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
Newark-Jarvis #1 115kV Line	NEWARK-JARVIS #2 115KV [3030]	P1	N-1	109	117	107	52	27	109	116	106	91	32	117	107	San Jose area mitigation
Newark-Kifer 115kV Line	LOS ESTEROS-NORTECH 115KV [4032]	P1	N-1	54	87	106	15	35	34	55	70	55	15	87	108	San Jose area mitigation
	NORTECH-NORTHERN RECEIVING STATION 115KV [1551]	P1	N-1	51	84	100	13	34	32	54	67	52	12	84	102	Sensitivity only
	NEWARK E-F BUS TIE 230KV [4640]	P1	N-1	65	89	96	16	36	48	64	67	71	17	89	104	Sensitivity only
	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	221	333	327	87	181	150	283	293	220	85	333	331	Project: SVP breaker upgrade project
	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	219	330	323	86	179	149	280	290	219	84	330	328	Project: SVP breaker upgrade project
	NRS 300 115 kV bus	P2	Bus/Breaker	73	144	206	20	53	45	83	113	74	19	143	203	San Jose area mitigation
	SRS 115 kV bus	P2	Bus/Breaker	100	179	180	14	56	68	85	Diverge	100	14	179	184	Project: SVP SRS bus upgrade
	NRS 400 115 kV bus	P2	Bus/Breaker	85	115	179	25	60	62	82	95	90	26	115	182	San Jose area mitigation
	Internal breaker fault at Duane Duane-SRS 115 kV and KRS-Duane 115 kV and DVR	P2	Bus/Breaker	77	103	124	30	52	56	72	88	78	29	104	136	San Jose area mitigation
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & KRS-DUANE 115kV (SVP)	P3	G-1/N-1	<100	102	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	<100
Newark-Lawrence 115kV Line	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	67	103	171	25	40	40	64	87	64	23	104	178	San Jose area mitigation
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	96	124	144	32	60	73	96	95	101	30	124	195	San Jose area mitigation
	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	57	91	130	18	35	34	56	74	56	17	91	165	San Jose area mitigation
	FMC-SAN JOSE B 115KV [2021] & KRS-DUANE 115kV (SVP)	P6	N-1-1	117	171	<100	<100	102	<100	0	145	114	<100	172	<100	San Jose area mitigation
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	92	118	133	28	56	70	91	89	96	26	118	167	San Jose area mitigation
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	91	117	132	27	55	69	91	88	96	25	118	165	San Jose area mitigation
	P7-1:A16:11_Newark-Northern Nos. 1 & 2 115 kV lines	P7	DCTL	57	95	114	6	38	36	63	73	64	9	95	128	San Jose area mitigation
Newark-Livermore 60kV Line	P7-1:A18:13_Northern - Scott #1 and #2 115 kV Lines	P7	DCTL	115	82	94	24	37	81	56	65	116	24	83	98	San Jose area mitigation
	LAWRENCE-MONTA VISTA 115KV [2090]	P1	N-1	66	65	73	41	27	37	39	43	63	39	65	127	Sensitivity only
	BRITTON-MONTA VISTA 115KV [1170]	P1	N-1	31	34	27	26	19	19	21	18	30	25	35	113	Sensitivity only
	NEWARK F-LOCKHD 2-APP MAT 115KV [0]	P1	N-1	30	34	27	26	19	19	21	18	30	25	35	117	Sensitivity only
	BRITTON-MONTA VISTA 115KV [1170]	P1	N-1	26	30	24	23	16	16	18	16	26	22	30	113	Sensitivity only
	MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	70	68	81	49	33	44	46	52	67	47	69	149	Sensitivity only
	APPLIED MATERIALS-BRITTON 115KV [4300] & LAWRENCE-MONTA VISTA 115KV [2090]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Sensitivity only
	P7-1:A17:12_Newark-Applied Materials & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	89	90	101	65	44	57	61	65	87	62	91	181	Continue to monitor future load forecast
	P7-1:A17:10_Britton-Monta Vista & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	69	68	76	49	33	44	46	50	67	47	69	135	Sensitivity only
	P7-1:A17:11_Lawrence - Monta Vista & Applied Materials-Britton 115 kV Lines	P7	DCTL	69	68	76	49	33	44	46	50	67	47	69	104	Sensitivity only
Newark-Livermore 60kV Line	LS PSTAS 230/60KV TB 4 & SANRAMON 230/60KV TB 1	P6	N-1-1	<100	<100	106	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor future load forecast

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
Newark-Los Esteros 230kV Line	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & LOS ESTEROS-METCALF 230KV [5353]	P3	G-1/N-1	<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	115	San Jose area mitigation
Newark-Milpitas #1 115kV Line	SWIFT-METCALF 115KV [3900] & NEWARK-MILPITAS #1 115KV [3070] MOAS OPENED ON NEWARK F_BARTRC_J	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	154	Sensitivity only
Newark-Milpitas #2 115kV Line	SWIFT-METCALF 115KV [3900] & NEWARK-MILPITAS #1 115KV [3070] MOAS OPENED ON NEWARK F_BARTRC_J	P6	N-1-1	<100	<100	104	<100	<100	<100	<100	<100	<100	<100	<100	<100	San Jose area mitigation
Newark-Newark Dist 230kV section	METCALF 230KV - SECTION 2D & 2E	P2	Bus/Breaker	81	88	89	38	42	64	71	65	81	32	88	100	Sensitivity only
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & LOS ESTEROS-METCALF 230KV [5353]	P3	G-1/N-1	<100	<100	107	<100	<100	<100	<100	<100	<100	<100	<100	118	Continue to monitor future load forecast
Newark-Northern Receiving Station #1 115kV Line	LOS ESTEROS-NORTECH 115KV [4032]	P1	N-1	54	92	118	20	35	31	60	82	58	21	92	135	San Jose area mitigation
	NEWARK E-F BUS TIE 230KV [4640]	P1	N-1	73	102	111	21	38	55	77	80	87	26	102	135	San Jose area mitigation
	NORTECH-NORTHERN RECEIVING STATION 115KV [1551]	P1	N-1	49	88	110	16	33	28	57	78	53	18	88	126	San Jose area mitigation
	SSS 230/230KV TB 1	P1	N-1	65	91	105	23	50	48	69	79	74	27	91	124	San Jose area mitigation
	NEWARK-LOS ESTEROS 230KV [2970]	P1	N-1	62	90	99	15	35	47	69	73	76	21	91	123	Sensitivity only
	NRS 300 115 kV bus	P2	Bus/Breaker	52	118	186	12	36	28	65	102	57	14	118	199	San Jose area mitigation
	KRS 115 kV bus	P2	Bus/Breaker	51	143	147	5	44	33	69	Diverge	62	10	143	160	Project: SVP KRS bus upgrade
	NEWARK F 115KV SECTION 2Z	P2	Bus/Breaker	69	99	123	21	32	45	69	85	78	22	99	167	San Jose area mitigation
	NEWARK E 230KV - SECTION 1E & 2E	P2	Bus/Breaker	75	104	119	21	39	56	80	82	88	27	104	149	San Jose area mitigation
	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	74	116	204	35	42	42	73	108	72	35	118	232	San Jose area mitigation
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	117	150	173	43	71	91	120	118	129	43	151	252	San Jose area mitigation
	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	61	102	155	27	36	34	63	92	61	27	102	215	San Jose area mitigation
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	112	144	161	39	66	86	115	110	123	38	144	217	San Jose area mitigation
	P7-1:A18:14_Newark - Kifer & FMC - Kifer 115 kV Lines	P7	DCTL	48	84	101	5	38	31	59	70	59	10	84	115	San Jose area mitigation
	P7-1:A18:25_Tesla - Newark No.2 and Newark - Los Esteros 230 kV Lines	P7	DCTL	56	85	95	10	34	42	64	68	71	18	85	120	Sensitivity only
P7-1:A16:17_Newark-Kifer 115 kV and Newark-Trimble 115 kV lines	P7	DCTL	45	76	92	6	29	29	52	64	56	11	76	112	Sensitivity only	
LOS ESTEROS-NORTECH 115KV [4032]	P1	N-1	45	92	111	12	33	24	56	72	46	12	92	112	San Jose area mitigation	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
Newark-Northern Receiving Station #2 115kV Line	NORTECH-NORTHERN RECEIVING STATION 115KV [1551]	P1	N-1	40	87	103	9	32	22	54	67	41	9	87	103	San Jose area mitigation
	NEWARK E-F BUS TIE 230KV [4640]	P1	N-1	57	92	97	11	34	43	67	66	67	14	92	105	Sensitivity only
	NRS 400 115 kV bus	P2	Bus/Breaker	65	113	177	18	60	48	82	90	75	21	113	179	San Jose area mitigation
	KRS 115 kV bus	P2	Bus/Breaker	48	162	152	4	47	30	72	Diverge	55	2	163	148	Project: SVP KRS bus upgrade
	LS ESTRS 115KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	45	92	111	12	33	24	56	72	46	12	92	112	San Jose area mitigation
	NORTECH 115KV SECTION 1F	P2	Bus/Breaker	42	88	106	10	32	23	55	69	43	10	88	105	San Jose area mitigation
	NORTECH 115KV SECTION 1E	P2	Bus/Breaker	40	87	103	9	32	22	54	67	41	9	87	102	San Jose area mitigation
	NEWARK E 230KV SECTION 1E	P2	Bus/Breaker	58	93	99	12	34	44	68	66	68	14	93	107	Sensitivity only
	NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Bus/Breaker	46	82	98	5	27	35	59	60	59	8	82	106	Sensitivity only
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	109	<100	<100	<100	<100	<100	<100	<100	<100	111	<100	San Jose area mitigation
	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	60	111	186	24	39	32	66	92	57	22	112	194	San Jose area mitigation
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	104	142	162	36	69	81	113	106	112	33	143	218	San Jose area mitigation
	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	47	96	140	15	34	25	57	77	46	14	97	178	San Jose area mitigation
	LOS ESTEROS-NORTECH 115KV [4032] & SSS-NRS 230kv (SVP)	P6	N-1-1	107	163	<100	<100	<100	<100	111	0	104	<100	163	<100	San Jose area mitigation
P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	98	134	149	30	62	76	106	98	105	27	135	185	San Jose area mitigation	
Newark-Trimble 115kV Line	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	<100	110	<100	<100	<100	<100	<100	<100	<100	<100	128	San Jose area mitigation
	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	61	79	123	35	18	35	47	64	54	31	80	159	San Jose area mitigation
	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	67	70	95	41	12	40	40	53	57	36	71	156	Sensitivity only
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	70	83	88	21	29	56	69	51	77	19	83	132	Sensitivity only
	LOS ESTEROS-METCALF 230KV [5353] & NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	<100	<100	125	<100	<100	<100	<100	<100	<100	<100	<100	<100	San Jose area mitigation
	NEWARK E-F BUS TIE 230KV [4640] & LOS ESTEROS-METCALF 230KV [5353]	P6	N-1-1	<100	<100	115	<100	<100	<100	<100	<100	<100	<100	<100	162	San Jose area mitigation

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	80	91	94	26	40	65	77	61	87	24	92	130	Sensitivity only
	P7-1:A18:8_Los Esteros - Trimble & Los Esteros - Montague 115 kV	P7	DCTL	64	65	79	39	13	38	37	48	55	35	65	121	Sensitivity only
Newark-Vallecitos 60kV Line	LS PSTAS 230/60KV TB 4 & SANRAMON 230/60KV TB 1	P6	N-1-1	<100	<100	107	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor future load forecast
Nortech-NRS 115 kV Line	SSS 230/230KV TB 1	P1	N-1	90	128	149	62	72	64	87	123	74	55	128	152	San Jose area mitigation
	FMC-SAN JOSE B 115KV [2021]	P1	N-1	52	98	116	36	43	29	59	89	38	29	98	113	San Jose area mitigation
	NEWARK-NORTHERN RECEIVING STATION #1 115KV [3100]	P1	N-1	48	90	112	34	33	24	52	86	35	28	91	114	San Jose area mitigation
	NEWARK F-ZANKER-KRS 115KV [0]	P1	N-1	47	89	109	33	32	24	51	83	33	27	90	106	San Jose area mitigation
	NRS 400 115 kV bus	P2	Bus/Breaker	100	153	224	64	84	71	104	145	87	59	153	224	San Jose area mitigation
	HICKS-METCALF 230KV [4910] & SSS-NRS 230kv (SVP)	P6	N-1-1	106	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	San Jose area mitigation
	P7-1:A16:11_Newark-Northern Nos. 1 & 2 115 kV lines	P7	DCTL	57	111	139	33	40	30	65	101	46	28	111	148	San Jose area mitigation
	P7-1:A18:14_Newark - Kifer & FMC - Kifer 115 kV Lines	P7	DCTL	55	108	129	31	48	31	65	95	43	25	108	120	San Jose area mitigation
	P7-1:A18:8_Los Esteros - Trimble & Los Esteros - Montague 115 kV	P7	DCTL	67	101	126	55	28	34	55	96	44	45	102	138	San Jose area mitigation
	P7-1:A18:11_Trimble - San Jose B & FMC - San Jose B 115 kV Lines	P7	DCTL	51	95	113	37	39	27	55	88	36	30	95	110	San Jose area mitigation
North Dublin-Cayetano 230KV Cable	P7-1:A18:9_Los Esteros - Trimble & Montague - Trimble 115 kV Line	P7	DCTL	54	89	110	47	24	27	46	86	32	38	90	119	San Jose area mitigation
	NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Bus/Breaker	100	105	106	66	26	68	85	105	72	44	105	117	Contra Costa 230 kV bus upgrade or Contra Costa area generation redispatch
	NEWARK D 230KV SECTION 1D	P2	Bus/Breaker	95	99	100	61	25	64	80	100	66	42	99	115	Continue to monitor future load forecast
	MORAGA 230KV - SECTION 2D & 1D	P2	Bus/Breaker	104	106	77	68	28	61	86	79	65	46	107	90	Project: Moraga 230 kV bus upgrade
	MORAGA 230kv Bus #1 & 2(Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	105	107	95	69	28	62	87	98	66	47	109	111	Project: Moraga 230 kV bus upgrade
	P7-1:A16:5_Tesla-Newark No.1 and Tesla-Ravenswood 230 kV lines	P7	DCTL	94	98	88	61	28	61	80	90	64	44	98	101	Sensitivity only
North Dublin-Vineyard 230 kV Line	P7-1:A8:4_Contra Costa-Moraga Nos. 1 & 2 230 kV lines	P7	DCTL	98	100	87	64	26	56	81	92	60	44	100	102	Continue to monitor future load forecast
	NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Bus/Breaker	89	94	96	57	29	60	76	96	68	42	94	107	Sensitivity only
	NEWARK D 230KV SECTION 1D	P2	Bus/Breaker	84	88	89	55	28	56	71	91	62	41	88	105	Sensitivity only
NRS-Scott No. 1 115 kV Line	MORAGA 230kv Bus #1 & 2(Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	94	96	84	63	30	56	81	90	61	45	97	100	Project: Moraga 230 kV bus upgrade
	NRS 300 115 kV bus	P2	Bus/Breaker	122	140	177	57	87	98	106	131	121	56	140	187	San Jose area mitigation
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NRS-AGNEW 60kv (SVP)	P3	G-1/N-1	<100	<100	107	<100	<100	<100	<100	<100	<100	<100	<100	110	San Jose area mitigation
	NRS 115/60kV TB 2 (SVP) & NRS-AGNEW 60kV (SVP)	P6	N-1-1	<100	<100	138	<100	<100	<100	<100	<100	<100	<100	<100	140	San Jose area mitigation
NRS 400 115 kV bus	NRS 115/60kV TB 2 (SVP) & NRS-SRS #2 115kV (SVP)	P6	N-1-1	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	103	<100	San Jose area mitigation
	NRS 400 115 kV bus	P2	Bus/Breaker	106	81	123	34	41	77	56	76	100	31	81	125	San Jose area mitigation

2021-2022 ISO Reliability Assessment - Study Results

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

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
NRS-Scott No. 2 115 kV Line	LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NRS-AGNEW 60kV (SVP)	P3	G-1/N-1	<100	<100	106	<100	<100	<100	<100	<100	<100	<100	<100	108	San Jose area mitigation
	NRS 115/60kV TB 2 (SVP) & NRS-AGNEW 60kV (SVP)	P6	N-1-1	<100	<100	137	<100	<100	<100	<100	<100	<100	<100	<100	139	San Jose area mitigation
	NRS 115/60kV TB 2 (SVP) & NRS-SRS #1 115kV (SVP)	P6	N-1-1	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	103	<100	San Jose area mitigation
NRS-Scott No. 3 115 kV Line	P7-1:A18:13_Northern - Scott #1 and #2 115 kV Lines	P7	DCTL	NA	90	106	NA	51	NA	70	90	NA	NA	91	116	San Jose area mitigation
Oakland C - Oakland L #1 115kV Cable	CLARMNT 115KV - SECTION 2D & 1D	P2	Bus/Breaker	98	98	108	64	46	98	105	115	86	52	99	108	Project: Oakland Clean Energy Initiative
	K-D #1 115KV [9966] & K-D #2 115KV [9967]	P6	N-1-1	98	98	108	64	46	98	104	115	86	52	99	108	Project: Oakland Clean Energy Initiative
Oakland C - Oakland X #2 115kV Cable	CLARMNT 115KV - SECTION 2D & 1D	P2	Bus/Breaker	109	106	109	75	82	104	107	113	98	65	107	109	Project: Oakland Clean Energy Initiative
	C-X #3 & D-L 115KV [9925]	P6	N-1-1	122	116	114	89	110	110	110	116	114	82	117	114	Project: Oakland Clean Energy Initiative
	K-D #1 115KV [9966] & K-D #2 115KV [9967]	P6	N-1-1	109	106	110	75	82	104	107	114	98	65	107	110	Project: Oakland Clean Energy Initiative
Oleum-Christie 115kV Line	P7-1:A7:3_Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	83	80	115	30	47	54	58	79	58	56	80	108	Continue to monitor future load forecast
Oleum-Martinez 115kV Line	PITSBG D 230KV SECTION 2D	P2	Bus/Breaker	74	71	64	10	33	79	97	106	86	60	71	83	Sensitivity only
	PITSBG D - 2D 230KV & PITSBG D-TBC_PT B1 #1 LINE	P2	Bus/Breaker	74	71	64	10	33	79	97	106	86	60	71	83	Sensitivity only
	PITSBG D SECTION 1D & PITSBG E SECTION 1E 230KV	P2	Bus/Breaker	31	29	10	47	87	42	59	66	42	124	29	33	Sensitivity only
	PITSBG D 230KV SECTION 1D	P2	Bus/Breaker	29	25	9	47	86	41	58	65	43	124	25	32	Sensitivity only
Piercy-Metcalf 115 kV Line	LOS ESTEROS-NORTECH 115KV [4032] & NEWARK-DIXON LANDING 115KV [2990]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Sensitivity only
Pittsburg 230/115kV Transformer #13	LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS & PITSBG D 230/115KV TB 12	P3	G-1/N-1	115	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Pittsburg 230/115 kV Transformer Capacity Increase
Potrero-Mission (AX) 115kV Cable	POTRERO 115KV SECTION 2E	P2	Bus/Breaker	59	69	110	53	19	45	46	109	49	42	69	111	Continue to monitor future load forecast
Ravenswood 230/115kV Transformer #1	RAVNSWD 230/115KV TB 2 & TESLA-METCALF 500KV	P6	N-1-1	102	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade
Ravenswood-Cooley Landing #1 115kV Line	RVNSWD E 115KV SECTION 1X	P2	Bus/Breaker	83	87	106	60	46	74	72	82	82	53	88	118	Continue to monitor future load forecast
Ravenswood-Cooley Landing #2 115kV Line	RAVNSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	122	123	136	89	64	102	101	Diverge	109	74	124	Diverge	Protection upgrade
Ravenswood-San Mateo #1 115kV Line	RAVNSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	169	171	193	122	85	141	141	Diverge	149	100	173	Diverge	Protection upgrade
San Jose B bus tie	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	74	107	93	<100	78	56	105	89	77	<100	106	93	Project: SVP breaker upgrade project
	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	54	76	106	28	49	36	59	64	50	29	76	111	San Jose area mitigation
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	70	87	95	27	61	57	82	67	73	26	88	117	Sensitivity only
	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	52	70	87	28	44	35	54	57	48	28	70	106	Sensitivity only
	NEWARK E-F BUS TIE 230KV [4640] & LOS ESTEROS-METCALF 230KV [5353]	P6	N-1-1	<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	127

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)							Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast		2031 Summer Peak with High SJ Load	
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	73	90	97	29	64	60	84	70	76	28	90	113	Sensitivity only	
San Jose 'B'-Stone-Evergreen 115 kV Line	EL PATIO-SAN JOSE A 115KV [1520]	P1	N-1	63	79	84	30	58	42	61	52	68	35	79	104	Sensitivity only	
	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	70	97	89	<100	71	47	83	72	76	<100	96	100	Sensitivity only	
	EL PATIO 115KV - SECTION 1D & 1E	P2	Bus/Breaker	64	80	84	29	57	41	60	52	67	34	80	104	Sensitivity only	
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & EL PATIO-SAN JOSE A 115KV [1520]	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	122	Sensitivity only
	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	57	75	105	32	49	35	52	57	57	37	76	122	San Jose area mitigation	
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	71	85	93	31	59	50	69	58	76	34	86	126	Sensitivity only	
	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	52	67	83	29	42	31	45	48	52	33	68	113	Sensitivity only	
	NEWARK E-F BUS TIE 230KV [4640] & LOS ESTEROS-METCALF 230KV [5353]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	132	Sensitivity only
	NEWARK-LOS ESTEROS 230KV [2970] & LOS ESTEROS-METCALF 230KV [5353]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	122	Sensitivity only
	P7-1:A18:16_Metcalf - El Patio No. 1 & 2 115 kV Lines	P7	DCTL	85	100	110	44	64	55	75	69	85	45	100	131	San Jose area mitigation	
P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	70	84	90	29	59	49	67	57	75	33	84	116	Sensitivity only		
San Jose Sta 'A'-'B' 115 kV Line	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	100	131	121	47	85	64	108	97	97	42	130	112	Project: SVP breaker upgrade project	
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	<100	112	<100	<100	<100	<100	<100	<100	<100	<100	112	San Jose area mitigation	
	PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	78	101	140	46	54	45	68	76	67	39	102	133	San Jose area mitigation	
	LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	94	113	125	44	68	65	89	78	91	35	114	140	San Jose area mitigation	
	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	75	94	117	46	49	44	63	69	65	38	95	128	San Jose area mitigation	
	MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	71	84	100	37	51	44	63	60	64	29	85	100	San Jose area mitigation	
	NEWARK E-F BUS TIE 230KV [4640] & LOS ESTEROS-METCALF 230KV [5353]	P6	N-1-1	<100	125	134	<100	<100	<100	<100	<100	<100	<100	125	152	San Jose area mitigation	
	NEWARK-LOS ESTEROS 230KV [2970] & LOS ESTEROS-METCALF 230KV [5353]	P6	N-1-1	<100	114	122	<100	<100	<100	<100	<100	<100	<100	116	140	San Jose area mitigation	
P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	102	120	134	56	64	65	88	83	91	43	121	133	San Jose area mitigation		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	98	116	127	47	71	68	92	81	94	38	116	135	San Jose area mitigation	
	P7-1:A18:16_Metcalf - El Patio No. 1 & 2 115 kV Lines	P7	DCTL	73	76	86	49	25	50	52	58	62	37	76	117	Sensitivity only	
San Leandro - Oakland J #1 115kV Line	EASTSHRE 115KV - SECTION 1D & 1E	P2	Bus/Breaker	101	97	94	56	28	82	88	88	93	37	98	97	Project: East Shore 230 kV Bus Terminals Reconfiguration	
	EAST SHORE 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	101	98	94	57	28	81	88	89	93	38	98	97	Project: East Shore 230 kV Bus Terminals Reconfiguration	
	E. SHORE 230/115KV TB 2 & E. SHORE 230/115KV TB 1	P6	N-1-1	<100	<100	101	<100	<100	<100	<100	0	<100	<100	<100	101	Continue to monitor future load forecast	
San Mateo-Bair 60kV Line	CLY LNDG 60KV SECTION 1D	P2	Bus/Breaker	97	100	123	65	35	69	72	84	82	46	102	125	Continue to monitor future load forecast	
	CLY LNDG 60KV - SECTION 1D & 2D	P2	Bus/Breaker	96	98	121	64	34	68	71	83	80	45	100	123	Continue to monitor future load forecast	
	RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	148	150	159	102	73	124	127	Diverge	126	81	151	Diverge	Protection upgrade	
	CLY LND 115/60KV TB 1 & CLY LND2 115/60KV TB 2	P6	N-1-1	139	140	174	<100	<100	111	116	0	113	<100	143	177	Operating solution	
San Mateo-Belmont 115kV Line	RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	189	191	215	133	87	157	160	Diverge	163	107	193	Diverge	Protection upgrade	
	RAVENSWOOD 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	85	91	120	55	39	75	73	83	85	47	92	133	Continue to monitor future load forecast	
	RAVENSWD 230/115KV TB 1 & RAVENSWD 230/115KV TB 2	P6	N-1-1	<100	102	124	<100	<100	<100	<100	0	<100	<100	102	138	Continue to monitor future load forecast	
	P7-1:A10:19_Ravenswood-Bair Nos. 1 & 2 115 kV lines	P7	DCTL	88	92	101	61	34	71	75	83	76	46	93	101	Continue to monitor future load forecast	
San Mateo-Hillsdale JCT 60kV Line	MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	87	90	86	68	46	87	96	102	62	42	92	88	Project: Monta Vista 230 kV Bus Upgrade	
	JEFFERSON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	239	241	247	176	112	186	255	277	141	98	247	250	Project: Jefferson 230 kV Bus Upgrade	
	JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	240	242	247	180	115	188	256	276	145	100	248	250	Project: Jefferson 230 kV Bus Upgrade	
	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	240	75	70	180	32	188	84	Diverge	145	100	77	73	Project: Jefferson 230 kV Bus Upgrade	
San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	92	95	94	75	51	90	101	112	65	47	98	97	Project: Monta Vista 230 kV Bus Upgrade	
	JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	282	284	283	207	137	216	300	315	171	115	291	286	Project: Jefferson 230 kV Bus Upgrade	
	JEFFERSON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	281	283	283	202	134	213	299	317	166	112	289	286	Project: Jefferson 230 kV Bus Upgrade	
	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	282	77	76	207	34	216	86	Diverge	171	115	79	79	Project: Jefferson 230 kV Bus Upgrade	
	MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	87	88	89	70	52	82	93	102	64	47	90	92	Project: Monta Vista 230 kV Bus Upgrade	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	271	280	275	201	134	203	284	301	165	114	287	278	Project: Jefferson 230 kV Bus Upgrade
	JEFFERSON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	270	279	275	197	130	200	283	303	160	111	285	278	Project: Jefferson 230 kV Bus Upgrade
	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	271	69	71	201	35	203	78	Diverge	165	114	71	74	Project: Jefferson 230 kV Bus Upgrade
San Ramon-Radum 60kV Line	LS PSTAS 230/60KV TB 4 & NEWARK D 115/115KV TB 1	P6	N-1-1	<100	<100	112	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor future load forecast
Saratoga-Vasona 230 kV Line	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	91	95	98	63	44	67	79	78	72	42	96	106	Sensitivity only
Scott-Duane 115 kV Line	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	126	187	180	61	117	99	179	179	126	61	187	176	Project: SVP breaker upgrade project
	NRS-AGNEW 60KV (SVP) & NEWARK F-ZANKER-KRS 115KV [0]	P6	N-1-1	<100	<100	105	<100	<100	<100	<100	<100	<100	<100	<100	<100	San Jose area mitigation
Sobrante-El Cerrito STA G #1 115kV Lin	SOBRANTE 115KV - SECTION 2E & 2D	P2	Bus/Breaker	93	90	96	42	36	70	77	71	67	46	101	90	Sensitivity only
Sobrante-El Cerrito STA G #2 115kV Line	SOBRANTE 115KV - SECTION 1D & 2D	P2	Bus/Breaker	95	93	99	45	38	72	79	77	73	48	107	104	Sensitivity only
Sobrante-Moraga 115kV Line	MORAGA 230kV Bus #1 & 2(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	84	85	90	68	53	77	73	84	81	53	85	104	Sensitivity only
Swift-Metcalf 115 kV Line	MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	84	90	85	45	41	63	76	59	65	28	91	100	Sensitivity only
Tassajara-Newark 230kV Line	PITSBG D 230KV SECTION 2D	P2	Bus/Breaker	77	67	70	10	32	57	64	75	106	32	66	82	Sensitivity only
	PITSBG D - 2D 230KV & PITSBG D-TBC_PT1 #1 LINE	P2	Bus/Breaker	77	67	70	10	32	57	64	75	106	32	66	82	Sensitivity only
Tesla - Newark 230 kV Line No. 2	TESLA-NEWARK #1 230KV [5720] & TESLA-METCALF 500kV	P6	N-1-1	<100	<100	100	<100	<100	<100	<100	<100	<100	<100	<100	104	Sensitivity only
Trimble-San Jose 'B' 115 kV Line	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	97	136	151	<100	60	67	110	142	84	<100	136	154	Project: SVP breaker upgrade project
	NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	97	136	151	NA	60	67	110	142	84	NA	136	154	Project: SVP breaker upgrade project
	SSS-NRS 230kV (SVP) & LOS ESTEROS-NORTECH 115KV [4032]	P6	N-1-1	<100	<100	117	<100	<100	<100	<100	<100	<100	<100	<100	114	San Jose area mitigation
	SSS-NRS 230kV (SVP) & LOS ESTEROS-NORTECH 115KV [4032]	P6	N-1-1	<100	<100	117	<100	<100	<100	<100	<100	<100	<100	<100	114	San Jose area mitigation
Vasona-Metcalf 230 kV Line	Base Case	P0	Normal	88	90	93	36	41	50	57	57	70	25	91	101	Upgrade limiting equipment
	HICKS-METCALF 230KV [4910]	P1	N-1	95	99	102	45	44	59	66	66	75	31	100	110	Upgrade limiting equipment
	MONTA VISTA-COYOTE SW STA 230KV [5090]	P1	N-1	94	97	101	44	44	58	66	66	75	30	98	109	Upgrade limiting equipment
	METCALF-MONTA VISTA #3 230KV [5091]	P1	N-1	94	96	100	44	44	58	66	65	75	30	97	108	Upgrade limiting equipment
	MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	104	109	115	47	47	62	74	70	84	32	110	124	Upgrade limiting equipment
	METCALF 230KV SECTION 2D	P2	Bus/Breaker	103	106	112	48	48	63	72	71	81	33	107	121	Upgrade limiting equipment
	MONTAVIS 230KV - SECTION 2E & 2D	P2	Bus/Breaker	103	107	108	48	49	64	74	72	83	33	108	116	Upgrade limiting equipment
	METCALF 230KV - SECTION 2D & 2E	P2	Bus/Breaker	93	113	104	37	64	63	62	64	100	43	116	115	Upgrade limiting equipment
	HICKS 230KV SECTION 1F	P2	Bus/Breaker	95	99	102	45	44	59	66	66	75	31	100	110	Upgrade limiting equipment
	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	125	128	135	58	59	76	88	87	99	40	130	144	Upgrade limiting equipment
	P7-1:A10:2_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	P7	DCTL	87	89	93	41	41	55	61	63	68	29	90	100	Upgrade limiting equipment

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)							Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast		2031 Summer Peak with High SJ Load
	P7-1:A16:5_Tesla-Newark No.1 and Tesla-Ravenswood 230 kV lines	P7	DCTL	85	88	93	40	41	54	60	61	67	28	89	100	Upgrade limiting equipment
	P7-1:A16:7_Tesla - Newark No.2 and Metcalf - Los Esteros 230 kV lines	P7	DCTL	85	88	93	40	40	53	59	59	69	27	88	100	Upgrade limiting equipment
Whisman-Monta Vista 115 kV Line	MNTA VSA 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	87	103	112	54	66	60	71	60	71	47	90	104	Continue to monitor future load forecast
	LECEFGT1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & MTN VIEW-MONTA VISTA 115KV [2920]	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Sensitivity only
	MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	78	79	107	57	24	60	64	81	56	33	80	112	Continue to monitor future load forecast
	NEWARK D 230/115KV TB 7 & MTN VIEW-MONTA VISTA 115KV [2920]	P6	N-1-1	<100	<100	107	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor future load forecast
	BRITTON-MONTA VISTA 115KV [1170] & MTN VIEW-MONTA VISTA 115KV [2920]	P6	N-1-1	<100	<100	100	<100	<100	<100	<100	<100	<100	<100	<100	110	Continue to monitor future load forecast
	P7-1:A17:10_Britton-Monta Vista & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	72	79	93	50	57	53	61	56	63	41	80	112	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
Agnew 115	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	1.02	1.00	0.89	1.03	1.03	1.03	1.01	1.00	1.01	1.03	1.00	0.87	continue to monitor future load forecast
Agnew 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
ALMADEN 60	P1-2:A17:34:_MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	0.98	1.02	0.87	0.99	1.07	1.03	1.03	0.93	1.00	1.02	1.02	0.84	continue to monitor future load forecast
ALMADEN 60	P2-4:A18:21:_MTCALF E 115KV - SECTION 1E & 2E	P2	Bus/Breaker	0.95	0.98	0.79	0.98	1.05	1.02	1.00	0.90	0.97	1.01	0.98	0.72	continue to monitor future load forecast
ALMADEN 60	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.75	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.73	continue to monitor future load forecast
ALMADEN 60	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.75	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.73	continue to monitor future load forecast
ALMADEN 60	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	0.96	0.99	0.82	0.98	1.05	1.02	1.01	0.91	0.98	1.01	0.99	0.79	continue to monitor future load forecast
AMES BS2 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
AMES BS2 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.02	1.02	0.90	1.02	1.03	1.02	1.02	0.99	1.03	1.02	1.02	0.89	continue to monitor future load forecast
AMES BS2 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
AMES DST 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
AMES DST 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.02	1.02	0.90	1.02	1.03	1.02	1.02	0.99	1.03	1.02	1.02	1.02	0.89	continue to monitor future load forecast
AMES DST 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
APP MAT 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A17:28:_BRITTON-MONTA VISTA 115KV [1170]	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	continue to monitor future load forecast
APP MAT 115	P5-5:A17:1:_MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.99	1.01	0.86	1.00	1.04	1.01	1.01	0.94	1.00	1.01	1.00	1.00	0.81	continue to monitor future load forecast
APP MAT 115	P1-2:A16:21:_TESLA-NEWARK #2 230KV [5354] & P1-2:A17:28:_BRITTON-MONTA VISTA 115KV [1170]	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	continue to monitor future load forecast
APP MAT 115	P7-1:A17:10_Britton-Monta Vista & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	1.00	1.01	0.91	1.00	1.03	1.01	1.01	0.97	1.00	1.01	1.00	1.00	0.89	Sensitivity only
BAIR 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	Sensitivity only
BARTLP 115	P1-2:A18:45:_PIERCY-METCALF 115KV [4318]	P1	N-1	0.97	1.02	0.90	1.00	1.02	1.00	1.00	0.95	0.99	1.01	1.02	1.02	0.88	continue to monitor future load forecast
BARTLP 115	P2-4:A18:21:_MTCALF E 115KV - SECTION 1E & 2E	P2	Bus/Breaker	0.96	1.01	0.86	0.99	1.02	1.00	0.99	0.94	0.98	1.01	1.01	1.01	0.82	continue to monitor future load forecast
BARTLP 115	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:48:_NEWARK-DIXON LANDING 115KV [2990]	P3	G-1/N-1	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
BARTLP 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.00	1.01	0.86	1.02	1.04	1.02	1.02	0.97	1.02	1.03	1.01	0.85	continue to monitor future load forecast
BARTLP 115	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:48:_NEWARK-DIXON LANDING 115KV [2990]	P6	N-1-1	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
BARTLP 115	P7-1:A18:6_Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	0.97	1.01	0.88	0.99	1.02	1.00	1.00	0.95	0.99	1.01	1.01	0.87	continue to monitor future load forecast
BARTRC 115	P2-4:A16:21:_NEWARK F 115KV - SECTION 2F & 1F	P2	Bus/Breaker	0.99	1.06	0.90	1.01	1.09	1.03	1.02	0.96	1.01	1.04	1.06	0.93	Sensitivity only
BARTRC 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.85	continue to monitor future load forecast
BARTRC 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.02	0.86	1.02	1.04	1.03	1.02	0.98	1.02	1.03	1.01	0.85	continue to monitor future load forecast
BARTRC 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.85	continue to monitor future load forecast
BARTRC 115	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	1.02	1.03	0.95	1.03	1.04	1.03	1.02	1.00	1.02	1.04	1.02	0.90	Sensitivity only
BAY MDWS 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
BAYSHOR1 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500KV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
BAYSHOR2 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500KV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
BELMONT 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
BERESFRD 60	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
BLLE HVN 60	P2-2:A10:36:_CLY LNDG 60KV SECTION 1D	P2	Bus/Breaker	1.01	1.00	0.89	1.00	1.02	1.02	1.01	0.93	1.02	1.01	1.00	1.00	0.89	continue to monitor future load forecast
BLLE HVN 60	P1-3:A10:12:_CLY LND2 115/60KV TB 2 & P1-3:A10:13:_CLY LND 115/60KV TB 1	P6	N-1-1	>0.9	>0.9	0.83	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.82	continue to monitor future load forecast
BRITTN 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A17:28:_BRITTON-MONTA VISTA 115KV [1170]	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	continue to monitor future load forecast
BRITTN 115	P5-5:A17:1:_MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.99	1.00	0.86	1.00	1.04	1.01	1.00	0.94	1.00	1.01	1.00	1.00	0.81	continue to monitor future load forecast
BRITTN 115	P1-2:A16:21:_TESLA-NEWARK #2 230KV [5354] & P1-2:A17:28:_BRITTON-MONTA VISTA 115KV [1170]	P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	continue to monitor future load forecast
BRITTN 115	P7-1:A17:10_Britton-Monta Vista & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	1.00	1.01	0.91	1.00	1.03	1.01	1.00	0.96	1.00	1.01	1.00	1.00	0.88	Sensitivity only
BURLNGME 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500kv	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Sensitivity only
CALEVRAS 115	P2-4:A16:24:_NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Bus/Breaker	1.00	0.99	0.93	1.02	1.02	1.01	1.00	0.99	1.00	1.03	0.99	0.95	0.95	Sensitivity only
CALEVRAS 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.00	0.89	1.03	1.03	1.02	1.01	1.00	1.02	1.03	0.99	0.99	0.90	continue to monitor future load forecast
CALEVRAS 115	P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640] & P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
CALMAT60 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A16:7:_LS PSTAS 230/60KV TB 4	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
CALTRAINSSF 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
CALTRAINSSJ 115	Base case	P0	Normal	>0.9	1.00	0.94	>0.9	1.03	>0.9	1.01	0.99	>0.9	>0.9	1.00	0.92	0.92	continue to monitor future load forecast
CALTRAINSSJ 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.00	0.99	0.91	1.02	1.03	1.02	1.02	0.97	1.01	1.03	0.99	0.87	0.87	Sensitivity only
CALTRAINSSJ 115	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	>0.9	0.84	0.78	>0.9	0.98	>0.9	0.86	0.81	>0.9	>0.9	0.84	0.76	0.76	Project: SVP breaker upgrade project
CALTRAINSSJ 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.77	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.74	continue to monitor future load forecast
CALTRAINSSJ 115	P1-2:A18:26:_FMC-SAN JOSE B 115KV [2021] & P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032]	P6	N-1-1	>0.9	>0.9	0.70	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.69	continue to monitor future load forecast
CALTRAINSSJ 115	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	0.99	0.99	0.90	1.02	1.03	1.02	1.00	0.97	1.00	1.04	0.98	0.81	0.81	Sensitivity only
CAROLNDS 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A10:57:_JEFFERSON-HILLSDALE JCT 60KV [7190] MOAS OPENED ON HLLSDLJT_HILDAL49	P3	G-1/N-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
CAROLNDS 60	P5-5:A10:2:_JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.84	0.82	0.78	0.89	0.95	0.92	0.82	0.75	0.92	0.96	0.81	0.78	0.78	Project: Jefferson 230 kV Bus Upgrade
CAROLNDS 60	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.83	1.02	1.01	0.89	1.03	0.92	1.03	0.99	0.92	0.96	1.02	1.00	1.00	Sensitivity only
CASTROVL 230	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:9:_CASTRO VALLEY-NEWARK 230KV [4450]	P3	G-1/N-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
CASTROVL 230	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:9:_CASTRO VALLEY-NEWARK 230KV [4450]	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
CAYETANO 230	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	continue to monitor future load forecast
CP LECEF 115	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	1.02	1.00	0.89	1.03	1.03	1.03	1.01	1.00	1.02	1.04	1.00	0.87	0.87	continue to monitor future load forecast
CP LECEF 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
CP LECEF 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
CP LECEF 115	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	1.01	1.01	0.94	1.03	1.02	1.03	1.02	1.00	1.02	1.03	1.01	0.85	0.85	Sensitivity only
CRYOGEN 115	P2-4:A16:24:_NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Bus/Breaker	0.96	0.95	0.90	1.01	1.02	0.97	0.96	0.97	0.96	1.02	0.95	0.92	0.92	continue to monitor future load forecast
CRYOGEN 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
CRYOGEN 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.97	0.96	0.85	1.02	1.02	0.99	0.97	0.97	0.99	1.02	0.96	0.86	0.86	continue to monitor future load forecast
CRYOGEN 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
CRYSTLSG 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A10:57:_JEFFERSON-HILLSDALE JCT 60KV [7190] MOAS OPENED ON HLLSDLJT_HILDAL49	P3	G-1/N-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
CRYSTLSG 60	P5-5:A10:2:_JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.65	0.63	0.61	0.78	0.86	0.82	0.63	0.57	0.79	0.88	0.62	0.60	Project: Jefferson 230 kV Bus Upgrade
CRYSTLSG 60	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.64	1.01	1.01	0.78	1.03	0.82	1.01	0.98	0.79	0.88	1.00	1.00	Sensitivity only
CV BART 230	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:9:_CASTRO VALLEY-NEWARK 230KV [4450]	P3	G-1/N-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
CV BART 230	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:9:_CASTRO VALLEY-NEWARK 230KV [4450]	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
CYTE PMP 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
DALY CTY 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500kV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
DEC PTSG 230	P1-1:A8:18:_LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P3	G-1/N-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
DEC PTSG 230	P1-1:A8:18:_LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
DIXON LD 115	P1-2:A16:48:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	0.98	1.07	0.91	1.02	1.07	1.02	1.02	0.96	1.01	1.04	1.07	0.89	Sensitivity only
DIXON LD 115	P2-4:A16:21:_NEWARK F 115KV - SECTION 2F & 1F	P2	Bus/Breaker	0.98	1.07	0.89	1.01	1.07	1.01	1.02	0.95	1.00	1.04	1.06	0.87	continue to monitor future load forecast
DIXON LD 115	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:48:_NEWARK-DIXON LANDING 115KV [2990]	P3	G-1/N-1	>0.9	>0.9	0.83	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
DIXON LD 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.02	0.86	1.02	1.04	1.02	1.02	0.97	1.02	1.03	1.01	0.85	continue to monitor future load forecast
DIXON LD 115	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & P1-2:A16:48:_NEWARK-DIXON LANDING 115KV [2990]	P6	N-1-1	>0.9	>0.9	0.83	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
DIXON LD 115	P7-1:A18:2:_Newark - Dixon Landing & Newark - Milpitas #1 115 kV Lines	P7	DCTL	0.98	1.07	0.90	1.02	1.07	1.02	1.02	0.96	1.00	1.04	1.07	0.89	Sensitivity only
DMTAR_SL 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	continue to monitor future load forecast
DUMBARTN 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-2:A16:32:_EASTSHORE-DUMBARTON 115KV [1495]	P6	N-1-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast
E DUBLIN 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A16:6:_SANRAMON 230/60KV TB 1	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
EDENVALE 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Sensitivity only
EDES 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Sensitivity only
EL PATIO 115	Base case	P0	Normal	1.02	1.02	0.95	1.03	1.05	1.03	1.03	1.00	1.02	1.04	1.02	0.93	Sensitivity only
EL PATIO 115	P1-1:A18:4:_LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.01	1.01	0.92	1.03	1.05	1.03	1.03	0.98	1.02	1.04	1.01	0.89	Sensitivity only
EL PATIO 115	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	0.98	0.92	0.85	1.02	1.01	1.01	0.93	0.89	0.98	1.04	0.92	0.83	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
EL PATIO 115	P1-1:A18:4:_LECEfst1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.81	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.78	continue to monitor future load forecast
EL PATIO 115	P1-1:A18:4:_LECEfst1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.81	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.78	continue to monitor future load forecast
EL PATIO 115	P7-1:A18:16_Metcalf - El Patio No. 1 & 2 115 kV Lines	P7	DCTL	1.00	0.99	0.89	1.01	1.04	1.02	1.01	0.96	1.00	1.02	0.99	0.86	continue to monitor future load forecast
EMBRCDRD 230	P1-2:A9:5:_SAN MATEO-MARTIN 230KV [9980] & P1-3:A9:1:_POTRERO 230/115KV TB 1	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast
EMRLD LE 60	P5-5:A10:2:_JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.66	0.65	0.61	0.78	0.86	0.83	0.63	0.58	0.80	0.88	0.64	0.61	Project: Jefferson 230 kV Bus Upgrade
EMRLD LE 60	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.65	1.02	1.01	0.78	1.03	0.83	1.02	0.99	0.80	0.88	1.02	1.00	Sensitivity only
EST GRND 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
EVRGRN 1 115	Base case	P0	Normal	1.02	1.02	0.96	1.03	1.05	1.04	1.03	1.00	1.02	1.05	1.02	0.94	Sensitivity only
EVRGRN 1 115	P1-1:A18:4:_LECEfst1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.01	1.01	0.93	1.03	1.05	1.04	1.03	0.98	1.02	1.04	1.01	0.90	Sensitivity only
EVRGRN 1 115	P2-4:A18:21:_MTCALF E 115KV - SECTION 1E & 2E	P2	Bus/Breaker	0.97	0.97	0.85	1.00	1.04	1.02	1.00	0.94	0.98	1.02	0.97	0.79	continue to monitor future load forecast
EVRGRN 1 115	P1-1:A18:4:_LECEfst1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.79	continue to monitor future load forecast
EVRGRN 1 115	P1-1:A18:4:_LECEfst1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.79	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
EVRGRN 1 115	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	0.98	0.98	0.88	1.01	1.04	1.02	1.01	0.95	0.99	1.02	0.98	0.84	continue to monitor future load forecast
FACEBOOKBH 60	P2-2:A10:36:_CLY LNDG 60KV SECTION 1D	P2	Bus/Breaker	0.99	0.99	0.89	0.99	1.01	1.01	0.99	0.93	1.00	1.00	0.99	0.89	continue to monitor future load forecast
FACEBOOKBH 60	P1-3:A10:12:_CLY LND2 115/60KV TB 2 & P1-3:A10:13:_CLY LND 115/60KV TB 1	P6	N-1-1	>0.9	>0.9	0.83	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.82	continue to monitor future load forecast
FMC 115	Base case	P0	Normal	1.01	1.00	0.94	1.03	1.04	1.03	1.01	0.99	1.01	1.04	1.00	0.92	continue to monitor future load forecast
FMC 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.00	0.99	0.91	1.02	1.03	1.03	1.02	0.97	1.01	1.03	0.99	0.87	Sensitivity only
FMC 115	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	0.95	0.84	0.78	1.02	0.98	0.99	0.86	0.81	0.95	1.03	0.84	0.76	Project: SVP breaker upgrade project
FMC 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.77	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.74	continue to monitor future load forecast
FMC 115	P1-2:A18:26:_FMC-SAN JOSE B 115KV [2021] & P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032]	P6	N-1-1	>0.9	>0.9	0.70	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.69	continue to monitor future load forecast
FMC 115	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	0.99	0.99	0.90	1.02	1.03	1.02	1.00	0.97	1.00	1.04	0.98	0.81	Sensitivity only
FREMNT 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
FREMNT 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.01	0.86	1.02	1.03	1.02	1.02	0.98	1.03	1.03	1.01	Bus Disconnected	continue to monitor future load forecast
FREMNT 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
GILROY F 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-2:A18:43:_MORGAN HILL-LLAGAS 115KV [2800]	P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
GLENWOOD 60	P1-3:A10:12:_CLY LND2 115/60KV TB 2 & P1-3:A10:13:_CLY LND 115/60KV TB 1	P6	N-1-1	>0.9	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.80	continue to monitor future load forecast
GRANT 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	continue to monitor future load forecast
HICKS 230	P2-4:A18:2:_METCALF 230KV - SECTION 1D & 2D	P2	Bus/Breaker	1.03	1.07	0.92	1.05	1.06	1.03	1.06	0.98	1.04	1.07	1.06	0.90	Sensitivity only
HICKS 230	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
HICKS 230	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
HILLSDLE 60	P5-5:A10:2:_JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.89	0.88	0.84	0.93	0.97	0.95	0.87	0.82	0.95	0.98	0.88	0.84	Project: Jefferson 230 kV Bus Upgrade
HILLSDLE 60	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.88	1.03	1.01	0.93	1.03	0.95	1.03	1.00	0.96	0.98	1.03	1.00	Sensitivity only
HLF MNBY 60	P5-5:A10:2:_JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.85	0.84	0.79	0.91	0.96	0.93	0.83	0.75	0.94	0.98	0.83	0.79	Project: Jefferson 230 kV Bus Upgrade
HLF MNBY 60	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.84	1.02	1.02	0.91	1.03	0.93	1.03	1.00	0.95	0.98	1.02	1.02	Sensitivity only
HNTRS PT 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500kV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
IBM-BALY 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
IBM-HRRS 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
IUKA 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A16:6:_SANRAMON 230/60KV TB 1	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
IUKAJCT 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A16:6:_SANRAMON 230/60KV TB 1	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
JARVIS 115	P2-4:A16:24:_NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Bus/Breaker	0.96	0.95	0.90	1.01	1.02	0.97	0.96	0.97	0.96	1.02	0.95	0.92	continue to monitor future load forecast
JARVIS 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
JARVIS 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.97	0.96	0.85	1.02	1.02	0.99	0.97	0.97	0.99	1.02	0.96	0.86	continue to monitor future load forecast
JARVIS 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
JENNINGS 60	Base case	P0	Normal	1.01	1.03	0.94	1.03	1.06	1.04	1.04	0.99	1.02	1.04	1.03	0.92	continue to monitor future load forecast
JENNINGS 60	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.01	1.02	0.91	1.02	1.06	1.04	1.04	0.97	1.02	1.03	1.02	0.88	Sensitivity only
JENNINGS 60	P2-4:A18:21:_MTCALF E 115KV - SECTION 1E & 2E	P2	Bus/Breaker	0.96	0.98	0.83	1.00	1.04	1.02	1.00	0.93	0.98	1.02	0.98	0.76	continue to monitor future load forecast
JENNINGS 60	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.77	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
JENNINGS 60	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.77	continue to monitor future load forecast
JENNINGS 60	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	0.97	0.99	0.86	1.00	1.05	1.02	1.01	0.94	0.99	1.02	0.99	0.82	continue to monitor future load forecast
JV BART 115	P2-4:A16:24:_NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Bus/Breaker	0.96	0.95	0.90	1.01	1.02	0.97	0.96	0.97	0.96	1.02	0.95	0.92	continue to monitor future load forecast
JV BART 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
JV BART 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.97	0.96	0.85	1.02	1.02	0.99	0.97	0.97	0.99	1.02	0.96	0.86	continue to monitor future load forecast
JV BART 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
LAKEWD-C 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A8:18:_LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
LAKEWD-M 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A8:18:_LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
LAS PLGS 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A10:55:_JEFFERSON-LAS PULGAS 60KV [7200]	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
LAS PLGS 60	P5-5:A10:2:_JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.64	0.63	0.59	0.77	0.86	0.82	0.62	0.55	0.79	0.87	0.62	0.59	Project: Jefferson 230 kV Bus Upgrade
LAS PLGS 60	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.63	1.01	1.00	0.77	1.03	0.82	1.01	0.97	0.79	0.87	1.01	0.99	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
LAWRENCE 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
LAWRENCE 115	P5-5:A17:1:_MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.00	1.01	0.88	1.01	1.03	1.02	1.01	0.96	1.01	1.02	1.01	0.80	continue to monitor future load forecast
LAWRENCE 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
LAWRENCE 115	P7-1:A17:12_Newark-Applied Materials & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	1.01	1.01	0.93	1.01	1.03	1.03	1.02	0.98	1.01	1.01	1.01	0.87	Sensitivity only
LIVERMRE 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A16:7:_LS PSTAS 230/60KV TB 4	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
LIVRMR_2 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A16:7:_LS PSTAS 230/60KV TB 4	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
LLAGAS 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-2:A18:43:_MORGAN HILL-LLAGAS 115KV [2800]	P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
LOCKHD 1 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast
LOCKHD 1 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.01	0.87	1.01	1.02	1.02	1.01	0.98	1.02	1.01	1.01	0.86	continue to monitor future load forecast
LOCKHD 1 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
LOCKHD 1 115	P7-1:A17:12_Newark-Applied Materials & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	1.01	1.02	0.93	1.01	1.03	1.03	1.03	0.98	1.02	1.01	1.02	0.88	Sensitivity only
LOCKHD 2 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast
LOCKHD 2 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.01	0.87	1.01	1.03	1.02	1.02	0.98	1.02	1.01	1.01	0.86	continue to monitor future load forecast
LOCKHD 2 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast
LOCKHD 2 115	P7-1:A17:10_Britton-Monta Vista & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	1.00	1.01	0.93	1.01	1.04	1.02	1.02	0.98	1.01	1.01	1.01	0.90	Sensitivity only
LONESTAR 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	Sensitivity only
LOS ALTS 60	P5-5:A17:1:_MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.00	1.01	0.87	1.02	1.05	1.03	1.05	0.97	1.01	1.03	1.01	0.82	continue to monitor future load forecast
LOS GATS 60	P1-2:A17:34:_MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	0.97	1.02	0.85	0.98	1.07	1.02	1.02	0.91	1.00	1.01	1.01	0.82	continue to monitor future load forecast
LOS GATS 60	P2-2:A17:48:_LOS GATS 60KV SECTION 1A	P2	Bus/Breaker	0.97	1.02	0.85	0.98	1.07	1.02	1.02	0.91	1.00	1.01	1.01	0.82	continue to monitor future load forecast
LOS GATS 60	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A17:34:_MONTA VISTA-LOS GATOS 60KV [7610]	P3	G-1/N-1	>0.9	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	0.78	continue to monitor future load forecast
LOS GATS 60	P5-5:A17:1:_MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.03	1.03	0.88	1.02	1.06	1.04	1.05	0.98	1.04	1.03	1.03	0.84	continue to monitor future load forecast
LOS GATS 60	P1-2:A16:21:_TESLA-NEWARK #2 230KV [5354] & P1-2:A17:34:_MONTA VISTA-LOS GATOS 60KV [7610]	P6	N-1-1	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.78	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
LOYOLA 60	P5-5:A17:1:_MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.02	1.02	0.89	1.03	1.05	1.03	1.05	0.98	1.03	1.03	1.02	0.84	continue to monitor future load forecast
MABURY 115	P1-2:A18:45:_PIERCY-METCALF 115KV [4318]	P1	N-1	0.97	1.02	0.90	1.00	1.02	1.00	1.00	0.95	0.99	1.01	1.02	0.88	continue to monitor future load forecast
MABURY 115	P2-4:A18:21:_MTCALF E 115KV - SECTION 1E & 2E	P2	Bus/Breaker	0.96	1.01	0.86	0.99	1.02	1.00	0.99	0.94	0.98	1.01	1.01	0.82	continue to monitor future load forecast
MABURY 115	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:48:_NEWARK-DIXON LANDING 115KV [2990]	P3	G-1/N-1	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
MABURY 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.00	1.01	0.86	1.02	1.04	1.02	1.02	0.97	1.02	1.03	1.01	0.85	continue to monitor future load forecast
MABURY 115	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:48:_NEWARK-DIXON LANDING 115KV [2990]	P6	N-1-1	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
MABURY 115	P7-1:A18:6_Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	0.97	1.01	0.88	0.99	1.02	1.00	1.00	0.95	0.99	1.01	1.01	0.87	continue to monitor future load forecast
MABURY 60	Base case	P0	Normal	1.01	1.03	0.94	1.03	1.06	1.04	1.04	0.99	1.02	1.04	1.03	0.92	continue to monitor future load forecast
MABURY 60	P1-1:A18:4:_LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.01	1.02	0.91	1.02	1.06	1.04	1.04	0.97	1.02	1.04	1.02	0.88	Sensitivity only
MABURY 60	P2-4:A18:21:_MTCALF E 115KV - SECTION 1E & 2E	P2	Bus/Breaker	0.96	0.98	0.83	1.00	1.05	1.02	1.00	0.93	0.98	1.02	0.98	0.76	continue to monitor future load forecast
MABURY 60	P1-1:A18:4:_LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.77	continue to monitor future load forecast
MABURY 60	P1-1:A18:4:_LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.77	continue to monitor future load forecast
MABURY 60	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	0.97	0.99	0.86	1.00	1.05	1.02	1.01	0.94	0.99	1.02	0.99	0.82	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
MARITIME 115	P1-2:A8:70:_PITTSBURG-MARTINEZ #2 115KV [3330] MOAS OPENED ON PITTSBURG_W.P.BART & P1-2:A16:26:_GRANT-EDES 115KV [0]	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
MARTIN C 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500kV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
MCKEE 115	P1-2:A18:45:_PIERCY-METCALF 115KV [4318]	P1	N-1	0.97	1.02	0.89	0.99	1.03	1.00	1.00	0.95	0.99	1.01	1.02	0.88	continue to monitor future load forecast
MCKEE 115	P2-4:A18:21:_MTCALF E 115KV - SECTION 1E & 2E	P2	Bus/Breaker	0.96	1.02	0.86	0.99	1.03	1.00	1.00	0.94	0.99	1.01	1.02	0.82	continue to monitor future load forecast
MCKEE 115	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:48:_NEWARK-DIXON LANDING 115KV [2990]	P3	G-1/N-1	>0.9	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
MCKEE 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.02	0.87	1.02	1.04	1.03	1.02	0.97	1.02	1.04	1.02	0.86	continue to monitor future load forecast
MCKEE 115	P1-2:A16:21:_TESLA-NEWARK #2 230KV [5354] & P1-2:A18:45:_PIERCY-METCALF 115KV [4318]	P6	N-1-1	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.83	continue to monitor future load forecast
MCKEE 115	P7-1:A18:6_Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	0.97	1.02	0.88	0.99	1.03	1.00	1.00	0.95	0.99	1.01	1.02	0.86	continue to monitor future load forecast
MEDW LNE 115	P1-1:A8:18:_LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P3	G-1/N-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
MEDW LNE 115	P1-1:A8:18:_LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
MENLO 60	P1-3:A10:12:_CLY LND2 115/60KV TB 2 & P1-3:A10:13:_CLY LND 115/60KV TB 1	P6	N-1-1	>0.9	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.79	continue to monitor future load forecast
MENLO G 60	P1-3:A10:12:_CLY LND2 115/60KV TB 2 & P1-3:A10:13:_CLY LND 115/60KV TB 1	P6	N-1-1	>0.9	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.79	continue to monitor future load forecast
MILLBRAE 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500kV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
MILLBRAE 60	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500kV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
MILPITAS 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.85	continue to monitor future load forecast
MILPITAS 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.02	0.86	1.02	1.04	1.03	1.02	0.97	1.02	1.03	1.01		0.84	continue to monitor future load forecast
MILPITAS 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.85	continue to monitor future load forecast
MILPITAS 115	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	1.01	1.03	0.95	1.03	1.04	1.03	1.02	1.00	1.02	1.04	1.03		0.89	Sensitivity only
MISSION 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500kV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
MOFT.FLD 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast
MOFT.FLD 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.01	0.87	1.01	1.02	1.02	1.01	0.98	1.02	1.02	1.01		0.86	continue to monitor future load forecast
MOFT.FLD 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast
MOFT.FLD 115	P7-1:A17:12_Newark-Applied Materials & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	1.01	1.02	0.94	1.01	1.03	1.03	1.03	0.98	1.02	1.01	1.02		0.88	Sensitivity only
MONTAGUE 115	Base case	P0	Normal	1.02	1.01	0.96	1.03	1.03	1.03	1.02	1.00	1.02	1.04	1.01		0.94	Sensitivity only
MONTAGUE 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.01	1.00	0.92	1.02	1.03	1.03	1.02	0.98	1.02	1.02	1.00		0.89	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
MONTAGUE 115	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	1.01	1.00	0.87	1.03	1.03	1.02	1.01	0.99	1.01	1.03	1.00	0.85	continue to monitor future load forecast
MONTAGUE 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.75	continue to monitor future load forecast
MONTAGUE 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.75	continue to monitor future load forecast
MONTAGUE 115	P7-1:A18:8_Los Esteros - Trimble & Los Esteros - Montague 115 kV	P7	DCTL	1.00	1.01	0.91	1.02	1.05	1.03	1.02	0.97	1.01	1.03	1.00	0.87	Sensitivity only
MRGN HIL 115	P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640] & P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Sensitivity only
MSFTSJDC 115	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	1.02	1.00	0.89	1.03	1.03	1.03	1.01	1.00	1.02	1.04	1.00	0.87	continue to monitor future load forecast
MSFTSJDC 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
MSFTSJDC 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
MSFTSJDC 115	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	1.01	1.01	0.94	1.03	1.02	1.03	1.02	1.00	1.02	1.03	1.01	0.84	Sensitivity only
MT EDEN 115	P1-3:A16:1:_E. SHORE 230/115KV TB 1 & P1-3:A16:2:_E. SHORE 230/115KV TB 2	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
MT VIEW 115	P5-5:A17:1:_MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.02	1.03	0.88	1.01	1.03	1.03	1.03	0.95	1.03	1.02	1.03	0.84	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
MT VIEW 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	Sensitivity only
NASA A 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
NASA A 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.02	1.02	0.90	1.02	1.03	1.02	1.02	0.99	1.03	1.02	1.02	1.02	0.89	continue to monitor future load forecast
NASA A 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
NASA B 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
NASA B 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.02	1.02	0.90	1.02	1.03	1.02	1.02	0.99	1.03	1.02	1.02	1.02	0.89	continue to monitor future load forecast
NASA B 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
NDUBLIN 230	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500KV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	continue to monitor future load forecast
NEWARK D 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load	
NEWARK D 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.00	0.88	1.03	1.03	1.02	1.01	0.99	1.02	1.03	0.99	0.89	continue to monitor future load forecast
NEWARK D 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	continue to monitor future load forecast
NORTECH 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032]	P1	N-1	1.00	0.97	0.90	1.03	1.01	1.02	0.99	0.96	1.00	1.03	0.97	0.88	continue to monitor future load forecast
NORTECH 115	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	1.01	0.98	0.85	1.03	1.02	1.02	1.00	0.98	1.01	1.03	0.98	0.84	continue to monitor future load forecast
NORTECH 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.77	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.75	continue to monitor future load forecast
NORTECH 115	P1-2:A21:1:_SSS-NRS 230kV (SVP) & P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032]	P6	N-1-1	>0.9	>0.9	0.72	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.72	continue to monitor future load forecast
NORTECH 115	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	1.01	1.00	0.93	1.03	1.02	1.02	1.01	0.99	1.02	1.03	1.00	0.83	Sensitivity only
NRTHGRUM 60	P1-3:A10:12:_CLY LND2 115/60KV TB 2 & P1-3:A10:13:_CLY LND 115/60KV TB 1	P6	N-1-1	>0.9	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.80	continue to monitor future load forecast
NWK DIST 230	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.78	continue to monitor future load forecast
NWK DIST 230	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.78	continue to monitor future load forecast
ORACLE60 60	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
PACIFICA 60	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500kV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
PERMNTE 60	P5-5:A17:1:_MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.03	1.04	0.91	1.03	1.06	1.05	1.06	1.00	1.04	1.03	1.03	1.03	0.86	Sensitivity only
PHILLIPS 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
PHILLIPS 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.01	0.89	1.01	1.02	1.01	1.01	0.98	1.02	1.01	1.00	1.00	0.87	continue to monitor future load forecast
PHILLIPS 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	continue to monitor future load forecast
PIERCY 115	P1-2:A18:45:_PIERCY-METCALF 115KV [4318]	P1	N-1	0.97	1.03	0.88	0.99	1.03	1.00	1.00	0.95	0.99	1.01	1.03	1.03	0.87	continue to monitor future load forecast
PIERCY 115	P2-4:A18:21:_MTCALF E 115KV - SECTION 1E & 2E	P2	Bus/Breaker	0.96	1.03	0.85	0.99	1.03	1.00	0.99	0.93	0.98	1.01	1.03	1.03	0.81	continue to monitor future load forecast
PIERCY 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A18:45:_PIERCY-METCALF 115KV [4318]	P3	G-1/N-1	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.82	continue to monitor future load forecast
PIERCY 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.02	1.04	0.91	1.04	1.06	1.04	1.04	1.00	1.03	1.05	1.03	1.03	0.90	Sensitivity only
PIERCY 115	P1-2:A16:21:_TESLA-NEWARK #2 230KV [5354] & P1-2:A18:45:_PIERCY-METCALF 115KV [4318]	P6	N-1-1	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.82	continue to monitor future load forecast
PIERCY 115	P7-1:A18:6_Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	0.96	1.03	0.87	0.99	1.03	1.00	1.00	0.94	0.99	1.01	1.03	1.03	0.86	continue to monitor future load forecast
POTRERO 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500kV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
POTRERO 230	P1-2:A9:5:_SAN MATEO-MARTIN 230KV [9980] & P1-3:A9:1:_POTRERO 230/115KV TB 1	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
PP STEEL 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
PT PINLE 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
RADUM 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A16:6:_SANRAMON 230/60KV TB 1	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
RALSTON 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A10:57:_JEFFERSON-HILLSDALE JCT 60KV [7190] MOAS OPENED ON HLLSDLJT_HILDAL49	P3	G-1/N-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
RALSTON 60	P5-5:A10:2:_JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.65	0.63	0.61	0.78	0.86	0.82	0.63	0.57	0.79	0.88	0.62	0.60	0.60	Project: Jefferson 230 kV Bus Upgrade
RALSTON 60	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.64	1.01	1.01	0.78	1.03	0.82	1.02	0.98	0.80	0.88	1.01	1.00	1.00	Sensitivity only
REDWOOD 60	P1-3:A10:12:_CLY LND2 115/60KV TB 2 & P1-3:A10:13:_CLY LND 115/60KV TB 1	P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast
RESEARCH 230	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	Sensitivity only
ROSSMOOR 230	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
S.L.A.C. 230	P1-2:A10:61:_JEFFERSN-EGBERTSWSTA 230KV [0] & P1-2:A21:4:_NRS-AGNEW 60KV (SVP)	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
SAN CRLS 60	P1-3:A10:12:_CLY LND2 115/60KV TB 2 & P1-3:A10:13:_CLY LND 115/60KV TB 1	P6	N-1-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
SAN MATO 60	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
SAN PBLO 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
SANMATEO 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
SANPAULA 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500KV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Sensitivity only
SANRAMON 230	P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS & P1-1:A8:18:_LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS	P3	G-1/N-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
SARATOGA 230	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	continue to monitor future load forecast
SARATOGA 230	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.02	1.02	0.90	1.02	1.04	1.02	1.04	0.99	1.03	1.04	1.02	0.90	Sensitivity only	
SARATOGA 230	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	continue to monitor future load forecast
SERRMNTTE 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500KV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
SFIA 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500KV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
SFIA-MA 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
SHAWROAD 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500kV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Sensitivity only
SHREDDER 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	Sensitivity only
SJB DG 115	Base case	P0	Normal	1.01	1.01	0.95	1.03	1.04	1.03	1.02	0.99	1.01	1.04	1.01	0.92	continue to monitor future load forecast
SJB DG 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.01	1.00	0.91	1.02	1.04	1.03	1.02	0.97	1.01	1.03	0.99	0.88	Sensitivity only
SJB DG 115	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	0.96	0.88	0.82	1.02	1.00	1.00	0.90	0.85	0.97	1.03	0.88	0.80	Project: SVP breaker upgrade project
SJB DG 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
SJB DG 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
SJB DG 115	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	0.99	0.99	0.90	1.02	1.03	1.02	1.01	0.97	1.00	1.03	0.99	0.87	Sensitivity only
SJB EF 115	Base case	P0	Normal	1.01	1.01	0.95	1.03	1.04	1.03	1.02	0.99	1.02	1.04	1.01	0.92	continue to monitor future load forecast
SJB EF 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.01	1.00	0.91	1.02	1.04	1.03	1.02	0.97	1.02	1.03	1.00	0.88	Sensitivity only
SJB EF 115	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	0.96	0.89	0.82	1.02	1.00	1.00	0.90	0.86	0.97	1.03	0.88	0.80	Project: SVP breaker upgrade project

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
SJB EF 115	P1-1:A18:4:_LECEfst1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
SJB EF 115	P1-1:A18:4:_LECEfst1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
SJB EF 115	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	0.99	0.99	0.90	1.02	1.04	1.02	1.01	0.97	1.00	1.03	0.99	0.87	Sensitivity only
SN BRNOT 60	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	Sensitivity only
SN JSE A 115	Base case	P0	Normal	1.01	1.01	0.95	1.03	1.04	1.03	1.02	0.99	1.02	1.04	1.01	0.92	continue to monitor future load forecast
SN JSE A 115	P1-1:A18:4:_LECEfst1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.01	1.00	0.92	1.02	1.04	1.03	1.02	0.98	1.02	1.03	1.00	0.88	Sensitivity only
SN JSE A 115	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	0.97	0.90	0.83	1.02	1.00	1.01	0.91	0.87	0.97	1.03	0.89	0.81	Project: SVP breaker upgrade project
SN JSE A 115	P1-1:A18:4:_LECEfst1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
SN JSE A 115	P1-1:A18:4:_LECEfst1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
SN JSE A 115	P7-1:A18:16_Metcalf - El Patio No. 1 & 2 115 kV Lines	P7	DCTL	1.00	0.99	0.90	1.02	1.04	1.02	1.01	0.96	1.00	1.03	0.99	0.87	Sensitivity only
SN LNDRO 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load		
SNANDRES 60	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-2:A30:3:_TESLA-METCALF 500kV	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
SNTH LNE 60	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	Sensitivity only
ST TRESA 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Sensitivity only
STANFORD 60	Base case	P0	Normal	0.98	0.98	0.93	0.98	0.99	1.02	0.99	0.96	0.98	0.99	0.98	0.98	0.91	Sensitivity only
STANFORD 60	P1-4:A17:1:_MONTAVIS SVD=V	P1	N-1	0.96	0.96	0.91	>0.9	>0.9	>0.9	0.97	0.94	0.97	>0.9	0.96	0.96	0.90	Sensitivity only
STANFORD 60	P2-4:A18:2:_METCALF 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.97	0.99	0.89	0.99	1.00	1.02	0.99	0.94	0.99	1.00	0.99	0.99	0.87	continue to monitor future load forecast
STANFORD 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A10:7:_JEFFERSN 230/60KV TB 2	P3	G-1/N-1	>0.9	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
STANFORD 60	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	0.97	0.98	0.90	0.98	0.99	1.01	0.99	0.95	0.99	0.99	0.98	0.98	0.89	Sensitivity only
STATIN J 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Sensitivity only
STD. OIL 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
STELLING 115	P5-5:A17:1:_MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.00	1.02	0.84	0.99	1.03	1.02	1.02	0.93	1.02	1.01	1.02	1.02	0.80	continue to monitor future load forecast
STELLING 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Sensitivity only
STONE 115	Base case	P0	Normal	1.01	1.01	0.95	1.03	1.05	1.04	1.03	0.99	1.02	1.04	1.01	1.01	0.93	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
STONE 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.01	1.01	0.92	1.02	1.05	1.04	1.03	0.98	1.02	1.04	1.00	0.89	Sensitivity only
STONE 115	P2-4:A18:21:_MTCALF E 115KV - SECTION 1E & 2E	P2	Bus/Breaker	0.96	0.97	0.84	1.00	1.04	1.02	1.00	0.93	0.98	1.02	0.97	0.78	continue to monitor future load forecast
STONE 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.81	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.79	continue to monitor future load forecast
STONE 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.81	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.79	continue to monitor future load forecast
STONE 115	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	0.97	0.97	0.87	1.00	1.04	1.02	1.01	0.94	0.99	1.02	0.97	0.84	continue to monitor future load forecast
SUNOL 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A16:6:_SANRAMON 230/60KV TB 1	P3	G-1/N-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
SWIFT 115	P1-2:A18:34:_SWIFT-METCALF 115KV [3900]	P1	N-1	0.99	1.02	0.92	1.00	1.04	1.01	1.01	0.97	1.01	1.02	1.02	0.89	Sensitivity only
SWIFT 115	P2-4:A18:21:_MTCALF E 115KV - SECTION 1E & 2E	P2	Bus/Breaker	0.98	1.01	0.88	1.00	1.03	1.01	1.00	0.95	1.00	1.01	1.01	0.83	continue to monitor future load forecast
SWIFT 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A18:34:_SWIFT-METCALF 115KV [3900]	P3	G-1/N-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.85	continue to monitor future load forecast
SWIFT 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.02	0.89	1.03	1.05	1.03	1.03	0.99	1.03	1.04	1.02	0.87	continue to monitor future load forecast
SWIFT 115	P1-2:A18:34:_SWIFT-METCALF 115KV [3900] & P1-2:A16:51:_NEWARK-MILPITAS #2 115KV [3080]	P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
SWIFT 115	P7-1:A18:6_Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	0.99	1.02	0.90	1.00	1.03	1.01	1.00	0.96	1.01	1.01	1.01	0.87	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
TASSAJAR 230	P1-1:A8:18:_LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P3	G-1/N-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
TASSAJAR 230	P1-1:A8:18:_LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
TESORO 230	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
TIDEWATR 230	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
TRIMBLE 115	Base case	P0	Normal	1.02	1.01	0.96	1.03	1.03	1.03	1.02	1.00	1.02	1.04	1.01	0.94	Sensitivity only
TRIMBLE 115	P1-1:A18:4:_LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS	P1	N-1	1.01	1.00	0.92	1.02	1.03	1.03	1.02	0.98	1.02	1.02	1.00	0.89	Sensitivity only
TRIMBLE 115	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	1.01	1.00	0.87	1.03	1.03	1.02	1.01	0.99	1.01	1.03	1.00	0.85	continue to monitor future load forecast
TRIMBLE 115	P1-1:A18:4:_LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
TRIMBLE 115	P1-1:A18:4:_LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.78	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.76	continue to monitor future load forecast
TRIMBLE 115	P7-1:A18:8_Los Esteros - Trimble & Los Esteros - Montague 115 kV	P7	DCTL	1.00	1.01	0.92	1.02	1.05	1.03	1.02	0.97	1.01	1.03	1.00	0.87	Sensitivity only

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
VALLECTS 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A16:6:_SANRAMON 230/60KV TB 1	P3	G-1/N-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
VASCO 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A16:7:_LS PSTAS 230/60KV TB 4	P3	G-1/N-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
VASONA 230	P2-4:A18:2:_METCALF 230KV - SECTION 1D & 2D	P2	Bus/Breaker	1.02	1.06	0.92	1.05	1.05	1.03	1.06	0.98	1.04	1.07	1.05	0.90	Sensitivity only
VASONA 230	P1-1:A18:4:_LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	continue to monitor future load forecast
VASONA 230	P1-1:A18:4:_LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	continue to monitor future load forecast
VINEYARD 230	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	continue to monitor future load forecast
WALNUTCR 115	P1-2:A18:52:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551] & P1-1:A8:18:_LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
WATRSLED 60	P5-5:A10:2:_JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.74	0.73	0.69	0.83	0.90	0.87	0.71	0.66	0.86	0.91	0.72	0.68	Project: Jefferson 230 kV Bus Upgrade
WATRSLED 60	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.73	1.02	1.01	0.83	1.03	0.87	1.02	0.99	0.86	0.91	1.02	1.01	Sensitivity only
WESTRN_D 115	P1-1:A18:4:_LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
WESTRN_D 115	P5-5:A10:6:_PALO ALTO SW. STA. 115KV DBDB BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.01	1.00	0.86	1.02	1.03	1.02	1.02	0.97	1.02	1.02	1.00	0.85	continue to monitor future load forecast
WESTRN_D 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	continue to monitor future load forecast
WHISMAN 115	P5-5:A17:1:_MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.02	1.03	0.89	1.01	1.03	1.02	1.02	0.96	1.03	1.02	1.02	0.85	continue to monitor future load forecast
WHISMAN 115	P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640] & P1-2:A18:6:_LOS ESTEROS-METCALF 230KV [5353]	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Sensitivity only
WOLFE 115	P5-5:A17:1:_MONTA VISTA 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.00	1.02	0.84	0.99	1.03	1.02	1.02	0.93	1.02	1.01	1.02	0.80	continue to monitor future load forecast
WOLFE 115	P1-2:A18:51:_LOS ESTEROS-NORTECH 115KV [4032] & P1-1:A8:17:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS	P6	N-1-1	>0.9	>0.9	99.00	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Sensitivity only
WOODSIDE 60	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-3:A10:7:_JEFFERSN 230/60KV TB 2	P3	G-1/N-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	continue to monitor future load forecast
WOODSIDE 60	P5-5:A10:2:_JEFFERSON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.64	0.63	0.59	0.77	0.86	0.82	0.62	0.55	0.79	0.88	0.62	0.59	Project: Jefferson 230 kV Bus Upgrade
WOODSIDE 60	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.63	1.01	1.00	0.77	1.03	0.82	1.01	0.97	0.80	0.88	1.01	0.99	Sensitivity only

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	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast		2031 Summer Peak with High SJ Load
Agnew 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	15	continue to monitor future load forecast
ALMADEN 60	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	11	<8	<8	<8	<8	<8	<8	<8	<8	12	continue to monitor future load forecast
BARTLP 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A18:45:_PIERCY-METCALF 115KV [4318]	P3	G-1/N-1	<8	<8	8	<8	<8	<8	<8	<8	<8	<8	<8	9	continue to monitor future load forecast
BRITTN 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A17:28:_BRITTON-MONTA VISTA 115KV [1170]	P3	G-1/N-1	<8	<8	8	<8	<8	<8	<8	<8	<8	<8	<8	6	continue to monitor future load forecast
CALTRAINSSJ 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	13	<8	<8	<8	<8	<8	<8	<8	<8	13	continue to monitor future load forecast
CP LECEF 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	15	continue to monitor future load forecast
EL PATIO 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	11	<8	<8	<8	<8	<8	<8	<8	<8	11	continue to monitor future load forecast
EVRGRN 1 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	10	<8	<8	<8	<8	<8	<8	<8	<8	11	continue to monitor future load forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)							Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast		2031 Summer Peak with High SJ Load
FMC 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	13	<8	<8	<8	<8	<8	<8	<8	<8	13	continue to monitor future load forecast
JENNINGS 60	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	10	<8	<8	<8	<8	<8	<8	<8	<8	11	continue to monitor future load forecast
LOS GATS 60	P1-2:A17:34:_MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	6	2	18	4	-2	0	2	11	4	2	2	20	continue to monitor future load forecast
MABURY 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A18:45:_PIERCY-METCALF 115KV [4318]	P3	G-1/N-1	<8	<8	8	<8	<8	<8	<8	<8	<8	<8	<8	9	continue to monitor future load forecast
MABURY 60	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	10	<8	<8	<8	<8	<8	<8	<8	<8	11	continue to monitor future load forecast
MCKEE 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A18:45:_PIERCY-METCALF 115KV [4318]	P3	G-1/N-1	<8	<8	9	<8	<8	<8	<8	<8	<8	<8	<8	10	continue to monitor future load forecast
MONTAGUE 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	13	<8	<8	<8	<8	<8	<8	<8	<8	14	continue to monitor future load forecast
MSFTSJDC 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	15	continue to monitor future load forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)							Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast		2031 Summer Peak with High SJ Load
NORTECH 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	14	<8	<8	<8	<8	<8	<8	<8	<8	15	continue to monitor future load forecast
NWK DIST 230	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	15	<8	<8	<8	<8	<8	<8	<8	<8	17	continue to monitor future load forecast
PIERCY 115	P1-2:A18:45:_PIERCY-METCALF 115KV [4318]	P1	N-1	7	2	11	6	3	4	4	8	5	5	2	11	continue to monitor future load forecast
SJB DG 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	12	<8	<8	<8	<8	<8	<8	<8	<8	13	continue to monitor future load forecast
SJB EF 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	12	<8	<8	<8	<8	<8	<8	<8	<8	12	continue to monitor future load forecast
SN JSE A 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	11	<8	<8	<8	<8	<8	<8	<8	<8	12	continue to monitor future load forecast
STONE 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	10	<8	<8	<8	<8	<8	<8	<8	<8	11	continue to monitor future load forecast
SWIFT 115	P1-1:A18:4:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A18:34:_SWIFT-METCALF 115KV [3900]	P3	G-1/N-1	<8	<8	7	<8	<8	<8	<8	<8	<8	<8	<8	9	continue to monitor future load forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)						Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		2026 SP High CEC Forecast	2031 Summer Peak with High SJ Load
TRIMBLE 115	P1-1:A18:4:_LECEFAST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:19:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<8	<8	13	<8	<8	<8	<8	<8	<8	<8	<8	14	continue to monitor future load forecast

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

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Permanent fault on Contra Costa-Moraga Nos. CK 1 & 2 230 kV lines	P7-1	DCTL	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Temporary fault on Contra Costa-Moraga Nos. CK 1 & 2 230 kV lines	P7-1	DCTL	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Permanent fault on Tesla-Newark 230kV and Tesla-Ravenswood 230kV lines	P7-1	DCTL	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Temporary fault on Tesla-Newark 230kV and Tesla-Ravenswood 230kV lines	P7-1	DCTL	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Metcalfe 500/230 kV #13 Transformer 3Ø fault with normal clearing.	P1-3	N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Metcalfe 500/230 kV #13 Transformer 3Ø fault with normal clearing with LMEC offline in the base case.	P3-3	G-1/N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Metcalfe 500/230 kV #13 Transformer SLG fault with delayed clearing.	P5-3	Non-Redundant Relay	Potential WECC/NERC criteria violation	No issue	No issue	No issue	No issue	No issue	Protection upgrade
Tesla-Newark 230 kV line 3Ø fault with normal clearing with Metcalfe 500/230 kV #13 Transformer offline in the base case.	P6-1	N-1-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Metcalfe 230 kV bus 3Ø fault with normal clearing with Metcalfe 500/230 kV #13 Transformer offline in the base case.	P6-2	N-1-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Contra Costa-Gateway 230 kV SLG fault with delayed clearing.	P5-2	Non-Redundant Relay	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Contra Costa-Gateway 230 kV SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-2	Stuck Breaker	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
TBC SLG fault with normal clearing.	P1-5	N-1	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Under Review
TBC SLG fault with normal clearing with LMEC offline in the base case.	P3-5	G-1/N-1	No issue	No issue	No issue	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
TBC SLG fault with normal clearing with Tesla-Newark 230 kV line offline in the base case.	P6-4	N-1-1	No issue	No issue	No issue	No issue	No issue	Potential WECC/NERC criteria violation	Sensitivity only
Newark 230 kV 3Ø fault with normal clearing.	P1-2	N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Tesla-Newark 230 kV line 3Ø fault with normal clearing with LMEC offline in the base case.	P3-2	G-1/N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required

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

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Monta Vista 230 kV SVD 3Ø fault with normal clearing.	P1-4	N-1	No issue	No issue	No issue	No issue	No issue	Potential WECC/NERC criteria violation	Sensitivity only
Monta Vista 230 kV SVD 3Ø fault with normal clearing with LMEC offline in the base case.	P3-4	G-1/N-1	No issue	No issue	No issue	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Monta Vista 230 kV SVD SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-4	Stuck Breaker	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Monta Vista 230 kV SVD SLG fault with delayed clearing.	P5-4	Non-Redundant Relay	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Ravenswood 230 kV SVD 3Ø fault with normal clearing with Monta Vista 230 kV SVD offline in the base case.	P6-3	Stuck Breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Metcalfe 230 kV bus SLG fault with normal clearing.	P2-2	Bus	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Metcalfe 230 kV line breaker SLG fault with normal clearing.	P2-3	Non-Bus-Tie Breaker	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Metcalfe 230 kV bus-tie breaker SLG fault with normal clearing.	P2-4	Bus-Tie Breaker	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Metcalfe 500/230 kV #13 Transformer SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-3	Stuck Breaker	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Metcalfe 230 kV bus SVD SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-5	Stuck Breaker	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Crocket 3Ø fault with normal clearing with LMEC offline in the base case.	P3-1	G-1/N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
LMEC 3Ø fault with normal clearing.	P1-1	N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
DEC 3Ø fault with normal clearing.	P1-1	N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Metcalfe 115 kV bus-tie breaker SVD SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-6	Stuck Breaker	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Metcalfe 115 kV bus SLG fault with delayed clearing.	P5-5	Non-Redundant Relay	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Protection upgrade

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

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Los Esteros SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-1	Stuck Breaker	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Los Esteros SLG fault with delayed clearing.	P5-1	Non-Redundant Relay	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)											Potential Mitigation Solutions	
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

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

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



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)											Potential Mitigation Solutions	
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

No single source substation with more than 100 MW

Study Area:
Thermal Overloads

PG&E Greater Fresno



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
(New) Los Banos-C560SS 230 kV Line	MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	Generation re	DCTL	2.52	9.94	1.06	50.32	81.22	8.79	102.17	59.43	Sensitivity only
	MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	2.27	8.63	0.53	50	80.67	7.48	Diverge	57.91	Sensitivity only
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	1.92	8.76	0.9	49.57	80.64	7.72	Diverge	57.99	Sensitivity only
(New)Oro Loma-Mendota 115kV Line	PANOCHÉ1 115KV SECTION 1D	P2	Bus/Breaker	45.32	45.2	48.3	89.51	96.75	46.03	16.95	102.45	Sensitivity only
	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	146.01	<100	<100	98.84	Generation re-dispatch
	PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2-1	Line Section w/o Fault	23.53	24.69	26.9	106.81	27.52	24.69	23.51	34.13	Generation re-dispatch
	PANOCHÉ2 115KV SECTION 2D	P2	Bus/Breaker	23.55	24.7	26.9	104.5	28.44	24.7	23.54	38.26	Generation re-dispatch
(New)Woodward-Shepherd 115 kV Line (34414 34348)	HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	22.09	15.13	22.82	89.83	104.2	15.24	8.62	100.06	Generation re-dispatch
	HERNDON-BARTON 115KV [1750] & HERNDON-MANCHESTER 115KV [1780]	P7	DCTL	32.96	24.85	32.04	76.92	105.31	25.14	10.1	93.62	Generation re-dispatch
	BARTON-AIRWAYS-SANGER 115KV [1060] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	13.88	16.89	22.04	106.3	98.97	16.8	13.79	105.62	Generation re-dispatch
Atwater-Merced 115 kV Line (34110 34144)	WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Diverge	Diverge	<100	23.62	38.78	Diverge	41.39	7.72	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	<100	23.73	38.77	Diverge	41.4	7.9	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
Barton-Airways-Sanger 115 kV Line (34359 34408)	MUSTANG SW STA-GREGG 230KV [4700] & TRANQUILLITY SW STA-KEARNEY 230KV [5380]	P6	N-1-1	<100	<100	<100	107.62	<100	<100	<100	<100	Generation re-dispatch
	HERNDON 115KV SECTION 2D	P2	Bus/Breaker	38.66	26.76	34.64	78.58	111.47	27.04	6.18	105.26	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & MC CALL-CHSR09SWSTA #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	103.93	<100	<100	<100	Generation re-dispatch
	TRANQUILLITY SW STA-KEARNEY 230KV [5380] (MCMULLN1-KEARNEY)	P2-1	Line Section w/o Fault	11.2	18.13	21.6	Diverge	56	18.45	4.91	83.81	Generation re-dispatch
	MUSTANG SW STA-GREGG 230KV [4700] (GREGG-HENTAP1)	P2-1	Line Section w/o Fault	21.02	35.43	33.36	Diverge	58.53	35.92	14.09	87.6	Generation re-dispatch
	HENTAP1-MUSTANGSS #1 230KV [0] & TRANQTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	30.71	45.62	44.7	107.19	18.98	46.59	5.96	66.85	Generation re-dispatch
	HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	25.63	40.53	39.46	101.77	21.12	41.38	5.58	67.35	Generation re-dispatch
Ballota - Warnerville 230 kV Line	MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	28.5	25.55	16.59	53.4	54.28	25.19	100.83	97.63	Sensitivity only
	Lines #7 & #8 - Warnerville-Standiford 115kV Out	P7	DCTL	60.33	28.33	20.39	55.9	48.92	28.12	132.95	73.58	Sensitivity only

Study Area:
Thermal Overloads

PG&E Greater Fresno



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Mendota - Warnerville 230 kV Line	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	35.54	28.57	18.43	56.86	61.2	28.05	Diverge	112	Sensitivity only
Chowchilla-Kerckhoff #2 115 kV Line (34105 34121)	WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Diverge	Diverge	<100	47.47	48.65	Diverge	39.67	54.96	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	<100	50.01	48.58	Diverge	40.15	56.9	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	PANOCHÉ-MENDOTA 115KV [3230] & WILSON-LE GRAND 115KV [4170]	P6	N-1-1	103.8	<100	<100	<100	<100	<100	196.23	80.07	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	70.57	42.77	66.04	6.53	116.6	43.48	3.29	58.85	Generation re-dispatch
	HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	69.57	41.82	65.04	6.51	117.53	42.52	4.02	59.67	Continue to Monitor
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	5.45	28.17	5.55	38.3	97.27	26.97	Diverge	55.59	Sensitivity only
	DAIRYLAND-MENDOTA 115KV [1360] & WILSON-LE GRAND 115KV [4170]	P6	N-1-1	<100	<100	<100	<100	104.77	<100	80.6	133.38	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
Dairyland-Mendota 115 kV Line (34150 34154)	PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	87.69	46.05	46.98	1.54	19.12	46.54	107.9	40.83	Sensitivity only
	PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2	Bus/Breaker	88.33	46.1	48.65	10.99	25.16	46.6	107.99	43.67	Sensitivity only
Dos Amigos PP-Panoche #3 230 kV Line	PANOCHÉ 230KV - SECTION 1E & 1D	P2	Bus/Breaker	48.36	22.62	14.24	5.2	51.46	22.17	101.34	43.52	Sensitivity only
	PADREFLATSSS 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	39.84	19.58	10.92	15.46	46.87	19.21	103.34	37.44	Sensitivity only
	MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	36.04	20.42	12.42	10.34	51.91	19.95	106.55	43.22	Sensitivity only
	LOS BANOS-PADRE FLAT SW STA 230KV [1092]	P1	N-1	39.89	19.61	10.97	15.44	51.45	19.24	112.13	42.36	Sensitivity only
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	56.67	31.15	19.92	19.19	72.74	30.11	Diverge	64.36	Sensitivity only
El Capitan-Wilson 115 kV Line (34136 34138)	ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED & WILSON-ATWATER #2 115KV [4160]	P6	N-1-1	114.4	116.07	118.81	<100	<100	117.26	<100	<100	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
Evabequer 115/70/13.8 kV Transformer (34112 34223)	WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Diverge	Diverge	<100	16.11	38.23	Diverge	25.12	12.35	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan

Study Area:
Thermal Overloads

PG&E Greater Fresno



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Excchequer 115/70/15.0 kV Transformer (34112 34292)	WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	<100	17.16	38.23	Diverge	25.13	13.04	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
Exchequer-Le Grand 115 kV Line (34112 34116)	WILSON-MERCED #1 115KV [4180] & EXCCEQUR 70/115KV TB 1	P6	N-1-1	100.07	100.08	<100	<100	<100	100.07	<100	<100	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Diverge	Diverge	<100	16.76	105.11	Diverge	107.94	19.31	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	<100	13.83	105.08	Diverge	107.85	17.13	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	MUSTANG SW STA-GREGG 230KV [4700] & EXCCEQUR 70/115KV TB 1	P6	N-1-1	<100	<100	<100	117.52	<100	<100	<100	<100	Generation re-dispatch
	MERCED 115KV SECTION 1D	P2	Bus/Breaker	58.39	62.19	97.43	37.56	66.38	61.94	120.39	64.81	Sensitivity only
	MERCED 115 KV #1 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	58.39	49.8	97.08	29.64	53.7	49.57	120.38	38.97	Sensitivity only
	MERCED - 1D 115KV & ATWATER-LIVINGSTON-MERCED LINE	P2	Bus/Breaker	58.39	62.19	97.42	37.52	66.38	61.94	120.38	64.81	Sensitivity only
	EXCCEQUR 70/115KV TB 1	P1	N-1	71.92	77.94	111.19	59.25	32.32	78.96	117.2	48.78	Continue to Monitor future forecast
Gates-Gregg 230 kV Line	PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7	DCTL	6.21	19.77	11.41	49.5	86.32	18.33	110.3	71.17	Sensitivity only
	PANOCHÉ 230KV - SECTION 1D & 2D	P2	Bus/Breaker	9.63	21.43	13.37	49.58	85.73	19.95	110.57	71.67	Sensitivity only
	LOSBANOS 500/230KV TB 1 & GATES-MUSTANG SW STA #1 230KV [2604]	P6	N-1-1	<100	<100	<100	58.36	114.23	<100	99.51	105.08	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	17.94	15.13	23.06	16.92	101.02	14.91	62.67	68.9	Generation re-dispatch
	GATES-MUSTANG SW STA #1 230KV [2604]	P1	N-1	14.53	39.61	29.27	56.18	107.88	37.64	137.06	99.25	Generation re-dispatch
	GATES F 230KV - MIDDLE BREAKER BAY 5	P2	Bus/Breaker	14.36	39.52	29.27	56.18	107.79	37.56	136.49	99.25	Generation re-dispatch
	GATES F 230KV - MIDDLE BREAKER BAY 4	P2	Bus/Breaker	14.25	39.8	29.1	56.05	107.95	37.85	136.7	99.18	Generation re-dispatch
Gregg-Ashlan 230 kV Line (30810 30845)	GREGG-HERNDON #1 230KV [4830] & GREGG-HERNDON #2 230KV [4840]	P6	N-1-1	99.49	99.55	99.52	<100	130.73	99.54	93.55	72.63	Generation re-dispatch
GWF-Kingsburg 115 kV Line (34429 34428)	MUSTANG SW STA-GREGG 230KV [4700] & MUSTANG SW STA-MCCALL 230KV [4710]	P6	N-1-1	<100	<100	<100	<100	<100	<100	99.47	Diverge	Sensitivity only
	MUSTANG SW STA-GREGG 230KV [4700] & CHSR09SWSTA-MUSTANGSS 230KV [0]	P6	N-1-1	<100	<100	<100	<100	154.81	<100	<100	<100	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	44.1	63.4	71.59	81.21	108.34	65.74	31.99	23.24	Generation re-dispatch

Study Area:
Thermal Overloads

PG&E Greater Fresno



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Henrietta 230/115 kV Transformer #3 (34430 30881)	TRANQUILLITY SW STA-HELM 230KV [5370] & MC CALL-CHSR09SWSTA #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	127.61	<100	<100	<100	Generation re-dispatch
	Q1036SPV1 34.50KV GEN UNIT 1 & CHSR09SWSTA-MUSTANGSS 230KV [0]	P3	G1/N1	<100	<100	<100	<100	111.21	<100	<100	<100	Generation re-dispatch
	PANOACHE-TRANQLTYSS #1 230KV [0] & PANOACHE-TRANQLTYSS #2 230KV [0]	P7	DCTL	7.9	6.89	29.2	31.04	109.96	8.28	82.98	68.55	Generation re-dispatch
	PANOACHE 230KV - SECTION 1D & 2D	P2	Bus/Breaker	8.47	5.56	27.68	30.39	109.44	6.93	82.88	69.02	Generation re-dispatch
	MUSTANG SW STA-MCCALL 230KV [4710] (HENTAP2-MUSTANGSS)	P2-1	Line Section w/o Fault	9	7.03	28.18	27.2	109.69	8.64	67.24	64.61	Generation re-dispatch
	MUSTANG SW STA-GREGG 230KV [4700] & MUSTANG SW STA-MCCALL 230KV [4710]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	Diverge	Sensitivity only
	MC CALL-CHSR09SWSTA #1 230KV [0] & HELM-MCCALL 230KV [4860]	P6	N-1-1	<100	<100	<100	<100	125.15	<100	<100	<100	Generation re-dispatch
	HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	19.41	29.21	49.97	9.91	103.71	30.53	39.84	67.67	Generation re-dispatch
	HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	18.81	24.8	46.48	14	109.28	26.18	47.7	68.54	Generation re-dispatch
	HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	18.54	24.47	46.12	13.82	109.56	25.84	47.94	68.76	Continue to Monitor
	HELM-MCCALL 230KV [4860] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	8.81	8.23	29.66	30.4	101.18	9.58	64.08	57.66	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	9.71	15.24	41.14	47.88	150.76	17.56	85.11	77.88	Generation re-dispatch
CHSR09SWSTA-MUSTANGSS 230KV [0]	P1	N-1	<100	7.06	28.23	<100	109.77	8.66	<100	<100	Generation re-dispatch	
Henrietta-GWF 115 kV Line (34430 34519)	TRANQUILLITY SW STA-HELM 230KV [5370] & MC CALL-CHSR09SWSTA #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	125.09	<100	<100	<100	Generation re-dispatch
	Q1158S 0.42KV GEN UNIT 1 & CHSR09SWSTA-MUSTANGSS 230KV [0]	P3	G1/N1	<100	<100	<100	<100	110.03	<100	<100	<100	Generation re-dispatch
	PANOACHE-TRANQLTYSS #1 230KV [0] & PANOACHE-TRANQLTYSS #2 230KV [0]	P7	DCTL	7.86	6.46	28.1	30.15	108.87	7.93	82.89	67.31	Generation re-dispatch
	PANOACHE 230KV - SECTION 1D & 2D	P2	Bus/Breaker	8.43	4.98	26.57	29.55	108.47	6.49	83.05	67.78	Generation re-dispatch
	MUSTANG SW STA-MCCALL 230KV [4710] (HENTAP2-MUSTANGSS)	P2-1	Line Section w/o Fault	8.97	6.54	27.07	26.25	107.5	8.25	67.21	63.38	Generation re-dispatch
	MC CALL-CHSR09SWSTA #1 230KV [0] & HELM-MCCALL 230KV [4860]	P6	N-1-1	<100	<100	<100	<100	122.61	<100	<100	<100	Generation re-dispatch
	HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	19.34	28.66	48.56	8.93	101.98	29.97	39.72	66.59	Generation re-dispatch
	HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	18.75	24.44	45.14	13.75	107.69	25.8	47.79	67.46	Generation re-dispatch
	HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	18.49	24.11	44.79	13.44	107.97	25.47	48.03	67.67	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	9.67	14.94	39.95	46.91	148.27	17.27	85.18	76.47	Generation re-dispatch

Study Area:

PG&E Greater Fresno

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
	HELM-MCCALL 230KV [4860] & CHSR09SWSTA-MUSTANGSS 230KV [0]	P6	N-1-1	<100	<100	<100	<100	141.25	<100	<100	<100	Generation re-dispatch
	CHSR09SWSTA-MUSTANGSS 230KV [0]	P1	N-1	<100	6.54	27.1	<100	107.57	8.24	<100	<100	Generation re-dispatch
	CHSR09SWSTA 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	<100	6.54	27.1	<100	107.57	8.24	<100	<100	Generation re-dispatch
	MUSTANG SW STA-GREGG 230KV [4700] & CHSR09SWSTA-MUSTANGSS 230KV [0]	P6	N-1-1	<100	<100	<100	<100	154.89	<100	<100	<100	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	7.98	9.08	27.13	33.7	108.34	11.33	31.99	23.3	Generation re-dispatch
Herndon-Ashlan 230 kV Line	GREGG-HERNDON #2 230KV [4840] & GREGG-HERNDON #1 230KV [4830]	P6	N-1-1	72.83	71.6	69.59	<100	120.26	71.45	<100	78.3	Generation re-dispatch
Herndon-Barton 115 kV Line (34408 34412)	TRANQUILITY SW STA-HELM 230KV [5370] & MC CALL-CHSR09SWSTA #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	101.92	<100	<100	<100	Generation re-dispatch
	HERNDON 115KV SECTION 2D	P2	Bus/Breaker	78.68	67.62	75.46	58.78	117.61	68.18	32.43	102.92	Generation re-dispatch
	HERNDON - 2D 115KV & HERNDON-WOODWARD LINE	P2	Bus/Breaker	78.26	67.2	75.02	59.13	117.98	67.77	32.05	103.32	Generation re-dispatch
	HERNDON - 2D 115KV & HERNDON-BULLARD #2 LINE	P2	Bus/Breaker	78.71	67.63	75.49	58.73	117.61	68.19	32.42	102.92	Project: Herndon-Bullard 115 kV Reconductor In-service date: 05/24 Short term: Action plan
	HELM-MCCALL 230KV [4860] & MC CALL-CHSR09SWSTA #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	110.21	<100	<100	<100	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	58.69	49.84	60.43	29.15	104.54	51.1	8.42	64.02	Generation re-dispatch
Herndon-Bullard #1 115 kV Line (34409 34416)	HERNDON-BULLARD #1 115KV [1760] (HERNDON-PNDLJ1)	P2-1	Line Section w/o Fault	119.58	66.53	72.27	43.73	13.75	67.04	70.63	18.48	Project: Herndon-Bullard 115 kV Reconductor In-service date: 05/24 Short term: Action plan
	HERNDON 115KV SECTION 1D	P2	Bus/Breaker	119.65	66.57	72.23	43.99	13.82	67.08	70.53	18.55	Project: Herndon-Bullard 115 kV Reconductor In-service date: 05/24 Short term: Action plan
Herndon-Manchester 115 kV Line (34410 34412)	HELM-MCCALL 230KV [4860] & MC CALL-CHSR09SWSTA #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	100.8	<100	<100	<100	Generation re-dispatch
Herndon-Woodward 115 kV Line (34414 34422)	WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	<100	25.57	96.74	Diverge	4.79	67.44	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	62.84	55.35	63.97	53.53	127.27	55.92	8.77	97.62	Generation re-dispatch
	HERNDON-BARTON 115KV [1750] & HERNDON-MANCHESTER 115KV [1780]	P7	DCTL	76.54	69.21	78.2	41.14	128.46	69.9	17.84	91.17	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & MC CALL-CHSR09SWSTA #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	109	<100	<100	<100	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	50.86	47.88	57.73	20.13	103.61	48.96	17.64	56.15	Generation re-dispatch

Study Area:
Thermal Overloads

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
	BARTON-AIRWAYS-SANGER 115KV [1060] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	43.06	36.06	43.96	69.32	121.88	36.48	1.08	103.22	Generation re-dispatch
HW_TAP-RB_TAP8 115kV Line (CCSF) (36998 36975)	COTTLE-MELONES 230KV [4530] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	69.48	29.59	22.22	25.46	61.65	29.31	123.42	86.48	Sensitivity only
	BELLOTA-COTTLE 230KV [4360] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	65.96	27.64	20.33	27.43	62.15	27.34	122.24	85.49	Sensitivity only
Intake-MOC_TAP5 230kV Line (CCSF)	PANOCHÉ-MENDOTA 115KV [3230] & Line #6-Intake-Warnerville 230kV Line Out	P6	N-1-1	<100	<100	<100	Diverge	<100	<100	<100	<100	Generation re-dispatch
	BARTON-AIRWAYS-SANGER 115KV [1060] & Line #6-Intake-Warnerville 230kV Line Out	P6	N-1-1	<100	<100	<100	95.7	<100	<100	<100	Diverge	Sensitivity only
	PANOCHÉ-MENDOTA 115KV [3230] & Line #5-Intake-Warnerville 230kV Line Out	P6	N-1-1	<100	<100	<100	Diverge	<100	<100	<100	<100	Generation re-dispatch
	BARTON-AIRWAYS-SANGER 115KV [1060] & Line #5-Intake-Warnerville 230kV Line Out	P6	N-1-1	<100	<100	<100	95.7	<100	<100	<100	Diverge	Sensitivity only
JACKSONSWSTA-Kingsburg #1 115 kV	MUSTANG SW STA-GREGG 230KV [4700] & CHSR09SWSTA-MUSTANGSS 230KV [0]	P6	N-1-1	<100	<100	<100	<100	152.55	<100	<100	<100	Generation re-dispatch
Kerckhoff - Clovis - Sanger #1 115 kV Line (Woodward-Shepherd) (34360 34348)	MUSTANG SW STA-GREGG 230KV [4700] & TRANQUILLITY SW STA-KEARNEY 230KV [5380]	P6	N-1-1	<100	<100	<100	101.5	<100	<100	<100	<100	Generation re-dispatch
	KERCKHOFF-CLOVIS-SANGER #2 115KV [1900] & CHOWCHILLA-KERCKHOFF 115KV [1250] MOAS OPENED ON SHARON T_OAKH_JCT	P6	N-1-1	<100	<100	<100	<100	<100	<100	100.72	<100	Sensitivity only
	HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	4.93	10.34	5.38	98.17	93.07	10.2	5.98	101.32	Generation re-dispatch
	BARTON-AIRWAYS-SANGER 115KV [1060] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	21.62	29.46	24.73	114.32	87.84	29.47	15.62	106.94	Generation re-dispatch
Kingsriver-Sanger-Reedley 115 kV Line (34366 34389)	MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE & SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY	P6	N-1-1	147.49	140.03	159.29	99.59	<100	144.61	<100	<100	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
Le Grand-Dairyland 115 kV Line	PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	89.25	67.23	69.58	12.8	36.19	68.12	123.97	59.57	Sensitivity only
	PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2	Bus/Breaker	89.55	67.26	71.28	25.76	42.49	68.15	123.94	62.61	Sensitivity only
	PANOCHÉ1 115KV SECTION 1D	P2	Bus/Breaker	89.97	67.22	69.59	13.54	36.92	68.11	123.93	59.43	Sensitivity only
	PANOCHÉ1 - 1D 115KV & PANOCHÉ-MENDOTA LINE	P2	Bus/Breaker	89.99	67.22	69.59	13.52	36.96	68.11	123.97	59.43	Sensitivity only
	KERCKHOFF-CLOVIS-SANGER #2 115KV [1900] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	<100	<100	115.59	<100	Sensitivity only
Los Banos-Dos Amigos 230 kV Line	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	30.42	27.78	8.07	57	102.26	25.92	Diverge	92.35	Install Redundant protection
LOS BANOS 230KV SECTION 2D	LOS BANOS 230KV SECTION 2D	P2	Bus/Breaker	34.57	26.96	11.83	52.8	102.54	26.09	131.97	84.51	Generation re-dispatch
	LOS BANOS-PADRE FLAT SW STA 230KV [1092]	P1	N-1	30.05	24.62	9.53	35.02	80.29	23.97	101.44	66.3	Sensitivity only

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Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Los Banos-Panoche #2 230 kV Line	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	46.67	44.66	25.12	41.53	117.41	42.83	Diverge	104.57	Install Redundant protection
Manchester - Airways - Sanger 115 kV Line (34410 34368)	MUSTANG SW STA-GREGG 230KV [4700] & TRANQUILLITY SW STA-KEARNEY 230KV [5380]	P6	N-1-1	<100	<100	<100	109.41	<100	<100	<100	<100	Generation re-dispatch
	KERCKHOFF-CLOVIS-SANGER #1 115KV [1890] & BARTON-AIRWAYS-SANGER 115KV [1060]	P6	N-1-1	<100	<100	<100	Diverge	<100	<100	<100	99.61	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & MC CALL-CHSR09SWSTA #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	111.41	<100	<100	<100	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	28.85	17.59	30.89	9.33	105.39	18.66	31.6	72.05	Generation re-dispatch
McCall 230/115 kV Transformer #2	MC CALL 230KV - SECTION 1D & 2D	P2	Bus/Breaker	83.95	78.04	83.76	108.89	4.95	78.95	35.67	50.8	Generation re-dispatch
McCall 230/115 kV Transformer #3	MC CALL 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	83.34	82.2	91.15	125.44	19.95	83.56	38.65	44.77	Generation re-dispatch
McCall-Kingsburg #1 115 kV Line (34370 34385)	MUSTANG SW STA-GREGG 230KV [4700] & MUSTANG SW STA-MCCALL 230KV [4710]	P6	N-1-1	<100	<100	<100	<100	<100	<100	82.02	Diverge	Sensitivity only
	MUSTANG SW STA-GREGG 230KV [4700] & CHSR09SWSTA-MUSTANGSS 230KV [0]	P6	N-1-1	<100	<100	<100	<100	144.61	<100	<100	<100	Generation re-dispatch
McCall-Kingsburg #2 115 kV Line	MUSTANG SW STA-GREGG 230KV [4700] & MUSTANG SW STA-MCCALL 230KV [4710]	P6	N-1-1	<100	<100	<100	<100	<100	<100	76.41	Diverge	Sensitivity only
	MUSTANG SW STA-GREGG 230KV [4700] & CHSR09SWSTA-MUSTANGSS 230KV [0]	P6	N-1-1	<100	<100	<100	<100	140.6	<100	<100	<100	Generation re-dispatch
McCall-Reedley 115 kV Line (Reedley-Wahtoke) (34382 34380)	KINGS RIVER-SANGER-REEDLEY 115KV [2030] & SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY	P6	N-1-1	111.63	107.48	112.71	<100	<100	109.81	<100	<100	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
McCall-Sanger #2 115 kV Line (34366 34370)	MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	44.48	50.81	57.18	100.56	5.79	51.96	21.85	47.44	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
McCall-Sanger #3 115 kV Line (34366 34370)	MUSTANG SW STA-GREGG 230KV [4700] (GREGG-HENTAP1)	P2-1	Line Section w/o Fault	30.73	41.63	44.16	Diverge	9.94	42.63	12.95	51.86	Generation re-dispatch
	MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	43.48	52.99	60.41	125.69	10.04	54.21	25.99	65.49	Generation re-dispatch
	MC CALL 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	49.54	56.57	63.7	111.97	6.44	57.85	24.48	52.82	Generation re-dispatch
	HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	37.17	49.11	51.92	101.26	21.27	50.47	16.11	36.95	Generation re-dispatch
TRANQLTYSS-HELM #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	TRANQLTYSS-HELM #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	2.74	2.74	0.49	58.14	105.39	2.74	2.73	59.71	Generation re-dispatch
	TRANQLTYSS 230KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	2.74	2.74	0.49	54.3	101.44	2.74	2.73	60.44	Generation re-dispatch
	PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7	DCTL	2.74	2.74	0.49	71.74	134.36	2.74	2.74	77.91	Generation re-dispatch

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Mendota-San Joaquin-Helm 70 kV Line	PANOCHÉ-MENDOTA 115KV [3230] & LE GRAND-DAIRYLAND 115KV [2100] MOAS OPENED ON CHWCHLASLRJT_DAIRYLND	P6	N-1-1	<100	<100	<100	108.15	<100	<100	<100	<100	Generation re-dispatch
	PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2	Bus/Breaker	42.78	9.36	28.77	134.09	74.21	9.68	39.52	51.94	Generation re-dispatch
	PANOCHÉ 230KV - SECTION 1D & 2D	P2	Bus/Breaker	2.74	2.74	0.48	61.93	134.02	2.74	2.74	78.14	Generation re-dispatch
	NORTHSTAR 0.36KV GEN UNIT 1 & TRANQUILLITY SW STA-HELM 230KV [5370]	P3	G1/N1	<100	<100	<100	<100	104.32	<100	<100	<100	Generation re-dispatch
Merced 115/70 kV Transformer #2 (34202 34146)	WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Diverge	Diverge	<100	29.11	92.33	Diverge	73.68	62.14	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	<100	32.91	92.31	Diverge	73.69	64.8	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	PANOCHÉ-MENDOTA 115KV [3230] & WILSON-LE GRAND 115KV [4170]	P6	N-1-1	<100	<100	<100	<100	<100	<100	106.95	<100	Sensitivity only
Merced Falls-Exchequer 70 kV Line (34321 34230)	WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Diverge	Diverge	<100	55.6	196.93	Diverge	142.21	59.22	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	<100	60.77	196.92	Diverge	142.22	62.85	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	PANOCHÉ-MENDOTA 115KV [3230] & WILSON-LE GRAND 115KV [4170]	P6	N-1-1	65.31	<100	<100	<100	<100	<100	144.87	<100	Sensitivity only
	DAIRYLAND-MENDOTA 115KV [1360] & WILSON-LE GRAND 115KV [4170]	P6	N-1-1	<100	<100	<100	<100	<100	<100	90.15	103.69	Sensitivity only
Merced-Merced Falls 70 kV Line (34202 34230)	WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Diverge	Diverge	<100	44.41	192.19	Diverge	147.9	68.97	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	<100	49.56	192.19	Diverge	147.91	72.76	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	PANOCHÉ-MENDOTA 115KV [3230] & WILSON-LE GRAND 115KV [4170]	P6	N-1-1	<100	<100	<100	<100	<100	<100	144.17	<100	Sensitivity only
MOC_TAP5-Warnerville 230kV Line (CCSF)	WOODWARD-SHEPHERD 115KV [1895] & Line #6-Intake-Warnerville 230kV Line Out	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	Diverge	Sensitivity only
	PANOCHÉ-MENDOTA 115KV [3230] & Line #6-Intake-Warnerville 230kV Line Out	P6	N-1-1	<100	<100	<100	Diverge	<100	<100	<100	<100	Generation re-dispatch
	WOODWARD-SHEPHERD 115KV [1895] & Line #5-Intake-Warnerville 230kV Line Out	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	Diverge	Sensitivity only

Study Area:

PG&E Greater Fresno

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
	PANOCHÉ-MENDOTA 115KV [3230] & Line #5-Intake-Warnerville 230kV Line Out	P6	N-1-1	<100	<100	<100	Diverge	<100	<100	<100	<100	Generation re-dispatch
MOSSLNSW-LASAGUILASS #2 230KV	PANOCHÉ 230KV - SECTION 2E & 1E	P2	Bus/Breaker	23.71	14.47	7.46	32.38	66.13	14.49	105.56	70.84	Sensitivity only
	LOSBANOS 230KV - SECTION 1D & 2D	P2	Bus/Breaker	18.37	10.73	4.99	41.16	75.95	10.77	120.03	80.85	Sensitivity only
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	25.39	20.6	9.98	34.72	88.59	20.02	Diverge	97.3	Sensitivity only
NORTHSTAR-Mendota 115 kV Line	Q1127-MENDOTA #1 115KV [0]	P1	N-1	86.62	9.31	15.75	0.98	72.99	10.08	101.02	72.32	Sensitivity only
	MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	85.52	9.06	14.7	0.98	71.36	9.9	100.43	71.16	Sensitivity only
	MENDOTA 115KV - MIDDLE BREAKER BAY 5	P2	Bus/Breaker	86.62	9.31	15.75	0.98	72.99	10.08	101.02	72.32	Sensitivity only
	HELMS-GREGG #1 230KV [4870] & HELMS-GREGG #2 230KV [4880]	P7	DCTL	85.8	12.58	16.19	0.97	72.01	13.39	101.27	70.61	Sensitivity only
	HELMS PP2 230KV SECTION 1E	P2	Bus/Breaker	85.73	9.78	15.37	0.98	72.37	10.5	100.32	71.16	Sensitivity only
Panoche-Gates 230 kV Line #1	MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	59.56	43.67	42.33	32.33	64.9	41.47	Diverge	68.4	Sensitivity only
Panoche-Gates 230 kV Line #2	MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	59.56	43.67	42.33	32.33	64.9	41.47	Diverge	68.4	Sensitivity only
Panoche-Lasaguilass 230 kV Line #2	PANOCHÉ 230KV - SECTION 2E & 1E	P2	Bus/Breaker	20.16	1.96	18.51	56.59	62.76	2.25	103.77	51.28	Sensitivity only
Panoche-Mendota 115 kV Line (34157 34155)	WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Diverge	Diverge	<100	35.73	80.82	Diverge	114.4	61.6	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	<100	34.8	80.75	Diverge	114.57	62.34	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON-LE GRAND 115KV [4170]	P1	N-1	58.92	33.4	31.3	35.66	69.19	34.2	109.95	61.5	Sensitivity only
	WILSON A 115KV SECTION 1D	P2	Bus/Breaker	58.15	33.8	<100	35.73	69.36	34.62	109.65	61.6	Sensitivity only
	WILSON A - 1D 115KV & WILSONSTCOM-WILSON A #1 LINE	P2	Bus/Breaker	58.15	33.8	<100	35.73	69.36	34.62	109.65	61.6	Sensitivity only
	PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7	DCTL	47.82	37.28	38.19	57.74	84.99	38.24	111.38	63.58	Sensitivity only
	PANOCHÉ 230KV - SECTION 1D & 2D	P2	Bus/Breaker	45.59	33.84	34.72	48.72	83.39	34.66	116.8	61.07	Sensitivity only
	MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	51.52	30.08	31.07	49.04	72.8	31.07	113.38	61.69	Sensitivity only
	MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	51.59	29.52	30.59	49.33	73.03	30.5	Diverge	62.07	Sensitivity only
	MELONES-WILSON 230KV [5080] & WARNERVILLE-WILSON 230KV [5870]	P7	DCTL	44.4	40.34	41.12	51.05	69.87	41.23	103.35	51.67	Sensitivity only
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	48.79	31.75	<100	47.52	69.33	32.6	Diverge	57.47	Sensitivity only
COTTLE-MELONES 230KV [4530] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	55.14	28.11	29.14	44.81	65.48	28.82	104.82	51.58	Sensitivity only	

Study Area:
Thermal Overloads

PG&E Greater Fresno



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
	BELLOTA-COTTLE 230KV [4360] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	53.73	29.62	30.59	46.28	65.91	30.37	104.1	51.15	Sensitivity only
Panoche-PADREFLATSSS 230 kV Line	PANOACHE 230KV SECTION 2E	P2	Bus/Breaker	38.64	20.77	8.96	25.42	50.76	20.27	102.56	38.55	Sensitivity only
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	41.38	25.51	14.35	23.76	63.87	24.47	Diverge	56.13	Sensitivity only
Panoche-Schindler #1 115 kV Line (34155 34350)	TRANQUILLITY SW STA-HELM 230KV [5370] & PANOACHE-EXCELSIOR SW STA #2 115KV [3260]	P6	N-1-1	<100	<100	<100	<100	94.92	<100	<100	104.5	Sensitivity only
	PANOACHE-EXCELSIOR SW STA #2 115KV [3260] (CHENYT-EXCELSIORSS)	P2-1	Line Section w/o Fault	91.59	35.73	77.97	27.26	83.67	35.68	3.21	100.39	Sensitivity only
	PANOACHE-EXCELSIOR SW STA #2 115KV [3260]	P1	N-1	89.69	33.84	76.15	27.26	83.66	33.83	3.2	100.38	Sensitivity only
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	92.56	34.27	<100	27.36	89.95	34.91	Diverge	101.2	Sensitivity only
	EXCELSIORSS 115KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	89.69	33.84	76.15	27.26	83.66	33.83	3.2	100.38	Sensitivity only
Panoche-Schindler #2 115 kV Line (34149 34158)	TRANQUILLITY SW STA-HELM 230KV [5370] & PANOACHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOACHE1_KAMM	P6	N-1-1	<100	<100	<100	<100	124.24	<100	<100	103	Generation re-dispatch
	PANOACHE1 115KV SECTION 1D	P2	Bus/Breaker	30.2	23.63	26.69	27.2	83.5	23.59	9.48	103.1	Sensitivity only
	PANOACHE1 - 1D 115KV & PANOACHE-MENDOTA LINE	P2	Bus/Breaker	30.2	23.63	26.69	27.21	83.5	23.59	9.48	103.1	Sensitivity only
	PANOACHE1 - 1D 115KV & PANOACHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	30.2	23.63	26.69	27.2	83.5	23.59	9.48	103.1	Sensitivity only
	PANOACHE1 - 1D 115KV & PANOACHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	30.2	23.63	26.69	27.2	83.5	23.59	9.48	103.1	Sensitivity only
RB_TAP8-Stanford 115kV Line (CCSF)	COTTLE-MELONES 230KV [4530] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	68.9	29.29	21.94	26.21	61.41	29.01	122.81	85.72	Sensitivity only
	BELLOTA-COTTLE 230KV [4360] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	65.38	27.34	20.05	28.19	61.91	27.04	121.63	84.72	Sensitivity only
Reedley 115/70 kV Transformer #2 (34492 34380)	REEDLEY 115KV - RING R5 & R4	P2	Bus/Breaker	98.41	97.73	99.76	69.09	24.43	100.1	54.24	26.05	Sensitivity only
Sanger-Reedley 115 kV Line (34487 34490)	KINGS RIVER-SANGER-REEDLEY 115KV [2030] & MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	108.63	103.21	111.27	<100	<100	105.34	<100	<100	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
Schindler 115/70 kV Transformer #1 (34562 34354)	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	122.39	62.51	113.03	16.07	82.72	63.22	Diverge	54.71	Redundant Relay Project
	GATES D 230KV SECTION 2D	P2	Bus/Breaker	104.79	46.77	102.23	13.51	71.64	47.76	10.55	44.91	Operating solution available
	PANOACHE-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOACHE2 115KV [3231]	P7	DCTL	59.66	8.01	58.46	35.88	102.85	8.64	21.09	151.41	Generation re-dispatch

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		
	PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	8.3	44.19	12.44	36.48	102.43	43.53	20.7	151.02	Generation re-dispatch	
	EXCELSIORSS-PANOCH1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7	DCTL	36.87	5.7	36.13	22.31	89.14	6.2	38.07	117.96	Sensitivity only	
Schindler-Coalinga #2 70 kV Line (34561 34566)	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	114.33	65.46	99.51	23.89	30.78	65.94	Diverge	12.18	Redundant Relay Project	
	PANOCH1-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7	DCTL	43.72	23.01	45.1	16.31	99.69	23.05	55.87	126.89	Sensitivity only	
	PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	19.68	49.92	9.45	25.02	105.23	49.61	55.91	130.13	Generation re-dispatch	
	MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	60.06	50.91	43.63	19.46	87.43	50.32	85.12	100.87	Sensitivity only	
	GATES-MUSTANG SW STA #1 230KV [2604] & GATES-MUSTANG SW STA #2 230KV [2605]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	101.1	Sensitivity only
	EXCELSIORSS-PANOCH1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7	DCTL	28.84	21.97	27.39	16.95	93.63	22.01	69.6	111.08	Sensitivity only	
Schindler-Huron-Gates 70 kV Line (34559 34560)	SCHINDLR 115KV - RING R1 & R3	P2	Bus/Breaker	106.21	76.78	106.27	63.8	66.6	77.83	39.75	67.66	Operating solution available	
	PANOCH1-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7	DCTL	133.87	77.74	132.84	72.96	113.92	79.07	18.19	131.37	Operating solution available	
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	120.42	47.6	114.75	10.32	52.22	48.32	Diverge	45.19	Redundant Relay Project	
	GATES D 230KV SECTION 2D	P2	Bus/Breaker	104.42	34.7	105.58	7.72	62.56	35.64	32.97	53.14	Operating solution available	
	EXCELSIORSS-PANOCH1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7	DCTL	106.68	75.35	104.82	64.11	105.16	76.5	36.43	109.32	Generation re-dispatch	
	EXCELSIORSS 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	106.23	76.78	106.29	63.57	66.42	77.83	39.76	67.22	Operating solution available	
	PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	71.47	24.26	69.98	86.16	121.73	25.12	18.75	135.89	Generation re-dispatch	
	MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	49.11	38.53	37.93	51.6	96.99	37.62	96.39	101.63	Sensitivity only	
	MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	49.07	38.27	37.68	51.24	96.4	37.37	Diverge	100.07	Sensitivity only	
GATES-MUSTANG SW STA #1 230KV [2604] & GATES-MUSTANG SW STA #2 230KV [2605]	P6	N-1-1	<100	<100	<100	<100	93.2	<100	81.25	101.87	Sensitivity only		
	TRANQUILLITY SW STA-HELM 230KV [5370]	P1	N-1	<100	<100	<100	54.82	107.74	<100	<100	48.95	Generation re-dispatch	
	TRANQLTYSS-HELM #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	<100	<100	<100	63.44	126.79	<100	<100	54.53	Generation re-dispatch	
	TRANQLTYSS 230KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	<100	<100	<100	46.33	119.29	<100	<100	60.24	Generation re-dispatch	
	Q678 0.38KV GEN UNIT 1 & TRANQUILLITY SW STA-HELM 230KV [5370]	P3	G1/N1	<100	<100	<100	<100	119.34	<100	<100	<100	Generation re-dispatch	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Stroud-Stroud Sw Station 70 kV Line (34474 34556)	PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7	DCTL	<100	<100	<100	92.26	176.18	<100	<100	101.39	Generation re-dispatch
	PANOCHÉ-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOCHÉ2 115KV [3231]	P7	DCTL	29.52	13.1	29.72	37.62	123.12	12.6	24.94	135.62	Operating solution available
	PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2	Bus/Breaker	29.81	13.36	29.72	24.33	108.41	12.83	25.51	127.24	Generation re-dispatch
	PANOCHÉ 230KV - SECTION 1D & 2D	P2	Bus/Breaker	<100	<100	<100	82.57	174.45	<100	<100	98.68	Generation re-dispatch
	MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	<100	<100	<100	45.62	112.13	<100	<100	81.89	Generation re-dispatch
	MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	<100	<100	<100	44.33	110.04	<100	Diverge	76.37	Generation re-dispatch
	HELM 230KV SECTION 1D	P2	Bus/Breaker	<100	<100	<100	14.2	83.67	<100	<100	101.2	Sensitivity only
	GATES D 230KV SECTION 2D	P2	Bus/Breaker	29.48	13.06	29.72	17.39	107.82	12.56	24.21	103.9	Generation re-dispatch
	EXCELSIORSS-PANOCHÉ1 115KV [3250] & EXCELSIORSS-PANOCHÉ2 115KV [3231]	P7	DCTL	29.52	13.1	29.72	29.76	112.46	12.6	24.93	111.03	Generation re-dispatch
CHSR09SWSTA-MUSTANGSS 230KV [0] & TRANQUILLITY SW STA-HELM 230KV [5370]	P6	N-1-1	<100	<100	<100	<100	175.02	<100	<100	<100	Generation re-dispatch	
Warnerville - Wilson 230 kV Line	PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7	DCTL	14.22	16.3	30.61	46.12	122.68	17.25	84.96	65.26	Generation re-dispatch
	PANOCHÉ 230KV - SECTION 1D & 2D	P2	Bus/Breaker	17.26	18.75	34.05	48.92	126.11	19.74	85.77	66.62	Generation re-dispatch
	MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	4.39	12.04	11.21	53.25	149.68	10.51	108.43	98.72	Generation re-dispatch
	MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	4.09	14.44	10.29	53.98	151.23	12.82	Diverge	101.76	Generation re-dispatch
	MUSTANG SW STA-GREGG 230KV [4700] (HENTAP1-MUSTANGSS)	P2-1	Line Section w/o Fault	6.79	11.29	25.59	44.39	116.08	12.27	78.5	56.42	Generation re-dispatch
	Holm Unit #1 out & GATES-MUSTANG SW STA #2 230KV [2605]	P3	G1/N1	<100	<100	<100	<100	105.26	<100	<100	<100	Generation re-dispatch
	HELMS-GREGG #1 230KV [4870] & HELMS-GREGG #2 230KV [4880]	P7	DCTL	81.76	81.78	92.32	23.53	108.92	82.6	29.06	64.69	Generation re-dispatch
	HELMS PP2 SECTION 1E & HELMS PP3 SECTION 1F 230KV	P2	Bus/Breaker	81.76	81.78	92.32	23.53	108.92	82.6	29.06	64.69	Generation re-dispatch
	HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	15.09	16.35	28.7	39.61	106.75	17.24	69.56	53.01	Generation re-dispatch
	GATES-MUSTANG SW STA #2 230KV [2605] & GATES-MUSTANG SW STA #1 230KV [2604]	P6	N-1-1	<100	<100	<100	<100	133.32	<100	82.7	98.57	Generation re-dispatch
GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	7.5	20.76	8.93	58.06	170.32	18.53	Diverge	118.75	Redundant Relay Project	
Warnerville 230/115 kV Bank #3 (CCSF) (36964 30515)	Warnerville 230/115kV Transformer #1 Out & Warnerville 230/115kV Transformer #2 Out	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	100.01	Sensitivity only
Warnerville-HW TAP 115kV Line (CCSF) (36964 36998)	COTTLE-MELONES 230KV [4530] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	69.49	29.59	22.23	25.42	61.65	29.31	123.42	86.49	Sensitivity only

Study Area:

PG&E Greater Fresno

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Warnerville-Stanford 115kV Line (CCSF) (36964 38230)	BELLOTA-COTTLE 230KV [4360] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	65.97	27.65	20.34	27.39	62.15	27.34	122.24	85.5	Sensitivity only
Warnerville-Stanford 115kV Line (CCSF) (36964 38230)	COTTLE-MELONES 230KV [4530] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	69.21	29.44	22.09	25.84	61.53	29.16	123.12	86.12	Sensitivity only
	BELLOTA-COTTLE 230KV [4360] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	65.69	27.5	20.2	27.82	62.03	27.19	121.94	85.12	Sensitivity only
Wilson-Atwater #2 115 kV Line (34134 34104)	EL CAPITAN-WILSON 115KV [1510] & ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	127.01	128.43	<100	<100	<100	129.81	<100	<100	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
Wilson-Gregg 230 kV Line	PANOCHÉ 230KV - SECTION 1D & 2D	P2	Bus/Breaker	17.58	27.73	<100	44.63	53.34	27.51	102.46	21.11	Sensitivity only
	MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	29.33	48.48	<100	50.13	68.88	47.69	122.81	44.93	Sensitivity only
	MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	29.92	51.76	<100	51.31	70.79	50.95	Diverge	49.89	Sensitivity only
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	34.65	53.7	<100	53.27	78.92	52.63	Diverge	54.61	Sensitivity only
	BORDEN 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	<100	<100	47.89	<100	<100	<100	<100	<100	Sensitivity only
Wilson-Le Grand 115 kV Line (34116 34134)	PANOCHÉ-MENDOTA 115KV [3230] (PANOCHÉ-MENDOTA)	P2-1	Line Section w/o Fault	51.88	23.7	<100	<100	69.97	24.46	105.49	<100	Sensitivity only
	PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	51.88	23.7	<100	<100	69.97	24.46	105.49	<100	Sensitivity only
	PANOCHÉ1 115KV SECTION 1D	P2	Bus/Breaker	52.58	23.47	<100	<100	70.28	24.23	105.47	<100	Sensitivity only
Wilson-Melones 230 kV Line	MUSTANG SW STA-GREGG 230KV [4700] (GREGG-HENTAP1)	P2-1	Line Section w/o Fault	<100	<100	34.79	Diverge	<100	<100	<100	25.17	Generation re-dispatch
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	15.94	8.45	<100	<100	46.42	9	Diverge	<100	Sensitivity only
Wilson-Merced #2 115 kV Line (34136 34144)	WILSON-MERCED #1 115KV [4180] & EL CAPITAN-WILSON 115KV [1510]	P6	N-1-1	113.52	112.45	<100	<100	<100	<100	<100	<100	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON B 115KV SECTION 2D	P2	Bus/Breaker	112.62	111.89	<100	<100	49.24	113.19	50.91	<100	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON A 115KV SECTION 1D	P2	Bus/Breaker	102.89	103.81	<100	<100	60.43	105.16	47.49	<100	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	WILSON 230/115KV TB 1 & WILSON 230/115KV TB 2	P6	N-1-1	98.32	131.37	<100	<100	<100	134.12	<100	<100	Project: Wilson-Oro Loma Reconductoring In-service date: 01/26 Short term: Action plan

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Wilson-Oro Loma 115 kV Line (34162 34168)	TRANQUILLITY SW STA-KEARNEY 230KV [5380] (MCMULLN1-KEARNEY)	P2-1	Line Section w/o Fault	25.4	22.66	13.93	Diverge	7.34	23.63	30.68	58.88	Project: Wilson-Oro Loma Reconductoring In-service date: 01/26 Short term: Action plan
	PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2-1	Line Section w/o Fault	71.02	68.06	107.98	40.32	22.04	69.48	38.21	38.79	Continue to Monitor future forecast
	PANOCHÉ2 115KV SECTION 2D	P2	Bus/Breaker	71.07	68.06	107.98	40.26	23.35	69.48	38.22	40.84	Continue to Monitor future forecast
	PANOCHÉ 230/115KV TB 1 & PANOCHÉ 230/115KV TB 2	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	100.22	Sensitivity only
	HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	40.39	43.95	35.81	104.22	23.98	45.46	24.24	44.3	Project: Wilson-Oro Loma Reconductoring In-service date: 01/26 Short term: Action plan
Wilson-Storey 230 kV Line #1	WILSON-BORDEN #2 230KV [9001] (WILSON-STOREYJCT2)	P2-1	Line Section w/o Fault	<100	<100	<100	104.06	<100	<100	<100	53.24	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	PANOCHÉ 230KV - SECTION 1D & 2D	P2	Bus/Breaker	7.35	17.85	<100	<100	60.23	17.57	102.84	<100	Sensitivity only
	MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	19.55	40.06	<100	<100	76.68	39.16	124.5	<100	Sensitivity only
	MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	20.17	43.58	<100	<100	78.61	42.65	Diverge	<100	Sensitivity only
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	25.23	45.62	<100	<100	87.29	44.45	Diverge	<100	Sensitivity only
Wilson-Storey 230 kV Line #2	WILSON-BORDEN #1 230KV [5890] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	100.65	<100	<100	<100	<100	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
	MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	15.77	33.9	<100	<100	61.28	33.18	Diverge	<100	Sensitivity only
	GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	19.7	35.48	<100	<100	68.01	34.57	Diverge	<100	Sensitivity only

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
FIREBAGH 70 kV	ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED & PANOCHÉ-ORO LOMA 115KV [3240]	P6	N-1-1	>0.9	>0.9	0.8396	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
CHWCHLLA 115 kV	BALCH-MCCALL 230KV [4350] & LE GRAND-CHOWCHILLA 115KV [2110]	P6	N-1-1	>0.9	>0.9	0.8915	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
FIGRDN 2 230 kV	BARTON-AIRWAYS-SANGER 115KV [1060] & BALCH-MCCALL 230KV [4350]	P6	N-1-1	>0.9	>0.9	>0.9	0.8994	>0.9	>0.9	>0.9	>0.9	Project: Oro Loma 70 kV Area Reinforcement In-service date: 05/25 Short term: Action plan
ASHLAN 230 kV	BARTON-AIRWAYS-SANGER 115KV [1060] & HERNDON 230/115KV TB 1	P6	N-1-1	>0.9	>0.9	>0.9	0.8996	>0.9	>0.9	>0.9	>0.9	Project: Oro Loma 70 kV Area Reinforcement In-service date: 05/25 Short term: Action plan
FIGRDN 1 230 kV		P6	N-1-1	>0.9	>0.9	>0.9	0.8991	>0.9	>0.9	>0.9	>0.9	Project: Oro Loma 70 kV Area Reinforcement In-service date: 05/25 Short term: Action plan
ORO LOMA 115 kV	BARTON-AIRWAYS-SANGER 115KV [1060] & PANOCHÉ-ORO LOMA 115KV [3240]	P6	N-1-1	>0.9	>0.9	>0.9	0.8957	>0.9	>0.9	>0.9	>0.9	Project: Oro Loma 70 kV Area Reinforcement In-service date: 05/25 Short term: Action plan
SNTA RTA 70 kV		P6	N-1-1	>0.9	>0.9	>0.9	0.8796	>0.9	>0.9	>0.9	>0.9	Project: Oro Loma 70 kV Area Reinforcement In-service date: 05/25 Short term: Action plan
CAL AVE 115 kV	CALIFORNIA AVE-MCCALL 115KV [2360] & SANGER-CALIFORNIA AVE 115KV [9130]	P6	N-1-1	>0.9	>0.9	0.8717	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
FIREBAGH 70 kV	CHOWCOGN 13.80KV GEN UNIT 1 & ORO LOMA-MENDOTA 70KV [9030]	P3	G-1/N-1	>0.9	>0.9	>0.9	0.8995	>0.9	>0.9	>0.9	>0.9	Project: Oro Loma 70 kV Area Reinforcement In-service date: 05/25 Short term: Action plan
TOMATAK 70 kV		P3	G-1/N-1	>0.9	>0.9	>0.9	0.8995	>0.9	>0.9	>0.9	>0.9	Project: Oro Loma 70 kV Area Reinforcement In-service date: 05/25 Short term: Action plan
DOS PALS 70 kV	CHOWCOGN 13.80KV GEN UNIT 1 & PANOCHÉ-ORO LOMA 115KV [3240]	P3	G-1/N-1	>0.9	>0.9	0.8836	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		
LIVINGSTN 115 kV	EL CAPITAN-WILSON 115KV [1510] & ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	0.8959	>0.9	>0.9	>0.9	>0.9	>0.9	0.8988	>0.9	>0.9	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
ORO LOMA 115 kV	ELNIDO 13.80KV GEN UNIT 1 & PANOCHÉ-ORO LOMA 115KV [3240]	P3	G-1/N-1	>0.9	>0.9	0.8995	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
SNTA RTA 70 kV		P3	G-1/N-1	>0.9	>0.9	0.878	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
YOSEMITE 70 kV	EXCHQUER 13.80KV GEN UNIT 1 & MERCED FALLS-EXCHEQUER 70KV [8990]	P3	G-1/N-1	>0.9	>0.9	0.8996	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
ASHLAN 230 kV	GREGG SVD=V & KERCKHOFF-CLOVIS-SANGER #1 115KV [1890]	P6	N-1-1	>0.9	>0.9	>0.9	0.8994	>0.9	>0.9	>0.9	>0.9	>0.9	System Reconfiguration
DOS PALS 70 kV	GREGG SVD=V & PANOCHÉ-ORO LOMA 115KV [3240]	P6	N-1-1	>0.9	>0.9	0.8744	0.8993	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
FIREBAGH 70 kV		P6	N-1-1	>0.9	>0.9	0.8304	0.8963	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
SNTA RTA 70 kV		P6	N-1-1	>0.9	>0.9	0.8689	0.8965	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
DOS PALS 70 kV	HAMMONDS 115 KV #1 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.9667	0.9837	0.8856	0.9257	1.0337	0.9817	0.9984	1.0044	1.0044	Continue to Monitor future forecast
FIREBAGH 70 kV		P5	Non-Redundant Relay	0.9391	0.957	0.8423	0.9117	0.9742	0.9545	0.9881	0.9482	0.9482	Continue to Monitor future forecast
ORO LOMA 70 kV		P5	Non-Redundant Relay	0.9746	0.9917	0.8972	0.9322	1.0285	0.99	0.9999	1.0018	1.0018	Continue to Monitor future forecast
SNTA RTA 70 kV		P5	Non-Redundant Relay	0.962	0.9803	0.8802	0.9229	1.0374	0.9781	0.9985	1.0097	1.0097	Continue to Monitor future forecast
CHWCHLLA 115 kV	HELMS-GREGG #1 230KV [4870] & LE GRAND-CHOWCHILLA 115KV [2110]	P6	N-1-1	>0.9	>0.9	0.8925	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
DOS PALS 70 kV	HELMS-GREGG #1 230KV [4870] & PANOCHÉ-ORO LOMA 115KV [3240]	P6	N-1-1	>0.9	>0.9	0.8795	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
SNTA RTA 70 kV		P6	N-1-1	>0.9	>0.9	0.8741	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast

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

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
CHWCHLLA 115 kV	HERNDN1T 13.20KV GEN UNIT 1 & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	>0.9	>0.9	0.8922	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
CHWCHLLA 115 kV	HERNDON 230/115KV TB 1 & LE GRAND-CHOWCHILLA 115KV [2110]	P6	N-1-1	>0.9	>0.9	0.8906	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
DOS PALS 70 kV	HERNDON-KEARNEY 230KV [4900] & PANOCHÉ-ORO LOMA 115KV [3240]	P6	N-1-1	>0.9	>0.9	0.882	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
SHARON 115 kV	HERNDON-WOODWARD 115KV [1790] & LE GRAND-CHOWCHILLA 115KV [2110]	P6	N-1-1	>0.9	>0.9	0.8855	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
CHWCHLLA 115 kV	KERCK1-3 6.60KV GEN UNIT 3 & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	>0.9	>0.9	0.8938	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
SHARON 115 kV	KERCKHOFF-CLOVIS-SANGER #1 115KV [1890] & LE GRAND-CHOWCHILLA 115KV [2110]	P6	N-1-1	>0.9	>0.9	0.8777	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
CHWCHLLA 115 kV	KERCKHOFF-CLOVIS-SANGER #2 115KV [1900] & LE GRAND-CHOWCHILLA 115KV [2110]	P6	N-1-1	>0.9	>0.9	0.8837	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
ASHLAN 230 kV	KERCKHOFFPH2 115/13.8KV TB 1 & GREGG SVD=V	P6	N-1-1	>0.9	>0.9	>0.9	0.8982	>0.9	>0.9	>0.9	>0.9	Generation re-dispatch
ASHLAN 230 kV	KERCKHOFFPH2 13.80KV GEN UNIT 1 & GREGG SVD=V	P3	G-1/N-1	>0.9	>0.9	>0.9	0.8987	>0.9	>0.9	>0.9	>0.9	Generation re-dispatch
FIGRDN 1 230 kV		P3	G-1/N-1	>0.9	>0.9	>0.9	0.8983	>0.9	>0.9	>0.9	>0.9	Generation re-dispatch
FIGRDN 2 230 kV		P3	G-1/N-1	>0.9	>0.9	>0.9	0.8974	>0.9	>0.9	>0.9	>0.9	Generation re-dispatch
SHARON 115 kV	KERCKHOFFPH2 13.80KV GEN UNIT 1 & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	>0.9	>0.9	0.8847	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
TOMATAK 70 kV	KERCKHOFFPH2 13.80KV GEN UNIT 1 & ORO LOMA-MENDOTA 70KV [9030]	P3	G-1/N-1	>0.9	>0.9	>0.9	0.8981	>0.9	>0.9	>0.9	>0.9	Project: Oro Loma 70 kV Area Reinforcement In-service date: 05/25 Short term: Action plan

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
REEDLEY 115 kV	KINGS RIVER-SANGER-REEDLEY 115KV [2030] & MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	>0.9	>0.9	0.8922	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
REEDLEY 70 kV		P6	N-1-1	>0.9	>0.9	0.8897	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
CHWCHLLA 115 kV	KINGSBUR 13.80KV & SANGERCGN 13.80KV & KINGSBUR 13.80KV & SANGERCGN 13.80KV GEN UNITS & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	>0.9	>0.9	0.8911	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
DUNLAP 70 kV	KINGSBUR 13.80KV & SANGERCGN 13.80KV GEN UNITS & MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P3	G-1/N-1	>0.9	>0.9	0.8922	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
SANDCRK 70 kV		P3	G-1/N-1	>0.9	>0.9	0.8991	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
DINUBA 70 kV	KINGSBUR 13.80KV & SANGERCGN 13.80KV GEN UNITS & REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	0.8891	>0.9	0.867	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
DINUBA 70 kV	KINGSRIV 13.80KV GEN UNIT 1 & REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	0.8889	>0.9	0.8694	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
CHWCHLLA 115 kV	LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	0.9348	0.9291	0.8962	0.9928	1.1217	0.9269	0.9865	1.0384	Continue to Monitor future forecast
SHARON 115 kV	LE GRAND-CHOWCHILLA 115KV [2110] & MC CALL 230/115KV TB 1	P6	N-1-1	>0.9	>0.9	0.8974	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
DOS PALS 70 kV		P7	DCTL	0.9667	0.9837	0.8855	0.9247	1.0332	0.9817	0.9967	1.0039	Continue to Monitor future forecast

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

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
FIREBAGH 70 kV	LOS BANOS-PANOCHÉ #1 230KV [5030] & PANOCHÉ-ORO LOMA 115KV [3240]	P7	DCTL	0.939	0.957	0.8422	0.9104	0.9743	0.9544	0.9863	0.948	Continue to Monitor future forecast
ORO LOMA 70 kV		P7	DCTL	0.9746	0.9917	0.8972	0.9313	1.028	0.99	0.9981	1.0012	Continue to Monitor future forecast
SNTA RTA 70 kV		P7	DCTL	0.962	0.9802	0.8801	0.9219	1.0369	0.9781	0.9967	1.0092	Continue to Monitor future forecast
CHWCHLLA 115 kV	MC CALL 230.00KV GEN UNIT VS & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	>0.9	>0.9	0.8923	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
DUNLAP 70 kV	MC CALL 230.00KV GEN UNIT VS & MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P3	G-1/N-1	>0.9	>0.9	0.8987	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
DINUBA 70 kV	MC CALL 230.00KV GEN UNIT VS & REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	>0.9	>0.9	0.8692	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
CAMDEN 70 kV	MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	0.8985	0.9211	0.9029	0.9444	1.0333	0.9198	0.9323	0.9653	Generation re-dispatch
DUNLAP 70 kV	MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.9192	0.9464	0.8959	0.9899	1.1151	0.9424	0.9628	1.0461	Continue to Monitor future forecast
TVY VLLY 70 kV	MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE & KINGS RIVER-SANGER-REEDLEY 115KV [2030]	P6	N-1-1	0.897	>0.9	0.8799	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
WAHTOKE 115 kV		P6	N-1-1	>0.9	>0.9	0.8852	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
DUNLAP 70 kV		P6	N-1-1	0.774	0.8231	0.7297	>0.9	>0.9	0.8113	>0.9	>0.9	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
OROSI 70 kV	MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE & SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY	P6	N-1-1	0.7975	0.8382	0.7575	>0.9	>0.9	0.8285	>0.9	>0.9	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
REEDLEY 115 kV		P6	N-1-1	0.8277	0.8604	0.7915	>0.9	>0.9	0.8525	>0.9	>0.9	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
REEDLEY 70 kV		P6	N-1-1	0.8247	0.8603	0.7852	>0.9	>0.9	0.8517	>0.9	>0.9	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
SANDCRK 70 kV		P6	N-1-1	0.7823	0.8308	0.7381	>0.9	>0.9	0.8196	>0.9	>0.9	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
STONCRRL 70 kV		P6	N-1-1	0.7859	0.8274	0.7505	>0.9	>0.9	0.8171	>0.9	>0.9	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
TVY VLLY 70 kV		P6	N-1-1	0.8124	0.8486	0.7719	>0.9	>0.9	0.8396	>0.9	>0.9	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
WAHTOKE 115 kV		P6	N-1-1	0.8197	0.8523	0.782	>0.9	>0.9	0.8443	>0.9	>0.9	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
CAL AVE 115 kV		MCCALL-WEST FRESNO #2 115KV [2370] &	P6	N-1-1	0.8859	0.8716	0.8239	>0.9	>0.9	0.8687	>0.9	>0.9

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High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
DANISHCM 115 kV	SANGER-CALIFORNIA AVE 115KV [9130]	P6	N-1-1	0.8938	0.8805	0.8346	>0.9	>0.9	0.8777	>0.9	>0.9	Generation re-dispatch
CHWCHLLA 115 kV	MCMULLN1 230.00KV GEN UNIT VS & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	>0.9	>0.9	0.8939	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
DINUBA 70 kV	MCMULLN1 230.00KV GEN UNIT VS & REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	>0.9	>0.9	0.873	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
TOMATAK 70 kV	NORTHSTAR-MENDOTA #1 115KV [0] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	>0.9	0.8774	0.8687	>0.9	>0.9	0.8773	>0.9	>0.9	Generation re-dispatch
TOMATAK 70 kV	PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	0.8783	0.8827	0.8745	0.9224	0.9814	0.8825	0.8747	0.9497	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
DOS PALS 70 kV	PANOCHÉ-ORO LOMA 115KV [3240]	P1	N-1	0.9667	0.9837	0.8856	0.9257	1.0337	0.9817	0.9984	1.0044	Continue to Monitor future forecast
FIREBAGH 70 kV		P1	N-1	0.9391	0.957	0.8423	0.9117	0.9742	0.9545	0.9881	0.9482	Continue to Monitor future forecast
ORO LOMA 70 kV		P1	N-1	0.9746	0.9917	0.8972	0.9322	1.0285	0.99	0.9999	1.0018	Continue to Monitor future forecast
SNTA RTA 70 kV		P1	N-1	0.962	0.9803	0.8802	0.9229	1.0374	0.9781	0.9985	1.0097	Continue to Monitor future forecast
ORO LOMA 70 kV	PANOCHÉ-ORO LOMA 115KV [3240] & GREGG SVD=V	P6	N-1-1	>0.9	>0.9	0.8862	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
ORO LOMA 70 kV	PANOCHÉ-ORO LOMA 115KV [3240] & MELONES-WILSON 230KV [5080]	P6	N-1-1	>0.9	>0.9	0.8854	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
ORO LOMA 115 kV	PANOCHÉ-ORO LOMA 115KV [3240] & WILSONSTCOM SVD=V	P6	N-1-1	>0.9	>0.9	0.8633	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
ORO LOMA 70 kV		P6	N-1-1	>0.9	>0.9	0.8586	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
DOS PALS 70 kV	PANOCHÉ-ORO LOMA 115KV [3240] & WILSONSTCOM-WILSONPGAE #1 115KV [0]	P6	N-1-1	>0.9	>0.9	0.8464	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
TOMATAK 70 kV	Q1028Q1029PV 34.50KV GEN UNIT 1 & PANOCHÉ-MENDOTA 115KV [3230]	P3	G-1/N-1	0.8754	0.8773	0.8691	>0.9	>0.9	0.8772	>0.9	>0.9	Generation re-dispatch
DINUBA 70 kV	REEDLEY-DINUBA #1 70KV [9050]	P1	N-1	0.8931	0.9082	0.8753	0.9779	1.1147	0.9045	0.9501	1.0443	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan

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High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
WST FRSO 115 kV	SANGER-CALIFORNIA AVE 115KV [9130] & CALIFORNIA AVE-MCCALL 115KV [2360]	P6	N-1-1	>0.9	>0.9	0.8848	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
WST FRSO 115 kV	SANGER-CALIFORNIA AVE 115KV [9130] & MCCALL-WEST FRESNO #2 115KV [2370]	P6	N-1-1	0.8775	0.8586	0.809	>0.9	>0.9	0.8556	>0.9	>0.9	Generation re-dispatch
CHWCHLLA 115 kV	SANGERCN 115/13.8KV TB 1 & LE GRAND-CHOWCHILLA 115KV [2110]	P6	N-1-1	>0.9	>0.9	0.8934	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
CHWCHLLA 115 kV	SHEPHERD SVD=V & LE GRAND-CHOWCHILLA 115KV [2110]	P6	N-1-1	>0.9	>0.9	0.879	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
CHWCHLLA 115 kV	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & LE GRAND-CHOWCHILLA 115KV [2110]	P6	N-1-1	>0.9	>0.9	0.8906	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
CANAL 70 kV	VEGA 0.36KV GEN UNIT 1 & LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	>0.9	>0.9	0.8913	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
ORO LOMA 115 kV	WARNERVILLE-WILSON 230KV [5870] & PANOCHÉ-ORO LOMA 115KV [3240]	P6	N-1-1	>0.9	>0.9	0.8839	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
ATWATER 115 kV	WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	1.0148	0.494	Diverge	0.2391	1.0285	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
BER VLLY 70 kV		P5	Non-Redundant Relay	Diverge	Diverge	Diverge	0.9615	0.8683	Diverge	0.8594	0.9742	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
ATWATER 115 kV	WILSON 230/115KV TB 1 & WILSON	P6	N-1-1	0.8726	0.8999	>0.9	>0.9	>0.9	0.8921	>0.9	>0.9	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
CRESSEY 115 kV		P6	N-1-1	0.8637	0.8913	>0.9	>0.9	>0.9	0.8833	>0.9	>0.9	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
EL CAPTN 115 kV		P6	N-1-1	0.8779	>0.9	>0.9	>0.9	>0.9	0.8958	>0.9	>0.9	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan

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High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
GALLO 115 kV	230/115KV TB 2	P6	N-1-1	0.853	0.8812	>0.9	>0.9	>0.9	0.873	>0.9	>0.9	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
LIVNGSTN 115 kV		P6	N-1-1	0.8563	0.8842	>0.9	>0.9	>0.9	0.8761	>0.9	>0.9	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
MERCED 115 kV		P6	N-1-1	0.8865	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Wilson 115kV Reinforcement Project In-service date: 05/28 Short term: Action plan
TOMATAK 70 kV	WILSON-LE GRAND 115KV [4170] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	0.8738	0.8777	0.8689	>0.9	>0.9	0.877	>0.9	>0.9	Project: Panoche-Oro Loma 115 kV Reconductoring Project In-service date: 05/23 Short term: Action plan
YOSEMITE 70 kV		P6	N-1-1	0.8992	>0.9	>0.9	>0.9	>0.9	>0.9	0.9	>0.9	Project: Panoche-Oro Loma 115 kV Reconductoring Project In-service date: 05/23 Short term: Action plan
ORO LOMA 70 kV	WILSON-ORO LOMA 115KV [4200] & PANOCHÉ-ORO LOMA 115KV [3240]	P6	N-1-1	>0.9	>0.9	>0.9	0.7808	>0.9	>0.9	>0.9	>0.9	Project: Panoche-Oro Loma 115 kV Reconductoring Project In-service date: 05/23 Short term: Action plan
ORO LOMA 115 kV	WILSONPGAE-STOREY #2 230KV [0] & PANOCHÉ-ORO LOMA 115KV [3240]	P6	N-1-1	>0.9	>0.9	0.8991	>0.9	>0.9	>0.9	>0.9	>0.9	Continue to Monitor future forecast
ASHLAN 230 kV	WOODWARD-SHEPHERD 115KV [1895] & BALCH-MCCALL 230KV [4350]	P6	N-1-1	>0.9	>0.9	>0.9	0.8975	>0.9	>0.9	>0.9	>0.9	Generation re-dispatch
FIGRDN 1 230 kV	WOODWARD-SHEPHERD 115KV [1895] & HERNDON-BARTON 115KV [1750]	P6	N-1-1	>0.9	>0.9	>0.9	0.8963	>0.9	>0.9	>0.9	>0.9	Generation re-dispatch
FIGRDN 2 230 kV		P6	N-1-1	>0.9	>0.9	>0.9	0.8954	>0.9	>0.9	>0.9	>0.9	Generation re-dispatch

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Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
DOS PALS 70 kV	CHOWCOGN 13.80KV GEN UNIT 1 & PANOCHÉ-ORO LOMA 115KV [3240]	P3	G1/N1	<8	<8	12.937	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
FIREBAGH 70 kV		P3	G1/N1	<8	<8	13.591	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
SNTA RTA 70 kV		P3	G1/N1	<8	<8	13.009	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
DOS PALS 70 kV	ELNIDO 13.80KV GEN UNIT 1 & PANOCHÉ-ORO LOMA 115KV [3240]	P3	G1/N1	<8	<8	12.921	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
FIREBAGH 70 kV		P3	G1/N1	<8	<8	13.575	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
ORO LOMA 115 kV		P3	G1/N1	<8	<8	12.689	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
ORO LOMA 70 kV		P3	G1/N1	<8	<8	12.762	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
SNTA RTA 70 kV		P3	G1/N1	<8	<8	12.993	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
CHWCHLLA 115 kV	HERNDN1T 13.20KV GEN UNIT 1 & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G1/N1	<8	<8	10.538	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
FIREBAGH 70 kV	HERNDN1T 13.20KV GEN UNIT 1 & PANOCHÉ-ORO LOMA 115KV [3240]	P3	G1/N1	<8	<8	13.564	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
DINUBA 70 kV	HERNDN1T 13.20KV GEN UNIT 1 & REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<8	<8	9.569	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
DINUBA 70 kV	HERNDN2T 13.20KV GEN UNIT 1 & REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<8	<8	9.564	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
CHWCHLLA 115 kV	KERCK1-3 6.60KV GEN UNIT 3 & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G1/N1	<8	<8	10.49	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
CHWCHLLA 115 kV	KERCKHOFFPH2 13.80KV GEN UNIT 1 & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G1/N1	<8	<8	12.179	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
SHARON 115 kV		P3	G1/N1	<8	<8	10.762	<8	<8	<8	<8	<8	Conitinue to monitor future forecast

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Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
DINUBA 70 kV	KERCKHOFFPH2 13.80KV GEN UNIT 1 & REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	9.046	<8	9.602	<8	<8	<8	<8	<8	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
CHWCHLLA 115 kV	KINGSRIV 13.80KV GEN UNIT 1 & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G1/N1	<8	<8	10.413	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
DINUBA 70 kV	KINGSRIV 13.80KV GEN UNIT 1 & REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	9.08	<8	9.489	<8	<8	<8	<8	<8	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
CHWCHLLA 115 kV	KRCDPCT1 13.80KV GEN UNIT 1 & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G1/N1	<8	<8	10.451	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
DINUBA 70 kV	KRCDPCT1 13.80KV GEN UNIT 1 & REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<8	<8	9.459	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
DINUBA 70 kV	KRCDPCT2 13.80KV GEN UNIT 1 & REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<8	<8	9.459	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
CHWCHLLA 115 kV	LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	8.3	8.503	10.249	3.695	-6.329	8.68	3.275	0.168	Project: Wilson - Le Grand 115 kV Line Reconductoring In-service date: 05/23
SHARON 115 kV		P1	N-1	7.323	7.527	9.084	3.217	-5.535	7.686	2.885	0.156	Project: Wilson - Le Grand 115 kV Line Reconductoring In-service date: 05/23
CHWCHLLA 115 kV	MC CALL 230.00KV GEN UNIT VS & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G1/N1	<8	<8	10.545	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
DINUBA 70 kV	MC CALL 230.00KV GEN UNIT VS & REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<8	<8	9.49	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
CHWCHLLA 115 kV	MCCALL1T 13.20KV GEN UNIT 1 & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G1/N1	<8	<8	10.667	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
DINUBA 70 kV	MCCALL1T 13.20KV GEN UNIT 1 & REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	9.1	<8	9.64	<8	<8	8.875	<8	<8	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
CHWCHLLA 115 kV	MCCALL3T 13.20KV GEN UNIT 1 & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G1/N1	<8	<8	10.425	<8	<8	<8	<8	<8	Conitinue to monitor future forecast

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Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
DINUBA 70 kV	MCCALL3T 13.20KV GEN UNIT 1 & REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<8	<8	9.468	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
CHWCHLLA 115 kV	MCMULLN1 230.00KV GEN UNIT VS & LE GRAND-CHOWCHILLA 115KV [2110]	P3	G1/N1	<8	<8	10.398	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
DOS PALS 70 kV	MCMULLN1 230.00KV GEN UNIT VS & PANOCHÉ-ORO LOMA 115KV [3240]	P3	G1/N1	<8	<8	12.919	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
FIREBAGH 70 kV		P3	G1/N1	<8	<8	13.573	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
ORO LOMA 115 kV		P3	G1/N1	<8	<8	12.687	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
ORO LOMA 70 kV		P3	G1/N1	<8	<8	12.76	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
SNTA RTA 70 kV		P3	G1/N1	<8	<8	12.991	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
DINUBA 70 kV	MCMULLN1 230.00KV GEN UNIT VS & REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<8	<8	9.552	<8	<8	<8	<8	<8	Conitinue to monitor future forecast
DOS PALS 70 kV	PANOCHÉ-ORO LOMA 115KV [3240]	P1	N-1	6.234	4.91	12.752	8.949	1.161	5.038	3.291	2.89	Project: Panoche-Oro Loma 115 kV Reconductoring Project In-service date: 05/23 Short term: Action plan
FIREBAGH 70 kV		P1	N-1	6.433	5.062	13.396	3.347	0.808	5.197	3.329	1.129	Project: Panoche-Oro Loma 115 kV Reconductoring Project In-service date: 05/23 Short term: Action plan
ORO LOMA 70 kV		P1	N-1	6.181	4.868	12.596	8.885	1.167	4.994	3.284	2.896	Project: Panoche-Oro Loma 115 kV Reconductoring Project In-service date: 05/23 Short term: Action plan

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
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
SNTA RTA 70 kV		P1	N-1	6.263	4.927	12.823	8.975	1.157	5.056	3.291	2.876	Project: Panoche-Oro Loma 115 kV Reconductoring Project In-service date: 05/23 Short term: Action plan
DINUBA 70 kV	REEDLEY-DINUBA #1 70KV [9050]	P1	N-1	9.012	8.588	9.422	4.602	-1.213	8.794	5.613	1.774	Project: Reedley 70 kV Reinforcement (Dinuba Battery Energy Storage) In-service date: 05/23 Short term: Action plan
CANAL 70 kV	VEGA 0.36KV GEN UNIT 1 & LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	<8	<8	9.411	<8	<8	<8	<8	<8	Conitinue to monitor future forecast

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Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
Helms unit 1	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Helms unit 1 and unit 2	P3-1	G-1/N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Gates 500/230kV Transformer #11	P1	T-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Gates 500/230kV Transformer #12	P1	T-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Wilson 230/115kV TB #1	P1	T-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Wilson 230/115kV TB #2	P1	T-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Gates 230kV Bus	P2-4	Bus Breaker	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
McCall 230kV Bus	P2-4	Bus Breaker	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Borden 230kV Bus	P2-4	Bus Breaker	No Issues	No Issues	No Issues	No Issues	Potential WECC/NERC criteria violation	No Issues	Sensitivity Only
McCall 230kV TB plus Helms unit 1	P3-3	G-1/T-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Wilson 230/115kV TB #1 & #2	P6	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Bellota-Warnerville 230kV and Warnerville-Wilson 230kV lines	P7	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Panoche-Tranquility #1 and #2 230kV Lines	P7	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Gates-McCall 230kV and Helms-McCall 230kV Lines	P7	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Gregg-Helms #1 and #2 230kV Lines Temporary	P7	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Gregg-Helms #1 and #2 230kV Lines Permanent	P7	DCTL	Potential WECC/NERC criteria violation	No Issues	No Issues	No Issues	No Issues	Potential WECC/NERC criteria violation	Under review with PTO
Gates-Mustang #1 and #2 230kV Lines	P7	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Herndon-Barton 115kV Line and Sanger-Manchester 115kV line	P7	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
McCall-Reedley 115kV Line and McCall- Sanger #1 115kV Line	P7	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Melones-Wilson and Warnerville-Wilson 230kV Line	P6	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	No Violation
Gregg 230kV Bus #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Potential WECC/NERC criteria violation	No Issues	No Issues	No Issues	No Issues	No Issues	Redundant Relay Project
Gregg 230kV Bus #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No Issues	Potential WECC/NERC criteria violation	No Issues	Redundant Relay Project

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	

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

Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)												Potential Mitigation Solutions
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	

No single source substation with more than 100 MW

Study Area:

PG&E Humboldt

Thermal Overloads

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

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



Study Area: **PG&E Humboldt**

High/Low Voltages

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

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



Study Area: **PG&E Humboldt**

Voltage Deviation

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

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



Study Area: **PG&E Humboldt**

Transient Stability

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

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





Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)												Potential Mitigation Solutions	
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		

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

2021-2022 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt**



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)											Potential Mitigation Solutions	
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

No single source substation with more than 100 MW

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



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Charka-CHSR 115 kV	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	<100	89	75	<100	118	91	<100	<100	Generation redispatch
	MIDWAY 115kV Section 2E	P2-2	Bus	<100	89	75	<100	118	91	<100	<100	Generation redispatch
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	<100	89	75	<100	118	91	<100	<100	Generation redispatch
CHARKA-FAMOSO 115 kV	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	88	112	100	<100	122	115	77	<100	Utilize Summer setup
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	88	112	100	<100	122	115	77	<100	Utilize Summer setup
	MIDWAY 115kV Section 2E	P2-2	Bus	88	112	100	<100	121	115	77	<100	Utilize Summer setup
Copus 70 kV bus-tie	Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	30	35	35	<100	104	33	108	<100	Generation redispatch
Copus-Old River 70 kV Line	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	29	15	17	<100	188	12	159	<100	Generation redispatch
	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	30	11	13	<100	240	8	215	68	Generation redispatch
	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	29	11	14	<100	240	9	215	69	Generation redispatch
	Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	57	65	69	<100	221	60	223	<100	Generation redispatch
	Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	53	61	65	<100	271	56	276	68	Generation redispatch
	Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	53	61	65	<100	271	56	276	69	Generation redispatch
Fellows-Midsun 115 kV Line	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	10	12	11	<100	103	11	94	<100	Generation redispatch
Fellows-Taft 115 kV Line	TAFT 115kV - Ring R2 & R1	P2-3	Non-Bus-Tie Breaker	27	29	31	61	95	27	101	102	Sensitivity only
	MIDWAY - 2D 115kV & MIDWAY-TEMBLOR line	P2-3	Non-Bus-Tie Breaker	15	19	20	50	98	17	96	100	Sensitivity only
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	11	14	15	<100	102	12	98	<100	Generation redispatch
Kern Canyon-Magunden-Weedpatch 70 kV Line	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	150	<100	<100	17	<100	<100	21	20	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D & MIDWAY-MIDWAY-R12 #1 line	P2-3	Non-Bus-Tie Breaker	129	<100	<100	<100	<100	<100	14	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D	P2-2	Bus	116	<100	<100	<100	<100	<100	34	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 1D & MIDWAY Section 1D 230kV	P2-4	Bus-Tie-Breaker	116	<100	<100	<100	<100	<100	34	<100	PGE Maintenance Bus Conversion Project
	MIDWAY-WHEELER RIDGE #2 230kV [5200] (BUENAVJ2-MIDWAY)	P2-1	Line Section w/o Fault	<100	59	42	<100	112	59	<100	<100	Generation redispatch
	MIDWAY-WHEELER RIDGE #1 230kV [5190] (BUENAVJ1-MIDWAY)	P2-1	Line Section w/o Fault	<100	58	42	<100	111	58	<100	<100	Generation redispatch
	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	164	<100	<100	<100	<100	<100	25	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D & MIDWAY-MIDWAY-R12 #1 line	P2-3	Non-Bus-Tie Breaker	147	<100	<100	<100	<100	<100	17	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D	P2-2	Bus	126	<100	<100	<100	<100	<100	39	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 1D & MIDWAY Section 1D 230kV	P2-4	Bus-Tie-Breaker	126	<100	<100	<100	<100	<100	39	<100	PGE Maintenance Bus Conversion Project
	MIDWAY-WHEELER RIDGE #2 230kV [5200] (BUENAVJ2-MIDWAY)	P2-1	Line Section w/o Fault	<100	86	63	<100	115	87	<100	<100	Generation redispatch
	MIDWAY-WHEELER RIDGE #1 230kV [5190] (BUENAVJ1-MIDWAY)	P2-1	Line Section w/o Fault	<100	86	63	<100	114	86	<100	<100	Generation redispatch
	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	183	<100	<100	26	<100	<100	57	24	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D & MIDWAY-MIDWAY-R12 #1 line	P2-3	Non-Bus-Tie Breaker	164	<100	<100	<100	<100	<100	50	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D	P2-2	Bus	149	<100	<100	<100	<100	<100	69	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 1D & MIDWAY Section 1D 230kV	P2-4	Bus-Tie-Breaker	149	<100	<100	<100	<100	<100	69	<100	PGE Maintenance Bus Conversion Project
	Midway-Wheeler Ridge #1 & #2 230 kV Lines	P7	DCTL	NConv	NConv	245	16	NConv	NConv	143	20	Utilize Summer setup
	Midway-Wheeler Ridge #1 & #2 230 kV Lines	P7	DCTL	NConv	NConv	275	<100	NConv	NConv	165	<100	Utilize Summer setup
	Midway-Wheeler Ridge #1 & #2 230 kV Lines	P7	DCTL	NConv	NConv	222	26	NConv	NConv	117	24	Utilize Summer setup
	Kern PP-Bakersfield 230 kV	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	<100	23	27	<100	110	23	<100	<100
MIDWAY 230kV Section 2E & MIDWAY-MIDWAY-R11 #1 line		P2-3	Non-Bus-Tie Breaker	15	30	18	11	107	32	12	<100	Generation redispatch
MIDWAY - 1E 230kV & MIDWAY-MIDWAY-R11 #1 line		P2-4	Bus-Tie-Breaker	15	23	27	11	110	23	12	<100	Generation redispatch
Kern PP-Seventh Standard 115 kV Line	KERN PWR 115kV - Section 1E & 2E	P2-4	Bus-Tie-Breaker	120	142	<100	49	72	144	51	28	PGE Maintenance Bus Conversion Project
Kern PP-Westpark #1 115 kV Line	KERN PWR 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	99	115	<100	31	61	116	47	11	PGE Maintenance Bus Conversion Project
Kern-Kern Oil-Famoso 70 kV Line	MIDWAY 115kV Section 2E	P2-2	Bus	101	118	119	24	104	121	49	12	Utilize Summer setup
	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	101	118	119	24	104	121	49	12	Utilize Summer setup
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	101	118	119	24	103	121	49	12	Utilize Summer setup
	MIDWAY 115kV Section 2E	P2-2	Bus	74	87	87	18	76	89	36	<100	Sensitivity only
	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	74	87	87	18	76	89	36	<100	Sensitivity only
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	74	87	87	<100	76	89	36	<100	Sensitivity only
	MIDWAY 115kV Section 2E	P2-2	Bus	95	112	113	19	106	115	50	<100	Utilize Summer setup
	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	95	112	113	19	106	115	50	<100	Utilize Summer setup

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	95	112	113	<100	105	115	49	<100	Utilize Summer setup
	MIDWAY 115kV Section 2E	P2-2	Bus	104	123	124	20	116	126	54	<100	Utilize Summer setup
	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	104	123	124	20	115	126	54	<100	Utilize Summer setup
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	104	123	124	20	115	126	53	<100	Utilize Summer setup
Kern-Magunden 70 kV Line	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	137	<100	<100	14	<100	<100	37	16	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D & MIDWAY-MIDWAY-R12 #1 line	P2-3	Non-Bus-Tie Breaker	121	<100	<100	<100	<100	<100	32	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D	P2-2	Bus	111	<100	<100	<100	<100	<100	47	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 1D & MIDWAY Section 1D 230kV	P2-4	Bus-Tie-Breaker	111	<100	<100	<100	<100	<100	47	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	137	<100	<100	14	<100	<100	37	16	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D & MIDWAY-MIDWAY-R12 #1 line	P2-3	Non-Bus-Tie Breaker	121	<100	<100	<100	<100	<100	31	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D	P2-2	Bus	111	<100	<100	<100	<100	<100	47	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 1D & MIDWAY Section 1D 230kV	P2-4	Bus-Tie-Breaker	111	<100	<100	<100	<100	<100	47	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	150	<100	<100	17	<100	<100	21	20	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D & MIDWAY-MIDWAY-R12 #1 line	P2-3	Non-Bus-Tie Breaker	129	<100	<100	<100	<100	<100	14	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D	P2-2	Bus	117	<100	<100	<100	<100	<100	34	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 1D & MIDWAY Section 1D 230kV	P2-4	Bus-Tie-Breaker	117	<100	<100	<100	<100	<100	34	<100	PGE Maintenance Bus Conversion Project
	Midway-Wheeler Ridge #1 & #2 230 kV Lines	P7	DCTL	NConv	NConv	184	13	NConv	NConv	90	16	Utilize Summer setup
	Midway-Wheeler Ridge #1 & #2 230 kV Lines	P7	DCTL	NConv	NConv	184	13	NConv	NConv	90	16	Utilize Summer setup
Midway-Wheeler Ridge #1 & #2 230 kV Lines	P7	DCTL	NConv	NConv	245	16	NConv	NConv	143	20	Utilize Summer setup	
Lerdo-Famoso 115 kV Line	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	106	126	116	<100	114	129	58	<100	Utilize Summer setup
	MIDWAY 115kV Section 2E	P2-2	Bus	106	126	116	<100	114	129	58	<100	Utilize Summer setup
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	106	126	116	<100	114	129	58	<100	Utilize Summer setup
	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	104	<100	<100	<100	<100	<100	36	<100	Utilize Summer setup
	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	74	93	79	27	139	96	83	26	Generation redispatch
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	74	93	79	<100	139	96	84	<100	Generation redispatch
	MIDWAY 115kV Section 2E	P2-2	Bus	74	93	79	27	139	96	83	26	Generation redispatch
	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	106	126	116	<100	105	129	54	<100	Utilize Summer setup
	MIDWAY 115kV Section 2E	P2-2	Bus	106	126	116	<100	105	129	54	<100	Utilize Summer setup
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	106	126	116	<100	106	129	54	<100	Utilize Summer setup
Lerdo-Kern Oil-7th Standard 115 kV Line	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	103	<100	<100	<100	<100	<100	33	<100	Utilize Summer setup
	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	112	135	124	13	137	138	65	18	Utilize Summer setup
	MIDWAY 115kV Section 2E	P2-2	Bus	112	135	124	13	137	138	65	18	Utilize Summer setup
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	112	135	124	13	137	138	65	18	Utilize Summer setup
	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	107	<100	<100	13	<100	<100	44	18	PGE Maintenance Bus Conversion Project
	KERN PWR 115kV - Section 1E & 2E	P2-4	Bus-Tie-Breaker	115	124	<100	36	51	126	49	<100	PGE Maintenance Bus Conversion Project
Line Oak Kern Oil 115 kV Line	KERN PWR 115kV - Section 1E & 2E	P2-4	Bus-Tie-Breaker	181	191	<100	58	76	194	80	21	PGE Maintenance Bus Conversion Project
	WESTPARK-MAGUNDEN 115kV [4130] MOAS OPENED ON COLUMBUS_BEAR TAP	P1	N-1	98	102	33	29	39	102	79	20	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan
	KERN-MAGUNDEN-WITCO 115kV [1970]	P1	N-1	95	107	32	31	28	108	75	17	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan
	7TH STANDARD-KERN 115kV [1981]	P1	N-1	95	106	32	35	25	107	73	13	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan
	KERN OIL-WITCO 115kV [1920]	P1	N-1	90	102	31	28	23	103	70	14	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan
	KERN-MAGUNDEN-WITCO 115kV [1970] (KERN PWR-KERNWATR)	P2-1	Line Section w/o Fault	112	121	37	42	30	122	84	21	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan
	KERN-MAGUNDEN-WITCO 115kV [1970] (KRN OL J-KERNWATR)	P2-1	Line Section w/o Fault	110	119	36	41	27	119	81	19	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan
MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	104	112	35	29	20	113	56	20	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Live Oak-Kern Oil 115 kV Line	MIDWAY 115kV Section 2E	P2-2	Bus	104	112	35	29	20	113	56	20	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	104	112	35	29	20	113	56	20	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan
	WESTPARK 115kV Bus (failure of non-redundent relay actually semi)	P5	Non-Redundant Relay	98	102	33	29	39	103	79	20	Add redundant Protection
	MAGUNDEN 115kV Bus (failure of non-redundent relay)	P5	Non-Redundant Relay	97	109	33	31	29	110	76	17	Add redundant Protection
	WITCO SS 115kV BUS (failure of non-redundent relay)	P5	Non-Redundant Relay	90	102	31	28	23	103	70	14	Add redundant Protection
	7TH STANDARD-KERN 115kV [1981] & KERN-MAGUNDEN-WITCO 115kV [1970]	P6	N-1-1	148	<100	<100	<100	<100	<100	<100	<100	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan
	Kern PP-Westpark No. 1 & 2 115 kV Lines	P7	DCTL	102	105	34	29	27	106	75	20	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan
	Kern-Magunden-Witco & Westpark-Magunden 115 kV Lines	P7	DCTL	96	108	32	30	27	108	74	16	Project: Kern PP 115 kV Area Reinforcement Short Term : Action Plan
Maricopa-Copus 70 kV Line	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	<100	28	24	<100	188	23	172	<100	Generation redispatch
	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	<100	31	26	<100	149	26	131	<100	Generation redispatch
	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	<100	31	25	<100	148	26	130	<100	Generation redispatch
	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	<100	31	25	<100	190	26	174	<100	Generation redispatch
	Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	72	80	78	<100	219	76	236	<100	Generation redispatch
	Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	76	83	80	<100	181	80	195	<100	Generation redispatch
	Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	74	83	79	<100	180	78	193	<100	Generation redispatch
	Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	74	83	79	<100	222	79	238	<100	Generation redispatch
Midsun-Midway 115 kV Line	MIDWAY-TAFT 115kV [2620]	P1	N-1	20	23	21	70	72	23	58	100	Sensitivity only
	MIDWAY - 2D 115kV & MIDWAY-TEMBLOR line	P2-3	Non-Bus-Tie Breaker	19	22	20	71	72	22	59	100	Sensitivity only
	TAFT 115kV - Ring R2 & R1	P2-3	Non-Bus-Tie Breaker	18	24	22	78	69	23	62	102	Sensitivity only
Midway 230/115 kV Transformer #3	MIDWAY 230kV Section 1D & MIDWAY-MIDWAY-R12 #1 line	P2-3	Non-Bus-Tie Breaker	143	<100	<100	<100	<100	<100	65	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D	P2-2	Bus	112	<100	<100	<100	<100	<100	35	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 1D & MIDWAY Section 1D 230kV	P2-4	Bus-Tie-Breaker	112	<100	<100	<100	<100	<100	35	<100	PGE Maintenance Bus Conversion Project
	MIDWAY - 2D 230kV & MIDWAY-MIDWAY-R12 #1 line	P2-4	Bus-Tie-Breaker	108	<100	<100	<100	<100	<100	44	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 2D	P2-2	Bus	108	<100	<100	<100	<100	<100	44	<100	PGE Maintenance Bus Conversion Project
Midway-Bakersfield 230 kV	MIDWAY 230kV - Middle Breaker Bay 3	P2-3	Non-Bus-Tie Breaker	<100	118	23	<100	71	119	<100	<100	Project:Midway-Kern PP 230 kV #2 Line Project Short Term : Action Plan
	MIDWAY 230kV Section 2E & MIDWAY-MIDWAY-R11 #1 line	P2-3	Non-Bus-Tie Breaker	<100	49	11	<100	107	51	<100	<100	Generation redispatch
	MIDWAY - 1E 230kV & MIDWAY-MIDWAY-R11 #1 line	P2-4	Bus-Tie-Breaker	<100	30	18	<100	110	31	<100	<100	Generation redispatch
	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	<100	30	18	<100	110	31	<100	<100	Generation redispatch
Midway-Kern #1 230 kV Line	MIDWAY Section 2D & MIDWAY Section 2E 230kV	P2-4	Bus-Tie-Breaker	117	<100	<100	33	<100	<100	23	34	PGE Maintenance Bus Conversion Project
	MIDWAY-KERN #3 230kV [5160] & KERN PP-BKRSFLDB-MIDWAY 230kV [0]	P6	N-1-1	110	<100	<100	<100	<100	<100	<100	<100	Project:Midway-Kern PP 230 kV #2 Line Project Short Term : Action Plan
	Midway-Kern No. 3 & Midway-Kern No. 4 230 kV Lines	P7	DCTL	110	<100	<100	33	<100	<100	22	35	Project:Midway-Kern PP 230 kV #2 Line Project Short Term : Action Plan
Midway-Kern #4 230 kV Line	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	150	<100	<100	18	<100	<100	12	25	PGE Maintenance Bus Conversion Project
	KERN PP-MIDWAY 230kV [0] & MIDWAY-KERN #3 230kV [5160]	P6	N-1-1	102	<100	<100	<100	<100	<100	<100	<100	Project:Midway-Kern PP 230 kV #2 Line Project Short Term : Action Plan
	Midway-Kern No. 3 & Midway-Kern No. 1 230 kV Lines	P7	DCTL	102	<100	<100	28	<100	<100	17	35	Project:Midway-Kern PP 230 kV #2 Line Project Short Term : Action Plan
	MIDWAY-TEMBLOR 115kV [2630] (TEMBLOR-PSE MCKJ)	P2-1	Line Section w/o Fault	42	43	26	41	94	43	105	101	Sensitivity only

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



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Midway-Temblor 115 kV Line	TEMBLOR 115kV Section 1D	P2-2	Bus	42	43	26	41	94	43	105	102	Sensitivity only
	TEMBLOR - 1D 115kV & TEMBLOR-SAN LUIS OBISPO line	P2-3	Non-Bus-Tie Breaker	42	43	26	41	94	43	105	102	Sensitivity only
	Caliente Sw Sta - Midway #1 & #2 230 kV Lines	P7	DCTL	39	43	15	<100	137	45	140	<100	Generation redispatch
Midway-Tupman-Renfro 115 kV Line	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	94	94	103	50	23	96	38	10	Utilize Summer setup
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	27	26	116	<100	16	26	<100	<100	Utilize Summer setup
	MIDWAY - 2D 115kV & MIDWAY-TEMBLOR line	P2-3	Non-Bus-Tie Breaker	27	26	119	19	16	26	<100	<100	Utilize Summer setup
	MIDWAY 115kV Section 2D	P2-2	Bus	27	26	118	19	16	26	<100	<100	Utilize Summer setup
	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	27	26	118	19	16	26	<100	<100	Utilize Summer setup
	MIDWAY-RENFRO-TUPMAN 115kV [2590] (MIDWAY-TPMNT1)	P2-1	Line Section w/o Fault	27	26	119	19	16	26	<100	<100	Utilize Summer setup
Midway-Tupman-Rio Bravo-Renfro 115 kV Line	MIDWAY 115kV Section 2D	P2-2	Bus	46	47	103	28	21	48	13	12	Utilize Summer setup
	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	46	47	102	27	20	48	13	12	Utilize Summer setup
	MIDWAY - 2D 115kV & MIDWAY-TEMBLOR line	P2-3	Non-Bus-Tie Breaker	46	47	103	28	21	48	13	12	Utilize Summer setup
	MIDWAY-RENFRO-TUPMAN 115kV [2590] (MIDWAY-TPMNT1)	P2-1	Line Section w/o Fault	45	47	105	28	20	48	14	12	Utilize Summer setup
Midway-Wheeler Ridge #1 230 kV Line	MIDWAY Section 2D & MIDWAY Section 2E 230kV	P2-4	Bus-Tie-Breaker	113	<100	<100	<100	<100	<100	72	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 2D & MIDWAY Section 2D 230kV	P2-4	Bus-Tie-Breaker	112	<100	<100	<100	<100	<100	72	<100	PGE Maintenance Bus Conversion Project
	MIDWAY - 2D 230kV & MIDWAY-MIDWAY-R12 #1 line	P2-4	Bus-Tie-Breaker	111	<100	<100	<100	<100	<100	73	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 2D	P2-2	Bus	111	<100	<100	<100	<100	<100	73	<100	PGE Maintenance Bus Conversion Project
	MIDWAY-WHEELER RIDGE #2 230kV [5200] (BUENAVJ2-MIDWAY)	P2-1	Line Section w/o Fault	109	<100	<100	<100	<100	<100	71	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 2D & MIDWAY Section 2E 230kV	P2-4	Bus-Tie-Breaker	104	<100	<100	37	<100	<100	62	28	PGE Maintenance Bus Conversion Project
	MIDWAY Section 2D & MIDWAY Section 2D 230kV	P2-4	Bus-Tie-Breaker	102	<100	<100	<100	<100	<100	61	<100	PGE Maintenance Bus Conversion Project
	MIDWAY - 2D 230kV & MIDWAY-MIDWAY-R12 #1 line	P2-4	Bus-Tie-Breaker	102	<100	<100	<100	<100	<100	63	<100	PGE Maintenance Bus Conversion Project
Midway-Wheeler Ridge #2 230 kV Line	MIDWAY 230kV Section 2D	P2-2	Bus	102	<100	<100	<100	<100	<100	63	<100	PGE Maintenance Bus Conversion Project
	MIDWAY-WHEELER RIDGE #1 230kV [5190] (BUENAVJ1-MIDWAY)	P2-1	Line Section w/o Fault	109	<100	<100	<100	<100	<100	71	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D & MIDWAY-MIDWAY-R12 #1 line	P2-3	Non-Bus-Tie Breaker	107	<100	<100	<100	<100	<100	75	<100	PGE Maintenance Bus Conversion Project
	MIDWAY Section 1D & MIDWAY Section 1E 230kV	P2-4	Bus-Tie-Breaker	107	<100	<100	<100	<100	<100	74	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 230kV Section 1D	P2-2	Bus	106	<100	<100	<100	<100	<100	72	<100	PGE Maintenance Bus Conversion Project
Semitropic-CHSR 115 kV	MIDWAY Section 1D & MIDWAY Section 1D 230kV	P2-4	Bus-Tie-Breaker	106	<100	<100	<100	<100	<100	72	<100	PGE Maintenance Bus Conversion Project
	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	<100	88	74	<100	119	90	<100	<100	Generation redispatch
	MIDWAY 115kV Section 2E	P2-2	Bus	<100	88	74	<100	119	90	<100	<100	Generation redispatch
Semitropic-Famoso 115 kV Line	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	<100	88	74	<100	119	90	<100	<100	Generation redispatch
	KERN PWR 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	98	105	<100	22	33	106	63	17	Utilize Summer setup
	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	66	88	72	<100	128	90	96	<100	Generation redispatch
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	66	88	72	<100	128	90	96	<100	Generation redispatch
	MIDWAY 115kV Section 2E	P2-2	Bus	66	88	72	<100	128	90	96	<100	Generation redispatch
Semitropic-Wasco 70 kV Line	MT POSO 13.80kV Gen Unit 1 & LERDO-KERN OIL-7TH STANDARD 115kV [1950]	P3	G-1/N-1	<100	104	110	<100	<100	105	97	<100	Utilize Summer setup
	MT POSO 13.80kV Gen Unit 1 & LERDO-KERN OIL-7TH STANDARD 115kV [1950]	P6	N-1-1	112	104	110	<100	<100	105	<100	<100	Utilize Summer setup
	MIDWAY 115kV Section 2E	P2-2	Bus	39	58	49	<100	107	59	92	<100	Generation redispatch
Smyrna-Semitropic-Midway 115 kV Line	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	39	58	49	<100	107	59	92	<100	Generation redispatch
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	39	57	49	<100	106	59	91	<100	Generation redispatch
Taft-Cuyama #1 70 kV Line	SEMITROPIC-MIDWAY #1 115kV [3630]	P1	N-1	52	58	50	41	70	59	33	100	Sensitivity only
Taft-Maricopa 70 kV Line	Base Case	P0	Base case	27	26	26	19	21	27	100	82	Sensitivity only
	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	12	29	28	<100	126	25	121	<100	Generation redispatch
	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	20	52	49	<100	151	48	144	<100	Generation redispatch
	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	<100	29	28	<100	104	26	97	<100	Generation redispatch
	MIDWAY 115kV - Section 2D & 1D	P2-4	Bus-Tie-Breaker	12	29	28	<100	126	25	121	<100	Generation redispatch
	Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	68	76	76	<100	158	73	181	<100	Generation redispatch
Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	91	100	98	<100	182	97	204	<100	Generation redispatch	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
	Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	60	66	64	<100	126	63	141	<100	Generation redispatch
	Midway-Taft & Fellows-Taft 115 kV Lines	P7	DCTL	68	76	76	<100	158	73	181	<100	Generation redispatch
Wasco-Famoso 70 kV Line	MIDWAY 115kV Section 2E	P2-2	Bus	60	81	78	<100	105	83	77	<100	Generation redispatch
	MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	60	81	78	<100	105	83	77	<100	Generation redispatch
	MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	60	81	78	<100	105	83	76	<100	Generation redispatch
Weedpatch-San Bernard 70 kV Line	Midway-Wheeler Ridge #1 & #2 230 kV Lines	P7	DCTL	NConv	NConv	195	<100	NConv	NConv	125	<100	Utilize Summer setup
	Midway-Wheeler Ridge #1 & #2 230 kV Lines	P7	DCTL	NConv	NConv	196	<100	NConv	NConv	70	<100	Utilize Summer setup
	Midway-Wheeler Ridge #1 & #2 230 kV Lines	P7	DCTL	NConv	NConv	177	<100	NConv	NConv	113	<100	Utilize Summer setup
	Midway-Wheeler Ridge #1 & #2 230 kV Lines	P7	DCTL	NConv	NConv	197	<100	NConv	NConv	70	<100	Utilize Summer setup
Westpark-Magunden (Columbus-Magunden) 115 kV	KERN PWR 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	98	126	<100	27	35	127	64	28	PGE Maintenance Bus Conversion Project
Wheeler Ridge-Weedpatch 70 kV Line	Midway-Wheeler Ridge #1 & #2 230 kV Lines	P7	DCTL	NConv	NConv	120	<100	NConv	NConv	60	<100	Utilize Summer setup

Study Area: **PG&E Kern**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
GANSO 115	P2-2:A15:40:_MIDWAY 115kV Section 2E	P2-2	Bus	0.98	0.96	0.89	NA	1.04	0.95	1.03	NA	Utilize Summer Setup
GANSO 115	P2-4:A15:14:_MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	0.98	0.96	0.90	NA	1.04	0.95	1.03	NA	Utilize Summer Setup
GANSO 115	P2-4:A15:15:_MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	0.98	0.96	0.90	NA	1.04	0.95	1.03	NA	Utilize Summer Setup
GOSE LKE 115	P2-2:A15:40:_MIDWAY 115kV Section 2E	P2-2	Bus	0.98	0.95	0.90	NA	1.05	0.95	1.04	NA	Utilize Summer Setup
GOSE LKE 115	P2-4:A15:14:_MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	0.98	0.95	0.90	NA	1.05	0.95	1.04	NA	Utilize Summer Setup
GOSE LKE 115	P2-4:A15:15:_MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	0.98	0.95	0.90	NA	1.05	0.95	1.04	NA	Utilize Summer Setup
MC FRLND 70	P2-2:A15:40:_MIDWAY 115kV Section 2E	P2-2	Bus	0.96	0.95	0.88	1.01	1.02	0.94	1.01	1.03	Utilize Summer Setup
MC FRLND 70	P2-4:A15:14:_MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	0.96	0.95	0.88	1.01	1.02	0.94	1.01	1.03	Utilize Summer Setup
MC FRLND 70	P2-4:A15:15:_MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	0.96	0.95	0.88	1.01	1.02	0.94	1.01	1.03	Utilize Summer Setup
PONDROAD 115	P2-2:A15:40:_MIDWAY 115kV Section 2E	P2-2	Bus	0.98	0.96	0.89	NA	1.04	0.96	1.03	NA	Utilize Summer Setup
PONDROAD 115	P2-4:A15:14:_MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	0.98	0.96	0.90	NA	1.04	0.96	1.03	NA	Utilize Summer Setup
PONDROAD 115	P2-4:A15:15:_MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	0.98	0.96	0.90	NA	1.04	0.96	1.03	NA	Utilize Summer Setup
SEMITROPIC_E 115	P2-2:A15:40:_MIDWAY 115kV Section 2E	P2-2	Bus	0.98	0.96	0.90	NA	1.04	0.95	1.03	NA	Utilize Summer Setup
SEMITROPIC_E 115	P2-4:A15:14:_MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	0.98	0.96	0.90	NA	1.04	0.95	1.03	NA	Utilize Summer Setup
SEMITROPIC_E 115	P2-4:A15:15:_MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	0.98	0.96	0.90	NA	1.04	0.95	1.03	NA	Utilize Summer Setup
SMTRPCWS 115	P2-2:A15:40:_MIDWAY 115kV Section 2E	P2-2	Bus	0.98	0.96	0.90	NA	1.04	0.95	1.03	NA	Utilize Summer Setup
SMTRPCWS 115	P2-4:A15:14:_MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	0.98	0.96	0.90	NA	1.04	0.95	1.03	NA	Utilize Summer Setup
SMTRPCWS 115	P2-4:A15:15:_MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	0.98	0.96	0.90	NA	1.04	0.95	1.03	NA	Utilize Summer Setup
SMYRNA 115	P2-2:A15:40:_MIDWAY 115kV Section 2E	P2-2	Bus	0.98	0.96	0.89	NA	1.04	0.96	1.03	NA	Utilize Summer Setup
SMYRNA 115	P2-4:A15:14:_MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	0.98	0.96	0.90	NA	1.04	0.96	1.03	NA	Utilize Summer Setup
SMYRNA 115	P2-4:A15:15:_MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	0.98	0.96	0.90	NA	1.04	0.96	1.03	NA	Utilize Summer Setup
WASCO 70	P2-2:A15:40:_MIDWAY 115kV Section 2E	P2-2	Bus	0.96	0.94	0.88	NA	1.01	0.94	1.00	NA	Utilize Summer Setup
WASCO 70	P2-4:A15:14:_MIDWAY 115kV - Section 2D & 2E	P2-4	Bus-Tie-Breaker	0.96	0.94	0.88	NA	1.01	0.94	1.00	NA	Utilize Summer Setup
WASCO 70	P2-4:A15:15:_MIDWAY 115kV - Section 2E & 1E	P2-4	Bus-Tie-Breaker	0.96	0.94	0.88	NA	1.01	0.94	1.00	NA	Utilize Summer Setup

2021-2022 ISO Reliability Assessment - Study Results

Study Area: **PG&E Kern**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
None												

Study Area: **PG&E Kern**

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	

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

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

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)											Potential Mitigation Solutions	
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

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

2021-2022 ISO Reliability Assessment - Study Results

Study Area: **PG&E Kern**



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)											Potential Mitigation Solutions	
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Clear Lake - Eagle Rock 60 kV (Clear Lake 60 kV sub to Konocti Sub 60 kV) (31334 31338)	FULTON 115KV - SECTION 2F & 1F	P2-4	Bus Tie Breaker Fault	NConv	NConv	51.07	NConv	NConv	44.65	41.32	37.31	NConv	58.42	34.33	Fulton 115kV bus upgrade or a new Fulton 230/60 kV bank
	FULTON BUS 1 & 2 SECTION D(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	52.25	NConv	NConv	46.58	44.94	46.08	NConv	64.8	43.14	Clear Lake 60 kV System Reinforcement – Dec 2027
Corona- Lakeville 115kV Line (31254 31255)	FULTON 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	112.26	112	135.08	121.36	128.09	156.32	74.07	35.69	113.63	82.49	49.4	Santa Rosa SPS
	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	116.66	112.82	124.66	111.4	119.39	NConv	55.18	18.43	117.3	62.3	20.54	Santa Rosa SPS
	FULTON BUS 1 & 2 SECTION D(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	135.02	NConv	NConv	155.87	74.51	35.7	NConv	82.1	49.42	Santa Rosa SPS
	FULTON 230/115KV TB 4 & FULTON 230/115KV TB 9	P6	N-1-1	116.36	111.12	124.45	108.73	117.37	NConv	<100	<100	115.4	<100	<100	Santa Rosa SPS
	FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	112.24	112.02	134.84	122.11	128.87	159.55	73.99	35.7	113.63	82.48	49.41	Santa Rosa SPS
EAGLE ROCK 115/60 KV BANK NO.1 (31344 31220)	GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON MPE TAP_MPE & EAGLE ROCK-REDBUD 115KV [1480] (2)	P6	N-1-1	107.19	105.87	111.78	98.89	100.69	NConv	<100	<100	109.98	<100	<100	Generation redispatch
Eagle Rock- Redbud 115 kV (Eagle Rock 115kV to Lower Lake 115 Kv Jct) (31225 31262)	CORTINA-MENDOCINO #1 115KV [1330] MOAS OPENED ON LUCERNJ1_LUCERNE & GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	107.12	104.35	112.01	<100	<100	NConv	<100	<100	109.74	<100	<100	Generation redispatch
Fulton- Molino- Cotati 60 kV	FULTON 115KV - SECTION 2F & 1F	P2-4	Bus Tie Breaker Fault	NConv	NConv	217.59	NConv	NConv	148.55	193.62	21.72	NConv	19.74	35.52	Fulton 115kV bus upgrade or a new Fulton 230/60 kV bank
	FULTON BUS 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	222	NConv	NConv	153.57	198.72	21.73	NConv	19.87	38.12	Install Redundant Relay
Fulton- Santa Rosa No.1 115 kV	FULTON-SANTA ROSA #2 115KV & CORONA-LAKEVILLE 115KV	P6	N-1-1	125.48	123.79	150.08	117.54	124.14	NConv	<100	<100	125.11	92.67	<100	Santa Rosa SPS
Fulton- Santa Rosa No.2 115 kV	FULTON-SANTA ROSA #1 115KV & CORONA-LAKEVILLE 115KV	P6	N-1-1	115.82	114.62	139.57	115.15	120	147.39	<100	<100	116.28	86.09	<100	Santa Rosa SPS
GEYSER # 3 - CLOVERDALE 115K (CLOVERDALE 115KV to MPE TAP115KV) (31208 31210)	FULTON 115KV - SECTION 2F & 1F	P2-4	Bus Tie Breaker Fault	NConv	NConv	70.05	NConv	NConv	58.37	51.67	38.86	NConv	53.92	34.92	Fulton 115kV bus upgrade or a new Fulton 230/60 kV bank
	EGLE RCK 115/60KV TB 1	P1	N-1	97.72	50.66	45.67	100.1	52.99	NConv	41.12	25.43	51.77	80.63	31.01	Generation redispatch

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
HOPLAND BANK 115/60.00 BANK NO.2 (31336 31206)	FULTON 115KV - SECTION 2F & 1F	P2-4	Bus Tie Breaker Fault	NConv	NConv	80.47	NConv	NConv	78.7	60.63	35.61	NConv	166.03	32.79	Fulton 115kV bus upgrade or a new Fulton 230/60 kV bank
	FULTON BUS 1 & 2 SECTION D(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	77.19	NConv	NConv	75.37	62.34	37.19	NConv	162.85	39.05	Maintenance project to increase capacity of Hopland Bank#2 by 2024
	FULTON 115/60KV TB 1 & FULTON 115/60KV TB 2	P6	N-1-1	NConv	NConv	<100	<100	NConv	<100	<100	<100	NConv	166.82	<100	Maintenance project to increase capacity of Hopland Bank#2 by 2024
	GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	100.97	53.52	52.21	101.53	54.18	53.74	48.02	33.57	52.36	94.4	41.04	Maintenance project to increase capacity of Hopland Bank#2 by 2024
Igancio-Alto 60kV (32664 32678)	IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 LINES	P7	DCTL	93.55	91.18	43.36	140.48	160.67	84.97	70.98	13.16	93.1	54.97	36.68	Ignacio Area Upgrade by Dec 2029
IGNACO A 115/60.00 kV BANK No. 2 (32664 32568)	IGNACIO 230/115KV TB 4	P1	N-1	38.35	66.84	40.35	93.98	92.79	57.16	79.03	102.98	63.19	75.88	86.18	Generation redispatch
	IGNACIO SVD=R	P1	N-1	30.21	54.94		84.35	83.71		80.62	100.81	51.79	66.55	87.81	Generation redispatch
Konocti - Eagle Rock 60kV (31338 31344)	FULTON 115KV - SECTION 2F & 1F	P2-4	Bus Tie Breaker Fault	NConv	NConv	82.04	NConv	NConv	64.71	61.05	30	NConv	68.17	39.48	Fulton 115kV bus upgrade or a new Fulton 230/60 kV bank
	FULTON BUS 1 & 2 SECTION D(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	82.72	NConv	NConv	66.09	63.74	35.36	NConv	71.93	44.97	Clear Lake 60 kV System Reinforcement – Dec 2027
Mendocino - Philo Jct - Hopland 60 kV(Mendocino Sub 60kV to UKIAH JT 60kV) (31300 31327)	GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON MPE TAP_MPE & MENDOCINO-UKIAH 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA	P6	N-1-1	103.68	109.1	142.14	<100	<100	NConv	<100	<100	109.37	<100	<100	Generation redispatch
Mendocino - Clearlake 60 kV (Mendocino Sub 60 kV to Upper Lake Sub 60 kV) (31300 31330)	EGLE RCK - MA 115KV & EGLE RCK-HOMSTKTP-CORTINA LINE	P2-3	Non-Bus Tie Breaker Fault	<100	56.46	NConv	<100	50.53	NConv	<100	15.8	57.71	<100	<100	Generation redispatch
	KONOCITI-EAGLE ROCK 60KV [6861] & CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON GRANITE_HPLND JT	P6	N-1-1	172.86	162.13	205.3	114.37	119.38	NConv	158.53	<100	172.76	98.74	93.94	Generation redispatch
San Rafeal Jct-Greenbre 60 kV Line (32678 32680)	IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 LINES	P7	DCTL	93.56	91.19	43.37	140.48	160.74	85	70.5	13.25	93.11	54.99	36.44	Ignacio Area Upgrade by Dec 2029
Santa Rosa- Corona 115 kv	FULTON 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	115.83	114.59	139.77	114.41	119.24	144.44	76.34	34.86	116.28	86.1	53.88	Santa Rosa SPS
	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	121.93	115.89	128.3	103.99	110.01	NConv	54.38	13.83	120.8	64.16	21.33	Santa Rosa SPS
	FULTON 230/115KV TB 4 & FULTON 230/115KV TB 9	P6	N-1-1	121.6	113.96	128.11	101.41	108.04	NConv	<100	<100	118.68	<100	<100	Santa Rosa SPS
	FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	115.82	114.62	139.57	115.15	120	147.39	76.25	34.87	116.28	86.09	53.9	Santa Rosa SPS
Sonoma - Pueblo 115 kV (31258 32564)	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	106.58	102.82	113	79.72	85.09	NConv	53.63	15.32	106.71	55.69	17.42	Install Redundant Relay
	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	106.47	101.39	114.84	<100	<100	<100	<100	<100	105.23	<100	<100	SPS or a new Fulton 230/60 kV bank
Tulucay - Vaca 230 kV (30440 30 30)	GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SANTAFE & VACA-LAKEVILLE #1 230KV [5840]	P6	N-1-1	110.89	<100	<100	92.11	<100	<100	<100	<100	<100	<100	<100	Switch in Vaca Dixon-Lakeville 230 kV series reactor
	LAKEVILLE 230KV - SECTION 1E & 2E	P2-4	Bus Tie Breaker Fault	113.49	113.25	101.14	89.73	91	101.25	<100	22.45	115.23	81.42	<100	Switch in Vaca Dixon-Lakeville 230 kV series reactor

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
	VACA-LAKEVILLE #1 230KV [5840] & GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SANTAFE	P6	N-1-1	<100	106.22	99.49	<100	93.52	NConv	<100	<100	108.98	<100	<100	Switch in Vaca Dixon-Lakeville 230 kV series reactor
Vaca-Lakeville #1 230Kv (30435 3030)	LAKEVILLE 230KV - SECTION 2E & 2D	P2-4	Bus Tie Breaker Fault	108.56	115.8	101.28	93.21	96.04	107.33	<100	11.68	118.51	69.27	<100	Switch in Vaca Dixon-Lakeville 230 kV series reactor
	TULUCAY-VACA 230KV [5800] & GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SANTAFE	P6	N-1-1	105.6	<100	<100	95.57	<100	<100	<100	<100	<100	<100	<100	Switch in Vaca Dixon-Lakeville 230 kV series reactor
	LAKEVILLE BUS 1&2 SECTION E(Failure of Non-Redundant Relay)	P5	Non-Redundant Relay	<100	105.83	94.74	<100	86.6	96.39	69.45	20.58	107.61	<100	31.2	Switch in Vaca Dixon-Lakeville 230 kV series reactor
	GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SANTAFE & TULUCAY-VACA 230KV [5800]	P6	N-1-1	<100	108.03	99.63	<100	97.21	NConv	<100	<100	111.59	<100	<100	Switch in Vaca Dixon-Lakeville 230 kV series reactor

2021-2022 ISO Reliability Assessment - Study Results

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

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
CALISTGA 60kv	CORONA - 1D 115KV & SANTA ROSA-CORONA LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	>0.9	>0.9	0.90	>0.9	>0.9	1.01	>0.9	1.02	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	CORONA 115KV SECTION 1D	P2-2	Bus Fault	0.85	0.94	0.93	0.90	0.90	0.97	1.01	1.04	1.02	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	CORONA-LAKEVILLE 115KV [4311]	P1	N-1	0.86	0.94	0.92	0.91	0.89	0.96	1.01	1.05	0.94	0.87	1.02	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	EAGLE ROCK-FULTON-SILVERADO 115KV [4392] (EGLE RCK-ERFT4_23CRJ)	P2-1	Line Section w/o Fault	0.85	>0.9	>0.9	0.90	>0.9	>0.9	1.00	>0.9	1.02	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	EGLE RCK-FULTON-SILVERDO 115KV [0]	P1	N-1	0.85	0.93	0.92	0.91	0.90	0.97	1.00	1.04	0.94	0.87	1.02	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON - 1D 115KV & FULTON-PUEBLO LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	>0.9	>0.9	0.91	>0.9	>0.9	1.00	>0.9	1.01	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON - 2D 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	>0.9	>0.9	0.91	>0.9	>0.9	1.00	>0.9	1.01	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 115/60KV TB 1	P1	N-1	0.85	0.94	0.93	0.91	0.89	0.96	1.00	1.05	0.94	0.87	1.02	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 115/60KV TB 2	P1	N-1	0.85	0.94	0.93	0.91	0.89	0.96	1.00	1.05	0.94	0.87	1.02	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	0.85	0.93	0.91	0.91	0.90	0.98	0.99	1.03	>0.9	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 115KV SECTION 1D	P2-2	Bus Fault	0.85	0.93	0.91	0.91	0.90	0.97	1.00	1.03	1.01	0.93	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 115KV SECTION 1F	P2-2	Bus Fault	0.85	0.94	0.93	0.91	0.89	0.96	1.00	1.05	1.02	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 115KV SECTION 2D	P2-2	Bus Fault	0.86	0.95	0.94	0.91	0.89	0.98	1.00	1.04	1.02	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 115KV SECTION 2F	P2-2	Bus Fault	0.86	0.95	0.93	0.91	0.90	0.96	1.01	1.04	1.03	0.95	0.88	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.73	0.88	0.74	0.82	0.81	0.76	1.00	1.04	1.01	0.87	0.85	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.85	0.94	0.87	0.90	0.89	0.86	1.00	1.04	1.01	0.93	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 230/115KV TB 4	P1	N-1	0.86	0.95	0.95	0.92	0.91	0.97	1.01	1.04	0.94	0.88	1.02	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 230/115KV TB 9	P1	N-1	0.85	0.93	0.91	0.91	0.89	0.96	1.00	1.03	0.94	0.87	1.01	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 230KV - MIDDLE BREAKER BAY 1	P2-1	Line Section w/o Fault	0.86	0.95	0.94	0.92	0.91	0.96	1.01	1.04	1.02	0.94	0.88	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 230KV - MIDDLE BREAKER BAY 3	P2-1	Line Section w/o Fault	0.85	0.93	0.92	0.91	0.90	0.96	1.00	1.05	1.02	0.93	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 230KV - MIDDLE BREAKER BAY 7	P2-1	Line Section w/o Fault	0.85	0.93	0.90	0.91	0.89	0.97	1.00	1.04	1.01	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON 230KV - MIDDLE BREAKER BAY 8	P2-1	Line Section w/o Fault	0.85	0.93	0.91	0.91	0.89	0.96	1.00	1.03	1.01	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON BUS 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	0.31	NConv	NConv	0.32	0.52	0.97	0.91	NConv	0.24	Switch in the Fulton SVD (230 kV)

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
CALISTGA 60kv	FULTON BUS 1 & 2 SECTION E/F (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	-5.45	-6.03	0.31	NConv	NConv	0.32	0.53	0.97	0.93	NConv	0.24	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON BUS 1&2 230 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.73	0.88	0.74	0.82	0.81	0.75	1.00	1.04	1.01	0.88	0.85	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON-LAKEVILLE 230KV [4950] (LAKEVILLE-T22_93)	P2-1	Line Section w/o Fault	>0.9	0.94	0.94	>0.9	0.89	0.96	>0.9	1.04	>0.9	0.94	>0.9	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	FULTON-LAKEVILLE 230KV [4950] (T22_93-FULTON)	P2-1	Line Section w/o Fault	>0.9	0.94	0.94	>0.9	0.89	0.97	>0.9	1.04	>0.9	0.94	>0.9	Switch in the Fulton SVD (230 kV)
CORONA 115kv	GEYSER12 13.80KV GEN UNIT 1 & CORONA-LAKEVILLE 115KV [4311]	P3	N-G-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Reactive support
DUNBAR 60kv	GEYSER12 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	N-G-1	0.85	>0.9	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	>0.9	Reactive support
CALISTGA 60kv	GEYSER16 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	N-G-1	0.77	0.83	0.83	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	0.83	>0.9	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	GEYSERS #12-FULTON 230KV [4750] (CR1T3_18-FULTON)	P2-1	Line Section w/o Fault	0.85	0.93	0.90	0.91	0.89	0.97	1.00	1.04	1.01	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	GEYSERS #12-FULTON 230KV [4750] (CR1T3_18-NCPATT2)	P2-1	Line Section w/o Fault	0.85	>0.9	>0.9	0.91	>0.9	>0.9	1.00	>0.9	1.02	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	GEYSERS #9-LAKEVILLE 230KV [4780] (CR2T3_18-LAKEVILLE)	P2-1	Line Section w/o Fault	0.85	>0.9	>0.9	0.91	>0.9	>0.9	1.00	>0.9	1.01	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	GEYSR12 - 1D 230KV & FULTON-GEYSR16-GEYSR12-GEYSR14 LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	0.93	0.90	0.91	0.89	0.97	1.00	1.04	1.01	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	GEYSR13 - 1D 230KV & GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	0.94	0.93	0.91	0.90	0.96	1.00	1.04	1.01	0.93	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	GEYSR14 - 1D 230KV & FULTON-GEYSR16-GEYSR12-GEYSR14 LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	0.93	0.90	0.91	0.89	0.97	1.00	1.04	1.01	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	GEYSR16 - 1D 230KV & FULTON-GEYSR16-GEYSR12-GEYSR14 LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	0.93	0.90	0.91	0.89	0.97	1.00	1.04	1.01	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	GEYSR18 - 1D 230KV & GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	0.94	0.93	0.91	0.90	0.96	1.00	1.04	1.01	0.93	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	GEYSR20 - 1D 230KV & GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	0.94	0.93	0.91	0.90	0.96	1.00	1.04	1.01	0.93	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	IGNACIO - 1D 230KV & IGNACIO-SOBRANTE LINE	P2-3	Non-Bus Tie Breaker Fault	0.87	0.95	0.95	0.92	0.91	0.97	1.01	1.05	1.02	0.95	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	IGNACIO - MA 115KV & IGNACIO-MARE ISLAND #1 LINE	P2-3	Non-Bus Tie Breaker Fault	0.86	0.94	0.95	0.92	0.90	0.96	1.01	1.04	1.02	0.95	0.88	Switch in the Fulton SVD (230 kV)

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
CALISTGA 60kv	IGNACIO - MA 115KV & IGNACIO-MARE ISLAND #2 LINE	P2-3	Non-Bus Tie Breaker Fault	0.86	0.94	0.95	0.92	0.90	0.96	1.01	1.04	1.02	0.95	0.88	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	IGNACIO 115KV SECTION MA	P2-2	Bus Fault	0.86	0.94	0.95	0.92	0.90	0.96	1.01	1.04	1.02	0.95	0.88	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	IGNACIO 230KV SECTION 1D	P2-2	Bus Fault	0.86	0.95	0.95	0.92	0.90	0.96	1.01	1.05	1.02	0.95	0.88	Switch in the Fulton SVD (230 kV)
GREENBRE 60KV	IGNACIO-ALTO 60KV [7150] MOAS OPENED ON IGNACO A_SAN_RFLJ & IGNACIO-ALTO-SAUSALITO #1 60KV [7160]	P6	N-1-1	0.88	0.89	>0.9	0.86	0.74	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Review effectiveness of switching in the Fulton SVD (230 kV), or reactive support
ALTO 60KV	IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 LINES	P7	DCTL	0.93	0.94	0.95	0.89	0.82	0.80	0.96	1.02	0.94	0.96	0.99	Review effectiveness of switching in the Fulton SVD (230 kV), or reactive support
GREENBRE 60KV		P7	DCTL	0.94	0.94	0.96	0.90	0.83	0.83	0.96	1.02	0.94	0.96	0.99	Review effectiveness of switching in the Fulton SVD (230 kV), or reactive support
CALISTGA 60kv	IGNACIO-SOBRANTE 230KV [4920] (CROCKETT-IGNACIO)	P2-1	Line Section w/o Fault	0.85	>0.9	>0.9	0.91	>0.9	>0.9	1.00	>0.9	1.02	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	LAKEVILLE - 2E 230KV & FULTON-LAKEVILLE LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	>0.9	>0.9	0.91	>0.9	>0.9	1.00	>0.9	1.02	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	LAKEVILLE - 2E 230KV & GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	>0.9	>0.9	0.90	>0.9	>0.9	1.00	>0.9	1.02	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	LAKEVILLE 230KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	0.85	>0.9	>0.9	0.91	>0.9	>0.9	1.00	>0.9	1.02	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	LAKEVILLE 230KV - SECTION 2E & 1E	P2-4	Bus Tie Breaker Fault	0.85	>0.9	>0.9	0.91	>0.9	>0.9	1.00	>0.9	1.02	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	LAKEVILLE 230KV - SECTION 2E & 2D	P2-4	Bus Tie Breaker Fault	0.85	>0.9	>0.9	0.91	>0.9	>0.9	1.00	>0.9	1.02	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	LAKEVILLE 230KV SECTION 2D	P2-2	Bus Fault	0.85	>0.9	>0.9	0.91	>0.9	>0.9	1.00	>0.9	1.02	>0.9	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	LAKEVILLE 230KV SECTION 2E	P2-2	Bus Fault	0.85	>0.9	>0.9	0.90	>0.9	>0.9	1.00	>0.9	1.02	>0.9	0.87	Switch in the Fulton SVD (230 kV)
DUNBAR 60KV	LAKEVILLE #1 60KV [7360]	P1	N-1	0.85	0.86	0.86	0.95	0.95	0.94	0.96	0.99	0.99	0.86	0.91	Reactive support
CALISTGA 60kv	LAKEVILLE - 2D 60KV & LAKEVILLE #1 LINE	P2-3	Non-Bus Tie Breaker Fault	0.78	0.84	0.83	0.89	0.88	0.91	0.96	1.00	0.99	0.84	0.84	Switch in the Fulton SVD (230 kV)

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
CALISTGA 60kv	LAKEVILLE 115KV SECTION 1D	P2-2	Bus Fault	0.85	0.94	0.92	0.91	0.89	0.96	1.01	1.05	1.02	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	NCPA2 230KV SECTION 1D	P2-2	Bus Fault	0.85	0.93	0.90	0.91	0.89	0.97	1.00	1.04	1.01	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	SANTA ROSA-CORONA 115KV [4309] (BELLVUE-PENNGRVE)	P2-1	Line Section w/o Fault	0.85	0.94	0.93	0.90	0.89	0.97	1.01	1.04	1.02	0.94	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	SANTAFE - 1D 230KV & GEYSR18-LAKEVILE-GEYSR20-GEYSR13 LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	0.94	0.93	0.91	0.90	0.96	1.00	1.04	1.01	0.93	0.87	Switch in the Fulton SVD (230 kV)
CALISTGA 60kv	SILVERDO - 1E 115KV & SILVERDO-FULTON-EGLE RCK LINE	P2-3	Non-Bus Tie Breaker Fault	0.85	0.93	0.92	0.91	0.90	0.97	1.00	1.04	1.02	0.94	0.87	Switch in the Fulton SVD (230 kV)

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	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		
CORONA 115kV	GEYSER16 13.80KV GEN UNIT 1 & CORONA-LAKEVILLE 115KV [4311]	P3	N-G-1	<8	<8	12	<8	<8	<8	<8	<8	<8	<8	<8	<8	Long term issue, keep monitor
PENNGRVE 115kV		P3	N-G-1	<8	<8	9	<8	<8	<8	<8	<8	<8	<8	<8	<8	Long term issue, keep monitor
CALISTGA 60kV	GEYSER16 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	N-G-1	8	11	11	<8	2	<8	<8	<8	<8	<8	10	Switch in the Fulton SVD (230 kV)	
CALISTGA 60kV	LAKEVILLE #1 60KV [7360]	P1	N-1	8	11	10	2	2	6	5	4	3	10	3	Switch in the Fulton SVD (230 kV)	

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

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2019-20 Transmission Planning Process for transient stability studies:									
http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf									

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)											Potential Mitigation Solutions	
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

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

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



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)											Potential Mitigation Solutions	
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Benton-Deschutes 60 kV Line (31576 31570)	COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	67.2	NConv	NConv	NConv	NConv	73.24	NConv	NConv	Install Redundant Relay
Benton-Deschutes 60 kV Line (31576 31570)	COTTONWOOD 230KV BUS SECTION E/G (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	179.04	147.86	159.55	43.6	116.19	154.84	13.37	80.51	Install Redundant Relay
Caribou - Table Mountain 230kV (31690 30255)	TBL MT D 230KV SECTION 1D	P2-2	Bus Fault	NConv	NConv	NConv	NConv	1.24	NConv	NConv	NConv	Modify Caribou RAS
	CARIBOU-TABLE MTN 230KV [4440] (BELDENTP-TBL MT D)	P2-1	Line Section w/o Fault	NConv	NConv	NConv	NConv	1.24	NConv	NConv	NConv	Modify Caribou RAS
	TBL MT D 230KV SECTION 1D	P2-2	Bus Fault	NConv	NConv	NConv	NConv	1.24	NConv	NConv	NConv	Modify Caribou RAS
	TBL MT D - 1D 230KV & IDLE LINE - NO DATA LINE	P2-3	Non-Bus Tie Breaker Fault	NConv	NConv	NConv	NConv	1.24	NConv	NConv	NConv	Modify Caribou RAS
	TBL MT D SECTION 1D & TBL MT E SECTION 1E 230KV	P2-4	Bus Tie Breaker Fault	NConv	NConv	NConv	NConv	1.24	NConv	NConv	NConv	Modify Caribou RAS
	TBL MT D 230KV - SECTION 1D & 2D	P2-4	Bus Tie Breaker Fault	NConv	NConv	NConv	NConv	1.24	NConv	NConv	NConv	Modify Caribou RAS
Caribou-Plumas Jct 60 kV Line (31677 31689)	TBL MT D 230KV - SECTION 1D & 2D	P2-4	Bus Tie Breaker Fault	NConv	NConv	NConv	NConv	13.1	NConv	NConv	NConv	Modify Caribou RAS
	CARIBOU-TABLE MTN 230KV [4440] (BELDENTP-TBL MT D)	P2-1	Line Section w/o Fault	NConv	NConv	NConv	NConv	15.55	NConv	NConv	NConv	Modify Caribou RAS
	TBL MT D 230KV SECTION 1D	P2-2	Bus Fault	NConv	NConv	NConv	NConv	15.55	NConv	NConv	NConv	Modify Caribou RAS
	TBL MT D SECTION 1D & TBL MT E SECTION 1E 230KV	P2-4	Bus Tie Breaker Fault	NConv	NConv	NConv	NConv	16.87	NConv	NConv	NConv	Modify Caribou RAS
	TBL MT D 230KV - SECTION 1D & 2D	P2-4	Bus Tie Breaker Fault	NConv	NConv	NConv	NConv	15.54	NConv	NConv	NConv	Modify Caribou RAS
Cascade No.1 115/60/13.8 kV Transformer (31468 31797)	COTTONWOOD 230KV BUS SECTION E/G (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	103.26	61.15	74.19	12.7	21.11	77.47	12.61	12.38	Cascade 115/60 kV No. 2 Transformer Project - Dec 2025
Cascade-Cottonwood 115 kV Line (31459 31469)	COTTONWOOD 230KV BUS SECTION E/G (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	113.08	117.48	125.86	28.58	51.82	119.45	57.05	40.52	Install Redundant Relay
Cascade-Deschutes 60 kV Line (31578 31592)	COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2-4	Bus Tie Breaker Fault	23.71	<100	<101	86.53	73.35	90.95	153.66	193.19	Sensitivity - gen redispatch
	COTTONWOOD 230KV BUS SECTION E/G (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	266.18	229.99	242.4	55.61	188.54	241.93	38.36	141.31	Install Redundant Relay
	CASCADE-COTTONWOOD 115KV [1240]	P1	N-1	57.33	73.21	58.51	93.09	93.72	70.38	83.35	100.35	Sensitivity - gen redispatch
	COTWD_E2 230/60KV TB 2 & COTWD_E 230/60KV TB 3	P6	N-1-1	133.41	147.8	158.32	<100	116.57	131.57176	<100	<100	Action plan
Cottonwood-Benton No.1 60 kV Line (31570 31572)	COTTONWOOD 230KV BUS SECTION E/G (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	103.12	88.17	96.79	31.91	60.03	91.88	3.41	35.75	Install Redundant Relay
Keswick-Cascade 60 kV Line (31564 31566)	COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	87.95	NConv	NConv	NConv	NConv	37.02	NConv	NConv	Install Redundant Relay
Palermo-Pease 115 kV Line (31482 31506)	TBL MT D - 1D 230KV & TBL MT D- TBL MT E 230KV	P2-3	Non-Bus Tie Breaker Fault	NConv	NConv	NConv	NConv	13.86	NConv	NConv	NConv	Modify Caribou RAS

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
Round Mountain - Cottonwood #1 230kV (37545 30 30)	ROUND MOUNTAIN 230KV BUS 1 & 2 SEC. E (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	142.15	137.13	133.61	75.98	44.64	137.14	157.19	76.45	Install Redundant Relay
Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498)	BUTTE-SYCAMORE CREEK 115KV [1190] (CHICOTP2-BUTTE)	P2-1	Line Section w/o Fault	96.16	97.46	104.85	44.56	23.78	98.47	50.15	13.15	Table Mountain SPS recommended in 2017-2018 TPP
	BUTTE 115KV SECTION MD	P2-2	Bus Fault	96.6	97.93	105.14	44.62	23.75	98.95	50.33	13.16	Table Mountain SPS recommended in 2017-2018 TPP
	BUTTE - MD 115KV & TABLE MTN-BUTTE #1 LINE	P2-3	Non-Bus Tie Breaker Fault	122.23	122.19	133.74	58.25	26.91	123.65	69.25	25.74	Table Mountain SPS recommended in 2017-2018 TPP
Table Mountain - Palermo 230kV (30300 30 30)	TBL MT D- TBL MT E 230KV & TABLE MTN-RIO OSO 230KV [5700]	P6	N-1-1	93.28	<100	NConv	<100	<100	93.28	NConv	98.51	Generation redispatch
Table Mountain No.3 230/115 kV Transformer (31504 30303)	TBL MT D - 1D 230KV & TBL MT D- TBL MT E 230KV	P2-3	Non-Bus Tie Breaker Fault	NConv	NConv	NConv	NConv	70.99	NConv	NConv	NConv	Modify Caribou RAS
Table Mountain-Butte No.1 115 kV Line (31500 31501)	Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	P7	DCTL	101.75	104.65	116.22	63.5	20.6	105.92	53.98	16.56	Table Mountain SPS recommended in 2017-2018 TPP
Table Mountain-Paradise 115 kV Line (31478 31494)	TBLE MTN 115KV SECTION 1D	P2-2	Bus Fault	87.22	90.68	100.79	34.58	16.46	91.94	50.29	11.7	Long term issue - continue to monitor
Trinity - Cottonwood 115kV (31522 31466)	COTTONWOOD 230KV BUS SECTION E/G (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	<100	117.25	124.83	19.52	73.79	118.09	<100	34.51	Install Redundant Relay
Trinity-Keswick 60 kV Line (31556 31564)	COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	90.2	NConv	NConv	NConv	NConv	38.06	NConv	NConv	Install Redundant Relay

2021-2022 ISO Reliability Assessment - Preliminary Study Results

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

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
MTN GATE 60kV	COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.89	NConv	NConv	0.96	0.98	0.91	0.97	0.98	Install Redundant Relay
STLLWATR 60kV		P5	Non-Redundant Relay	0.92	NConv	NConv	0.58	NConv	0.94	0.46	0.57	Install Redundant Relay
RED BLFF 60kV	COTTONWOOD 230KV BUS SECTION E/G (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.88	0.94	0.83	1.01	1.07	0.93	1.01	1.04	Install Redundant Relay
VINA 60kV	COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT_RED BLFF	P1	N-1	NA	0.96	0.89	0.99	1.07	0.96	1.00	1.05	Long term issue - continue to monitor
ANTLER 60kV	COTWDPGE 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Fault	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	0.98	>0.9	Cottonwood 115 kV Bus Sectionalizing Breaker Dec, 2025
MTN GATE 60kV		P2-4	Bus Tie Breaker Fault	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	0.98	>0.9	Cottonwood 115 kV Bus Sectionalizing Breaker Dec, 2025
EST QNCY 60kV	SPIQUINCY 13.80KV GEN UNIT 1 & IDLE LINE - NO DATA 230KV [9999]	P3	N-G-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
ANDERSON 60kV	COTWD_E2 230/60KV TB 2 & COTWD_E 230/60KV TB 3	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
BIG BAR 60kV	HUMBOLDT-TRINITY 115KV [1820] & BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	Long term issue - continue to monitor
BIG BAR 60kV	HUMBOLDT-TRINITY 115KV [1820] & KESWICK-CASCADE 60KV [7260] MOAS OPENED ON CASCADE_STLLWATR	P6	N-1-1	0.80	0.80	0.81	>0.9	>0.9	0.78	>0.9	>0.9	Non-BES
BIG MDWS 60kV	TABLE MT-VACA-DIX 500kV & TABLE MT 500/230KV TB 1	P6	N-1-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
CHESTER 60kV	TABLE MT-TESLA 500kV & TABLE MT 500/230KV TB 1	P6	N-1-1	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
CLMN FSH 60kV	COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2	P6	N-1-1	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
CR CANAL 60kV	CASCADE 115/60KV TB 1 & TYLER SVD=V	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Non-BES
DESCHUTS 60kV	KILARC-DESCHUTES 60KV [7300] & CASCADE-BENTON-DESCHUTES 60KV [6310]	P6	N-1-1	0.89	0.87	0.87	>0.9	>0.9	0.88	>0.9	>0.9	Non-BES
DIRYVLE 60kV	COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON COTTONWD_RED B JT & COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1-1	0.87	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Non-BES
EST QNCY 60kV	SPIQUINCY 13.80KV GEN UNIT 1 & IDLE LINE - NO DATA 230KV [9999]	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
FRNCHGLH 60kV	HUMBOLDT-TRINITY 115KV [1820] & KESWICK-CASCADE 60KV [7260] MOAS OPENED ON CASCADE_STLLWATR	P6	N-1-1	0.69	0.64	0.65	>0.9	>0.9	0.62	>0.9	>0.9	Non-BES
GANSNER 60kV	TABLE MT-VACA-DIX 500kV & TABLE MT 500/230KV TB 1	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
GERBER 60kV	COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2	P6	N-1-1	0.88	0.88	0.80	>0.9	>0.9	0.88	>0.9	>0.9	Operation Solution
GIRVAN 60kV	COTWD_E2 230/60KV TB 2 & COTWD_E 230/60KV TB 3	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
GROUSCRK 60kV	TRINITY 115/60KV TB 1 & KESWICK-CASCADE 60KV [7260] MOAS OPENED ON CASCADE_STLLWATR	P6	N-1-1	0.87	0.88	0.88	>0.9	>0.9	0.87	>0.9	>0.9	Non-BES
GRYS FLT 60kV	TABLE MT-VACA-DIX 500kV & TABLE MT 500/230KV TB 1	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Non-BES
HMLTN BR 60kV	TABLE MT-TESLA 500kV & TABLE MT 500/230KV TB 1	P6	N-1-1	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	Non-BES

2021-2022 ISO Reliability Assessment - Preliminary Study Results

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

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
HYAMPOM 60kV	HUMBOLDT-TRINITY 115KV [1820] & KESWICK-CASCADE 60KV [7260] MOAS OPENED ON CASCADE_STLLWATR	P6	N-1-1	0.86	0.88	0.88	>0.9	>0.9	0.87	>0.9	>0.9	Non-BES
LPSPI 60kV	COTWD_E2 230/60KV TB 2 & COTWD_E 230/60KV TB 3	P6	N-1-1	0.90	>0.9	0.81	>0.9	>0.9	0.90	>0.9	>0.9	Operation Solution
LS MLNSJ 60kV	COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON COTTONWD_RED B JT & COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1-1	0.86	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	Non-BES
RASN JNT 60kV	CASCADE 115/60KV TB 1 & TYLER SVD=V	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
RED BLFF 60kV	COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON COTTONWD_RED B JT & COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1-1	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Non-BES
RED BLFF 60kV	COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON COTTONWD_RED B JT & COLEMAN-RED BLUFF 60KV [6440]	P6	N-1-1	>0.9	0.90	0.81	>0.9	>0.9	0.90	>0.9	>0.9	Non-BES
SPANSHCK 60kV	TABLE MT-VACA-DIX 500kV & TABLE MT 500/230KV TB 1	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
STLLWATR 60kV	KESWICK-CASCADE 60KV [7260] MOAS OPENED ON CASCADE_STLLWATR & HUMBOLDT-TRINITY 115KV [1820]	P6	N-1-1	0.70	0.55	0.57	0.88		0.54	0.89	>0.9	Non-BES
SYCAMORE 115kV	SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV [4314] & TABLE MTN-BUTTE #1 115KV [3910]	P6	N-1-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
TYLER 60kV	CASCADE 115/60KV TB 1 & TYLER SVD=V	P6	N-1-1	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
VINA 60kV	COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON COTTONWD_RED B JT & COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1-1	0.85	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	Non-BES
VINA 60kV	COTWD_E2 230/60KV TB 2 & COTWD_E 230/60KV TB 3	P6	N-1-1	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	>0.9	>0.9	Long term issue - continue to monitor
VOLTA 60kV	COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON COTTONWD_RED B JT & COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Non-BES

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
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
CR CANAL 60kV	NEO REDB 13.80KV GEN UNIT 1	P1	G-1	9	9	11	9	<8	<8	<8	<8	Tyler 60 kV Shunt Capacitor
RASN JNT 60kV	NEO REDB 13.80KV GEN UNIT 1	P1	G-1	9	9	11	9	<8	<8	<8	<8	Tyler 60 kV Shunt Capacitor
TYLER 60kV	NEO REDB 13.80KV GEN UNIT 1	P1	G-1	9	9	11	9	<8	<8	<8	<8	Tyler 60 kV Shunt Capacitor
CR CANAL 60kV	NEO REDB 13.80KV GEN UNIT 1 & TYLER SVD=V	P3	N-G-1	<8	<8	11	<8	<8	<8	<8	<8	Long term issue, keep monitoring
RASN JNT 60kV	NEO REDB 13.80KV GEN UNIT 1 & TYLER SVD=V	P3	N-G-1	<8	<8	11	<8	<8	<8	<8	<8	Long term issue, keep monitoring
TYLER 60kV	NEO REDB 13.80KV GEN UNIT 1 & TYLER SVD=V	P3	N-G-1	<8	<8	11	<8	<8	<8	<8	<8	Long term issue, keep monitoring
RED BLFF 60kV	COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT_RED BLFF	P1	N-1	<8	<8	9	<8	9	<8	<8	<8	Operational Switching
RED BLFF 60kV	VOLTA1-2 9.11KV GEN UNIT 1 & COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT_RED BLFF	P3	N-G-1	<8	<8	9	<8	<8	<8	<8	<8	Long term issue, keep monitoring

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

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen	
In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2019-20 Transmission Planning Process for transient stability studies:									
http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf									

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)											Potential Mitigation Solutions	
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

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

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



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)											Potential Mitigation Solutions	
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen		2023 OP Heavy Renewable & Min Gas Gen

No single source substation with more than 100 MW

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



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)							Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off- Peak	2026 Spring Off- Peak	2031 Spring Off- Peak	2031 Winter Off- Peak	2023 SP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	
500 kV LINES														
MALIN-ROUND MTN # 2 500 kV	Diablo unit and Capt Jack-Olinda 500 kV	P3	G-1/L-1	<95%	N/A	N/A	96.7%	<95%	<95%	<95%	<95%	<95%	<95%	Reduce COI flow according to seasonal nomogram
MALIN-ROUND MTN # 2 500 kV	Diablo unit and Malin-Round Mtn # 1 500 kV	P3	G-1/L-1	109.3%	N/A	N/A	107.5%	<95%	<95%	<95%	104.2%	<95%	<95%	
MALIN-ROUND MTN # 1 500 kV	Diablo unit and Malin-Round Mtn # 2 500 kV	P3	G-1/L-1	95.7%	N/A	N/A	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
ROUND MTN –TABLE MTN #1 or #2 500 kV	Rnd Mtn –Table Mtn #2 or # 1 500 kV	P1	L-1	102.7%	N/A	N/A	97.0%	N/A	N/A	<95%	99.9%	N/A	<95%	Install SPS to bypass series capacitors on the remaining Round Mtn-Table Mtn 500 kV line if overload. With Diablo unit out, need to reduce COI flow after first contingency to avoid voltage collapse when series caps are bypassed
	Round Mtn-Table Mtn # 2 or # 1 500 kV and Diablo unit	P3	G-1/L-1	115.8%	N/A	N/A	109.4%	N/A	N/A	<95%	114.1%	N/A	<95%	
	Round Mtn-Table Mtn # 1 and Table Mtn 500/230 kV	P6	L-1/T-1	105.1%	N/A	N/A	100.1%	N/A	N/A	<95%	104.6%	N/A	<95%	
ROUND MTN-TABLE MTN # 1 500 kV	Round Mtn-Table Mtn # 2 and Table Mtn 500/230 kV	P2/P6	BRK	105.0%	N/A	N/A	99.3%	N/A	N/A	<95%	103.9%	N/A	<95%	
ROUND MTN –ROUND MT STATCOM #1 or #2 500 kV	Round Mtn - Round Mtn Statcom # 1 or 2 500 kV	P1	L-1	N/A	112.0%	115.3%	N/A	<95%	<95%	<95%	N/A	112.1%	N/A	Install SPS to bypass series capacitors on Round Mtn and Table Mtn on both lines
TABLE MTN –ROUND MT STATCOM #1 or #2 500 kV	Table Mtn - Round Mtn Statcom # 1 or 2 500 kV	P1	L-1	N/A	103.0%	107.5%	N/A	<95%	<95%	<95%	N/A	102.8%	N/A	
	Round Mtn Statcom - Table Mtn # 1 500 kV and Table Mtn 500/230 kV	P6	L-1/T-1	N/A	105.5%	109.1%	N/A	<95%	<95%	<95%	N/A	105.3%	N/A	
TABLE MTN –ROUND MT STATCOM #1 500 kV	Round Mtn Statcom-Table Mtn # 2 and Table Mtn 500/230 kV	P2	BRK	N/A	105.3%	108.9%	N/A	<95%	<95%	<95%	N/A	105.2%	N/A	
TABLE MTN-TESLA 500 kV	Table Mtn-Vaca Dix 500 kV and Diablo unit	P3	G-1/L-1	<95%	N/A	N/A	<95%	N/A	N/A	N/A	101.3%	N/A	<95%	reduce COI flow after first contingency
MIDWAY-WHIRLWIND # 3 500 kV	Midway-Vincent # 1 and 2 500 kV	P6	L-1/L-1	140.6%	<95%	<95%	<95%	<95%	142.5%	<95%	145.2%	<95%	154.8%	These overload are on the SCE lines. Please refer to SCE bulk results for potential mitigation solutions.
MIDWAY-VINCENT # 1 500 kV	Midway-Vincent # 2 and Midway-Whirlwind	P6	L-1/L-1	104.3%	<95%	<95%	<95%	<95%	106.3%	<95%	107.6%	<95%	114.8%	
MIDWAY-VINCENT # 2 500 kV	Midway-Vincent # 1 and Midway-Whirlwind 500 kV	P6	L-1/L-1	106.3%	<95%	<95%	<95%	<95%	108.4%	<95%	105.4%	<95%	117.1%	
500/230 kV TRANSFORMERS														
	Olinda 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	118.0%	124.2%	97.1%	<95%	<95%	<95%	
	Captain Jack-Olinda 500 kV	P1	L-1	<95%	<95%	<95%	<95%	107.9%	109.4%	<95%	<95%	<95%	<95%	
	Round Mtn-Statcom # 2 500 kV	P1	L-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV transformer and Table Mtn-Statcom # 1 or 2 500 kV	P2/P6	BRK	N/A	<95%	<95%	N/A	<95%	98.5%	<95%	N/A	<95%	N/A	
	Captain Jack-Olinda 500 kV and Olinda 500/230 kV transformer	P6	L-1/T-1	<95%	<95%	<95%	<95%	123.6%	128.8%	95.7%	<95%	<95%	<95%	

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



ROUND MTN 500/230 kV transformer	Olinda 500/230 kV transformer and Olinda-Tracy 500 kV line	P6	L-1/T-1	<95%	<95%	<95%	<95%	124.0%	131.6%	98.9%	<95%	<95%	<95%	Reduce COI flow according to the nomogram, reduce generation in the area
	Olinda-Tracy 500 kV and Captain Jack-Olinda 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	124.0%	128.5%	95.6%	<95%	<95%	<95%	
	Round Mnt-Round Mnt Statcom # 1 and #2 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	123.7%	125.2%	<95%	<95%	<95%	N/A	
	Table Mnt-Round Mnt Statcom # 1 and #2 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	125.0%	127.9%	<95%	<95%	<95%	N/A	
	Table Mt -Vaca Dix 500 kV and Table Mt 500/230 kV	P6	L-1/T-1	<95%	<95%	<95%	<95%	<95%	107.6%	<95%	<95%	<95%	<95%	
	Table Mt -Tesla 500 kV and Table Mt 500/230 kV	P6	L-1/T-1	<95%	<95%	<95%	<95%	<95%	103.5%	<95%	<95%	<95%	<95%	
	Malin-Round Mtn #1 and #2 500 kV	P6	L-1/L-1	<95%	96.3%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
TABLE MTN 500/230 kV transformer	normal conditions	P0	normal	<95%	<95%	<95%	<95%	97.0%	<95%	<95%	<95%	<95%	<95%	Reduce COI flow according to the nomogram, or reduce generation in the area
	Table Mtn-Vaca Dix or Table Mtn-Tesla 500 kV	P1	L-1	<95%	<95%	<95%	<95%	98.3%	<95%	<95%	<95%	<95%	<95%	
	Captain Jack-Olinda 500 kV	P1	L-1	<95%	<95%	<95%	<95%	100.8%	<95%	<95%	<95%	<95%	<95%	
	Olinda 500/230 kV	P1	T-1	<95%	<95%	<95%	<95%	97.6%	<95%	<95%	<95%	<95%	<95%	
	Olinda-Tracy 500 kV	P1	L-1	<95%	<95%	<95%	<95%	98.0%	<95%	<95%	<95%	<95%	<95%	
	Round Mtn 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	100.8%	<95%	<95%	<95%	<95%	95.0%	
	Vaca Dix 500 kV stuck BRK- lines to Table Mtn & transformer #11	P2/P6	BRK	<95%	<95%	<95%	<95%	99.8%	<95%	<95%	<95%	<95%	<95%	
	Round Mtn 500 kV stuck BRK- line to Table Mtn # 2 & transformer	P2/P6	L-1/T-1	<95%	<95%	<95%	<95%	101.5%	<95%	<95%	<95%	<95%	95.9%	
	Round Mtn 500 kV stuck BRK- line to Malin # 1 & transformer	P2/P6	BRK	<95%	<95%	<95%	<95%	101.3%	<95%	<95%	<95%	<95%	<95%	
	Round Mt -Table Mt # 1 and Round Mt 500/230	P2/P6	BRK	<95%	<95%	<95%	<95%	101.5%	96.3%	<95%	<95%	<95%	96.9%	
	Olinda-Tracy 500 kV and Olinda 500/230 kV transformer	P6	L-1/T-1	<95%	<95%	<95%	<95%	101.4%	95.6%	<95%	<95%	<95%	<95%	
Table Mtn-Vaca Dix and Table Mtn-Tesla 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	104.1%	97.7%	<95%	<95%	<95%	<95%		
Table Mtn-Tesla and Vaca Dix-Tesla 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	102.1%	<95%	<95%	<95%	<95%	<95%		
TESLA 500/230 kV # 6 transformer	Tesla-Metcalf and MossIndg-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	98.3%	<95%	sensitivity only	
METCALF 500/230 kV transformer #11, 12 or 13	Metcalf 500/230 kV Trnformers #11 & #12 or #13	P6	T-1/T-1	99.0%	97.4%	101.7%	104.2%	<95%	<95%	<95%	142.3%	100.4%	<95%	- Increase generation in the area after 1st contingency, - load tripping still might be required to address the P6 overload.
LOS BANOS 500/230 kV transformer	Gates 500/230 kV # 11 and # 12 transformers	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	117.6%	<95%	<95%	<95%	reduce generation in the area	
	Gates 500/230 kV # 12 transformer	P1	T-1	<95%	<95%	<95%	<95%	113.7%	146.3%	<95%	119.9%	<95%	122.6%	

GATES 500/230 kV # 11 transformer	Gates-Diablo 500 kV and Gates 500/230 # 12	P6	L-1/T-1	<95%	<95%	<95%	<95%	<P1	<P1	<95%	123.9%	<95%	131.5%	reduce generation in the area or install SPS to trip generation at Gates.
	LOSBANOS 230/500kV & GATES 230/500kV # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	125.6%	165.5%	<95%	129.2%	<95%	133.9%	
	MIDWAY 230/500 kV # 11, 12 or 13 & GATES 230/500kV #12	P6	T-1/T-1	<95%	<95%	<95%	<95%	118.7%	155.8%	<95%	127.1%	<95%	130.3%	
	Any two MIDWAY 230/500kV transformers	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	101.0%	<95%	<95%	<95%	<95%	
	Gates 500/230 kV # 12 transformer and Diablo unit	P3	G-1/T-1	<95%	N/A	<95%	<95%	N/A	N/A	N/A	125.1%	<95%	128.9%	
GATES 500/230 kV # 12 transformer	Gates 500/230 kV # 11 transformer	P1	T-1	<95%	<95%	<95%	<95%	115.6%	151.9%	<95%	124.0%	<95%	127.3%	reduce generation in the area or install SPS to trip generation at Gates.
	Los Banos 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	<95%	105.4%	<95%	<95%	<95%	<95%	
	Midway 500/230 kV transformer # 11,12 or 13	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	100.1%	<95%	<95%	<95%	<95%	
	Gates-Diablo 500 kV and Gates 500/230 # 11	P6	L-1/T-1	<95%	<95%	<95%	<95%	<P1	<P1	<95%	128.1%	<95%	131.5%	
	LOSBANOS 230/500kV & GATES 230/500kV #11	P6	T-1/T-1	<95%	<95%	<95%	<95%	128.0%	171.5%	<95%	133.4%	<95%	138.9%	
	MIDWAY 230/500kV & GATES 230/500kV #11	P6	T-1/T-1	<95%	<95%	<95%	<95%	121.0%	161.7%	<95%	131.4%	<95%	135.2%	
	Any two MIDWAY 230/500kV transformers	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	112.4%	<95%	<95%	<95%	95.9%	
	Gates 500/230 kV # 11 transformer and Diablo unit	P3	G-1/T-1	<95%	<95%	<95%	<95%	N/A	N/A	N/A	129.9%	<95%	134.2%	
MIDWAY 500/230 kV transformer # 11, 12 or 13	Any two MIDWAY 230/500kV transformers	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	107.2%	<95%	<95%	<95%	reduce generation at Midway after first contingency, or use Midway SPS	
230 kV LINES														
COTTONWD E-ROUND MTN 230kV #2	Table Mtn-Vaca Dix and Table Mtn-Tesla 500 kV	P6	L-1/L-1	<95%	<95%	98.5%	<95%	<95%	<95%	<95%	107.5%	<95%	<95%	Reduce COI flow according to seasonal nomogram, or upgrade the lines if economic.
COTTONWD E-ROUND MTN 230kV #3	Table Mtn-Vaca Dix and Table Mtn-Tesla 500 kV	P6	L-1/L-1	104.8%	102.4%	108.6%	<95%	<95%	<95%	<95%	118.5%	102.2%	<95%	
TABLE MTN-RIO OSO 230 kV	Tbl Mtn-Vaca Dix 500 kV and Table Mtn-Palermo 230 kV	P6	L-1/L-1	101.1%	101.4%	111.5%	<95%	<95%	<95%	<95%	<95%	101.9%	<95%	Project: Rio Oso 230 kV BAAH Bus Upgrade Project ISD: Dec 2022, currently delayed, not modeled Short term: COI Nomogram, or redispatch generation after first contingency
	Table Mtn-Vaca Dix and Table Mtn-Tesla 500 kV	P6	L-1/L-1	104.7%	103.2%	112.9%	<95%	<95%	<95%	<95%	101.8%	103.5%	<95%	
CAYETANO- LONETREE 230 kV	Tesla-Vaca Dix 500 kV and Diablo unit	P3	G-1/L-1	95.5%	N/A	N/A	<95%	N/A	N/A	N/A	<95%	N/A	<95%	
	Tesla-Metcalf 500 kV and Diablo unit	P3	G-1/L-1	96.0%	N/A	N/A	<95%	N/A	N/A	N/A	<95%	N/A	<95%	
	Tesla-Metcalf 500 kV and Tesla 500/230 # 2	P2/P6	BRK/or N-2	96.2%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Tesla-Metcalf and Metcalf-Moss Landing 500 kV	P6	L-1/L-1	100.7%	<95%	98.2%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	

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	Tesla-Metcalf & Mossland-LosBanos 500 kV	P6	L-1/L-1	100.7%	<95%	97.7%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	Also, P6 500 kV and 230 kV lines. Reduce generation in the area
	Tesla-Metcalf & Tesla-Los Banos 500kV	P6	L-1/L-1	96.5%	<95%	95.18%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Vaca Dix-Tesla & Tesla-Metcalf 500 kV	P6	L-1/L-1	100.1%	<95%	98.9%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
LAS POSITAS-NEWARK 230 KV	Tesla-Metcalf and Metcalf-Moss Lading 500 kV	P6	L-1/L-1	95.2%	<95%	99.2%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Vaca Dix-Tesla & Tesla-Metcalf 500 kV	P6	L-1/L-1	95.4%	<95%	100.5%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Tesla-Metcalf & Mossland-LosBanos 500 kV	P6	L-1/L-1	96.1%	<95%	98.6%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
NEWARK-LOS ESTEROS 230 KV	Tesla-Metcalf and MossIndg-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	diverged	<95%	<95%	dispatch generation in San Jose(Los Esteros) after first contingency. Use Metcalf SPS to avoid voltage collapse
	Tesla-Metcalf and MossIndg-Metcalf 500 kV	P6	L-1/L-1	<95%	<95%	95.1%	<95%	<95%	<95%	<95%	109.9%	<95%	<95%	
NEWARK-E-F BRK (to LOS ESTEROS) 230 KV	Tesla-Metcalf and MossIndg-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	96.5%	<95%	<95%	<95%	<95%	diverged	<95%	<95%	
	Tesla-Metcalf and MossIndg-Metcalf 500 kV	P6	L-1/L-1	<95%	<95%	97.8%	<95%	<95%	<95%	<95%	109.5%	<95%	<95%	
NEWARK-TESLA # 2 230 KV	Tesla-Metcalf and MossIndg-Metcalf 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	98.3%	<95%	<95%	
GOLDHILL-EIGHT MILE 230 KV	Table Mtn 500/230 kV	P1	T-1	<95%	<95%	<95%	<95%	<95%	97.7%	<95%	<95%	<95%	<95%	Winter ratings used for the Winter case. Use Table Mtn SPS. Table Mtn SPS modeled for off-peak cases. Reduce Ralston and Middle Fork generation if still overloads
	Table Mtn and Round Mtn 500/230 kV transformer	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	95.5%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Eight Mile-Lodi 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	<95%	130.6%	141.3%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Bellota-Weber 230 kV	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	101.2%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Bellota-Tesla 230 kV	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	101.5%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Tesla-Weber 230 kV	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	101.7%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Goldhill-Lodi 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	<95%	131.0%	141.3%	<95%	<95%	<95%	
GOLDHILL-LODI 230 KV	Table Mtn 500/230 kV	P1	T-1	<95%	<95%	<95%	<95%	<95%	98.1%	<95%	<95%	<95%	<95%	Winter ratings used for the Winter case. Use Table Mtn SPS. Table Mtn SPS modeled for off-peak cases. Reduce Ralston and Middle Fork generation if still overloads
	Table Mtn and Round Mtn 500/230 kV transformer	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	96.0%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Tesla-Weber 230 kV	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	102.2%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Tesla-Bellota 230 kV	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	102.0%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Bellota-Weber 230 kV	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	101.7%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Gold Hill-Eight Mile 230 kV	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	132.4%	142.9%	<95%	<95%	<95%	
	Table Mtn 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	107.8%	121.6%	<95%	<95%	<95%	<95%	

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EIGHT MILE -TESLA 230 kV	Diablo unit and Table Mtn 500/230 kV transformer	P3	G-1/T-1	<95%	N/A	N/A	<95%	N/A	N/A	N/A	<95%	<95%	96.1%	Winter ratings used for the Winter case. Table Mtn SPS modeled for off-peak cases. Summer rating is limited by substation bus or jumper. Consider upgrade of this equipment to eliminate P1 overload. Reduce Ralston and Middle Fork generation and/or separate the system if still overloads
	Table Mtn and Round Mtn 500/230 kV transformer	P6	T-1/T-1	<95%	<95%	<95%	<95%	110.3%	124.2%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 and Table Mtn-Statcom # 1 or 2 500 kV	P2/P6	BRK	N/A	<95%	<95%	N/A	108.0%	121.4%	<95%	N/A	<95%	N/A	
	Table Mtn 500/230 kV and Bellota-Weber 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	116.8%	132.1%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Tesla-Weber 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	118.1%	132.9%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Tesla-Bellota 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	117.6%	132.5%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Stagg-Eight Mile 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	160.6%	177.3%	111.7%	<95%	<95%	112.9%	
	Table Mtn 500/230 kV and Stagg-Tesla 230 kV, or Stagg BRK	P6	T-1/L-1	<95%	<95%	<95%	<95%	165.1%	167.8%	102.0%	<95%	<95%	97.8%	
STAGG-EIGHT MILE 230 kV	Table Mtn 500/230 kV and Eight Mile-Tesla 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	139.7%	152.3%	107.0%	<95%	<95%	104.0%	
STAGG H - STAGG F BRK 230 kV		P6	T-1/L-1	<95%	<95%	<95%	<95%	114.9%	125.6%	105.2%	<95%	<95%	<95%	
STAGG D - STAGG F BRK 230 kV		P6	T-1/L-1	<95%	<95%	<95%	<95%	114.3%	127.2%	102.8%	<95%	<95%	<95%	
STAGG-TESLA E 230 kV		P6	T-1/L-1	<95%	<95%	<95%	<95%	145.8%	166.3%	<95%	<95%	<95%	<95%	
STAGG-TESLA E 230 kV	Table Mtn 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	<95%	97.1%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV transformer and Tesla-Weber 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	<95%	102.6%	<95%	<95%	<95%	<95%	
BELLOTA-BRIGHTON 230 kV	Table Mtn 500/230 kV transformer and Diablo unit	P3	G-1/T-1	<95%	N/A	N/A	<95%	N/A	N/A	N/A	<95%	N/A	96.1%	
BELLOTA-COTTLE 230 kV	Gates 500/230 # 11 and # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	100.8%	<95%	<95%	sensitivity only
BELLOTA-WEBER 230 kV	Table Mtn 500/230 kV and Bellota-Tesla 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	105.3%	120.7%	<95%	<95%	<95%	<95%	Table Mtn 500/230 kV SPS assumed for off peak cases. Reduce generation from Collerville, Electra and Valley Springs
	Table Mtn 500/230 kV and Eight Mile-Tesla 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	<95%	103.8%	<95%	<95%	<95%	<95%	
TESLA-WEBER 230 kV	Table Mtn 500/230 kV and Bellota-Tesla 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	115.5%	127.0%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Gold Hill-Eight Mile 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	<95%	103.4%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	<95%	96.2%	<95%	<95%	<95%	<95%	
	Table Mtn and Round Mtn 500/230 kV	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	100.1%	<95%	<95%	<95%	<95%	
BELLOTA-TESLA 230 kV	Table Mtn and Round Mtn 500/230 kV	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	97.7%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Bellota-Weber 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	109.5%	123.3%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Gold Hill-Eight Mile 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	<95%	101.1%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV and Eight Mile-Tesla 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	<95%	101.4%	<95%	<95%	<95%	<95%	

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	Table Mtn 500/230 kV and Tesla-Weber 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	113.0%	125.5%	<95%	<95%	<95%	<95%		
DELEVAN-CORTINA 230 KV	Olinda-Tracy 500 kV	P1	L-1	97.3%	<95%	98.03%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	Reduce generation in the area	
	Table Mtn-Vaca Dix 500 kV	P1	L-1	95.8%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	<95%		
	Olinda-Tracy 500 kV and Diablo unit	P3	G-1/L-1	103.8%	N/A	N/A	<95%	N/A	N/A	N/A	<95%	N/A	<95%		
	Table Mtn-Vaca Dix 500 kV and Diablo unit	P3	G-1/L-1	102.0%	N/A	N/A	<95%	N/A	N/A	N/A	<95%	N/A	<95%		
	Table-VacaDix and Table Mt-Round Mt # 1 500 kV	P2/P6	BRK/or L-2	98.0%	<95%	99.3%	<95%	<95%	<95%	<95%	<95%	<95%	<95%		
	Vaca Dix -Table Mtn 500 kV and VacaDix 500/230 # 11	P2/P6	BRK/or N-2	96.2%	<95%	99.1%	<95%	<95%	<95%	<95%	<95%	<95%	<95%		
	Table-Vaca Dix and Table Mt-Round Mtn #2 500 kV	P6	L-1/L-1	98.1%	<95%	99.1%	<95%	<95%	<95%	<95%	<95%	<95%	<95%		
	Table Mtn-Vaca Dix and Vaca Dix-Tesla 500 kV	P6	L-1/L-1	98.0%	<95%	97.9%	<95%	<95%	<95%	<95%	<95%	<95%	95.6%		<95%
	Round Mtn Statcom-Round Mtn 500 kV #2 and Malin-Round Mtn # 2 500 kV	P6	L-1/L-1	N/A	97.7%	<95%	N/A	<95%	<95%	<95%	<95%	N/A	99.4%		N/A
	Round Mtn-Table Mtn 500 kV #1 and #2 500 kV	P6	L-1/L-1	104.0%	N/A	N/A	<95%	N/A	N/A	N/A	<95%	N/A	<95%		
	Round Mtn Statcom-Table Mtn 500 kV #1 and #2 500 kV	P6	L-1/L-1	N/A	98.0%	105.4%	N/A	<95%	<95%	<95%	<95%	N/A	99.5%		N/A
Round Mtn-Round Mtn Statcom 500 kV #1 and #2 500 kV	P6	L-1/L-1	N/A	98.0%	105.3%	N/A	<95%	<95%	<95%	<95%	N/A	99.5%	N/A		
Table Mtn-Vaca Dix and Table Mtn-Tesla 500 kV	P6	L-1/L-1	108.5%	103.3%	112.3%	<95%	<95%	<95%	<95%	<95%	<95%	104.7%	<95%		
WARNERVILLE-WILSON 230 KV	Gates 500/230 kV # 11 and 12	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	123.1%	<95%	<95%	<95%	<95%	insert Wilson series reactor	
MELONES-COTTLE 230 KV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	<95%	<95%	100.1%	<95%	<95%	Sensitivity only	
	Gates 500/230 kV # 11 and # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	109.1%	<95%	<95%		
DOS AMIGOS-PANOCHÉ #2 230 KV	Gates 500/230 kV # 11 and # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	132.0%	<95%	120.1%	Reduce generation in the area(Tranquility and/or Pine Flat, Balch)	
	Los Banos-Gates # 1 and # 3 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	97.1%	<95%	<95%		
LOS BANOS-DOS AMIGOS 230 KV	Gates 500/230 kV # 11 and # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	107.2%	<95%	105.4%	<95%	<95%		
PADRE FLAT-PANOCHÉ 230 KV	Gates 500/230 kV # 11 and # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	101.4%	<95%	<95%		
LOS BANOS-PANOCHÉ #2 230 KV	Gates 500/230 kV # 11 and # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	98.7%	122.5%	<95%	120.8%	<95%	109.2%		
MUSTANG SS-SWITCH STA 230 KV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	<95%	<95%	110.4%	<95%	<95%	Sensitivity only, reduce generation in the area. Radial line	
	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	99.9%	98.9%	<95%	119.1%	<95%	<95%		

MOSSLANDING-LAS AGUILAS 230 kV	Tesla-Metcalf 500 kV	P1	L-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	107.1%	<95%	<95%	Turning off generation in the area for P6 may not eliminate overloads without turning on Moss Landing generation in some cases.
	Mosslanding-Los Banos 500 kV	P1	L-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	111.6%	<95%	<95%	
	Mosslanding-Los Banos and Tracy-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	103.5%	<95%	<95%	118.1%	<95%	<95%	
	Tesla-Metcalf and Tesla-Table Mtn 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	109.5%	<95%	<95%	
	Moss Landing-Los Banos 500 kV and Los Banos 500/230 kV	P6	L-1/T-1	<95%	<95%	<95%	<95%	99.1%	<95%	<95%	114.8%	<95%	<95%	
	Gates 500/230 kV # 11 and # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	103.6%	109.1%	<95%	121.9%	<95%	98.6%	
	Moss Landing-Los Banos and Los Banos-Gates 500 kV# 1	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	115.2%	<95%	<95%	
	Moss Landing-Los Banos and Los Banos-Gates 500 kV# 3	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	113.1%	<95%	<95%	
	Tesla-Los Banos & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	107.8%	<95%	<95%	122.0%	<95%	<95%	
	Mosslanding-Los Banos 500 kV & Tesla-Metcalf 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	127.2%	101.1%	<95%	diverged	<95%	96.3%	
HENRIETTA-HENTAP (to Mustang and Gregg) 230 kV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	104.7%	<95%	<95%	<95%	<95%	reduce generation in the area (Henrietta 230 kV)
	Los Banos 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	<95%	106.1%	<95%	<95%	<95%	<95%	
230/115 kV TRANSFORMERS and 230/70 kV														
NEWARK 230/115 kV #11	Tesla-Metcalf and Metcalf-Moss Landing 500 kV	P6	L-1/L-1	<95%	<95%	95.3%	<95%	<95%	<95%	<95%	95.6%	<95%	<95%	Adjust NRS phase shifter and/or increasing generation in the area.
	Tesla-Metcalf 500 kV and Newark -Los Esteros 230 kV	P6	L-1/L-1	103.4%	101.1%	113.2%	<95%	<95%	<95%	<95%	106.1%	101.0%	<95%	
	Tesla-Metcalf 500 kV and Newark E-F 230 kV bus tie (to Los Esteros)	P6	L-1/BRK	108.7%	105.8%	117.8%	<95%	<95%	<95%	<95%	110.8%	105.7%	<95%	
115 kV LINES														
DELTA - CASCADE 115 kV	Malin-Round Mtn #1 and #2 500 kV	P6	L-1/L-1	98.7%	<95%	97.4%	107.4%	<95%	<95%	<95%	98.3%	<95%	<95%	adjust Weed Phase Shifter or limit COI flow within seasonal nomogram
	Round Mtn-Table Mtn # 1 and # 2 500 kV	P6	L-1/L-1	<95%	<95%	<95%	98.4%	<95%	<95%	<95%	<95%	<95%	<95%	
NEWARK D-NRS 400 115 kV	Tesla-Metcalf 500 kV and Newark- Newark brk (to Los Esteros) 115 kV	P6	L-1/BRK	96.3%	<95%	143.2%	<95%	<95%	<95%	<95%	114.0%	113.6%	<95%	Adjust NRS phase shifter and/or increasing generation in the area. In 2031, install additional reactive support in San Jose
	Tesla-Metcalf 500 kV and Newark -Los Esteros 230 kV kV	P6	L-1/L-1	<95%	<95%	135.1%	<95%	<95%	<95%	<95%	105.6%	105.2%	<95%	
NEWARK F-NRS 300 115 kV	Tesla-Metcalf 500 kV and Newark- Newark brk (to Los Esteros) 115 kV	P6	L-1/BRK	<95%	<95%	108.4%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Tesla-Metcalf 500 kV and Newark -Los Esteros 230 kV kV	P6	L-1/L-1	<95%	<95%	102.2%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
NEWARK E-FANKER-KIEFER 115 kV	Tesla-Metcalf 500 kV and Newark- Newark brk (to Los Esteros) 230 kV	P6	L-1/L-1	<95%	<95%	103.7%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	

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



NEWARK-ZANKER-RIVER 115 kV	Tesla-Metcalf 500 kV and Newark -Los Esteros 230 kV	P6	L-1/L-1	<95%	<95%	100.6%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
NEWARK-LOCKHID J2 (APPLIED MATERIALS) # 1 115 kV	Tesla-Metcalf and Metcalf-Moss Landing 500 kV	P6	L-1/L-1	101.1%	<95%	96.1%	<95%	<95%	<95%	<95%	105.3%	<95%	<95%	Dispatch generation in San Jose (Metcalf) after first contingency, or adjust phase-shifter at NRS
	Tesla-Metcalf & Mossland-LosBanos 500 kV	P6	L-1/L-1	102.5%	<95%	<95%	<95%	<95%	<95%	<95%	diverged	<95%	<95%	
LOS ESTEROS - NORTECH 115 kV	Normal conditions	P0	normal	<95%	<95%	100.7%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	also other P1 contingencies in San Jose and P6 contingencies in the area in the 2031 Summer peak case. Rating limited by substation Bus or Jumper Conductor rating. Consider replacing the jumper. Install additional reactive support for low voltages, this will also mitigate overloads
	Table Mtn-Vaca Dix 500 kV	P1	L-1	<95%	<95%	103.7%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Table Mtn-Tesla 500 kV	P1	L-1	<95%	<95%	103.3%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Metcalf-Tesla 500 kV	P1	L-1	<95%	<95%	102.8%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Olinda-Tracy 500 kV	P1	L-1	<95%	<95%	102.8%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Vaca Dix-Tesla 500 kV	P1	L-1	<95%	<95%	101.7%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Table Mtn-Tesla 500 kV and Los Esteros-Trimble 115 kV	P6	L-1/L-1	<95%	<95%	109.6%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Tesla-Metcalf and Metcalf-Moss Landing 500 kV	P6	L-1/L-1	<95%	<95%	106.8%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Tesla-Metcalf & Mossland-LosBanos 500 kV	P6	L-1/L-1	<95%	<95%	105.8%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Bi-pole PDCI	P7	HVDC	<95%	<95%	105.5%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Table Mtn-Tesla and Tesla-Metcalf 500 kV	P6	L-1/L-1	<95%	<95%	105.1%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Table Mtn-Tesla and Tesla-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	104.3%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Tesla-Metcalf and Tesla-Losbanos 500 kV	P6	L-1/L-1	<95%	<95%	104.2%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
	Table Mtn-Vaca Dix and Vaca Dix-Tesla 500 kV	P6	L-1/L-1	<95%	<95%	104.1%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
Olinda-Tracy and Tracy-Tesla 500 kV	P6	L-1/L-1	<95%	<95%	104.1%	<95%	<95%	<95%	<95%	<95%	<95%	<95%		
Tesla-Table Mt and Tesla- Tracy 500 kV	P6	L-1/L-1	<95%	<95%	104.0%	<95%	<95%	<95%	<95%	<95%	<95%	<95%		
Table-Vaca and Table Mt-DRS #1 or # 2 500 kV	P6	L-1/L-1	<95%	<95%	103.9%	<95%	<95%	<95%	<95%	<95%	<95%	<95%		
Vaca Dix- Tesla and Tesla-Metcalf 500 kV	P6	L-1/L-1	<95%	<95%	103.7%	<95%	<95%	<95%	<95%	<95%	<95%	<95%		
NORTECH-NRS 300 115 kV	Tesla-Metcalf and Metcalf-Mosslanding 500 kV	P6	L-1/L-1	<95%	<95%	95.7%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	not a violation, monitor
SPRING GAP-Mi WUK 115 kV	Normal conditions	P0	normal	<95%	<95%	<95%	98.9%	<95%	<95%	<95%	98.6%	98.5%	<95%	not a violation, monitor
KERN FRNT-POSO MTN JCT-LIVE OAK 115 kV	Normal conditions	P0	normal	99.1%	106.2%	<95%	<95%	<95%	<95%	<95%	<95%	107.0%	<95%	reduce generation in the area (Live Oaks)
	Tracy-Los Banos and Los Banos-Gates # 3 500 kV	P6	L-1/L-1	<95%	97.7%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
EXCHEQUER-LE GRAND 115 kV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	97.3%	<95%	<95%	100.1%	<95%	<95%	reduce generation in the area (Exchequer)

2021-2022 ISO Reliability Assessment - Study Results

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



MENDOTA-NORTH STAR 115 kV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	<95%	<95%	113.9%	<95%	<95%	reduce generation in the area (Northstar)
HERNDON-WOODWARD 115 kV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	98.2%	115.3%	<95%	<95%	<95%	<95%	reduce generation in the area (Kerkhoff)
	Gates 500/230 kV # 11 and 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	103.1%	<95%	<95%	<95%	<95%	
	Los Banos-Gates # 1 and Gates-Midway 500 kV	P2/P6	BRK	<95%	<95%	<95%	<95%	<95%	98.5%	<95%	<95%	<95%	<95%	
MENDOTA-PANOCHÉ 115 kV	Table Mtn 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	<95%	97.5%	<95%	<95%	<95%	<95%	reduce generation in the area (Northstar) if overload
	Table Mtn 500/230 and Tesla 500/230 # 2, 4 or 6	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	98.5%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 and Round Mtn 500/230	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	98.0%	<95%	<95%	<95%	<95%	
BELRDGE - MIDWAY 115 kV	Gates 500/230 kV # 11 and # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	104.3%	<95%	<95%	<95%	<95%	110.1%	Reduce generation in the area (Pump Jack)
CHENY T-PANOCHÉ 115 kV	Gates 500/230 kV # 11 and # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	100.8%	Reduce generation in the area (Exelsior)
CONTADNA-JACKSON SW 115 kV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	102.2%	<95%	<95%	<95%	<95%	reduce generation in the area (Connected to Jackson Switching station)
MANTECA-AVENAL-MELONES 115 kV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	104.9%	<95%	<95%	<95%	<95%	reduce generation in the area (Tulloch or/and Sandbar)
	Table Mtn and Round Mtn 500/230 kV transformer	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	103.3%	<95%	<95%	<95%	<95%	
	Table Mtn and Tesla 500/230 kV transformer	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	104.5%	<95%	<95%	<95%	<95%	
	Gates 500/230 kV # 11 and # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	95.4%	<95%	<95%	<95%	<95%	
	Table Mtn 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	<95%	101.6%	<95%	<95%	<95%	<95%	
MANTECA-RIPON 115 kV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	96.2%	106.8%	<95%	<95%	<95%	<95%	reduce generation in the area (Tulloch or/and Sandbar)
	Table Mtn 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	<95%	102.7%	<95%	<95%	<95%	<95%	
	Round Mtn and Table Mnt 500/230 kV	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	104.3%	<95%	<95%	<95%	<95%	
	Gates 500/230 kV # 11 and # 12	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	96.8%	<95%	<95%	<95%	<95%	
	TABLE MTN 500/230 and TESLA 500/230 # 2	P6	T-1/T-1	<95%	<95%	<95%	<95%	<95%	105.4%	<95%	<95%	<95%	<95%	
70 kV LINES (normal conditions only)														
KETTLEMAN-GATES 70 kV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	150.9%	<95%	<95%	<95%	<95%	Mitigation in Fresno local area studies
AVENAL-SUN CITY 70 kV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	119.9%	<95%	<95%	<95%	<95%	Mitigation in Fresno local area studies
SCHINDLER-CRESCENT 70 kV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	102.2%	<95%	<95%	<95%	<95%	Mitigation in Fresno local area studies

TAFT-TAFT SWITCH STA 70 kV	Normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	121.1%	<95%	109.6%	<95%	<95%	Mitigation in Fresno local area studies
60 kV LINES (normal conditions only)														
UOP- WSTLNE SW (West Lane) 60 kV	Normal conditions	P0	normal	145.5%	<95%	<95%	96.2%	<95%	<95%	<95%	105.3%	<95%	<95%	Mitigation in Stockton local area studies
Bridgeville-Garberville 60 kV	Normal conditions	P0	normal	113.3%	<95%	<95%	<95%	<95%	<95%	<95%	108.6%	<95%	<95%	Mitigation in North Coast local area studies. Reduce generation from Humboldt. Overload in 2023 and 2031 Summer peak with contingencies up to 10%
Vaca Dix-Winters 60 kV	Normal conditions	P0	normal	112.0%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	96.9%	<95%	Mitigation in Sacramento local area studies
Plain Field-Winters 60 kV	Normal conditions	P0	normal	119.2%	102.1%	<95%	<95%	<95%	<95%	<95%	<95%	106.2%	<95%	Mitigation in Sacramento local area studies
OTHER ISSUES														
Insufficient reactive margin	Mosslanding-Los Banos 500 kV & Tesla-Metcalf 500 kV											voltage instability		dispatch more generation in the Moss landing area after first contingency

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage, kV (Baseline Scenarios)							Post Cont. Voltage, kV (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2031 Winter Off-Peak	2023 SP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	
DIABLO 500 kV	Normal Conditions	P0	normal	within limits	1.083	1.088	within limits	1.082	within limits	1.080	within limits	1.086	within limits	install reactive support to absorb VARs on Gates, modeled starting from 2026. Reduce scheduled voltage on Gates and /or turn on reactors in the Midway tertiary to bring Diablo voltage within the limits. The upper limit is 1.09 under normal and contingency conditions.
	Two Statcoms on Gates	P6	S-1/S-1	N/A	1.101	1.090	N/A	1.100	<1.08	1.095	N/A	1.102	N/A	
GATES 500 kV	Two Statcoms on Gates	P6	S-1/S-1	N/A	1.088	1.080	N/A	1.088	<1.08	1.084	N/A	1.089	N/A	within limits for P6 contingency
MIDWAY 500 kV	Two Statcoms on Gates	P6	S-1/S-1	N/A	1.082	<1.08	N/A	1.081	<1.08	<1.08	N/A	1.084	N/A	within limits for P6 contingency
Low voltages in the Las Aguilas-Moss Landing area	Mosslanding-Los Banos 500 kV & Tesla-Metcalf 500 kV	P6	L-1/L-1								insufficient reactive margin			
Low voltages in the San Jose area	Normal Conditions and contingencies	P0, P1-P7				<0.9								consider installation of reactive support. Mitigation in the local Bay area studies

Study Area: **PG&E Bulk**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)							Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2031 Winter Off-Peak	2023 SP Heavy Renewable & Min Gas Gen	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	
NONE over 8%														

Transient Stability

UNITS GENERATING LESS THAN 1 MW NOT INCLUDED
ONLY GENERATION AND LOAD IN CALIFORNIA ISO AREA SHOWN
 Transient Stability Performance (Tripped generation and load)



AREA	BUS NUMBER	NAME/ POI	TYPE	Contingency Category	Contingency	2026 Summer Peak	2031 Summer Peak	2023 Spring Off- Peak	2031 Spring Off- Peak	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	reason for tripping	Mitigation/Comments
Generation Trip													
SCE	24340	CHARMIN/Santa Clara 66 kV	synchr gen	P1, P6, P7	3 ph fault on Midway	19 MW at 2.5 sec	19 MW at 2.5 sec	not tripped	modeled off	19 MW at 2.5 sec	not tripped	high voltage	high voltage due to composite load reduction in the SCE area. Investigate composite load parameters
				P1, P6, P7	3 ph fault on Los Banos or Gates	19 MW at 2 sec	19 MW at 2 sec	not tripped	modeled off	not tripped	not tripped	high voltage	
SCE	25079	PRIDGE B/Gold Finger 66 kV	solar PV	P1, P6, P7	3 ph fault Tesla, Los Banos, Gates, Diablo or Midway	modeled off	modeled off	modeled off	20 MW tripped with fault	modeled off	modeled off	high voltage	high voltage w/fault, instant trip at 1.2 p.u. Possible modeling error, need to check the model
				P2	1 ph fault Midway w/delayed clearing	modeled off	modeled off	modeled off		modeled off	modeled off	modeled off	
SCE	25092	MOJAVE/ Sun Spot 66 kV	solar PV	P1, P2, P4, P6, P7	1ph w/delayed clearing or 3ph normal on Midway, or 3 ph fault on Los Banos, Moss landing, Gates, Metcalf, RM Statcom, Round Mtn or Table Mtn	modeled off	modeled off	19 MW not tripped	19 MW tripped w/fault	modeled off	modeled off	high voltage	high voltage w/fault, instant trip at 1.2 p.u. Possible modeling error, need to check the model
SCE	25169	PRIDGE C/ Gold Finger 66 kV	solar PV	P1, P6, P7	3ph fault on Tracy, Tesla, Los Banos, Gates, Midway, Diablo	modeled off	modeled off	modeled off	12 MW tripped w/fault	modeled off	modeled off	high voltage	high voltage w/fault, instant trip at 1.2 p.u. Possible modeling error, need to check the model
SCE	29308	Center 66 kV	peaker	P1, P6, P7	3 ph fault on Midway	47 MW at 2 sec	47 MW at 2 sec	modeled off	modeled off	47 MW at 2 sec	modeled off	high voltage	high voltage due to composite load reduction in the SCE area. Investigate composite load parameters
SCE	29307	Mira Loma 66 kV	peaker	P1, P6, P7	3 ph w/normal or 1 ph w/delayed clearing fault on	47 MW at 2 sec	47 MW at 2 sec	modeled off	modeled off	47 MW at 2 sec	modeled off		
SCE	29309	Barre 66 kV	peaker	P1, P6, P7	3 ph w/normal or 1 ph w/delayed clearing fault on	47 MW at 2 sec	47 MW at 2 sec	modeled off	modeled off	47 MW at 2 sec	modeled off		
SCE	29340	Clear Water ST/ Mira Loma 66 kV	co-gen	P1, P6, P7	3ph fault Los Banos, Gates, Midway	7 MW not tripped	8 MW at 8 or 19 sec	8 MW not tripped	modeled off	7 MW not tripped	8 MW not tripped	out of step generic realy	large reduction in composite load in SCE. Investigate composite load parameters
SCE	29536	SS1T2_G1 0.34	solar PV	P1, P6, P7	3ph fault Midway, any contingency	modeled off	modeled off	50 MW at 4 sec	78 MW not tripped	modeled off	50 MW not tripped	low voltage	voltage doesn't recover above 0.8 pu after the fault. Tripped in accordance with PRC-024
SCE	29537	SS1T2_G2 0.34	solar PV	P1, P6, P7	3ph fault Midway, any contingency	modeled off	modeled off	50 MW at 4 sec	78 MW not tripped	modeled off	50 MW not tripped	low voltage	
SCE	29391	Camino solar/ Manzana 230 kV	solar PV	P1, P6, P7	3 ph on Gates or Midway	modeled off	modeled off	not in the case	43 MW w/fault	modeled off	not in the case	high voltage	high voltage w/fault, possible modeling error, instant trip at 1.2 p.u.
SCE	29590	Voyager1_G 0.64	wind	P1, P2, P6, P7	3ph fault Midway, or 1ph with delayed clearing	52 MW not tripped	52 MW not tripped	not in the case	45 MW w/fault	53 MW not tripped	not in the case	high voltage	high voltage w/fault, possible modeling error, instant trip at 1.2 p.u.
SCE	29606	AVSR_A_G2 0.31	solar PV	P1, P6, P7	3ph fault Midway	modeled off	modeled off	modeled off	50 MW w/fault	modeled off	25 MW not tripped	high voltage	high voltage w/fault, possible modeling error, instant trip at 1.2 p.u.
SCE	29610	AVSR_B_G4 0.31	solar PV	P1, P6, P7	3ph fault Midway	modeled off	modeled off	modeled off	86 MW w/fault	modeled off	45 MW not tripped	high voltage	high voltage w/fault, possible modeling error, instant trip at 1.2 p.u.
SCE	29724	BSKY_G_ABSR 0.38, BIG SKY 230 kV connect to Antelope 230 kV	solar PV	P1, P6, P7	3ph fault Vaca Dixon, Tracy, Tesla, Moss Landing, Metcalf, Los Banos, Gates, Midway, Diablo	modeled off	modeled off	modeled off	19 MW with fault	modeled off	not tripped, 15 MW	high voltage	high voltage w/fault, possible modeling error, instant trip at 1.2 p.u.

Transient Stability

UNITS GENERATING LESS THAN 1 MW NOT INCLUDED
ONLY GENERATION AND LOAD IN CALIFORNIA ISO AREA SHOWN
 Transient Stability Performance (Tripped generation and load)



AREA	BUS NUMBER	NAME/ POI	TYPE	Contingency Category	Contingency	2026 Summer Peak	2031 Summer Peak	2023 Spring Off- Peak	2031 Spring Off- Peak	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	reason for tripping	Mitigation/Comments
Generation Trip													
PG&E	31846	COVE RD 13.8	hydro	P7	3 phase fault on Tesla	6 MW at 19 sec	modeled off	stable	stable	6 MW at 19 sec	stable	out of step	small unit, possible modeling error
PG&E	31847	ROAMONG 13.8	hydro	P7	3 phase fault on Tesla	2 MW at 18 sec	modeled off	stable	stable	2 MW at 18 sec	stable	out of step	small unit, possible modeling error
PG&E	32181	SHILOH 1/ Birds Landing 230 kV	wind type 3	P1, P6, P7	3ph Fault Tesla	63 MW at 1.3 sec	63 MW at 1.3 sec	30 MW not tripped	not tripped	63 MW at 1.3 sec	96 MW not tripped	low voltage	Under-over voltage relay settings don't meet PRC-024 Standard. Need to change relay settings.
				P1	3ph fault Midway transformer	63 MW at 2 sec	not tripped		not tripped	high voltage			
				P1, P6, P7	3ph fault Table Mtn or Los Banos	not tripped	not tripped		30 MW at 1.2 sec	not tripped		high voltage	
PG&E	33868	Q709RPWRP2/ Tesla 115 kV	wind	P1, P6, P7	3 ph Malin, Round Mt, RM Statcom, Midway	19MW not tripped	19MW not tripped	9 MW not tripped	9 MW tripped w/fault	19 MW not tripped	29 MW not tripped	high voltage	instant tripping at 1.2 p.u. voltage, high initial voltage off-peak
				P2	1 ph fault on Tesla w/delayed clearing,	19 MW not tripped	19MW not tripped	9 MW not tripped	9 MW tripped w/fault	19 MW not tripped	29 MW not tripped	high voltage	instant tripping at 1.2 p.u. voltage, high initial voltage off-peak
PG&E	34629	KETTLEMANS/ Henrietta 70 kV	solar PV	P1, P2, P6	1ph fault w/delayed clearing on Tesla, Los Banos, Gates or Midway, 3 ph Gates	modeled off	modeled off	modeled off	19 MW w/fault	modeled off	20 MW not tripped	high voltage	instant tripping at 1.2 p.u. voltage. Possible modeling error
PG&E	34683	MUSTANG 230 kV	solar PV	P2	1 ph fault on Tesla, or Mosslanding w/delayed clearing	modeled off	modeled off	modeled off	modeled off	modeled off	102 MW at 2 sec	high voltage	over-voltage and under-frequency relay settings don't meet PRC -024 Standard, high voltage with contingency. Need to reduce scheduled voltage in the base case. Frequency below relay settings due to Diablo generation loss
				P4-1	1 ph fault on Diablo w/delayed clearing						102 MW at 6 sec	low frequency	
PG&E	34694	KENT_S/ Henrietta 70 kV	solar PV	P1, P6, P7	3 ph fault on Midway	modeled off	modeled off	modeled off	19 MW w/fault	modeled off	20 MW not tripped	high voltage	voltage spike with fault, possible modeling error
				P6	3 ph fault on Gates	modeled off	modeled off	modeled off	19 MW w/fault	modeled off	20 MW not tripped	high voltage	voltage spike with fault, possible modeling error
PG&E	35082	ORION 0.44	solar PV	P1, P6, P7	3ph fault Midway	modeled off	modeled off	modeled off	19 MW w/fault	modeled off	20 MW not tripped	high voltage	voltage spike with fault, possible modeling error
PG&E	35883	MEC STG1	Steam turbine	P1, P6, P7	3 ph fault Tesla	222 MW not tripped	237 MW at 4 sec	222 MW not tripped	modeled off	222 MW not tripped	modeled off	low voltage	Low voltage due to induction motor stalling, low voltage in the base case
PG&E	36411	DIABLO 1 25 kV	nuclear	P4-1	3ph fault Stuck breaker on Diablo 500 kV	N/A	N/A	1190 MW at 2 sec	N/A	N/A	1190 MW at 2 sec	out of step	extreme contingency, unit tripped by out of step relay. Allowed for extreme events. The system was stable
PG&E	36413	UNION OIL 13.8 kV	synchr gen	P1	3 ph fault Gates 500/230 kV # 11 or 12	stable	stable	6 MW at 18 sec	stable	stable	stable	out of step	small unit, possible modeling error
PG&E	38207	MCH_PV_1 0.34	solar PV	P6, P7	3 ph fault Tesla, Tracy	24 MW at 3 sec	24 MW not tripped	24 MW not tripped	24 MW not tripped	24 MW at 3 sec	24 MW not tripped	low voltage	low voltage due to induction motor stalling
PG&E	38552	DONPEDRO2	hydro	P1, P6	3 ph fault Metcalf, or Tesla	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	30 MW, possible modeling error
PG&E	38554	DONPEDRO4	hydro	P1, P6	3 ph fault Metcalf, or Tesla	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	25 MW possible modeling error

Transient Stability

UNITS GENERATING LESS THAN 1 MW NOT INCLUDED
ONLY GENERATION AND LOAD IN CALIFORNIA ISO AREA SHOWN
 Transient Stability Performance (Tripped generation and load)



AREA	BUS NUMBER	NAME/ POI	TYPE	Contingency Category	Contingency	2026 Summer Peak	2031 Summer Peak	2023 Spring Off- Peak	2031 Spring Off- Peak	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	reason for tripping	Mitigation/Comments
Generation Trip													
PG&E	38562	DAWSON/ Tuolumne 70 kV	hydro	P1, P6	3 ph fault Metcalf, or Tesla	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	undamped oscillations	small unit (2 MW), possible modeling error
PG&E	365534	Q954 0.27 on Gates 230 kV	solar PV	P1, P6, P7	3ph fault on Tracy, Tesla, Gates, Los Banos, Midway	modeled off	modeled off	modeled off	modeled off	modeled off	149 MW w/fault	high voltage	voltage spike with fault, possible modeling error
PG&E	365540	STANDARD OIL 12.47 kV Sobrante 115 kV	synchr gen	P1, P6, P7	3ph fault on Tesla	18 MW at 12 sec	18 MW at 13 sec	18 MW not tripped	18 MW not tripped	18 MW at 12 sec	18 MW not tripped	out of step	large loss of composite load with three-phase faults on Tesla in peak cases
PG&E	365659	Q622BSPV 0.44	solar PV	P1, P6, P7	3ph fault Gates, Diablo or Midway	modeled off	modeled off	modeled off	19 MW at 1.2 sec	modeled off	20 MW w/fault	high voltage	instant trip at 1.2 p.u. Possible modeling error
				P2	1ph fault w/delayed clearing on Midway	modeled off	modeled off	modeled off	19 MW w/fault	modeled off	not tripped	high voltage	
				P1, P6, P7	3ph fault Los Banos,	modeled off	modeled off	modeled off	not tripped	modeled off	20 MW w/fault	high voltage	
PG&E	366394	Q1454B 0.69 KV, connected to Metcalf 115 kV	battery	P1, P6, P7	3ph fault on Round Mtn, RM Statcom, Table Mtn	76 MW at 2 sec	modeled off	modeled off	-77 MW at 3 sec	76 MW at 2 sec	modeled off	high voltage	large loss of composite load with three-phase faults in peak cases
				P1, P6, P7	3ph fault on Tracy, Tesla or Metcalf	76 MW at 12 sec			-77 MW at 8 sec	76 MW at 12 sec			
				P1	3ph fault on Los Banos	not tripped			-77 MW at 3 sec	not tripped			
				P2	1 ph on Tesla or Metcalf w/delayed clearing	76 MW at 3sec			-77 MW at 4 sec	76 MW at 3sec			
				P1, P6, P7	3ph fault on Vaca Dix	76 MW at 3sec			-77 MW at 4 sec	76 MW at 3sec			
PG&E	366711	Q1472BESS1 34.5	battery	P1, P6, P7	3ph fault on Tesla-Metcalf, or Tracy-Tesla	104 MW at 13 sec	modeled off	104 MW not tripped	104 MW not tripped	104 MW at 13 sec	104 MW not tripped	high voltage	large loss of composite load with three-phase faults on Tesla or Tracy in peak cases
				P2_3	1 ph fault w/delayed clearing on Tesla, Metcalf or Mosslanding	104 MW at 2 sec	modeled off	104 MW not tripped	104 MW not tripped	104 MW at 2 sec	104 MW not tripped		
PG&E	366712	Q1472BESS2 34.5	battery	P1, P6, P7	3ph fault on Tesla-Metcalf, or Tracy-Tesla	104 MW at 13 sec	modeled off	104 MW not tripped	104 MW not tripped	104 MW at 13 sec	104 MW not tripped	high voltage	large loss of composite load with three-phase faults on Tesla or Tracy in peak cases
				P2_3	1 ph fault w/delayed clearing on Tesla, Metcalf or Mosslanding	104 MW at 2 sec	modeled off	104 MW not tripped	104 MW not tripped	104 MW at 2 sec	104 MW not tripped		
PG&E	366713	Q1472BESS3 34.5	battery	P1, P6, P7	3ph fault on Tesla-Metcalf, or Tracy-Tesla	101 MW at 13 sec	modeled off	101 MW not tripped	101 MW not tripped	101 MW at 13 sec	101 MW not tripped	high voltage	large loss of composite load with three-phase faults on Tesla or Tracy in peak cases
				P2_3	1 ph fault w/delayed clearing on Tesla, Metcalf or Mosslanding	101 MW at 2 sec	modeled off	101 MW not tripped	101 MW not tripped	101 MW at 2 sec	101 MW not tripped		
LOAD TRIP													

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AREA	BUS NUMBER	NAME/ POI	TYPE	Contingency Category	Contingency	2026 Summer Peak	2031 Summer Peak	2023 Spring Off- Peak	2031 Spring Off- Peak	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	reason for tripping	Mitigation/Comments
Generation Trip													
PG&E	36012	WATSONVILLE # 1	net load	P1, P6, P7	3 ph fault on Tesla 500 kV, any contingency	7.6 MW, at 4 sec	7.7 MW, at 4 sec	7.4 MW not tripped	-2 MW not tripped	8.2 MW, at 4 sec	3.7 MW not tripped	undervoltage	0.9 p.u. 3 sec relay settings for under-voltage load tripping
				P1, P6, P7	3 ph fault on Metcalf 500 kV, any contingency	7.6 MW, not tripped	7.7 MW, at 4 sec	7.4 MW not tripped	-2 MW not tripped	8.2 MW, at 4 sec	3.7 MW not tripped	undervoltage	0.9 p.u. 3 sec relay settings for under-voltage load tripping
				P1, P6, P7	3 ph fault Moss Landing 500 kV, any contingency	7.6 MW, not tripped	7.7 MW, at 4 sec	7.4 MW not tripped	-2 MW not tripped	8.2 MW, not tripped	3.7 MW not tripped	undervoltage	0.9 p.u. 3 sec relay settings for under-voltage load tripping
PG&E	36857	Mission 60.0 # 1	net load	P1, P6, P7	3 ph fault RM Statcom, Table Mtn, Vaca Dix	reduced to 84% w/fault	not tripped	not tripped	not tripped	reduced to 84% w/fault	not tripped	overfrequency	Frequency drop with fault, possible modeling error
PG&E	36860	Palm 60.0 # 1	net load	P6, P7	3 ph fault RM Statcom, Table Mtn	reduced to 68% w/fault	not tripped	not tripped	not tripped	reduced to 68% w/fault	not tripped	overfrequency	Frequency drop with fault, possible modeling error
PG&E	36860	Palm 60.0 # 2	net load	P6, P7	3 ph fault RM Statcom, Table Mtn	reduced to 58% w/fault	not tripped	not tripped	not tripped	reduced to 58% w/fault	not tripped	overfrequency	Frequency drop with fault, possible modeling error
PG&E	36890	Walsh 60.0 # 1	net load	P6, P7	3 ph fault Round Mtn, RM Statcom, Table Mtn, Tracy	reduced to 96% w/fault	not tripped	not tripped	not tripped	reduced to 96% w/fault	not tripped	overfrequency	Frequency drop with fault, possible modeling error
PG&E	36891	Zeno 60.0 # 2	net load	P1, P6, P7	3 ph fault Round Mtn, RM Statcom, Table Mtn, Tracy, Vaca Dix	reduced to 74% w/fault	not tripped	not tripped	not tripped	reduced to 74% w/fault	not tripped	overfrequency	Frequency drop with fault, possible modeling error
PG&E	38905	Kenneth 60.0 # 1	net load	P6, P7	3 ph fault Round Mtn, RM Statcom, Table Mtn	reduced to 41% w/fault	not tripped	not tripped	not tripped	reduced to 41% w/fault	not tripped	overfrequency	Frequency drop with fault, possible modeling error
PG&E	38146	LEAVITT	net load	P6	Table Mt-DRS # 1 and Table MT 500/230	not tripped	not tripped	not tripped	not tripped	not tripped	reduced to 93% at 2 sec	underfrequency	large frequency swing



Transient Stability

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Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)						Potential Mitigation Solutions/ Comments
			Baseline scenarios				Sensitivity		
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off- Peak	2031 Spring Off- Peak	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	
P1_2-0. RPS-MOSSLAND #1 500kV, fault on MOSSLANDING	P1	L-1	no issues	Potential WECC/NERC criteria violation	no issues	no issues	no issues	no issues	Change UVLS relay settings on Watsonville load (Peak cases).
P1_2-1, or P1_2-2. ROUND MTN-TABLE MTN 500 kV, fault on TABLE MTN	P1	L-1	Potential WECC/NERC criteria violation	no issues	no issues	no issues	Potential WECC/NERC criteria violation	no issues	Review UVLS settings in Northwest so that load would not trip
P1_2-3. TABLE MTN-VACA DIX 500 kV , fault on TABLE MTN	P1	L-1	Potential WECC/NERC criteria violation	no issues	no issues	no issues	Potential WECC/NERC criteria violation	no issues	Review for possible modelling errors for UFLS in San Jose with the fault
P1_2-4. TABLE MTN-TESLA 500 kV, fault on TABLE MTN	P1	L-1	Potential WECC/NERC criteria violation	no issues	no issues	no issues	Potential WECC/NERC criteria violation	no issues	Review for possible modelling errors for UFLS in San Jose with the fault
P1_2-6. VACA DIX-TESLA 500 kV, fault on VACA DIX	P1	L-1	Potential WECC/NERC criteria violation	no issues	no issues	no issues	Potential WECC/NERC criteria violation	no issues	Review for possible modelling errors for UFLS in San Jose with the fault
P1_2-7. TRACY-TESLA 500 kV, fault on TRACY	P1	L-1	Potential WECC/NERC criteria violation	no issues	no issues	no issues	Potential WECC/NERC criteria violation	no issues	Change UVLS relay settings on Watsonville load (Peak cases). Review Dawson and San Pedro #2 and #4 units models because of undamped oscillations, also in other cases. Review for possible modelling errors for UFLS in San Jose with the fault . May need additional dynamic reactive support in the Bay Area
P1_2-8. TRACY-LOS BANOS 500 kV, fault on TRACY	P1	L-1	Potential WECC/NERC criteria violation	no issues	no issues	no issues	no issues	no issues	
P1_2-9. TESLA-METCALF 500 kV, fault on TESLA	P1	L-1	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Change UVLS relay settings on Watsonville load (Peak cases). Review steam unit at Sobrante Standard Oil models for errors because of out-of-step tripping. Review Dawson and San Pedro #2 and #4 units models because of undamped

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Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)						Potential Mitigation Solutions/ Comments
			Baseline scenarios				Sensitivity		
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off- Peak	2031 Spring Off- Peak	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	
P1-2-10 TESLA - LOSBANOS 500 kV, fault on TESLA	P1	L-1	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	oscillations, also in other cases. May need additional dynamic reactive support in the Bay Area
P1-2-11 METCALF - MOSSLAND 500 kV, fault on METCALF	P1	L-1	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Change UVLS relay settings on Watsonville load (Peak cases). Review Dawson and San Pedro #2 and #4 units models because of undamped oscillations, also in other cases
P1-2-12 MOSSLANDING - LOSBANOS 500 kV, fault on MOSSLANDING	P1	L-1	no issues	Potential WECC/NERC criteria	no issues	no issues	no issues	no issues	Change UVLS relay settings on Watsonville load (Peak cases)
P1-2-13 LOSBANOS -GATES 500 kV # 3, fault on LOS BANOS	P1	L-1	no issues	Potential WECC/NERC criteria violations	no issues	no issues	no issues	no issues	Review Clearwater (SCE) generator model for errors because of out-of-step tripping
P1-2-14 LOSBANOS -GATES 500 kV # 1, fault on LOS BANOS	P1	L-1	no issues	Potential WECC/NERC criteria violations	no issues	no issues	no issues	no issues	Review Clearwater (SCE) generator model for errors because of out-of-step tripping
P1-2-15 LOSBANOS - MIDWAY 500 kV, fault on LOS BANOS	P1	L-1	no issues	Potential WECC/NERC criteria violations	no issues	no issues	no issues	no issues	Review Clearwater (SCE) generator model for errors because of out-of-step tripping
P1-2-16 GATES - DIABLO 500 kV, fault on GATES	P1	L-1	no issues	Potential WECC/NERC criteria violations	no issues	no issues	no issues	no issues	Review Clearwater (SCE) generator model for errors because of out-of-step tripping
P1_2-17 GATES - MIDWAY 500 kV, fault on GATES	P1	L-1	no issues	Potential WECC/NERC criteria violations	no issues	no issues	no issues	no issues	Review Clearwater (SCE) generator model for errors because of out-of-step tripping

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Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)						Potential Mitigation Solutions/ Comments
			Baseline scenarios				Sensitivity		
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off- Peak	2031 Spring Off- Peak	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	
P1-2-20, P1_2-21 MIDWAY - VINCENT 500 kV # 1, fault on MIDWAY	P1	L-1	no issues	Potential WECC/NERC criteria violations	no issues	Potential WECC/NERC criteria violations	no issues	no issues	Review Clearwater (SCE) generator model for errors because of out-of-step tripping in 2031 peak. Undamped oscillations on 25378 RP_WWB_G renewable in 2031 off-peak. Possible modeling error
P1-2-22 MIDWAY-WHIRLWIND 500 kV, fault on MIDWAY	P1	L-1	no issues	Potential WECC/NERC criteria violations	no issues	Potential WECC/NERC criteria violations	no issues	no issues	Review Clearwater (SCE) generator model for errors because of out-of-step tripping in 2031 peak. Undamped oscillations on 25378 RP_WWB_G renewable in 2031 off-peak. Possible modeling error
P1_2-23 or P1_2-24 MALIN-ROUND MTN 500 kV, fault on MALIN	P1	L-1	Potential WECC/NERC criteria violations	no issues	no issues	no issues	Potential WECC/NERC criteria violations	no issues	Review UVLS settings in Northwest so that load would not trip
P1_2-25 CAPT JACK-OLINDA 500 kV, fault on CAPT JACK	P1	L-1	Potential WECC/NERC criteria violations	no issues	no issues	no issues	Potential WECC/NERC criteria violations	no issues	Review UVLS settings in Northwest so that load would not trip
P1_3-2 TRACY 500/230 kV transformer # 1 , fault on TRACY 500 kV	P1	T-1	no issues	no issues	no issues	no issues	no issues	no issues	May need additional dynamic reactive support in the Bay Area
P1_3-7,8,9 TESLA 500/230 kV transformer # 2, 4 or 6, fault on TESLA 500 kV	P1	T-1	Potential WECC/NERC criteria violations	Potential WECC/NERC criteria violations	Potential WECC/NERC criteria violations	Potential WECC/NERC criteria violations	Potential WECC/NERC criteria violations	Potential WECC/NERC criteria violations	Change UVLS relay settings on Watsonville load (Peak cases). Review steam unit at Sobrante Standard Oil models for errors because of out-of-step tripping. Review Dawson and San Pedro #2 and #4 units models because of undamped oscillations, also in other cases. May need additional dynamic reactive support in the Bay Area. Review steam unit at Sobrante Standard Oil models for errors because of out-of-step tripping.
P1_3-11 METCALF 500/230 kV transformer # 11, fault on METCLAF 500 kV	P1	T-1	no issues	Potential WECC/NERC criteria violations	no issues	no issues	Potential WECC/NERC criteria violations	no issues	Change UVLS relay settings on Watsonville load (Peak cases).

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Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)						Potential Mitigation Solutions/ Comments
			Baseline scenarios				Sensitivity		
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off- Peak	2031 Spring Off- Peak	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	
P1_3-13 MOSSLANDING 500/230 kV transformer # 11, fault on MOSSLANDING 500 kV	P1	T-1	no issues	Potential WECC/NERC criteria violations	no issues	no issues	no issues	no issues	Change UVLS relay settings on Watsonville load (Peak cases).
P1_3-14 LOS BANOS 500/230 kV transformer, fault on LOS BANOS 500 kV	P1	T-1	no issues	Potential WECC/NERC criteria violations	no issues	no issues	no issues	no issues	Review Clearwater (SCE) generator model for errors because of out-of-step tripping
P1_3-15 GATES 500/230 kV transformer # 11, fault on GATES 500 kV	P1	T-1	no issues	Potential WECC/NERC criteria violations	no issues	no issues	no issues	no issues	Review Clearwater (SCE) generator model for errors because of out-of-step tripping
P1_3-18 MIDWAY 500/230 kV transformer # 11	P1	T-1	no issues	Potential WECC/NERC criteria violations	no issues	Potential WECC/NERC criteria violations	no issues	no issues	Review Clearwater (SCE) generator model for errors because of out-of-step tripping in 2031 peak. Undamped oscillations on 25378 RP_WWB_G renewable in 2031 off-peak. Possible modeling error
P6_1_1-22 TESLA-TABLE MTN 500 kV and TESLA-TRACY 500 kV, fault on TESLA 500 kV	P6	L-1/L-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-23 TESLA-TABLE MTN 500 kV and TESLA-METCALF 500 kV, fault on TESLA 500 kV	P6	L-1/L-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-24 TESLA-TABLE MTN 500 kV and TESLA-LOS BANOS 500 kV, fault on TESLA 500 kV	P6	L-1/L-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-25 TESLA-VACA DIX 500 kV and TESLA-TRACY 500 kV, fault on TESLA 500 kV	P6	L-1/L-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-26 TESLA-VACA DIX 500 kV and TESLA-METCALF 500 kV, fault on TESLA 500 kV	P6	L-1/L-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-27 TESLA-VACA DIX 500 kV and TESLA-LOS BANOS 500 kV, fault on TESLA 500 kV	P6	L-1/L-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area

Transient Stability

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Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)						Potential Mitigation Solutions/ Comments
			Baseline scenarios				Sensitivity		
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off- Peak	2031 Spring Off- Peak	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	
P6_1_1-28 TESLA-TRACY 500 kV and TESLA-METCALF 500 kV, fault on TESLA 500 kV	P6	L-1/L-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-29 TESLA-TRACY 500 kV and TESLA-LOS BANOS 500 kV, fault on TESLA 500 kV	P6	L-1/L-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-30 TESLA-METCALF 500 kV and TESLA-LOS BANOS 500 kV, fault on TESLA 500 kV	P6	L-1/L-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-83 TRACY-OLINDA and TRACY-LOS BANOS 500 kV, fault on TRACY	P6	L-1/L-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_1-84 TRACY-TESLA and TRACY-LOS BANOS 500 kV, fault on TRACY	P6	L-1/L-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-10 TESLA - TABLE MTN 500 kV and TESLA 500/230 kV transformer	P6	L-1/T-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-11 TESLA - VACA DIX 500 kV and TESLA 500/230 kV transformer	P6	L-1/T-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-12 TESLA - METCALF 500 kV and TESLA 500/230 kV transformer	P6	L-1/T-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-13 TESLA - METCALF 500 kV and TESLA # 2 500/230 kV transformer, fault on TESLA	P6	L-1/T-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-14 TESLA - LOSBANOS 500 kV and TESLA 500/230 kV transformer, fault on TESLA 500 kV	P6	L-1/T-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-17 TESLA-METCALF #1 500kV Line & METCALF 230/500kV #11	P6	L-1/T-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-41 TRACY-OLINDA 500 kV and TRACY 500/230 kV transformer, fault on TRACY	P6	L-1/T-1	no issues	no issues	no issues	no issues	no issues	no issues	May need additional dynamic reactive support in the Bay Area
P6_1_2-42 TRACY-TESLA 500 kV and TRACY 500/230 kV transformer, fault on TRACY	P6	L-1/T-1	no issues	no issues	no issues	no issues	no issues	no issues	May need additional dynamic reactive support in the Bay Area

Transient Stability

ONLY CONTINGENCIES WITH POTENTIAL VIOLATIONS ARE LISTED

Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)						Potential Mitigation Solutions/ Comments
			Baseline scenarios				Sensitivity		
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off- Peak	2031 Spring Off- Peak	2026 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	
P6_1_2-43 TRACY-LOS BANOS 500 kV and TRACY 500/230 kV transformer, fault on TRACY	P6	L-1/T-1	no issues	no issues	no issues	no issues	no issues	no issues	May need additional dynamic reactive support in the Bay Area
P6_2_2-0 TESLA 500/230 kV transformers # 2 and 4, fault on TESLA 500 kV	P6	T-1/T-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P6_2_2-5 TRACY 500/230 kV transformers # 1 and 2, fault on TRACY	P6	T-1/T-1	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area
P7_1_1-21 TESLA-TABLE MTN 500 kV and TESLA-VACA DIX 500 kV, fault on TESLA 500 kV	P7	L-2	Acceptable for P6	Acceptable for P6	no issues	no issues	Acceptable for P6	no issues	May need additional dynamic reactive support in the Bay Area

Study Area: **PG&E Bulk**



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
			2021 Summer Peak	2024 Summer Peak	2029 Summer Peak	2021 Spring Off- Peak	2024 Spring Off- Peak	2029 Spring Off- Peak	2029 Winter Off- Peak	2021 SP Heavy Renewable & Min Gas Gen	2024 SP High CEC Forecast	2024 SpOP Hi Renew & Min Gas Gen	
N/A													

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

Study Area: **PG&E Bulk**



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)									Potential Mitigation Solutions	
	2021 Summer Peak	2024 Summer Peak	2029 Summer Peak	2021 Spring Off- Peak	2024 Spring Off- Peak	2029 Spring Off- Peak	2029 Winter Off- Peak	2021 SP Heavy Renewable & Min Gas Gen	2024 SP High CEC Forecast		2024 SpOP Hi Renew & Min Gas Gen
N/A											

No single source substation with more than 100 MW Load

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Bus/Substation	Zone	Voltage PU (Baseline Scenarios)				Voltage PU (Sensitivity Scenario)	Project & Potential Mitigation Solutions
		2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2031 Winter Off Peak		
RM_TM_12 500 kV	300 - Bulk System	1.1159	1.0595	1.0591	1.0665	1.0533	- Round Mountain DRS Projects - Expected ISD: Jun. 2024 - Short term: Action Plan
RM_TM_22 500 kV	300 - Bulk System	1.1167	1.0598	1.0593	1.0667	1.0534	
ORICK 60 kV	301 - Humboldt	1.0217	1.0278	1.052	1.0465	1.0277	System adjustments or voltage support if needed
MENDOCNO 115 kV	302 - North Coast	1.0699	1.0705	1.0621	1.0543	1.0586	System adjustments or voltage support if needed
CALPELLA 115 kV	302 - North Coast	1.0646	1.0692	1.0607	1.0531	1.0552	System adjustments or voltage support if needed
UKIAH 115 kV	302 - North Coast	1.0563	1.0667	1.0583	1.0513	1.05	System adjustments or voltage support if needed
CLOVRDLE 115 kV	302 - North Coast	1.0353	1.0581	1.0515	1.0467	1.0384	System adjustments or voltage support if needed
MPE 115 kV	302 - North Coast	1.0347	1.0532	1.0479	1.0446	1.038	System adjustments or voltage support if needed
LUCERNE 115 kV	302 - North Coast	1.0507	1.0611	1.0554	1.0521	1.0457	System adjustments or voltage support if needed
REDBUD 115 kV	302 - North Coast	1.0454	1.06	1.0556	1.0501	1.0443	System adjustments or voltage support if needed
INDIN VL 115 kV	302 - North Coast	1.0429	1.053	1.0496	1.0501	1.0403	System adjustments or voltage support if needed
HIGHLAND 115 kV	302 - North Coast	1.0271	1.052	1.0479	1.046	1.0328	System adjustments or voltage support if needed
FULTON 115 kV	302 - North Coast	1.0052	1.0572	1.0426	1.0378	1.0192	System adjustments or voltage support if needed
MONROE1 115 kV	302 - North Coast	0.9977	1.0572	1.0407	1.0338	1.0128	System adjustments or voltage support if needed
MONROE2 115 kV	302 - North Coast	0.9968	1.0585	1.0406	1.0336	1.012	System adjustments or voltage support if needed
SNTA RSA 115 kV	302 - North Coast	0.9955	1.0571	1.0397	1.0322	1.0107	System adjustments or voltage support if needed
STONY PT 115 kV	302 - North Coast	0.9981	1.0531	1.0364	1.0291	1.0121	System adjustments or voltage support if needed
BELLVUE 115 kV	302 - North Coast	1.0004	1.0544	1.036	1.0288	1.0139	System adjustments or voltage support if needed
RINCON 115 kV	302 - North Coast	1.0066	1.0602	1.0474	1.0412	1.0208	System adjustments or voltage support if needed
GUALALA 60 kV	302 - North Coast	1.0037	1.0654	1.0595	1.038	1.0266	System adjustments or voltage support if needed
ANNAPOLS 60 kV	302 - North Coast	1.0124	1.063	1.057	1.0401	1.0301	System adjustments or voltage support if needed
FORT RSS 60 kV	302 - North Coast	1.0165	1.0604	1.0543	1.0401	1.031	System adjustments or voltage support if needed
SLMN CRK 60 kV	302 - North Coast	1.0164	1.0581	1.0529	1.0391	1.03	System adjustments or voltage support if needed
MONTE RO 60 kV	302 - North Coast	1.0239	1.0564	1.0487	1.0396	1.0325	System adjustments or voltage support if needed
WOHLER 60 kV	302 - North Coast	1.0386	1.0509	1.041	1.0391	1.0398	System adjustments or voltage support if needed
MIRABEL 60 kV	302 - North Coast	1.0377	1.053	1.045	1.042	1.04	System adjustments or voltage support if needed
MOLINO 60 kV	302 - North Coast	1.0203	1.0585	1.0436	1.0345	1.0298	System adjustments or voltage support if needed
GYSRVLL 60 kV	302 - North Coast	1.023	1.05	1.0354	1.0278	1.0315	System adjustments or voltage support if needed
FULTON 60 kV	302 - North Coast	1.0504	1.0489	1.0433	1.0436	1.0492	System adjustments or voltage support if needed
LAGUNA 60 kV	302 - North Coast	1.0138	1.0606	1.034	1.0269	1.0254	System adjustments or voltage support if needed
COTATI 60 kV	302 - North Coast	1.0072	1.0613	1.0333	1.0253	1.0233	System adjustments or voltage support if needed

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High Voltages Under P0 Conditions



		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
SNMALDFL	60 kV	302 - North Coast	1.0084	1.0618	1.0341	1.0262	1.0241	System adjustments or voltage support if needed
SLYCREEK	115 kV	303 - North Valley	1.0472	1.0558	1.0542	1.057	1.0501	System adjustments or voltage support if needed
OWID	115 kV	303 - North Valley	1.0432	1.0531	1.0512	1.0549	1.0465	System adjustments or voltage support if needed
FORBSTWN	115 kV	303 - North Valley	1.0438	1.0531	1.0513	1.0548	1.047	System adjustments or voltage support if needed
WYANDTTE	115 kV	303 - North Valley	1.0388	1.0582	1.0559	1.0585	1.0453	System adjustments or voltage support if needed
PALERMO	115 kV	303 - North Valley	1.0434	1.0571	1.0544	1.059	1.0482	System adjustments or voltage support if needed
HONCUT	115 kV	303 - North Valley	1.036	1.0592	1.058	1.0582	1.043	System adjustments or voltage support if needed
NORD 1	115 kV	303 - North Valley	1.0231	1.0568	1.0526	1.0419	1.0311	System adjustments or voltage support if needed
SYCAMORE	115 kV	303 - North Valley	1.0226	1.0562	1.0524	1.0418	1.0305	System adjustments or voltage support if needed
NOTRDAME	115 kV	303 - North Valley	1.0271	1.054	1.0506	1.0422	1.033	System adjustments or voltage support if needed
BUTTE	115 kV	303 - North Valley	1.0282	1.0534	1.0502	1.0424	1.0336	System adjustments or voltage support if needed
WHITMORE	60 kV	303 - North Valley	1.0606	1.0796	1.0901	1.0738	1.0792	System adjustments or voltage support if needed
CEDR CRK	60 kV	303 - North Valley	1.0684	1.0914	1.1041	1.0856	1.0894	System adjustments or voltage support if needed
KILARC	60 kV	303 - North Valley	1.0691	1.0896	1.1006	1.0836	1.0887	System adjustments or voltage support if needed
RED BLFF	60 kV	303 - North Valley	1.011	1.0508	1.0451	1.0377	1.0213	System adjustments or voltage support if needed
DIRYVLE	60 kV	303 - North Valley	1.0002	1.0549	1.049	1.0356	1.0177	System adjustments or voltage support if needed
LPSP	60 kV	303 - North Valley	0.9982	1.0562	1.0114	1.0043	1.0317	System adjustments or voltage support if needed
GERBER	60 kV	303 - North Valley	0.9916	1.0629	1.0233	1.0063	1.0295	System adjustments or voltage support if needed
VINA	60 kV	303 - North Valley	0.9866	1.0566	1.051	1.0334	1.0085	System adjustments or voltage support if needed
CORNING	60 kV	303 - North Valley	1.0367	1.0467	1.0588	1.0419	1.0366	System adjustments or voltage support if needed
CHALLNGE	60 kV	303 - North Valley	1.0334	1.0585	1.0499	1.0602	1.0394	System adjustments or voltage support if needed
DRHM JCB	60 kV	303 - North Valley	1.0349	1.0493	1.0504	1.0441	1.0443	System adjustments or voltage support if needed
ESQUON	60 kV	303 - North Valley	1.034	1.0501	1.0513	1.044	1.0443	System adjustments or voltage support if needed
ORLAND B	60 kV	303 - North Valley	1.0342	1.0493	1.0551	1.0474	1.0399	System adjustments or voltage support if needed
ELKCREEK	60 kV	303 - North Valley	1.0346	1.0679	1.084	1.062	1.0422	System adjustments or voltage support if needed
WILLOWS	60 kV	303 - North Valley	1.0233	1.0493	1.0648	1.0471	1.0321	System adjustments or voltage support if needed
CAPAY	60 kV	303 - North Valley	1.0366	1.0403	1.0523	1.0466	1.0403	System adjustments or voltage support if needed
HAMILTON	60 kV	303 - North Valley	1.0231	1.0441	1.0609	1.053	1.0369	System adjustments or voltage support if needed
HEADGATE	60 kV	303 - North Valley	1.0311	1.0407	1.056	1.0454	1.0398	System adjustments or voltage support if needed
ANITA	60 kV	303 - North Valley	1.0079	1.0427	1.0721	1.0404	1.0377	System adjustments or voltage support if needed
JACINTO	60 kV	303 - North Valley	1.0028	1.0348	1.0634	1.0516	1.0264	System adjustments or voltage support if needed
MOBILCHE	115 kV	304 - Sacramento	1.0221	1.0514	1.056	1.0393	1.0397	System adjustments or voltage support if needed
WOODLANDBIOM	115 kV	304 - Sacramento	1.0239	1.0516	1.0558	1.0394	1.0403	System adjustments or voltage support if needed
KNIGHTLD	115 kV	304 - Sacramento	1.0277	1.0507	1.0552	1.0415	1.0441	System adjustments or voltage support if needed
KNIGHT2	115 kV	304 - Sacramento	1.0269	1.0499	1.055	1.0413	1.0433	System adjustments or voltage support if needed
KNIGHT1	115 kV	304 - Sacramento	1.0277	1.0507	1.0551	1.0415	1.0441	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
WOODLD	115 kV	304 - Sacramento	1.022	1.0514	1.056	1.0393	1.0393	System adjustments or voltage support if needed
ZAMORA1	115 kV	304 - Sacramento	1.0274	1.051	1.0554	1.0415	1.0439	System adjustments or voltage support if needed
ZAMORA	115 kV	304 - Sacramento	1.0233	1.0506	1.0557	1.041	1.0407	System adjustments or voltage support if needed
ZAMORA2	115 kV	304 - Sacramento	1.0234	1.0505	1.0557	1.041	1.0408	System adjustments or voltage support if needed
POST	115 kV	304 - Sacramento	1.0436	1.0498	1.0543	1.0382	1.0507	System adjustments or voltage support if needed
BRIGHTN	115 kV	304 - Sacramento	1.0514	1.0437	1.0492	1.0402	1.0607	System adjustments or voltage support if needed
W.SCRMNO	115 kV	304 - Sacramento	1.0456	1.0495	1.0544	1.0384	1.0518	System adjustments or voltage support if needed
DEEPWATR	115 kV	304 - Sacramento	1.0429	1.0486	1.0548	1.0384	1.0503	System adjustments or voltage support if needed
BRKR SLG	115 kV	304 - Sacramento	1.0331	1.0503	1.054	1.0371	1.0488	System adjustments or voltage support if needed
DAVIS	115 kV	304 - Sacramento	1.0268	1.0512	1.0544	1.036	1.0425	System adjustments or voltage support if needed
GRAND IS	115 kV	304 - Sacramento	1.0417	1.049	1.0546	1.0398	1.0559	System adjustments or voltage support if needed
CAMPUS	115 kV	304 - Sacramento	1.0261	1.0511	1.0537	1.0353	1.0421	System adjustments or voltage support if needed
Q653F	115 kV	304 - Sacramento	1.0258	1.0509	1.0544	1.0365	1.0416	System adjustments or voltage support if needed
RICE	60 kV	304 - Sacramento	0.9945	1.0784	1.0668	1.042	1.026	System adjustments or voltage support if needed
CLSA CRS	60 kV	304 - Sacramento	1.0101	1.0731	1.0623	1.0431	1.0337	System adjustments or voltage support if needed
DELEVAN	60 kV	304 - Sacramento	1.0207	1.069	1.0589	1.0438	1.0388	System adjustments or voltage support if needed
MAXWELL	60 kV	304 - Sacramento	1.0206	1.069	1.0588	1.0437	1.0387	System adjustments or voltage support if needed
HARINTON	60 kV	304 - Sacramento	1.0124	1.0562	1.0478	1.0327	1.0249	System adjustments or voltage support if needed
ARBUCKLE	60 kV	304 - Sacramento	1.0177	1.0592	1.0485	1.0357	1.0284	System adjustments or voltage support if needed
DRAKE	60 kV	304 - Sacramento	1.0102	1.0555	1.048	1.0314	1.0239	System adjustments or voltage support if needed
WILLIAMS	60 kV	304 - Sacramento	1.0384	1.0553	1.0519	1.0458	1.0405	System adjustments or voltage support if needed
DUNNIGAN	60 kV	304 - Sacramento	0.9999	1.0537	1.0519	1.0271	1.0202	System adjustments or voltage support if needed
WILSONAV	60 kV	304 - Sacramento	1.008	1.0731	1.0623	1.0432	1.0327	System adjustments or voltage support if needed
COLUSA	60 kV	304 - Sacramento	1.0079	1.0659	1.0672	1.0418	1.0327	System adjustments or voltage support if needed
MERIDIAN	60 kV	304 - Sacramento	1.0224	1.0689	1.0688	1.042	1.0363	System adjustments or voltage support if needed
WESCOT1	60 kV	304 - Sacramento	1.0313	1.0628	1.0627	1.0433	1.0395	System adjustments or voltage support if needed
WESCOT2	60 kV	304 - Sacramento	1.0424	1.0541	1.05	1.0468	1.0421	System adjustments or voltage support if needed
WINTERS	60 kV	304 - Sacramento	0.9936	1.0517	1.044	1.029	1.0177	System adjustments or voltage support if needed
PLAINFLD	60 kV	304 - Sacramento	0.9089	1.0727	1.0724	1.0139	0.985	System adjustments or voltage support if needed
PEASE	115 kV	305 - Sierra	0.9928	1.0547	1.048	1.0349	1.0215	System adjustments or voltage support if needed
E.MRYSVE	115 kV	305 - Sierra	1.0346	1.0562	1.069	1.0617	1.0467	System adjustments or voltage support if needed
OLIVHRST	115 kV	305 - Sierra	1.0063	1.0527	1.0517	1.0383	1.0314	System adjustments or voltage support if needed
BOGUE	115 kV	305 - Sierra	1.0233	1.0661	1.063	1.0545	1.0337	System adjustments or voltage support if needed
GLEAF 1	115 kV	305 - Sierra	1.0306	1.0571	1.0584	1.05	1.0426	System adjustments or voltage support if needed
E.NICOLS	115 kV	305 - Sierra	1.0341	1.0514	1.0571	1.0488	1.0482	System adjustments or voltage support if needed
DRUM	115 kV	305 - Sierra	1.0522	1.0576	1.0476	1.057	1.061	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
DTCH FL1	115 kV	305 - Sierra	1.0456	1.0564	1.0489	1.0539	1.0549	System adjustments or voltage support if needed
CHCGO PK	115 kV	305 - Sierra	1.0429	1.0573	1.0506	1.0536	1.052	System adjustments or voltage support if needed
BRUNSWCK	115 kV	305 - Sierra	1.033	1.0567	1.0552	1.0514	1.0484	System adjustments or voltage support if needed
BRNSWALT	115 kV	305 - Sierra	1.0404	1.0561	1.0539	1.0524	1.0535	System adjustments or voltage support if needed
PLACER	115 kV	305 - Sierra	1.0265	1.0558	1.0548	1.0459	1.037	System adjustments or voltage support if needed
HORSESHE	115 kV	305 - Sierra	1.0356	1.0545	1.048	1.0426	1.0411	System adjustments or voltage support if needed
HIGGINS	115 kV	305 - Sierra	1.0289	1.0579	1.0552	1.0493	1.0408	System adjustments or voltage support if needed
NEWCSTLE	115 kV	305 - Sierra	1.0313	1.0556	1.0525	1.0453	1.0395	System adjustments or voltage support if needed
FLINT1	115 kV	305 - Sierra	1.028	1.0557	1.0541	1.0457	1.0378	System adjustments or voltage support if needed
FLINT	115 kV	305 - Sierra	1.0279	1.0552	1.0538	1.0455	1.0376	System adjustments or voltage support if needed
BELL PGE	115 kV	305 - Sierra	1.0259	1.0567	1.0553	1.0466	1.0372	System adjustments or voltage support if needed
FLINT2	115 kV	305 - Sierra	1.028	1.0551	1.0538	1.0455	1.0377	System adjustments or voltage support if needed
BRNSWCKP	115 kV	305 - Sierra	1.0381	1.0557	1.0535	1.0519	1.0517	System adjustments or voltage support if needed
ELDORAD	115 kV	305 - Sierra	1.0327	1.0559	1.0522	1.0451	1.0382	System adjustments or voltage support if needed
APPLE HL	115 kV	305 - Sierra	1.0311	1.0555	1.0516	1.0439	1.0371	System adjustments or voltage support if needed
PLCRVLB2	115 kV	305 - Sierra	1.0306	1.054	1.0499	1.0429	1.0359	System adjustments or voltage support if needed
PLCRVLT1	115 kV	305 - Sierra	1.0337	1.0532	1.0485	1.0429	1.0381	System adjustments or voltage support if needed
PLCRVLB3	115 kV	305 - Sierra	1.0305	1.054	1.05	1.0429	1.0359	System adjustments or voltage support if needed
PLCRVLT2	115 kV	305 - Sierra	1.0307	1.0539	1.0499	1.043	1.036	System adjustments or voltage support if needed
DMND SPR	115 kV	305 - Sierra	1.0318	1.0533	1.049	1.0426	1.0367	System adjustments or voltage support if needed
DIMOND_2	115 kV	305 - Sierra	1.0319	1.0533	1.0489	1.0426	1.0367	System adjustments or voltage support if needed
MIZOU_T2	115 kV	305 - Sierra	1.0313	1.0536	1.0494	1.0428	1.0364	System adjustments or voltage support if needed
MIZOU_T1	115 kV	305 - Sierra	1.0341	1.0528	1.0481	1.0426	1.0384	System adjustments or voltage support if needed
SHPRING1	115 kV	305 - Sierra	1.0348	1.0522	1.0472	1.0421	1.0389	System adjustments or voltage support if needed
CLRKSVLE	115 kV	305 - Sierra	1.0363	1.0535	1.0464	1.0392	1.042	System adjustments or voltage support if needed
SHPRING	115 kV	305 - Sierra	1.0346	1.0523	1.0473	1.042	1.0388	System adjustments or voltage support if needed
DIMOND_1	115 kV	305 - Sierra	1.0345	1.0525	1.0476	1.0423	1.0387	System adjustments or voltage support if needed
SPICAMIN	115 kV	305 - Sierra	1.0312	1.0554	1.0516	1.044	1.0371	System adjustments or voltage support if needed
LINCLN	115 kV	305 - Sierra	1.0226	1.0506	1.0532	1.0456	1.0364	System adjustments or voltage support if needed
SPI-LINC	115 kV	305 - Sierra	1.0236	1.0504	1.0531	1.0455	1.0373	System adjustments or voltage support if needed
RBROCKLIN	115 kV	305 - Sierra	1.0173	1.0518	1.0523	1.0465	1.0305	System adjustments or voltage support if needed
PLSNT GR	115 kV	305 - Sierra	1.015	1.0521	1.0522	1.0465	1.0285	System adjustments or voltage support if needed
DTCH FL2	115 kV	305 - Sierra	1.0495	1.0571	1.0495	1.0559	1.0593	System adjustments or voltage support if needed
DOBBINS	60 kV	305 - Sierra	1.0381	1.0579	1.0485	1.0603	1.0428	System adjustments or voltage support if needed
ROCKLIN	60 kV	305 - Sierra	1.0172	1.0846	1.0785	1.0728	1.0361	System adjustments or voltage support if needed
TAYLOR	60 kV	305 - Sierra	1.018	1.0844	1.0781	1.0728	1.0365	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)				Voltage PU (Sensitivity Scenario)		
DEL MAR	60 kV	305 - Sierra	1.0057	1.091	1.0814	1.0746	1.0269	System adjustments or voltage support if needed
SIERRAPI	60 kV	305 - Sierra	1.0057	1.091	1.0814	1.0746	1.0269	System adjustments or voltage support if needed
COLGATE	60 kV	305 - Sierra	1.0385	1.0577	1.0483	1.0603	1.0431	System adjustments or voltage support if needed
CHLLNGEA	60 kV	305 - Sierra	1.0381	1.0579	1.0485	1.0603	1.0428	System adjustments or voltage support if needed
NARRWS 2	60 kV	305 - Sierra	1.0211	1.0501	1.0365	1.041	1.0257	System adjustments or voltage support if needed
CLMBA HL	60 kV	305 - Sierra	1.0353	1.0605	1.0507	1.0609	1.0415	System adjustments or voltage support if needed
PIKE CTY	60 kV	305 - Sierra	1.0325	1.0629	1.0531	1.0623	1.0398	System adjustments or voltage support if needed
ALLEGHNY	60 kV	305 - Sierra	1.03	1.064	1.054	1.0626	1.038	System adjustments or voltage support if needed
GRSS VLY	60 kV	305 - Sierra	1.0222	1.0609	1.0547	1.0578	1.033	System adjustments or voltage support if needed
ENVRO_HY	60 kV	305 - Sierra	1.0054	1.0619	1.0454	1.0288	1.0097	System adjustments or voltage support if needed
FORST HL	60 kV	305 - Sierra	1.0009	1.0602	1.0437	1.0271	1.0079	System adjustments or voltage support if needed
OXBOW	60 kV	305 - Sierra	1.0065	1.0622	1.0458	1.0292	1.0102	System adjustments or voltage support if needed
ATLANTI	60 kV	305 - Sierra	1.0203	1.0844	1.0782	1.0737	1.0381	System adjustments or voltage support if needed
SILVERDO	115 kV	306 - North Bay	1.0019	1.0646	1.0532	1.0428	1.0194	System adjustments or voltage support if needed
MONTCLO	115 kV	306 - North Bay	1.0018	1.0643	1.0545	1.0437	1.0196	System adjustments or voltage support if needed
MNTCLOPH	115 kV	306 - North Bay	1.002	1.0645	1.0548	1.044	1.0198	System adjustments or voltage support if needed
PITSBURG	115 kV	308 - Diablo	1.0279	1.0628	1.0646	1.0552	1.0343	System adjustments or voltage support if needed
KIRKER	115 kV	308 - Diablo	1.0247	1.0639	1.0652	1.0547	1.0321	System adjustments or voltage support if needed
UNITEDSP	115 kV	308 - Diablo	1.0252	1.0639	1.0652	1.0549	1.0323	System adjustments or voltage support if needed
PRAXAIR	115 kV	308 - Diablo	1.0246	1.0601	1.0638	1.0521	1.0333	System adjustments or voltage support if needed
CLMBIAPV	115 kV	308 - Diablo	1.0251	1.061	1.0648	1.0526	1.0343	System adjustments or voltage support if needed
CLMBIAHS	115 kV	308 - Diablo	1.0251	1.0609	1.0647	1.0526	1.0342	System adjustments or voltage support if needed
CLAYTN	115 kV	308 - Diablo	1.021	1.0642	1.0643	1.0535	1.0285	System adjustments or voltage support if needed
MEDW LNE	115 kV	308 - Diablo	1.0137	1.065	1.0636	1.051	1.0224	System adjustments or voltage support if needed
LAKEWD-C	115 kV	308 - Diablo	1.0155	1.0645	1.0624	1.0497	1.0239	System adjustments or voltage support if needed
LAKEWD-M	115 kV	308 - Diablo	1.0155	1.0643	1.0623	1.0493	1.0239	System adjustments or voltage support if needed
WALNUTCR	115 kV	308 - Diablo	1.015	1.0646	1.0627	1.0502	1.0234	System adjustments or voltage support if needed
LMEC	115 kV	308 - Diablo	1.0281	1.0625	1.0643	1.0547	1.034	System adjustments or voltage support if needed
MARTNZ D	115 kV	308 - Diablo	1.0291	1.0523	1.0535	1.046	1.0343	System adjustments or voltage support if needed
MARTNZ E	115 kV	308 - Diablo	1.0291	1.0523	1.0535	1.0463	1.0342	System adjustments or voltage support if needed
BOLLMAN2	115 kV	308 - Diablo	1.0289	1.0557	1.057	1.0491	1.0344	System adjustments or voltage support if needed
W.P.BART	115 kV	308 - Diablo	1.0262	1.0618	1.0599	1.0504	1.0328	System adjustments or voltage support if needed
BOLLMAN	115 kV	308 - Diablo	1.0273	1.0563	1.0564	1.048	1.0331	System adjustments or voltage support if needed
ALHAMBRA	115 kV	308 - Diablo	1.0284	1.0505	1.0529	1.045	1.0338	System adjustments or voltage support if needed
BOLLMAN1	115 kV	308 - Diablo	1.0276	1.0568	1.0567	1.0483	1.0334	System adjustments or voltage support if needed
IMHOFF	115 kV	308 - Diablo	1.0291	1.0543	1.0555	1.0479	1.0344	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
EGBERT S2	230 kV	309 - San Francisco	N/A	1.052	1.0319	1.0124	N/A	System adjustments or voltage support if needed
S.L.A.C.	230 kV	310 - Peninsula	1.0309	1.0707	1.0476	1.0166	1.0364	System adjustments or voltage support if needed
JEDAMCX1	230 kV	310 - Peninsula	N/A	1.0705	1.0432	1.0158	N/A	System adjustments or voltage support if needed
JEDAMCX2	230 kV	310 - Peninsula	N/A	1.0705	1.0432	1.0158	N/A	System adjustments or voltage support if needed
JEFFERSN	230 kV	310 - Peninsula	1.0316	1.0717	1.0426	1.0134	1.037	System adjustments or voltage support if needed
TRAN230A	230 kV	310 - Peninsula	1.032	1.0685	1.0424	1.0164	1.0371	System adjustments or voltage support if needed
TRAN230B	230 kV	310 - Peninsula	1.0302	1.0642	1.0401	1.0164	1.035	System adjustments or voltage support if needed
CAROLD1	60 kV	310 - Peninsula	1.0319	1.0589	1.0422	1.0209	1.0384	System adjustments or voltage support if needed
CAROLD2	60 kV	310 - Peninsula	1.024	1.0689	1.043	1.0132	1.0309	System adjustments or voltage support if needed
CAROLNDS	60 kV	310 - Peninsula	1.0319	1.0589	1.0423	1.0209	1.0384	System adjustments or voltage support if needed
HILLSdle	60 kV	310 - Peninsula	1.0306	1.0528	1.0403	1.0244	1.0355	System adjustments or voltage support if needed
HLLSDLJT	60 kV	310 - Peninsula	1.0328	1.0584	1.0418	1.0212	1.0387	System adjustments or voltage support if needed
CRYSTLSG	60 kV	310 - Peninsula	1.0239	1.0689	1.043	1.0132	1.0309	System adjustments or voltage support if needed
RALSTON	60 kV	310 - Peninsula	1.0242	1.0704	1.0434	1.0135	1.0312	System adjustments or voltage support if needed
HLF MNB	60 kV	310 - Peninsula	1.0444	1.0595	1.0436	1.018	1.0526	System adjustments or voltage support if needed
LAS PLGS	60 kV	310 - Peninsula	1.0168	1.0708	1.0445	1.0112	1.0269	System adjustments or voltage support if needed
EMRLD LE	60 kV	310 - Peninsula	1.0253	1.0723	1.0401	1.0115	1.0313	System adjustments or voltage support if needed
WATRSHEd	60 kV	310 - Peninsula	1.0308	1.0668	1.0427	1.0178	1.0366	System adjustments or voltage support if needed
JEFRSN_D	60 kV	310 - Peninsula	1.0292	1.0735	1.0435	1.0153	1.0349	System adjustments or voltage support if needed
STANFORD	60 kV	310 - Peninsula	0.98	1.061	0.9971	0.9653	0.9879	System adjustments or voltage support if needed
WOODSIDE	60 kV	310 - Peninsula	1.0183	1.0708	1.0445	1.0117	1.028	System adjustments or voltage support if needed
S.L.A.C.	60 kV	310 - Peninsula	0.9843	1.0622	1.0013	0.9697	0.9921	System adjustments or voltage support if needed
TRAN-60	60 kV	310 - Peninsula	1.032	1.059	1.0423	1.021	1.0384	System adjustments or voltage support if needed
LSPLGSJT	60 kV	310 - Peninsula	1.0039	1.0672	1.0198	0.9896	1.0108	System adjustments or voltage support if needed
OX_MTN60	60 kV	310 - Peninsula	1.0443	1.0591	1.043	1.0187	1.0511	System adjustments or voltage support if needed
HILDAL49	60 kV	310 - Peninsula	1.0328	1.0586	1.0418	1.0212	1.0387	System adjustments or voltage support if needed
RLSTN35	60 kV	310 - Peninsula	1.0315	1.0641	1.0424	1.019	1.0373	System adjustments or voltage support if needed
RLSTN45	60 kV	310 - Peninsula	1.0243	1.0704	1.0434	1.0135	1.0313	System adjustments or voltage support if needed
HILDAL47	60 kV	310 - Peninsula	1.0242	1.0699	1.0433	1.0134	1.0312	System adjustments or voltage support if needed
JEFRSN_E	60 kV	310 - Peninsula	1.0294	1.0735	1.0437	1.0155	1.0351	System adjustments or voltage support if needed
MELNS JA	115 kV	311 - Stockton	1.0168	1.0606	1.0652	1.0543	1.0233	System adjustments or voltage support if needed
FROGTOWN	115 kV	311 - Stockton	1.0176	1.0629	1.0666	1.0547	1.0254	System adjustments or voltage support if needed
CATARACT	115 kV	311 - Stockton	1.0244	1.0621	1.0634	1.056	1.0303	System adjustments or voltage support if needed
STANISLS	115 kV	311 - Stockton	1.0261	1.0629	1.0635	1.0564	1.0319	System adjustments or voltage support if needed
LAMMERS	115 kV	311 - Stockton	1.0141	1.0533	1.0489	1.0557	1.0196	System adjustments or voltage support if needed
OI GLASS	115 kV	311 - Stockton	1.0134	1.0533	1.0487	1.0554	1.0192	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
SAFEWAY	115 kV	311 - Stockton	1.0209	1.0537	1.0486	1.0569	1.0243	System adjustments or voltage support if needed
TESLA	115 kV	311 - Stockton	1.0356	1.0544	1.0493	1.0595	1.0351	System adjustments or voltage support if needed
ELLS GTY	115 kV	311 - Stockton	1.0323	1.0539	1.0492	1.0589	1.0327	System adjustments or voltage support if needed
AEC_300	115 kV	311 - Stockton	1.0267	1.054	1.0485	1.0578	1.0284	System adjustments or voltage support if needed
SCHULTE	115 kV	311 - Stockton	1.017	1.0533	1.0487	1.0563	1.0215	System adjustments or voltage support if needed
GWFRACY	115 kV	311 - Stockton	1.017	1.0533	1.0487	1.0563	1.0215	System adjustments or voltage support if needed
CAMANCHE	115 kV	311 - Stockton	1.0454	1.0474	1.052	1.0418	1.0435	System adjustments or voltage support if needed
TH.E.DV.	115 kV	311 - Stockton	1.0346	1.0552	1.0483	1.0578	1.0342	System adjustments or voltage support if needed
GRANITE	115 kV	311 - Stockton	1.0192	1.0543	1.0385	1.0474	1.0213	System adjustments or voltage support if needed
RIPONCOGENJT	115 kV	311 - Stockton	1.0324	1.0562	1.0461	1.0539	1.0321	System adjustments or voltage support if needed
TESLAMTR	115 kV	311 - Stockton	1.0314	1.0563	1.045	1.0512	1.0311	System adjustments or voltage support if needed
RIPONCOGEN	115 kV	311 - Stockton	1.035	1.0563	1.0464	1.0542	1.0347	System adjustments or voltage support if needed
MDWYWWD	115 kV	311 - Stockton	1.0361	1.0538	1.049	1.0584	1.036	System adjustments or voltage support if needed
TEICHERT	115 kV	311 - Stockton	1.0189	1.0544	1.0381	1.0471	1.021	System adjustments or voltage support if needed
WEST PNT	60 kV	311 - Stockton	1.0435	1.0646	1.0698	1.0581	1.0484	System adjustments or voltage support if needed
ELECTRAJ	60 kV	311 - Stockton	1.0412	1.0521	1.057	1.0478	1.0428	System adjustments or voltage support if needed
PNE GRVE	60 kV	311 - Stockton	1.034	1.0592	1.0658	1.0519	1.0398	System adjustments or voltage support if needed
VLLY SPS	60 kV	311 - Stockton	1.0507	1.0419	1.0518	1.0425	1.0491	System adjustments or voltage support if needed
N BRANCH	60 kV	311 - Stockton	1.0489	1.0447	1.0545	1.0424	1.049	System adjustments or voltage support if needed
CAL CMNT	60 kV	311 - Stockton	1.0457	1.0484	1.0577	1.042	1.0477	System adjustments or voltage support if needed
MARTELL	60 kV	311 - Stockton	1.0342	1.0479	1.0554	1.0364	1.0375	System adjustments or voltage support if needed
OLETA	60 kV	311 - Stockton	1.0168	1.0528	1.062	1.0347	1.0238	System adjustments or voltage support if needed
AM FORST	60 kV	311 - Stockton	1.0335	1.047	1.054	1.0354	1.0367	System adjustments or voltage support if needed
CLAY	60 kV	311 - Stockton	1.0276	1.0538	1.0577	1.0354	1.0347	System adjustments or voltage support if needed
INE PRSN	60 kV	311 - Stockton	1.0184	1.0514	1.0533	1.0286	1.0277	System adjustments or voltage support if needed
MCSP	60 kV	311 - Stockton	1.0187	1.0513	1.0531	1.0287	1.0278	System adjustments or voltage support if needed
BUENAVISTA	60 kV	311 - Stockton	1.0302	1.053	1.0578	1.0365	1.0365	System adjustments or voltage support if needed
PARDEE A	60 kV	311 - Stockton	1.0558	1.047	1.0569	1.0476	1.0541	System adjustments or voltage support if needed
VSLDSW87	60 kV	311 - Stockton	1.0545	1.0458	1.0556	1.0463	1.0529	System adjustments or voltage support if needed
PRDESWS	60 kV	311 - Stockton	1.0373	1.0509	1.0579	1.0392	1.0414	System adjustments or voltage support if needed
N.HOGAN	60 kV	311 - Stockton	1.0378	1.0469	1.0597	1.0407	1.0446	System adjustments or voltage support if needed
CORRAL	60 kV	311 - Stockton	1.0198	1.0525	1.0698	1.0379	1.0382	System adjustments or voltage support if needed
STAGG	60 kV	311 - Stockton	1.0508	1.0488	1.049	1.047	1.0506	System adjustments or voltage support if needed
HERDLYN	60 kV	311 - Stockton	1.0523	1.0538	1.0534	1.06	1.0513	System adjustments or voltage support if needed
B.BTHNY-	60 kV	311 - Stockton	1.051	1.0526	1.0521	1.0583	1.0504	System adjustments or voltage support if needed
ALTA-CGE	60 kV	311 - Stockton	1.0511	1.0527	1.0522	1.0583	1.051	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)				Voltage PU (Sensitivity Scenario)		
WEST SDE	60 kV	311 - Stockton	1.0506	1.0528	1.0518	1.0584	1.0496	System adjustments or voltage support if needed
DONNELLS	115 kV	312 - Stanislaus	1.041	1.0694	1.0762	1.0587	1.0428	System adjustments or voltage support if needed
BEARDSLY	115 kV	312 - Stanislaus	1.0383	1.07	1.0768	1.0592	1.0405	System adjustments or voltage support if needed
SPRNG GP	115 kV	312 - Stanislaus	1.0363	1.0692	1.0759	1.0585	1.0387	System adjustments or voltage support if needed
SANDBAR	115 kV	312 - Stanislaus	1.0382	1.0703	1.0768	1.0599	1.0406	System adjustments or voltage support if needed
MI-WUK	115 kV	312 - Stanislaus	1.0225	1.0674	1.0748	1.0556	1.0268	System adjustments or voltage support if needed
CURTISS	115 kV	312 - Stanislaus	1.0146	1.0653	1.0729	1.053	1.0201	System adjustments or voltage support if needed
SPISONORA	115 kV	312 - Stanislaus	1.015	1.0653	1.0729	1.0531	1.0204	System adjustments or voltage support if needed
R.TRACK	115 kV	312 - Stanislaus	1.021	1.0631	1.0701	1.0545	1.0261	System adjustments or voltage support if needed
CH.STN	115 kV	312 - Stanislaus	1.0175	1.0596	1.0677	1.0509	1.0215	System adjustments or voltage support if needed
PEORIA	115 kV	312 - Stanislaus	1.0174	1.0611	1.0682	1.0523	1.0217	System adjustments or voltage support if needed
MELONES	115 kV	312 - Stanislaus	1.0222	1.0622	1.0688	1.0544	1.0267	System adjustments or voltage support if needed
TULLOCH	115 kV	312 - Stanislaus	1.0316	1.0588	1.0642	1.0541	1.031	System adjustments or voltage support if needed
MELNS JB	115 kV	312 - Stanislaus	1.0161	1.058	1.0625	1.0531	1.0221	System adjustments or voltage support if needed
RVRBANK	115 kV	312 - Stanislaus	1.0388	1.0499	1.0572	1.0423	1.0407	System adjustments or voltage support if needed
SALADO	60 kV	312 - Stanislaus	1.0541	1.0554	1.041	1.0487	1.0532	System adjustments or voltage support if needed
PATTERSN	60 kV	312 - Stanislaus	1.0469	1.0544	1.0438	1.0472	1.05	System adjustments or voltage support if needed
STNSLSRP	60 kV	312 - Stanislaus	1.0501	1.051	1.0396	1.041	1.0541	System adjustments or voltage support if needed
CROWCREEK SS	60 kV	312 - Stanislaus	1.0485	1.0505	1.0399	1.0389	1.0547	System adjustments or voltage support if needed
FRONTIERPV	60 kV	312 - Stanislaus	1.0487	1.0514	1.041	1.0389	1.0559	System adjustments or voltage support if needed
NEWMAN	60 kV	312 - Stanislaus	1.0247	1.0567	1.0547	1.0395	1.0432	System adjustments or voltage support if needed
CRWS LDG	60 kV	312 - Stanislaus	1.0382	1.0544	1.0478	1.0449	1.0468	System adjustments or voltage support if needed
GUSTINE	60 kV	312 - Stanislaus	1.0123	1.0568	1.0597	1.0358	1.0376	System adjustments or voltage support if needed
Q1350	60 kV	312 - Stanislaus	N/A	1.05	1.0394	1.0384	N/A	System adjustments or voltage support if needed
CHWCHLLA	115 kV	313 - Yosemite	1.0204	1.0532	1.0465	1.0249	1.0209	System adjustments or voltage support if needed
ATWATER	115 kV	313 - Yosemite	1.0227	1.0335	1.0614	1.0276	1.028	System adjustments or voltage support if needed
EXCHEQUR	115 kV	313 - Yosemite	1.0503	1.0733	1.0799	1.0444	1.044	System adjustments or voltage support if needed
SHARON	115 kV	313 - Yosemite	1.0199	1.0568	1.0469	1.0259	1.0213	System adjustments or voltage support if needed
OAKHURST	115 kV	313 - Yosemite	1.0022	1.0809	1.0778	1.0317	1.0208	System adjustments or voltage support if needed
CORSGOLD	115 kV	313 - Yosemite	1.0086	1.0784	1.0728	1.0326	1.0241	System adjustments or voltage support if needed
LIVNGSTN	115 kV	313 - Yosemite	1.0182	1.0275	1.0615	1.026	1.0248	System adjustments or voltage support if needed
GALLO	115 kV	313 - Yosemite	1.0174	1.0245	1.0606	1.025	1.0242	System adjustments or voltage support if needed
WILSONPGAE	115 kV	313 - Yosemite	N/A	N/A	1.0555	1.0284	N/A	System adjustments or voltage support if needed
EL CAPTN	115 kV	313 - Yosemite	1.0247	1.0345	1.0606	1.0279	1.0291	System adjustments or voltage support if needed
CRESSEY	115 kV	313 - Yosemite	1.0194	1.0321	1.0622	1.0266	1.0264	System adjustments or voltage support if needed
MERCED	115 kV	313 - Yosemite	1.0287	1.0358	1.059	1.0271	1.0319	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
CHENY	115 kV	313 - Yosemite	1.0565	1.0519	1.047	1.038	1.0473	System adjustments or voltage support if needed
DAIRYLND	115 kV	313 - Yosemite	1.0205	1.0522	1.0521	1.021	1.0224	System adjustments or voltage support if needed
PANOCH1	115 kV	313 - Yosemite	1.0573	1.0514	1.0464	1.0379	1.0459	System adjustments or voltage support if needed
PANOCH2	115 kV	313 - Yosemite	1.0573	1.0514	1.0464	1.0379	1.0459	System adjustments or voltage support if needed
EL NIDO	115 kV	313 - Yosemite	1.0305	1.035	1.0556	1.0304	1.0333	System adjustments or voltage support if needed
CALPEAKPNCHE	115 kV	313 - Yosemite	1.0573	1.0514	1.0464	1.0379	1.0459	System adjustments or voltage support if needed
STARWDPNCH	115 kV	313 - Yosemite	1.0573	1.0514	1.0464	1.0379	1.0459	System adjustments or voltage support if needed
CHWCHLASLR	115 kV	313 - Yosemite	1.0222	1.0501	1.0523	1.022	1.0228	System adjustments or voltage support if needed
WILSONSTCOM	115 kV	313 - Yosemite	1.035	1.0346	1.0555	1.0284	1.035	System adjustments or voltage support if needed
WRIGHT T	70 kV	313 - Yosemite	1.0455	1.0581	1.0338	1.0547	1.0402	System adjustments or voltage support if needed
ARBURU T	70 kV	313 - Yosemite	1.0383	1.0616	1.0372	1.0544	1.0368	System adjustments or voltage support if needed
BONITA T	70 kV	313 - Yosemite	1.0271	1.0552	1.0532	1.0394	1.0444	System adjustments or voltage support if needed
ELPECO T	70 kV	313 - Yosemite	1.0348	1.0494	1.0448	1.0422	1.0431	System adjustments or voltage support if needed
WESIX	70 kV	313 - Yosemite	0.9777	1.0207	1.0437	1.0312	0.9965	System adjustments or voltage support if needed
WESTLAND	70 kV	313 - Yosemite	0.9794	1.0213	1.0453	1.0329	0.9982	System adjustments or voltage support if needed
ORO LOMA	70 kV	313 - Yosemite	1.0346	1.0599	1.0466	1.0359	1.0376	System adjustments or voltage support if needed
LIVNGSTN	70 kV	313 - Yosemite	1.0323	1.0732	1.0521	1.0571	1.0426	System adjustments or voltage support if needed
CANAL	70 kV	313 - Yosemite	1.0285	1.0651	1.0431	1.0548	1.0317	System adjustments or voltage support if needed
CHEVPIPE	70 kV	313 - Yosemite	1.0468	1.0561	1.0328	1.0547	1.0408	System adjustments or voltage support if needed
SNTA NLA	70 kV	313 - Yosemite	1.0464	1.0561	1.0329	1.0547	1.0406	System adjustments or voltage support if needed
LVNGSTNT	70 kV	313 - Yosemite	1.0308	1.0642	1.042	1.0549	1.0331	System adjustments or voltage support if needed
LOS BANS	70 kV	313 - Yosemite	1.0509	1.0559	1.0318	1.0546	1.0433	System adjustments or voltage support if needed
SNTA RTA	70 kV	313 - Yosemite	1.0252	1.0686	1.0572	1.0354	1.0386	System adjustments or voltage support if needed
DOS PALS	70 kV	313 - Yosemite	1.0283	1.065	1.0531	1.0355	1.0372	System adjustments or voltage support if needed
ORTIGA	70 kV	313 - Yosemite	1.0316	1.064	1.0413	1.0546	1.0344	System adjustments or voltage support if needed
MRCYSPRS	70 kV	313 - Yosemite	1.0352	1.0623	1.0395	1.0544	1.0357	System adjustments or voltage support if needed
ARBURUA	70 kV	313 - Yosemite	1.0339	1.0598	1.0327	1.05	1.0324	System adjustments or voltage support if needed
PCHCOWND	70 kV	313 - Yosemite	1.0497	1.0563	1.0322	1.0546	1.0426	System adjustments or voltage support if needed
CANANDGA	70 kV	313 - Yosemite	1.0374	1.0481	1.0434	1.0422	1.0444	System adjustments or voltage support if needed
BONITA	70 kV	313 - Yosemite	1.0219	1.0585	1.0577	1.0379	1.0442	System adjustments or voltage support if needed
GLASS	70 kV	313 - Yosemite	1.0375	1.048	1.0433	1.0422	1.0444	System adjustments or voltage support if needed
MADERA	70 kV	313 - Yosemite	1.0389	1.0498	1.0449	1.0437	1.0458	System adjustments or voltage support if needed
TRIGO	70 kV	313 - Yosemite	1.0375	1.0486	1.0439	1.0426	1.0446	System adjustments or voltage support if needed
BORDEN	70 kV	313 - Yosemite	1.0436	1.0458	1.0409	1.0427	1.0481	System adjustments or voltage support if needed
MERCYSPRNGSS	70 kV	313 - Yosemite	1.0359	1.0618	1.039	1.0544	1.036	System adjustments or voltage support if needed
NRTHFORK	70 kV	313 - Yosemite	1.0005	1.0516	1.0847	1.0443	1.0348	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)				Voltage PU (Sensitivity Scenario)		
SJNO2	70 kV	313 - Yosemite	1.0025	1.0523	1.0843	1.0445	1.0356	System adjustments or voltage support if needed
SJNO3	70 kV	313 - Yosemite	0.9984	1.0508	1.0851	1.044	1.0339	System adjustments or voltage support if needed
CASSIDY	70 kV	313 - Yosemite	1.0292	1.0474	1.0558	1.0428	1.0427	System adjustments or voltage support if needed
EL PECO	70 kV	313 - Yosemite	1.0323	1.05	1.0455	1.042	1.0416	System adjustments or voltage support if needed
FIREBAGH	70 kV	313 - Yosemite	1.0063	0.9862	1.0437	1.0267	1.0304	System adjustments or voltage support if needed
TOMATAK	70 kV	313 - Yosemite	0.9045	0.9794	1.042	1.0263	0.9029	System adjustments or voltage support if needed
MENDOTA	70 kV	313 - Yosemite	0.9208	0.9465	1.0451	1.0384	0.9191	System adjustments or voltage support if needed
BIOMASS	70 kV	313 - Yosemite	0.937	0.968	1.0458	1.0372	0.9424	System adjustments or voltage support if needed
WRGHT PP	70 kV	313 - Yosemite	1.0446	1.0582	1.034	1.0546	1.0395	System adjustments or voltage support if needed
CALRENEW	70 kV	313 - Yosemite	0.937	0.9679	1.0457	1.0372	0.9424	System adjustments or voltage support if needed
ADAMS_E	70 kV	313 - Yosemite	0.9707	1.016	1.0507	1.0353	0.9956	System adjustments or voltage support if needed
PCHCO PP	70 kV	313 - Yosemite	1.037	1.0713	1.0176	1.0398	1.0342	System adjustments or voltage support if needed
Q723	70 kV	313 - Yosemite	1.0437	1.05	1.044	1.0428	1.048	System adjustments or voltage support if needed
INTL TUR	70 kV	313 - Yosemite	1.0387	1.0706	1.0194	1.0413	1.0369	System adjustments or voltage support if needed
VEGA	70 kV	313 - Yosemite	1.0359	1.0618	1.0391	1.0544	1.036	System adjustments or voltage support if needed
SHEPHERD	115 kV	314 - Fresno	1.0318	1.0621	1.0502	1.041	1.0348	System adjustments or voltage support if needed
KAMM	115 kV	314 - Fresno	1.0469	1.0534	1.0503	1.0376	1.0466	System adjustments or voltage support if needed
CANTUA	115 kV	314 - Fresno	1.0378	1.0579	1.0551	1.0377	1.048	System adjustments or voltage support if needed
SCHINDLR	115 kV	314 - Fresno	1.0301	1.0608	1.058	1.0377	1.0485	System adjustments or voltage support if needed
AIRWAYS2	115 kV	314 - Fresno	1.0195	1.0765	1.0586	1.0399	1.0261	System adjustments or voltage support if needed
KERCKHF1	115 kV	314 - Fresno	1.0288	1.0693	1.0581	1.0371	1.0336	System adjustments or voltage support if needed
KERCKHOFFPH2	115 kV	314 - Fresno	1.0292	1.0698	1.0587	1.0377	1.0341	System adjustments or voltage support if needed
AIRWAYS	115 kV	314 - Fresno	1.0144	1.0658	1.0494	1.0348	1.016	System adjustments or voltage support if needed
CLOVIS-1	115 kV	314 - Fresno	1.0263	1.0697	1.0568	1.0442	1.0325	System adjustments or voltage support if needed
CLOVIS-2	115 kV	314 - Fresno	1.0216	1.0736	1.0592	1.0451	1.0289	System adjustments or voltage support if needed
SANGER	115 kV	314 - Fresno	1.0298	1.0722	1.0581	1.0459	1.0357	System adjustments or voltage support if needed
LASPALMS	115 kV	314 - Fresno	1.0212	1.0747	1.0577	1.0398	1.027	System adjustments or voltage support if needed
MC CALL	115 kV	314 - Fresno	1.042	1.0696	1.0567	1.0502	1.047	System adjustments or voltage support if needed
MALAGA	115 kV	314 - Fresno	1.0351	1.0686	1.0587	1.0466	1.0408	System adjustments or voltage support if needed
RANCHRS	115 kV	314 - Fresno	1.0348	1.0683	1.0588	1.0468	1.0406	System adjustments or voltage support if needed
PPG	115 kV	314 - Fresno	1.0351	1.0686	1.0587	1.0466	1.0408	System adjustments or voltage support if needed
AIRPROD	115 kV	314 - Fresno	1.0357	1.0687	1.0582	1.047	1.0413	System adjustments or voltage support if needed
REEDLEY	115 kV	314 - Fresno	1.0214	1.0782	1.0634	1.0484	1.0326	System adjustments or voltage support if needed
KRCDP	115 kV	314 - Fresno	1.036	1.0686	1.0587	1.0466	1.0415	System adjustments or voltage support if needed
WAHTOKE	115 kV	314 - Fresno	1.0276	1.0761	1.061	1.0498	1.0367	System adjustments or voltage support if needed
SESWTF	115 kV	314 - Fresno	1.0152	1.0652	1.0489	1.0347	1.0163	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
KNGSCOGN	115 kV	314 - Fresno	1.0369	1.066	1.0517	1.0472	1.0414	System adjustments or voltage support if needed
SUNMAID	115 kV	314 - Fresno	1.0369	1.066	1.0517	1.0472	1.0414	System adjustments or voltage support if needed
RAINBW	115 kV	314 - Fresno	1.0266	1.074	1.06	1.0464	1.0342	System adjustments or voltage support if needed
DANISHCM	115 kV	314 - Fresno	1.0219	1.0742	1.0618	1.0458	1.031	System adjustments or voltage support if needed
EXCELSIORSS	115 kV	314 - Fresno	1.0339	1.0595	1.0567	1.0379	1.0488	System adjustments or voltage support if needed
PIEDRA 1	115 kV	314 - Fresno	1.0279	1.0749	1.0614	1.0486	1.0365	System adjustments or voltage support if needed
Q678	115 kV	314 - Fresno	1.0339	1.0594	1.0567	1.0379	1.0488	System adjustments or voltage support if needed
PIEDRA 2	115 kV	314 - Fresno	1.033	1.0717	1.0584	1.0475	1.0383	System adjustments or voltage support if needed
BALCH	115 kV	314 - Fresno	1.0416	1.0697	1.0586	1.0513	1.0451	System adjustments or voltage support if needed
KNGSRVR1	115 kV	314 - Fresno	1.0387	1.0736	1.0623	1.0533	1.0448	System adjustments or voltage support if needed
CAL AVE	115 kV	314 - Fresno	1.0207	1.0742	1.0624	1.0457	1.03	System adjustments or voltage support if needed
WST FRSO	115 kV	314 - Fresno	1.0187	1.0746	1.0631	1.0459	1.0286	System adjustments or voltage support if needed
BARTON	115 kV	314 - Fresno	1.0134	1.0614	1.0439	1.0313	1.0111	System adjustments or voltage support if needed
PNDLJ2	115 kV	314 - Fresno	1.0125	1.056	1.0441	1.0243	1.0121	System adjustments or voltage support if needed
MANCHSTR	115 kV	314 - Fresno	1.0185	1.0718	1.0567	1.0358	1.0231	System adjustments or voltage support if needed
PNEDLE	115 kV	314 - Fresno	1.0105	1.0573	1.0448	1.0243	1.0108	System adjustments or voltage support if needed
WOODWARD	115 kV	314 - Fresno	1.0253	1.0604	1.0474	1.0362	1.0272	System adjustments or voltage support if needed
PNEDLE2	115 kV	314 - Fresno	1.0122	1.0561	1.0442	1.0243	1.0118	System adjustments or voltage support if needed
BULLARD	115 kV	314 - Fresno	1.0098	1.0569	1.0457	1.025	1.0105	System adjustments or voltage support if needed
KINGS J2	115 kV	314 - Fresno	1.0356	1.0659	1.051	1.0465	1.0402	System adjustments or voltage support if needed
KINGSBURGD	115 kV	314 - Fresno	1.031	1.0648	1.0477	1.0442	1.036	System adjustments or voltage support if needed
KINGSBURGE	115 kV	314 - Fresno	1.031	1.0648	1.0477	1.0442	1.036	System adjustments or voltage support if needed
CORCORAN	115 kV	314 - Fresno	1.0128	1.059	1.0385	1.0368	1.0456	System adjustments or voltage support if needed
CHLDHOSP	115 kV	314 - Fresno	1.0238	1.0557	1.0416	1.0303	1.0224	System adjustments or voltage support if needed
GRDNGLS1WB	115 kV	314 - Fresno	1.0348	1.0675	1.0507	1.0461	1.0395	System adjustments or voltage support if needed
WESTLNDS	115 kV	314 - Fresno	1.0353	1.0586	1.056	1.0377	1.0484	System adjustments or voltage support if needed
WAUKENA_SS	115 kV	314 - Fresno	1.0145	1.0581	1.0371	1.0375	1.0458	System adjustments or voltage support if needed
CORCORANPV_P	115 kV	314 - Fresno	1.0146	1.0582	1.0372	1.0375	1.0459	System adjustments or voltage support if needed
Q529	115 kV	314 - Fresno	1.0158	1.0577	1.0371	1.0375	1.0456	System adjustments or voltage support if needed
GRDNGLS2EB	115 kV	314 - Fresno	1.0369	1.066	1.0517	1.0472	1.0414	System adjustments or voltage support if needed
Q558	115 kV	314 - Fresno	1.0146	1.0582	1.0372	1.0375	1.0459	System adjustments or voltage support if needed
SANGERCGN	115 kV	314 - Fresno	1.0283	1.0737	1.0595	1.0462	1.0351	System adjustments or voltage support if needed
PARLIER	115 kV	314 - Fresno	1.024	1.0761	1.0619	1.0474	1.0333	System adjustments or voltage support if needed
JACKSONSWSTA	115 kV	314 - Fresno	N/A	1.0533	1.0311	1.0389	N/A	System adjustments or voltage support if needed
CHSR10A	115 kV	314 - Fresno	N/A	1.0533	1.0311	1.0389	N/A	System adjustments or voltage support if needed
CHSR10B	115 kV	314 - Fresno	N/A	1.0533	1.0311	1.0389	N/A	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
RVRRCK T	70 kV	314 - Fresno	1.0268	1.0491	1.0633	1.044	1.0431	System adjustments or voltage support if needed
AVNLPARK	70 kV	314 - Fresno	0.9785	1.0296	1.0428	0.9897	1.0319	System adjustments or voltage support if needed
SUN CITY	70 kV	314 - Fresno	0.978	1.031	1.045	0.9896	1.0333	System adjustments or voltage support if needed
KANSASS_P	70 kV	314 - Fresno	1.0366	1.0496	1.0423	1.0371	1.0382	System adjustments or voltage support if needed
WISHON	70 kV	314 - Fresno	1.0083	1.0544	1.0827	1.045	1.0375	System adjustments or voltage support if needed
RIVERROC	70 kV	314 - Fresno	1.0268	1.0491	1.0633	1.044	1.0431	System adjustments or voltage support if needed
KETTLEMNS	70 kV	314 - Fresno	1.0469	1.0419	1.0346	1.0376	1.0357	System adjustments or voltage support if needed
Q679	70 kV	314 - Fresno	0.9733	1.025	1.0458	1.0347	1.0165	System adjustments or voltage support if needed
HARDWICK	70 kV	314 - Fresno	0.9982	1.0522	1.0325	1.0219	1.0101	System adjustments or voltage support if needed
GUERNSEY	70 kV	314 - Fresno	1.0145	1.0635	1.0583	1.0342	1.0395	System adjustments or voltage support if needed
COPPRMNE	70 kV	314 - Fresno	1.0243	1.0512	1.0716	1.0451	1.0437	System adjustments or voltage support if needed
BIOLA	70 kV	314 - Fresno	1.0291	1.0636	1.0387	1.034	1.0428	System adjustments or voltage support if needed
BOWLES	70 kV	314 - Fresno	1.0369	1.0534	1.036	1.0351	1.0454	System adjustments or voltage support if needed
GIFFEN	70 kV	314 - Fresno	0.9732	1.025	1.0458	1.0347	1.0165	System adjustments or voltage support if needed
SAN JOQN	70 kV	314 - Fresno	1.0369	1.0481	1.0404	1.0372	1.0386	System adjustments or voltage support if needed
HELM	70 kV	314 - Fresno	1.0415	1.0452	1.0383	1.0375	1.0426	System adjustments or voltage support if needed
AGRICO	70 kV	314 - Fresno	1.0303	1.0561	1.0456	1.0361	1.0335	System adjustments or voltage support if needed
TVY VLLY	70 kV	314 - Fresno	1.0219	1.1021	1.0822	1.0627	1.0379	System adjustments or voltage support if needed
KEARNEY	70 kV	314 - Fresno	1.0458	1.0494	1.0312	1.0371	1.0496	System adjustments or voltage support if needed
FRESNOWW	70 kV	314 - Fresno	1.045	1.0486	1.0303	1.0362	1.0487	System adjustments or voltage support if needed
KERMAN1	70 kV	314 - Fresno	1.0202	1.0611	1.0491	1.0359	1.0275	System adjustments or voltage support if needed
KERMAN2	70 kV	314 - Fresno	1.0201	1.0611	1.0491	1.0359	1.0274	System adjustments or voltage support if needed
REEDLEY	70 kV	314 - Fresno	1.028	1.0962	1.0787	1.0631	1.0406	System adjustments or voltage support if needed
AUBERRY	70 kV	314 - Fresno	1.0039	1.0569	1.0862	1.0436	1.0365	System adjustments or voltage support if needed
DUNLAP	70 kV	314 - Fresno	1.0031	1.1041	1.088	1.0616	1.0243	System adjustments or voltage support if needed
SANDCRK	70 kV	314 - Fresno	1.007	1.1036	1.0869	1.062	1.0273	System adjustments or voltage support if needed
STONCRRL	70 kV	314 - Fresno	1.0129	1.102	1.085	1.0627	1.0315	System adjustments or voltage support if needed
DNUBAEGY	70 kV	314 - Fresno	1.0232	1.0979	1.0807	1.0627	1.0379	System adjustments or voltage support if needed
DINUBA	70 kV	314 - Fresno	1.013	1.1011	1.0845	1.0617	1.032	System adjustments or voltage support if needed
OROSI	70 kV	314 - Fresno	1.0161	1.101	1.0834	1.063	1.0329	System adjustments or voltage support if needed
CAMDEN	70 kV	314 - Fresno	0.9792	1.0533	1.0391	1.0175	1.001	System adjustments or voltage support if needed
CARUTHRS	70 kV	314 - Fresno	1.0347	1.0642	1.0383	1.0373	1.0455	System adjustments or voltage support if needed
LEMORNAS	70 kV	314 - Fresno	1.0454	1.0342	1.0337	1.031	1.034	System adjustments or voltage support if needed
LEPRINO	70 kV	314 - Fresno	1.0236	1.0308	1.039	1.0248	1.0213	System adjustments or voltage support if needed
LEMOORE	70 kV	314 - Fresno	1.0248	1.0331	1.041	1.0264	1.0228	System adjustments or voltage support if needed
HNFDR SW	70 kV	314 - Fresno	1.0006	1.0504	1.0311	1.0223	1.0108	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
CANDLEWK	70 kV	314 - Fresno	1.0253	1.0328	1.0407	1.0265	1.023	System adjustments or voltage support if needed
CORCORAN	70 kV	314 - Fresno	1.0278	1.0803	1.0541	1.0525	1.0588	System adjustments or voltage support if needed
JGBSWLL	70 kV	314 - Fresno	1.0232	1.0796	1.0513	1.0494	1.0535	System adjustments or voltage support if needed
ARMSTRNG	70 kV	314 - Fresno	1.0143	1.0637	1.0584	1.0342	1.0392	System adjustments or voltage support if needed
RESERVE	70 kV	314 - Fresno	1.0141	1.0637	1.0584	1.0342	1.0391	System adjustments or voltage support if needed
ANGIOLA	70 kV	314 - Fresno	1.019	1.0784	1.0513	1.0487	1.0499	System adjustments or voltage support if needed
GWF_HENR	70 kV	314 - Fresno	1.046	1.0484	1.0383	1.0368	1.0407	System adjustments or voltage support if needed
BOSWELL	70 kV	314 - Fresno	1.0237	1.0799	1.0515	1.0496	1.0542	System adjustments or voltage support if needed
HENRIETTAD	70 kV	314 - Fresno	1.0466	1.0355	1.0349	1.0322	1.0352	System adjustments or voltage support if needed
JCBSCRNR	70 kV	314 - Fresno	1.032	1.0499	1.0436	1.0372	1.0359	System adjustments or voltage support if needed
TLRE LKE	70 kV	314 - Fresno	1.009	1.0445	1.0394	1.0296	1.005	System adjustments or voltage support if needed
AVENAL	70 kV	314 - Fresno	0.9776	1.0312	1.0456	0.9895	1.0336	System adjustments or voltage support if needed
KENT SS	70 kV	314 - Fresno	1.0464	1.0472	1.038	1.037	1.0395	System adjustments or voltage support if needed
AMSTG SW	70 kV	314 - Fresno	1.0143	1.0637	1.0584	1.0342	1.0392	System adjustments or voltage support if needed
CRESCENTSS	70 kV	314 - Fresno	1.0359	1.0503	1.043	1.0338	1.0486	System adjustments or voltage support if needed
STROUD	70 kV	314 - Fresno	1.0314	1.0569	1.0482	1.0332	1.0509	System adjustments or voltage support if needed
KENT_S	70 kV	314 - Fresno	1.0464	1.0472	1.038	1.037	1.0395	System adjustments or voltage support if needed
KNGLOBUS	70 kV	314 - Fresno	1.0068	1.0439	1.0263	1.0227	1.0121	System adjustments or voltage support if needed
FRANTDM	70 kV	314 - Fresno	1.032	1.0474	1.0674	1.0439	1.0431	System adjustments or voltage support if needed
SCULPIN	70 kV	314 - Fresno	1.0359	1.0516	1.0443	1.0351	1.0499	System adjustments or voltage support if needed
Q272	70 kV	314 - Fresno	1.0466	1.035	1.035	1.0322	1.035	System adjustments or voltage support if needed
HENRIETTAE	70 kV	314 - Fresno	1.0462	1.0484	1.0383	1.0369	1.0406	System adjustments or voltage support if needed
Q1136	70 kV	314 - Fresno	1.0464	1.047	1.038	1.037	1.0392	System adjustments or voltage support if needed
TUPMAN	115 kV	315 - Kern	1.0375	1.0559	1.0378	1.0459	1.0358	System adjustments or voltage support if needed
RIO BRVO	115 kV	315 - Kern	1.0356	1.0583	1.0404	1.0459	1.0347	System adjustments or voltage support if needed
RENFRO	115 kV	315 - Kern	1.0356	1.0573	1.0365	1.0461	1.0361	System adjustments or voltage support if needed
SHAFTER	115 kV	315 - Kern	1.0373	1.0577	1.0408	1.0463	1.0357	System adjustments or voltage support if needed
RENFRO2	115 kV	315 - Kern	1.035	1.0601	1.0405	1.0457	1.0353	System adjustments or voltage support if needed
NORCO_TA	115 kV	315 - Kern	1.0373	1.0558	1.0377	1.0458	1.0356	System adjustments or voltage support if needed
NORCO	115 kV	315 - Kern	1.0373	1.0558	1.0377	1.0458	1.0356	System adjustments or voltage support if needed
INERGY	115 kV	315 - Kern	1.0362	1.0547	1.0366	1.0447	1.0345	System adjustments or voltage support if needed
FRITO LY	115 kV	315 - Kern	1.0399	1.0536	1.0376	1.0457	1.0366	System adjustments or voltage support if needed
LOSTHL T	70 kV	315 - Kern	1.0434	1.0451	1.0387	1.039	1.031	System adjustments or voltage support if needed
BDGRHL T	70 kV	315 - Kern	1.0332	1.0429	1.0361	1.0342	1.0226	System adjustments or voltage support if needed
CARNAT T	70 kV	315 - Kern	1.0301	1.0355	1.0373	1.0373	1.0323	System adjustments or voltage support if needed
BSCSCH T	70 kV	315 - Kern	1.0241	1.0448	1.0389	1.0356	1.0307	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
TECUYA T	70 kV	315 - Kern	1.026	1.0443	1.0469	1.0332	1.0281	System adjustments or voltage support if needed
GRMMWY T	70 kV	315 - Kern	1.0071	1.0449	1.0384	1.0228	1.0139	System adjustments or voltage support if needed
BDGR HLL	70 kV	315 - Kern	1.0301	1.0404	1.033	1.0311	1.0195	System adjustments or voltage support if needed
ARCO	70 kV	315 - Kern	1.0468	1.0461	1.0398	1.0408	1.0339	System adjustments or voltage support if needed
DEVLS DN	70 kV	315 - Kern	1.0435	1.0467	1.0373	1.0373	1.0312	System adjustments or voltage support if needed
TAFT_SW_T AFC	70 kV	315 - Kern	1.0376	1.0326	1.0211	1.0419	1.0193	System adjustments or voltage support if needed
DEVLDNPP	70 kV	315 - Kern	1.03	1.0436	1.0229	1.0239	1.0169	System adjustments or voltage support if needed
BLUSTNPP	70 kV	315 - Kern	1.0247	1.0426	1.0175	1.0185	1.0115	System adjustments or voltage support if needed
POLPASPP	70 kV	315 - Kern	1.0214	1.0414	1.0142	1.0152	1.0082	System adjustments or voltage support if needed
TAFT A	70 kV	315 - Kern	1.0377	1.0328	1.0213	1.042	1.0194	System adjustments or voltage support if needed
GARDNER	70 kV	315 - Kern	1.0263	1.0389	1.0321	1.0348	1.026	System adjustments or voltage support if needed
BSCL_PLD	70 kV	315 - Kern	1.024	1.0448	1.0388	1.0355	1.0306	System adjustments or voltage support if needed
GARDNR T	70 kV	315 - Kern	1.0269	1.0399	1.0329	1.0355	1.0267	System adjustments or voltage support if needed
COPUS_D	70 kV	315 - Kern	1.0241	1.0448	1.039	1.0356	1.0308	System adjustments or voltage support if needed
COPUS_E	70 kV	315 - Kern	1.0241	1.0448	1.039	1.0356	1.0308	System adjustments or voltage support if needed
LAKEVIEW	70 kV	315 - Kern	1.0267	1.0437	1.0469	1.0334	1.0283	System adjustments or voltage support if needed
WHEELER	70 kV	315 - Kern	1.033	1.0463	1.0499	1.0369	1.0343	System adjustments or voltage support if needed
TEJON	70 kV	315 - Kern	1.0253	1.0441	1.0466	1.0329	1.0275	System adjustments or voltage support if needed
Q620	70 kV	315 - Kern	1.0263	1.0418	1.0352	1.0355	1.0287	System adjustments or voltage support if needed
ORION	70 kV	315 - Kern	1.0195	1.0485	1.0487	1.0298	1.0292	System adjustments or voltage support if needed
SN BRNRD	70 kV	315 - Kern	1.0249	1.0433	1.0454	1.0319	1.0275	System adjustments or voltage support if needed
TAFT_SW_T AFM	70 kV	315 - Kern	1.0377	1.0328	1.0213	1.0419	1.0194	System adjustments or voltage support if needed
SAN EMDO	70 kV	315 - Kern	1.0258	1.0436	1.0415	1.0374	1.0333	System adjustments or voltage support if needed
S_KERN	70 kV	315 - Kern	1.0253	1.0482	1.044	1.0369	1.0364	System adjustments or voltage support if needed
ARVIN	70 kV	315 - Kern	1.0191	1.0476	1.0476	1.0296	1.0278	System adjustments or voltage support if needed
WEEDPTCH	70 kV	315 - Kern	1.0148	1.0484	1.0428	1.0275	1.0212	System adjustments or voltage support if needed
WEEDPATCH_SF	70 kV	315 - Kern	1.0148	1.0484	1.0428	1.0275	1.0212	System adjustments or voltage support if needed
KRN CNYN	70 kV	315 - Kern	1.0293	1.0537	1.0413	1.0337	1.0315	System adjustments or voltage support if needed
RIOBRVQF	70 kV	315 - Kern	1.0281	1.0531	1.0407	1.033	1.0305	System adjustments or voltage support if needed
BAKRSFLD	70 kV	315 - Kern	1.0271	1.0535	1.0338	1.0309	1.0288	System adjustments or voltage support if needed
EISEN	70 kV	315 - Kern	1.0109	1.0548	1.0177	1.0147	1.0126	System adjustments or voltage support if needed
MAGUNDEN	70 kV	315 - Kern	1.0269	1.0533	1.039	1.0323	1.0295	System adjustments or voltage support if needed
OLD RIVR	70 kV	315 - Kern	1.0262	1.0391	1.0394	1.0378	1.0307	System adjustments or voltage support if needed
PANAMA	70 kV	315 - Kern	1.0244	1.0346	1.0384	1.0372	1.0278	System adjustments or voltage support if needed
MORELS	70 kV	315 - Kern	1.0377	1.039	1.034	1.0334	1.0284	System adjustments or voltage support if needed
GRMWY_SM	70 kV	315 - Kern	1.0045	1.0433	1.0359	1.0203	1.0113	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
WELLFILD	70 kV	315 - Kern	1.0048	1.0442	1.0382	1.0224	1.0117	System adjustments or voltage support if needed
FRUITVLE	70 kV	315 - Kern	1.0411	1.0449	1.0431	1.0434	1.0422	System adjustments or voltage support if needed
KERN PW1	70 kV	315 - Kern	1.0413	1.0447	1.043	1.0434	1.0423	System adjustments or voltage support if needed
KERN PW2	70 kV	315 - Kern	1.0412	1.0446	1.0429	1.0433	1.0422	System adjustments or voltage support if needed
KRN OL J	70 kV	315 - Kern	1.0299	1.0377	1.0348	1.0357	1.0312	System adjustments or voltage support if needed
3EMIDIO	70 kV	315 - Kern	1.0199	1.0359	1.0387	1.0253	1.0213	System adjustments or voltage support if needed
VALPREDO	70 kV	315 - Kern	1.0227	1.0385	1.0414	1.0281	1.0241	System adjustments or voltage support if needed
ROSE	70 kV	315 - Kern	1.0213	1.039	1.0427	1.0289	1.0235	System adjustments or voltage support if needed
LST HLLS	70 kV	315 - Kern	1.0419	1.0434	1.0373	1.0376	1.0296	System adjustments or voltage support if needed
TECUYA	70 kV	315 - Kern	1.0249	1.0436	1.0458	1.0321	1.027	System adjustments or voltage support if needed
STALLION	70 kV	315 - Kern	1.0223	1.0462	1.0473	1.0312	1.0284	System adjustments or voltage support if needed
STALIONJ	70 kV	315 - Kern	1.022	1.0459	1.0469	1.0309	1.0281	System adjustments or voltage support if needed
BRRNDA C	70 kV	315 - Kern	1.0371	1.0466	1.0318	1.0307	1.0257	System adjustments or voltage support if needed
BRRNDA A	70 kV	315 - Kern	1.0385	1.047	1.0322	1.0313	1.0269	System adjustments or voltage support if needed
ANTLP JC	70 kV	315 - Kern	1.0372	1.0467	1.032	1.0308	1.0259	System adjustments or voltage support if needed
ANTELOPE	70 kV	315 - Kern	1.037	1.0467	1.032	1.0308	1.0257	System adjustments or voltage support if needed
TWISSLMN	70 kV	315 - Kern	1.0319	1.0366	1.0323	1.0287	1.0267	System adjustments or voltage support if needed
CHLME JT	70 kV	315 - Kern	1.0406	1.0484	1.0336	1.0329	1.0288	System adjustments or voltage support if needed
Q1493	70 kV	315 - Kern	1.0469	1.0407	1.04	1.04	1.035	System adjustments or voltage support if needed
FOREBAYWIND	60 kV	316 - Mission	1.0207	1.0531	1.0473	1.0413	1.0262	System adjustments or voltage support if needed
VASCO	60 kV	316 - Mission	1.0204	1.0545	1.0484	1.0422	1.0256	System adjustments or voltage support if needed
LIVERMRE	60 kV	316 - Mission	1.0135	1.0551	1.0469	1.0399	1.0202	System adjustments or voltage support if needed
RADUM	60 kV	316 - Mission	1.0091	1.0551	1.0462	1.0394	1.0169	System adjustments or voltage support if needed
PARKS	60 kV	316 - Mission	1.0097	1.0552	1.0485	1.0424	1.0182	System adjustments or voltage support if needed
FRICKWND	60 kV	316 - Mission	1.0205	1.0531	1.0473	1.0413	1.0259	System adjustments or voltage support if needed
SAN RAMN	60 kV	316 - Mission	1.0107	1.0551	1.0518	1.0469	1.0202	System adjustments or voltage support if needed
VALLECTS	60 kV	316 - Mission	1.0129	1.0522	1.0429	1.0348	1.0187	System adjustments or voltage support if needed
SUNOL	60 kV	316 - Mission	1.0143	1.051	1.0421	1.0334	1.0195	System adjustments or voltage support if needed
LPOSTAS	60 kV	316 - Mission	1.021	1.0551	1.0488	1.0427	1.026	System adjustments or voltage support if needed
E DUBLIN	60 kV	316 - Mission	1.0097	1.0552	1.0488	1.0428	1.0183	System adjustments or voltage support if needed
CALMAT60	60 kV	316 - Mission	1.0094	1.0551	1.0453	1.0384	1.0168	System adjustments or voltage support if needed
LIVRMR_2	60 kV	316 - Mission	1.0135	1.0551	1.0468	1.0399	1.0201	System adjustments or voltage support if needed
VINEYARD	60 kV	316 - Mission	1.0092	1.0551	1.0462	1.0394	1.017	System adjustments or voltage support if needed
SNTACLRAWIND	60 kV	316 - Mission	1.0207	1.0531	1.0473	1.0413	1.0262	System adjustments or voltage support if needed
VALLCITJ	60 kV	316 - Mission	1.0107	1.0541	1.045	1.038	1.0178	System adjustments or voltage support if needed
SNRAMONJ	60 kV	316 - Mission	1.0148	1.0542	1.0459	1.0388	1.0207	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
IUKA	60 kV	316 - Mission	1.0096	1.0548	1.0457	1.0389	1.0172	System adjustments or voltage support if needed
MONTAVIS	230 kV	317 - De Anza	1.032	1.0775	1.0646	1.0289	1.0372	System adjustments or voltage support if needed
SARATOGA	230 kV	317 - De Anza	1.0266	1.0711	1.0598	1.0282	1.0317	System adjustments or voltage support if needed
VASONA	230 kV	317 - De Anza	1.0249	1.0665	1.0564	1.0277	1.0296	System adjustments or voltage support if needed
MNTA VSA	60 kV	317 - De Anza	1.0514	1.0515	1.0425	1.0485	1.0514	System adjustments or voltage support if needed
PRMNT J3	60 kV	317 - De Anza	1.0505	1.0517	1.0425	1.0482	1.0508	System adjustments or voltage support if needed
PRMNT J1	60 kV	317 - De Anza	1.0453	1.0502	1.0364	1.0424	1.0453	System adjustments or voltage support if needed
LOS GATS	60 kV	317 - De Anza	1.0301	1.0513	1.0446	1.0428	1.0369	System adjustments or voltage support if needed
HICKS	230 kV	318 - San Jose	1.0245	1.0635	1.0535	1.0275	1.0289	System adjustments or voltage support if needed
DIXON LD	115 kV	318 - San Jose	1.0224	1.0528	1.0461	1.0362	1.0252	System adjustments or voltage support if needed
ELPT_SJ1	115 kV	318 - San Jose	1.022	1.0608	1.0499	1.0339	1.0242	System adjustments or voltage support if needed
ELPT_SJ2	115 kV	318 - San Jose	1.0247	1.0658	1.0554	1.0384	1.0274	System adjustments or voltage support if needed
SJB DG	115 kV	318 - San Jose	1.021	1.0573	1.0459	1.0308	1.0226	System adjustments or voltage support if needed
SN JSE A	115 kV	318 - San Jose	1.022	1.0608	1.0499	1.0339	1.0242	System adjustments or voltage support if needed
SJB EF	115 kV	318 - San Jose	1.0212	1.0582	1.0469	1.0316	1.0231	System adjustments or voltage support if needed
EL PATIO	115 kV	318 - San Jose	1.0247	1.0658	1.0554	1.0384	1.0274	System adjustments or voltage support if needed
IBM-HR J	115 kV	318 - San Jose	1.047	1.0808	1.0744	1.0567	1.0502	System adjustments or voltage support if needed
SWIFT	115 kV	318 - San Jose	1.0308	1.07	1.0663	1.0502	1.0361	System adjustments or voltage support if needed
MILPITAS	115 kV	318 - San Jose	1.0243	1.0578	1.0468	1.0366	1.0265	System adjustments or voltage support if needed
MCKEE	115 kV	318 - San Jose	1.0219	1.0625	1.0614	1.0454	1.0279	System adjustments or voltage support if needed
MABURY	115 kV	318 - San Jose	1.0184	1.0549	1.057	1.0421	1.024	System adjustments or voltage support if needed
MARKHAM	115 kV	318 - San Jose	1.0228	1.0632	1.0522	1.0357	1.0255	System adjustments or voltage support if needed
EVGRN 1	115 kV	318 - San Jose	1.0256	1.0705	1.061	1.0424	1.0298	System adjustments or voltage support if needed
IBM-CTLE	115 kV	318 - San Jose	1.0504	1.0833	1.0814	1.0626	1.0543	System adjustments or voltage support if needed
EDENVALE	115 kV	318 - San Jose	1.0504	1.0836	1.0817	1.0626	1.0544	System adjustments or voltage support if needed
IBM-HRRS	115 kV	318 - San Jose	1.0519	1.0842	1.0812	1.0627	1.0555	System adjustments or voltage support if needed
IBM-BALY	115 kV	318 - San Jose	1.0538	1.0855	1.0809	1.0628	1.0572	System adjustments or voltage support if needed
MTCALF D	115 kV	318 - San Jose	1.0549	1.0861	1.0809	1.0631	1.0581	System adjustments or voltage support if needed
MTCALF E	115 kV	318 - San Jose	1.055	1.0859	1.0807	1.0629	1.0581	System adjustments or voltage support if needed
CYTE PMP	115 kV	318 - San Jose	1.0545	1.0856	1.0802	1.0624	1.0575	System adjustments or voltage support if needed
MRGN HIL	115 kV	318 - San Jose	1.0323	1.0765	1.0736	1.0498	1.0435	System adjustments or voltage support if needed
GILROYENG	115 kV	318 - San Jose	1.0238	1.0822	1.076	1.048	1.0374	System adjustments or voltage support if needed
LLAGAS	115 kV	318 - San Jose	1.0239	1.0823	1.076	1.049	1.0375	System adjustments or voltage support if needed
GILROY F	115 kV	318 - San Jose	1.0238	1.0822	1.0759	1.048	1.0374	System adjustments or voltage support if needed
PIERCY	115 kV	318 - San Jose	1.038	1.0764	1.0742	1.0566	1.0433	System adjustments or voltage support if needed
GILROYPK	115 kV	318 - San Jose	1.0238	1.0822	1.076	1.0479	1.0374	System adjustments or voltage support if needed

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		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
STONE	115 kV	318 - San Jose	1.0225	1.0704	1.0611	1.0417	1.0274	System adjustments or voltage support if needed
ST TRESA	115 kV	318 - San Jose	1.0507	1.0835	1.0815	1.0627	1.0546	System adjustments or voltage support if needed
Q1454	115 kV	318 - San Jose	1.055	1.0833	1.0783	1.061	1.0581	System adjustments or voltage support if needed
MABURY	60 kV	318 - San Jose	1.0173	1.0786	1.0656	1.0436	1.025	System adjustments or voltage support if needed
JENNINGS	60 kV	318 - San Jose	1.0172	1.0777	1.0646	1.0435	1.0241	System adjustments or voltage support if needed
EVERGREN	60 kV	318 - San Jose	1.0171	1.0768	1.0634	1.0434	1.0231	System adjustments or voltage support if needed
SENER	60 kV	318 - San Jose	1.0171	1.0768	1.0634	1.0434	1.0232	System adjustments or voltage support if needed
ALMADEN	60 kV	318 - San Jose	0.9986	1.0827	1.0659	1.0393	1.011	System adjustments or voltage support if needed
GREENVALLEY	115 kV	319 - Central Coast	1.0212	1.0479	1.0523	1.0313	1.0302	System adjustments or voltage support if needed
CMP EVRS	115 kV	319 - Central Coast	1.0202	1.049	1.0575	1.0309	1.0299	System adjustments or voltage support if needed
PAUL SWT	115 kV	319 - Central Coast	1.0163	1.0494	1.0582	1.0308	1.0277	System adjustments or voltage support if needed
ROB ROY	115 kV	319 - Central Coast	1.0182	1.0484	1.0556	1.0311	1.0288	System adjustments or voltage support if needed
HOLLISTR	115 kV	319 - Central Coast	1.017	1.0524	1.0557	1.0301	1.0312	System adjustments or voltage support if needed
HOLST D	115 kV	319 - Central Coast	1.017	1.0524	1.0556	1.0301	1.0312	System adjustments or voltage support if needed
BIG BASN	60 kV	319 - Central Coast	1.0416	1.0532	1.0419	1.0446	1.0444	System adjustments or voltage support if needed
BURNS	60 kV	319 - Central Coast	1.0403	1.0533	1.0413	1.0437	1.0435	System adjustments or voltage support if needed
LONE STR	60 kV	319 - Central Coast	1.039	1.0528	1.04	1.0424	1.0422	System adjustments or voltage support if needed
CRUSHER	60 kV	319 - Central Coast	1.0385	1.0539	1.0408	1.0426	1.0422	System adjustments or voltage support if needed
GREENVALLEY	60 kV	319 - Central Coast	1.0095	1.0774	1.0419	1.0208	1.02	System adjustments or voltage support if needed
ERTA	60 kV	319 - Central Coast	1.0058	1.073	1.0394	1.0176	1.0169	System adjustments or voltage support if needed
WTSNVLL	60 kV	319 - Central Coast	0.9996	1.0651	1.0349	1.012	1.0116	System adjustments or voltage support if needed
AGRILINK	60 kV	319 - Central Coast	1.0006	1.0663	1.0356	1.0129	1.0124	System adjustments or voltage support if needed
GONZALES	60 kV	319 - Central Coast	1.0027	1.0361	1.0547	1.0252	1.0207	System adjustments or voltage support if needed
CAMPHORA	60 kV	319 - Central Coast	1.01	1.0411	1.055	1.0273	1.0272	System adjustments or voltage support if needed
SOLEDAD	60 kV	319 - Central Coast	1.0121	1.0412	1.0537	1.0282	1.0268	System adjustments or voltage support if needed
LOS CCHS	60 kV	319 - Central Coast	1.0269	1.0562	1.043	1.0436	1.0229	System adjustments or voltage support if needed
LOS OST	60 kV	319 - Central Coast	1.0272	1.053	1.0406	1.0444	1.0193	System adjustments or voltage support if needed
JOLON	60 kV	319 - Central Coast	1.024	1.0596	1.0486	1.0449	1.0242	System adjustments or voltage support if needed
SAN ARDO	60 kV	319 - Central Coast	1.0232	1.0578	1.0384	1.0355	1.0172	System adjustments or voltage support if needed
OILFLDS	60 kV	319 - Central Coast	1.0207	1.0612	1.0335	1.0309	1.0165	System adjustments or voltage support if needed
CHVSANARDO	60 kV	319 - Central Coast	1.018	1.0647	1.0296	1.0272	1.0143	System adjustments or voltage support if needed
SARG CYN	60 kV	319 - Central Coast	1.0207	1.0612	1.0335	1.0308	1.0165	System adjustments or voltage support if needed
SALN RVR	60 kV	319 - Central Coast	1.0209	1.0634	1.0324	1.03	1.0171	System adjustments or voltage support if needed
AERA_ENG	60 kV	319 - Central Coast	1.02	1.0604	1.0329	1.0302	1.0158	System adjustments or voltage support if needed
AERA_MTR	60 kV	319 - Central Coast	1.0206	1.0611	1.0335	1.0308	1.0164	System adjustments or voltage support if needed
OCEANO	115 kV	320 - Los Padres	1.0156	1.0545	1.0426	1.0233	1.0339	System adjustments or voltage support if needed



		Voltage PU (Baseline Scenarios)			Voltage PU (Sensitivity Scenario)			
UNIONOIL	115 kV	320 - Los Padres	1.0198	1.0524	1.0398	1.0244	1.0361	System adjustments or voltage support if needed
CALLENDERSS	115 kV	320 - Los Padres	1.0197	1.0524	1.0399	1.0244	1.0361	System adjustments or voltage support if needed
CHOLAME	70 kV	320 - Los Padres	1.0266	1.0555	1.0277	1.0177	1.0191	System adjustments or voltage support if needed
PSA RBLS	70 kV	320 - Los Padres	0.9944	1.0366	1.0187	1.0147	1.0092	System adjustments or voltage support if needed
DIVIDE	70 kV	320 - Los Padres	1.0334	1.0569	1.0454	1.0423	1.0448	System adjustments or voltage support if needed
VAFB SSA	70 kV	320 - Los Padres	1.0276	1.0575	1.0412	1.0384	1.0407	System adjustments or voltage support if needed
VAFB SSB	70 kV	320 - Los Padres	1.0276	1.0575	1.0413	1.0385	1.0407	System adjustments or voltage support if needed
VAFB A-N	70 kV	320 - Los Padres	1.028	1.0578	1.0416	1.0388	1.041	System adjustments or voltage support if needed
1257-RD	70 kV	320 - Los Padres	1.0276	1.0575	1.0412	1.0384	1.0407	System adjustments or voltage support if needed

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		
22886 SUNCREST 230 228860 SUNCREST TP1 230 1 1	TL50001_Line ECO-ML 500kV ck 1	P1	N-1	<100	<100	<100	<100	<100	<100	115.47	101.94	Existing TL23040 IV 500 kV N-1 RAS would eliminate the P1 and the P3 overload concerns along with system adjustment after the G-1 event. The 30-minute short-term emergency ratings of the 230 kV lines (130% higher than their continuous ratings) allow the market and operators to bring down the overloads that do not exceed 130% for the P6 contingencies within the continuous ratings in 30 minutes as operational mitigation measures. The remaining P6 overloads that exceed 130% can be eliminated by additional system adjustment between the overlapping P1 events. Either the operational mitigations or the system adjustment could involve operational actions, such as reducing generation output in the greater IV area, dispatching convention gas generation, preferred resources, and/or energy storage in the San Diego area, and adjusting the IV phase shifting transformers as needed. Reducing the gen drop to 1150 MW, per existing RAS guidelines, addresses the Nonconv problems in the sensitivity cases. The amount of gen drop as part of the RAS actions is being investigated.	
	TL50001_Line ECO-ML 500kV ck 1 AND PEC_ALL_Gen PEN_CT1/CT2/ST ID 1	P3	G-1/N-1	113.41	<100	103.99	<100	<100	<100	<100	117.78		
	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND PEC_ALL_Gen PEN_CT1/CT2/ST ID 1	P3	G-1/N-1	102.1	<100	<100	<100	<100	<100	Nonconv	Nonconv		
	TL50001_Line ECO-ML 500kV ck 1 AND OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1	P3	G-1/N-1	112.55	<100	<100	<100	<100	<100	<100	<100		
	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1	P3	G-1/N-1	101.25	<100	<100	<100	<100	<100	Nonconv	Nonconv		
	ML7013_ML 7013 CB - BK 80&81	P4	Fault+Stuck Breaker	<100	<100	<100	<100	<100	<100	115.23	102.46		
	ECO-500-4T_CB EAST COUNTY 500KV 4T	P4	Fault+Stuck Breaker	<100	<100	<100	<100	<100	<100	111.7	<100		
	ML8013_ML 8013 CB - BK 80&TL50001	P4	Fault+Stuck Breaker	<100	104.55	<100	<100	<100	<100	115.57	102.3		
	ML8023_ML 8023 CB - BK 81&TL50001	P4	Fault+Stuck Breaker	<100	104.55	<100	<100	<100	<100	115.57	102.38		
	TL50001_Line ECO-ML 500kV ck 1 AND TL23050_Line IV PST-ROA 230kV ck 1	P6	N-1-1	115.46	<100	106.51	<100	<100	<100	101.51	<100		119.33
	TL23040_Line OM-TJI 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	<100	<100	104.44	<100	<100	<100	<100	<100		117.45
PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL50001_Line ECO-ML 500kV ck 1	P3	G-1/N-1	104.92	<100	103.74	<100	<100	<100	<100	<100	108.76	The 30-minute ratings allow the market and operators to eliminate the P6 overloads that do not exceed 130% within 30	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
228320 SYCAMORE TP1 230 22832 SYCAMORE 230 1 1	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND PEC_ALL_Gen PEN_CT1/CT2/ST ID 1	P3	G-1/N-1	101.89	<100	<100	<100	<100	<100	Nonconv	Nonconv	Eliminate the P6 overloads that do not exceed 100%, within 60 minutes as post-contingency operational mitigations, along with existing TL23054/23055 RAS. The remaining P6 overloads that exceed 130% can be addressed by additional system adjustment between the overlapping P1 events. The system adjustments could involve operational actions, such as reducing generation in the greater IV area while dispatching conventional gas units, preferred resources, and energy storage in the San Diego and SCE areas, curtailing the ISO import, adjusting the IV phase shifting transformers, and bypassing the series capacitor banks in the 500 kV lines between Hassayampa and North Gila as needed. Reducing the gen drop to 1150 MW, per existing RAS guidelines, addresses the Nonconv problems in the sensitivity cases. The amount of gen drop as part of the RAS actions is being investigated.
	TL50001_Line ECO-ML 500kV ck 1 AND TL23055_Line SCR-SX 230kV ck 2	P6	N-1-1	176.18	144.8	166.93	134.89	<100	152.31	227.29	191.3	
	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND TL23055_Line SCR-SX 230kV ck 2	P6	N-1-1	157.39	115.54	139.58	112.29	<100	123.37	Nonconv	Nonconv	
22885 SUNCREST 500 22889 SNCRSMP2 500 1 1	SCR_BK80_Tran SCR 500/230kV ck 1	P1	N-1	<100	<100	<100	<100	<100	<100	102.13	<100	Rely on congestion management, along with the use of the 24-hr emergency ratings of the Suncrest banks (if necessary, the 30-min emergency rating may also be utilized). Additional system adjustments can be utilized after the first contingency for the P6 events. These system adjustments would be similar to the actions described above for the TL23054/23055 overload issues, but the scope of these operation actions tends to be relatively smaller. Reducing the gen drop to 1150 MW, per existing RAS guidelines, addresses the Nonconv problems in the sensitivity cases. The amount of gen drop as part of the RAS actions is being investigated.
	TL50001_Line ECO-ML 500kV ck 1 AND SCR_BK80_Tran SCR 500/230kV ck 1	P6	N-1-1	132.27	109.16	126.28	103.26	<100	112.24	183.79	142.23	
	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND SCR_BK80_Tran SCR 500/230kV ck 1	P6	N-1-1	119.36	<100	106.18	<100	<100	<100	Nonconv	Nonconv	
22885 SUNCREST 500 22888 SNCRSMP1 500 1 1	SCR_BK81_Tran SCR 500/230kV ck 2	P1	N-1	<100	<100	<100	<100	<100	<100	102.13	<100	Rely on congestion management, along with the use of the 24-hr emergency ratings of the Suncrest banks (if necessary, the 30-min emergency rating may also be utilized). Additional system adjustments can be utilized after the first contingency for the P6 events. These system adjustments would be similar to the actions described above for the TL23054/23055 overload issues, but the scope of these operation actions tends to be relatively smaller.
	TL50001_Line ECO-ML 500kV ck 1 AND SCR_BK81_Tran SCR 500/230kV ck 2	P6	N-1-1	132.2	109.08	126.24	103.11	<100	112.16	183.74	142.27	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		
	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND SCR_BK81_Tran SCR 500/230kV ck 2	P6	N-1-1	119.3	<100	106.12	<100	<100	<100	<100	Nonconv	Nonconv	Reducing the gen drop to 1150 MW, per existing RAS guidelines, addresses the Nonconv problems in the sensitivity cases. The amount of gen drop as part of the RAS actions is being investigated.
22609 OTAYMESA 230 22466 MLMS3TAP 230 1 1	TL23041_Line SX-OM-ML 230kV ck 1	P1	N-1	<100	104.55	<100	<100	<100	<100	105.54	<100	<100	Congestion management. For the P6 contingencies, system adjustments after first contingency.
	TL23041B_TL23041B OTAYMESA-MLSXTAP ckt 1	P2.1	Line Section w/o Fault	<100	104.91	<100	<100	<100	<100	105.89	<100	<100	
	SX-230-23T_CB SYCAMORE CANYON 230KV 22T	P4	Fault+Stuck Breaker	<100	104.58	<100	<100	<100	<100	105.58	<100	<100	
	SX-23T_SYCAMORE 230 kV 23T CB	P4	Fault+Stuck Breaker	<100	104.58	<100	<100	<100	<100	105.58	<100	<100	
	ML-4T_Miguel 230 kV 4T CB	P4	Fault+Stuck Breaker	<100	104.45	<100	<100	<100	<100	105.45	<100	<100	
	TL23041_Line SX-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	<100	122.37	<100	<100	<100	<100	123.76	<100	<100	
	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	<100	104.87	<100	<100	<100	<100	105.4	<100	<100	
22609 OTAYMESA 230 22467 MLSXTAP 230 1 1	TL23042_Line BB-OM-ML 230kV ck 1	P1	N-1	<100	104.49	<100	<100	<100	<100	105.47	<100	<100	Congestion management. For the P6 & P7 contingencies, system adjustments after first contingency.
	TL23042B_TL23042B OTAYMESA-MLMS3TAP ck 1	P2.1	Line Section w/o Fault	<100	104.76	<100	<100	<100	<100	105.74	<100	<100	
	BB-230-4T_CB BAY BOULEVARD 230KV 4T	P4	Fault+Stuck Breaker	<100	104.48	<100	<100	<100	<100	105.47	<100	<100	
	ML-230-7T_CB MIGUEL 230KV 7T	P4	Fault+Stuck Breaker	<100	104.22	<100	<100	<100	<100	105.21	<100	<100	
	TL23042_Line BB-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	<100	121.76	<100	<100	<100	<100	123.14	<100	<100	
	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND TL23042_Line BB-OM-ML 230kV ck 1	P6	N-1-1	<100	<100	<100	<100	<100	<100	104.64	<100	<100	
	TL23042+13815_TC-GHL + ML-SG-OM	P7	DCTL	<100	104.45	<100	<100	<100	<100	105.35	<100	<100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
20102 RUM-230 230 20118 ROA-230 230 1 1	ML8013_ML 8013 CB - BK 80&TL50001	P4	Fault+Stuck Breaker	<100	<100	<100	<100	106.46	<100	<100	<100	Use of existing 230kV Otay Mesa Gen Drop RAS, and pre-contingency congestion management.
	ML8023_ML 8023 CB - BK 81&TL50001	P4	Fault+Stuck Breaker	<100	<100	<100	<100	106.43	<100	<100	<100	
	ML7013_ML 7013 CB - BK 80&81	P4	Fault+Stuck Breaker	<100	<100	<100	<100	106.42	<100	<100	<100	
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	132.98	140.75	<100	109.22	<100	140.76	<100	<100	
22468 MIGUEL 500 22472 MIGUELMP 500 1 1 AND 22464 MIGUEL 230 22472 MIGUELMP 500 1 1	ML_BK81_Tran ML 500/230kV ck 2	P1	N-1	<100	<100	<100	<100	<100	<100	141.23	<100	Rely on congestion management and the existing Miguel BK 80/81 RAS, along with the use of the 24-hr emergency ratings of the Miguel banks (if necessary, the 30-min emergency rating may also be utilized). Additional system adjustments can be utilized after the first contingency for the P3 & P6 events. These system adjustments would be similar to the actions described above for the TL23054/23055 overload issues, but the scope of these operation actions tends to be relatively smaller. Reducing the gen drop to 1150 MW, per existing RAS guidelines, addresses the Nonconv problems in the sensitivity cases. The amount of gen drop as part of the RAS actions is being investigated.
	TL50003_Line OCO-SCR 500kV ck 1	P1	N-1	<100	<100	<100	<100	<100	<100	119.09	<100	
	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	101.32	<100	<100	<100	<100	<100	<100	<100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	<100	<100	101.79	<100	<100	<100	<100	102.89	
	OCO-500-2W_CB OCOTILLO 500kV 2W	P4	Fault+Stuck Breaker	<100	<100	<100	<100	<100	<100	117.86	<100	
	ML-230-2T_CB MIGUEL 230kV 2T	P4	Fault+Stuck Breaker	<100	<100	<100	<100	<100	<100	140.89	<100	
	ML-2T_MIGUEL 230 kV 2T CB	P4	Fault+Stuck Breaker	<100	<100	<100	<100	<100	<100	140.89	<100	
	TL50003_Line OCO-SCR 500kV ck 1 AND ML_BK81_Tran ML 500/230kV ck 2	P6	N-1-1	140.67	106.66	137.8	108.44	<100	112.53	223.84	154.95	
22464 MIGUEL 230 22468 MIGUEL 500 2 1	ML_BK80_Tran ML 500/230kV ck 1	P1	N-1	<100	<100	<100	<100	<100	<100	138.42	<100	Rely on congestion management and the existing Miguel BK 80/81 RAS, along with the use of the 24-hr emergency ratings of the Miguel banks (if necessary, the 30-min emergency rating may also be utilized). Additional system adjustments can be utilized after the first contingency for the P3 & P6 events. These system adjustments would be similar to the actions described above for the TL23054/23055 overload issues, but the scope of these operation actions tends to be relatively smaller. Reducing the gen drop to 1150 MW, per existing RAS guidelines, addresses the Nonconv problems in the sensitivity cases. The amount of gen drop as part of the RAS actions is being investigated.
	TL50003_Line OCO-SCR 500kV ck 1 AND ML_BK80_Tran ML 500/230kV ck 1	P6	N-1-1	134.49	104.89	135.51	105.64	<100	110.66	220.04	151.18	
	TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS AND ML_BK80_Tran ML 500/230kV ck 1	P6	N-1-1	117.75	<100	113.98	<100	<100	<100	Nonconv	Nonconv	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
22930 ECO 500 22468 MIGUEL 500 1 2	OCO-500-1E_CB OCOTILLO 500KV 1E	P4	Fault+Stuck Breaker	<100	<100	<100	<100	<100	<100	116.97	<100	Existing TL23040 IV 500 kV N-1 RAS would eliminate the P4 and P7 overload concerns along with system adjustment after the G-1 event as needed. The P6 overload can be eliminated by the system adjustment between the overlapping P1 events.
	SCR-2T_SUNCREST 2T BK81 & TL50003	P4	Fault+Stuck Breaker	<100	<100	<100	<100	<100	<100	118.03	<100	
	SCR-500-2T_CB SUNCREST 500KV 2T	P4	Fault+Stuck Breaker	<100	<100	<100	<100	<100	<100	118.03	<100	
	TL23050_Line IV PST-ROA 230kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	<100	<100	<100	<100	<100	<100	136.1	<100	
	TL23054+23055_Lines SCR-SX 230kV ck 1 + SCR-SX 230kV ck 2	P7	DCTL	<100	<100	<100	<100	<100	<100	117.38	<100	
22356 IMPRLVLY 230 22362 IV BK82 MP 500 1 1	IV_BK81_Tran IV 500/230kV ck 2 AND IV_BK80_Tran IV 500/230kV ck 1	P6	N-1-1	<100	<100	<100	<100	<100	<100	128.19	107.62	Curtail the generation that are delivered to the Imperial Valley 230 kV substation after the first contingency as system adjustment
22357 IV PFC1 230 22358 IV PFC 230 1 1	TL23040_Line OM-TJI 230kV ck 1 AND IV_PST2_Tran IV 230/230kV ck 2	P6	N-1-1	110.66	<100	<100	<100	<100	<100	110.59	<100	Curtail the path 45 flow southbound flow from SDGE to CENACE after the first contingency as system adjustment.
22357 IV PFC1 230 22358 IV PFC 230 1 1 AND 22357 IV PFC1 230 22358 IV PFC 230 2 1	TL50003_Line OCO-SCR 500kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	106.44	<100	108.98	<100	<100	<100	Nonconv	<100	P6 overloads can be eliminated by system adjustments, such as reducing generation output in the greater IV area while dispatching conventional gas unit, preferred resources, and energy storage in the San Diego area, and adjusting the IV phase shifting transformers if needed.
22609 OTAYMESA 230 20149 TJI-230 230 1 2	TL23041_Line SX-OM-ML 230kV ck 1 AND TL23042_Line BB-OM-ML 230kV ck 1	P6	N-1-1	108.09	122.2	<100	<100	<100	122.22	<100	<100	Use of existing 230kV Otay Mesa Gen Drop RAS. The P6 overloads can be eliminated by the system adjustments, such as reducing generation output in the greater IV area while dispatching conventional gas unit, preferred resources, and energy storage in the San Diego area, and adjusting the IV phase shifting transformers if needed.
	TL50003_Line OCO-SCR 500kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	<100	<100	114.8	<100	<100	<100	Nonconv	104.18	
22430 SILVERGT 230 22596 OLD TOWN 230 1 1	TL23028_Line SG-MS-OT 230kV ck 1 AND TL23071_Line SX-PQ 230kV ck 1	P6	N-1-1	<100	109.82	<100	102.37	<100	110.24	<100	103.7	The 2-hour short-term emergency ratings of TL23036, TL23028A, and TL23029 (129~143% higher than their normal ratings) would give the market and operators enough time to
	TL23028_Line SG-MS-OT 230kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	<100	107.8	<100	100.51	<100	108.92	<100	106.28	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
22430 SILVERGT 230 22597 OLDTWNT 230 1 1	TL23029_Line SG-OT 230kV ck 1 AND TL23071_Line SX-PQ 230kV ck 1	P6	N-1-1	<100	108.93	<100	101.56	<100	109.25	<100	102.76	ratings) would give the market and operators enough time to eliminate most of the P6 overloads as post-contingency operational mitigation measures.
	TL23029_Line SG-OT 230kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	<100	107.72	<100	100.46	<100	108.74	<100	106.1	
22356 IMPRLVLY 230 21025 ELCENTSW 230 1 1	TL50002_Line NG-IV 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	<100	<100	<100	107.49	<100	<100	Nonconv	Nonconv	Congestion management to protect against the loss of TL50002. The amount of gen drop as part of the RAS actions is being investigated given that reducing the gen drop to 1150 MW, per existing RAS guidelines, addresses the Nonconv problems in the sensitivity cases
22870 VALCNTR 69.0 22012 ASH TP 69.0 1 1	TL50001_Line ECO-ML 500kV ck 1 AND BR_GEN1_Gen BR GEN1 ID 1	P3	G-1/N-1	<100	<100	<100	107.49	<100	<100	<100	107.93	System adjustments after first contingency
21072 YUCCA161 161 21059 PILOTKNB 161 1 1	TL50002_Line NG-IV 500kV ck 1	P1	N-1	101.69	99.89	<100	<100	<100	104.87	<100	<100	Congestion management
	PPEC_1A_Gen PIO PICO 1A ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	103.92	102.14	<100	<100	<100	107.08	<100	<100	System adjustments after first contingency
	OCO_GEN1_Gen OCO GEN ID G1/G2 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	103.9	102.12	<100	<100	<100	107.07	<100	<100	
	IV-500-8022_CB IMPERIAL VALLEY 500KV 8022	P4	Fault+Stuck Breaker	100.86	99.15	<100	<100	<100	104.11	<100	<100	Congestion management
	IV-8022_IV 8022 50002 & BK81 CB	P4	Fault+Stuck Breaker	100.68	99.15	<100	<100	<100	104.11	<100	<100	
	TL50002_Line NG-IV 500kV ck 1 AND TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS	P6	N-1-1	120.58	133.99	100.14	<100	<100	139.19	Nonconv	Nonconv	Congestion management to protect against the loss of TL50002. The amount of gen drop as part of the RAS actions is being investigated given that reducing the gen drop to 1150 MW, per existing RAS guidelines, addresses the Nonconv problems in the sensitivity cases. Generation dropped by the RAS may contribute to exacerbating this overload.
IV_GEN1_ALL_Gen IV GEN1 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	124.45	103.98	100.34	<100	<100	110.98	<100	<100		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	
21331 ELCENTSW 161 21059 PILOTKNB 161 1 1	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	118.58	<100	<100	<100	<100	103.13	<100	<100	System adjustments after first contingency
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	116.57	<100	<100	<100	<100	100.11	<100	<100	
	PLV-COL_Line PLV-COL 500kV ck 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	111.58	<100	<100	<100	<100	<100	<100	<100	
	EA_GEN1_10_Gen CEC GEN10 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	102.15	<100	<100	<100	<100	<100	<100	<100	
	TL50002_Line NG-IV 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	144.53	125.06	122.3	<100	<100	131.67	Nonconv	Nonconv	Congestion management to protect against the loss of TL50002. The amount of gen drop as part of the RAS actions is being investigated given that reducing the gen drop to 1150 MW, per existing RAS guidelines, addresses the Nonconv problems in the sensitivity cases. Generation dropped by the RAS may contribute to exacerbating this overload.
22604 OTAY 69.0 22616 OTAYLKTP 69.0 1 1	TL6910_Line BD-SLT 69kV ck 1	P1	N-1	122.01	111.73	<100	<100	<100	107.61	<100	<100	Pre-contingency Generation Re-dispatch/ Post-contingency Generation Redispatch within 30 minutes, 30-min rating
	TL0649D_TL0649D OTAYLKTP-SANYSDRO ck 1	P2.1	Line Section w/o Fault	113.55	105.65	<100	<100	<100	104.46	<100	<100	
22740 SANYSDRO 69.0 22616 OTAYLKTP 69.0 1 1	TL6910_Line BD-SLT 69kV ck 1	P1	N-1	102.38	101.78	<100	<100	<100	103.45	<100	<100	Pre-contingency Generation Re-dispatch/ Post-contingency Generation Redispatch within 30 minutes, 30-min rating
22708 SANLUSRY 69.0 22582 OCEAN RANCH 69.0 1 1	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	<100	<100	104.35	<100	<100	<100	<100	<100	System adjustments after first contingency
22884 WARNERS 69.0 22688 RINCON 69.0 1 1	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	141.03	System adjustments after first contingency
22870 VALCNTR 69.0 22012 ASH TP 69.0 1 1	BR_GEN1_Gen BR GEN1 ID 1 AND TL688_Line ES-LI 69kV ck 1	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	129.99	System adjustments after first contingency
22884 WARNERS 69.0 22736 SANTYSBL 69.0 1 1	BR_GEN1_Gen BR GEN1 ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	114.84	System adjustments after first contingency
System	TL50001+IV_N-1_RAS_Line ECO-ML 500kV ck 1 + IV N-1 RAS	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	Nonconv	Nonconv	No non-convergence issues observed if the existing 1150 MW N-1 gen drop RAS guideline is followed
System	TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	Nonconv	Nonconv	No non-convergence issues observed if the existing 1150 MW N-1 gen drop RAS guideline is followed
System	TL50005+GEN_DROP_RAS_Line IV-OCO 500kV ck 1 + GEN DROP RAS	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	Nonconv	No issues	No non-convergence issues observed if the existing 1150 MW N-1 gen drop RAS guideline is followed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions		
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen			
VALCNTR 69 kV	TL681_Line AS-VC-FE 69kV ck 1	P1	N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	Pre-contingency energy storage curtailment, or propose a RAS to trip the energy storage (under charging mode) at Valley Center.	
	TL0681B_TL0681B ASH TP-VALCNTR ck 1	P2.1	Line Section w/o Fault	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87		
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87		
Q1191_HV 69 kV	TL681_Line AS-VC-FE 69kV ck 1	P1	N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87		
	TL0681B_TL0681B ASH TP-VALCNTR ck 1	P2.1	Line Section w/o Fault	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87		
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87		
RINCON 69 kV	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90		
SUNCREST TP1 230 kV	TL23050_Line IV PST-ROA 230kV ck 1 AND TL50004_Line IV-ECO 500kV ck 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	>0.9		System adjustments, such as increasing dispatch of existing gas generation (Pio Pico, Carlsbad, Palomar Energy, Otay Mesa, etc.), after first contingency.
SUNCREST TP2 230 kV	TL23050_Line IV PST-ROA 230kV ck 1 AND TL50004_Line IV-ECO 500kV ck 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	>0.9		
SYCAMORE TP1 230 kV	TL23050_Line IV PST-ROA 230kV ck 1 AND TL50004_Line IV-ECO 500kV ck 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	>0.9		
SYCAMORE TP2 230 kV	TL23050_Line IV PST-ROA 230kV ck 1 AND TL50004_Line IV-ECO 500kV ck 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.86	>0.9		
SNCRS SVC HV 230 kV	TL23050_Line IV PST-ROA 230kV ck 1 AND TL50004_Line IV-ECO 500kV ck 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	>0.9		

Study Area: **San Diego Area**

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen		
VALCNTR 69 kV	TL681_Line AS-VC-FE 69kV ck 1	P1	N-1	<8	<8	<8	<8	<8	<8	<8	11.03	Pre-contingency energy storage curtailment, or propose a RAS to trip the energy storage (under charging mode) at Valley Center.	
	TL0681B_TL0681B ASH TP-VALCNTR ck 1	P2.1	Line Section w/o Fault	<8	<8	<8	<8	<8	<8	<8	11.03		
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	<8	<8	<8	<8	<8	<8	<8	10.91		
Q1191_HV 69 kV	TL681_Line AS-VC-FE 69kV ck 1	P1	N-1	<8	<8	<8	<8	<8	<8	<8	11.01		
	TL0681B_TL0681B ASH TP-VALCNTR ck 1	P2.1	Line Section w/o Fault	<8	<8	<8	<8	<8	<8	<8	11.01		
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	<8	<8	<8	<8	<8	<8	<8	10.89		
RINCON 69 kV	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	<8	<8	<8	<8	<8	<8	<8	8.57		
SUNCREST TP1 230 kV	TL23050_Line IV PST-ROA 230kV ck 1 AND TL50004_Line IV-ECO 500kV ck 1	P6	N-1-1	<8	<8	<8	<8	<8	<8	14.88	<8		System adjustments, such as increasing dispatch of existing gas generation (Pio Pico, Carlsbad, Palomar Energy, Otay Mesa, etc.), after first contingency.
SUNCREST TP2 230 kV	TL23050_Line IV PST-ROA 230kV ck 1 AND TL50004_Line IV-ECO 500kV ck 1	P6	N-1-1	<8	<8	<8	<8	<8	<8	14.88	<8		
SYCAMORE TP1 230 kV	TL23050_Line IV PST-ROA 230kV ck 1 AND TL50004_Line IV-ECO 500kV ck 1	P6	N-1-1	<8	<8	<8	<8	<8	<8	14.65	<8		
SYCAMORE TP2 230 kV	TL23050_Line IV PST-ROA 230kV ck 1 AND TL50004_Line IV-ECO 500kV ck 1	P6	N-1-1	<8	<8	<8	<8	<8	<8	14.65	<8		
SNCRS SVC HV 230 kV	TL23050_Line IV PST-ROA 230kV ck 1 AND TL50004_Line IV-ECO 500kV ck 1	P6	N-1-1	<8	<8	<8	<8	<8	<8	15.01	<8		

Study Area:

San Diego Area

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance				
			Baseline Scenarios			Sensitivity Scenarios	
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen
SLO Fault at DEVERS 500, trip DEVERS to VALLEYSC 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
SLO Fault at PQ 230kV, trip PQ to SX 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
SLO Fault at PEN 230, trip PEN to ES 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
3PH Fault at IV 500kV, trip IMPRLVLY to ECO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
SLO at MIGUEL 500kV, trip MIGUEL to ECO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
SLO Fault at IV 230kV, trip IMPRLVLY PFC to ROA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
3PH Fault at IV 500kV, trip IMPRLVLY to N.GILA 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
3PH Fault at PQ 230kV, trip PQ to OLD TOWN 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
3PH Fault at SANLUSRY 230kV, trip SA to EA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
SLO Fault at TA 230kV, trip TA-ESC-CP 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
3PH Fault at TALEGA 230kV, trip S.ONOFRE to TALEGA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
SLO Fault at PALO VERDE 500kV, trip PALO VERDE to COLRIVER 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
3PH Fault at MIGUEL 230, trip MIGUEL to BAY BLVD to OTAY MESA 230kV	P1	N-1	No issues	No issues	No issues	No issues	No issues
SLO 3PH Fault at HAA 500kV, trip HAA - HDWSH 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
SLO 3PH Fault at NG 500kV, trip NG - HAA 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
SLO 3PH Fault at HDWSH 500kV, trip HDWSH-NG 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
3PH Fault at SILVERGT 230kV, trip SILVERGT to BAY BLVD 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
3PH Fault at OLD TOWN 230kV, trip OT-MS-SG 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
3PH Fault at IV 500kV, trip IMPRLVLY to OCOTILLO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues
3PH Fault at ML230, trip ML230 bus	P2.2	Bus	No issues	No issues	No issues	No issues	No issues
Bus BATIQUITOS 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS BUE 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS CANNON 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
Bus CAPISTRANO 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS EAST COUNTY 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS FRIARS 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS GRANT HILL 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
Bus MISSION 230kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
Bus MISSION 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS PALOMAR AIRPORT 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS PALOMAR ENERGY 230kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS PICO 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues

Study Area:

San Diego Area

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance				
			Baseline Scenarios			Sensitivity Scenarios	
			2023 Spring Off-Peak	2026 Summer Peak	2031 Summer Peak	2026 SP High CEC Forecast	2023 OP Heavy Renewable & Min Gas Gen
BUS PROCTAR VALLEY 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS RANCHO MISSION VIEJO 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS SAN LUIS REY 230KV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS SANTEE 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS SHADOW RIDGE 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS SILVERGATE 230KV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS SYCAMORE CANYON 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS TALEGA 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
BUS TELEGRAPH CANYON 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues
DLO Fault at MIGUEL 230, trip both lines MIGUEL to MISSION 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues
DLO Fault at MIGUEL 230, trip MIGUEL to SYCAMORE and MIGUEL to SYCAMORE to OTAYMESA 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues
DLO Fault at SANLUSRY 230, trip TL23002 AND TL23006 SANLUSRY to S.ONOFRE 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues
DLO Fault at SANLUSRY 230kV, trip SA-EA AND SA-EATAP 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues
DLO Fault at S.ONOFRE 230, trip SO-SANTIAGO 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues
DLO Fault at PEN230, trip PEN-AR 230kV AND PEN-ENCINATP 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues
Fault at OTAYMESA 230kV, trip TL23041 AND TL23042	P7	DCTL	No issues	No issues	No issues	No issues	No issues
3Ph Fault at SANLUSRY 230kV, trip SANLUSRY to MISSION 230kV 1 & 2	P7	DCTL	No issues	No issues	No issues	No issues	No issues

Study Area: **San Diego Area**



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)								Potential Mitigation Solutions
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	

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

Study Area: **San Diego Area**



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)								Potential Mitigation Solutions
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	

No single source substation with more than 100 MW

Study Area: **Valley Electric Association**
 Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2023 SP with Forecasted Load Addition	2026 SP with Forecasted Load Addition	2023 OP Heavy Renewable & Min Gas Gen	
Amargosa 230/138kV transformer	Base Case	P0	Base Case	<100	<100	<100	<100	<100	109.11	<100	<100	<100	Generation redispatch precontingency; RAS proposed in GIDAP process; will evaluate further in policy study for potential upgrade
	NWEST 230.0 to DESERT VIEW 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	251.24	<100	<100	<100	
	SLOAN_CANYON230-kV BRKR	P4	Stuck Breaker	<100	<100	<100	<100	<100	164.31	<100	<100	<100	
Northwest - Desert View 230kV line	Base Case	P0	Base Case	<100	<100	<100	<100	<100	109.26	<100	<100	<100	
	TROUT CANYON 230.0 to SLOAN CANYON 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	109.46	<100	<100	<100	
	SLOAN_CANYON230-kV BRKR	P4	Stuck Breaker	<100	<100	<100	<100	<100	109.42	<100	<100	<100	
Mercury SW - IS Tap 138kV line	Base Case	P0	Base Case	<100	<100	<100	<100	<100	135.37	<100	<100	<100	
	NWEST 230.0 to DESERT VIEW 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	432.03	<100	<100	<100	
	TROUT CANYON 230.0 to SLOAN CANYON 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	184.41	<100	<100	<100	
	SLOAN CANYON 230-kV Bus Fault	P4	Stuck Breaker	<100	<100	<100	<100	<100	184.36	<100	<100	<100	
Pahrump - Innovation 230kV line	NWEST 230.0 to DESERT VIEW 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	104.32	<100	<100	<100	
Pahrump - Gamebird 230kV line	NWEST 230.0 to DESERT VIEW 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	102.66	<100	<100	<100	
Amargosa - Sandy - Gamebird 138kV line	NWEST 230.0 to DESERT VIEW 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	177.36	<100	<100	<100	
Innovation 230/138kV transformer	NWEST 230.0 to DESERT VIEW 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	180.82	<100	<100	<100	
	INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	119.43	<100	<100	<100	
Innovation - Desert View 230kV line	Base Case	P0	Base Case	<100	<100	<100	<100	<100	123.84	<100	<100	<100	
	IS TAP 138.0 to MERCURY SW 138.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	100.31	<100	<100	<100	
	TROUT CANYON 230.0 to SLOAN CANYON 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	124.68	<100	<100	<100	
	P4-2-10_SLOAN_CANYON230-kV BRKR	P4	Stuck Breaker	<100	<100	<100	<100	<100	124.53	<100	<100	<100	
Innovation - Mercury SW 138kV	line_1_Line NWEST 230.0 to DESERT VIEW 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	115.18	<100	<100	<100	
Trout Canyon - Sloan Canyon 230kV	line_1_Line NWEST 230.0 to DESERT VIEW 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	176.35	<100	<100	<100	
	line_18_Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1	P1	N-1	<100	<100	<100	<100	<100	128.7	<100	<100	<100	
Amargosa - Sandy 138kV line	Trout Canyon - Sloan Canyon 230kV line and Northwest - Desert View 230kV line	P6	N-1-1	<100	<100	Diverge	<100	<100	<100	<100	<100	102.38	Monitor load growth in the area; 2nd Pahrump - Trout Canyon - Sloan Canyon 230kV; rely on existing UVLS; for the overload in sensitivity case, rely on Sloan Canyon RAS
	Trout Canyon - Sloan Canyon 230kV line and Pahrump - Innovation 230kV line	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	112.11	Sloan Canyon RAS
Amargosa 230/138kV transformer	Gamebird - Pahrump 138kV and Gamebird 230/138kV transformer	P6	N-1-1	107.36	110.95	167.54	<100	<100	<100	131.58	142.56	<100	Rely on existing UVLS
Pahrump 230/138kV transformer No.1	Pahrump 230/138kV transformer No.2 and Gamebird 230/138kV transformer	P6	N-1-1	<100	<100	118.48	<100	<100	<100	<100	<100	<100	Monitor load growth in the area; utilize the short-term emergency rating of the transformer and perform manual load shedding
Pahrump 230/138kV transformer No.2	Pahrump 230/138kV transformer No.1 and Gamebird 230/138kV transformer	P6	N-1-1	<100	<100	116.9	<100	<100	<100	<100	<100	<100	
Gamebird 230/138kV transformer	Trout Canyon - Sloan Canyon 230kV line and Pahrump - Gamebird 230kV line	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	125.72	Sloan Canyon RAS
Gamebird - Pahrump 138kV line	Trout Canyon - Sloan Canyon 230kV line and Pahrump - Gamebird 230kV line	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	101.28	Sloan Canyon RAS
Jackass Flats - Mercury SW 138kV line	Pahrump - Vista 138kV line and Jackass Flats - Stockwash 138kV line	P6	N-1-1	<100	<100	<100	<100	107.8	<100	<100	<100	<100	Generation redispatch following first contingency
	Trout Canyon - Sloan Canyon 230kV line and Pahrump - Innovation 230kV line	P6	N-1-1	<100	<100	106.74	<100	<100	<100	<100	<100	129.4	Monitor load growth in the area; transmission reconfiguration; for the overload in sensitivity case, rely on Sloan Canyon RAS

Study Area: **Template**

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2023 SP with Forecasted Load Addition	2026 SP with Forecasted Load Addition	2023 OP Heavy Renewable & Min Gas Gen	
Gamebird, Pahrump, Innovation, Trout Canyon and Desert View 230kV	Trout Canyon - Sloan Canyon 230kV and Northwest - Desert View 230kV	P6	N-1-1	0.84	>0.9	Diverge	0.85	>0.9	>0.9	0.82	>0.9	>0.9	Rely on the existing UVLS; 2nd Pahrump - Trout Canyon - Sloan Canyon 230kV
Charleston, Thousandaire, Pahrump 138kV	Pahrump - Innovation 230kV and Gamebird - Trout Canyon 230kV	P6	N-1-1	0.84	0.84	0.68	>0.9	>0.9	>0.9	0.79	0.77	>0.9	Existing UVLS
Charleston, Thousandaire, Sandy 138kV	Gamebird 230/138kV transformer and Gamebird - Pahrump 230kV line	P6	N-1-1	0.81	0.82	0.74	>0.9	>0.9	>0.9	0.73	0.72	>0.9	

Study Area: **Valley Electric Association**

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance					
			Baseline Scenarios				Sensitivity Scenarios	
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2031 Spring Off-Peak	2026 SP with Forecasted Load Addition	2023 OP Heavy Renewable & Min Gas Gen
Pahrump-Innovation 230kV Fault	P1	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump-Gamebird 230kV	P1	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump 230/138kV Transformer No.1	P1	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump 230/138kV Transformer No.2	P1	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Amargosa-Sandy 138kV	P1	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump-Vista 138kV	P1	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump-Gamebird 138kV	P1	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Vista-Johnnie-Valley 138kV	P1	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Innovation-Desert View 230kV	P1	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Innovation 230/138kV Transformer	P1	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Northwest-Desert View 230kV	P1	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
PAHRUMP-VISTA 138 & PAHRUMP-GAMEBIRD 138; BKR PA222	P4	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
PAHRUMP 138/230kV Tran Bnk. 1 & PAHRUMP-Sloan Canyon/Carpenter Canyon 230-kV Line; BKR PA112	P4	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
PAHRUMP 138/230kV Tran Bnk. 1 & PAHRUMP-INNOVATION 230; BKR PA132	P4	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
PAHRUMP 138/230kV Tran Bnk. 2 & PAHRUMP-INNOVATION 230; BKR PA122	P4	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
PAHRUMP 138/230kV Tran Bnk. 2 & PAHRUMP-Sloan Canyon/Carpenter Canyon 230; BKR PA142	P4	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
PAHRUMP 138/230kV Tran Bnk. 2 & PAHRUMP-VISTA 138-kV Line; BKR PA212	P4	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
PAHRUMP 138/230kV Tran Bnk. 1 & PAHRUMP-GAMEBIRD 138; BKR PA232	P4	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
INNOVATION -PAHRUMP 230 & INNOVATION-DESERT VIEW 230 & INNOVATION TRANS	P4	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
GAMEBIRD 138/230kV Tran Bnk. 1 & PAHRUMP-Gamebird 230-kV Line; BKR PA112	P4	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump 230kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Sloan Canyon 230kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Desert View 230kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met

Study Area: **Valley Electric Association**

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance					
			Baseline Scenarios				Sensitivity Scenarios	
			2026 Summer Peak	2031 Summer Peak	2023 Spring Off-Peak	2031 Spring Off-Peak	2026 SP with Forecasted Load Addition	2023 OP Heavy Renewable & Min Gas Gen
Innovation 230kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Gamebird 230kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Innovation 138kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump 138kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Amargosa 138kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Lathrop 138kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Sandy 138kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Valley 138kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Valley SS 138kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Vista 138kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Gamebird 138kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Thousandaire 138kV Bus	P5.5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump-Innovation 230kV & Pahrump-Gamebird 230kV	P6	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Northwest-Desert View 230kV & Pahrump-Gamebird 230kV	P6	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump-Gamebird 230kV & Pahrump-Gamebird 138kV	P7	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump-Gamebird 230kV & Gamebird-Sandy 138kV	P7	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump-Innovation 230kV & Pahrump-Vista 138kV	P7	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Pahrump-Innovation 230kV & Vista-ValleySS 138kV	P7	Normal Clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met

2021-2022 ISO Reliability Assessment - Study Results

Study Area: **Valley Electric Association**

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)											
			2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen

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

Potential Mitigation Solutions

Study Area: **Valley Electric Association**



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)												Potential Mitigation Solutions
	2023 Summer Peak	2026 Summer Peak	2031 Summer Peak	2023 Winter Peak	2026 Winter Peak	2031 Winter Peak	2023 Spring Off-Peak	2026 Spring Off-Peak	2031 Spring Off-Peak	2026 SP High CEC Forecast	2023 SP Heavy Renewable & Min Gas Gen	2023 OP Heavy Renewable & Min Gas Gen	

No single source substation with more than 100 MW