



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
30435 LAKEVILLE 230 30445 IGNACIO 230 2 1	LAKEVILLE - IGNACIO #1 & LAKEVILLE - SOBRANTE #2 LINES	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Sensitivity only
	LAKEVILLE-IGNACIO #1 & LAKEVILLE-SOBRANTE #2 230KV LINES	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Sensitivity only
30435 LAKEVILLE 230 30460 VACA-DIX 230 2 1	LAKEVILLE 230KV - SECTION 2E & 2D	P2	Bus-tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	119	Sensitivity only
	GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Sensitivity only
31200 MENDOCNO 115 31260 MND CNO M 115 1 1	UKIAH-HOPLAND-CLOVERDALE 115KV [4050] & CORTINA 115KV [1330] MOAS OPENED ON LUCERNJ1_LUCERNE	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	102	<100	<100	<100	Sensitivity only
31224 INDIN VL 115 31215 LUCERNJ1 115 1 1	EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2	Non-bus-tie Breaker	105	123	137	<100	<100	117	127	132	120	<100	<100	126	Bus Upgrade
	EGLE RCK 115/60KV TB 1 & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	103	<100	<100	<100	Sensitivity only
31225 HGHLNDJ1 115 31262 CACHE J2 115 1 1	P1-2:A2:20:_CORTINA 115KV [1330] MOAS OPENED ON LUCERNJ1_LUCERNE & P1-2:A2:18:_GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	Operating Solution or SPS
31236 FULTON 115 31238 MONROE1 115 1 1	FULTON 115KV [1630] & CORONA-LAKEVILLE 115KV [4311]	P6	N-1-1	111	117	129	<100	<100	119	119	133	114	<100	<100	128	SPS per 2017-2018 TPP Mitigation Plan
31240 SNTA RSA 115 31242 STNY PTP 115 1 1	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	<100	<100	109	<100	<100	<100	<100	110	<100	<100	<100	122	Protection Upgrade
	P1-3:A2:18:_FULTON 230/115KV TB 9 & P1-3:A2:17:_FULTON 230/115KV TB 4	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	105	<100	<100	<100	109	SPS per 2017-2018 TPP Mitigation Plan
31246 BELLVUE 115 31248 PENNGRVE 115 1 1	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2	Bus/Breaker	110	115	128	<100	<100	111	110	123	111	<100	<100	128	SPS per 2017-2018 TPP Mitigation Plan
	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	101	124	141	<100	<100	102	100	143	119	<100	<100	154	Protection Upgrade
	P1-2:A2:26:_FULTON 115KV [1620] & P1-2:A2:27:_FULTON 115KV [1630]	P6	N-1-1	103	108	120	<100	<100	111	110	123	103	<100	<100	120	Operating Solution or SPS
	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	110	115	128	<100	<100	111	110	123	110	<100	<100	128	Operating Solution or SPS
31248 PENNGRVE 115 31254 CORONA 115 1 1	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2	Bus/Breaker	114	119	134	<100	<100	115	115	129	115	<100	<100	134	Bus Upgrade
	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	105	129	147	<100	<100	106	105	149	124	<100	<100	160	Protection Upgrade
	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	114	119	134	<100	<100	114	114	130	115	<100	<100	134	SPS per 2017-2018 TPP Mitigation Plan
	P1-2:A2:26:_FULTON 115KV [1620] & P1-2:A2:27:_FULTON 115KV [1630]	P6	N-1-1	107	112	125	<100	<100	114	115	130	108	<100	<100	125	SPS per 2017-2018 TPP Mitigation Plan
31254 CORONA 115 31255 LAKEVLLE 115 1 1	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2	Bus/Breaker	108	114	127	<100	<100	121	122	137	110	<100	<100	127	SPS per 2017-2018 TPP Mitigation Plan
	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	101	122	138	<100	<100	113	113	156	117	<100	<100	149	Protection Upgrade
	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	108	114	126	<100	<100	121	122	138	110	<100	<100	126	SPS per 2017-2018 TPP Mitigation Plan

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
	P1-2:A2:26:_FULTON 115KV [1620] & P1-2:A2:27:_FULTON 115KV [1630]	P6	N-1-1	113	119	132	<100	<100	121	122	138	115	<100	<100	132	SPS per 2017-2018 TPP Mitigation Plan
	P1-3:A2:18:_FULTON 230/115KV TB 9 & P1-3:A2:17:_FULTON 230/115KV TB 4	P6	N-1-1	100	121	140	<100	<100	108	106	152	117	<100	<100	151	SPS per 2017-2018 TPP Mitigation Plan
31258 SONOMA 115 32564 PUEBLO 115 1 1	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	<100	116	130	<100	<100	<100	<100	121	110	<100	<100	141	Protection Upgrade
	P1-3:A2:17:_FULTON 230/115KV TB 4 & P1-3:A2:18:_FULTON 230/115KV TB 9	P6	N-1-1	<100	<100	109	<100	<100	<100	<100	116	<100	<100	<100	117	Operating Solution or SPS
31262 CACHE J2 115 31229 REDBUDJ2 115 1 1	P1-2:A2:20:_CORTINA 115KV [1330] MOAS OPENED ON LUCERNJ1_LUCERNE & P1-2:A2:18:_GEYSERS #3 115KV [1650] MOAS OPENED ON MPE_TAP_MPE	P6	N-1-1	<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	Operating Solution or SPS
31265 STHELNJ1 115 32562 PUEBLOJT 115 1 1	P2-4:A2:10:_LAKEVILLE 115KV - SECTION 1D & 2D	P2	Bus/Breaker	<100	<100	119	<100	<100	<100	<100	<100	<100	<100	<100	116	Bus Upgrade
	P7-1:A2:16:_LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 LINES	P7	DCTL	<100	<100	114	<100	<100	<100	<100	<100	<100	<100	<100	112	Operating Solution or SPS
31300 MENDOCNO 60.0 31260 MNDCNO M 115 1 1	P1-2:A2:17:_UKIAH-HOPLAND-CLOVERDALE 115KV [4050] & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	107	<100	<100	<100	Sensitivity only
31300 MENDOCNO 60.0 31330 UPPR LKE 60.0 1 1	P1-2:A2:56:_KONOCI 60KV [6861]	P1	N-1	<100	119	145	<100	<100	<100	<100	140	128	<100	<100	140	Non-BES Facility
	P2-1:A2:56:_KONOCI 60KV [6861] (KONOCI6-EGLE RCK)	P2	Bus/Breaker	<100	119	145	<100	<100	<100	<100	140	128	<100	<100	140	Non-BES Facility
	KONOCI 60KV [6861] (KONOCI6-EGLE RCK)	P2	Line Section w/o Fault	<100	118	140	<100	<100	<100	<100	139	124	<100	<100	140	Operating Solution or SPS
	P1-1:A2:19:_GEO.ENGY 9.11KV GEN UNIT 1 & P1-2:A2:56:_KONOCI 60KV [6861]	P3	G1/N1	<100	101	124	<100	<100	<100	141	109	<100	<100	<100	<100	Operating Solution or SPS
	P1-2:A2:56:_KONOCI 60KV [6861] & P1-2:A2:51:_CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON CLER LKE_GRANITE	P6	N-1-1	219	227	211	<100	<100	<100	259	220	230	<100	114	<100	Operating Solution or SPS
31300 MENDOCNO 60.0 31327 UKIAH JT 60.0 1 1	P1-2:A2:18:_GEYSERS #3 115KV [1650] MOAS OPENED ON MPE_TAP_MPE & P1-2:A2:14:_MENDOCINO 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA	P6	N-1-1	<100	106	110	<100	<100	<100	<100	<100	<100	<100	<100	106	Operating Solution or SPS
31326 PHLO JCT 60.0 31336 HPLND JT 60.0 1 1	P1-2:A2:18:_GEYSERS #3 115KV [1650] MOAS OPENED ON MPE_TAP_MPE & P1-2:A2:14:_MENDOCINO 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA	P6	N-1-1	118	129	138	<100	<100	<100	<100	<100	<100	<100	<100	134	Operating Solution or SPS
31330 UPPR LKE 60.0 31332 HARTLEY 60.0 1 1	P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P1	N-1	<100	110	135	<100	<100	<100	<100	132	117	<100	<100	129	Disable automatics at and above a predetermined load
	P2-3:A2:26:_EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Bus/Breaker	<100	114	135	<100	<100	<100	<100	129	148	<100	<100	135	Disable automatics at and above a predetermined load
	P1-1:A2:7:_GEYSER11 13.80KV GEN UNIT 1 & P1-2:A2:56:_KONOCI 60KV [6861]	P3	G1/N1	<100	<100	118	<100	<100	<100	133	<100	<100	<100	<100	116	Operating Solution or SPS
	P1-2:A2:51:_CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON CLER LKE_GRANITE & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P6	N-1-1	209	218	201	<100	<100	<100	<100	<100	221	<100	<100	<100	Operating Solution or SPS

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				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
31332 HARTLEY 60.0 31334 CLER LKE 60.0 1 1	CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON GRANITE_HPLND JT & EGLE RCK 115/60KV TB 1	P6	N-1-1	132	135	121	<100	<100	<100	<100	<100	135	<100	<100	120	Operating Solution or SPS
31334 CLER LKE 60.0 31335 GRANITE 60.0 1 1	EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2	Non-bus-tie Breaker	122	77	90	57	25	104	79	75	80	80	23	90	Project: Clear Lake - Hopland reconductoring In -service date: 2022
	POTTRVLY 2.40KV GEN UNIT 1 & EGLE RCK 115/60KV TB 1	P3	G1/N1	<100	<100	<100	<100	<100	104	<100	<100	<100	<100	<100	<100	Operating Solution or SPS
	INDIAN V 9.11KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	<100	<100	<100	<100	<100	103	<100	<100	<100	<100	<100	<100	Operating Solution or SPS
	MENDOCINO 60KV [7510] & KONOCTI 60KV [6861]	P6	N-1-1	141	<100	<100	<100	<100	<100	<100	129	<100	<100	<100	<100	Project: Clear Lake - Hopland reconductoring In -service date: 2022
	KONOCTI 60KV [6861] & MENDOCINO 60KV [7510]	P6	N-1-1	141	138	125	<100	<100	167	115	130	136	<100	<100	125	Operating Solution or SPS
	EGLE RCK 115/60KV TB 1 & MENDOCINO 60KV [7510]	P6	N-1-1	140	136	125	<100	<100	167	115	130	136	<100	<100	125	Operating Solution or SPS
31334 CLER LKE 60.0 31338 KONOCTI6 60.0 1 1	P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P1	N-1	<100	<100	125	<100	<100	<100	<100	116	111	<100	<100	120	Disable automatics at and above a predetermined load
	P2-3:A2:26:_EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Bus/Breaker	<100	104	109	<100	<100	<100	<100	<100	143	<100	<100	111	Disable automatics at and above a predetermined load
	P1-1:A2:21:_INDIAN V 9.11KV GEN UNIT 1 & P1-2:A2:56:_KONOCTI 60KV [6861]	P3	G1/N1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Sensitivity only
	P1-3:A2:27:_EGLE RCK 115/60KV TB 1 & P1-2:A2:18:_GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	116	<100	<100	<100	Sensitivity only
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	KONOCTI 60KV [6861]	P1	N-1	118	<100	<100	<100	<100	103	105	<100	<100	<100	<100	<100	Project: Clear Lake - Hopland reconductoring In -service date: 2022
	EGLE RCK 115/60KV TB 1	P1	N-1	118	<100	<100	<100	<100	103	105	<100	<100	<100	<100	<100	Project: Clear Lake - Hopland reconductoring In -service date: 2022
	KONOCTI 60KV [6861] (KONOCTI6-EGLE RCK)	P2	Line Section w/o Fault	118	<100	<100	<100	<100	103	105	<100	<100	<100	<100	<100	Project: Clear Lake - Hopland reconductoring In -service date: 2022
	EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2	Non-bus-tie Breaker	119	<100	<100	<100	<100	104	106	<100	<100	<100	<100	<100	Project: Clear Lake - Hopland reconductoring In -service date: 2022
	P1-1:A2:16:_POTTRVLY 2.40KV GEN UNIT 1 & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P3	G1/N1	<100	<100	<100	<100	104	104	<100	<100	<100	<100	<100	<100	Non-BES Facility
31336 HPLND JT 60.0 31370 CLVRDLJT 60.0 1 1	P1-2:A6:13:_SILVERDO-FULTON-EGLE RCK 115KV [0]	P1	N-1	<100	<100	113	<100	<100	<100	<100	<100	<100	<100	<100	<100	Non-BES Facility
	P2-1:A2:20:_EAGLE ROCK-FULTON-SILVERADO 115KV [4392] (EGLE RCK-ERFT5_25)	P2	Bus/Breaker	<100	<100	115	<100	<100	<100	<100	<100	100	<100	<100	<100	Non-BES Facility
	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	<100	<100	106	<100	<100	<100	<100	<100	<100	<100	<100	<100	Protection Upgrade
	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	158	Diverge	Diverge	<100	<100	167	168	Diverge	Diverge	<100	102	Diverge	Disable automatics at and above a predetermined load
	P7-1:A2:5:_GEYSERS #17-FULTON & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	<100	100	119	<100	100	<100	<100	<100	104	101	102	<100	Disable automatics at and above a predetermined load



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
	P7-1:A2:6:_GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	108	110	132	<100	110	<100	<100	<100	114	111	112	<100	Disable automatics at and above a predetermined load
31338 KONOCTI6 60.0 31344 EGLE RCK 60.0 1 1	P1-2:A2:18:_GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE & P1-2:A2:13:_EAGLE ROCK-REDBUD 115KV [1480]	P6	N-1-1	105	107	109	<100	<100	111	<100	108	103	<100	<100	111	Non-BES Facility
	P1-2:A2:23:_CORTINA 115KV [1330] & P1-2:A2:18:_GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	101	103	105	<100	<100	109	102	106	<100	<100	<100	103	Non-BES Facility
31344 EGLE RCK 60.0 31220 EGLE RCK 115 1 1	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	<100	Diverge	Diverge	<100	<100	<100	<100	Diverge	Diverge	<100	<100	Diverge	Operating Solution or SPS
31366 MLNO JCT 60.0 31385 LAGUNATP 60.0 1 1	P1-2:A2:67:_LAKEVILLE #2 60KV [7340] MOAS OPENED ON PETLMA_A_LKVLE JT & P1-2:A2:66:_LAKEVILLE 60KV [7350]	P6	N-1-1	Diverge	<100	<100	<100	<100	Diverge	Diverge	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
	P1-3:A2:21:_LAKEVILE 230/60KV TB 3 & P1-3:A2:22:_LAKEVILE 230/60KV TB 5	P6	N-1-1	235	<100	<100	<100	<100	251	248	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	221	<100	<100	<100	<100	227	224	<100	<100	<100	119	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
31370 CLVRDLJT 60.0 31374 GYSRJCT1 60.0 1 1	P1-2:A6:13:_SILVERDO-FULTON-EGLE RCK 115KV [0]	P1	N-1	<100	<100	113	<100	<100	<100	<100	<100	<100	<100	<100	<100	Non-BES Facility
	P2-3:A6:2:_SILVERDO - 1E 115KV & SILVERDO-FULTON-EGLE RCK LINE	P2	Bus/Breaker	<100	<100	113	<100	<100	<100	<100	<100	<100	<100	<100	<100	Non-BES Facility
	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	<100	<100	106	<100	<100	<100	<100	<100	<100	<100	<100	<100	Protection Upgrade
	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	158	Diverge	Diverge	<100	<100	167	168	Diverge	Diverge	<100	102	Diverge	Non-BES Facility
	P7-1:A2:6:_GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	108	110	132	<100	110	<100	<100	<100	114	111	112	<100	Non-BES Facility
31377 FCHMNTP2 60.0 31380 FTCH MTN 60.0 1 1	WINDSOR-FCHMNTP2 60KV [0] NO FAULT	P2	Line Section w/o Fault	104	106	102	36	24	75	77	74	94	20	58	102	Non-BES Facility
	WINDSOR 60KV SECTION 1D	P2	Bus	103	106	102	36	24	75	77	74	94	20	58	101	Non-BES Facility
	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:62:_FULTON-WINDSOR #1 60KV [0]	P3	G1/N1	146	150	148	<100	142	146	145	141	<100	<100	94	148	Non-BES Facility
	GEYSER12 13.80KV GEN UNIT 1 & FULTON-WINDSOR #1 60KV [0]	P3	G1/N1	146	149	147	<100	<100	141	119	144	155	<100	<100	147	Non-BES Facility
	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	<100	<100	116	<100	<100	<100	<100	<100	<100	<100	<100	113	Protection Upgrade
	P1-2:A2:21:_EGLE RCK-FULTON-SILVERDO 115KV [0] & P1-2:A2:62:_FULTON-WINDSOR #1 60KV [0]	P6	N-1-1	147	151	149	<100	<100	144	146	147	142	<100	<100	148	Non-BES Facility
	P7-1:A2:5:_GEYSERS #17-FULTON & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	<100	<100	102	<100	<100	<100	<100	<100	<100	<100	<100	<100	Non-BES Facility

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
31378 FULTON 60.0 32650 ST.HELNA 60.0 1 1	P2-3:A2:64:_LAKEVILLE - 2D 60KV & LAKEVILLE #1 LINE	P2	Bus/Breaker	106	112	117	<100	<100	<100	<100	<100	<100	<100	<100	116	Non-BES Facility
31379 HDSBGTP2 60.0 31377 FCHMNT2 60.0 1 1	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	117	Sensitivity only
	P7-1:A2:21:_FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Sensitivity only
31380 FTCH MTN 60.0 31381 HDSBGTP1 60.0 1 1	FULTON 115/60KV TB 1 & FULTON 115/60KV TB 2	P6	N-1-1	<100	Diverge	Diverge	<100	<100	<100	<100	Diverge	Diverge	<100	<100	Diverge	Non-BES Facility
31384 COTATI 60.0 31389 PETC_JCT 60.0 1 1	P2-4:A2:10:_LAKEVILLE 115KV - SECTION 1D & 2D	P2	Bus/Breaker	102	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	181	<100	<100	<100	<100	145	144	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
	P7-1:A2:10:_FULTON-IGNACIO #1 & FULTON-LAKEVILLE LINES	P7	DCTL	111	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
	P1-2:A2:67:_LAKEVILLE #2 60KV [7340] MOAS OPENED ON PETLMA A_LKVLE JT & P1-2:A2:66:_LAKEVILLE 60KV [7350]	P6	N-1-1	Diverge	<100	<100	<100	<100	Diverge	Diverge	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
31384 COTATI 60.0 31391 SNMA TAP 60.0 1 1	P1-2:A2:67:_LAKEVILLE #2 60KV [7340] MOAS OPENED ON PETLMA A_LKVLE JT & P1-2:A2:66:_LAKEVILLE 60KV [7350]	P6	N-1-1	Diverge	<100	<100	<100	<100	Diverge	Diverge	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
31389 PETC_JCT 60.0 31390 PETLMA A 60.0 1 1	P2-3:A2:62:_LAKEVILLE - 1D 60KV & LAKEVILLE LINE	P2	Bus/Breaker	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
	P1-2:A2:66:_LAKEVILLE 60KV [7350] & P1-2:A2:61:_FULTON 60KV [6910] MOAS OPENED ON SNMA TAP_SNMALDFL	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	108	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	182	<100	<100	<100	<100	202	197	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
31390 PETLMA A 60.0 31394 LKVLE JT 60.0 1 1	P2-3:A2:62:_LAKEVILLE - 1D 60KV & LAKEVILLE LINE	P2	Bus/Breaker	107	<100	<100	<100	<100	111	111	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
	P1-1:A2:22:_SONMA LF 9.11KV GEN UNIT 1 & P1-2:A2:66:_LAKEVILLE 60KV [7350]	P3	G1/N1	110	<100	<100	<100	122	115	<100	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	126	<100	<100	<100	<100	127	126	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	238	<100	<100	<100	<100	262	256	<100	<100	<100	122	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
31391 SNMA TAP 60.0 31395 LAGUNITA2 60.0 1 1	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	128	<100	<100	<100	<100	103	101	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
31391 SONOMA TAP 60.0 31365 LAKEVILLE 60.0 1 1	P1-2:A2:67:_LAKEVILLE #2 60KV [7340] MOAS OPENED ON PETLMA A_LKVLE JT & P1-2:A2:66:_LAKEVILLE 60KV [7350]	P6	N-1-1	Diverge	<100	<100	<100	<100	Diverge	Diverge	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
31392 LAKEVILLE 60.0 30435 LAKEVILLE 230 3 1	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	<100	<100	<100	<100	<100	106	104	<100	<100	<100	<100	<100	Operating Solution or SPS
31392 LAKEVILLE 60.0 31394 LKVLE JT 60.0 1 1	P2-3:A2:62:_LAKEVILLE - 1D 60KV & LAKEVILLE LINE	P2	Bus/Breaker	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	118	<100	<100	<100	<100	110	109	<100	<100	<100	<100	<100	Project: Lakeville 60 kV Area Reinforcement In-service date: December 2021 Short term: Action plan
32562 PUEBLOJT 115 32564 PUEBLO 115 1 1	P2-4:A2:10:_LAKEVILLE 115KV - SECTION 1D & 2D	P2	Bus/Breaker	<100	<100	119	<100	<100	<100	<100	<100	<100	<100	<100	116	Bus Upgrade
	P7-1:A2:16:_LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 LINES	P7	DCTL	<100	<100	114	<100	<100	<100	<100	<100	<100	<100	<100	112	Operating Solution or SPS
32568 IGNACIO 115 32574 SAN RAFL 115 1 1	P2-1:A6:5:_IGNACIO 115KV [1860] (IGNACIO-LS GLLNS)	P2	Bus/Breaker	100	104	88	23	16	99	101	65	92	12	48	87	Project: Ignacio Area Reinforcement In-service date: 2023
	P1-1:A2:10:_GEYSER14 13.80KV GEN UNIT 1 & P1-2:A6:16:_IGNACIO 115KV [1860] MOAS OPENED ON IGNACIO_LS GLLNS	P3	G1/N1	<100	105	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Ignacio Area Reinforcement In-service date: 2023
	P1-2:A6:11:_IGNACIO 115KV [1840] MOAS OPENED ON IGNACIO_SKGGS J2 & P1-2:A6:16:_IGNACIO 115KV [1860] MOAS OPENED ON IGNACIO_LS GLLNS	P6	N-1-1	99	104	<100	<100	<100	<100	100	<100	91	<100	<100	<100	Project: Ignacio Area Reinforcement In-service date: 2023
32618 NTWRJCT1 115 32020 JMSN JCT 115 1 1	NRTH TWR - 1D 115KV & NRTH TWR-SOBRANTE LINE	P2	Non-bus-tie Breaker	<100	<100	Diverge	<100	<100	<100	Diverge	Diverge	<100	<100	<100	Diverge	Disable automatics at and above a predetermined load
	NRTH TWR - 1D 115KV & NRTH TWR-MARTNZ D LINE	P2	Non-bus-tie Breaker	<100	<100	Diverge	<100	<100	<100	Diverge	Diverge	<100	<100	<100	Diverge	Disable automatics at and above a predetermined load
32655 TULCAY1 60.0 32662 TULCY JT 60.0 1 1	P1-2:A6:23:_TULUCAY 60KV [8190]	P1	N-1	100	102	110	<100	<100	<100	<100	104	<100	<100	<100	108	Non-BES Facility
	P2-1:A2:89:_TULUCAY 60KV [8190] (TULUCAY-BSLT TAP)	P2	Bus/Breaker	155	157	177	<100	<100	151	156	170	144	<100	<100	173	Non-BES Facility
	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:70:_TULUCAY 60KV [8190]	P3	G1/N1	<100	<100	111	<100	<100	<100	105	<100	<100	<100	<100	108	Non-BES Facility
	P1-3:A6:1:_TULUCAY 230/60KV TB 1 & P1-2:A2:70:_TULUCAY 60KV [8190]	P6	N-1-1	<100	<100	110	<100	<100	<100	<100	104	<100	<100	<100	108	Non-BES Facility
	P7-1:A6:12:_TULUCAY-NAPA #2 & BASALT #1 60 KV LINES	P7	DCTL	100	102	110	<100	<100	<100	<100	104	<100	<100	<100	108	Non-BES Facility
32656 NAPA 60.0 32662 TULCY JT 60.0 1 1	P1-2:A6:23:_TULUCAY 60KV [8190]	P1	N-1	95	97	104	29	24	93	95	99	87	21	54	103	Non-BES Facility
	P2-1:A2:89:_TULUCAY 60KV [8190] (TULUCAY-BSLT TAP)	P2	Bus/Breaker	150	153	171	44	36	147	152	166	139	31	83	168	Non-BES Facility
	P1-1:A2:12:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A6:23:_TULUCAY 60KV [8190]	P3	G1/N1	<100	<100	105	<100	<100	<100	100	<100	<100	<100	<100	103	Non-BES Facility



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
32656 NAPA 60.0 32662 TOLENT 51 60.0 1 1	P1-2:A2:70:_TULUCAY 60KV [8190] & P1-2:A2:3:_GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE	P6	N-1-1	<100	<100	108	<100	<100	<100	<100	102	<100	<100	<100	<100	Non-BES Facility
	P7-1:A6:12:_TULUCAY-NAPA #2 & BASALT #1 60 KV LINES	P7	DCTL	<100	<100	104	<100	<100	<100	<100	<100	<100	<100	<100	103	Non-BES Facility
32667 IG JCT 60.0 32678 SAN_RFLJ 60.0 1 1	P7-1:A6:6:_IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 LINES	P7	DCTL	101	108	<100	<100	<100	106	110	<100	108	<100	<100	<100	Project: Ignacio Area Reinforcement In-service date: 2023
	P1-2:A6:26:_IGNACIO 60KV [7170] & P1-2:A6:27:_IGNACIO 60KV [7160]	P6	N-1-1	<100	100	<100	<100	<100	106	110	<100	100	<100	<100	<100	Project: Ignacio Area Reinforcement In-service date: 2024
32678 SAN_RFLJ 60.0 32680 GREENBRE 60.0 1 1	P7-1:A6:6:_IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 LINES	P7	DCTL	100	108	<100	<100	<100	<100	<100	<100	108	<100	<100	<100	Project: Ignacio Area Reinforcement In-service date: 2023
32671 BOLINAS 60.0 32674 WOODACRE 60.0 1 1	P2-1:A6:30:_IGNACIO 60KV [7180] (IGNACO B-STAF_JCT)	P2	Bus/Breaker	<100	<100	116	<100	<100	<100	<100	<100	<100	<100	<100	116	Non-BES Facility
32672 OLEMA 60.0 32671 BOLINAS 60.0 1 1	P2-1:A6:30:_IGNACIO 60KV [7180] (IGNACO B-STAF_JCT)	P2	Bus/Breaker	159	172	236	<100	<100	151	148	191	160	<100	<100	237	Non-BES Facility
32673 TOCA_JCT 60.0 32672 OLEMA 60.0 1 1	P2-1:A6:30:_IGNACIO 60KV [7180] (IGNACO B-STAF_JCT)	P2	Bus/Breaker	144	155	208	<100	<100	133	133	171	144	<100	<100	210	Non-BES Facility

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
ALTO 60 kV	Base Case	P0	Base case	1.01	1.02	0.97	1.07	1.08	1.01	1.04	0.98	1.01	1.04	1.08	0.97	Load power factor correction and voltage support if needed
ALTOJT1 60 kV	Base Case	P0	Base case	1.01	1.02	0.97	1.07	1.08	1.01	1.04	0.98	1.01	1.04	1.08	0.97	Load power factor correction and voltage support if needed
ALTOJT2 60 kV	Base Case	P0	Base case	1.01	1.02	0.97	1.07	1.08	1.01	1.04	0.98	1.01	1.04	1.08	0.97	Load power factor correction and voltage support if needed
ANNAPOLS 60 kV	Base Case	P0	Base case	0.99	0.99	1.00	1.04	1.06	0.97	0.99	0.98	0.99	1.02	1.06	1.00	Load power factor correction and voltage support if needed
BAHIA 230 kV	Base Case	P0	Base case	1.01	1.02	0.97	1.06	1.05	1.00	1.02	1.00	1.01	1.02	1.06	0.97	Load power factor correction and voltage support if needed
BELLVUE 115 kV	Base Case	P0	Base case	1.04	1.06	1.00	1.07	1.07	1.06	1.05	1.01	1.06	1.05	1.06	1.00	Load power factor correction and voltage support if needed
BOLINAS 60 kV	Base Case	P0	Base case	1.04	1.05	0.98	1.09	1.09	1.03	1.06	1.00	1.04	1.06	1.09	0.98	Load power factor correction and voltage support if needed
CACHE J1 115 kV	Base Case	P0	Base case	1.05	1.04	1.02	1.09	1.07	1.04	1.06	1.04	1.03	1.06	1.07	1.02	Load power factor correction and voltage support if needed
CACHE J2 115 kV	Base Case	P0	Base case	1.04	1.04	1.03	1.06	1.06	1.04	1.04	1.04	1.03	1.04	1.06	1.03	Load power factor correction and voltage support if needed
CALISTGA 60 kV	Base Case	P0	Base case	0.95	0.95	0.95	1.04	1.05	0.96	0.98	0.96	0.95	1.00	1.05	0.95	Load power factor correction and voltage support if needed
CALPELLA 115 kV	Base Case	P0	Base case	1.04	1.05	1.04	1.07	1.07	1.05	1.05	1.06	1.04	1.04	1.07	1.04	Load power factor correction and voltage support if needed
CARQUINZ 115 kV	Base Case	P0	Base case	1.05	1.07	0.99	1.10	1.10	1.04	1.06	1.00	1.07	1.07	1.11	0.99	Load power factor correction and voltage support if needed
CLER LKE 60 kV	Base Case	P0	Base case	1.02	1.01	0.99	1.04	1.05	1.03	1.03	0.99	1.01	1.03	1.05	0.99	Load power factor correction and voltage support if needed
CLOVRDLE 115 kV	Base Case	P0	Base case	1.03	1.03	1.03	1.06	1.06	1.04	1.04	1.04	1.03	1.04	1.06	1.03	Load power factor correction and voltage support if needed
CRQNZTP1 115 kV	Base Case	P0	Base case	1.05	1.07	0.99	1.10	1.10	1.04	1.06	1.00	1.07	1.07	1.11	0.99	Load power factor correction and voltage support if needed
CRQNZTP2 115 kV	Base Case	P0	Base case	1.00	1.01	0.96	1.08	1.08	0.99	1.03	0.97	1.00	1.03	1.08	0.96	Load power factor correction and voltage support if needed
EGLE RCK 115 kV	Base Case	P0	Base case	1.04	1.04	1.03	1.06	1.06	1.04	1.05	1.04	1.04	1.04	1.06	1.03	Load power factor correction and voltage support if needed
EGLE RCK 60 kV	Base Case	P0	Base case	1.05	1.05	1.05	1.05	1.06	1.06	1.05	1.05	1.06	1.04	1.06	1.05	Load power factor correction and voltage support if needed
ER_FTNJT 115 kV	Base Case	P0	Base case	1.05	1.06	1.01	1.09	1.08	1.06	1.06	1.02	1.06	1.06	1.08	1.01	Load power factor correction and voltage support if needed
ERFT5_25 115 kV	Base Case	P0	Base case	1.04	1.04	1.02	1.07	1.06	1.04	1.05	1.03	1.04	1.05	1.06	1.02	Load power factor correction and voltage support if needed
FORT RSS 60 kV	Base Case	P0	Base case	1.00	1.00	1.00	1.04	1.06	0.98	1.00	0.99	0.99	1.02	1.06	1.00	Load power factor correction and voltage support if needed

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
FULTON 115 kV	Base Case	P0	Base case	1.06	1.06	1.02	1.08	1.08	1.06	1.06	1.03	1.06	1.06	1.08	1.02	Load power factor correction and voltage support if needed
FULTON 60 kV	Base Case	P0	Base case	1.04	1.05	1.05	1.05	1.05	1.05	1.04	1.05	1.04	1.04	1.05	1.05	Load power factor correction and voltage support if needed
GARCIA 60 kV	Base Case	P0	Base case	1.04	1.04	1.04	1.05	1.05	1.04	1.05	1.04	1.04	1.05	1.05	1.04	Load power factor correction and voltage support if needed
GARCIA J 60 kV	Base Case	P0	Base case	1.04	1.04	1.04	1.05	1.05	1.04	1.05	1.04	1.04	1.05	1.05	1.04	Load power factor correction and voltage support if needed
GEYSERS34 115 kV	Base Case	P0	Base case	1.04	1.04	1.03	1.06	1.06	1.04	1.05	1.04	1.04	1.04	1.06	1.03	Load power factor correction and voltage support if needed
GEYSERS56 115 kV	Base Case	P0	Base case	1.04	1.04	1.03	1.06	1.06	1.04	1.05	1.04	1.04	1.04	1.06	1.03	Load power factor correction and voltage support if needed
GEYSR11 115 kV	Base Case	P0	Base case	1.04	1.04	1.03	1.06	1.06	1.04	1.05	1.04	1.04	1.04	1.06	1.03	Load power factor correction and voltage support if needed
GRANITE 60 kV	Base Case	P0	Base case	1.02	1.02	1.00	1.05	1.05	1.03	1.04	1.00	1.02	1.03	1.06	1.00	Load power factor correction and voltage support if needed
GREENBRE 60 kV	Base Case	P0	Base case	1.01	1.02	0.98	1.07	1.08	1.00	1.03	0.99	1.01	1.04	1.08	0.98	Load power factor correction and voltage support if needed
GUALALA 60 kV	Base Case	P0	Base case	0.98	0.98	0.99	1.04	1.06	0.96	0.98	0.97	0.98	1.01	1.06	0.99	Load power factor correction and voltage support if needed
GYSR78TP 115 kV	Base Case	P0	Base case	1.04	1.04	1.03	1.06	1.06	1.04	1.05	1.04	1.04	1.04	1.06	1.03	Load power factor correction and voltage support if needed
HIGHLAND 115 kV	Base Case	P0	Base case	1.04	1.04	1.02	1.08	1.07	1.03	1.06	1.03	1.03	1.05	1.07	1.02	Load power factor correction and voltage support if needed
HGHLNDJ1 115 kV	Base Case	P0	Base case	1.04	1.04	1.03	1.06	1.06	1.04	1.05	1.04	1.04	1.04	1.06	1.03	Load power factor correction and voltage support if needed
HGHLNDJ2 115 kV	Base Case	P0	Base case	1.04	1.04	1.02	1.08	1.07	1.03	1.06	1.03	1.03	1.05	1.07	1.02	Load power factor correction and voltage support if needed
HGHWY J1 115 kV	Base Case	P0	Base case	1.05	1.06	1.00	1.10	1.10	1.04	1.06	1.01	1.06	1.06	1.10	1.00	Load power factor correction and voltage support if needed
HGHWY J2 115 kV	Base Case	P0	Base case	1.01	1.02	0.96	1.08	1.09	0.99	1.03	0.97	1.01	1.03	1.09	0.96	Load power factor correction and voltage support if needed
HighWAY 115 kV	Base Case	P0	Base case	1.00	1.01	0.96	1.08	1.09	0.99	1.03	0.97	1.01	1.03	1.09	0.96	Load power factor correction and voltage support if needed
HOMEGRND 115 kV	Base Case	P0	Base case	1.04	1.04	1.02	1.08	1.07	1.03	1.06	1.03	1.03	1.05	1.07	1.02	Load power factor correction and voltage support if needed
HOMEPROC 115 kV	Base Case	P0	Base case	1.04	1.04	1.02	1.08	1.07	1.03	1.06	1.03	1.03	1.05	1.07	1.02	Load power factor correction and voltage support if needed
HOMSTKTP 115 kV	Base Case	P0	Base case	1.04	1.04	1.03	1.08	1.07	1.03	1.06	1.03	1.03	1.05	1.07	1.03	Load power factor correction and voltage support if needed
HPLND JT 115 kV	Base Case	P0	Base case	1.03	1.03	1.03	1.06	1.06	1.04	1.04	1.04	1.03	1.04	1.06	1.03	Load power factor correction and voltage support if needed

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
HPLND JT 60 kV	Base Case	P0	Base case	1.03	1.03	1.03	1.05	1.06	1.04	1.04	1.04	1.03	1.03	1.06	1.03	Load power factor correction and voltage support if needed
IG JCT 60 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.09	1.04	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
IGNACIO 115 kV	Base Case	P0	Base case	1.05	1.05	1.01	1.09	1.09	1.04	1.06	1.02	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
IGNACO A 60 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.09	1.04	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
IGNACO B 60 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.09	1.04	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
INDIN VL 115 kV	Base Case	P0	Base case	1.06	1.05	1.03	1.09	1.08	1.05	1.07	1.05	1.04	1.07	1.08	1.03	Load power factor correction and voltage support if needed
JCPMPJCT 115 kV	Base Case	P0	Base case	1.05	1.07	0.99	1.10	1.10	1.04	1.06	1.01	1.06	1.07	1.10	0.99	Load power factor correction and voltage support if needed
JMSCNPMP 115 kV	Base Case	P0	Base case	1.05	1.07	0.99	1.10	1.10	1.04	1.06	1.01	1.06	1.07	1.10	0.99	Load power factor correction and voltage support if needed
KONOCI6 60 kV	Base Case	P0	Base case	1.03	1.04	1.02	1.06	1.06	1.05	1.05	1.02	1.04	1.03	1.07	1.02	Load power factor correction and voltage support if needed
LAKEVI&1 230 kV	Base Case	P0	Base case	1.02	1.02	0.99	1.05	1.05	1.02	1.03	1.01	1.01	1.02	1.05	0.99	Load power factor correction and voltage support if needed
LOWR LKE 60 kV	Base Case	P0	Base case	1.02	1.03	1.01	1.06	1.07	1.06	1.05	1.01	1.04	1.03	1.07	1.01	Load power factor correction and voltage support if needed
LS GLLNS 115 kV	Base Case	P0	Base case	1.04	1.05	0.99	1.09	1.09	1.04	1.06	1.01	1.04	1.06	1.09	0.99	Load power factor correction and voltage support if needed
LUCERNE 115 kV	Base Case	P0	Base case	1.05	1.04	1.03	1.08	1.08	1.04	1.06	1.05	1.03	1.05	1.08	1.03	Load power factor correction and voltage support if needed
LUCERNJ1 115 kV	Base Case	P0	Base case	1.05	1.04	1.03	1.08	1.08	1.04	1.06	1.05	1.03	1.05	1.08	1.03	Load power factor correction and voltage support if needed
LUCERNJ2 115 kV	Base Case	P0	Base case	1.04	1.04	1.04	1.07	1.07	1.04	1.04	1.05	1.04	1.04	1.07	1.04	Load power factor correction and voltage support if needed
LWRLAKEJ 115 kV	Base Case	P0	Base case	1.04	1.04	1.03	1.08	1.07	1.03	1.06	1.03	1.03	1.05	1.07	1.03	Load power factor correction and voltage support if needed
MENDOCNO 115 kV	Base Case	P0	Base case	1.05	1.05	1.04	1.07	1.07	1.06	1.05	1.06	1.04	1.05	1.07	1.04	Load power factor correction and voltage support if needed
MEYERS 115 kV	Base Case	P0	Base case	1.05	1.07	0.99	1.10	1.10	1.04	1.06	1.00	1.07	1.07	1.11	0.99	Load power factor correction and voltage support if needed
MEYERTP1 115 kV	Base Case	P0	Base case	1.05	1.07	0.99	1.10	1.10	1.04	1.06	1.00	1.07	1.07	1.11	0.99	Load power factor correction and voltage support if needed
MEYERTP2 115 kV	Base Case	P0	Base case	1.00	1.01	0.96	1.08	1.08	0.99	1.03	0.97	1.00	1.03	1.08	0.96	Load power factor correction and voltage support if needed
MIDDLTWN 60 kV	Base Case	P0	Base case	1.00	1.03	1.01	1.07	1.08	1.07	1.05	0.99	1.03	1.02	1.09	1.01	Load power factor correction and voltage support if needed

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
MIRABEL 60 kV	Base Case	P0	Base case	1.03	1.03	1.04	1.05	1.05	1.03	1.03	1.03	1.03	1.04	1.05	1.03	Load power factor correction and voltage support if needed
MIRBELTP 60 kV	Base Case	P0	Base case	1.03	1.03	1.04	1.05	1.05	1.03	1.03	1.03	1.03	1.04	1.05	1.03	Load power factor correction and voltage support if needed
MNTCLOJ1 115 kV	Base Case	P0	Base case	1.04	1.05	1.01	1.07	1.07	1.04	1.05	1.02	1.05	1.05	1.07	1.01	Load power factor correction and voltage support if needed
MNTCLOJ2 115 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.09	1.06	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
MNTCLOPH 115 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.09	1.06	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
MOLINO 60 kV	Base Case	P0	Base case	1.02	1.01	1.02	1.04	1.05	1.02	1.02	1.01	1.01	1.03	1.05	1.01	Load power factor correction and voltage support if needed
MONROE1 115 kV	Base Case	P0	Base case	1.05	1.06	1.01	1.08	1.08	1.07	1.06	1.01	1.06	1.06	1.08	1.00	Load power factor correction and voltage support if needed
MONROE2 115 kV	Base Case	P0	Base case	1.05	1.06	1.00	1.08	1.08	1.07	1.06	1.01	1.06	1.06	1.08	1.00	Load power factor correction and voltage support if needed
MONTCLLO 115 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.09	1.06	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
MONTE RO 60 kV	Base Case	P0	Base case	1.01	1.02	1.02	1.04	1.06	1.00	1.01	1.01	1.01	1.03	1.06	1.01	Load power factor correction and voltage support if needed
MPE 115 kV	Base Case	P0	Base case	1.04	1.04	1.03	1.06	1.06	1.04	1.04	1.04	1.04	1.04	1.06	1.03	Load power factor correction and voltage support if needed
MPE TAP 115 kV	Base Case	P0	Base case	1.04	1.04	1.03	1.06	1.06	1.04	1.04	1.04	1.04	1.04	1.06	1.03	Load power factor correction and voltage support if needed
MREIS JC 115 kV	Base Case	P0	Base case	1.05	1.07	0.99	1.10	1.10	1.04	1.06	1.00	1.06	1.07	1.10	0.99	Load power factor correction and voltage support if needed
MTCLPHJ1 115 kV	Base Case	P0	Base case	1.04	1.05	1.01	1.07	1.07	1.04	1.05	1.02	1.05	1.05	1.07	1.01	Load power factor correction and voltage support if needed
MTCLPHJ2 115 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.09	1.06	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
NOVATO 60 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.09	1.04	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
NRTH TWR 115 kV	Base Case	P0	Base case	1.03	1.04	1.01	1.05	1.06	1.02	1.03	1.02	1.04	1.03	1.06	1.01	Load power factor correction and voltage support if needed
NTWR ALT 115 kV	Base Case	P0	Base case	1.00	1.01	0.96	1.08	1.08	0.99	1.03	0.97	1.01	1.03	1.08	0.96	Load power factor correction and voltage support if needed
NTWRJCT1 115 kV	Base Case	P0	Base case	1.05	1.06	1.00	1.11	1.11	1.06	1.06	1.04	1.05	1.06	1.11	1.00	Load power factor correction and voltage support if needed
NTWRJCT2 115 kV	Base Case	P0	Base case	1.03	1.04	1.01	1.05	1.06	1.02	1.03	1.02	1.04	1.03	1.06	1.01	Load power factor correction and voltage support if needed
NVTO JCT 60 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.09	1.04	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed

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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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
OLEMA 60 kV	Base Case	P0	Base case	1.04	1.04	0.97	1.09	1.09	1.02	1.05	0.99	1.04	1.06	1.09	0.97	Load power factor correction and voltage support if needed
PARKWAY 230 kV	Base Case	P0	Base case	1.01	1.01	0.97	1.06	1.06	1.00	1.02	0.99	1.00	1.02	1.06	0.97	Load power factor correction and voltage support if needed
PENNGRVE 115 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.06	1.06	1.05	1.04	1.02	1.05	1.04	1.06	1.00	Load power factor correction and voltage support if needed
PNT ARNA 60 kV	Base Case	P0	Base case	1.04	1.04	1.04	1.05	1.05	1.04	1.05	1.04	1.04	1.05	1.05	1.04	Load power factor correction and voltage support if needed
PUEBLO 115 kV	Base Case	P0	Base case	1.02	1.03	0.99	1.05	1.06	1.02	1.03	1.00	1.03	1.03	1.05	0.99	Load power factor correction and voltage support if needed
PUEBLOJT 115 kV	Base Case	P0	Base case	1.04	1.05	1.01	1.07	1.07	1.04	1.05	1.02	1.05	1.05	1.07	1.01	Load power factor correction and voltage support if needed
REDBUD 115 kV	Base Case	P0	Base case	1.03	1.04	1.03	1.06	1.06	1.04	1.04	1.04	1.03	1.04	1.07	1.03	Load power factor correction and voltage support if needed
REDBUDJ1 115 kV	Base Case	P0	Base case	1.03	1.04	1.03	1.06	1.06	1.04	1.04	1.04	1.03	1.04	1.07	1.03	Load power factor correction and voltage support if needed
REDBUDJ2 115 kV	Base Case	P0	Base case	1.03	1.04	1.03	1.06	1.06	1.04	1.04	1.04	1.03	1.04	1.07	1.03	Load power factor correction and voltage support if needed
RINCON 115 kV	Base Case	P0	Base case	1.05	1.06	1.01	1.09	1.08	1.06	1.06	1.02	1.06	1.06	1.08	1.01	Load power factor correction and voltage support if needed
RINCONJ1 115 kV	Base Case	P0	Base case	1.05	1.06	1.02	1.08	1.08	1.06	1.06	1.02	1.06	1.06	1.08	1.01	Load power factor correction and voltage support if needed
RINCONJ2 115 kV	Base Case	P0	Base case	1.05	1.06	1.01	1.09	1.08	1.06	1.06	1.02	1.06	1.06	1.08	1.01	Load power factor correction and voltage support if needed
SAN RAFL 115 kV	Base Case	P0	Base case	1.04	1.05	0.99	1.09	1.09	1.03	1.06	1.00	1.04	1.06	1.09	0.99	Load power factor correction and voltage support if needed
SAN_RFLJ 60 kV	Base Case	P0	Base case	1.02	1.02	0.99	1.08	1.08	1.01	1.04	1.00	1.02	1.04	1.08	0.98	Load power factor correction and voltage support if needed
SAUSALTO 60 kV	Base Case	P0	Base case	1.01	1.01	0.96	1.07	1.07	1.00	1.03	0.97	1.00	1.04	1.08	0.96	Load power factor correction and voltage support if needed
SILVERDO 115 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.08	1.06	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
SILVRDJ1 115 kV	Base Case	P0	Base case	1.04	1.05	1.01	1.07	1.07	1.04	1.05	1.02	1.05	1.05	1.07	1.01	Load power factor correction and voltage support if needed
SILVRDJ2 115 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.08	1.06	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
SKAGGS 115 kV	Base Case	P0	Base case	1.05	1.06	1.00	1.09	1.09	1.04	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
SKGGS J1 115 kV	Base Case	P0	Base case	1.05	1.06	1.00	1.09	1.09	1.04	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
SKGGS J2 115 kV	Base Case	P0	Base case	1.02	1.03	0.98	1.09	1.09	1.01	1.04	0.99	1.02	1.04	1.09	0.98	Load power factor correction and voltage support if needed

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
SLMN CRK 60 kV	Base Case	P0	Base case	0.99	1.00	1.00	1.04	1.06	0.98	1.00	0.99	0.99	1.02	1.06	1.00	Load power factor correction and voltage support if needed
SLMN JCT 60 kV	Base Case	P0	Base case	1.00	1.00	1.01	1.04	1.06	0.99	1.00	1.00	1.00	1.02	1.06	1.01	Load power factor correction and voltage support if needed
SNTA RSA 115 kV	Base Case	P0	Base case	1.05	1.06	1.00	1.08	1.08	1.07	1.06	1.01	1.06	1.06	1.08	1.00	Load power factor correction and voltage support if needed
ST.HELNA 60 kV	Base Case	P0	Base case	0.99	1.00	1.00	1.04	1.05	1.00	1.01	1.00	0.99	1.02	1.05	1.00	Load power factor correction and voltage support if needed
STAF_JCT 60 kV	Base Case	P0	Base case	1.05	1.05	0.98	1.09	1.09	1.03	1.06	0.99	1.05	1.07	1.09	0.98	Load power factor correction and voltage support if needed
STAFFORD 60 kV	Base Case	P0	Base case	1.05	1.05	0.98	1.09	1.09	1.03	1.06	0.99	1.05	1.07	1.09	0.98	Load power factor correction and voltage support if needed
STHELNJ1 115 kV	Base Case	P0	Base case	1.04	1.05	1.01	1.07	1.07	1.04	1.05	1.02	1.05	1.05	1.07	1.01	Load power factor correction and voltage support if needed
STHELNJ2 115 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.08	1.06	1.06	1.01	1.05	1.06	1.09	1.00	Load power factor correction and voltage support if needed
STNY PTP 115 kV	Base Case	P0	Base case	1.05	1.06	1.00	1.07	1.07	1.06	1.05	1.01	1.06	1.05	1.07	1.00	Load power factor correction and voltage support if needed
STONY PT 115 kV	Base Case	P0	Base case	1.05	1.06	1.00	1.07	1.07	1.06	1.05	1.01	1.06	1.05	1.07	1.00	Load power factor correction and voltage support if needed
TOCA_JCT 60 kV	Base Case	P0	Base case	1.04	1.05	0.98	1.09	1.09	1.02	1.06	0.99	1.04	1.06	1.09	0.98	Load power factor correction and voltage support if needed
TOCALOMA 60 kV	Base Case	P0	Base case	1.04	1.05	0.98	1.09	1.09	1.02	1.06	0.99	1.04	1.06	1.09	0.98	Load power factor correction and voltage support if needed
TRNTN JT 60 kV	Base Case	P0	Base case	1.03	1.04	1.04	1.05	1.05	1.03	1.03	1.04	1.04	1.04	1.05	1.04	Load power factor correction and voltage support if needed
TRNTN_JC 60 kV	Base Case	P0	Base case	1.03	1.04	1.04	1.05	1.05	1.03	1.03	1.04	1.04	1.04	1.05	1.04	Load power factor correction and voltage support if needed
TULUCA&1 230 kV	Base Case	P0	Base case	1.01	1.02	0.99	1.05	1.05	1.02	1.02	1.01	1.01	1.02	1.05	0.99	Load power factor correction and voltage support if needed
TULUCAY 230 kV	Base Case	P0	Base case	1.01	1.02	0.99	1.05	1.05	1.01	1.02	1.01	1.01	1.02	1.05	0.99	Load power factor correction and voltage support if needed
TWR2_19 60 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.08	1.03	1.05	1.01	1.04	1.06	1.08	1.00	Load power factor correction and voltage support if needed
TWR2_20 60 kV	Base Case	P0	Base case	1.04	1.05	1.00	1.09	1.08	1.03	1.05	1.01	1.04	1.06	1.08	1.00	Load power factor correction and voltage support if needed
UKIAH 115 kV	Base Case	P0	Base case	1.03	1.04	1.03	1.06	1.06	1.05	1.04	1.05	1.03	1.04	1.07	1.03	Load power factor correction and voltage support if needed
WHLR JCT 60 kV	Base Case	P0	Base case	1.03	1.03	1.04	1.05	1.05	1.03	1.03	1.03	1.03	1.04	1.05	1.03	Load power factor correction and voltage support if needed
WHLR TAP 60 kV	Base Case	P0	Base case	1.03	1.04	1.04	1.05	1.05	1.03	1.03	1.04	1.04	1.04	1.05	1.04	Load power factor correction and voltage support if needed

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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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
WOHLER 60 kV	Base Case	P0	Base case	1.03	1.04	1.04	1.05	1.05	1.03	1.03	1.04	1.03	1.04	1.05	1.04	Load power factor correction and voltage support if needed
WOODACRE 60 kV	Base Case	P0	Base case	1.04	1.05	0.99	1.09	1.09	1.03	1.05	1.00	1.04	1.06	1.09	0.99	Load power factor correction and voltage support if needed
ALTO 60kV	IGNACIO SVD=R	P1	N-1	1.03	1.04	1.00	1.10	1.10	1.03	1.06	1.00	1.03	1.06	1.10	0.99	Switch off cap bank at Greenbrae
ALTOJT1 60kV	IGNACIO SVD=R	P1	N-1	1.03	1.04	1.00	1.10	1.10	1.03	1.06	1.00	1.03	1.06	1.10	0.99	Switch off cap bank at Greenbrae
ALTOJT2 60kV	IGNACIO SVD=R	P1	N-1	1.03	1.04	1.00	1.10	1.10	1.03	1.06	1.01	1.03	1.06	1.10	1.00	Switch off cap bank at Greenbrae
BOLINAS 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.01	1.12	1.12	1.05	1.07	1.02	1.06	1.08	1.12	1.00	Switch off cap bank at Greenbrae
CALISTGA 60kV	LAKEVILLE #1 60KV [7360]	P1	N-1	0.88	0.87	0.86	1.04	1.06	0.87	0.93	0.87	0.86	0.99	1.07	0.86	Project: Fulton 230/115 kv Bank alternative In-service date: 2023 Short Term: Open line between Cotatiand Petaluma Long Term: Continue to monitor future load forecast
CARQUINZ 115kV	IGNACIO SVD=R	P1	N-1	1.07	1.09	1.01	1.13	1.13	1.06	1.08	1.02	1.09	1.09	1.13	1.01	Switch off cap bank at Greenbrae
CLER LKE 60kV	KONOCTI 60KV [6861]	P1	N-1	0.95	0.89	0.78	1.04	1.06	0.97	1.00	0.72	0.87	1.00	1.06	0.77	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
CLER LKE 60kV	EGLERCK 115/60KV TB 1	P1	N-1	0.95	0.89	0.78	1.04	1.06	0.97	1.00	0.72	0.87	1.00	1.06	0.78	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
CORONA 115kV	CORONA-LAKEVILLE 115KV [4311]	P1	N-1	1.06	1.08	0.96	1.10	1.10	1.07	1.07	0.97	1.08	1.08	1.10	0.96	Add reactor
CRQNZTP1 115kV	IGNACIO SVD=R	P1	N-1	1.07	1.09	1.01	1.13	1.13	1.06	1.08	1.02	1.08	1.09	1.13	1.01	Switch off cap bank at Greenbrae
CRQNZTP2 115kV	IGNACIO SVD=R	P1	N-1	1.02	1.03	0.98	1.11	1.11	1.02	1.05	0.99	1.03	1.05	1.11	0.98	Switch off cap bank at Greenbrae
DUNBAR 60kV	LAKEVILLE #1 60KV [7360]	P1	N-1	0.90	0.89	0.88	1.05	1.07	0.88	0.95	0.89	0.88	1.00	1.08	0.88	Project: Fulton 230/115 kv Bank alternative In-service date: 2023 Short Term: Open line between Cotatiand Petaluma Long Term: Continue to monitor future load forecast
EGLERCK 60kV	EGLERCK 115/60KV TB 1	P1	N-1	0.91	0.86	0.70	1.05	1.07	0.95	0.99	0.62	0.83	0.98	1.08	0.70	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
GRANITE 60kV	KONOCTI 60KV [6861]	P1	N-1	0.96	0.91	0.83	1.04	1.06	0.98	1.01	0.78	0.90	1.00	1.06	0.83	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
GRANITE 60kV	EGLE RCK 115/60KV TB 1	P1	N-1	0.96	0.91	0.83	1.04	1.06	0.98	1.01	0.78	0.90	1.00	1.06	0.83	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
GREENBRE 60kV	IGNACIO SVD=R	P1	N-1	1.03	1.04	1.00	1.10	1.10	1.03	1.05	1.01	1.03	1.06	1.10	1.00	Switch off cap bank at Greenbrae
HARTLEY 60kV	KONOCTI 60KV [6861]	P1	N-1	0.96	0.90	0.80	1.03	1.05	0.97	1.00	0.75	0.89	1.00	1.05	0.80	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
HARTLEY 60kV	EGLE RCK 115/60KV TB 1	P1	N-1	0.96	0.90	0.80	1.03	1.05	0.97	1.00	0.76	0.89	1.00	1.06	0.80	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
HGHWY J1 115kV	IGNACIO SVD=R	P1	N-1	1.07	1.08	1.02	1.12	1.12	1.06	1.08	1.03	1.08	1.08	1.12	1.02	Switch off cap bank at Greenbrae
HGHWY J2 115kV	IGNACIO SVD=R	P1	N-1	1.03	1.04	0.98	1.11	1.11	1.02	1.05	0.99	1.03	1.05	1.11	0.98	Switch off cap bank at Greenbrae
HighWAY 115kV	IGNACIO SVD=R	P1	N-1	1.03	1.04	0.98	1.11	1.11	1.02	1.05	0.99	1.03	1.05	1.11	0.98	Switch off cap bank at Greenbrae
IG JCT 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.02	1.11	1.11	1.06	1.08	1.03	1.07	1.08	1.11	1.02	Switch off cap bank at Greenbrae
IGNACIO 115kV	IGNACIO SVD=R	P1	N-1	1.07	1.07	1.03	1.11	1.11	1.07	1.08	1.04	1.07	1.08	1.11	1.02	Switch off cap bank at Greenbrae
IGNACO A 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.02	1.11	1.11	1.06	1.08	1.03	1.07	1.08	1.11	1.02	Switch off cap bank at Greenbrae
IGNACO B 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.02	1.11	1.11	1.06	1.08	1.03	1.07	1.08	1.11	1.02	Switch off cap bank at Greenbrae
JCPMPJCT 115kV	IGNACIO SVD=R	P1	N-1	1.07	1.09	1.01	1.12	1.13	1.06	1.08	1.03	1.08	1.09	1.13	1.01	Switch off cap bank at Greenbrae
JMSCNPMP 115kV	IGNACIO SVD=R	P1	N-1	1.07	1.09	1.01	1.12	1.13	1.06	1.08	1.03	1.08	1.09	1.13	1.01	Switch off cap bank at Greenbrae
KONOCTI6 60kV	KONOCTI 60KV [6861]	P1	N-1	0.91	0.86	0.70	1.05	1.07	0.95	0.99	0.62	0.83	0.97	1.08	0.69	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
KONOCTI6 60kV	EGLE RCK 115/60KV TB 1	P1	N-1	0.91	0.86	0.70	1.05	1.07	0.95	0.99	0.62	0.83	0.98	1.08	0.70	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
LOWR LKE 60kV	KONOCTI 60KV [6861]	P1	N-1	0.89	0.86	0.67	1.06	1.08	0.96	0.99	0.59	0.83	0.97	1.08	0.67	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
LOWR LKE 60kV	EGLE RCK 115/60KV TB 1	P1	N-1	0.89	0.86	0.67	1.06	1.07	0.96	0.99	0.59	0.83	0.97	1.09	0.67	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
LS GLLNS 115kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.01	1.11	1.11	1.06	1.08	1.03	1.06	1.08	1.11	1.01	Switch off cap bank at Greenbrae
MEYERS 115kV	IGNACIO SVD=R	P1	N-1	1.07	1.09	1.01	1.13	1.13	1.06	1.08	1.02	1.09	1.09	1.13	1.01	Switch off cap bank at Greenbrae
MEYERTP1 115kV	IGNACIO SVD=R	P1	N-1	1.07	1.09	1.01	1.13	1.13	1.06	1.08	1.02	1.09	1.09	1.13	1.01	Switch off cap bank at Greenbrae
MEYERTP2 115kV	IGNACIO SVD=R	P1	N-1	1.02	1.03	0.98	1.11	1.11	1.02	1.05	0.99	1.03	1.05	1.11	0.98	Switch off cap bank at Greenbrae

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
MIDDLTWN 60kV	KONOCI 60KV [6861]	P1	N-1	0.87	0.86	0.63	1.06	1.09	0.97	0.99	0.54	0.83	0.96	1.10	0.63	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
MIDDLTWN 60kV	EGLE RCK 115/60KV TB 1	P1	N-1	0.87	0.86	0.63	1.06	1.09	0.97	0.99	0.54	0.83	0.96	1.10	0.63	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
MREIS JC 115kV	IGNACIO SVD=R	P1	N-1	1.07	1.09	1.01	1.13	1.13	1.06	1.08	1.02	1.08	1.09	1.13	1.01	Switch off cap bank at Greenbrae
NOVATO 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.02	1.11	1.11	1.06	1.08	1.03	1.07	1.08	1.11	1.02	Switch off cap bank at Greenbrae
NTWR ALT 115kV	IGNACIO SVD=R	P1	N-1	1.02	1.03	0.98	1.11	1.11	1.02	1.05	0.99	1.03	1.05	1.11	0.98	Switch off cap bank at Greenbrae
NVTO JCT 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.02	1.11	1.11	1.06	1.08	1.03	1.07	1.08	1.11	1.02	Switch off cap bank at Greenbrae
OLEMA 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.06	1.00	1.11	1.12	1.05	1.07	1.01	1.06	1.08	1.12	0.99	Switch off cap bank at Greenbrae
SAN RAFL 115kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.01	1.11	1.11	1.06	1.07	1.03	1.06	1.08	1.11	1.01	Switch off cap bank at Greenbrae
SAN_RFLJ 60kV	IGNACIO SVD=R	P1	N-1	1.04	1.04	1.01	1.10	1.10	1.04	1.06	1.02	1.04	1.06	1.11	1.01	Switch off cap bank at Greenbrae
SAUSALTO 60kV	IGNACIO SVD=R	P1	N-1	1.03	1.03	0.99	1.10	1.10	1.02	1.05	0.99	1.03	1.06	1.10	0.99	Switch off cap bank at Greenbrae
SKAGGS 115kV	IGNACIO SVD=R	P1	N-1	1.07	1.08	1.02	1.12	1.12	1.07	1.08	1.03	1.07	1.08	1.12	1.02	Switch off cap bank at Greenbrae
SKGGS J1 115kV	IGNACIO SVD=R	P1	N-1	1.07	1.08	1.02	1.12	1.12	1.07	1.08	1.03	1.07	1.08	1.12	1.02	Switch off cap bank at Greenbrae
SKGGS J2 115kV	IGNACIO SVD=R	P1	N-1	1.04	1.05	1.00	1.11	1.11	1.04	1.06	1.01	1.04	1.06	1.11	1.00	Switch off cap bank at Greenbrae
STAF_JCT 60kV	IGNACIO SVD=R	P1	N-1	1.07	1.07	1.00	1.12	1.12	1.05	1.08	1.01	1.07	1.09	1.12	1.00	Switch off cap bank at Greenbrae
STAFFORD 60kV	IGNACIO SVD=R	P1	N-1	1.07	1.07	1.00	1.12	1.12	1.05	1.08	1.01	1.07	1.09	1.12	1.00	Switch off cap bank at Greenbrae
TOCA_JCT 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.00	1.12	1.12	1.05	1.08	1.01	1.06	1.08	1.12	1.00	Switch off cap bank at Greenbrae
TOCALOMA 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.00	1.12	1.12	1.05	1.08	1.01	1.06	1.08	1.12	1.00	Switch off cap bank at Greenbrae
TWR2_19 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.02	1.11	1.11	1.06	1.07	1.03	1.06	1.08	1.11	1.02	Switch off cap bank at Greenbrae
TWR2_20 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.02	1.11	1.11	1.06	1.07	1.03	1.06	1.08	1.11	1.02	Switch off cap bank at Greenbrae
UPPR LKE 60kV	KONOCI 60KV [6861]	P1	N-1	0.97	0.92	0.85	1.03	1.04	0.97	1.00	0.81	0.91	1.00	1.04	0.85	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
UPPR LKE 60kV	EGLE RCK 115/60KV TB 1	P1	N-1	0.97	0.92	0.85	1.03	1.04	0.98	1.00	0.81	0.91	1.00	1.05	0.85	Short Term: Middletown UVLS Long Term: Instsall a new 115/60 kV bank at Middletown Sub or increase the planned voltage support (10-15MVAR) at Middle Town
WOODACRE 60kV	IGNACIO SVD=R	P1	N-1	1.06	1.07	1.01	1.11	1.11	1.06	1.07	1.02	1.06	1.08	1.12	1.01	Switch off cap bank at Greenbrae
ALTO 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.03	1.03	0.98	1.05	0.99	1.10	1.10	1.02	1.03	1.06	1.10	0.98	Switch off cap bank at Greenbrae
BELLVUE 115 kV	LAKEVILLE 115KV - SECTION 1D & 2D	P2	Bus-tie Breaker	1.05	1.07	0.94	1.07	0.95	1.10	1.10	1.06	1.07	1.08	1.10	0.94	Load power factor correction and voltage support if needed
BELLVUE 115 kV	FULTON 115KV - SECTION 2D & 1D	P2	Bus-tie Breaker	0.99	1.02	0.88	1.01	0.87	1.03	1.04	1.04	1.02	1.02	1.04	0.88	Load power factor correction and voltage support if needed
BIG RIVR 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.03	1.03	0.93	1.03	0.97	1.03	1.03	1.03	0.86	1.03	1.03	0.92	Middletown UVLS

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
BOLINAS 60 kV	IGNACIO 60KV [7180] (IGNACO B-STAF_JCT)	P2	Line Section w/o Fault	1.00	0.99	0.85	1.03	0.86	1.09	1.09	0.94	0.98	1.06	1.10	0.85	Load power factor correction and voltage support if needed
BOLINAS 60 kV	IGNACIO 60KV [7140] (IGNACO B-WOODACRE)	P2	Line Section w/o Fault	0.98	0.97	0.89	1.01	0.87	1.09	1.10	0.94	0.96	1.05	1.11	0.87	Load power factor correction and voltage support if needed
BOLINAS 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.05	1.06	0.99	1.07	1.01	1.12	1.12	1.04	1.05	1.08	1.12	0.99	Switch off cap bank at Greenbrae
CALISTGA 60 kV	LAKEVILLE - 2D 60KV & LAKEVILLE #1 LINE	P2	Non-bus-tie Breaker	0.87	0.87	0.86	0.93	0.87	1.04	1.06	0.87	0.86	0.99	1.07	0.86	Load power factor correction and voltage support if needed
CALPELLA 115 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.01	0.97	0.82	1.03	0.86	1.07	1.06	1.00	0.81	1.00	1.07	0.82	Middletown UVLS
CLER LKE 60 kV	KONOCTI 60KV [6861] (KONOCTI6-EGLE RCK)	P2	Line Section w/o Fault	0.95	0.89	0.78	1.00	0.72	1.04	1.06	0.97	0.87	1.00	1.06	0.77	Middletown UVLS
CLER LKE 60 kV	EGLE RCK 115KV SECTION MA	P2	Bus	0.95	0.88	0.72	0.99	0.70	1.04	1.06	0.97	0.88	0.99	1.06	0.72	Middletown UVLS
CLER LKE 60 kV	KONOCTI6 60KV SECTION 1E	P2	Bus	0.96	0.94	0.85	1.01	0.80	1.04	1.05	0.98	0.93	1.00	1.06	0.86	Middletown UVLS
CLER LKE 60 kV	EGLE RCK 60KV SECTION 1D	P2	Bus	0.95	0.89	0.78	1.00	0.72	1.04	1.06	0.97	0.87	1.00	1.06	0.77	Middletown UVLS
CLER LKE 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.94	0.87	0.62	1.00	0.62	1.04	1.06	0.95	0.63	0.98	1.06	0.61	Middletown UVLS
CLER LKE 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2	Non-bus-tie Breaker	0.95	0.88	0.72	0.99	0.70	1.04	1.06	0.97	0.88	0.99	1.06	0.72	Middletown UVLS
CLER LKE 60 kV	EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2	Non-bus-tie Breaker	0.95	0.88	0.72	0.99	0.70	1.04	1.06	0.97	0.88	0.99	1.06	0.72	Middletown UVLS
CLER LKE 60 kV	KONOCTI6 - 1E 60KV & KONOCTI LINE	P2	Non-bus-tie Breaker	0.96	0.94	0.85	1.01	0.80	1.04	1.05	0.98	0.93	1.00	1.06	0.86	Middletown UVLS
CORONA 115 kV	LAKEVILLE 115KV SECTION 1D	P2	Bus	1.06	1.08	0.96	1.07	0.97	1.10	1.10	1.07	1.08	1.08	1.10	0.96	Switch off cap bank at Middletown
CORONA 115 kV	LAKEVILLE 115KV - SECTION 1D & 2D	P2	Bus-tie Breaker	1.05	1.08	0.93	1.07	0.94	1.11	1.11	1.06	1.07	1.08	1.11	0.93	Load power factor correction and voltage support if needed
COVELO6 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.98	0.97	0.81	1.01	0.89	1.02	1.03	1.01	0.82	1.01	1.03	0.81	Middletown UVLS
DUNBAR 60 kV	LAKEVILLE - 2D 60KV & LAKEVILLE #1 LINE	P2	Non-bus-tie Breaker	0.90	0.89	0.88	0.95	0.89	1.05	1.07	0.88	0.88	1.00	1.08	0.88	Load power factor correction and voltage support if needed
EGLE RCK 60 kV	EGLE RCK 115KV SECTION MA	P2	Bus	0.91	0.85	0.63	0.98	0.59	1.05	1.07	0.95	0.84	0.97	1.08	0.63	Middletown UVLS
EGLE RCK 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.90	0.83	0.54	0.99	0.53	1.05	1.07	0.93	0.56	0.96	1.08	0.54	Middletown UVLS
EGLE RCK 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2	Non-bus-tie Breaker	0.91	0.85	0.63	0.98	0.59	1.05	1.07	0.95	0.84	0.97	1.08	0.63	Middletown UVLS
EGLE RCK 60 kV	EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2	Non-bus-tie Breaker	0.91	0.85	0.63	0.98	0.59	1.05	1.07	0.95	0.84	0.97	1.08	0.63	Middletown UVLS
ELK 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.03	1.03	0.91	1.04	0.95	1.04	1.05	1.02	0.86	1.04	1.05	0.91	Middletown UVLS
FRT BRGG 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.02	1.01	0.90	1.02	0.94	1.03	1.03	1.02	0.84	1.02	1.03	0.90	Middletown UVLS
GARCIA 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.03	1.03	0.92	1.04	0.95	1.04	1.05	1.03	0.86	1.04	1.05	0.91	Middletown UVLS

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
GRANITE 60 kV	KONOCI6 60KV [6861] (KONOCI6-EGLE RCK)	P2	Line Section w/o Fault	0.96	0.91	0.83	1.01	0.78	1.04	1.06	0.98	0.90	1.00	1.06	0.83	Middletown UVLS
GRANITE 60 kV	EGLE RCK 115KV SECTION MA	P2	Bus	0.96	0.90	0.77	1.00	0.75	1.04	1.06	0.98	0.90	1.00	1.06	0.77	Middletown UVLS
GRANITE 60 kV	KONOCI6 60KV SECTION 1E	P2	Bus	0.98	0.95	0.89	1.01	0.85	1.04	1.05	1.00	0.94	1.01	1.06	0.89	Middletown UVLS
GRANITE 60 kV	EGLE RCK 60KV SECTION 1D	P2	Bus	0.96	0.91	0.83	1.01	0.78	1.04	1.06	0.98	0.90	1.00	1.06	0.83	Middletown UVLS
GRANITE 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.95	0.89	0.67	1.00	0.68	1.04	1.05	0.96	0.67	0.99	1.06	0.67	Middletown UVLS
GRANITE 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2	Non-bus-tie Breaker	0.96	0.90	0.77	1.00	0.75	1.04	1.06	0.98	0.90	1.00	1.06	0.77	Middletown UVLS
GRANITE 60 kV	EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2	Non-bus-tie Breaker	0.96	0.90	0.77	1.00	0.75	1.04	1.06	0.98	0.90	1.00	1.06	0.77	Middletown UVLS
GRANITE 60 kV	KONOCI6 - 1E 60KV & KONOCI6 LINE	P2	Non-bus-tie Breaker	0.98	0.95	0.89	1.01	0.85	1.04	1.05	1.00	0.94	1.01	1.06	0.89	Middletown UVLS
GREENBRE 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.02	1.03	0.99	1.05	1.00	1.10	1.10	1.02	1.02	1.06	1.10	0.99	Switch off cap bank at Greenbrae
HARTLEY 60 kV	EGLE RCK 115KV SECTION MA	P2	Bus	0.96	0.89	0.75	0.99	0.73	1.03	1.05	0.97	0.89	0.99	1.06	0.75	Middletown UVLS
HARTLEY 60 kV	KONOCI6 60KV SECTION 1E	P2	Bus	0.97	0.94	0.87	1.00	0.82	1.03	1.05	0.99	0.93	1.00	1.05	0.87	Middletown UVLS
HARTLEY 60 kV	EGLE RCK 60KV SECTION 1D	P2	Bus	0.96	0.90	0.80	1.00	0.75	1.03	1.05	0.97	0.89	1.00	1.05	0.80	Middletown UVLS
HARTLEY 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.95	0.88	0.64	1.00	0.65	1.03	1.05	0.96	0.66	0.99	1.06	0.64	Middletown UVLS
HARTLEY 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2	Non-bus-tie Breaker	0.96	0.89	0.75	0.99	0.73	1.03	1.05	0.97	0.89	0.99	1.06	0.75	Middletown UVLS
HARTLEY 60 kV	EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2	Non-bus-tie Breaker	0.96	0.89	0.75	0.99	0.73	1.03	1.05	0.97	0.89	0.99	1.05	0.75	Middletown UVLS
HARTLEY 60 kV	KONOCI6 - 1E 60KV & KONOCI6 LINE	P2	Non-bus-tie Breaker	0.97	0.94	0.87	1.00	0.82	1.03	1.05	0.99	0.93	1.00	1.05	0.87	Middletown UVLS
HIGHLAND 115 kV	EAGLE ROCK 115KV [1470] (EGLE RCK-LWRLAKEJ)	P2	Line Section w/o Fault	1.05	1.03	1.01	1.08	1.03	1.13	1.09	1.02	1.02	1.07	1.09	1.01	Switch off cap bank at Middletown
HIGHLAND 115 kV	EGLE RCK 115KV SECTION MA	P2	Bus	1.05	1.02	0.98	1.08	1.01	1.13	1.09	1.02	1.02	1.07	1.09	0.98	Switch off cap bank at Middletown
HIGHLAND 115 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.95	0.89	0.75	0.99	0.79	1.09	1.05	0.89	0.71	0.95	1.06	0.75	Middletown UVLS
HIGHLAND 115 kV	EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2	Non-bus-tie Breaker	1.05	1.02	0.98	1.08	1.01	1.13	1.09	1.01	1.01	1.07	1.09	0.98	Switch off cap bank at Middletown
HIGHLAND 115 kV	EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2	Non-bus-tie Breaker	1.05	1.02	0.98	1.08	1.01	1.13	1.09	1.02	1.02	1.07	1.09	0.98	Switch off cap bank at Middletown
HighWAY 115 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.02	1.03	0.97	1.04	0.98	1.11	1.11	1.01	1.02	1.05	1.11	0.97	Switch off cap bank at Greenbrae
HPLND JT 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.00	0.97	0.86	1.03	0.89	1.05	1.05	1.00	0.84	1.01	1.06	0.86	Middletown UVLS
IGNACIO 115 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.06	1.07	1.01	1.07	1.03	1.11	1.11	1.06	1.06	1.07	1.11	1.01	Switch off cap bank at Greenbrae
IGNACO A 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.06	1.06	1.01	1.07	1.02	1.11	1.11	1.05	1.06	1.07	1.11	1.01	Switch off cap bank at Greenbrae
IGNACO B 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.06	1.07	1.01	1.07	1.02	1.11	1.11	1.05	1.06	1.07	1.11	1.01	Switch off cap bank at Greenbrae
KONOCI6 60 kV	EGLE RCK 115KV SECTION MA	P2	Bus	0.91	0.85	0.63	0.98	0.59	1.05	1.07	0.95	0.84	0.97	1.08	0.63	Middletown UVLS
KONOCI6 60 kV	KONOCI6 60KV SECTION 1E	P2	Bus	0.93	0.93	0.81	1.00	0.74	1.04	1.06	0.98	0.91	0.99	1.07	0.82	Middletown UVLS

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
KONOCI6 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.90	0.83	0.54	0.99	0.53	1.05	1.07	0.93	0.56	0.96	1.08	0.54	Middletown UVLS
KONOCI6 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2	Non-bus-tie Breaker	0.91	0.85	0.63	0.98	0.59	1.05	1.07	0.95	0.84	0.97	1.08	0.63	Middletown UVLS
KONOCI6 60 kV	KONOCI6 60KV - SECTION 1D & 1E	P2	Bus-tie Breaker	0.99	0.94	0.90	1.01	0.90	1.03	1.04	0.98	0.94	1.01	1.04	0.91	Load power factor correction and voltage support if needed
LOWR LKE 60 kV	KONOCI6 60KV [6861] (KONOCI6-EGLE RCK)	P2	Line Section w/o Fault	0.89	0.86	0.67	0.99	0.59	1.06	1.08	0.96	0.83	0.97	1.08	0.67	Middletown UVLS
LOWR LKE 60 kV	EGLE RCK 115KV SECTION MA	P2	Bus	0.89	0.85	0.60	0.98	0.56	1.06	1.08	0.96	0.84	0.96	1.09	0.60	Middletown UVLS
LOWR LKE 60 kV	KONOCI6 60KV SECTION 1E	P2	Bus	0.92	0.93	0.80	1.00	0.70	1.05	1.07	0.98	0.91	0.98	1.08	0.80	Middletown UVLS
LOWR LKE 60 kV	EGLE RCK 60KV SECTION 1D	P2	Bus	0.89	0.86	0.67	0.99	0.59	1.06	1.08	0.96	0.83	0.97	1.08	0.67	Middletown UVLS
LOWR LKE 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.88	0.83	0.51	0.99	0.50	1.06	1.08	0.94	0.55	0.96	1.09	0.51	Middletown UVLS
LOWR LKE 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2	Non-bus-tie Breaker	0.89	0.85	0.60	0.98	0.56	1.06	1.08	0.96	0.84	0.96	1.09	0.60	Middletown UVLS
LOWR LKE 60 kV	EGLE RCK - MA 115KV & EAGLE RCK-FULTON-SILVERDO LINE	P2	Non-bus-tie Breaker	0.89	0.85	0.60	0.98	0.56	1.06	1.08	0.96	0.84	0.96	1.09	0.60	Middletown UVLS
LOWR LKE 60 kV	KONOCI6 - 1E 60KV & KONOCI6 LINE	P2	Non-bus-tie Breaker	0.92	0.93	0.80	1.00	0.70	1.05	1.07	0.98	0.91	0.98	1.08	0.80	Middletown UVLS
LUCERNE 115 kV	MENDOCNO 115KV SECTION 1D	P2	Bus	1.05	1.04	1.04	1.09	1.02	1.12	1.11	1.04	1.02	1.09	1.11	1.04	Switch off cap bank at Middletown
LUCERNE 115 kV	MENDOCNO - 1D 115KV & MENDOCINO LINE	P2	Non-bus-tie Breaker	1.05	1.04	1.04	1.09	1.02	1.12	1.11	1.04	1.02	1.09	1.11	1.04	Switch off cap bank at Middletown
LUCERNE 115 kV	MENDOCNO - 1D 115KV & MENDOCINO LINE (2)	P2	Non-bus-tie Breaker	1.05	1.04	1.04	1.09	1.02	1.12	1.11	1.04	1.02	1.09	1.11	1.04	Switch off cap bank at Middletown
LUCERNE 115 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.01	0.96	0.84	1.04	0.89	1.09	1.08	0.98	0.83	1.03	1.08	0.84	Middletown UVLS
LYTNVLE 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.99	0.97	0.82	1.01	0.90	1.02	1.03	1.01	0.83	1.01	1.03	0.82	Middletown UVLS
LYTNVLE 60 kV	MENDOCNO - MA 60KV & MENDOCINO LINE (2)_Dup1	P2	Non-bus-tie Breaker	1.03	1.01	0.95	1.03	0.80	1.03	1.02	1.03	1.01	1.04	1.03	0.96	Middletown UVLS
MENDOCNO 115 kV	MENDOCNO 115KV SECTION 1D	P2	Bus	1.05	1.05	1.06	1.10	1.02	1.13	1.13	1.06	1.03	1.10	1.13	1.06	Switch off cap bank at Middletown
MENDOCNO 115 kV	MENDOCNO - 1D 115KV & MENDOCINO LINE	P2	Non-bus-tie Breaker	1.05	1.05	1.06	1.10	1.02	1.13	1.13	1.06	1.03	1.10	1.13	1.06	Switch off cap bank at Middletown
MENDOCNO 115 kV	MENDOCNO - 1D 115KV & MENDOCINO LINE (2)	P2	Non-bus-tie Breaker	1.05	1.05	1.06	1.10	1.02	1.13	1.13	1.06	1.03	1.10	1.13	1.06	Switch off cap bank at Middletown
MENDOCNO 115 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.01	0.96	0.81	1.04	0.86	1.08	1.07	1.00	0.80	1.00	1.07	0.81	Middletown UVLS
MENDOCNO 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.01	1.01	0.88	1.02	0.93	1.02	1.02	1.01	0.87	1.01	1.02	0.88	Middletown UVLS
MEYERS 115 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.07	1.08	1.00	1.07	1.01	1.13	1.13	1.05	1.08	1.09	1.13	1.00	Switch off cap bank at Greenbrae
MIDDLTWN 60 kV	KONOCI6 60KV [6861] (KONOCI6-EGLE RCK)	P2	Line Section w/o Fault	0.87	0.86	0.63	0.99	0.54	1.06	1.09	0.97	0.83	0.96	1.10	0.63	Middletown UVLS

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
MIDDLTWN 60 kV	EGLE RCK 115KV SECTION MA	P2	Bus	0.86	0.85	0.56	0.98	0.52	1.06	1.09	0.97	0.84	0.95	1.10	0.56	Middletown UVLS
MIDDLTWN 60 kV	KONOC16 60KV SECTION 1E	P2	Bus	0.89	0.94	0.77	1.01	0.66	1.06	1.08	1.00	0.92	0.97	1.09	0.77	Middletown UVLS
MIDDLTWN 60 kV	EGLE RCK 60KV SECTION 1D	P2	Bus	0.87	0.86	0.63	0.99	0.54	1.06	1.09	0.97	0.83	0.96	1.10	0.63	Middletown UVLS
MIDDLTWN 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.86	0.83	0.48	0.99	0.46	1.06	1.09	0.95	0.54	0.94	1.10	0.48	Middletown UVLS
MIDDLTWN 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2	Non-bus-tie Breaker	0.86	0.85	0.56	0.98	0.52	1.06	1.09	0.97	0.84	0.95	1.10	0.56	Middletown UVLS
MIDDLTWN 60 kV	EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2	Non-bus-tie Breaker	0.86	0.85	0.56	0.98	0.52	1.06	1.09	0.97	0.84	0.95	1.10	0.56	Middletown UVLS
MIDDLTWN 60 kV	KONOC16 - 1E 60KV & KONOC1 LINE	P2	Non-bus-tie Breaker	0.89	0.94	0.77	1.01	0.66	1.06	1.08	1.00	0.92	0.97	1.09	0.77	Middletown UVLS
NOVATO 60 kV	IGNACIO 60KV [7150] (IGNACO A-IG JCT)	P2	Line Section w/o Fault	0.96	0.97	0.88	1.00	0.90	1.07	1.08	0.95	0.96	1.03	1.08	0.88	Load power factor correction and voltage support if needed
NOVATO 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.06	1.06	1.01	1.07	1.02	1.11	1.11	1.05	1.06	1.07	1.11	1.01	Switch off cap bank at Greenbrae
NRTH TWR 115 kV	NRTH TWR 115KV SECTION 1D	P2	Bus	1.01	1.03	-6.44	1.03	0.95	1.11	1.11	-6.62	1.02	1.04	1.11	-6.47	Middletown UVLS
OLEMA 60 kV	IGNACIO 60KV [7180] (IGNACO B-STAF_JCT)	P2	Line Section w/o Fault	0.91	0.90	0.68	0.97	0.68	1.08	1.10	0.82	0.88	1.03	1.11	0.68	Load power factor correction and voltage support if needed
OLEMA 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.05	1.06	0.98	1.07	1.00	1.11	1.12	1.04	1.05	1.08	1.12	0.98	Switch off cap bank at Greenbrae
PENNGRVE 115 kV	LAKEVILLE 115KV - SECTION 1D & 2D	P2	Bus-tie Breaker	1.05	1.07	0.94	1.07	0.94	1.10	1.10	1.06	1.07	1.08	1.10	0.93	Load power factor correction and voltage support if needed
PHILO 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.01	1.01	0.89	1.03	0.93	1.04	1.05	1.01	0.85	1.03	1.05	0.89	Middletown UVLS
PTTR VLY 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.03	1.02	0.89	1.03	0.94	1.03	1.02	1.03	0.88	1.02	1.02	0.89	Middletown UVLS
PUEBLO 115 kV	LAKEVILLE 115KV - SECTION 1D & 2D	P2	Bus-tie Breaker	0.95	1.00	0.80	1.03	0.82	1.11	1.12	0.93	0.99	1.04	1.12	0.79	Load power factor correction and voltage support if needed
REDBUD 115 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.95	0.90	0.76	0.99	0.80	1.09	1.05	0.91	0.72	0.96	1.06	0.76	Middletown UVLS
SAN RAFL 115 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.05	1.06	1.00	1.07	1.01	1.11	1.11	1.05	1.06	1.07	1.11	1.00	Switch off cap bank at Greenbrae
SAN_RFLJ 60 kV	IGNACIO 60KV [7150] (IGNACO A-IG JCT)	P2	Line Section w/o Fault	0.96	0.97	0.90	1.00	0.92	1.07	1.07	0.95	0.96	1.02	1.08	0.90	Load power factor correction and voltage support if needed
SAN_RFLJ 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.03	1.04	0.99	1.06	1.01	1.10	1.10	1.03	1.03	1.06	1.11	0.99	Switch off cap bank at Greenbrae
SAUSALTO 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.02	1.03	0.97	1.05	0.98	1.10	1.10	1.01	1.02	1.05	1.10	0.97	Switch off cap bank at Greenbrae
SKAGGS 115 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.06	1.07	1.01	1.07	1.02	1.12	1.12	1.06	1.07	1.08	1.12	1.01	Switch off cap bank at Greenbrae
SNTA RSA 115 kV	LAKEVILLE 115KV - SECTION 1D & 2D	P2	Bus-tie Breaker	1.05	1.07	0.95	1.07	0.96	1.10	1.10	1.06	1.06	1.08	1.10	0.95	Load power factor correction and voltage support if needed
SNTA RSA 115 kV	FULTON 115KV - SECTION 2D & 1D	P2	Bus-tie Breaker	0.99	1.02	0.85	1.01	0.85	1.03	1.04	1.04	1.03	1.02	1.04	0.85	Load power factor correction and voltage support if needed
SONOMA 115 kV	LAKEVILLE 115KV - SECTION 1D & 2D	P2	Bus-tie Breaker	0.93	0.99	0.76	1.02	0.79	1.12	1.13	0.91	0.98	1.04	1.13	0.76	Load power factor correction and voltage support if needed
STAFFORD 60 kV	IGNACIO 60KV [7180] (IGNACO B-STAF_JCT)	P2	Line Section w/o Fault	0.90	0.89	0.58	0.96	0.58	1.08	1.10	0.78	0.86	1.04	1.11	0.58	Load power factor correction and voltage support if needed

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
STAFFORD 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.06	1.07	0.99	1.08	1.00	1.12	1.12	1.04	1.06	1.08	1.12	0.99	Switch off cap bank at Greenbrae
STONY PT 115 kV	LAKEVILLE 115KV - SECTION 1D & 2D	P2	Bus-tie Breaker	1.05	1.07	0.94	1.07	0.95	1.10	1.10	1.06	1.06	1.08	1.10	0.94	Load power factor correction and voltage support if needed
STONY PT 115 kV	FULTON 115KV - SECTION 2D & 1D	P2	Bus-tie Breaker	0.99	1.02	0.87	1.01	0.87	1.03	1.04	1.04	1.02	1.02	1.04	0.87	Load power factor correction and voltage support if needed
TOCALOMA 60 kV	IGNACIO 60KV [7180] (IGNACO B-STAF_JCT)	P2	Line Section w/o Fault	0.90	0.88	0.62	0.96	0.62	1.08	1.10	0.79	0.86	1.04	1.11	0.62	Load power factor correction and voltage support if needed
TOCALOMA 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.06	1.06	0.99	1.07	1.00	1.12	1.12	1.04	1.05	1.08	1.12	0.99	Switch off cap bank at Greenbrae
UKIAH 115 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.00	0.96	0.83	1.03	0.87	1.07	1.06	1.00	0.82	1.00	1.06	0.83	Middletown UVLS
UKIAH JT 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.01	1.00	0.87	1.02	0.91	1.03	1.04	1.01	0.86	1.01	1.04	0.87	Middletown UVLS
UPPR LKE 60 kV	KONOCI 60KV [6861] (KONOCI6-EGLE RCK)	P2	Line Section w/o Fault	0.97	0.92	0.85	1.00	0.81	1.03	1.04	0.97	0.91	1.00	1.04	0.85	Middletown UVLS
UPPR LKE 60 kV	EGLE RCK 115KV SECTION MA	P2	Bus	0.97	0.92	0.80	0.99	0.79	1.03	1.04	0.98	0.92	1.00	1.05	0.80	Middletown UVLS
UPPR LKE 60 kV	KONOCI 60KV SECTION 1E	P2	Bus	0.98	0.95	0.90	1.00	0.86	1.02	1.04	0.99	0.95	1.00	1.04	0.90	Middletown UVLS
UPPR LKE 60 kV	EGLE RCK 60KV SECTION 1D	P2	Bus	0.97	0.92	0.85	1.00	0.81	1.03	1.04	0.97	0.91	1.00	1.04	0.85	Middletown UVLS
UPPR LKE 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	0.96	0.91	0.69	1.00	0.71	1.03	1.04	0.97	0.70	0.99	1.05	0.69	Middletown UVLS
UPPR LKE 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2	Non-bus-tie Breaker	0.97	0.92	0.80	0.99	0.79	1.03	1.04	0.98	0.92	1.00	1.05	0.80	Middletown UVLS
UPPR LKE 60 kV	EGLE RCK - MA 115KV & EAGLE RCK-FULTON-SILVERDO LINE	P2	Non-bus-tie Breaker	0.97	0.92	0.80	0.99	0.79	1.03	1.04	0.98	0.92	1.00	1.05	0.80	Middletown UVLS
UPPR LKE 60 kV	KONOCI 6 - 1E 60KV & KONOCI LINE	P2	Non-bus-tie Breaker	0.98	0.95	0.90	1.00	0.86	1.02	1.04	0.99	0.95	1.00	1.04	0.90	Middletown UVLS
WILLITS 60 kV	EGLE RCK - MA 115KV & EAGLE ROCK LINE	P2	Non-bus-tie Breaker	1.01	1.00	0.86	1.02	0.91	1.02	1.02	1.01	0.85	1.01	1.02	0.86	Middletown UVLS
WILLITS 60 kV	MENDOCNO - MA 60KV & MENDOCINO LINE (2)_Dup1	P2	Non-bus-tie Breaker	1.04	1.01	0.94	1.04	0.78	1.02	1.01	1.04	1.01	1.04	1.02	0.95	Middletown UVLS
WOODACRE 60 kV	IGNACIO 60KV [7140] (IGNACO B-WOODACRE)	P2	Line Section w/o Fault	0.97	0.96	0.88	1.00	0.86	1.09	1.10	0.92	0.94	1.04	1.11	0.86	Load power factor correction and voltage support if needed
WOODACRE 60 kV	IGNACIO 230KV SECTION 2D	P2	Bus	1.05	1.06	1.00	1.07	1.01	1.11	1.11	1.05	1.05	1.07	1.12	1.00	Switch off cap bank at Greenbrae
CALISTGA 60 kV	GEYSER16 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	G1/N1	0.87	0.87	0.86	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	0.86	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Middletown UVLS
CALPELLA 115 kV	GEYSER11 13.80KV GEN UNIT 1 & MENDOCINO 115KV [2420] MOAS OPENED ON CALPELLA_UKIAH	P3	G1/N1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.10	>0.9, <1.1	Switch off cap bank at Middletown
CLER LKE 60 kV	GEYSER16 13.80KV GEN UNIT 1 & EGLE RCK 115/60KV TB 1	P3	G1/N1	>0.9, <1.1	0.89	0.76	>0.9, <1.1	0.72	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.76	Middletown UVLS
CLER LKE 60 kV	GEYSER11 13.80KV GEN UNIT 1 & KONOCI 60KV [6861]	P3	G1/N1	>0.9, <1.1	0.89	0.75	>0.9, <1.1	0.72	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.75	Middletown UVLS

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
CORONA 115 kV	GEYSER11 13.80KV GEN UNIT 1 & CORONA LAKEVILLE 115KV [4311]	P3	G1/N1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.10	1.10	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	>0.9, <1.1	Switch off cap bank at Middletown
DUNBAR 60 kV	GEYSER16 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	G1/N1	0.90	0.89	0.88	>0.9, <1.1	0.89	>0.9, <1.1	>0.9, <1.1	0.88	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Middletown UVLS
EGLE RCK 60 kV	GEYSER16 13.80KV GEN UNIT 1 & EGLE RCK 115/60KV TB 1	P3	G1/N1	>0.9, <1.1	0.86	0.67	>0.9, <1.1	0.62	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.67	Middletown UVLS
GRANITE 60 kV	SMUDGE01 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	>0.9, <1.1	>0.9, <1.1	0.81	>0.9, <1.1	0.78	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.81	Middletown UVLS
GRANITE 60 kV	SMUDGE01 13.80KV GEN UNIT 1 & EGLE RCK 115/60KV TB 1	P3	G1/N1	>0.9, <1.1	>0.9, <1.1	0.82	>0.9, <1.1	0.78	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.81	Middletown UVLS
HARTLEY 60 kV	GEYSER11 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	>0.9, <1.1	0.90	0.78	>0.9, <1.1	0.75	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.78	Middletown UVLS
HARTLEY 60 kV	GEYSER11 13.80KV GEN UNIT 1 & EGLE RCK 115/60KV TB 1	P3	G1/N1	>0.9, <1.1	0.90	0.78	>0.9, <1.1	0.75	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.78	Middletown UVLS
KONOCTI6 60 kV	GEYSER16 13.80KV GEN UNIT 1 & EGLE RCK 115/60KV TB 1	P3	G1/N1	>0.9, <1.1	0.86	0.67	>0.9, <1.1	0.62	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.67	Middletown UVLS
KONOCTI6 60 kV	GEYSER78 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	>0.9, <1.1	0.85	0.67	>0.9, <1.1	0.62	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.67	Middletown UVLS
LOWR LKE 60 kV	GEYSER11 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	0.89	0.85	0.64	>0.9, <1.1	0.58	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.64	Middletown UVLS
LOWR LKE 60 kV	GEYSER11 13.80KV GEN UNIT 1 & EGLE RCK 115/60KV TB 1	P3	G1/N1	0.89	0.85	0.64	>0.9, <1.1	0.58	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.64	Middletown UVLS
MENDOCNO 115 kV	GEYSER11 13.80KV GEN UNIT 1 & MENDOCINO 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA	P3	G1/N1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.10	1.10	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.10	>0.9, <1.1	Switch off cap bank at Middletown
MIDDLTWN 60 kV	GEYSER11 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	0.86	0.85	0.59	>0.9, <1.1	0.53	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.59	Middletown UVLS
MIDDLTWN 60 kV	GEYSER11 13.80KV GEN UNIT 1 & EGLE RCK 115/60KV TB 1	P3	G1/N1	0.87	0.85	0.59	>0.9, <1.1	0.53	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.59	Middletown UVLS
PENNGRVE 115 kV	GEYSER11 13.80KV GEN UNIT 1 & CORONA LAKEVILLE 115KV [4311]	P3	G1/N1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.10	1.10	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.10	>0.9, <1.1	Switch off cap bank at Middletown
UPPR LKE 60 kV	GEYSER11 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	>0.9, <1.1	0.92	0.83	>0.9, <1.1	0.81	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.83	Middletown UVLS
UPPR LKE 60 kV	MONTICLO 9.11KV GEN UNIT 3 & EGLE RCK 115/60KV TB 1	P3	G1/N1	>0.9, <1.1	>0.9, <1.1	0.83	>0.9, <1.1	0.80	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.84	Middletown UVLS
ANNAPOLS 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.95	0.94	0.80	0.98	0.75	1.03	1.05	0.94	0.93	1.01	1.05	0.79	Protection Upgrade
CALISTGA 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.90	0.90	0.74	0.97	0.72	1.03	1.04	0.93	0.88	1.00	1.05	0.73	Protection Upgrade
COTATI 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.99	0.94	0.81	1.00	0.77	1.02	1.03	0.98	0.93	1.02	1.04	0.79	Protection Upgrade

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
FORT RSS 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.95	0.95	0.81	0.99	0.76	1.03	1.05	0.95	0.93	1.01	1.05	0.80	Protection Upgrade
FTCH MTN 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.96	0.96	0.84	1.01	0.82	1.02	1.03	0.99	0.95	1.01	1.03	0.83	Protection Upgrade
FULTON 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	1.00	1.00	0.87	1.03	0.84	1.04	1.04	1.02	0.99	1.04	1.04	0.86	Protection Upgrade
GUALALA 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.94	0.93	0.79	0.97	0.73	1.03	1.05	0.93	0.91	1.00	1.05	0.78	Protection Upgrade
GYSRVLE 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.95	0.95	0.83	1.00	0.81	1.02	1.03	0.98	0.93	1.01	1.03	0.82	Protection Upgrade
LAGUNA 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.98	0.95	0.82	1.00	0.78	1.03	1.03	0.98	0.94	1.02	1.04	0.80	Protection Upgrade
LAGUNATP 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.98	0.95	0.82	1.00	0.78	1.03	1.04	0.98	0.94	1.02	1.04	0.80	Protection Upgrade
MIRABEL 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.99	0.98	0.85	1.02	0.82	1.04	1.04	1.00	0.97	1.03	1.04	0.84	Protection Upgrade
MOLINO 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.97	0.96	0.82	1.00	0.79	1.03	1.04	0.98	0.95	1.02	1.04	0.81	Protection Upgrade
MONTE RO 115 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.97	0.97	0.82	1.00	0.78	1.04	1.05	0.96	0.95	1.02	1.05	0.81	Protection Upgrade
PENNGRVE 115 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.97	0.97	0.90	0.99	0.89	1.04	1.04	0.99	0.97	1.01	1.04	0.89	Protection Upgrade
PUEBLO 115 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.96	0.96	0.89	0.98	0.88	1.03	1.04	0.96	0.95	1.00	1.04	0.89	Protection Upgrade
ST.HELNA 115 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.95	0.94	0.80	1.00	0.78	1.03	1.04	0.97	0.93	1.02	1.04	0.79	Protection Upgrade
WINDSOR 60 kV	FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.97	0.97	0.84	1.01	0.82	1.03	1.03	0.99	0.96	1.02	1.03	0.83	Protection Upgrade
ALTO 60 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	1.11	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	>0.9, <1.1	Load power factor correction and voltage support if needed
ALTO 60 kV	IGNACIO 60KV [7160] & IGNACIO 60KV [7150] MOAS OPENED ON SAN_RFLJ_GREENBRE	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.86	>0.9, <1.1	0.85	>0.9, <1.1	>0.9, <1.1	0.89	0.89	>0.9, <1.1	>0.9, <1.1	0.86	Load power factor correction and voltage support if needed
ANNAPOLS 60 kV	FULTON 230/115KV TB 4 & FULTON 230/115KV TB 9	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.80	>0.9, <1.1	0.75	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.79	Load power factor correction and voltage support if needed
ANNAPOLS 60 kV	FULTON 115/60KV TB 1 & FULTON 115/60KV TB 2	P6	N-1-1	0.42	>0.9, <1.1	>0.9, <1.1	0.45	>0.9, <1.1	>0.9, <1.1	0.87	0.37	>0.9, <1.1	0.68	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
BELLVUE 115 kV	FULTON 115KV [1620] & FULTON 115KV [1630]	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.87	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.88	Load power factor correction and voltage support if needed
BELLVUE 115 kV	LAKEVILE 230/115KV TB 1 & LAKEVILE 230/115KV TB 2	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	1.11	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	>0.9, <1.1	Load power factor correction and voltage support if needed

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
BIG RIVR 60 kV	FORT BRAGG 60KV [2060] MOAS OPENED ON BIG RIVR_ELK & BIG RIVR 60.00KV ID=7H & BIG RIVR 60.00KV ID=5H & BIG RIVR 60.00KV ID=8H & BIG RIVR 60.00KV ID=V SHUNT DEVICES	P6	N-1-1	0.88	0.83	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.81	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Fort Bragg UVLS
BIG RIVR 60 kV	BIG RIVR 60.00KV ID=7H & BIG RIVR 60.00KV ID=5H & BIG RIVR 60.00KV ID=8H & BIG RIVR 60.00KV ID=V SHUNT DEVICES & FORT BRAGG 60KV [2060] MOAS OPENED ON BIG RIVR_ELK	P6	N-1-1	0.88	0.83	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.82	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
BOLINAS 60 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.13	>0.9, <1.1	Load power factor correction and voltage support if needed
CALISTGA 60 kV	FULTON-GEYSR16-GEYSR12-GEYSR14 230KV [0] MOAS OPENED ON G16T0_2_WSRDFLT & LAKEVILLE #1 60KV [7360]	P6	N-1-1	0.87	0.87	>0.9, <1.1	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	0.87	0.86	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
CALISTGA 60 kV	GEYSR17 230/13.8KV TB 1 & LAKEVILLE #1 60KV [7360]	P6	N-1-1	>0.9, <1.1	0.86	0.86	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.86	Load power factor correction and voltage support if needed
CALISTGA 60 kV	FULTON 230/115KV TB 4 & FULTON 230/115KV TB 9	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.74	>0.9, <1.1	0.72	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.88	>0.9, <1.1	>0.9, <1.1	0.73	Load power factor correction and voltage support if needed
CALISTGA 60 kV	FULTON 115/60KV TB 2 & FULTON 115/60KV TB 1	P6	N-1-1	0.39	>0.9, <1.1	>0.9, <1.1	0.45	>0.9, <1.1	>0.9, <1.1	0.87	0.37	>0.9, <1.1	0.66	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
CALPELLA 115 kV	MENDOCINO 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	0.80	0.83	0.77	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.81	>0.9, <1.1	>0.9, <1.1	0.77	Load power factor correction and voltage support if needed
CALPELLA 115 kV	MENDOCINO 115KV [2410] & MENDOCINO 115KV [2420] MOAS OPENED ON CALPELLA_UKIAH	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	>0.9, <1.1	Switch off cap bank at Middletown
CARQUINZ 115 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.14	1.14	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.14	>0.9, <1.1	Load power factor correction and voltage support if needed
CLER LKE 60 kV	MENDOCINO 60KV [7510] & EGLE RCK 115/60KV TB 1	P6	N-1-1	0.90	0.51	0.49	>0.9, <1.1	0.46	>0.9, <1.1	1.11	>0.9, <1.1	0.50	>0.9, <1.1	1.12	0.49	Middletown UVLS
CLER LKE 60 kV	CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON CLER LKE_GRANITE & EGLE RCK 115/60KV TB 1	P6	N-1-1	0.59	0.55	0.52	0.77	0.49	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.54	0.86	>0.9, <1.1	0.52	Middletown UVLS
CLER LKE 60 kV	KONOCI 60KV [6861] & CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON GRANITE_HPLND JT	P6	N-1-1	0.59	0.55	0.52	0.77	0.49	>0.9, <1.1	>0.9, <1.1	0.50	0.54	0.85	>0.9, <1.1	0.52	Middletown UVLS

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
CLOVRDLE 115 kV	GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE & MENDOCINO 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA	P6	N-1-1	0.80	0.83	0.78	>0.9, <1.1	0.88	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.80	>0.9, <1.1	>0.9, <1.1	0.78	Load power factor correction and voltage support if needed
CLOVRDLE 115 kV	KONOCITI 60KV [6861] & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.81	>0.9, <1.1	0.85	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.81	>0.9, <1.1	>0.9, <1.1	0.81	Middletown UVLS
CLVRDLJT 60 kV	GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE & MENDOCINO 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA	P6	N-1-1	0.90	>0.9, <1.1	0.88	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.89	>0.9, <1.1	>0.9, <1.1	0.88	Load power factor correction and voltage support if needed
CLVRDLJT 60 kV	KONOCITI 60KV [6861] & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.89	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.89	>0.9, <1.1	>0.9, <1.1	0.89	Middletown UVLS
CLVRDLJT 60 kV	FULTON 115/60KV TB 1 & FULTON 115/60KV TB 2	P6	N-1-1	0.74	>0.9, <1.1	>0.9, <1.1	0.76	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.73	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
CORONA 115 kV	LAKEVILLE 230/115KV TB 1 & LAKEVILLE 230/115KV TB 2	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.90	>0.9, <1.1	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	0.90	Load power factor correction and voltage support if needed
COTATI 60 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.80	>0.9, <1.1	0.77	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.79	Load power factor correction and voltage support if needed
COTATI 60 kV	FULTON 115/60KV TB 1 & FULTON 115/60KV TB 2	P6	N-1-1	0.73	>0.9, <1.1	>0.9, <1.1	0.74	>0.9, <1.1	>0.9, <1.1	0.86	0.70	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
COVELO6 60 kV	GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & MENDOCINO 60KV [7550] MOAS OPENED ON FRT BRGG_BIG RIVR	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.83	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
COVELO6 60 kV	KONOCITI 60KV [6861] & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.85	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.89	>0.9, <1.1	>0.9, <1.1	0.85	Middletown UVLS
DUNBAR 60 kV	GEYSERS #17 230KV [4770] & LAKEVILLE #1 60KV [7360]	P6	N-1-1	0.90	>0.9, <1.1	0.87	>0.9, <1.1	0.88	>0.9, <1.1	>0.9, <1.1	0.88	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.87	Load power factor correction and voltage support if needed
DUNBAR 60 kV	FULTON 60KV [6890] MOAS OPENED ON HDSBGTP1_FTCHMTNP & LAKEVILLE #1 60KV [7360]	P6	N-1-1	>0.9, <1.1	0.89	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.88	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
DUNBAR 60 kV	GEYSR17 230/13.8KV TB 1 & LAKEVILLE #1 60KV [7360]	P6	N-1-1	>0.9, <1.1	0.89	0.88	>0.9, <1.1	0.89	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.88	Load power factor correction and voltage support if needed
DUNBAR 60 kV	LAKEVILLE 230/60KV TB 3 & LAKEVILLE 230/60KV TB 5	P6	N-1-1	0.55	>0.9, <1.1	>0.9, <1.1	0.69	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.50	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
EGLE RCK 60 kV	MENDOCINO 60KV [7510] & EGLE RCK 115/60KV TB 1	P6	N-1-1	0.85	0.46	0.43	>0.9, <1.1	0.39	>0.9, <1.1	1.12	>0.9, <1.1	0.45	>0.9, <1.1	1.14	0.43	Middletown UVLS

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
EGLERCK 60 kV	EGLERCK 115/60KV TB 1 & CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON CLER LKE_GRANITE	P6	N-1-1	0.53	0.49	0.46	0.75	0.42	>0.9, <1.1	>0.9, <1.1	0.46	0.48	0.83	>0.9, <1.1	0.46	Middletown UVLS
FORTRSS 60 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.81	>0.9, <1.1	0.76	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.80	Load power factor correction and voltage support if needed
FORTRSS 60 kV	FULTON 115/60KV TB 2 & FULTON 115/60KV TB 1	P6	N-1-1	0.43	>0.9, <1.1	>0.9, <1.1	0.46	>0.9, <1.1	>0.9, <1.1	0.87	0.38	>0.9, <1.1	0.68	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
FRTBRGG 60 kV	FORT BRAGG 60KV [2060] MOAS OPENED ON BIG RIVR_ELK & BIG RIVR 60.00KV ID=7H & BIG RIVR 60.00KV ID=5H & BIG RIVR 60.00KV ID=8H & BIG RIVR 60.00KV ID=V SHUNT DEVICES	P6	N-1-1	0.89	0.85	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.83	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Fort Bragg UVLS
FTCHMTN 60 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.83	>0.9, <1.1	0.81	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.82	Load power factor correction and voltage support if needed
FTCHMTN 60 kV	FULTON 115/60KV TB 1 & FULTON 115/60KV TB 2	P6	N-1-1	0.47	>0.9, <1.1	>0.9, <1.1	0.51	>0.9, <1.1	>0.9, <1.1	0.87	0.45	>0.9, <1.1	0.71	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
FULTON 115 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.82	>0.9, <1.1	0.80	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.81	Load power factor correction and voltage support if needed
FULTON 60 kV	FULTON 115/60KV TB 1 & FULTON 115/60KV TB 2	P6	N-1-1	0.49	>0.9, <1.1	>0.9, <1.1	0.53	>0.9, <1.1	>0.9, <1.1	0.87	0.46	>0.9, <1.1	0.73	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
GARCIA 60 kV	MENDOCINO 60KV [7520] MOAS OPENED ON PHLO JCT_HPLND JT & BIG RIVR 60.00KV ID=7H & BIG RIVR 60.00KV ID=5H & BIG RIVR 60.00KV ID=8H & BIG RIVR 60.00KV ID=V SHUNT DEVICES	P6	N-1-1	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.83	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Middletown UVLS
GRANITE 60 kV	MENDOCINO 60KV [7510] & EGLERCK 115/60KV TB 1	P6	N-1-1	>0.9, <1.1	0.59	0.59	>0.9, <1.1	0.57	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.58	>0.9, <1.1	1.11	0.59	Middletown UVLS
GRANITE 60 kV	KONOCI 60KV [6861] & CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON GRANITE_HPLND JT	P6	N-1-1	0.59	0.55	0.52	0.77	0.49	>0.9, <1.1	>0.9, <1.1	0.50	0.54	0.85	>0.9, <1.1	0.52	Middletown UVLS
GREENBRE 60 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	1.11	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	>0.9, <1.1	Load power factor correction and voltage support if needed
GREENBRE 60 kV	IGNACIO 60KV [7150] MOAS OPENED ON SAN_RFLJ_GREENBRE & IGNACIO 60KV [7170]	P6	N-1-1	0.90	0.89	0.86	>0.9, <1.1	0.85	>0.9, <1.1	>0.9, <1.1	0.88	0.87	>0.9, <1.1	>0.9, <1.1	0.86	Load power factor correction and voltage support if needed
GUALALA 60 kV	FULTON 230/115KV TB 4 & FULTON 230/115KV TB 9	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.78	>0.9, <1.1	0.73	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.77	Load power factor correction and voltage support if needed
GUALALA 60 kV	FULTON 115/60KV TB 2 & FULTON 115/60KV TB 1	P6	N-1-1	0.41	>0.9, <1.1	>0.9, <1.1	0.44	>0.9, <1.1	>0.9, <1.1	0.87	0.36	>0.9, <1.1	0.67	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
GYSRVLE 60 kV	FULTON 115/60KV TB 2 & FULTON 115/60KV TB 1	P6	N-1-1	0.45	>0.9, <1.1	>0.9, <1.1	0.51	>0.9, <1.1	>0.9, <1.1	0.87	0.44	>0.9, <1.1	0.70	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
HARTLEY 60 kV	CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON CLER LKE_GRANITE & KONOCTI 60KV [6861]	P6	N-1-1	0.65	0.61	0.58	0.79	0.56	>0.9, <1.1	>0.9, <1.1	0.56	0.60	0.88	>0.9, <1.1	0.58	Middletown UVLS
HARTLEY 60 kV	EGLE RCK 115/60KV TB 1 & MENDOCINO 60KV [7510]	P6	N-1-1	0.90	0.50	0.47	>0.9, <1.1	0.45	>0.9, <1.1	1.11	>0.9, <1.1	0.49	>0.9, <1.1	1.12	0.47	Middletown UVLS
HighWAY 115 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	>0.9, <1.1	Load power factor correction and voltage support if needed
HPLND JT 60 kV	KONOCTI 60KV [6861] & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.81	>0.9, <1.1	0.85	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.82	>0.9, <1.1	>0.9, <1.1	0.81	Middletown UVLS
IGNACIO 115 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	>0.9, <1.1	Load power factor correction and voltage support if needed
KONOCTI6 60 kV	MENDOCINO 60KV [7510] & EGLE RCK 115/60KV TB 1	P6	N-1-1	0.85	0.46	0.43	>0.9, <1.1	0.39	>0.9, <1.1	1.12	>0.9, <1.1	0.45	>0.9, <1.1	1.14	0.43	Middletown UVLS
KONOCTI6 60 kV	CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON CLER LKE_GRANITE & KONOCTI 60KV [6861]	P6	N-1-1	0.53	0.50	0.45	0.75	0.42	>0.9, <1.1	>0.9, <1.1	0.45	0.48	0.83	>0.9, <1.1	0.45	Middletown UVLS
LAGUNA 60 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.82	>0.9, <1.1	0.78	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.80	Load power factor correction and voltage support if needed
LAGUNA 60 kV	FULTON 115/60KV TB 1 & FULTON 115/60KV TB 2	P6	N-1-1	0.63	>0.9, <1.1	>0.9, <1.1	0.65	>0.9, <1.1	>0.9, <1.1	0.86	0.60	>0.9, <1.1	0.81	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
LAKEVILLE 115 kV	LAKEVILE 230/115KV TB 2 & LAKEVILE 230/115KV TB 1	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.89	>0.9, <1.1	0.90	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.13	0.89	Load power factor correction and voltage support if needed
LAKEVILLE 60 kV	LAKEVILE 230/60KV TB 3 & LAKEVILE 230/60KV TB 5	P6	N-1-1	0.59	>0.9, <1.1	>0.9, <1.1	0.72	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.55	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
LOWR LKE 60 kV	MENDOCINO 60KV [7510] & EGLE RCK 115/60KV TB 1	P6	N-1-1	0.84	0.45	0.41	>0.9, <1.1	0.37	>0.9, <1.1	1.13	>0.9, <1.1	0.43	>0.9, <1.1	1.14	0.41	Middletown UVLS
LOWR LKE 60 kV	CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON CLER LKE_GRANITE & KONOCTI 60KV [6861]	P6	N-1-1	0.51	0.48	0.43	0.75	0.40	>0.9, <1.1	>0.9, <1.1	0.45	0.47	0.82	>0.9, <1.1	0.43	Middletown UVLS
LUCERNE 115 kV	MENDOCINO 115KV [2410] & MENDOCINO 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	1.11	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	>0.9, <1.1	Switch off cap bank at Middletown
LUCERNE 115 kV	KONOCTI 60KV [6861] & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.89	>0.9, <1.1	>0.9, <1.1	0.87	Middletown UVLS

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
LYTNVLE 60 kV	KONOCTI 60KV [6861] & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.86	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.90	>0.9, <1.1	>0.9, <1.1	0.86	Middletown UVLS
LYTNVLE 60 kV	LAKEVILLE 230KV [4970] & MENDOCINO 60KV [7550] MOAS OPENED ON FRT BRGG_BIG RIVR	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.84	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
MASONITE 60 kV	KONOCTI 60KV [6861] & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.86	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	0.86	Middletown UVLS
MENDOCNO 115 kV	MENDOCINO 115KV [2410] & MENDOCINO 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.10	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	>0.9, <1.1	Switch off cap bank at Middletown
MENDOCNO 115 kV	KONOCTI 60KV [6861] & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.83	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.84	>0.9, <1.1	>0.9, <1.1	0.83	Middletown UVLS
MEYERS 115 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.14	1.14	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.14	>0.9, <1.1	Load power factor correction and voltage support if needed
MIDDLTWN 60 kV	MENDOCINO 60KV [7510] & EGLE RCK 115/60KV TB 1	P6	N-1-1	0.81	0.44	0.38	>0.9, <1.1	0.34	>0.9, <1.1	1.14	>0.9, <1.1	0.42	>0.9, <1.1	1.16	0.38	Middletown UVLS
MIDDLTWN 60 kV	CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON CLER LKE_GRANITE & KONOCTI 60KV [6861]	P6	N-1-1	0.48	0.47	0.40	0.75	0.36	>0.9, <1.1	>0.9, <1.1	0.45	0.46	0.81	>0.9, <1.1	0.40	Middletown UVLS
MIRABEL 60 kV	FULTON 230/115KV TB 4 & FULTON 230/115KV TB 9	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.85	>0.9, <1.1	0.82	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.84	Load power factor correction and voltage support if needed
MIRABEL 60 kV	FULTON 115/60KV TB 2 & FULTON 115/60KV TB 1	P6	N-1-1	0.47	>0.9, <1.1	>0.9, <1.1	0.51	>0.9, <1.1	>0.9, <1.1	0.87	0.43	>0.9, <1.1	0.72	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
MOLINO 60 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.82	>0.9, <1.1	0.79	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.81	Load power factor correction and voltage support if needed
MOLINO 60 kV	FULTON 115/60KV TB 2 & FULTON 115/60KV TB 1	P6	N-1-1	0.53	>0.9, <1.1	>0.9, <1.1	0.57	>0.9, <1.1	>0.9, <1.1	0.87	0.50	>0.9, <1.1	0.76	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
MONROE1 115 kV	LAKEVILE 230/115KV TB 1 & LAKEVILE 230/115KV TB 2	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.10	1.10	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.10	>0.9, <1.1	Load power factor correction and voltage support if needed
MONTCLLO 115 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.83	>0.9, <1.1	0.81	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.82	Load power factor correction and voltage support if needed
MONTE RO 60 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.82	>0.9, <1.1	0.78	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.81	Load power factor correction and voltage support if needed
MONTE RO 60 kV	FULTON 115/60KV TB 1 & FULTON 115/60KV TB 2	P6	N-1-1	0.45	>0.9, <1.1	>0.9, <1.1	0.47	>0.9, <1.1	>0.9, <1.1	0.87	0.40	>0.9, <1.1	0.70	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
NOVATO 60 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	>0.9, <1.1	Load power factor correction and voltage support if needed

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
NRTH TWR 115 kV	IGNACIO SVD=R & NRTH TWR-OLEUM-CHRISTIE 115KV [0]	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
OLEMA 60 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.13	>0.9, <1.1	Load power factor correction and voltage support if needed
PENNGRVE 115 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.90	>0.9, <1.1	0.89	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.89	Load power factor correction and voltage support if needed
PENNGRVE 115 kV	LAKEVILE 230/115KV TB 1 & LAKEVILE 230/115KV TB 2	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	1.11	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	>0.9, <1.1	Load power factor correction and voltage support if needed
PHILO 60 kV	MENDOCINO 60KV [7520] MOAS OPENED ON PHLO JCT_HPLND JT & BIG RIVR 60.00KV ID=7H & BIG RIVR 60.00KV ID=5H & BIG RIVR 60.00KV ID=8H & BIG RIVR 60.00KV ID=V SHUNT DEVICES	P6	N-1-1	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	0.90	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.82	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	Middletown UVLS
PHILO 60 kV	KONOCI 60KV [6861] & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.88	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	0.88	Middletown UVLS
PUEBLO 115 kV	LAKEVILLE 115KV [2063] & LAKEVILLE 115KV [2070]	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.82	>0.9, <1.1	0.84	1.10	1.11	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	0.82	Load power factor correction and voltage support if needed
REDBUD 115 kV	EAGLE ROCK-REDBUD 115KV [1480] & MENDOCINO 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.10	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	>0.9, <1.1	Load power factor correction and voltage support if needed
RINCON 115 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.83	>0.9, <1.1	0.82	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.83	Load power factor correction and voltage support if needed
SAN RAFL 115 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	>0.9, <1.1	Load power factor correction and voltage support if needed
SAN_RFLJ 60 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	1.11	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	>0.9, <1.1	Load power factor correction and voltage support if needed
SAUSALTO 60 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	1.11	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	>0.9, <1.1	Load power factor correction and voltage support if needed
SAUSALTO 60 kV	IGNACIO 60KV [7160] & IGNACIO 60KV [7150] MOAS OPENED ON SAN_RFLJ_GREENBRE	P6	N-1-1	>0.9, <1.1	0.90	0.85	>0.9, <1.1	0.84	>0.9, <1.1	>0.9, <1.1	0.88	0.88	>0.9, <1.1	>0.9, <1.1	0.85	Load power factor correction and voltage support if needed
SILVERDO 115 kV	FULTON 230/115KV TB 4 & FULTON 230/115KV TB 9	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.83	>0.9, <1.1	0.82	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.82	Load power factor correction and voltage support if needed
SKAGGS 115 kV	GEYSR18-LAKEVILE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.13	1.13	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.13	>0.9, <1.1	Load power factor correction and voltage support if needed

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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
SNTA RSA 115 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.82	>0.9, <1.1	0.81	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.82	Load power factor correction and voltage support if needed
SNTA RSA 115 kV	LAKEVILLE 230/115KV TB 1 & LAKEVILLE 230/115KV TB 2	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.10	1.10	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.11	>0.9, <1.1	Load power factor correction and voltage support if needed
SONOMA 115 kV	LAKEVILLE 115KV [2063] & LAKEVILLE 115KV [2070]	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.79	>0.9, <1.1	0.81	1.11	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	0.79	Load power factor correction and voltage support if needed
SONOMA 115 kV	LAKEVILLE 230/115KV TB 2 & LAKEVILLE 230/115KV TB 1	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.89	>0.9, <1.1	0.89	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.13	0.89	Load power factor correction and voltage support if needed
ST.HELNA 60 kV	FULTON 230/115KV TB 4 & FULTON 230/115KV TB 9	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.80	>0.9, <1.1	0.78	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.79	Load power factor correction and voltage support if needed
ST.HELNA 60 kV	FULTON 115/60KV TB 2 & FULTON 115/60KV TB 1	P6	N-1-1	0.44	>0.9, <1.1	>0.9, <1.1	0.48	>0.9, <1.1	>0.9, <1.1	0.87	0.41	>0.9, <1.1	0.69	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
STAFFORD 60 kV	GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.13	>0.9, <1.1	Load power factor correction and voltage support if needed
STONY PT 115 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.84	>0.9, <1.1	0.83	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.84	Load power factor correction and voltage support if needed
TOCALOMA 60 kV	GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.13	>0.9, <1.1	Load power factor correction and voltage support if needed
UKIAH 115 kV	GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE & MENDOCINO 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA	P6	N-1-1	0.79	0.83	0.76	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.80	>0.9, <1.1	>0.9, <1.1	0.76	Load power factor correction and voltage support if needed
UPPR LKE 60 kV	EGLE RCK 115/60KV TB 1 & CLEAR LAKE-HOPLAND 60KV [6390] MOAS OPENED ON CLER LKE_GRANITE	P6	N-1-1	0.72	0.68	0.68	0.83	0.66	>0.9, <1.1	>0.9, <1.1	0.65	0.68	>0.9, <1.1	>0.9, <1.1	0.68	Middletown UVLS
WILLITS 60 kV	KONOCI 60KV [6861] & GEYSERS #3 115KV [1650] MOAS OPENED ON MPE TAP_MPE	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.87	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.90	>0.9, <1.1	>0.9, <1.1	0.88	Middletown UVLS
WINDSOR 60 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.84	>0.9, <1.1	0.82	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.83	Load power factor correction and voltage support if needed
WINDSOR 60 kV	FULTON 115/60KV TB 1 & FULTON 115/60KV TB 2	P6	N-1-1	0.47	>0.9, <1.1	>0.9, <1.1	0.51	>0.9, <1.1	>0.9, <1.1	0.87	0.45	>0.9, <1.1	0.71	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
WOHLER 60 kV	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	0.85	>0.9, <1.1	0.83	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	0.84	Load power factor correction and voltage support if needed
WOHLER 60 kV	FULTON 115/60KV TB 1 & FULTON 115/60KV TB 2	P6	N-1-1	0.48	>0.9, <1.1	>0.9, <1.1	0.51	>0.9, <1.1	>0.9, <1.1	0.87	0.44	>0.9, <1.1	0.72	>0.9, <1.1	>0.9, <1.1	Load power factor correction and voltage support if needed
WOODACRE 60 kV	GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SNTAFE & IGNACIO SVD=R	P6	N-1-1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	1.12	>0.9, <1.1	>0.9, <1.1	>0.9, <1.1	1.12	>0.9, <1.1	Load power factor correction and voltage support if needed

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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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
BELLVUE 115 kV	FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	0.99	1.02	0.87	1.01	0.87	1.03	1.04	1.04	1.02	1.02	1.04	0.88	Load power factor correction and voltage support if needed
PUEBLO 115 kV	LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 LINES	P7	DCTL	0.95	0.99	0.82	1.02	0.84	1.10	1.11	0.93	0.98	1.03	1.11	0.82	Load power factor correction and voltage support if needed
SNTA RSA 115 kV	FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	0.99	1.03	0.85	1.01	0.85	1.03	1.04	1.05	1.03	1.02	1.04	0.85	Load power factor correction and voltage support if needed
SONOMA 115 kV	LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 LINES	P7	DCTL	0.93	0.98	0.79	1.01	0.81	1.11	1.12	0.91	0.97	1.03	1.12	0.79	Load power factor correction and voltage support if needed
STONY PT 115 kV	FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	0.99	1.02	0.86	1.01	0.86	1.03	1.04	1.04	1.02	1.02	1.04	0.87	Load power factor correction and voltage support if needed

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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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
CLER LKE 60 kV	KONOCTI 60KV [6861]	P1	N-1	7	12	22	0	0	6	3	27	14	3	1	22	Load power factor correction and voltage support if needed
GRANITE 60 kV	KONOCTI 60KV [6861]	P1	N-1	6	11	18	0	0	5	3	22	12	2	1	18	Load power factor correction and voltage support if needed
HARTLEY 60 kV	KONOCTI 60KV [6861]	P1	N-1	6	11	18	0	0	5	3	23	12	3	1	18	Load power factor correction and voltage support if needed
KONOCTI6 60 kV	KONOCTI 60KV [6861]	P1	N-1	12	18	33	1	0	10	6	40	20	6	1	33	Load power factor correction and voltage support if needed
LOWR LKE 60 kV	KONOCTI 60KV [6861]	P1	N-1	13	18	35	1	0	10	6	42	20	6	1	35	Load power factor correction and voltage support if needed
MIDDLTWN 60 kV	KONOCTI 60KV [6861]	P1	N-1	13	18	38	1	0	10	6	45	20	6	1	38	Load power factor correction and voltage support if needed
UPPR LKE 60 kV	KONOCTI 60KV [6861]	P1	N-1	5	9	14	0	0	4	2	18	10	2	0	14	Load power factor correction and voltage support if needed
CALISTGA 60 kV	LAKEVILLE #1 60KV [7360]	P1	N-1	7	8	9	0	1	9	5	9	9	2	2	9	Load power factor correction and voltage support if needed
DUNBAR 60 kV	LAKEVILLE #1 60KV [7360]	P1	N-1	9	10	10	2	4	11	5	10	11	0	4	10	Load power factor correction and voltage support if needed
ST.HELNA 60 kV	LAKEVILLE #1 60KV [7360]	P1	N-1	7	8	9	0	1	9	5	8	8	2	2	9	Load power factor correction and voltage support if needed
CLER LKE 60 kV	EGLE RCK 115/60KV TB 1	P1	N-1	7	12	21	0	0	6	3	27	14	3	1	21	Load power factor correction and voltage support if needed
EGLE RCK 60 kV	EGLE RCK 115/60KV TB 1	P1	N-1	14	20	35	0	1	10	6	43	22	7	2	36	Load power factor correction and voltage support if needed
GRANITE 60 kV	EGLE RCK 115/60KV TB 1	P1	N-1	6	10	17	0	0	5	3	22	12	2	1	17	Load power factor correction and voltage support if needed
HARTLEY 60 kV	EGLE RCK 115/60KV TB 1	P1	N-1	6	11	18	0	0	5	3	23	12	2	1	18	Load power factor correction and voltage support if needed
KONOCTI6 60 kV	EGLE RCK 115/60KV TB 1	P1	N-1	12	18	32	1	0	10	6	40	20	6	1	32	Load power factor correction and voltage support if needed
LOWR LKE 60 kV	EGLE RCK 115/60KV TB 1	P1	N-1	12	18	34	1	0	10	6	42	20	6	1	34	Load power factor correction and voltage support if needed
MIDDLTWN 60 kV	EGLE RCK 115/60KV TB 1	P1	N-1	13	17	37	1	0	10	6	45	20	6	1	38	Load power factor correction and voltage support if needed
UPPR LKE 60 kV	EGLE RCK 115/60KV TB 1	P1	N-1	4	9	14	0	0	4	2	18	10	2	0	14	Load power factor correction and voltage support if needed
BIG RIVR 60 kV	BIG RIVR 60.00KV ID=7H & BIG RIVR 60.00KV ID=5H & BIG RIVR 60.00KV ID=8H & BIG RIVR 60.00KV ID=V SHUNT DEVICES	P1	N-1	7	8	5	2	1	4	5	6	9	4	1	5	Load power factor correction and voltage support if needed
KONOCTI6 60 kV	SANTA FE 13.80KV GEN UNIT 1 & EGLE RCK 115/60KV TB 1	P3	G1/N1	<8	<8	35	<8	<8	<8	<8	40	<8	<8	<8	34	Load power factor correction and voltage support if needed
CALISTGA 60 kV	GEYSER16 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	G1/N1	8	8	9	<8	<8	9	<8	9	<8	<8	<8	<8	Load power factor correction and voltage support if needed

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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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
DUNBAR 60 kV	GEYSER16 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	G1/N1	9	10	10	<8	<8	11	<8	11	<8	<8	<8	<8	Load power factor correction and voltage support if needed
ST.HELNA 60 kV	GEYSER16 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	G1/N1	<8	8	8	<8	<8	9	<8	8	<8	<8	<8	<8	Load power factor correction and voltage support if needed
CALISTGA 60 kV	GEYSER17 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	G1/N1	<8	<8	9	<8	<8	<8	<8	8	<8	<8	<8	9	Load power factor correction and voltage support if needed
BIG RIVR 60 kV	GEYSER17 13.80KV GEN UNIT 1 & BIG RIVR 60.00KV ID=7H & BIG RIVR 60.00KV ID=5H & BIG RIVR 60.00KV ID=8H & BIG RIVR 60.00KV ID=V SHUNT DEVICES	P3	G1/N1	<8	<8	<8	<8	<8	<8	<8	<8	9	<8	<8	<8	Load power factor correction and voltage support if needed
KONOCTI6 60 kV	POTTRVLY 2.40KV GEN UNIT 1 & PKONOCTI 60KV [6861]	P3	G1/N1	<8	18	34	<8	<8	10	<8	<8	<8	<8	<8	35	Load power factor correction and voltage support if needed
LOWR LKE 60 kV	POTTRVLY 2.40KV GEN UNIT 1 & PKONOCTI 60KV [6861]	P3	G1/N1	<8	18	37	<8	<8	10	<8	<8	<8	<8	<8	37	Load power factor correction and voltage support if needed
MIDDLTWN 60 kV	POTTRVLY 2.40KV GEN UNIT 1 & PKONOCTI 60KV [6861]	P3	G1/N1	13	18	40	<8	<8	10	<8	<8	<8	<8	<8	40	Load power factor correction and voltage support if needed
LOWR LKE 60 kV	POTTRVLY 2.40KV GEN UNIT 1 & PEGLE RCK 115/60KV TB 1	P3	G1/N1	<8	18	37	<8	<8	10	<8	42	<8	<8	<8	37	Load power factor correction and voltage support if needed
MIDDLTWN 60 kV	POTTRVLY 2.40KV GEN UNIT 1 & PEGLE RCK 115/60KV TB 1	P3	G1/N1	13	18	40	<8	<8	10	<8	46	<8	<8	<8	41	Load power factor correction and voltage support if needed
UPPR LKE 60 kV	POTTRVLY 2.40KV GEN UNIT 1 & PEGLE RCK 115/60KV TB 1	P3	G1/N1	<8	<8	15	<8	<8	<8	<8	18	<8	<8	<8	15	Load power factor correction and voltage support if needed
EGLE RCK 60 kV	GEO.ENGY 9.11KV GEN UNIT 1 & PEGLE RCK 115/60KV TB 1	P3	G1/N1	<8	<8	38	<8	<8	<8	<8	44	<8	<8	<8	38	Load power factor correction and voltage support if needed
GRANITE 60 kV	GEO.ENGY 9.11KV GEN UNIT 2 & PKONOCTI 60KV [6861]	P3	G1/N1	<8	<8	19	<8	<8	<8	<8	22	<8	<8	<8	19	Load power factor correction and voltage support if needed
LOWR LKE 60 kV	GEO.ENGY 9.11KV GEN UNIT 2 & PKONOCTI 60KV [6861]	P3	G1/N1	<8	<8	37	<8	<8	<8	<8	42	<8	<8	<8	37	Load power factor correction and voltage support if needed
MIDDLTWN 60 kV	GEO.ENGY 9.11KV GEN UNIT 2 & PKONOCTI 60KV [6861]	P3	G1/N1	<8	<8	41	<8	<8	<8	<8	45	<8	<8	<8	41	Load power factor correction and voltage support if needed
BIG RIVR 60 kV	GEYSR5-6 13.80KV GEN UNIT 1 & BIG RIVR 60.00KV ID=7H & BIG RIVR 60.00KV ID=5H & BIG RIVR 60.00KV ID=8H & BIG RIVR 60.00KV ID=V SHUNT DEVICES	P3	G1/N1	<8	9	<8	<8	<8	<8	<8	<8	9	<8	<8	<8	Load power factor correction and voltage support if needed
GRANITE 60 kV	GEYSER11 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	<8	11	19	<8	<8	<8	<8	22	<8	<8	<8	19	Load power factor correction and voltage support if needed
HARTLEY 60 kV	GEYSER11 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	<8	11	20	<8	<8	<8	<8	22	<8	<8	<8	20	Load power factor correction and voltage support if needed
KONOCTI6 60 kV	GEYSER11 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	12	18	35	<8	<8	<8	<8	40	<8	<8	<8	35	Load power factor correction and voltage support if needed
LOWR LKE 60 kV	GEYSER11 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	13	18	37	<8	<8	<8	<8	42	<8	<8	<8	37	Load power factor correction and voltage support if needed

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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
				2020 Summer Peak	2023 Summer Peak	2028 Summer Peak	2020 Spring Off-Peak	2023 Spring Peak	2020 Winter Peak	2023 Winter Peak	2028 Winter Peak	2023 SP High CEC Forecast	2023 SpOP Hi Renew & Min Gas Gen	2020 SP Heavy Renewable & Min Gas Gen	2028 Retirement of QF Generations	
MIDDLTWN 60 kV	GEYSER11 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	13	18	40	<8	<8	<8	<8	45	<8	<8	<8	40	Load power factor correction and voltage support if needed
UPPR LKE 60 kV	GEYSER11 13.80KV GEN UNIT 1 & KONOCTI 60KV [6861]	P3	G1/N1	<8	9	15	<8	<8	<8	<8	17	<8	<8	<8	15	Load power factor correction and voltage support if needed
EGLE RCK 60 kV	GEYSER11 13.80KV GEN UNIT 1 & EGLE RCK 115/60KV TB 1	P3	G1/N1	14	20	38	<8	<8	<8	<8	43	<8	<8	<8	38	Load power factor correction and voltage support if needed
CALISTGA 60 kV	GEYSER12 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	G1/N1	7	<8	10	<8	<8	<8	<8	9	9	<8	<8	10	Load power factor correction and voltage support if needed
DUNBAR 60 kV	GEYSER12 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	G1/N1	9	<8	10	<8	<8	<8	<8	10	12	<8	<8	10	Load power factor correction and voltage support if needed
ST.HELNA 60 kV	GEYSER12 13.80KV GEN UNIT 1 & LAKEVILLE #1 60KV [7360]	P3	G1/N1	<8	<8	9	<8	<8	<8	<8	8	8	<8	<8	9	Load power factor correction and voltage support if needed

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Transient Stability



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2020 Summer Peak	2028 Summer Peak	2023 Spring Off-Peak	2020 SP Heavy Renewable & Min Gas Gen	2023 SpOP Hi Renew & Min Gas Gen	
Bus fault at LAKEVILE 230kV	P2-2	Bus	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Internal fault at Non-bus-tie-breaker #222 at LAKEVILE 230kV	P2-3	Non-Bus-Tie Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Internal fault at Bus-tie-breaker #422 at LAKEVILE 230kV	P2-4	Bus-Tie Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
GEYSER11 Unit 1 and LAKEVILE -CR2T3_18 230kV No.1 Line	P3-2	G-1/N-1	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Breaker stuck for CB #212 protecting LAKEVILE-CR2T3_18 230kV #1 Line	P4-2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Breaker stuck for CB #282 protecting LAKEVLLE/LAKEVILE 115/230kV No.2 Transformer	P4-3	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Breaker stuck for CB #202 protecting LAKEVILE 230 kV Bus #2 SEC E	P4-5	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Breaker stuck for CB #422 protecting LAKEVILE 230kV Bus #2 SEC E	P4-6	Stuck Breaker	Stable/WECC criteria met	WECC criteria not met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Mitigation under development
LAKEVILE -CR2T3_18 230kV No.1 Line	P5-2	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
LAKEVILE/LAKEVLLE 230/115 kV No.1 Transformer	P5-3	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
LAKEVILE 230kV SEC E	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	No violation
LAKEVILE -CR2T3_18 230kV No.1 Line and TULUCAY-VACA-DIX 230kV No.1 Line	P6-1	N-1-1	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
LAKEVILE -CR2T3_18 230kV No.1 Line and IGNACIO/IGNACIO 230/115 kV No.6 Transformer	P6-2	N-1-1	Stable/WECC criteria met	WECC criteria not met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Mitigation under development
IGNACIO/IGNACIO 230/115 kV No.6 Transformer	P1-3	N-1	Stable/WECC criteria met	WECC criteria not met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Mitigation under development
LP SAMOA Unit 1 and HUMB_BS1/HUMB_G1 115/13.8 kV No.1 Transformer	P3-3	G-1/N-1	Stable/WECC criteria met	WECC criteria not met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Mitigation under development
PUEBLO 115 kV ID v SVD and BIG RIVR 60 kV ID v SVD	P6-3	N-1-1	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Breaker stuck for CB #366 protecting MENDOCNO 115 kV ID v SVD	P4-4	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
MENDOCNO 115 kV ID v SVD	P5-4	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Breaker stuck for CB #182 protecting GEYSER78 Unit 1	P4-1	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
GEYSER78 Unit 1	P5-1	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
GEYSER11 Unit 1	P1-1	N-1	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
GEYSER11 Unit 1 and GEYSER13 Unit 1	P3-1	G-1/N-1	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No violation
Fault on Fulton - Lakeville 230 kV Line and Geysers 9 - Lakeville 230 kV Line	P7-1	DCTL	Stable/WECC criteria met	WECC criteria not met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Mitigation under development

Study Area: PG&E North Coast & North Bay



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
			Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	

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
	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	

No Single Source Substation with more than 100 MW Load.