

# **APPENDIX C: Reliability Assessment Study Results**

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Note: Reliability assessment for 2025 scenarios will be re-run as part of the Policy study with Humboldt offshore wind interconnection alternatives.

Overloaded Facility	Contingency Description	Contingency Code	Category Description	Loading % (Baseline Scenarios)							Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off Peak	2028 Spring Off Peak	2035 Spring Off Peak	2025 Winter Off Peak	2025 SP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
ROUND MT 500.0 - RM_TM_21 500.0 - 2	ROUND MT-RM_DRS #1 500KV LINE	P1_2_0	L-1	130%	127%	132%	<95%	<95%	<95%	<95%	126%	<95%	128%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	TABLE MTN-RM_DRS #1 500KV LINE	P1_2_19	L-1	<95%	<95%	<95%	<95%	<95%	<95%	107%	<95%	<95%	<95%	
RM_TM_21 500.0 - FERN RD 500.0 - 2	ROUND MT-RM_DRS #1 500KV LINE	P1_2_0	L-1	115%	113%	117%	<95%	<95%	<95%	<95%	112%	<95%	113%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	ROUND MT-RM_DRS #2 500KV LINE	P1_2_20	L-1	130%	127%	132%	<95%	<95%	<95%	<95%	126%	<95%	128%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
ROUND MT 500.0 - RM_TM_11 500.0 - 1	DIABLOCNVNS GENERATOR & ROUND MT-RM_DRS #2 500KV LINE	P1_2_1	G-L/J-1	<95%	<95%	132%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	TABLE MTN-RM_DRS #2 500KV LINE	P1_2_20	L-1	<95%	<95%	<95%	<95%	<95%	<95%	107%	<95%	<95%	<95%	
RM_TM_11 500.0 - FERN RD 500.0 - 1	ROUND MT-RM_DRS #2 500KV LINE	P1_2_1	L-1	115%	113%	117%	<95%	<95%	<95%	<95%	112%	<95%	113%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	DIABLOCNVNS GENERATOR & ROUND MT-RM_DRS #2 500KV LINE	P1_2_1	G-L/J-1	<95%	<95%	132%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
TABLE MTN 500.0 - TM_VO_11 500.0 - 1	OLINDA-CAPTACK #1 500KV LINE	P1_2_19	L-1	97%	<95%	112%	<95%	<95%	<95%	<95%	105%	<95%	<95%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	TABLE MTN-TRACY #1 500KV LINE	P1_2_4	L-1	103%	96%	115%	<95%	<95%	<95%	<95%	108%	<95%	96%	
VACA-DIX 500.0 - TM_VO_12 500.0 - 1	TABLE MTN-TRACY #1 500KV LINE & TRACY-TESLA #1 500KV L	P6_1_1_13	L-L/J-1	<95%	<95%	109%	<95%	<95%	<95%	<95%	105%	<95%	<95%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	DIABLOCNVNS GENERATOR & OLINDA-TRACY #1 500KV LINE	P1_2_4	G-L/J-1	<95%	<95%	111%	<95%	<95%	<95%	<95%	104%	<95%	<95%	
TABLE MTN 500.0 - RM_TM_22 500.0 - 2	OLINDA-CAPTACK #1 500KV LINE	P1_2_19	L-1	99%	<95%	114%	<95%	<95%	<95%	<95%	107%	<95%	<95%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	OLINDA-TRACY #1 500KV LINE & OLINDA #1 500/230KV BANK	P6_1_2_37	L-L/J-1	102%	98%	117%	<95%	<95%	<95%	<95%	111%	<95%	98%	
TABLE MTN 500.0 - RM_TM_12 500.0 - 1	OLINDA-CAPTACK #1 500KV LINE & OLINDA #1 500/230KV BANK	P6_1_2_38	L-L/J-1	103%	98%	117%	<95%	<95%	<95%	<95%	111%	<95%	98%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	OLINDA-TRACY #1 500KV LINE & OLINDA #1 500/230KV BANK	P6_1_2_37	L-L/J-1	103%	98%	117%	<95%	<95%	<95%	<95%	111%	<95%	98%	
TABLE MTN 500.0 - RM_TM_12 500.0 - 1	TABLE MTN-TESLA #1 500KV LINE & TRACY-TESLA #1 500KV L	P6_1_1_13	L-L/J-1	<95%	<95%	108%	<95%	<95%	<95%	<95%	104%	<95%	<95%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	DIABLOCNVNS GENERATOR & OLINDA-CAPTACK #1 500KV LINE	P1_2_19	G-L/J-1	<95%	<95%	111%	<95%	<95%	<95%	<95%	105%	<95%	<95%	
TABLE MTN 500.0 - RM_TM_12 500.0 - 1	OLINDA-TRACY #1 500KV LINE & OLINDA #1 500/230KV BANK	P6_1_2_37	L-L/J-1	97%	<95%	107%	<95%	<95%	<95%	<95%	105%	<95%	<95%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	ROUND MT-RM_DRS #1 500KV LINE & TABLE MTN-RM_DRS #1 50	P6_1_1_79	L-L/J-1	116%	114%	138%	<95%	<95%	<95%	<95%	113%	<95%	114%	
TABLE MTN 500.0 - RM_TM_22 500.0 - 2	ROUND MT-RM_DRS #1 500KV LINE & TABLE MTN-RM_DRS #1 50	P6_1_1_77	L-L/J-1	114%	114%	138%	<95%	<95%	<95%	<95%	113%	<95%	114%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	TABLE MTN-TRACY #1 500KV LINE	P1_2_4	L-1	<95%	<95%	105%	<95%	<95%	<95%	<95%	105%	<95%	<95%	
TABLE MTN 500.0 - RM_TM_22 500.0 - 2	TABLE MTN-TESLA #1 500KV LINE & TABLE MTN-RM_DRS #1 50	P6_1_1_9	L-L/J-1	<95%	<95%	110%	<95%	<95%	<95%	<95%	109%	<95%	<95%	Higher overloads from last year due to 500KV terminal equipment derating; project to restore ratings proposed. SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	DIABLOCNVNS GENERATOR & TABLE MTN-RM_DRS #1 500KV LINE	P6_1_2_20	L-L/J-1	<95%	<95%	139%	<95%	<95%	<95%	<95%	109%	<95%	<95%	
RM_TM_22 500.0 - FERN RD 500.0 - 2	TABLE MTN-RM_DRS #1 500KV LINE	P1_2_20	L-1	106%	103%	125%	<95%	<95%	<95%	<95%	103%	<95%	104%	SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	DIABLOCNVNS GENERATOR & TABLE MTN-RM_DRS #1 500KV LINE	P1_2_20	G-L/J-1	<95%	<95%	125%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
TABLE MTN 500.0 - RM_TM_12 500.0 - 1	OLINDA-TRACY #1 500KV LINE & OLINDA #1 500/230KV BANK	P6_1_2_37	L-L/J-1	95%	<95%	105%	<95%	<95%	<95%	<95%	105%	<95%	<95%	SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	OLINDA-CAPTACK #1 500KV LINE & OLINDA #1 500/230KV BANK	P6_1_2_38	L-L/J-1	96%	<95%	107%	<95%	<95%	<95%	<95%	105%	<95%	<95%	
TABLE MTN 500.0 - RM_TM_12 500.0 - 1	OLINDA-TRACY #1 500KV LINE & OLINDA-CAPTACK #1 500KV	P6_1_1_72	L-L/J-1	96%	<95%	107%	<95%	<95%	<95%	<95%	105%	<95%	<95%	SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	TABLE MTN-RM_DRS #2 500KV LINE	P1_2_21	L-1	117%	115%	139%	<95%	<95%	<95%	<95%	114%	<95%	116%	
TABLE MTN 500.0 - RM_TM_12 500.0 - 1	TABLE MTN-TESLA #1 500KV LINE & TABLE MTN-RM_DRS #2 50	P6_1_1_10	L-L/J-1	<95%	<95%	110%	<95%	<95%	<95%	<95%	109%	<95%	<95%	SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	DIABLOCNVNS GENERATOR & TABLE MTN-RM_DRS #2 500KV LINE	P1_2_21	G-L/J-1	<95%	<95%	139%	<95%	<95%	<95%	<95%	109%	<95%	<95%	
RM_TM_12 500.0 - FERN RD 500.0 - 1	TABLE MTN-RM_DRS #2 500KV LINE	P1_2_21	L-1	106%	103%	125%	<95%	<95%	<95%	<95%	103%	<95%	104%	SPS to bypass series cap on remaining Round Mtn-Table Mtn 500KV line on overload.
	DIABLOCNVNS GENERATOR & TABLE MTN-RM_DRS #2 500KV LINE	P1_2_21	G-L/J-1	<95%	<95%	125%	<95%	<95%	<95%	<95%	<95%	<95%	<95%	
LS P235 230.0 - NEWARK D 230.0 - 1	VACA-DIX-TESLA #1 500KV LINE & TESLA-METCALF #1 500KV	P6_1_1_17	L-L/J-1	98%	99%	110%	<95%	<95%	<95%	<95%	95%	<95%	102%	Eliminate excessive 230KV loop flow by redispatching generation.
	TESLA-METCALF #1 500KV LINE & METCALF-MOSSLAND #1 500K	P6_1_1_23	L-L/J-1	103%	103%	111%	<95%	<95%	<95%	96%	<95%	<95%	102%	
CAYETANO 230.0 - USWP-JRW CT 230.0 - 1	VACA-DIX-TESLA #1 500KV LINE & TESLA-METCALF #1 500KV	P6_1_1_17	L-L/J-1	103%	100%	120%	<95%	<95%	<95%	100%	<95%	<95%	102%	Eliminate excessive 230KV loop flow by redispatching generation.
	TESLA-METCALF #1 500KV LINE & METCALF-MOSSLAND #1 500K	P6_1_1_23	L-L/J-1	98%	96%	112%	<95%	<95%	<95%	104%	<95%	<95%	97%	
NEWARK E 230.0 - HWK DIST 230.0 - 1	TESLA-METCALF #1 500KV LINE & METCALF-MOSSLAND #1 500K	P6_1_1_23	L-L/J-1	98%	96%	112%	<95%	<95%	<95%	104%	<95%	<95%	97%	Redispatch or open to prevent loop flow
	TESLA-METCALF #1 500KV LINE & METCALF-MOSSLAND #1 500K	P6_1_1_23	L-L/J-1	98%	96%	112%	<95%	<95%	<95%	104%	<95%	<95%	97%	
NWK DIST 230.0 - LS ESTRS 230.0 - 1	TESLA-METCALF #1 500KV LINE & METCALF-MOSSLAND #1 500K	P6_1_1_23	L-L/J-1	96%	96%	112%	<95%	<95%	<95%	104%	<95%	<95%	98%	Redispatch or open to prevent loop flow
	TESLA-METCALF #1 500KV LINE & METCALF-MOSSLAND #1 500K	P6_1_1_23	L-L/J-1	96%	96%	112%	<95%	<95%	<95%	104%	<95%	<95%	98%	
METCALF 500.0 - METCALF 230.0 - 13	TESLA-METCALF #1 500KV LINE & METCALF-MOSSLAND #1 500K	P6_1_1_23	L-L/J-1	96%	96%	112%	<95%	<95%	<95%	104%	<95%	<95%	98%	Increase transformer capacity.
	METCALF #11 & #12 500/230KV BANK	P6_1_2_2	L-L/J-1	116%	108%	129%	101%	114%	<95%	<95%	111%	100%	111%	
MIDWAY 500.0 - MW_WRLWIND_31 500.0 - 3	MIDWAY-VINCENT #1 500KV LINE & MIDWAY-VINCENT #2 500KV	P6_1_1_66	L-L/J-1	<95%	118%	<95%	<95%	<95%	<95%	<95%	99%	<95%	118%	Refer to south bulk result.
	MIDWAY-VINCENT #1 500KV LINE & MIDWAY-WIRLWIND #3 500K	P6_1_1_67	L-L/J-1	<95%	140%	<95%	103%	<95%	<95%	<95%	118%	105%	140%	
MIDWAY 500.0 - MW_VINCENT_21 500.0 - 2	MIDWAY-VINCENT #1 500KV LINE & MIDWAY-WIRLWIND #3 500K	P6_1_1_67	L-L/J-1	<95%	122%	<95%	<95%	<95%	<95%	<95%	104%	<95%	122%	Refer to south bulk result.
	MIDWAY-VINCENT #1 500KV LINE & MIDWAY-WIRLWIND #3 500K	P6_1_1_67	L-L/J-1	<95%	122%	<95%	<95%	<95%	<95%	<95%	104%	<95%	122%	
VINCENT 500.0 - MW_VINCENT_12 500.0 - 1	MIDWAY-VINCENT #1 500KV LINE & MIDWAY-WIRLWIND #3 500K	P6_1_1_68	L-L/J-1	<95%	122%	<95%	<95%	<95%	<95%	<95%	103%	<95%	122%	Refer to south bulk result.
	MIDWAY-VINCENT #2 500KV LINE & MIDWAY-WIRLWIND #3 500K	P6_1_1_68	L-L/J-1	<95%	122%	<95%	<95%	<95%	<95%	<95%	103%	<95%	122%	
PITTSBURG-E 230.0 - SANMATEO 230.0 - 1	VACA-DIX-TESLA #1 500KV LINE & TESLA 500/230KV	P6_2_2_13	L-L/J-1	<95%	<95%	100%	<95%	<95%	<95%	<95%	95%	<95%	<95%	Longer term solution is use of pittsburg series reactor
	TESLA 500/230KV & TESLA 500/230KV	P6_2_2_1	L-L/J-1	<95%	<95%	101%	<95%	<95%	<95%	<95%	95%	<95%	<95%	
PITTSBURG-E 230.0 - SANMATEO 230.0 - 1	TESLA #2 & #3 500/230KV BANK	P6_2_2_1	L-L/J-1	<95%	<95%	101%	<95%	<95%	<95%	<95%	95%	<95%	<95%	Longer term solution is use of pittsburg series reactor
	TESLA 500/230KV & METCALF 500/300KV	P6_2_2_16	L-L/J-1	<95%	<95%	102%	<95%	<95%	<95%	<95%	95%	<95%	<95%	
VACA-DIX 500.0 - VACA-DIX 230.0 - 1	TESLA-METCALF #1 500KV LINE	P1_2_8	L-1	<95%	<95%	100%	<95%	<95%	<95%	<95%	95%	<95%	<95%	Longer term solution is use of pittsburg series reactor
	DIABLOCNVNS GENERATOR & TESLA-METCALF #1 500KV LINE	P1_2_8	G-L/J-1	<95%	<95%	100%	<95%	<95%	<95%	<95%	95%	<95%	<95%	
COLLINSVILLE 230.0 - PITTSBURG-E 230.0 - 1	TESLA-METCALF #1 500KV LINE & TESLA 500/230KV BANK	P6_1_2_11	L-L/J-1	<95%	<95%	114%	<95%	<95%	<95%	<95%	95%	<95%	<95%	Use Pittsburg series reactor
	TESLA-METCALF #1 500KV LINE & METCALF-MOSSLAND #1 500K	P6_1_1_23	L-L/J-1	<95%	<95%	124%	<95%	<95%	<95%	<95%	95%	<95%	<95%	
PITTSBURG-E 230.0 - E. SHORE 230.0 - 1	TESLA-METCALF #1 500KV LINE & METCALF-MOSSLAND #1 500K	P6_1_1_23	L-L/J-1	<95%	<95%	109%	<95%	<95%	<95%	<95%	95%	<95%	<95%	Use Pittsburg series reactor
	TESLA-METCALF #1 500KV LINE & TESLA 500/230KV BANK	P6_1_2_11	L-L/J-1	<95%	<95%	108%	<95%	<95%	<95%	<95%	95%	<95%	<95%	
NEWARK E 230.0 - PPRASICT 230.0 - 2	TESLA-METCALF #1 500KV LINE & METCALF-MOSSLAND #1 500K	P6_1_1_23	L-L/J-1	<95%	<95%	108%	<95%	<95%	<95%	<95%	95%	<95%	<95%	Longer term solution will continue to monitor
	TESLA-METCALF #1 500KV LINE & TESLA 500/230KV BANK	P6_1_2_11	L-L/J-1	<95%	<95%	108%	<95%	<95%	<95%	<95%	95%	<95%	<95%	
COLLINSVILLE 230.0 - PITTSBURG-F 230.0 - 1														

Project Name	Asset ID	Asset Type	Asset Description	Asset Location	Asset Status	Asset Age	Asset Condition	Asset Risk	Asset Value	Asset Cost	Asset Benefit	Asset Impact	Asset Notes	
MOSSNSW 230.0 - LASAGILRICTR 230.0 - 1	TESLA-LOSABOS #1 500KV LINE & LOSABOS-GATES #3 500KV	PE 1-142	L-1/L-1	<95%	<95%	<95%	<95%	104%	<95%	<95%	<95%	<95%		
	METCALF-MOSSLAND #1 500KV LINE & MOSSLAND #500/230KV	PE 1-219	L-1/L-1	<95%	<95%	<95%	<95%	111%	<95%	<95%	<95%	<95%		
	MOSSLAND-LOSABOS #1 500KV LINE & MOSSLAND #500/230KV	PE 1-230	L-1/L-1	<95%	<95%	<95%	<95%	108%	<95%	<95%	<95%	<95%		
	TRACY-LOSABOS #1 500KV LINE & MOSSLAND-LOSABOS #1 500KV	PE 1-136	L-1/L-1	<95%	<95%	<95%	<95%	120%	103%	<95%	<95%	<95%	Generation redispach	
	MOSSLAND-LOSABOS #1 500KV LINE	PE 1-211	L-1	<95%	<95%	<95%	<95%	126%	111%	<95%	<95%	<95%		
	MOSSLAND-LOSABOS #1 500KV LINE & LOSABOS-GATES #3 50	PE 1-145	L-1/L-1	<95%	<95%	<95%	<95%	135%	113%	<95%	<95%	<95%		
	METCALF-MOSSLAND #1 500KV LINE & MOSSLAND-LOSABOS #1	PE 1-133	L-1/L-1	<95%	<95%	<95%	<95%	137%	128%	<95%	<95%	<95%		
	TRACY-LOSABOS #1 500KV LINE & MOSSLAND-LOSABOS #1 500KV	PE 1-141	L-1/L-1	<95%	<95%	<95%	<95%	156%	135%	101%	<95%	<95%		
	TESLA-LOSABOS #1 500KV LINE & MOSSLAND-LOSABOS #1 50	PE 1-141	L-1/L-1	<95%	<95%	<95%	<95%	167%	144%	108%	<95%	<95%		
	TESLA-METCALF & MOSSLAND-LOSABOS #1 500KV LINES	PE 1-1100	L-1/L-1	<95%	<95%	<95%	<95%	130%	107%	<95%	<95%	<95%	Generation redispach	
PANOCHO 230.0 - LASAGILRICTR 230.0 - 2	TRACY-LOSABOS #1 500KV LINE & MOSSLAND-LOSABOS #1 500KV	PE 1-137	L-1/L-1	<95%	<95%	<95%	<95%	101%	<95%	<95%	<95%	<95%	Generation redispach	
	TESLA-LOSABOS #1 500KV LINE & MOSSLAND-LOSABOS #1 50	PE 1-141	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
	TESLA-LOSABOS #1 500KV LINE & MOSSLAND-LOSABOS #1 50	PE 1-141	L-1/L-1	<95%	<95%	<95%	<95%	108%	<95%	<95%	<95%	<95%		
	TESLA-METCALF & MOSSLAND-LOSABOS #1 500KV LINES	PE 1-1100	L-1/L-1	<95%	<95%	<95%	<95%	131%	107%	9%	<95%	<95%		
	TRACY-LOSABOS #1 500KV LINE & MOSSLAND-LOSABOS #1 500KV	PE 1-137	L-1/L-1	<95%	<95%	<95%	<95%	101%	<95%	<95%	<95%	<95%	Generation redispach	
	TESLA-LOSABOS #1 500KV LINE & MOSSLAND-LOSABOS #1 50	PE 1-141	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
	TESLA-METCALF #1 500KV LINE & METCALF-MOSSLAND #1 500KV	PE 1-123	L-1/L-1	<95%	<95%	<95%	<95%	106%	<95%	<95%	9%	<95%	<95%	Longer term solution will continue to monitor
	TRACY-TESLA #1 500KV LINE & TRACY #1 500/230KV BANK	PE 1-241	L-1/L-1	<95%	<95%	<95%	<95%	123%	<95%	<95%	<95%	101%	<95%	Longer term solution will continue to monitor
	TRACY-TESLA #1 500KV LINE & TRACY #1 500/230KV BANK	PE 1-241	L-1/L-1	<95%	<95%	<95%	<95%	123%	<95%	<95%	<95%	100%	<95%	Longer term solution will continue to monitor
	LOSABOS-GATES #1 500KV LINE & GATES-DIABLOCNYSNS #1 500KV	PE 1-145	L-1/L-1	<95%	<95%	<95%	<95%	100%	<95%	<95%	<95%	<95%	<95%	
GATES 500.0 - GT_MW_11 500.0 - 1	DIABLOCNYSNS GENERATOR & GATES-DIABLOCNYSNS #1 500KV LIN	PE 2-15	G-1/L-1	<95%	<95%	<95%	<95%	103%	<95%	<95%	<95%	<95%	This is a series capacitor branch. Mitigate violation by closing the bypass switch. Removing overhead handled by system redispach.	
	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-DIABLOCNYSNS #1 500KV	PE 1-228	L-1/L-1	<95%	<95%	<95%	<95%	111%	<95%	<95%	<95%	<95%		
	LOSABOS-GATES #3 500KV LINE & GATES-DIABLOCNYSNS #1 500KV	PE 1-143	L-1/L-1	<95%	<95%	<95%	<95%	112%	<95%	<95%	<95%	<95%		
	GATES-DIABLOCNYSNS #1 500KV LINE	PE 2-120	L-1	<95%	<95%	<95%	<95%	117%	<95%	<95%	<95%	<95%		
	LOSABOS-MIDWAY #1 500KV LINE	PE 1-214	L-1	<95%	<95%	<95%	<95%	111%	<95%	<95%	<95%	<95%		
	MOSSLAND-LOSABOS #1 500KV LINE & LOSABOS-MIDWAY #1 500KV	PE 1-138	L-1/L-1	<95%	<95%	<95%	<95%	101%	<95%	<95%	<95%	<95%		
	LOSABOS-MIDWAY #1 500KV LINE	PE 1-214	L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%	Voltage regulation can mitigate overload	
	LOSABOS-MIDWAY #1 500KV LINE & MIDWAY #1 500/230KV B	PE 1-230	L-1/L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%		
	GATES-MIDWAY #1 500KV LINE	PE 1-214	L-1	<95%	<95%	<95%	<95%	108%	<95%	<95%	<95%	<95%		
	LOSABOS-MIDWAY #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-148	L-1/L-1	<95%	<95%	<95%	<95%	127%	<95%	<95%	<95%	<95%	Area redispach from south to northern inflows.	
GATES F 230.0 - MIDWAY-F 230.0 - 1	GATES #11 & #12 500/230KV BANK	PE 2-23	L-1/L-1	<95%	<95%	<95%	<95%	148%	<95%	<95%	100%	146%	<95%	
	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-147	L-1/L-1	<95%	<95%	<95%	<95%	165%	<95%	<95%	<95%	<95%		
	GATES-MIDWAY #1 500KV LINE	PE 2-16	L-1	<95%	<95%	<95%	<95%	110%	<95%	<95%	<95%	<95%		
	GATES #11 & #12 500/230KV BANK	PE 2-23	L-1/L-1	<95%	<95%	<95%	<95%	147%	<95%	<95%	100%	142%	<95%	
	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-147	L-1/L-1	<95%	<95%	<95%	<95%	158%	<95%	<95%	<95%	<95%	Open to avoid loop flow.	
	GATES-MIDWAY #1 500KV LINE	PE 2-16	L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%		
	LOSABOS-GATES #1 500KV LINE & GATES-MIDWAY #1 500KV L	PE 1-146	L-1/L-1	<95%	<95%	<95%	<95%	108%	<95%	<95%	<95%	<95%	SC bypass being considered as longer term solution.	
	LOSABOS-GATES #3 500KV LINE & LOSABOS-GATES #1 500KV	PE 1-139	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-147	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
	GATES-MIDWAY #1 500KV LINE	PE 2-16	L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%		
LB_MW_11 500.0 - LB_MW_12 500.0 - 1	LOSABOS-GATES #1 500KV LINE & LOSABOS-GATES #1 500KV	PE 1-139	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-147	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
	GATES-MIDWAY #1 500KV LINE	PE 2-16	L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%		
	LOSABOS-GATES #1 500KV LINE & LOSABOS-GATES #1 500KV	PE 1-139	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-147	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
	GATES-MIDWAY #1 500KV LINE	PE 2-16	L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%		
	LOSABOS-GATES #1 500KV LINE & LOSABOS-GATES #1 500KV	PE 1-139	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-147	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
	GATES-MIDWAY #1 500KV LINE	PE 2-16	L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%		
	LOSABOS-GATES #1 500KV LINE & LOSABOS-GATES #1 500KV	PE 1-139	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
PANOCHO 230.0 - GATES F 230.0 - 1	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-147	L-1/L-1	<95%	<95%	<95%	<95%	108%	<95%	<95%	<95%	<95%		
	LOSABOS-MIDWAY #1 500KV LINE & LOSABOS #1 500/230KV B	PE 1-224	L-1/L-1	<95%	<95%	<95%	<95%	101%	<95%	<95%	<95%	<95%		
	MOSSLAND-LOSABOS #1 500KV LINE & LOSABOS #1 500/230KV B	PE 1-222	L-1/L-1	<95%	<95%	<95%	<95%	108%	<95%	<95%	<95%	<95%	Area redispach	
	LOSABOS-GATES #3 500KV LINE & LOSABOS-GATES #1 500KV	PE 1-139	L-1/L-1	<95%	<95%	<95%	<95%	144%	<95%	<95%	<95%	<95%		
	MOSSLAND-LOSABOS #1 500KV LINE & LOSABOS-GATES #3 50	PE 1-145	L-1/L-1	<95%	<95%	<95%	<95%	99%	100%	<95%	<95%	<95%		
	TESLA-LOSABOS #1 500KV LINE & MOSSLAND-LOSABOS #1 50	PE 1-132	L-1/L-1	<95%	<95%	<95%	<95%	99%	100%	<95%	<95%	<95%		
	MOSSLAND-LOSABOS #1 500KV LINE & LOSABOS-MIDWAY #1 500KV	PE 1-138	L-1/L-1	<95%	<95%	<95%	<95%	101%	<95%	<95%	<95%	<95%		
	MOSSLAND-LOSABOS #1 500KV LINE & LOSABOS-GATES #1 500KV	PE 1-139	L-1/L-1	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%		
	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-147	L-1/L-1	<95%	<95%	<95%	<95%	108%	<95%	<95%	<95%	<95%		
	LOSABOS-MIDWAY #1 500KV LINE & LOSABOS #1 500/230KV B	PE 1-224	L-1/L-1	<95%	<95%	<95%	<95%	101%	<95%	<95%	<95%	<95%		
PANOCHO 230.0 - GATES F 230.0 - 2	MOSSLAND-LOSABOS #1 500KV LINE & LOSABOS #1 500/230KV B	PE 1-222	L-1/L-1	<95%	<95%	<95%	<95%	108%	<95%	<95%	<95%	<95%		
	LOSABOS-GATES #3 500KV LINE & LOSABOS-GATES #1 500KV	PE 1-139	L-1/L-1	<95%	<95%	<95%	<95%	121%	99%	<95%	<95%	<95%		
	TRACY-LOSABOS #1 500KV LINE & LOSABOS-GATES #3 500KV	PE 1-138	L-1/L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%		
	TESLA-LOSABOS #1 500KV LINE & LOSABOS-GATES #3 500KV	PE 1-145	L-1/L-1	<95%	<95%	<95%	<95%	107%	<95%	<95%	<95%	<95%		
	MOSSLAND-LOSABOS #1 500KV LINE & LOSABOS-MIDWAY #1 500KV	PE 1-138	L-1/L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%		
	MOSSLAND-LOSABOS #1 500KV LINE	PE 2-111	L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%		
	GATES #11 & #12 500/230KV BANK	PE 2-23	L-1/L-1	<95%	<95%	<95%	<95%	105%	<95%	<95%	<95%	<95%		
	MOSSLAND-LOSABOS #1 500KV LINE & LOSABOS #1 500/230KV	PE 1-222	L-1/L-1	<95%	<95%	<95%	<95%	105%	<95%	<95%	<95%	<95%	Redispach following 1st contingency.	
	TRACY-LOSABOS #1 500KV LINE & MOSSLAND-LOSABOS #1 50	PE 1-137	L-1/L-1	<95%	<95%	<95%	<95%	99%	<95%	<95%	<95%	<95%		
	TESLA-LOSABOS #1 500KV LINE & MOSSLAND-LOSABOS #1 50	PE 1-137	L-1/L-1	<95%	<95%	<95%	<95%	95%	<95%	<95%	<95%	<95%		
GATES 500.0 - LB_GT_11 500.0 - 1	MANNING-MIDWAY #2 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-150	L-1/L-1	<95%	<95%	<95%	<95%	118%	<95%	<95%	<95%	<95%		
	LOSABOS-MANNING #1 500KV LINE & LOSABOS-MIDWAY #1 500KV	PE 1-140	L-1/L-1	<95%	<95%	<95%	<95%	114%	<95%	<95%	<95%	<95%	System redispach	
	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-147	L-1/L-1	<95%	<95%	<95%	<95%	130%	<95%	<95%	<95%	<95%	System redispach	
	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-147	L-1/L-1	<95%	<95%	<95%	<95%	131%	<95%	<95%	<95%	<95%	System redispach	
	GATES-DIABLOCNYSNS #1 500KV LINE & GATES-MIDWAY #1 500KV	PE 1-147	L-1/L-1	<95%	<95%	<95%	<95%	131%	<95%	<95%	<95%	<95%	System redispach	
	GATES #1													

SANDHLWICT 230.0 - DELTAMP 230.0 - 1	TESLA-METCALF & MOSSLAND-LOSBANOS #1 500KV LINES	PG 1 1-100	L-1/L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%	<95%	Sensitivity only
	TABLE MTN-VACA-DIX #1 500KV LINE & VACA-DIX-TESLA #1 5	PG 1 1-22	L-1/L-1	<95%	<95%	<95%	<95%	<95%	<95%	108%	<95%	<95%	<95%	
TESLA E 230.0 - NEWARK D 230.0 - 1	VACA-DIX #1 & #2 500/230KV BANK	PG 2 2-1	L-1/L-1	<95%	<95%	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	System redispach
	TESLA-METCALF & MOSSLAND-LOSBANOS #1 500KV LINES	PG 1 1-100	L-1/L-1	<95%	<95%	<95%	<95%	104%	<95%	<95%	<95%	<95%	<95%	
LASAGUILAS 230.0 - LASAGUILASCTR 230.0 - 1	TESLA-LOSBANOS #1 500KV LINE & MOSSLAND-LOSBANOS #1 50	PG 1 1-41	L-1/L-1	<95%	<95%	<95%	<95%	103%	<95%	<95%	<95%	<95%	<95%	System redispach
	TESLA-METCALF & MOSSLAND-LOSBANOS #1 500KV LINES	PG 1 1-100	L-1/L-1	<95%	<95%	<95%	<95%	121%	<95%	<95%	<95%	<95%	<95%	
NEWARK 0115.0 - NRS 400 115.0 - 1	TESLA-METCALF & MOSSLAND-LOSBANOS #1 500KV LINES	PG 1 1-100	L-1/L-1	<95%	<95%	<95%	<95%	110%	<95%	<95%	<95%	<95%	<95%	System redispach
	METCALF 500.0 - MOSSLAND 500.0 - 1	PG 1 1-100	L-1/L-1	<95%	<95%	<95%	<95%	106%	<95%	<95%	<95%	<95%	<95%	
MOSSLAND 500.0 - LOSBANOS 500.0 - 1	TRACY-LOSBANOS #1 500KV LINE & TESLA-LOSBANOS #1 500KV	PG 1 1-36	L-1/L-1	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%	<95%	System redispach
	TRACY-LOSBANOS #1 500KV LINE & TESLA-LOSBANOS #1 500KV	PG 1 1-36	L-1/L-1	<95%	<95%	<95%	<95%	111%	<95%	<95%	<95%	<95%	<95%	
QUINTO_SS 230.0 - LOSBANOS 230.0 - 1	TRACY-LOSBANOS #1 500KV LINE & MOSSLAND-LOSBANOS #1 50	PG 1 1-17	L-1/L-1	<95%	<95%	<95%	<95%	117%	<95%	<95%	<95%	<95%	<95%	System redispach
	TESLA-LOSBANOS #1 500KV LINE & MOSSLAND-LOSBANOS #1 50	PG 1 1-41	L-1/L-1	<95%	<95%	<95%	<95%	100%	<95%	<95%	<95%	<95%	<95%	
TRACY 500.0 - LOSBANOS 500.0 - 1	TRACY-LOSBANOS #1 500KV LINE & TESLA-LOSBANOS #1 500KV	PG 1 1-36	L-1/L-1	<95%	<95%	<95%	<95%	141%	100%	<95%	<95%	<95%	<95%	System redispach
	TESLA-LOSBANOS #1 500KV LINE & MOSSLAND-LOSBANOS #1 50	PG 1 1-41	L-1/L-1	<95%	<95%	<95%	<95%	120%	<95%	<95%	<95%	<95%	<95%	
MIDWAY 500.0 - MN_MW_23 500.0 - 2	GATES-DIABLOCNYS #1 500KV LINE & GATES-MIDWAY #1 500	PG 1 1-56	L-1/L-1	<95%	<95%	<95%	<95%	116%	100%	<95%	<95%	<95%	<95%	System redispach
	MN_MW_21 500.0 - MANNING 500.0 - 2	PG 1 1-56	L-1/L-1	<95%	<95%	<95%	<95%	115%	<95%	<95%	<95%	<95%	<95%	
RIO OSD 230.0 - LOCKFORD 230.0 - 1	GATES-DIABLOCNYS #1 500KV LINE & GATES-MIDWAY #1 500	PG 1 1-56	L-1/L-1	<95%	<95%	<95%	<95%	109%	104%	<95%	<95%	<95%	<95%	Area/Local redispach
	TABLE MTN #5 & #6 500/230KV BANK	PG 2 2-0	L-1/L-1	<95%	<95%	<95%	<95%	109%	104%	<95%	<95%	<95%	<95%	
ATLANTC 230.0 - GOLDHILL 230.0 - 1	TABLE MTN #5 & #6 500/230KV BANK	PG 2 2-0	L-1/L-1	<95%	<95%	<95%	<95%	104%	113%	<95%	<95%	<95%	<95%	Area/Local redispach
	GOLDHILL 230.0 - LAKE 230.0 - 1	PG 2 2-0	L-1/L-1	<95%	<95%	<95%	<95%	109%	99%	<95%	<95%	<95%	<95%	
BRIGHTON 230.0 - LOCKH 230.0 - 1	TABLE MTN #5 & #6 500/230KV BANK	PG 2 2-0	L-1/L-1	<95%	<95%	<95%	<95%	107%	110%	<95%	<95%	<95%	<95%	Area/Local redispach
	EIGHT MI 230.0 - TESLA E 230.0 - 1	PG 2 2-0	L-1/L-1	<95%	<95%	<95%	<95%	111%	120%	<95%	<95%	<95%	<95%	
LAKE 230.0 - FOLSOM 230.0 - 1	TABLE MTN #5 & #6 500/230KV BANK	PG 2 2-0	L-1/L-1	<95%	<95%	<95%	<95%	107%	<95%	<95%	<95%	<95%	<95%	Area/Local redispach
	LOSBANOS 500.0 - LB_MN_21 500.0 - 2	PG 1 1-41	L-1/L-1	<95%	<95%	<95%	<95%	<95%	125%	95%	<95%	<95%	<95%	
LOSBANOS 500.0 - LB_MN_11 500.0 - 1	LOSBANOS-GATES #3 500KV LINE & LOSBANOS-MANNING #1 500	PG 1 1-42	L-1/L-1	<95%	<95%	<95%	<95%	<95%	125%	95%	<95%	<95%	<95%	System redispach
	OLUNDA-TRACY #1 500KV LINE & OLUNDA-CAPTJACK #1 500KV	PG 1 1-74	L-1/L-1	<95%	<95%	<95%	<95%	<95%	103%	<95%	<95%	<95%	<95%	
ROUND MT 500.0 - RD MT 500.0 - 1	OLUNDA-CAPTJACK #1 500KV LINE & OLUNDA #1 500/230KV BA	PG 1 1-39	L-1/L-1	<95%	<95%	<95%	<95%	<95%	103%	<95%	<95%	<95%	<95%	System redispach
	OLUNDA-TRACY #1 500KV LINE & OLUNDA #1 500/230KV BANK	PG 1 2-38	L-1/L-1	<95%	<95%	<95%	<95%	<95%	103%	95%	<95%	<95%	<95%	
ROUND MT-RM_DRS #1 500KV LINE & ROUND MT-MALIN #2 500	ROUND MT-RM_DRS #1 500KV LINE & ROUND MT-MALIN #2 500	PG 1 1-4	L-1/L-1	<95%	<95%	<95%	<95%	<95%	107%	<95%	<95%	<95%	<95%	System redispach
	ROUND MT-RM_DRS #1 500KV LINE & ROUND MT-RM_DRS #2 500	PG 1 1-0	L-1/L-1	<95%	<95%	<95%	<95%	<95%	107%	<95%	<95%	<95%	<95%	
RD MT IM 500.0 - ROUND MT 230.0 - 1	TABLE MTN-RM_DRS #1 500KV LINE & TABLE MTN-RM_DRS #2 5	PG 1 1-11	L-1/L-1	<95%	<95%	<95%	<95%	<95%	112%	<95%	<95%	<95%	<95%	System redispach
	OLUNDA-CAPTJACK #1 500KV LINE & OLUNDA #1 500/230KV BA	PG 1 2-39	L-1/L-1	<95%	<95%	<95%	<95%	<95%	102%	<95%	<95%	<95%	<95%	
FINKSWSTA 230.0 - QUINTO_SS 230.0 - 1	OLUNDA-TRACY #1 500KV LINE & OLUNDA-CAPTJACK #1 500KV	PG 1 1-74	L-1/L-1	<95%	<95%	<95%	<95%	<95%	103%	<95%	<95%	<95%	<95%	Local/Area redispach
	ROUND MT-RM_DRS #1 500KV LINE & ROUND MT-RM_DRS #2 500	PG 1 1-4	L-1/L-1	<95%	<95%	<95%	<95%	<95%	103%	<95%	<95%	<95%	<95%	
MANNING 500.0 - LB_MN_21 500.0 - 1	ROUND MT-RM_DRS #1 500KV LINE & ROUND MT-RM_DRS #2 500	PG 1 1-4	L-1/L-1	<95%	<95%	<95%	<95%	<95%	105%	<95%	<95%	<95%	<95%	System redispach
	TABLE MTN-RM_DRS #1 500KV LINE & TABLE MTN-RM_DRS #2 5	PG 1 1-11	L-1/L-1	<95%	<95%	<95%	<95%	<95%	109%	<95%	<95%	<95%	<95%	
LOSBANOS 230.0 - PANCOHR 230.0 - 2	TRACY-LOSBANOS #1 500KV LINE & TESLA-LOSBANOS #1 500KV	PG 1 1-29	L-1/L-1	<95%	<95%	<95%	<95%	<95%	104%	<95%	<95%	<95%	<95%	System redispach
	LOSBANOS-GATES #3 500KV LINE & LOSBANOS-MANNING #1 500	PG 1 1-41	L-1/L-1	<95%	<95%	<95%	<95%	<95%	111%	<95%	<95%	<95%	<95%	
MANNING 500.0 - MN_MW_21 500.0 - 2	LOSBANOS-GATES #3 500KV LINE & LOSBANOS-MANNING #2 500	PG 1 1-42	L-1/L-1	<95%	<95%	<95%	<95%	<95%	111%	<95%	<95%	<95%	<95%	System redispach
	LOSBANOS-MANNING #1 500KV LINE & LOSBANOS-MANNING #2 5	PG 1 1-43	L-1/L-1	<95%	<95%	<95%	<95%	<95%	117%	104%	<95%	<95%	<95%	
MANNING 500.0 - MN_MW_21 500.0 - 1	GATES-DIABLOCNYS #1 500KV LINE & GATES-MIDWAY #1 500	PG 1 1-59	L-1/L-1	<95%	<95%	<95%	<95%	<95%	106%	<95%	<95%	<95%	<95%	System redispach
	MW_WRLWIND_32 500.0 - WIRLWIND 500.0 - 3	PG 1 1-68	L-1/L-1	<95%	<95%	<95%	<95%	<95%	123%	<95%	<95%	<95%	<95%	





2023-2024 ISO Reliability Assessment - Preliminary Study Results

Study Area:

PG&E Bulk System

Transient Stability



Note: Reliability assessment for 2035 scenarios will be re-run as part of the Policy study with Humboldt offshore wind interconnection alternative(s).

Contingency	Category	Category Description	2025-SOP	2028-HS	2025-SOP-HighRE	2028-HS-HighCEC	Project & Potential Mitigation Solutions
P_EXT-10. PATH 66 COI TRIPLE LINE OUTAGE	P1	L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Extreme contingency; results in system separation and results in a stable island but with temporary overvoltages. COI-RAS IRAS shedding being checked.
P_EXT-11. PATH 26 TRIPLE LINE OUTAGE	P1	L-1	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Extreme contingency; results in north/south california system separation. Islanded system stable. Overvoltages occur; IRAS actions being checked for accuracy.
P_EXT-12. TABLE - VACA 500 + OTHERS	P1	L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Simulation did not proceed to completion for all scenarios - this is being investigated. This is a 500KV / 230KV corridor outage TableMn-Vaca Dix and 230KV Vaca Dixon line outages.
P_EXT-15. GATES - MIDWAY 500KV + OTHERS	P1	L-1	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	This is a common corridor outage. Brief overvoltage.
P1_2-19. MIDWAY-VINCENT #1 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Re-evaluate with increased pre-contingency var support at Monta Visa, Saratoga, etc at 230KV
P1_2-2. TABLE MTN-VACA-DIX #1 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Re-evaluate with increased pre-contingency var support at Monta Vista 230KV in 2035 scenarios
P1_2-20. MIDWAY-VINCENT #2 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Variance with P1_2-19 requires investigation
P1_2-21. MIDWAY-WIRLWIND #3 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Comparable results as P1_2-20
P1_2-3. TABLE MTN-TESLA #1 500KV LINE	P1	L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Brief overvoltage; actual event likely to be acceptable
P6_1_1-0. ROUND MT-RM_DRS #1 500KV LINE & ROUND MT-RM_DRS #2 500	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-1. ROUND MT-RM_DRS #1 500KV LINE & ROUND MT-MALIN #1 500K	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-10. TABLE MTN-TESLA #1 500KV LINE & TABLE MTN-RM_DRS #2 50	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-12. TABLE MTN-TESLA #1 500KV LINE & VACA-DIX-TESLA #1 500K	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Brief overvoltage; actual event likely to be acceptable
P6_1_1-13. TABLE MTN-TESLA #1 500KV LINE & TRACY-TESLA #1 500KV L	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	May need additional dynamic reactive support in the Bay Area
P6_1_1-14. TABLE MTN-TESLA #1 500KV LINE & TESLA-METCALF #1 500KV	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	May need additional dynamic reactive support in the Bay Area
P6_1_1-15. TABLE MTN-TESLA #1 500KV LINE & TESLA-LOSBANOS #1 500K	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	May need additional dynamic reactive support in the Bay Area
P6_1_1-22. TABLE MTN-VACA-DIX #1 500KV LINE & VACA-DIX-TESLA #1 5	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Simulation did not proceed to completion for all scenarios. Being investigated
P6_1_1-3. ROUND MT-RM_DRS #2 500KV LINE & ROUND MT-MALIN #1 500K	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-48. LOSBANOS-MIDWAY #1 500KV LINE & GATES-MIDWAY #1 500KV	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Large voltage dip. Being investigated.
P6_1_1-49. LOSBANOS-MIDWAY #1 500KV LINE & DIABLOCNYNSS-MIDWAY #2	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-50. LOSBANOS-MIDWAY #1 500KV LINE & DIABLOCNYNSS-MIDWAY #3	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-51. LOSBANOS-MIDWAY #1 500KV LINE & MIDWAY-VINCENT #1 500K	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-52. LOSBANOS-MIDWAY #1 500KV LINE & MIDWAY-VINCENT #2 500K	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-53. LOSBANOS-MIDWAY #1 500KV LINE & MIDWAY-WIRLWIND #3 500	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-54. GATES-MIDWAY #1 500KV LINE & DIABLOCNYNSS-MIDWAY #2 50	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-55. GATES-MIDWAY #1 500KV LINE & DIABLOCNYNSS-MIDWAY #3 50	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-56. GATES-MIDWAY #1 500KV LINE & MIDWAY-VINCENT #1 500KV L	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-57. GATES-MIDWAY #1 500KV LINE & MIDWAY-VINCENT #2 500KV L	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-58. GATES-MIDWAY #1 500KV LINE & MIDWAY-WIRLWIND #3 500KV	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-59. DIABLOCNYNSS-MIDWAY #2 500KV LINE & DIABLOCNYNSS-MIDWA	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-60. DIABLOCNYNSS-MIDWAY #2 500KV LINE & MIDWAY-VINCENT #1	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-61. DIABLOCNYNSS-MIDWAY #2 500KV LINE & MIDWAY-VINCENT #2	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-62. DIABLOCNYNSS-MIDWAY #2 500KV LINE & MIDWAY-WIRLWIND #3	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-63. DIABLOCNYNSS-MIDWAY #3 500KV LINE & MIDWAY-VINCENT #1	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-64. DIABLOCNYNSS-MIDWAY #3 500KV LINE & MIDWAY-VINCENT #2	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-65. DIABLOCNYNSS-MIDWAY #3 500KV LINE & MIDWAY-WIRLWIND #3	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-66. MIDWAY-VINCENT #1 500KV LINE & MIDWAY-VINCENT #2 500KV	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-67. MIDWAY-VINCENT #1 500KV LINE & MIDWAY-WIRLWIND #3 500K	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-68. MIDWAY-VINCENT #2 500KV LINE & MIDWAY-WIRLWIND #3 500K	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable



P6_1_1-7. TABLE MTN-VACA-DIX #1 500KV LINE & TABLE MTN-RM_DRS #1	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-72. OLINDA-TRACY #1 500KV LINE & OLINDA-CAPTJACK #1 500KV	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-76. ROUND MT-RM_DRS #1 500KV LINE & ROUND MT-RM_DRS #2 500	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-8. TABLE MTN-VACA-DIX #1 500KV LINE & TABLE MTN-RM_DRS #2	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_1-9. TABLE MTN-TESLA #1 500KV LINE & TABLE MTN-RM_DRS #1 50	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_2-13. TABLE MTN-VACA-DIX #1 500KV LINE & VACA-DIX #11 500/23	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Simulation did not proceed to completion for all scenarios. Being investigated
P6_1_2-2. ROUND MT-MALIN #1 500KV LINE & ROUND MT #1 500/230KV B	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Brief overvoltage; actual event likely to be acceptable
P6_1_2-30. LOSBANOS-MIDWAY #1 500KV LINE & MIDWAY #11 500/230KV B	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_2-31. GATES-MIDWAY #1 500KV LINE & MIDWAY #11 500/230KV BANK	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_2-32. DIABLOCNYNSS-MIDWAY #2 500KV LINE & MIDWAY #11 500/230	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_2-33. DIABLOCNYNSS-MIDWAY #3 500KV LINE & MIDWAY #11 500/230	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_2-34. MIDWAY-VINCENT #1 500KV LINE & MIDWAY #11 500/230KV BA	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_2-35. MIDWAY-VINCENT #2 500KV LINE & MIDWAY #11 500/230KV BA	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_2-36. MIDWAY-WIRLWIND #3 500KV LINE & MIDWAY #11 500/230KV B	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_2-38. OLINDA-CAPTJACK #1 500KV LINE & OLINDA #1 500/230KV BA	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_2-4. TABLE MTN-VACA-DIX #1 500KV LINE & TABLE MTN #5 500/23	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Brief overvoltage; actual event likely to be acceptable
P6_1_2-5. TABLE MTN-TESLA #1 500KV LINE & TABLE MTN #5 500/230KV	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Brief overvoltage; actual event likely to be acceptable
P6_1_2-8. TABLE MTN-TESLA #1 500KV LINE & TESLA #2 500/230KV BAN	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	May need additional dynamic reactive support in the Bay Area
P6_1_3-0. TABLE MTN-VACA-DIX #1 500KV LINE & TABLE MTN 500KV SHUNT	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Brief overvoltage; actual event likely to be acceptable
P6_1_3-1. TABLE MTN-TESLA #1 500KV LINE & TABLE MTN 500KV SHUNT	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_1_3-7. OLINDA-CAPTJACK #1 500KV LINE & OLINDA 500KV SHUNT	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Acceptable
P6_2_2-5. TRACY #1 & #2 500/230KV BANK	P6	L-1/L-1	no issues	Potential WECC/NERC criteria violation	no issues	Potential WECC/NERC criteria violation	Overvoltage; being investigated

2023-2024 ISO Reliability Assessment - Preliminary Study Results

Study Area: **PG&E Bulk System**

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)											Potential Mitigation Solutions	
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off Peak	2028 Spring Off Peak	2035 Spring Off Peak	2035 Winter Peak	2025 SP Heavy Renewable	2025 SOP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast	2035-SP-HalfSC		

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



**2023-2024 ISO Reliability Assessment - Preliminary Study Results**

**Study Area:** PG&E Bulk System

**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)										Potential Mitigation Solutions	
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off Peak	2028 Spring Off Peak	2035 Spring Off Peak	2035 Winter Peak	2025 SP Heavy Renewable	2025 SOP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		2035-SP-HalfSC

No single source substation with more than 100 MW

Thermal Overloads

Note: Reliability assessment for 2035 scenarios may be re-run as part of the Policy study with Humboldt offshore wind interconnection alternative(s).

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
Bridgeville - Garberville 60 kV Line (BRDGVILLE-FRUTLDJT)	P1-2A1.5_KEKAWAKA-GRBRVLE-LYTNVLE 60KV [0]	P1	N-1	115	135	NA	89	87	NA	67	63	95	67	137	Project: Garberville Area Reinforcement
Bridgeville-Cottonwood 115kV line	P1-1A1.2_HRCGENSAB 13.80KV GEN UNIT 2&P1-2A1.2_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P3	G-1/N-1	<100	<100	<100	<100	120	<100	<100	<100	<100	<100	<100	Operating solution
Garberville-Laytonville 60kV line	P1-2A1.24_BRIDGEVILLE-GARBERVILLE 60KV [8220] MOAS OPENED ON BRDGVILLE_FRUTLDJT	P1	N-1	100	104	NA	76	79	NA	88	58	99	88	105	Project: Garberville Area Reinforcement
	P5-SCA1.2_BRIDGEVILLE 115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	100	104	NA	76	79	NA	88	59	99	88	105	Project: Garberville Area Reinforcement
Humboldt - Bridgeville 115 kV Line	P1-1A1.2_HRCGENSAB 13.80KV GEN UNIT 2&P1-2A1.2_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P3	G-1/N-1	<100	<100	<100	<100	111	<100	<100	<100	<100	<100	<100	Operating solution
Humboldt Bay - Eureka 60 kV Line	P1-2A1.11_HUMBOLDT-EUREKA 60KV [7120] MOAS OPENED ON HUMBOLDT_HARRIS	P1	N-1	57	60	122	64	77	137	59	31	35	59	61	Continue to monitor
	Base Case	P0	Base Case	65	69	124	52	52	85	40	23	70	40	70	Continue to monitor
Humboldt Bay - Rio Dell Jct 60 kV Line	P1-3A1.3_BRDGVILLE 115/60KV TB 1	P1	N-1	113	118	124	100	109	85	68	37	112	68	120	Load forecast under review
	P2-2A1.1_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	112	40	63	NConv	41	16	9	41	NConv	Load forecast under review
	P2-3A1.18_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	104	111	124	94	108	85	59	29	137	59	112	Load forecast under review
	P2-3A1.19_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	104	111	124	94	108	85	59	29	136	59	112	Load forecast under review
	P2-3A1.1_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	113	NConv	NConv	NConv	33	13	NConv	NConv	Load forecast under review	
	P2-3A1.20_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	104	111	124	94	108	85	59	29	138	59	112	Load forecast under review
	P2-3A1.2_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	112	40	63	NConv	41	16	9	41	NConv	Load forecast under review
	P1-1A1.9_HMBOBAYPPA 13.80KV GEN UNIT 3&P1-3A1.3_BRDGVILLE 115/60KV TB 1	P3	G-1/N-1	NConv	NConv	112	40	63	NConv	41	16	9	41	NConv	Load forecast under review
	P5-5A.A1.1_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	113	NConv	NConv	NConv	33	13	NConv	NConv	Load forecast under review	
	P5-SCA1.1_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/R	<100	<100	<100	<100	108	<100	<100	<100	<100	<100	<100	Load forecast under review
	Keswick-Cascade 60 kV Line	P1-1A1.2_HRCGENSAB 13.80KV GEN UNIT 2&P1-2A1.2_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P3	G-1/N-1	<100	<100	<100	<100	116	<100	<100	<100	<100	<100	<100
P1-1A1.2_HRCGENSAB 13.80KV GEN UNIT 2&P1-2A1.2_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP		P3	G-1/N-1	<100	<100	<100	<100	112	<100	<100	<100	<100	<100	<100	Operating solution
Newburg-Rio Dell Tap 60 kV Line	P2-2A1.1_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	NA	67	93	NA	136	59	78	136	NConv	Project: Garberville Area Reinforcement
	P2-3A1.18_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	65	60	NA	54	60	NA	26	3	104	26	62	Sensitivity only
	P2-3A1.19_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	65	60	NA	54	60	NA	26	3	104	25	62	Sensitivity only
	P2-3A1.1_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	NA	NConv	NConv	NA	NConv	68	86	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3A1.20_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	65	60	NA	54	60	NA	26	3	104	26	62	Sensitivity only
	P2-3A1.2_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	NA	67	93	NA	136	59	78	136	NConv	Project: Garberville Area Reinforcement
	P5-5A.A1.1_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	NA	67	93	NA	136	59	78	136	NConv	Project: Garberville Area Reinforcement
P5-SCA1.1_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	NConv	NConv	NA	NConv	NConv	NA	NConv	68	86	NConv	NConv	Project: Garberville Area Reinforcement	
Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER)	P2-2A1.1_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	13	84	115	30	138	53	137	138	NConv	Project: Garberville Area Reinforcement
	P2-3A1.1_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	13	NConv	NConv	30	NConv	62	141	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3A1.2_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	13	84	115	30	138	53	137	138	NConv	Project: Garberville Area Reinforcement
	P5-5A.A1.1_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	13	84	115	30	138	53	137	138	NConv	Project: Garberville Area Reinforcement
	P5-SCA1.1_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	NConv	NConv	13	NConv	NConv	30	NConv	62	141	NConv	NConv	Project: Garberville Area Reinforcement
Rio Dell Tap 60 kV Line(SCOTIATP-RIODLLTP)	P1-1A1.2_HRCGENSAB 13.80KV GEN UNIT 2	P1	N-1	62	50	39	37	37	57	39	25	110	40	50	Sensitivity only
	P2-1A1.52_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (HRCGEN-SCOTIA)CT)	P2	Bus/Breaker	87	69	101	65	68	111	42	35	84	42	69	Continue to monitor
	P2-2A1.1_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	82	61	68	84	62	35	109	62	NConv	Project: Garberville Area Reinforcement
	P2-3A1.18_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	84	68	0	64	70	0	42	35	112	42	68	Project: Garberville Area Reinforcement
	P2-3A1.19_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	84	68	0	64	70	0	42	35	111	42	68	Project: Garberville Area Reinforcement
	P2-3A1.20_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	84	68	0	64	70	0	42	35	113	42	68	Project: Garberville Area Reinforcement
	P2-3A1.2_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	82	61	68	84	62	35	109	62	NConv	Project: Garberville Area Reinforcement
	P5-5A.A1.1_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	82	61	68	84	62	35	109	62	NConv	Project: Garberville Area Reinforcement
P5-SCA1.1_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	NConv	NConv	82	NConv	NConv	84	NConv	35	105	NConv	NConv	Project: Garberville Area Reinforcement	
Trinity-Cottonwood 115 kV Line	P1-1A1.13_HUMBOLDT2-25.250KV GEN UNIT VW&P1-2A1.3_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P3	G-1/N-1	<100	<100	<100	<100	<100	109	<100	<100	<100	<100	<100	Operating solution
Trinity-Maplecreek 60 kV Line	P5-5A.A1.1_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	52	67	89	NConv	95	41	90	95	NConv	Add Redundant Relay
	P5-SCA1.1_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	NConv	NConv	68	NConv	NConv	NConv	35	69	NConv	NConv	Add Redundant Battery	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
BRDGVILLE 115 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.98	0.94	0.90	NConv	0.83	1.05	0.78	0.83	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.96	0.96	0.98	0.96	0.98	0.97	0.96	0.96	0.81	0.95	0.96	Project: Garberville Area Reinforcement
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.98	NConv	NConv	NConv	NConv	1.05	0.77	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.86	0.84	NA	0.85	0.76	NA	0.94	1.05	0.63	0.94	0.83	Project: Garberville Area Reinforcement
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.98	0.94	0.90	NConv	0.83	1.05	0.78	0.83	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.98	0.94	0.90	NConv	0.83	1.05	0.78	0.83	NConv	Install Redundant Relay
P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.98	NConv	NConv	NConv	NConv	1.05	0.77	NConv	NConv	Install Redundant Battery	
BRDGVILLE 60 kV	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	0.93	0.93	0.95	0.94	0.96	NConv	0.94	0.97	0.88	0.94	0.93	Project: Garberville Area Reinforcement
	P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P1	N-1	0.84	0.83	NA	0.85	0.81	NA	0.94	1.03	0.86	0.94	0.83	Project: Garberville Area Reinforcement
	P1-4:A1:7:_FRT SWRD SVD=V1	P1	N-1	NA	NA	0.92	NA	NA	0.90	NA	NA	NA	NA	NA	Project: Garberville Area Reinforcement
	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (FRSTGLEN-LOW GAP1)	P2	Bus/Breaker	0.94	0.94	0.95	0.94	0.96	NConv	0.94	0.97	0.89	0.94	0.94	Project: Garberville Area Reinforcement
	P2-1:A1:52:_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (HRCGEN-SCOTIAJCT)	P2	Bus/Breaker	0.95	0.94	0.92	0.95	0.98	0.88	0.97	0.99	0.95	0.97	0.95	Project: Garberville Area Reinforcement
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.97	0.94	0.89	NConv	0.80	1.04	0.74	0.80	NConv	Project: Garberville Area Reinforcement
	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	0.93	0.93	0.95	0.94	0.96	NConv	0.95	0.97	0.88	0.94	0.93	Project: Garberville Area Reinforcement
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.84	0.82	NA	0.83	0.75	NA	0.92	1.03	0.62	0.92	0.82	Project: Garberville Area Reinforcement
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.84	0.82	NA	0.83	0.75	NA	0.93	1.03	0.63	0.93	0.82	Project: Garberville Area Reinforcement
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.96	NConv	NConv	NConv	NConv	1.04	0.73	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.84	0.82	NA	0.83	0.75	NA	0.92	1.03	0.62	0.92	0.82	Project: Garberville Area Reinforcement
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.97	0.94	0.89	NConv	0.80	1.04	0.74	0.80	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.97	0.94	0.89	NConv	0.80	1.04	0.74	0.80	NConv	Install Redundant Relay
	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.96	NConv	NConv	NConv	NConv	1.04	0.73	NConv	NConv	Install Redundant Battery
	P1-1:A1:1:_HRCGENSAB 13.80KV GEN UNIT 1	P1	N-1	0.95	0.95	0.94	0.95	0.97	0.89	0.97	1.00	0.96	0.97	0.95	continue to monitor
	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2	P1	N-1	0.95	0.95	0.94	0.95	0.97	0.89	0.97	1.00	0.90	0.97	0.95	continue to monitor
	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC NEWBURG	P1	N-1	0.88	0.87	0.95	0.88	0.89	0.94	0.93	0.99	0.82	0.93	0.87	Project: Garberville Area Reinforcement
	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	0.95	0.95	0.94	0.95	0.96	NConv	0.97	1.00	0.90	0.97	0.95	continue to monitor
	P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P1	N-1	0.91	0.90	NA	0.92	0.90	NA	0.97	1.03	0.91	0.97	0.90	project:garberville Area Reinforcement control point under review
	P1-4:A1:7:_FRT SWRD SVD=V1	P1	N-1	NA	NA	0.92	NA	NA	0.89	NA	NA	NA	NA	NA	continue to monitor
	P2-1:A1:52:_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (HRCGEN-SCOTIAJCT)	P2	Bus/Breaker	0.92	0.91	0.78	0.92	0.94	0.72	0.95	0.99	0.93	0.95	0.92	continue to monitor
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.95	0.92	0.90	NConv	0.63	1.02	0.53	0.63	NConv	Project: Garberville Area Reinforcement
	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	0.95	0.95	0.94	0.95	0.96	NConv	0.97	1.00	0.90	0.97	0.95	continue to monitor
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.91	0.90	NA	0.91	0.87	NA	0.95	1.03	0.68	0.95	0.90	project:garberville Area Reinforcement control point under review

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.91	0.90	NA	0.91	0.87	NA	0.96	1.03	0.70	0.96	0.90	project:garberville Area Reinforcement control point under review
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.95	NConv	NConv	NConv	NConv	1.02	0.51	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.91	0.90	NA	0.91	0.87	NA	0.95	1.02	0.68	0.95	0.90	project:garberville Area Reinforcement control point under review
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.95	0.92	0.90	NConv	0.63	1.02	0.53	0.63	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.95	0.92	0.90	NConv	0.63	1.02	0.53	0.63	NConv	Install Redundant Relay
	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.95	NConv	NConv	NConv	NConv	1.02	0.51	NConv	NConv	Install Redundant Battery
COVELO6 60 kv	P1-1:A1:9:_HIMBOBAYPAPA 13.80KV GEN UNIT 3&P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P3	G-1/N-1	0.89	0.88	NA	NA	NA	NA	NA	NA	NA	NA	NA	Project: Garberville Area Reinforcement
EEL RIVER JC 60 KV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.94	0.93	0.94	NConv	0.56	1.02	0.48	0.56	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.95	0.94	0.96	0.95	0.93	0.95	0.97	1.03	0.73	0.96	0.94	sensitivity only
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.95	0.94	0.96	0.95	0.93	0.95	0.98	1.03	0.74	0.98	0.94	sensitivity only
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.93	NConv	NConv	NConv	NConv	1.02	0.46	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.95	0.94	0.96	0.95	0.93	0.95	0.97	1.03	0.73	0.96	0.94	sensitivity only
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.94	0.93	0.94	NConv	0.56	1.02	0.48	0.56	NConv	Project: Garberville Area Reinforcement
	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2&P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P3	G-1/N-1	NA	NA	NA	NA	0.7162	NA	NA	NA	NA	NA	NA	Load forecast under review
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.94	0.93	0.94	NConv	0.56	1.02	0.48	0.56	NConv	Install Redundant Relay
P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.93	NConv	NConv	NConv	NConv	1.02	0.46	NConv	NConv	Install Redundant Battery	
EEL RIVER 60 KV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.93	0.93	0.93	NConv	0.55	1.02	0.48	0.55	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.94	0.94	0.95	0.95	0.92	0.95	0.97	1.02	0.72	0.96	0.93	Project: Garberville Area Reinforcement
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.94	0.94	0.95	0.95	0.92	0.95	0.98	1.02	0.74	0.97	0.93	sensitivity only
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.92	NConv	NConv	NConv	NConv	1.02	0.46	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.94	0.94	0.95	0.95	0.92	0.95	0.96	1.02	0.72	0.96	0.93	sensitivity only
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.93	0.93	0.93	NConv	0.55	1.02	0.48	0.55	NConv	Project: Garberville Area Reinforcement
	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2&P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P3	G-1/N-1	NA	NA	NA	NA	0.7104	NA	NA	NA	NA	NA	NA	Load forecast under review
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.93	0.93	0.93	NConv	0.55	1.02	0.48	0.55	NConv	Install Redundant Relay
P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.92	NConv	NConv	NConv	NConv	1.02	0.46	NConv	NConv	Install Redundant Battery	
EUREKA 60 KV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.00	0.98	1.01	NConv	0.51	1.03	0.48	0.51	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	1.02	1.02	1.02	1.03	1.03	1.02	1.01	1.03	0.83	1.00	1.02	sensitivity only
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	1.02	1.02	1.02	1.03	1.03	1.02	1.02	1.03	0.85	1.02	1.02	sensitivity only
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.99	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	1.02	1.02	1.02	1.03	1.03	1.02	1.00	1.03	0.83	1.00	1.02	sensitivity only
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.00	0.98	1.01	NConv	0.51	1.03	0.48	0.51	NConv	Project: Garberville Area Reinforcement

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2&P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P3	G-1/N-1	NA	NA	NA	NA	0.8931	NA	NA	NA	NA	NA	NA	Load forecast under review
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.00	0.98	1.01	NConv	0.51	1.03	0.48	0.51	NConv	Install Redundant Relay
	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.99	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Install Redundant Battery
EUREKA A 60 KV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.00	0.98	1.01	NConv	0.51	1.03	0.48	0.51	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	1.02	1.02	1.02	1.03	1.02	1.02	1.00	1.03	0.83	1.00	1.02	sensitivity only
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	1.02	1.02	1.02	1.03	1.03	1.02	1.02	1.03	0.85	1.01	1.02	sensitivity only
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.99	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	1.02	1.02	1.02	1.03	1.02	1.02	1.00	1.03	0.83	1.00	1.02	sensitivity only
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.00	0.98	1.01	NConv	0.51	1.03	0.48	0.51	NConv	Project: Garberville Area Reinforcement
	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2&P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P3	G-1/N-1	NA	NA	NA	NA	0.8927	NA	NA	NA	NA	NA	NA	continue to monitor
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.00	0.98	1.01	NConv	0.51	1.03	0.48	0.51	NConv	Install Redundant Relay
P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.99	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Install Redundant Battery	
	P1-1:A1:9:_HMBOBAYPPA 13.80KV GEN UNIT 3&P1-4:A1:7:_FRT SWRD SVD=V1	P3	G-1/N-1	NA	NA	0.82	NA	NA	NA	NA	NA	NA	NA	NA	continue to monitor
	Base Case	P0	Base Case	0.89	0.90	1.03	0.89	0.92	1.03	0.96	1.02	0.92	0.96	0.90	Project: Garberville Area Reinforcement
	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER IC_NEWBURG	P1	N-1	0.87	0.88	1.03	0.87	0.91	1.03	0.95	1.02	0.89	0.95	0.88	Project: Garberville Area Reinforcement
	P1-2:A1:19:_HMBOBAYPPC-HMBLT BY 60 kv Line [9999]	P1	N-1	0.89	0.90	1.03	0.89	0.90	1.03	0.96	1.02	0.92	0.96	0.90	Project: Garberville Area Reinforcement
	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115KV [1810]	P1	N-1	0.90	0.92	1.03	0.90	0.89	1.03	0.99	1.03	0.94	0.99	0.92	continue to monitor
	P1-2:A1:22:_RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA_SWNS FLT	P1	N-1	0.88	0.90	1.03	0.88	0.92	1.03	0.95	1.02	0.92	0.95	0.90	Project: Garberville Area Reinforcement
	P1-2:A1:23:_RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA_SWNS FLT (2)	P1	N-1	0.88	0.90	1.03	0.88	0.92	1.03	0.95	1.02	0.92	0.95	0.90	Project: Garberville Area Reinforcement
	P1-2:A1:24:_BRIDGEVILLE-GARBerville 60KV [6220] MOAS OPENED ON BRDGVILLE_FRUTLDT	P1	N-1	0.45	0.42	NA	0.43	0.42	NA	0.55	1.03	0.48	0.55	0.43	Project: Garberville Area Reinforcement
	P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P1	N-1	0.89	0.90	1.03	0.89	0.91	1.03	0.95	1.02	0.91	0.95	0.90	Project: Garberville Area Reinforcement
	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	0.87	0.87	1.03	0.87	0.87	NConv	0.93	1.00	0.84	0.92	0.87	Project: Garberville Area Reinforcement
	P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	0.88	0.89	1.03	0.85	0.84	0.98	0.96	1.02	0.88	0.96	0.89	Project: Garberville Area Reinforcement
	P1-2:A1:5:_KEKAWAKA-GRBRVILLE-LYTNVILLE 60KV [0]	P1	N-1	0.72	0.67	NA	0.73	0.78	NA	0.92	1.02	0.78	0.92	0.66	Project: Garberville Area Reinforcement
	P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P1	N-1	0.78	0.77	NA	0.80	0.72	NA	0.93	1.03	0.82	0.93	0.77	Project: Garberville Area Reinforcement
	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	0.88	0.89	1.03	0.85	0.84	0.98	0.96	1.02	0.88	0.96	0.89	Project: Garberville Area Reinforcement
	P1-3:A1:8:_HMBOBAYPPC 60/13.8KV TB 2	P1	N-1	0.89	0.90	1.03	0.89	0.90	1.03	0.96	1.02	0.92	0.96	0.90	Project: Garberville Area Reinforcement
	P1-4:A1:4:_HUMBOLDT 60.00KV ID=7H & HUMBOLDT 60.00KV ID=5H & HUMBOLDT 60.00KV ID=1H & HUMBOLDT 60.00KV ID=V SHUNT DEVICES	P1	N-1	0.90	0.92	1.03	0.90	0.88	1.03	0.97	1.03	0.93	0.97	0.92	Project: Garberville Area Reinforcement
	P1-4:A1:5:_GRBRVILLE 60.00KV ID=8H & GRBRVILLE 60.00KV ID=7H & GRBRVILLE 60.00KV ID=5H & GRBRVILLE 60.00KV ID=V SHUNT DEVICES	P1	N-1	0.82	0.80	0.92	0.81	0.84	0.89	0.88	0.96	0.84	0.88	0.80	Project: Garberville Area Reinforcement
	P1-4:A1:7:_FRT SWRD SVD=V1	P1	N-1	NA	NA	0.84	NA	NA	0.80	NA	NA	NA	NA	NA	continue to monitor



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
FRT SWRD 60 KV	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (FRSTGLEN-LOW GAP1)	P2	Bus/Breaker	0.87	0.88	1.03	0.87	0.86	NConv	0.93	1.00	0.84	0.92	0.88	Project: Garberville Area Reinforcement
	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	0.88	0.89	1.03	0.85	0.84	0.98	0.96	1.02	0.88	0.96	0.89	Project: Garberville Area Reinforcement
	P2-1:A1:52:_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (HRCGEN-SCOTIAJCT)	P2	Bus/Breaker	0.88	0.89	1.01	0.88	0.90	0.93	0.95	1.02	0.91	0.95	0.89	Project: Garberville Area Reinforcement
	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	0.88	0.89	1.03	0.85	0.84	0.98	0.96	1.02	0.88	0.96	0.89	Project: Garberville Area Reinforcement
	P2-2:A1:13:_HMBOBAYPPC 13.8KV SECTION 1D	P2	Bus/Breaker	0.89	0.90	1.03	0.89	0.90	1.03	0.96	1.02	0.92	0.96	0.90	Project: Garberville Area Reinforcement
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.03	0.87	0.82	NConv	0.81	1.03	0.70	0.81	NConv	Project: Garberville Area Reinforcement
	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	0.87	0.87	1.03	0.87	0.87	NConv	0.93	1.00	0.84	0.92	0.87	Project: Garberville Area Reinforcement
	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.77	0.74	NA	0.76	0.61	NA	0.90	1.03	0.58	0.90	0.74	Project: Garberville Area Reinforcement
	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.77	0.74	NA	0.76	0.61	NA	0.91	1.03	0.58	0.91	0.74	Project: Garberville Area Reinforcement
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	1.03	NConv	NConv	NConv	NConv	1.03	0.69	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.77	0.74	NA	0.76	0.61	NA	0.90	1.03	0.57	0.89	0.74	Project: Garberville Area Reinforcement
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.03	0.87	0.82	NConv	0.81	1.03	0.70	0.81	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.03	0.87	0.82	NConv	0.81	1.03	0.70	0.81	NConv	Install Redundant Relay
	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.03	NConv	NConv	NConv	NConv	1.03	0.69	NConv	NConv	Install Redundant Battery
	P5-5C:A1:2:_BRIDGEVILLE 115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	0.45	0.42	NA	0.43	0.42	NA	0.55	1.03	0.48	0.55	0.42	Install Redundant Battery
	P7-1:A1:2:_HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	0.88	NA	1.03	0.85	NA	NA	0.96	NA	0.88	0.96	NA	Project: Garberville Area Reinforcement
P7-1:A1:6:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	P7	DCTL	0.88	NA	1.03	0.88	NA	NA	0.96	NA	0.92	0.96	NA	Project: Garberville Area Reinforcement	
P1-1:A1:9:_HMBOBAYPPA 13.80KV GEN UNIT 3&P1-4:A1:7:_FRT SWRD SVD=V1	P3	G-1/N-1	NA	NA	0.83	NA	NA	NA	NA	NA	NA	NA	NA	continue to monitor	
Base Case	P0	Base Case	0.90	0.90	0.98	0.89	0.92	0.98	0.95	1.01	0.92	0.95	0.90	Project: Garberville Area Reinforcement	
P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC NEWBURG	P1	N-1	0.88	0.88	0.98	0.87	0.91	0.98	0.94	1.01	0.89	0.94	0.88	Project: Garberville Area Reinforcement	
P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115KV [1810]	P1	N-1	0.91	0.91	0.98	0.90	0.89	0.98	0.99	1.03	0.95	0.99	0.91	continue to monitor	
P1-2:A1:22:_RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA_SWNS FLT	P1	N-1	0.89	0.89	0.98	0.88	0.92	0.98	0.95	1.01	0.92	0.95	0.89	Project: Garberville Area Reinforcement	
P1-2:A1:23:_RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA_SWNS FLT (2)	P1	N-1	0.89	0.89	0.98	0.88	0.92	0.98	0.95	1.01	0.92	0.95	0.89	Project: Garberville Area Reinforcement	
P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVLE_FRUTLDT	P1	N-1	0.44	0.40	NA	0.41	0.40	NA	0.54	1.03	0.48	0.54	0.41	Project: Garberville Area Reinforcement	
P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P1	N-1	0.90	0.89	0.98	0.89	0.91	0.97	0.94	1.01	0.91	0.94	0.89	Project: Garberville Area Reinforcement	
P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	0.88	0.87	0.98	0.87	0.87	NConv	0.92	0.99	0.84	0.92	0.87	Project: Garberville Area Reinforcement	
P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	0.88	0.89	0.98	0.85	0.84	0.92	0.95	1.01	0.89	0.95	0.89	Project: Garberville Area Reinforcement	
P1-2:A1:5:_KEKAWAKA-GRBRVLE-LYTNVLE 60KV [0]	P1	N-1	0.75	0.71	NA	0.76	0.81	NA	0.92	1.01	0.81	0.92	0.70	Project: Garberville Area Reinforcement	
P1-3:A1:3:_BRDGVLE 115/60KV TB 1	P1	N-1	0.79	0.77	NA	0.79	0.72	NA	0.92	1.03	0.82	0.92	0.77	Project: Garberville Area Reinforcement	
P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	0.88	0.89	0.98	0.85	0.84	0.92	0.95	1.01	0.89	0.95	0.89	Project: Garberville Area Reinforcement	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
FRUITLND 60 kV	P1-4:A1:4:_HUMBOLDT 60.00KV ID=7H & HUMBOLDT 60.00KV ID=5H & HUMBOLDT 60.00KV ID=1H & HUMBOLDT 60.00KV ID=V SHUNT DEVICES	P1	N-1	0.91	0.92	0.98	0.90	0.89	0.98	0.96	1.03	0.94	0.96	0.92	Project: Garberville Area Reinforcement
	P1-4:A1:5:_GRBRVLE 60.00KV ID=8H & GRBRVLE 60.00KV ID=7H & GRBRVLE 60.00KV ID=5H & GRBRVLE 60.00KV ID=V SHUNT DEVICES	P1	N-1	0.84	0.82	0.89	0.82	0.85	0.86	0.89	0.96	0.86	0.89	0.82	Project: Garberville Area Reinforcement
	P1-4:A1:7:_FRT SWRD SVD=v1	P1	N-1	NA	NA	0.85	NA	NA	0.81	NA	NA	NA	NA	NA	continue to monitor
	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115KV [1110] [FRSTGLEN-LOW GAP1]	P2	Bus/Breaker	0.88	0.88	0.98	0.87	0.87	NConv	0.92	0.99	0.85	0.92	0.88	Project: Garberville Area Reinforcement
	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	0.88	0.89	0.98	0.85	0.84	0.92	0.95	1.01	0.89	0.95	0.89	Project: Garberville Area Reinforcement
	P2-1:A1:52:_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (HRCGEN-SCOTIAJCT)	P2	Bus/Breaker	0.89	0.89	0.94	0.88	0.91	0.88	0.95	1.01	0.92	0.95	0.89	Project: Garberville Area Reinforcement
	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	0.88	0.89	0.98	0.85	0.84	0.92	0.95	1.01	0.89	0.95	0.89	Project: Garberville Area Reinforcement
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.98	0.87	0.82	NConv	0.80	1.03	0.70	0.80	NConv	Project: Garberville Area Reinforcement
	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	0.88	0.87	0.98	0.87	0.87	NConv	0.92	0.99	0.84	0.92	0.87	Project: Garberville Area Reinforcement
	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.78	0.74	NA	0.76	0.62	NA	0.90	1.03	0.58	0.89	0.74	Project: Garberville Area Reinforcement
	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.78	0.74	NA	0.76	0.62	NA	0.90	1.03	0.59	0.90	0.74	Project: Garberville Area Reinforcement
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.98	NConv	NConv	NConv	NConv	1.03	0.69	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.78	0.74	NA	0.76	0.62	NA	0.90	1.03	0.58	0.89	0.74	Project: Garberville Area Reinforcement
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.98	0.87	0.82	NConv	0.80	1.03	0.70	0.80	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.98	0.87	0.82	NConv	0.80	1.03	0.70	0.80	NConv	Install Redundant Relay
	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.98	NConv	NConv	NConv	NConv	1.03	0.69	NConv	NConv	Install Redundant Battery
	P5-5C:A1:2:_BRIDGEVILLE 115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	0.44	0.40	NA	0.41	0.40	NA	0.54	1.03	0.48	0.54	0.41	Install Redundant Battery
	P7-1:A1:2:_HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	0.88	NA	0.98	0.85	NA	NA	0.95	NA	0.88	0.95	NA	Project: Garberville Area Reinforcement
P7-1:A1:6:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	P7	DCTL	0.90	NA	0.98	0.88	NA	NA	0.95	NA	0.92	0.95	NA	Project: Garberville Area Reinforcement	
P1-1:A1:9:_HMBOBAYPPA 13.80KV GEN UNIT 3&P1-4:A1:7:_FRT SWRD SVD=v1	P3	G-1/N-1	NA	NA	0.81	NA	NA	NA	NA	NA	NA	NA	NA	Project: Garberville Area Reinforcement	
Base Case	P0	Base Case	0.89	0.91	1.01	0.88	0.91	1.01	0.96	1.03	0.92	0.96	0.91	Project: Garberville Area Reinforcement	
P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2	P1	N-1	0.89	0.91	1.01	0.88	0.91	1.01	0.96	1.03	0.90	0.96	0.91	Project: Garberville Area Reinforcement	
P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC_NEWBURG	P1	N-1	0.87	0.89	1.01	0.87	0.90	1.01	0.96	1.03	0.89	0.96	0.88	Project: Garberville Area Reinforcement	
P1-2:A1:19:_HMBOBAYPPC-HMBLBT BY 60 kV Line [9999]	P1	N-1	0.89	0.91	1.01	0.88	0.89	1.01	0.96	1.03	0.92	0.96	0.91	Project: Garberville Area Reinforcement	
P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115KV [1810]	P1	N-1	0.90	0.92	1.01	0.90	0.88	1.01	0.99	1.03	0.94	0.99	0.92	Project: Garberville Area Reinforcement	
P1-2:A1:22:_RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA_SWNS FLT	P1	N-1	0.88	0.90	1.01	0.88	0.91	1.01	0.96	1.03	0.92	0.96	0.90	Project: Garberville Area Reinforcement	
P1-2:A1:23:_RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA_SWNS FLT (2)	P1	N-1	0.88	0.90	1.01	0.88	0.91	1.01	0.96	1.03	0.92	0.96	0.90	Project: Garberville Area Reinforcement	
P1-2:A1:24:_BRIDGEVILLE-GARBerville 60KV [6220] MOAS OPENED ON BRDGVLE_FRUTLDT	P1	N-1	0.47	0.44	NA	0.45	0.44	NA	0.57	1.03	0.50	0.57	0.45	Project: Garberville Area Reinforcement	
P1-2:A1:25:_BRIDGEVILLE-GARBerville 60KV [6220] MOAS OPENED ON FTSWRDJT_GRBRVLE	P1	N-1	0.54	0.54	NA	0.53	0.52	NA	0.95	1.03	0.58	0.95	0.54	Project: Garberville Area Reinforcement	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
GRBRVLE 60 KV	P1-2:A1:2:_HUMBOLDT-TRINITY 115KV [1820] MOAS OPENED ON TRINITY_JESSTAP	P1	N-1	0.89	0.90	1.01	0.88	0.90	1.00	0.96	1.03	0.91	0.96	0.90	Project: Garberville Area Reinforcement
	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	0.87	0.87	1.00	0.87	0.85	NConv	0.93	1.02	0.83	0.93	0.87	Project: Garberville Area Reinforcement
	P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	0.87	0.89	1.01	0.85	0.83	0.95	0.96	1.03	0.88	0.96	0.89	Project: Garberville Area Reinforcement
	P1-2:A1:5:_KEKAWAKA-GRBRVLE-LYTNVLE 60KV [0]	P1	N-1	0.67	0.63	NA	0.69	0.75	NA	0.92	1.03	0.75	0.92	0.62	Project: Garberville Area Reinforcement
	P1-3:A1:3:_BRDGVLE 115/60KV TB 1	P1	N-1	0.78	0.77	NA	0.79	0.72	NA	0.93	1.03	0.82	0.93	0.77	Project: Garberville Area Reinforcement
	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	0.87	0.89	1.01	0.85	0.83	0.95	0.96	1.03	0.88	0.96	0.89	Project: Garberville Area Reinforcement
	P1-3:A1:8:_HMBOBAYPPC 60/13.8KV TB 2	P1	N-1	0.89	0.91	1.01	0.88	0.89	1.01	0.96	1.03	0.92	0.96	0.91	Project: Garberville Area Reinforcement
	P1-4:A1:4:_HUMBOLDT 60.00KV ID=7H & HUMBOLDT 60.00KV ID=5H & HUMBOLDT 60.00KV ID=1H & HUMBOLDT 60.00KV ID=V SHUNT DEVICES	P1	N-1	0.90	0.92	1.01	0.89	0.88	1.01	0.97	1.03	0.93	0.97	0.92	Project: Garberville Area Reinforcement
	P1-4:A1:5:_GRBRVLE 60.00KV ID=8H & GRBRVLE 60.00KV ID=7H & GRBRVLE 60.00KV ID=5H & GRBRVLE 60.00KV ID=V SHUNT DEVICES	P1	N-1	0.79	0.78	0.85	0.78	0.81	0.82	0.87	0.95	0.81	0.87	0.78	Load forecast under review
	P1-4:A1:7:_FRT SWRD SVD=V1	P1	N-1	NA	NA	0.83	NA	NA	0.78	NA	NA	NA	NA	NA	continue to monitor
	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (FRSTGLEN-LOW GAP1)	P2	Bus/Breaker	0.87	0.87	1.01	0.87	0.85	NConv	0.93	1.02	0.84	0.93	0.87	Project: Garberville Area Reinforcement
	P2-1:A1:3:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	0.87	0.89	1.01	0.85	0.83	0.95	0.96	1.03	0.88	0.96	0.89	Project: Garberville Area Reinforcement
	P2-1:A1:52:_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (HRCGEN-SCOTIAJCT)	P2	Bus/Breaker	0.88	0.89	0.97	0.88	0.90	0.90	0.96	1.03	0.91	0.96	0.89	Project: Garberville Area Reinforcement
	P2-2:A1:11:_HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	0.87	0.89	1.01	0.85	0.83	0.95	0.96	1.03	0.88	0.96	0.89	Project: Garberville Area Reinforcement
	P2-2:A1:13:_HMBOBAYPPC 13.8KV SECTION 1D	P2	Bus/Breaker	0.89	0.91	1.01	0.88	0.89	1.01	0.96	1.03	0.92	0.96	0.91	Project: Garberville Area Reinforcement
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.01	0.87	0.81	NConv	0.82	1.03	0.71	0.82	NConv	Project: Garberville Area Reinforcement
	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	0.87	0.87	1.00	0.87	0.85	NConv	0.93	1.02	0.83	0.93	0.87	Project: Garberville Area Reinforcement
	P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.76	0.73	NA	0.75	0.59	NA	0.90	1.03	0.58	0.90	0.73	Project: Garberville Area Reinforcement
	P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.76	0.73	NA	0.75	0.59	NA	0.91	1.03	0.58	0.91	0.73	Project: Garberville Area Reinforcement
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	1.01	NConv	NConv	NConv	NConv	1.03	0.70	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.76	0.73	NA	0.75	0.59	NA	0.90	1.03	0.58	0.90	0.73	Project: Garberville Area Reinforcement
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.01	0.87	0.81	NConv	0.82	1.03	0.71	0.82	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	0.87	0.81	NConv	0.82	1.03	0.71	0.82	NConv	Project: Garberville Area Reinforcement
	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	NConv	NConv	NConv	NConv	1.03	0.70	NConv	NConv	Project: Garberville Area Reinforcement
	P5-5C:A1:2:_BRIDGEVILLE 115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	0.47	0.44	NA	0.45	0.44	NA	0.57	1.03	0.50	0.57	0.45	Project: Garberville Area Reinforcement
	P7-1:A1:2:_HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	0.87	NA	1.01	0.85	NA	NA	0.96	NA	0.88	0.96	NA	Project: Garberville Area Reinforcement
	P7-1:A1:6:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	P7	DCTL	0.88	NA	1.01	0.87	NA	NA	0.96	NA	0.92	0.96	NA	Project: Garberville Area Reinforcement
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.01	0.98	1.02	NConv	0.51	1.03	0.48	0.51	NConv	Project: Garberville Area Reinforcement
P2-3:A1:18:_BRDGVLE 115KV - RING R3 & R2	P2	Bus/Breaker	1.03	1.03	1.03	1.03	1.04	1.03	1.01	1.03	0.85	1.01	1.03	sensitivity only	
P2-3:A1:19:_BRDGVLE 115KV - RING R1 & R2	P2	Bus/Breaker	1.03	1.03	1.03	1.03	1.04	1.03	1.03	1.03	0.86	1.03	1.03	sensitivity only	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast		
HARRIS 60 kV	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.99	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Project: Garberville Area Reinforcement	
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	1.03	1.03	1.03	1.03	1.04	1.03	1.01	1.03	0.85	1.01	1.03	sensitivity only	
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.01	0.98	1.02	NConv	0.51	1.03	0.48	0.51	NConv	Project: Garberville Area Reinforcement	
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	0.98	1.02	NConv	0.51	1.03	0.48	0.51	NConv	Project: Garberville Area Reinforcement	
HARRISST 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.00	0.98	1.02	NConv	0.51	1.03	0.48	0.51	NConv	Project: Garberville Area Reinforcement	
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	1.03	1.03	1.03	1.03	1.04	1.03	1.01	1.03	0.85	1.01	1.03	sensitivity only	
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	1.03	1.03	1.03	1.03	1.04	1.03	1.03	1.03	0.86	1.03	1.03	sensitivity only	
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.99	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Project: Garberville Area Reinforcement	
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	1.03	1.03	1.03	1.03	1.04	1.03	1.01	1.03	0.85	1.01	1.03	sensitivity only	
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.00	0.98	1.02	NConv	0.51	1.03	0.48	0.51	NConv	Project: Garberville Area Reinforcement	
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.00	0.98	1.02	NConv	0.51	1.03	0.48	0.51	NConv	Install Redundant Relay	
HMBLT BY 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.01	0.98	1.01	NConv	0.52	1.03	0.48	0.52	NConv	Project: Garberville Area Reinforcement	
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	1.01	1.01	1.03	1.02	1.02	1.02	1.00	1.03	0.82	1.00	1.01	sensitivity only	
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	1.01	1.01	1.03	1.02	1.02	1.02	1.01	1.03	0.83	1.01	1.01	sensitivity only	
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	1.00	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Project: Garberville Area Reinforcement	
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	1.01	1.01	1.03	1.02	1.02	1.02	1.00	1.03	0.81	1.00	1.01	sensitivity only	
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.01	0.98	1.01	NConv	0.52	1.03	0.48	0.52	NConv	Project: Garberville Area Reinforcement	
	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2&P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P3	G-1/N-1	NA	NA	NA	NA	0.87	NA	NA	NA	NA	NA	NA	NA	Load forecast under review
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	0.98	1.01	NConv	0.52	1.03	0.48	0.52	NConv	Project: Garberville Area Reinforcement	
HMBOBAYPPA 60 kV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.01	0.98	1.01	NConv	0.52	1.03	0.48	0.52	NConv	Project: Garberville Area Reinforcement	
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	1.01	1.01	1.03	1.02	1.02	1.02	1.00	1.03	0.82	1.00	1.01	sensitivity only	
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	1.01	1.01	1.03	1.02	1.02	1.02	1.01	1.03	0.83	1.01	1.01	sensitivity only	
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	1.01	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Project: Garberville Area Reinforcement	
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	1.01	1.01	1.03	1.02	1.02	1.02	1.00	1.03	0.81	1.00	1.01	sensitivity only	
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.01	0.98	1.01	NConv	0.52	1.03	0.48	0.52	NConv	Project: Garberville Area Reinforcement	
	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2&P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P3	G-1/N-1	NA	NA	NA	NA	0.87	NA	NA	NA	NA	NA	NA	continue to monitor	
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	0.98	1.01	NConv	0.52	1.03	0.48	0.52	NConv	Project: Garberville Area Reinforcement	
	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Project: Garberville Area Reinforcement	
P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.98	0.98	0.99	0.98	0.99	0.99	0.96	0.96	0.81	0.95	0.98	sensitivity only		

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast		
HMBOBAYPPB 115 KV	P2-3:A1:19: BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.98	0.98	0.99	0.98	0.99	0.99	0.97	0.96	0.82	0.97	0.98	sensitivity only	
	P2-3:A1:20: BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.98	0.98	0.99	0.98	0.99	0.99	0.96	0.96	0.81	0.95	0.98	sensitivity only	
HMBOBAYPPC 60 KV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.01	0.98	1.01	NConv	0.52	1.03	0.48	0.52	NConv	Project: Garberville Area Reinforcement	
	P2-3:A1:18: BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	1.01	1.01	1.03	1.02	1.02	1.02	1.00	1.03	0.82	1.00	1.01	sensitivity only	
	P2-3:A1:19: BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	1.01	1.01	1.03	1.02	1.02	1.02	1.01	1.03	0.83	1.01	1.01	sensitivity only	
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	1.01	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Project: Garberville Area Reinforcement	
	P2-3:A1:20: BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	1.01	1.01	1.03	1.02	1.02	1.02	1.00	1.03	0.81	1.00	1.01	sensitivity only	
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.01	0.98	1.01	NConv	0.52	1.03	0.48	0.52	NConv	Project: Garberville Area Reinforcement	
	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2&P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P3	G-1/N-1	NA	NA	NA	NA	0.87	NA	NA	NA	NA	NA	NA	NA	continue to monitor
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	0.98	1.01	NConv	0.52	1.03	0.48	0.52	NConv	Project: Garberville Area Reinforcement	
P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Project: Garberville Area Reinforcement		
HOOPA 60 KV	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60KV [7130] MOAS OPENED ON HUMBOLDT_MPLE CRK	P1	N-1	0.68	1.02	1.02	0.73	1.02	1.02	0.84	1.03	0.80	0.84	1.02	Project: Garberville Area Reinforcement	
	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	0.93	1.02	1.02	0.95	1.02	NConv	0.96	1.03	0.90	0.96	1.02	continue to monitor	
	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (FRSTGLEN-LOW GAP1)	P2	Bus/Breaker	0.93	1.02	1.02	0.95	1.02	NConv	0.96	1.03	0.90	0.95	1.02	continue to monitor	
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.01	0.88	0.96	NConv	0.48	1.03	0.45	0.48	NConv	Project: Garberville Area Reinforcement	
	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	0.93	1.02	1.02	0.95	1.02	NConv	0.96	1.03	0.89	0.96	1.02	continue to monitor	
	P2-3:A1:18: BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.93	1.02	1.02	0.95	1.01	1.02	0.95	1.03	0.78	0.94	1.02	sensitivity only	
	P2-3:A1:19: BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.93	1.02	1.02	0.95	1.02	1.02	0.96	1.03	0.79	0.96	1.02	sensitivity only	
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.97	NConv	NConv	NConv	NConv	1.03	0.40	NConv	NConv	Project: Garberville Area Reinforcement	
	P2-3:A1:20: BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.93	1.02	1.02	0.95	1.01	1.02	0.95	1.03	0.77	0.94	1.02	sensitivity only	
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.01	0.88	0.96	NConv	0.48	1.03	0.45	0.48	NConv	Project: Garberville Area Reinforcement	
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	0.88	0.96	NConv	0.48	1.03	0.45	0.48	NConv	Project: Garberville Area Reinforcement	
	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.97	NConv	NConv	NConv	NConv	1.03	0.40	NConv	NConv	Project: Garberville Area Reinforcement	
HRCGEN 60 KV	P1-1:A1:1:_HRCGENSAB 13.80KV GEN UNIT 1	P1	N-1	0.94	0.94	0.94	0.95	0.96	0.89	0.97	1.00	0.95	0.97	0.94	continue to monitor	
	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2	P1	N-1	0.94	0.94	0.94	0.95	0.96	0.89	0.97	1.00	0.85	0.97	0.94	continue to monitor	
	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC_NEWBURG	P1	N-1	0.89	0.88	0.96	0.89	0.90	0.94	0.94	1.00	0.81	0.94	0.88	Project: Garberville Area Reinforcement	
	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	0.95	0.95	0.95	0.96	0.96	NConv	0.97	1.01	0.89	0.97	0.95	continue to monitor	
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.96	0.93	0.91	NConv	0.66	1.02	0.52	0.66	NConv	Project: Garberville Area Reinforcement	
	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	0.95	0.95	0.95	0.96	0.96	NConv	0.97	1.01	0.89	0.97	0.95	continue to monitor	
	P2-3:A1:18: BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.92	0.92	NA	0.93	0.89	NA	0.96	1.03	0.68	0.96	0.92	continue to monitor	
	P2-3:A1:19: BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.92	0.92	NA	0.93	0.89	NA	0.97	1.03	0.69	0.97	0.92	continue to monitor	
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.96	NConv	NConv	NConv	NConv	1.02	0.50	NConv	NConv	Project: Garberville Area Reinforcement	
	P2-3:A1:20: BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.92	0.92	NA	0.93	0.89	NA	0.96	1.03	0.67	0.96	0.92	continue to monitor	
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.96	0.93	0.91	NConv	0.66	1.02	0.52	0.66	NConv	Project: Garberville Area Reinforcement	
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.96	0.93	0.91	NConv	0.66	1.02	0.52	0.66	NConv	Project: Garberville Area Reinforcement	
P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.96	NConv	NConv	NConv	NConv	1.02	0.50	NConv	NConv	Project: Garberville Area Reinforcement		

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
HUMBOLDT 115 KV	P2-3:A1:18_ BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.96	0.96	0.98	0.96	0.98	0.97	0.94	0.96	0.79	0.94	0.96	sensitivity only
	P2-3:A1:19_ BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.96	0.96	0.98	0.96	0.98	0.97	0.95	0.96	0.81	0.95	0.96	sensitivity only
	P2-3:A1:20_ BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.96	0.96	0.98	0.96	0.98	0.97	0.94	0.96	0.79	0.94	0.96	sensitivity only
HUMBOLDT 60 KV	P2-2:A1:1_ HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.01	0.98	1.02	NConv	0.52	1.03	0.48	0.52	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:18_ BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	1.03	1.03	1.03	1.03	1.04	1.03	1.02	1.03	0.85	1.01	1.03	sensitivity only
	P2-3:A1:19_ BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	1.03	1.03	1.03	1.03	1.04	1.03	1.03	1.03	0.86	1.03	1.03	sensitivity only
	P2-3:A1:1_ HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.99	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20_ BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	1.03	1.03	1.03	1.03	1.04	1.03	1.02	1.03	0.85	1.01	1.03	sensitivity only
	P2-3:A1:2_ HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.01	0.98	1.02	NConv	0.52	1.03	0.48	0.52	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1_ HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	0.98	1.02	NConv	0.52	1.03	0.48	0.52	NConv	Install Redundant Relay
	P5-5C:A1:1_ HUMBOLDT 115KV BATT(Failure of Non-Redundant BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.99	NConv	NConv	NConv	NConv	1.03	0.45	NConv	NConv	Install Redundant Battery
KEKAWAKA 60 KV	Base Case	P0	Base Case	0.90	0.92	0.96	0.90	0.92	0.97	0.97	1.03	0.93	0.97	0.92	Project: Garberville Area Reinforcement
	P1-2:A1:16_ HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC NEWBURG	P1	N-1	0.88	0.90	0.96	0.88	0.91	0.97	0.96	1.03	0.90	0.96	0.90	Project: Garberville Area Reinforcement
	P1-2:A1:1_ HUMBOLDT-BRIDGEVILLE 115KV [1810]	P1	N-1	0.91	0.93	0.96	0.91	0.89	0.97	0.99	1.03	0.94	0.99	0.93	Load forecast under review
	P1-2:A1:22_ RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA SWNS FLT	P1	N-1	0.89	0.92	0.96	0.90	0.92	0.97	0.96	1.03	0.93	0.96	0.92	Project: Garberville Area Reinforcement
	P1-2:A1:23_ RIO DELL JCT-BRIDGEVILLE 60KV [7850] MOAS OPENED ON CARLOTTA SWNS FLT (2)	P1	N-1	0.89	0.91	0.96	0.90	0.92	0.97	0.96	1.03	0.93	0.96	0.91	Project: Garberville Area Reinforcement
	P1-2:A1:24_ BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVILLE FRUTLDT	P1	N-1	0.52	0.50	0.96	0.51	0.50	0.97	0.61	1.03	0.55	0.61	0.50	Project: Garberville Area Reinforcement
	P1-2:A1:25_ BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON FTSWRDIT GRBRVLE	P1	N-1	0.58	0.58	0.96	0.58	0.57	0.97	0.95	1.03	0.62	0.95	0.58	Project: Garberville Area Reinforcement
	P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	0.88	0.88	0.96	0.88	0.86	NConv	0.93	1.01	0.84	0.93	0.88	Project: Garberville Area Reinforcement
	P1-2:A1:4_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	0.89	0.90	0.96	0.86	0.84	0.97	0.97	1.03	0.89	0.97	0.90	Project: Garberville Area Reinforcement
	P1-3:A1:3_ BRDGVILLE 115/60KV TB 1	P1	N-1	0.80	0.79	0.96	0.82	0.74	0.97	0.94	1.03	0.83	0.94	0.79	Project: Garberville Area Reinforcement
	P1-3:A1:4_ HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	0.89	0.90	0.96	0.86	0.84	0.97	0.97	1.03	0.89	0.97	0.90	Project: Garberville Area Reinforcement
	P1-4:A1:4_ HUMBOLDT 60.00KV ID=7H & HUMBOLDT 60.00KV ID=5H & HUMBOLDT 60.00KV ID=1H & HUMBOLDT 60.00KV ID=V SHUNT DEVICES	P1	N-1	0.91	0.93	0.96	0.91	0.89	0.97	0.97	1.03	0.94	0.97	0.93	continue to monitor
	P1-4:A1:5_ GRBRVLE 60.00KV ID=8H & GRBRVLE 60.00KV ID=7H & GRBRVLE 60.00KV ID=5H & GRBRVLE 60.00KV ID=V SHUNT DEVICES	P1	N-1	0.82	0.81	0.96	0.81	0.83	0.97	0.89	0.96	0.84	0.89	0.80	Project: Garberville Area Reinforcement
	P2-1:A1:2_ BRIDGEVILLE-COTTONWOOD 115KV [1110] (FRSTGLEN-LOW GAP1)	P2	Bus/Breaker	0.88	0.88	0.96	0.88	0.86	NConv	0.93	1.01	0.85	0.93	0.88	Project: Garberville Area Reinforcement
	P2-1:A1:3_ HUMBOLDT BAY-HUMBOLDT #1 115KV [1800] (HMBOBAYPPB-HUMBOLDT)	P2	Bus/Breaker	0.89	0.90	0.96	0.86	0.84	0.97	0.97	1.03	0.89	0.97	0.90	Project: Garberville Area Reinforcement
	P2-1:A1:52_ PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (HRCGEN-SCOTIACT)	P2	Bus/Breaker	0.89	0.90	0.96	0.89	0.91	0.97	0.96	1.03	0.92	0.96	0.90	Project: Garberville Area Reinforcement
	P2-2:A1:11_ HMBOBAYPPB 13.8KV SECTION 1D	P2	Bus/Breaker	0.89	0.90	0.96	0.86	0.85	0.97	0.97	1.03	0.90	0.97	0.90	Project: Garberville Area Reinforcement
	P2-2:A1:1_ HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.96	0.88	0.83	NConv	0.84	1.03	0.74	0.84	NConv	Project: Garberville Area Reinforcement
	P2-2:A1:2_ LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	0.88	0.88	0.96	0.88	0.86	NConv	0.93	1.01	0.84	0.93	0.88	Project: Garberville Area Reinforcement
	P2-3:A1:18_ BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.78	0.75	0.96	0.78	0.62	0.97	0.91	1.03	0.62	0.90	0.75	Project: Garberville Area Reinforcement
P2-3:A1:19_ BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.78	0.75	0.96	0.78	0.62	0.97	0.91	1.03	0.62	0.91	0.75	Project: Garberville Area Reinforcement	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.96	NConv	NConv	NConv	NConv	1.03	0.74	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.78	0.75	0.96	0.78	0.62	0.97	0.91	1.03	0.62	0.90	0.75	Project: Garberville Area Reinforcement
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.96	0.88	0.83	NConv	0.84	1.03	0.74	0.84	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.96	0.88	0.83	NConv	0.84	1.03	0.74	0.84	NConv	Install Redundant Relay
	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.96	NConv	NConv	NConv	NConv	1.03	0.74	NConv	NConv	Install Redundant Battery
	P5-5C:A1:2:_BRIDGEVILLE 115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.52	0.50	0.96	0.51	0.50	0.97	0.61	1.03	0.55	0.61	0.50	Install Redundant Battery
	P7-1:A1:2:_HUMBOLDT BAY & HUMBOLDT BAY LINES	P7	DCTL	0.89	NA	0.96	0.86	NA	NA	0.97	NA	0.89	0.97	NA	Project: Garberville Area Reinforcement
P7-1:A1:6:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	P7	DCTL	0.90	NA	0.96	0.89	NA	NA	0.97	NA	0.93	0.97	NA	Project: Garberville Area Reinforcement	
LOW GAP1 115 KV	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.98	0.96	0.92	NConv	0.87	1.05	0.83	0.87	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.98	NConv	NConv	NConv	NConv	1.05	0.82	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.98	0.96	0.92	NConv	0.87	1.05	0.83	0.87	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.98	0.96	0.92	NConv	0.87	1.05	0.83	0.87	NConv	Install Redundant Relay
	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.98	NConv	NConv	NConv	NConv	1.05	0.82	NConv	NConv	Install Redundant Battery
LYTNVILLE 60 KV	P1-1:A1:9:_HMBOBAYPPA 13.80KV GEN UNIT 3&P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P3	G-1/N-1	0.90	0.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	Project: Garberville Area Reinforcement
MPLE CRK 60 KV	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60KV [7130] MOAS OPENED ON HUMBOLDT_MPLE CRK	P1	N-1	0.76	1.02	1.02	0.79	1.02	1.02	0.88	1.03	0.86	0.88	1.03	Project: Garberville Area Reinforcement
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.01	0.93	0.97	NConv	0.53	1.03	0.51	0.53	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.99	1.02	1.02	1.00	1.02	1.03	0.99	1.03	0.84	0.98	1.02	sensitivity only
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.99	1.02	1.02	1.00	1.02	1.03	1.00	1.03	0.85	1.00	1.02	sensitivity only
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.97	NConv	NConv	NConv	NConv	1.03	0.46	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.99	1.02	1.02	1.00	1.02	1.03	0.99	1.03	0.84	0.98	1.02	sensitivity only
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.01	0.93	0.97	NConv	0.53	1.03	0.51	0.53	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	0.93	0.97	NConv	0.53	1.03	0.51	0.53	NConv	Install Redundant Relay
P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.97	NConv	NConv	NConv	NConv	1.03	0.46	NConv	NConv	Install Redundant Battery	
NEWBURG 60 KV	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC_NEWBURG	P1	N-1	0.86	0.85	NA	0.86	0.87	NA	0.92	0.98	0.80	0.92	0.85	Project: Garberville Area Reinforcement
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.91	0.92	0.91	NConv	0.58	1.01	0.49	0.58	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.93	0.92	0.93	0.93	0.90	0.93	0.96	1.02	0.71	0.96	0.92	sensitivity only
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.93	0.92	0.93	0.93	0.90	0.93	0.97	1.02	0.72	0.97	0.92	sensitivity only
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.90	NConv	NConv	NConv	NConv	1.01	0.47	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.93	0.92	0.93	0.93	0.90	0.93	0.96	1.02	0.70	0.95	0.92	sensitivity only
P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.91	0.92	0.91	NConv	0.58	1.01	0.49	0.58	NConv	Project: Garberville Area Reinforcement	



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.91	0.92	0.91	NConv	0.58	1.01	0.49	0.58	NConv	Install Redundant Relay
	P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.90	NConv	NConv	NConv	NConv	1.01	0.47	NConv	NConv	Install Redundant Battery
PCLUMBER 60 KV	P1-1:A1:1:_HRCGENSAB 13.80KV GEN UNIT 1	P1	N-1	0.95	0.95	0.94	0.95	0.97	0.89	0.97	1.00	0.96	0.97	0.95	continue to monitor
	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2	P1	N-1	0.95	0.95	0.94	0.95	0.97	0.89	0.97	1.00	0.90	0.97	0.95	continue to monitor
	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC NEWBURG	P1	N-1	0.88	0.87	0.95	0.88	0.89	0.94	0.93	0.99	0.82	0.93	0.87	Project: Garberville Area Reinforcement
	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	0.95	0.95	0.94	0.95	0.96	NConv	0.97	1.00	0.90	0.97	0.95	continue to monitor
	P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P1	N-1	0.91	0.90	NA	0.92	0.90	NA	0.97	1.03	0.91	0.97	0.90	continue to monitor
	P1-4:A1:7:_FRT SWRD SVD=V1	P1	N-1	NA	NA	0.92	NA	NA	0.89	NA	NA	NA	NA	NA	continue to monitor
	P2-1:A1:52:_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (HRCGEN-SCOTIA)CT)	P2	Bus/Breaker	0.92	0.91	0.78	0.92	0.94	0.72	0.95	0.99	0.93	0.95	0.92	continue to monitor
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.95	0.92	0.90	NConv	0.63	1.02	0.53	0.63	NConv	Project: Garberville Area Reinforcement
	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	0.95	0.95	0.94	0.95	0.96	NConv	0.97	1.00	0.90	0.97	0.95	continue to monitor
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.91	0.90	NA	0.91	0.87	NA	0.95	1.03	0.68	0.95	0.90	continue to monitor
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.91	0.90	NA	0.91	0.87	NA	0.96	1.03	0.70	0.96	0.90	continue to monitor
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.95	NConv	NConv	NConv	NConv	1.02	0.51	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.91	0.90	NA	0.91	0.87	NA	0.95	1.02	0.68	0.95	0.90	continue to monitor
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.95	0.92	0.90	NConv	0.63	1.02	0.53	0.63	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.95	0.92	0.90	NConv	0.63	1.02	0.53	0.63	NConv	Install Redundant Relay
P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.95	NConv	NConv	NConv	NConv	1.02	0.51	NConv	NConv	Install Redundant Battery	
RDGE CBN 60 KV	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60KV [7130] MOAS OPENED ON HUMBOLDT_MPLE CRK	P1	N-1	0.82	1.02	1.02	0.83	1.02	1.01	0.92	1.03	0.89	0.92	1.02	Project: Garberville Area Reinforcement
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.00	0.93	0.93	NConv	0.61	1.03	0.60	0.61	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.99	1.01	1.01	1.00	0.99	1.03	0.98	1.03	0.86	0.98	1.01	sensitivity only
	P2-3:A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.99	1.01	1.01	1.00	0.99	1.03	0.99	1.03	0.87	0.99	1.01	sensitivity only
	P2-3:A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.94	NConv	NConv	NConv	NConv	1.02	0.51	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.99	1.01	1.01	0.99	0.99	1.03	0.98	1.03	0.86	0.98	1.01	sensitivity only
	P2-3:A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.00	0.93	0.93	NConv	0.61	1.03	0.60	0.61	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.00	0.93	0.93	NConv	0.61	1.03	0.60	0.61	NConv	Install Redundant Relay
P5-5C:A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.94	NConv	NConv	NConv	NConv	1.02	0.51	NConv	NConv	Install Redundant Battery	
RIO DELL 60 KV	P1-1:A1:1:_HRCGENSAB 13.80KV GEN UNIT 1	P1	N-1	0.94	0.94	0.93	0.95	0.96	0.88	0.97	1.00	0.94	0.97	0.94	continue to monitor
	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2	P1	N-1	0.94	0.94	0.93	0.95	0.96	0.88	0.96	1.00	0.85	0.96	0.94	continue to monitor
	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC NEWBURG	P1	N-1	0.88	0.88	0.96	0.89	0.90	0.93	0.94	1.00	0.81	0.94	0.88	Project: Garberville Area Reinforcement
	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	0.95	0.95	0.95	0.96	0.96	NConv	0.97	1.01	0.89	0.97	0.95	continue to monitor
	P1-4:A1:7:_FRT SWRD SVD=V1	P1	N-1	NA	NA	0.93	NA	NA	0.90	NA	NA	NA	NA	NA	continue to monitor
	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (FRSTGLEN-LOW GAP1)	P2	Bus/Breaker	0.95	0.95	0.95	0.96	0.96	NConv	0.97	1.01	0.90	0.97	0.95	continue to monitor
	P2-1:A1:52:_PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (HRCGEN-SCOTIA)CT)	P2	Bus/Breaker	0.89	0.89	0.74	0.90	0.91	0.68	0.94	0.99	0.90	0.94	0.89	Project: Garberville Area Reinforcement
	P2-2:A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.96	0.93	0.91	NConv	0.66	1.02	0.52	0.66	NConv	Project: Garberville Area Reinforcement
	P2-2:A1:2:_LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	0.95	0.95	0.95	0.96	0.96	NConv	0.97	1.01	0.89	0.97	0.95	continue to monitor



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P2-3:A1:18_ BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.92	0.91	NA	0.92	0.89	NA	0.96	1.03	0.68	0.96	0.91	continue to monitor
	P2-3:A1:19_ BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.92	0.91	NA	0.92	0.89	NA	0.97	1.03	0.69	0.97	0.91	continue to monitor
	P2-3:A1:1_ HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.96	NConv	NConv	NConv	NConv	1.02	0.50	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20_ BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.92	0.91	NA	0.92	0.89	NA	0.96	1.03	0.67	0.96	0.91	continue to monitor
	P2-3:A1:2_ HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.96	0.93	0.91	NConv	0.66	1.02	0.52	0.66	NConv	Project: Garberville Area Reinforcement
	P5-5A:A1:1_ HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.96	0.93	0.91	NConv	0.66	1.02	0.52	0.66	NConv	Install Redundant Relay
	P5-5C:A1:1_ HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.96	NConv	NConv	NConv	NConv	1.02	0.50	NConv	NConv	Install Redundant Battery
RUSS RCH 60 KV	P1-2:A1:14_ HUMBOLDT-MAPLE CREEK 60KV [7130] MOAS OPENED ON HUMBOLDT_MPLE CRK	P1	N-1	0.75	1.03	1.03	0.78	1.03	1.02	0.87	1.03	0.84	0.87	1.03	Project: Garberville Area Reinforcement
	P2-2:A1:1_ HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.01	0.92	0.97	NConv	0.52	1.03	0.50	0.52	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:18_ BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.98	1.03	1.03	0.99	1.02	1.03	0.98	1.03	0.83	0.97	1.03	sensitivity only
	P2-3:A1:19_ BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.98	1.03	1.03	0.99	1.02	1.03	0.99	1.03	0.84	0.99	1.03	sensitivity only
	P2-3:A1:1_ HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.97	NConv	NConv	NConv	NConv	1.03	0.44	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3:A1:20_ BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.98	1.03	1.03	0.99	1.02	1.03	0.98	1.03	0.82	0.97	1.03	sensitivity only
	P2-3:A1:2_ HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.01	0.92	0.97	NConv	0.52	1.03	0.50	0.52	NConv	Project: Garberville Area Reinforcement
SWNS FLT 60 KV	P5-5A:A1:1_ HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.01	0.92	0.97	NConv	0.52	1.03	0.50	0.52	NConv	Install Redundant Relay
	P5-5C:A1:1_ HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.97	NConv	NConv	NConv	NConv	1.03	0.44	NConv	NConv	Install Redundant Battery
	P1-2:A1:16_ HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC_NEWBURG	P1	N-1	0.92	0.92	0.96	0.92	0.96	0.96	0.96	0.99	0.90	0.96	0.92	sensitivity only
	P1-2:A1:3_ BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	0.94	0.94	0.95	0.94	0.96	NConv	0.95	0.98	0.89	0.95	0.94	continue to monitor
	P1-3:A1:3_ BRDGVILLE 115/60KV TB 1	P1	N-1	0.86	0.85	NA	0.86	0.83	NA	0.95	1.03	0.88	0.95	0.85	Project: Garberville Area Reinforcement
	P1-4:A1:7_ FRT SWRD SVD=V1	P1	N-1	NA	NA	0.92	NA	NA	0.90	NA	NA	NA	NA	NA	continue to monitor
	P2-1:A1:2_ BRIDGEVILLE-COTTONWOOD 115KV [1110] (FRSTGLEN-LOW GAP1)	P2	Bus/Breaker	0.94	0.94	0.95	0.94	0.96	NConv	0.95	0.98	0.89	0.95	0.94	continue to monitor
	P2-1:A1:52_ PACIFIC LUMBER (SCOTIA) TAP 60KV [7852] (HRCGEN-SCOTIACT)	P2	Bus/Breaker	0.94	0.94	0.89	0.94	0.97	0.84	0.96	0.99	0.95	0.96	0.94	continue to monitor
	P2-2:A1:1_ HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	0.96	0.93	0.89	NConv	0.75	1.03	0.68	0.75	NConv	Project: Garberville Area Reinforcement
	P2-2:A1:2_ LOW GAP1 115KV SECTION 1D	P2	Bus/Breaker	0.94	0.94	0.95	0.94	0.96	NConv	0.95	0.98	0.89	0.95	0.94	continue to monitor
	P2-3:A1:18_ BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.86	0.84	NA	0.85	0.78	NA	0.93	1.03	0.64	0.93	0.84	Project: Garberville Area Reinforcement
	P2-3:A1:19_ BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.86	0.84	NA	0.85	0.78	NA	0.94	1.03	0.65	0.94	0.84	Project: Garberville Area Reinforcement
	P2-3:A1:1_ HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.96	NConv	NConv	NConv	NConv	1.03	0.67	NConv	NConv	Project: Garberville Area Reinforcement
P2-3:A1:20_ BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.86	0.84	NA	0.85	0.78	NA	0.93	1.03	0.64	0.92	0.84	Project: Garberville Area Reinforcement	
P2-3:A1:2_ HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	0.96	0.93	0.89	NConv	0.75	1.03	0.68	0.75	NConv	Project: Garberville Area Reinforcement	
P5-5A:A1:1_ HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.96	0.93	0.89	NConv	0.75	1.03	0.68	0.75	NConv	Install Redundant Relay	
P5-5C:A1:1_ HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.96	NConv	NConv	NConv	NConv	1.03	0.67	NConv	NConv	Install Redundant Battery	
P1-2:A1:14_ HUMBOLDT-MAPLE CREEK 60KV [7130] MOAS OPENED ON HUMBOLDT_MPLE CRK	P1	N-1	0.70	1.03	1.03	0.75	1.03	1.03	0.85	1.03	0.81	0.85	1.03	Project: Garberville Area Reinforcement	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
WILLWCRK 60 kV	P2-2-A1:1:_HUMBOLDT 115KV SECTION MA	P2	Bus/Breaker	NConv	NConv	1.02	0.89	0.98	NConv	0.49	1.03	0.46	0.49	NConv	Project: Garberville Area Reinforcement
	P2-3-A1:18:_BRDGVILLE 115KV - RING R3 & R2	P2	Bus/Breaker	0.95	1.03	1.03	0.96	1.03	1.03	0.95	1.03	0.79	0.95	1.03	sensitivity only
	P2-3-A1:19:_BRDGVILLE 115KV - RING R1 & R2	P2	Bus/Breaker	0.95	1.03	1.03	0.96	1.03	1.03	0.97	1.03	0.80	0.96	1.03	sensitivity only
	P2-3-A1:1:_HUMBOLDT - MA 115KV & HUMBOLDT-TRINITY LINE	P2	Bus/Breaker	NConv	NConv	0.98	NConv	NConv	NConv	NConv	1.03	0.41	NConv	NConv	Project: Garberville Area Reinforcement
	P2-3-A1:20:_BRDGVILLE 115KV - RING R1 & R3	P2	Bus/Breaker	0.95	1.03	1.03	0.96	1.03	1.03	0.95	1.03	0.79	0.95	1.03	sensitivity only
	P2-3-A1:2:_HUMBOLDT - MA 115KV & HUMBOLDT BAY-HUMBOLDT #1 LINE	P2	Bus/Breaker	NConv	NConv	1.02	0.89	0.98	NConv	0.49	1.03	0.46	0.49	NConv	Project: Garberville Area Reinforcement
	P5-5A-A1:1:_HUMBOLDT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	1.02	0.89	0.98	NConv	0.49	1.03	0.46	0.49	NConv	Install Redundant Relay
P5-5C-A1:1:_HUMBOLDT 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	0.98	NConv	NConv	NConv	NConv	1.03	0.41	NConv	NConv	Install Redundant Battery	

Substation	Contingency	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)								Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
BRDGVLL	P1-3:A1:3:_BRDGVLL 115/60KV TB 1	P1	N-1	12	13	<8	11	20	<8	<8	<8	10	<8	13	Project:Garberville Area Reinforcement
CARLOTTA	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC_NEWBURG	P1	N-1	<8	9	<8	9	9	<8	<8	<8	14	<8	9	Project:Garberville Area Reinforcement
	P1-3:A1:3:_BRDGVLL 115/60KV TB 1	P1	N-1	<8	<8	<8	<8	8	<8	<8	<8	<8	<8	<8	Project:Garberville Area Reinforcement
FRT SWRD	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVLL_FRUTLDJT	P1	N-1	44	48	<8	46	50	<8	41	<8	44	40	47	Project:Garberville Area Reinforcement
	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	<8	<8	<8	<8	<8	<8	<8	<8	8	<8	<8	Project:Garberville Area Reinforcement
	P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	<8	<8	<8	<8	8	<8	<8	<8	<8	<8	<8	Project:Garberville Area Reinforcement
	P1-2:A1:5:_KEKAWAKA-GRBRVLL-LYTNVLL 60KV [0]	P1	N-1	17	23	<8	16	14	<8	<8	<8	14	<8	24	Project:Garberville Area Reinforcement
	P1-3:A1:3:_BRDGVLL 115/60KV TB 1	P1	N-1	11	13	<8	9	20	<8	<8	<8	10	<8	13	Project:Garberville Area Reinforcement
	P1-4:A1:5:_GRBRVLL 60.00KV ID=8H & GRBRVLL 60.00KV ID=7H & GRBRVLL 60.00KV ID=5H & GRBRVLL 60.00KV ID=V SHUNT DEVICES	P1	N-1	<8	10	<8	8	9	14	<8	<8	8	<8	10	Project:Garberville Area Reinforcement
P1-4:A1:7:_FRT SWRD SVD=V1	P1	N-1	<8	<8	19	<8	<8	24	<8	<8	<8	<8	<8	continue to monitor	
FRUITLND	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVLL_FRUTLDJT	P1	N-1	46	50	<8	47	53	<8	41	<8	45	41	49	Project:Garberville Area Reinforcement
	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	<8	<8	<8	<8	<8	<8	<8	<8	8	<8	<8	sensitivity only
	P1-2:A1:4:_HUMBOLDT BAY-HUMBOLDT #1 115KV [1800]	P1	N-1	<8	<8	<8	<8	9	<8	<8	<8	<8	<8	<8	continue to monitor
	P1-2:A1:5:_KEKAWAKA-GRBRVLL-LYTNVLL 60KV [0]	P1	N-1	14	19	<8	13	12	<8	<8	<8	11	<8	20	Project:Garberville Area Reinforcement
	P1-3:A1:3:_BRDGVLL 115/60KV TB 1	P1	N-1	11	13	<8	10	20	<8	<8	<8	10	<8	13	Project:Garberville Area Reinforcement
	P1-3:A1:4:_HMBOBAYPPB 115/13.8KV TB 1	P1	N-1	<8	<8	<8	<8	9	<8	<8	<8	<8	<8	<8	Project:Garberville Area Reinforcement
	P1-4:A1:5:_GRBRVLL 60.00KV ID=8H & GRBRVLL 60.00KV ID=7H & GRBRVLL 60.00KV ID=5H & GRBRVLL 60.00KV ID=V SHUNT DEVICES	P1	N-1	<8	8	10	<8	<8	12	<8	<8	<8	<8	8	continue to monitor
P1-4:A1:7:_FRT SWRD SVD=V1	P1	N-1	<8	<8	13	<8	<8	17	<8	<8	<8	<8	<8	continue to monitor	
GRBRVLL	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON BRDGVLL_FRUTLDJT	P1	N-1	42	46	<8	43	47	<8	39	<8	42	39	45	Project:Garberville Area Reinforcement
	P1-2:A1:25:_BRIDGEVILLE-GARBERVILLE 60KV [6220] MOAS OPENED ON FTSWRDJT_GRBRVLL	P1	N-1	35	36	<8	35	39	<8	<8	<8	34	<8	37	Project:Garberville Area Reinforcement
	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	<8	<8	<8	<8	<8	<8	<8	<8	9	<8	<8	Project:Garberville Area Reinforcement
	P1-2:A1:5:_KEKAWAKA-GRBRVLL-LYTNVLL 60KV [0]	P1	N-1	21	28	<8	19	16	<8	<8	<8	17	<8	29	Project:Garberville Area Reinforcement
	P1-3:A1:3:_BRDGVLL 115/60KV TB 1	P1	N-1	11	13	<8	9	20	<8	<8	<8	10	<8	13	Project:Garberville Area Reinforcement
	P1-4:A1:5:_GRBRVLL 60.00KV ID=8H & GRBRVLL 60.00KV ID=7H & GRBRVLL 60.00KV ID=5H & GRBRVLL 60.00KV ID=V SHUNT DEVICES	P1	N-1	9	13	16	10	11	19	10	<8	10	10	13	Install reactive support
P1-4:A1:7:_FRT SWRD SVD=V1	P1	N-1	<8	<8	17	<8	<8	22	<8	<8	<8	<8	<8	continue to monitor	
HOOPA	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60KV [7130] MOAS OPENED ON HUMBOLDT_MPLE CRK	P1	N-1	27	<8	<8	23	<8	<8	14	<8	17	14	<8	Project:Maple creek reactive support
MPLC CRK	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60KV [7130] MOAS OPENED ON HUMBOLDT_MPLE CRK	P1	N-1	24	<8	<8	22	<8	<8	13	<8	16	13	<8	Project:Maple creek reactive support

Substation	Contingency	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)								Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
NEWBURG	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC_NEWBURG	P1	N-1	10	11	<8	11	11	<8	<8	<8	16	<8	11	Project:Garberville Area Reinforcement
PCLUMBER	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC_NEWBURG	P1	N-1	<8	9	<8	9	9	<8	<8	<8	14	<8	9	continue to monitor
	P1-3:A1:3:_BRDGVILLE 115/60KV TB 1	P1	N-1	<8	<8	<8	<8	8	<8	<8	<8	<8	<8	<8	continue to monitor
RIO DELL	P1-1:A1:2:_HRCGENSAB 13.80KV GEN UNIT 2	P1	N-1	<8	<8	<8	<8	<8	<8	<8	<8	9	<8	<8	sensitivity only
	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60KV [7100] MOAS OPENED ON EEL RIVER JC_NEWBURG	P1	N-1	<8	8	<8	<8	<8	<8	<8	<8	14	<8	8	continue to monitor
RUSS RCH	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60KV [7130] MOAS OPENED ON HUMBOLDT_MPLE CRK	P1	N-1	25	<8	<8	22	<8	<8	13	<8	16	13	<8	Project:Maple creek reactive support
WILLWCRK	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60KV [7130] MOAS OPENED ON HUMBOLDT_MPLE CRK	P1	N-1	26	<8	<8	23	<8	<8	14	<8	16	14	<8	Project:Maple creek reactive support

Contingency	Category	Category Description	Transient Stability Performance				Potential Mitigation Solutions
			Baseline Scenarios		Sensitivity Scenarios		
			2025 Spring Off-Peak	2028 Summer Peak	2035 Summer Peak	2028 SP High CEC Forecast	

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

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

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		2028 SP High CEC Forecast

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

2023-2024 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt**

Single Source Substation with more than 100 MW Load



Substation	Load Served (MW)											Potential Mitigation Solutions
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Clear Lake - Eagle Rock 60 kV (Clear Lake 60 kV sub to Konocti Sub 60 kV)	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	88	92	113	60	62	73	61	8	94	36	61	Continue to Monitor
	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	88	92	112	60	62	74	61	8	94	36	61	Continue to Monitor
	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	84	85	158	79	86	127	80	46	86	62	80	Continue to Monitor
	P5-5A:A2:11:_ MENDOCINO 115 KV BUS 1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	84	84	157	78	85	125	80	46	86	62	80	Add Redunctane Relay
	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	NConv	NConv	NConv	NConv	NConv	65	NConv	66	NConv	Add Redunctane Relay
	P5-5A:A2:9:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	NConv	NConv	NConv	NConv	NConv	64	NConv	64	NConv	Add Redunctane Relay
P7-1:A2:23:_EAGLE ROCK -REBUD & CORTINA-MENDOCINO #1 LINES	P7	DCTL	76	77	108	70	74	84	69	39	NConv	64	NConv	Continue to Monitor	
Corona- Lakeville 115kV Line	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	127	52	65	142	49	53	111	20	53	82	111	Project: Santa Rosa 115 kV lines Reconductoring project
	P5-5A:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	119	54	86	135	52	50	104	7	55	51	104	Project: Santa Rosa 115 kV lines Reconductoring project
	P5-5A:A2:9:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	64	NConv	NConv	53	NConv	20	NConv	83	NConv	Project: Santa Rosa 115 kV lines Reconductoring project
	P5-5A:A2:1:_CLOVERDALE 115 KV(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	128	52	64	142	49	53	111	20	53	82	111	Project: Santa Rosa 115 kV lines Reconductoring project
	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	128	52	65	142	50	53	112	20	53	83	111	Project: Santa Rosa 115 kV lines Reconductoring project
EAGLE ROCK 115/60 KV BANK NO.1	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	86	88	131	90	97	129	72	28	90	52	72	Continue to Monitor
	P5-5A:A2:11:_ MENDOCINO 115 KV BUS 1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	86	88	130	90	96	128	71	28	89	52	72	Add Redunctane Relay
	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	NConv	NConv	NConv	NConv	NConv	38	NConv	55	NConv	Add Redunctane Relay
	P7-1:A2:23:_EAGLE ROCK -REBUD & CORTINA-MENDOCINO #1 LINES	P7	DCTL	81	82	100	84	88	101	65	24	83	48	65	Continue to Monitor
GEYSER # 3 - CLOVERDALE 115K (CLOVERDALE 115KV to MPE TAP115KV)	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	71	72	119	62	65	82	66	33	73	47	66	Continue to Monitor
	P4-2:A2:1:_NO BF RELAY EAGLE ROCK 115KV CB 142	P5	Non-Redundant Relay	79	78	122	66	69	79	70	40	79	55	70	Continue to Monitor
	P5-5A:A2:11:_ MENDOCINO 115 KV BUS 1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	69	69	110	59	62	79	64	36	70	46	64	Continue to Monitor
	P7-1:A2:23:_EAGLE ROCK -REBUD & CORTINA-MENDOCINO #1 LINES	P7	DCTL	89	90	129	80	85	97	81	39	92	58	81	Continue to Monitor
	P7-1:A2:4:_MENDOCINO-REBUD & CORTINA-MENDOCINO #1 LINES	P7	DCTL	77	78	111	68	71	83	72	37	78	53	72	Continue to Monitor
	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	108	108	44	102	104	44	87	50	109	74	87	Maintenance project to increase capacity of Hopland Bank#2
	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	107	108	44	102	104	44	87	51	109	74	87	Maintenance project to increase capacity of Hopland Bank#2
	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	108	102	35	94	90	35	89	83	103	93	89	Maintenance project to increase capacity of Hopland Bank#2
	P2-3:A2:25:_EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2-3	Non-Bus-Tie Breaker	106	102	36	94	90	36	89	83	102	93	89	Maintenance project to increase capacity of Hopland Bank#2



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
HOPLAND BANK 115/60.00 BANK NO.2	P2-3:A2:26:_EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2-3	Non-Bus-Tie Breaker	108	102	35	94	90	35	89	83	104	93	89	Maintenance project to increase capacity of Hopland Bank#2
	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	109	108	66	120	129	66	99	64	109	84	99	Maintenance project to increase capacity of Hopland Bank#2
	P2-4:A2:8:_FULTON 115KV - SECTION 2F & 1F	P2-4	Bus-Tie-Breaker	NConv	NConv	73	NConv	NConv	73	NConv	126	NConv	142	NConv	Maintenance project to increase capacity of Hopland Bank#2
	P4-2:A2:1:_NO BF RELAY EAGLE ROCK 115KV CB 142	P5	Non-Redundant Relay	118	109	48	106	105	48	89	51	111	79	89	Maintenance project to increase capacity of Hopland Bank#2
	P5-5A:A2:11:_MENDOCINO 115 KV BUS 1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	112	112	68	123	133	68	102	64	113	86	102	Maintenance project to increase capacity of Hopland Bank#2
	P5-5A:A2:8:_FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	76	NConv	NConv	76	NConv	130	NConv	144	NConv	Maintenance project to increase capacity of Hopland Bank#2
	P5-5A:A2:9:_FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	73	NConv	NConv	73	NConv	129	NConv	141	NConv	Maintenance project to increase capacity of Hopland Bank#2
	P5-5c(DC):A2:8: Station DC Battery Supply *EGLE ROCK 115-60kV Batt*	P5	Non-Redundant Relay	108	103	36	95	92	36	89	82	104	93	89	Maintenance project to increase capacity of Hopland Bank#2
P7-1:A2:6:_GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	104	96	47	95	93	47	88	66	96	86	88	Maintenance project to increase capacity of Hopland Bank#2	
Konocti - Eagle Rock 60kV	P2-1:A2:25:_GEYSERS #3-CLOVERDALE 115KV [1650] (CLOVRDLE-AIDLINJCT)	P2-1	Line Section w/o Fault	91	93	101	79	82	88	76	37	94	59	76	Continue to Monitor
	P5-5A:A2:11:_MENDOCINO 115 KV BUS 1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	98	100	151	88	94	123	81	31	101	59	81	Continue to Monitor
	P5-5A:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	72	72	116	62	65	73	58	26	83	48	58	Continue to Monitor
	P7-1:A2:23:_EAGLE ROCK -REDBUD & CORTINA-MENDOCINO #1 LINES	P7	DCTL	92	94	113	82	85	99	73	27	95	54	73	Continue to Monitor
Clear Lake- Hopland 60 Kv(Clear Lake 60 KV sub to Granite Sub 60 Kv)	P1-2:A2:56:_KONOCOTI-EAGLE ROCK 60KV [6861]	P1	N-1	113	118	80	79	82	52	86	10	121	51	86	Project: Clear Lake 60 kv System Reinforcement
	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	113	118	80	79	82	52	85	10	120	51	85	Project: Clear Lake 60 kv System Reinforcement
	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	114	121	59	81	84	55	88	18	123	55	88	Project: Clear Lake 60 kv System Reinforcement
	P2-3:A2:25:_EGLE RCK - MA 115KV & EAGLE RCK-FULTON-SILVERDO LINE	P2-3	Non-Bus-Tie Breaker	114	121	59	81	84	55	88	18	123	55	88	Project: Clear Lake 60 kv System Reinforcement
	P4-2:A2:1:_NO BF RELAY EAGLE ROCK 115KV CB 142	P5	Non-Redundant Relay	116	122	86	82	85	55	88	12	125	54	89	Project: Clear Lake 60 kv System Reinforcement
	P5-5A:A2:7:_EAGLE ROCK 115KV(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	115	122	60	81	85	55	88	18	124	55	88	Project: Clear Lake 60 kv System Reinforcement
	P5-5c(DC):A2:8: Station DC Battery Supply *EGLE ROCK 115-60kV Batt*	P5	Non-Redundant Relay	114	121	NConv	80	84	55	88	18	124	55	88	Add Redunctane Battery
Mendocino -Clearlake 60 kv (Mendocino Sub 60 kv to Upper Lake Sub 60 kv)	P1-2:A2:56:_KONOCOTI-EAGLE ROCK 60KV [6861]	P1	N-1	79	80	132	63	64	102	55	3	81	35	55	Continue to Monitor
	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	79	80	131	63	64	102	55	3	81	35	55	Continue to Monitor
	P4-2:A2:1:_NO BF RELAY EAGLE ROCK 115KV CB 142	P5	Non-Redundant Relay	71	75	121	56	58	96	51	1	76	31	51	Continue to Monitor
	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	136	48	61	137	46	50	120	19	49	89	120	Project: Santa Rosa 115 kv lines Reconductoring project
	P5-5A:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	127	51	82	130	49	47	112	7	51	53	112	Project: Santa Rosa 115 kv lines Reconductoring project

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Santa Rosa- Corona 115 kv (Santa Rosa 115kv sub to Stony Point Sub 115 kv)	P5-5A:A2:9:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	60	NConv	NConv	50	NConv	19	NConv	89	NConv	Project: Santa Rosa 115 kv Lines Reconductoring project
	P5-5A:A2:1: "CLOVERDALE 115 KV(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	136	48	60	137	46	50	120	19	49	89	120	Project: Santa Rosa 115 kv lines Reconductoring project
	FULTON-SANTA ROSA #2 115KV [1630] & FULTON-SANTA ROSA #1 115KV [1620]	P6	N-1-1	136.60	<100	<100	136.73	<100	<100	119.35	<100	<100	<100	119.36	Project: Santa Rosa 115 kv lines Reconductoring project
	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	137	48	61	137	47	50	121	19	49	89	119	Project: Santa Rosa 115 kv Lines Reconductoring project
Tulucay - Vaca 230 kv Line	P2-4:A2:2:_LAKEVILLE 230KV - SECTION 2E & 1E	P2-4	Bus-Tie-Breaker	118	76	88	106	77	87	92	17	77	91	92	Project: Vaca Dixon-Lakeville 230 kv Corridor Series Compensation
	P5-5A:A2:13:_ LAKEVILLE 230 kv BUS 1&2 SECTION E(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	118	76	88	106	77	87	92	17	77	91	92	Project: Vaca Dixon-Lakeville 230 kv Corridor Series Compensation
	VACA-LAKEVILLE #1 230KV [5840] & GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SANTAFE	P6	N-1-1	112.85	<100	<100	103.23	<100	<100	91.82	<100	<100	77.75	91.78	Project: Vaca Dixon-Lakeville 230 kv Corridor Series Compensation
Vaca - Lakeville 230 kv Line No. 1	P7-1:A2:11:_GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	102	75	85	89	69	79	82	22	76	79	82	Project: Vaca Dixon-Lakeville 230 kv Corridor Series Compensation
	P2-4:A2:1:_LAKEVILLE 230KV - SECTION 2E & 2D	P2-4	Bus-Tie-Breaker	114	75	88	110	88	94	88	7	76	77	88	Project: Vaca Dixon-Lakeville 230 kv Corridor Series Compensation
Fulton - Hopland 60 kv (Hopland Jct 60 kv to Cloverdale Jct 60 kv)	TULUCAY-VACA 230KV [5800] & GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SANTAFE	P6	N-1-1	115	<100	<100	107	<100	<100	93	<100	<100	79	93	Project: Vaca Dixon-Lakeville 230 kv Corridor Series Compensation
	P1-2:A2:19:_EGLE RCK-FULTON-SILVERDO 115KV [0]	P1	N-1	101	81	76	54	47	65	81	85	80	100	81	Project: Fulton -Fitch Mountain 60 kv Line reconductor
	P1-2:A6:12:_SILVERDO-FULTON-EGLE RCK 115KV [0]	P1	N-1	101	81	76	54	47	65	81	85	80	100	81	Project: Fulton -Fitch Mountain 60 kv Line reconductor
	P2-1:A2:30:_EAGLE ROCK-FULTON-SILVERADO 115KV [4392] (EGLE RCK-ERF4_23CRJ)	P2-1	Line Section w/o Fault	101	81	77	54	47	65	82	85	81	100	82	Project: Fulton -Fitch Mountain 60 kv Line reconductor
	P2-3:A6:2:_SILVERDO - 1E 115KV & SILVERDO-FULTON-EGLE RCK LINE	P2-3	Non-Bus-Tie Breaker	101	81	76	54	47	65	81	85	80	100	81	Project: Fulton -Fitch Mountain 60 kv Line reconductor
	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	229	NConv	NConv	179	NConv	199	NConv	217	NConv	Add Redunctane Relay
	P5-5A:A2:9:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	220	NConv	NConv	173	NConv	199	NConv	216	NConv	Add Redunctane Relay
	P5-5c(DC):A2:17: Station DC Battery Supply "RINCON 115kv Batt"	P5	Non-Redundant Relay	101	81	76	54	47	65	81	85	80	100	81	Project: Fulton -Fitch Mountain 60 kv Line reconductor
Fulton- Molino- Cotati 60 kv(Molino sub 60 kv to Molino Jct 60 kv)	P7-1:A2:5:_GEYSERS #17-FULTON & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	106	86	81	57	50	68	90	89	85	104	90	Project: Fulton -Fitch Mountain 60 kv Line reconductor
	P7-1:A2:6:_GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	114	93	88	63	55	73	94	96	92	112	94	Project: Fulton -Fitch Mountain 60 kv Line reconductor
	P1-2:A2:66:_LAKEVILLE #2 60KV [7340] MOAS OPENED ON PETLMA A_LKVLE JT	P1	N-1	76	84	101	71	73	79	79	9	85	21	79	Continue to Monitor
Fulton- Molino- Cotati 60 kv(Molino sub 60 kv to Molino Jct 60 kv)	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	220	NConv	NConv	164	NConv	11	NConv	19	NConv	Add Redunctane Relay
	P5-5A:A2:9:_ FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	224	NConv	NConv	168	NConv	11	NConv	20	NConv	Add Redunctane Relay
	P5-5A:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	61	69	155	59	61	65	62	6	70	10	62	Continue to Monitor

Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Fulton - Calistoga 60 kV (Fulton Sub 60 kV to St. Helena Jct 60 kV)	P5-5A:A2.2: "FULTON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	62	67	NConv	58	62	211	54	6	70	10	54	Continue to Monitor
	P1-2:A2:67: LAKEVILLE #1 60KV [7360]	P1	N-1	76	82	113	51	55	71	55	14	84	35	55	Continue to Monitor
Tulucay - Napa #2 60 kV (Tulucay 60 kV to Basalt 60 kV)	P5-5A:A2.2: "FULTON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	100	97	NConv	51	54	75	59	11	104	35	59	Add Reductane Relay
	Base Case	P0	Base case	104	46	49	61	39	40	84	20	46	77	84	Project: Tulucay-Napa #2 60 kV line Reconductoring project
	P1-2:A2:68: TULUCAY-NAPA #1 60KV [8180] MOAS OPENED ON TULUCAY1_TULCY JT	P1	N-1	117	59	65	75	51	52	95	26	60	87	95	Project: Tulucay-Napa #2 60 kV line Reconductoring project
Eagle Rock- Fulton- Silverado 115 kv (Eagle rock sub to Ricon Jct Jct2 115 kv)	P1-2:A2:70: TULUCAY-NAPA #1 60KV [8180] MOAS OPENED ON TULCY JT_CRD-JCT	P1	N-1	114	58	63	73	50	51	92	25	59	84	92	Project: Tulucay-Napa #2 60 kV line Reconductoring project
	P5-5A:A2.1: FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	106	100	121	66	63	71	97	62	101	82	97	Add Reductane Relay
	P5-5A:A2.2: "FULTON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	128	108	NConv	81	74	87	91	50	111	84	91	Add Reductane Relay
LAKEVILLE #2 60 kV (Petaluma Jct 60 kV to Petaluma A)	P1-2:A2:65: LAKEVILLE-PETALUMA C 60KV [7350]	P1	N-1	74	77	113	56	59	82	62	14	78	34	62	Continue to Monitor
	P5-5A:A2.1: FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0	0	199	0	0	93	0	0	0	0	0	Continue to Monitor
	P5-5A:A2.8: FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0	0	237	0	0	184	0	0	0	0	0	Continue to Monitor
	P5-5A:A2.9: FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0	0	241	0	0	186	0	0	0	0	0	Continue to Monitor
LAKEVILLE #2 60KV	P5-5A:A2.1: FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NA	NA	295	NA	NA	140	NA	NA	NA	NA	NA	Add Reductane Relay
	P5-5A:A2.8: FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NA	NA	351	NA	NA	276	NA	NA	NA	NA	NA	Add Reductane Relay
	P5-5A:A2.9: FULTON BUS 115 KV 1 & 2 SECTION E/F(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NA	NA	358	NA	NA	281	NA	NA	NA	NA	NA	Add Reductane Relay
	P5-5A:A2.2: "FULTON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NA	NA	NConv	NA	NA	139	NA	NA	NA	NA	NA	Add Reductane Relay
LAKEVILLE 230/60 kV Bank # 3	P1-3:A2:6: LAKEVILLE 230/60KV TB 5	P1	N-1	64	30	56	60	63	98	148	74	35	109	148	Operating Solution
	P2-2:A2:13: LAKEVILLE 230KV SECTION 1D	P2-2	Bus	64	30	57	60	63	99	148	73	35	109	148	Operating Solution
	P2-4:A2:3: LAKEVILLE 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	64	35	57	60	63	99	148	72	38	109	148	Operating Solution
	P2-4:A2:4: LAKEVILLE 230KV - SECTION 1D & 1E	P2-4	Bus-Tie-Breaker	64	29	60	60	63	102	148	71	38	109	148	Continue to Monitor
Cortina - Mendocino 115 kV Line	P2-2:A2:21: EGGLE ROCK 115KV SECTION MA	P2-2	Bus	68	65	NConv	63	69	98	48	17	67	17	48	Continue to Monitor
	P2-3:A2:25: EGGLE ROCK - MA 115KV & EGGLE ROCK-FULTON-SILVERDO LINE	P2-3	Non-Bus-Tie Breaker	78	76	NConv	74	81	110	55	15	78	23	55	Continue to Monitor
	P2-3:A2:26: EGGLE ROCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2-3	Non-Bus-Tie Breaker	78	76	NConv	74	81	110	55	15	78	23	55	Continue to Monitor
	P4-2:A2:1: NO BF RELAY EAGLE ROCK 115KV CB 142	P5	Non-Redundant Relay	67	66	118	63	68	85	52	5	67	32	52	Continue to Monitor
	P5-5A:A2:7: EAGLE ROCK 115KV(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	77	75	NConv	73	80	110	54	15	77	23	54	Continue to Monitor

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Cortina - Mendocino 115 kV Line	P5-5A:A2.2: "FULTON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	85	75	NConv	79	78	102	54	11	77	31	54	Continue to Monitor
	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	79	77	NConv	75	81	111	55	15	79	24	55	Continue to Monitor
	EAGLE ROCK-REDBUD 115KV [1480] & GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	<100	<100	143	<100	<100	104	<100	<100	<100	<100	<100	Continue to Monitor
	GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR & EGLE RCK 115/60KV TB 1	P6	N-1-1	<100	<100	127	<100	<100	108	<100	<100	<100	<100	<100	Continue to Monitor
Eagle Rock - Cortina 115 kV (Highland to Highland Jct2)	P5-5A:A2.1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	71	71	123	68	70	94	46	28	73	13	46	Continue to Monitor
	P5-5A:A2.2: "FULTON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	100	85	NConv	95	90	124	52	40	87	23	52	Continue to Monitor
	FULTON 230/115KV TB 4 & FULTON 230/115KV TB 9	P6	N-1-1	<100	<100	119	<100	<100	<100	<100	<100	<100	<100	<100	Continue to Monitor
Hartley - Clear Lake 60kV	P2-4:A2.5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	67	71	142	66	73	105	66	28	72	42	66	Continue to Monitor
Monte Rio- Fulton 60 KV(Wohler Jct 60 Kv to Monte Rio Sub 60 KV)	P1-2:A2:61:_FULTON-MOLINO-COTATI 60KV [6910] MOAS OPENED ON SNMA TAP _SNMADLDFL	P1	N-1	65	71	104	73	76	88	67	12	73	17	67	Continue to Monitor
	P7-1:A2:12:_FULTON-SANTA ROSA #1 & FULTON-MOLINO-COTATI LINES	P7	DCTL	NA	NA	117	NA	NA	NA	NA	NA	NA	NA	NA	Operating Solution
Sonoma - Pueblo 115 kV	P5-5A:A2.1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	115	116	173	102	102	97	100	13	118	49	100	Add Redunctane Relay
	FULTON 230/115KV TB 9 & FULTON 230/115KV TB 4	P6	N-1-1	116	118	172	<100	103	98	99	<100	121	<100	99	Operating Solution
	P5-5A:A2:10:_LAKEVILLE 115 KV BUS 1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	111	111	119	51	51	55	80	21	114	48	80	Add Redunctane Relay
	P5-5A:A2:2: "FULTON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	130	136	NConv	53	54	60	87	21	138	49	87	Add Redunctane Relay
	LAKEVILLE-SONOMA #2 115KV [2070] & LAKEVILLE-SONOMA #1 115KV [2063]	P6	N-1-1	108	109	116	<100	<100	<100	<100	<100	112	<100	<100	Operating Solution
P7-1:A2:16:_LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 LINES	P7	DCTL	109	109	117	51	52	55	79	21	112	48	79	Operating Solution	
Ukiah-Hopland-Cloverdale 115 kV (Ukiah sub 115kV to Hopland Jct 115kV)	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	63	65	108	49	53	67	59	34	66	44	59	Continue to Monitor
	P7-1:A2:23:_EAGLE ROCK -REDBUD & CORTINA-MENDOCINO #1 LINES	P7	DCTL	81	84	119	65	69	79	74	40	85	56	74	Continue to Monitor
	P7-1:A2:4:_MENDOCINO-REDBUD & CORTINA-MENDOCINO #1 LINES	P7	DCTL	69	71	101	54	58	66	65	38	72	51	65	Continue to Monitor
FULTON 230/115 kV Bank # 9	CORONA-LAKEVILLE 115KV [4311] & FULTON 230/115KV TB 4	P6	N-1-1	<100	<100	111	<100	<100	<100	<100	<100	<100	<100	Continue to Monitor	
FULTON 230/115 kV Bank # 4	CORONA-LAKEVILLE 115KV [4311] & FULTON 230/115KV TB 9	P6	N-1-1	<100	<100	109	<100	<100	<100	<100	<100	<100	<100	Continue to Monitor	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
MIDDLTWN 60kV	Base Case	P0	Base Case	0.95	0.94	0.98	0.99	0.99	1.03	0.97	1.04	0.95	0.99	0.97	Project: Clear Lake 60 kV System Reinforcement
CALISTGA 60kV	Base Case	P0	Base Case	0.95	0.95	0.91	0.97	0.96	0.94	0.98	1.03	0.94	0.98	0.98	Switch in Fulton 230kV SVD
LYTNVLE 60kV	P1-2:A2:45:_LAYTONVILLE-WILLITS 60KV [8360]	P1	N-1	0.72	0.86	NA	0.51	0.50	NA	0.77	1.04	0.85	0.87	0.77	Project: Garberville area reinforcement project
COVELO6 60kV	P1-2:A2:45:_LAYTONVILLE-WILLITS 60KV [8360]	P1	N-1	0.71	0.85	NA	0.50	0.49	NA	0.76	1.04	0.84	0.86	0.76	Project: Garberville area reinforcement project
UPPR LKE 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	0.95	0.94	0.85	0.96	0.96	0.92	0.95	1.02	0.94	0.99	0.95	Continue to Monitor
UPPR LKE 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	0.94	0.94	0.85	0.96	0.96	0.92	0.95	1.02	0.94	0.99	0.95	Continue to Monitor
HARTLEY 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	0.93	0.93	0.80	0.94	0.94	0.90	0.93	1.03	0.92	0.99	0.93	Continue to Monitor
HARTLEY 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	0.93	0.93	0.80	0.94	0.94	0.90	0.93	1.03	0.92	0.99	0.93	Continue to Monitor
CLER LKE 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	0.92	0.92	0.78	0.94	0.94	0.89	0.93	1.03	0.92	0.98	0.93	Continue to Monitor
CLER LKE 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	0.92	0.92	0.78	0.94	0.94	0.89	0.93	1.03	0.92	0.98	0.93	Continue to Monitor
GRANITE 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	0.94	0.94	0.83	0.95	0.95	0.91	0.95	1.03	0.94	0.99	0.95	Continue to Monitor
GRANITE 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	0.94	0.94	0.83	0.95	0.95	0.91	0.95	1.03	0.94	0.99	0.95	Continue to Monitor
KONOCTI6 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	0.86	0.86	0.69	0.90	0.90	0.86	0.88	1.04	0.85	0.96	0.88	Existing Middletown UVLS
KONOCTI6 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	0.86	0.86	0.70	0.90	0.90	0.86	0.88	1.04	0.85	0.96	0.88	Existing Middletown UVLS
LOWR LKE 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	0.84	0.83	0.67	0.89	0.89	0.86	0.86	1.04	0.82	0.95	0.86	Existing Middletown UVLS
LOWR LKE 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	0.84	0.83	0.67	0.89	0.89	0.86	0.87	1.04	0.82	0.95	0.87	Existing Middletown UVLS
DUNBAR 60kV	P1-2:A2:67:_LAKEVILLE #1 60KV [7360]	P1	N-1	0.92	0.92	0.84	0.98	0.98	0.95	0.95	1.05	0.91	0.99	0.95	Continue to Monitor
ST.HELNA 60kV	P1-2:A2:67:_LAKEVILLE #1 60KV [7360]	P1	N-1	0.94	0.94	0.88	0.99	0.98	0.96	0.97	1.05	0.94	1.00	0.97	Continue to Monitor
CALISTGA 60kV	P1-2:A2:1:_FULTON-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P1	N-1	0.94	0.93	0.89	0.97	0.96	0.93	0.98	1.03	0.93	0.96	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P1-2:A2:2:_GEYSR18-LAKEVILLE-GEYSR20-GEYSR13 230KV [0] MOAS OPENED ON G13TT1_8_SANTAFE	P1	N-1	0.95	0.94	0.90	0.97	0.96	0.94	0.98	1.03	0.94	0.97	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P1-2:A2:67:_LAKEVILLE #1 60KV [7360]	P1	N-1	0.89	0.88	0.80	0.95	0.94	0.91	0.94	1.04	0.88	0.96	0.94	Switch in Fulton 230kV SVD
CALISTGA 60kV	P1-3:A2:1:_FULTON 230/115KV TB 4	P1	N-1	0.95	0.93	0.90	0.97	0.96	0.93	0.98	1.03	0.93	0.97	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P1-3:A2:26:_FULTON 115/60KV TB 1	P1	N-1	0.95	0.94	0.90	0.97	0.96	0.93	0.97	1.03	0.93	0.98	0.97	Switch in Fulton 230kV SVD
CALISTGA 60kV	P1-3:A2:27:_FULTON 115/60KV TB 2	P1	N-1	0.95	0.94	0.90	0.97	0.96	0.93	0.97	1.03	0.93	0.98	0.97	Switch in Fulton 230kV SVD
CALISTGA 60kV	P1-3:A2:2:_FULTON 230/115KV TB 9	P1	N-1	0.94	0.93	0.90	0.97	0.96	0.93	0.98	1.02	0.93	0.97	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P1-4:A2:6:_FULTON SVD=V	P1	N-1	0.95	0.95	0.90	0.97	0.96	0.94	0.98	1.03	0.94	0.98	0.98	Switch in Fulton 230kV SVD
PENNGRVE 115kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	0.90	0.94	0.89	0.92	0.97	0.96	0.89	1.00	0.93	0.94	0.89	Operating Solution
MONROE1 115kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	0.84	0.91	0.83	0.89	0.97	0.96	0.82	1.01	0.91	0.90	0.82	Operating Solution
MONROE2 115kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	0.84	0.91	0.83	0.89	0.97	0.96	0.82	1.01	0.91	0.90	0.82	Operating Solution
SNTA RSA 115kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	0.84	0.91	0.83	0.89	0.97	0.96	0.83	1.01	0.91	0.90	0.83	Operating Solution
STNY PTP 115kV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	0.86	0.92	0.85	0.90	0.97	0.96	0.84	1.01	0.92	0.91	0.84	Operating Solution

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
STONY PT 115KV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	0.86	0.92	0.85	0.90	0.97	0.96	0.84	1.00	0.92	0.91	0.84	Operating Solution
BELLVUE 115KV	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	0.87	0.92	0.85	0.90	0.97	0.96	0.85	1.00	0.92	0.92	0.85	Operating Solution
SONOMA 115KV	P2-4:A2:11:_LAKEVILLE 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	0.74	0.74	0.74	1.00	1.01	0.98	0.84	1.07	0.73	0.90	0.84	Operating Solution
WILLITS 60KV	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	0.95	0.94	0.48	0.92	0.91	0.58	0.96	1.04	0.93	0.98	0.96	Operating Solution
LYTNVILLE 60KV	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	0.92	0.91	0.44	0.87	0.87	0.55	0.94	1.03	0.91	0.96	0.94	New reactive device
COVELO6 60KV	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	0.91	0.90	0.42	0.87	0.87	0.54	0.93	1.04	0.90	0.96	0.93	New reactive device
HARTLEY 60KV	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	0.94	0.93	NConv	0.96	0.94	0.90	0.93	1.03	0.92	0.99	0.93	Continue to Monitor
HARTLEY 60KV	P2-3:A2:25:_EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2-3	Non-Bus-Tie Breaker	0.94	0.93	NConv	0.96	0.94	0.90	0.93	1.03	0.92	0.99	0.93	Continue to Monitor
CLER LKE 60KV	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	0.93	0.92	NConv	0.95	0.94	0.89	0.93	1.03	0.91	0.98	0.93	Continue to Monitor
CLER LKE 60KV	P2-3:A2:25:_EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2-3	Non-Bus-Tie Breaker	0.93	0.92	NConv	0.95	0.94	0.89	0.93	1.03	0.91	0.98	0.93	Continue to Monitor
CLER LKE 60KV	P2-3:A2:26:_EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2-3	Non-Bus-Tie Breaker	0.93	0.92	NConv	0.95	0.94	0.89	0.93	1.03	0.92	0.98	0.93	Continue to Monitor
KONOCI6 60KV	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	0.88	0.86	NConv	0.92	0.90	0.86	0.88	1.04	0.85	0.96	0.88	Existing Middletown UVLS
KONOCI6 60KV	P2-3:A2:25:_EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2-3	Non-Bus-Tie Breaker	0.88	0.86	NConv	0.92	0.90	0.86	0.88	1.04	0.85	0.96	0.88	Existing Middletown UVLS
KONOCI6 60KV	P2-3:A2:26:_EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2-3	Non-Bus-Tie Breaker	0.88	0.86	NConv	0.92	0.90	0.87	0.88	1.04	0.85	0.96	0.88	Existing Middletown UVLS
KONOCI6 60KV	P2-3:A2:27:_EGLE RCK - MA 115KV & EGLE RCK-HOMSTKTP-CORTINA LINE	P2-3	Non-Bus-Tie Breaker	0.87	0.86	NConv	0.92	0.91	NConv	0.90	1.04	0.86	0.96	0.90	Existing Middletown UVLS
LOWR LKE 60KV	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	0.85	0.83	NConv	0.91	0.89	0.85	0.87	1.04	0.82	0.95	0.87	Existing Middletown UVLS
LOWR LKE 60KV	P2-3:A2:25:_EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2-3	Non-Bus-Tie Breaker	0.85	0.83	NConv	0.91	0.89	0.85	0.87	1.04	0.82	0.95	0.87	Existing Middletown UVLS
LOWR LKE 60KV	P2-3:A2:26:_EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2-3	Non-Bus-Tie Breaker	0.85	0.83	NConv	0.91	0.89	0.86	0.86	1.04	0.82	0.95	0.86	Existing Middletown UVLS
LOWR LKE 60KV	P2-3:A2:27:_EGLE RCK - MA 115KV & EGLE RCK-HOMSTKTP-CORTINA LINE	P2-3	Non-Bus-Tie Breaker	0.84	0.83	NConv	0.91	0.90	NConv	0.88	1.04	0.83	0.95	0.88	Existing Middletown UVLS
MIDDLTWN 60KV	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	0.81	0.79	NConv	0.89	0.87	0.85	0.84	1.04	0.78	0.93	0.84	Existing Middletown UVLS
MIDDLTWN 60KV	P2-3:A2:25:_EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2-3	Non-Bus-Tie Breaker	0.81	0.79	NConv	0.89	0.87	0.85	0.84	1.04	0.78	0.93	0.84	Existing Middletown UVLS
MIDDLTWN 60KV	P2-3:A2:26:_EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2-3	Non-Bus-Tie Breaker	0.81	0.78	NConv	0.89	0.87	0.86	0.84	1.04	0.78	0.93	0.84	Existing Middletown UVLS
MIDDLTWN 60KV	P2-3:A2:27:_EGLE RCK - MA 115KV & EGLE RCK-HOMSTKTP-CORTINA LINE	P2-3	Non-Bus-Tie Breaker	0.80	0.79	NConv	0.89	0.88	NConv	0.86	1.04	0.79	0.93	0.86	Existing Middletown UVLS
MIDDLTWN 60KV	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	0.94	0.93	0.78	0.97	0.97	0.96	0.96	1.04	0.93	0.98	0.96	Existing Middletown UVLS
EGLE RCK 60KV	P2-2:A2:21:_EGLE RCK 115KV SECTION MA	P2-2	Bus	0.88	0.86	NConv	0.92	0.90	0.86	0.88	1.04	0.85	0.96	0.88	Operating Solution
EGLE RCK 60KV	P2-3:A2:25:_EGLE RCK - MA 115KV & EGLE RCK-FULTON-SILVERDO LINE	P2-3	Non-Bus-Tie Breaker	0.88	0.86	NConv	0.92	0.90	0.86	0.88	1.04	0.85	0.96	0.88	Operating Solution

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
EGLE RCK 60kV	P2-3:A2:26:_EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2-3	Non-Bus-Tie Breaker	0.88	0.86	NConv	0.92	0.90	0.87	0.88	1.04	0.85	0.96	0.88	Operating Solution
EGLE RCK 60kV	P2-3:A2:27:_EGLE RCK - MA 115KV & EGLE RCK-HOMSTKTP-CORTINA LINE	P2-3	Non-Bus-Tie Breaker	0.87	0.86	NConv	0.92	0.91	NConv	0.90	1.04	0.86	0.96	0.90	Operating Solution
PUEBLO 115kV	P2-4:A2:11:_LAKEVILLE 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	0.78	0.79	0.78	1.01	1.01	0.99	0.86	1.07	0.78	0.93	0.86	Operating Solution
CALISTGA 60kV	P2-1:A2:2:_GEYSERS #12-FULTON 230KV [4750] [CR1T3 18-FULTON]	P2-1	"Line Section w/o Fault	0.94	0.93	0.89	0.97	0.96	0.93	0.98	1.03	0.93	0.96	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P2-2:A2:5:_NCPA2 230KV SECTION 1D	P2-2	Bus	0.94	0.93	0.89	0.97	0.96	0.93	0.98	1.03	0.93	0.96	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P2-3:A2:11:_FULTON 230KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie Breaker	0.95	0.94	0.90	0.97	0.96	0.93	0.97	1.02	0.93	0.97	0.97	Switch in Fulton 230kV SVD
CALISTGA 60kV	P2-3:A2:2:_GEYSR18 - 1D 230KV & GEYSR18-LAKEVILE-GEYSR20-GEYSR13 LINE	P2-3	Non-Bus-Tie Breaker	0.95	0.94	0.90	0.97	0.96	0.94	0.98	1.03	0.94	0.97	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P2-3:A2:5:_SANTAFE - 1D 230KV & GEYSR18-LAKEVILE-GEYSR20-GEYSR13 LINE	P2-3	Non-Bus-Tie Breaker	0.95	0.94	0.90	0.97	0.96	0.94	0.98	1.03	0.94	0.97	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P2-3:A2:6:_GEYSR13 - 1D 230KV & GEYSR18-LAKEVILE-GEYSR20-GEYSR13 LINE	P2-3	Non-Bus-Tie Breaker	0.95	0.94	0.90	0.97	0.96	0.94	0.98	1.03	0.94	0.97	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P2-3:A2:7:_GEYSR20 - 1D 230KV & GEYSR18-LAKEVILE-GEYSR20-GEYSR13 LINE	P2-3	Non-Bus-Tie Breaker	0.95	0.94	0.90	0.97	0.96	0.94	0.98	1.03	0.94	0.97	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P2-4:A2:11:_LAKEVILLE 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	0.95	0.93	0.89	0.97	0.97	0.94	0.97	1.03	0.93	0.97	0.97	Switch in Fulton 230kV SVD
CALISTGA 60kV	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	0.95	0.95	0.89	0.97	0.96	0.93	0.98	1.03	0.94	0.98	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:67:_LAKEVILLE #1 60KV [7360]	P3	G-1/N-1	0.89	0.87	0.79	NA	NA	NA	NA	NA	0.87	NA	NA	Switch in Fulton 230kV SVD
COVELO6 60kV	P1-1:A2:18:_POTTRVLY 2.40KV GEN UNIT 1 & P1-2:A2:43:_MENDOCINO-WILLITS-FORT BRAGG 60KV [7550] MOAS OPENED ON FRT BRGG_BIG RIVR	P3	G-1/N-1	NA	NA	0.90	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
DUNBAR 60kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:67:_LAKEVILLE #1 60KV [7360]	P3	G-1/N-1	NA	NA	0.84	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
EGLE RCK 60kV	P1-1:A2:15:_GEYSER18 13.80KV GEN UNIT 1 & P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P3	G-1/N-1	NA	NA	0.70	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
GUALALA 60kV	P1-1:A2:6:_GEYSR5-6 13.80KV GEN UNIT 2 & P1-2:A2:61:_FULTON-MOLINO-COTATI 60KV [6910] MOAS OPENED ON SNMA TAP_SNMALDFL	P3	G-1/N-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
HARTLEY 60kV	P1-1:A2:15:_GEYSER18 13.80KV GEN UNIT 1 & P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	NA	NA	0.80	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
KONOCTI6 60kV	P1-1:A2:15:_GEYSER18 13.80KV GEN UNIT 1 & P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	NA	NA	0.69	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		
LOWR LKE 60kV	P1-1:A2:15:_GEYSER18 13.80KV GEN UNIT 1 & P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	NA	NA	0.66	NA	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
LYTNVLE 60kV	P1-1:A6:6:_MONTICLO 9.11KV GEN UNIT 3 & P1-2:A2:56:_LAYTONVILLE-WILLITS 60KV [8360]	P3	G-1/N-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.86	NA	NA	Continue to Monitor
MIDDLTWN 60kV	P1-1:A2:15:_GEYSER18 13.80KV GEN UNIT 1 & P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	NA	NA	0.62	0.87	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
ST.HELNA 60kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:67:_LAKEVILLE #1 60KV [7360]	P3	G-1/N-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
UPPR LKE 60kV	P1-1:A2:15:_GEYSER18 13.80KV GEN UNIT 1 & P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
CR1T3_18 230kV	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	0.88	0.94	NConv	0.99	0.99	0.97	0.97	1.02	0.92	1.00	0.97	NA	Add Redunctane Battery
G14CRT15 230kV	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	0.89	0.94	NConv	1.00	1.00	0.98	0.98	1.02	0.93	1.00	0.98	NA	Add Redunctane Battery
GEYSR12 230kV	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	0.89	0.94	NConv	1.00	1.00	0.98	0.98	1.02	0.93	1.00	0.98	NA	Add Redunctane Battery
GEYSR14 230kV	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	0.89	0.94	NConv	1.00	1.00	0.98	0.98	1.02	0.93	1.00	0.98	NA	Add Redunctane Battery
G16T0_2 230kV	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	0.89	0.94	NConv	1.00	1.00	0.98	0.98	1.02	0.93	1.00	0.98	NA	Add Redunctane Battery
GEYSR16 230kV	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	0.89	0.94	NConv	1.00	1.00	0.98	0.98	1.02	0.93	1.00	0.98	NA	Add Redunctane Battery
NCPA2 230kV	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	0.89	0.94	NConv	1.00	1.00	0.98	0.98	1.02	0.93	1.00	0.98	NA	Add Redunctane Battery
BOTTLERK 230kV	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	0.86	0.91	NConv	0.99	0.99	0.95	0.96	1.02	0.89	1.00	0.96	NA	Add Redunctane Battery
GEYSR17 230kV	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	0.86	0.91	NConv	0.99	0.99	0.95	0.96	1.02	0.89	1.00	0.96	NA	Add Redunctane Battery
FULTON 230kV	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	0.84	0.89	NConv	0.97	0.97	0.93	0.93	1.03	0.87	0.99	0.93	NA	Add Redunctane Battery
IGNACIO 230kV	P5-5c(DC):A2:8: Station DC Battery Supply "EGLE ROCK 115-60kV Batt"	P5	Non-Redundant Relay	0.88	0.90	NConv	0.96	0.96	0.92	0.95	1.01	0.89	0.98	0.95	NA	Add Redunctane Battery
PENNGRVE 115kV	P5-5A:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.90	0.92	0.74	0.93	0.95	0.95	0.90	1.01	0.92	0.94	0.90	NA	Add Redunctane Relay



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
PENNGRVE 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.90	0.94	0.90	0.92	0.97	0.96	0.89	1.00	0.94	0.93	0.89	Add Redunctane Relay
PENNGRVE 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.78	0.87	NConv	0.99	1.01	0.96	0.90	1.08	0.85	0.98	0.90	Add Redunctane Relay
FULTON 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.84	0.86	0.58	0.91	0.94	0.92	0.83	1.01	0.86	0.91	0.83	Add Redunctane Relay
FULTON 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.83	0.89	NConv	1.01	1.01	0.96	0.94	1.07	0.87	1.01	0.94	Add Redunctane Relay
MONROE1 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.84	0.87	0.59	0.91	0.94	0.92	0.83	1.01	0.87	0.91	0.83	Add Redunctane Relay
MONROE1 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.84	0.92	0.84	0.89	0.98	0.96	0.82	1.01	0.91	0.90	0.82	Add Redunctane Relay
MONROE1 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.81	0.88	NConv	1.00	1.01	0.96	0.92	1.08	0.87	1.00	0.92	Add Redunctane Relay
MONROE2 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.84	0.87	0.59	0.91	0.94	0.92	0.83	1.01	0.87	0.91	0.83	Add Redunctane Relay
MONROE2 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.81	0.88	NConv	0.99	1.01	0.96	0.92	1.08	0.87	0.99	0.92	Add Redunctane Relay
SNTA RSA 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.84	0.87	0.60	0.91	0.94	0.93	0.83	1.01	0.87	0.91	0.83	Add Redunctane Relay
SNTA RSA 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.84	0.92	0.84	0.89	0.98	0.96	0.83	1.00	0.91	0.90	0.83	Add Redunctane Relay
SNTA RSA 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.80	0.88	NConv	0.99	1.01	0.96	0.91	1.08	0.86	0.99	0.91	Add Redunctane Relay
STNY PTP 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.86	0.89	0.64	0.91	0.95	0.93	0.85	1.01	0.88	0.92	0.85	Add Redunctane Relay
STNY PTP 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.86	0.92	0.86	0.89	0.97	0.96	0.84	1.00	0.92	0.91	0.84	Add Redunctane Relay
STNY PTP 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.79	0.88	NConv	0.99	1.01	0.96	0.90	1.08	0.86	0.99	0.90	Add Redunctane Relay
STONY PT 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.86	0.89	0.64	0.91	0.94	0.93	0.85	1.01	0.88	0.92	0.85	Add Redunctane Relay
STONY PT 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.86	0.92	0.86	0.89	0.97	0.96	0.84	1.00	0.92	0.91	0.84	Add Redunctane Relay

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
STONY PT 115kV	P5-5A:A2:8:_ FULTON BUS 115 KV 1 & 2 SECTION D(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.79	0.88	NConv	0.99	1.01	0.96	0.90	1.08	0.86	0.99	0.90	Add Redunctane Relay
BELLVUE 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.87	0.89	0.66	0.92	0.95	0.93	0.86	1.01	0.89	0.93	0.86	Add Redunctane Relay
RINCON 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.85	0.87	0.57	0.92	0.95	0.93	0.85	1.02	0.87	0.92	0.85	Add Redunctane Relay
CORONA 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.95	0.95	0.82	0.96	0.97	0.96	0.95	1.00	0.95	0.97	0.95	Add Redunctane Relay
SONOMA 115kV	P5-5A:A2:10:_ LAKEVILLE 115 KV BUS 1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.74	0.74	0.74	1.00	1.01	0.98	0.84	1.07	0.73	0.90	0.84	Add Redunctane Relay
WILLITS 60kV	P5-5A:A2:11:_ MENDOCINO 115 KV BUS 1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.95	0.96	0.50	0.92	0.91	0.58	0.95	1.04	0.96	0.97	0.95	Add Redunctane Relay
LYTNVLE 60kV	P5-5A:A2:11:_ MENDOCINO 115 KV BUS 1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.92	0.93	0.45	0.87	0.87	0.55	0.93	1.03	0.93	0.96	0.93	Add Redunctane Relay
COVELO6 60kV	P5-5A:A2:11:_ MENDOCINO 115 KV BUS 1&2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.91	0.92	0.44	0.87	0.87	0.54	0.93	1.03	0.92	0.96	0.93	Add Redunctane Relay
HARTLEY 60kV	P4-2:A2:1:_NO BF RELAY EAGLE ROCK 115KV CB 142	P5	Non-Redundant Relay	0.95	0.93	0.55	0.96	0.95	0.91	0.93	1.03	0.92	0.99	0.93	Add Redunctane Relay
HARTLEY 60kV	P5-5A:A2:7:_EAGLE ROCK 115KV(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.94	0.92	NConv	0.96	0.94	0.90	0.93	1.03	0.92	0.99	0.93	Add Redunctane Relay
CLER LKE 60kV	P4-2:A2:1:_NO BF RELAY EAGLE ROCK 115KV CB 142	P5	Non-Redundant Relay	0.94	0.92	0.53	0.96	0.94	0.90	0.93	1.03	0.91	0.98	0.93	Add Redunctane Relay
CLER LKE 60kV	P5-5A:A2:7:_EAGLE ROCK 115KV(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.94	0.92	NConv	0.95	0.94	0.89	0.93	1.03	0.92	0.98	0.93	Add Redunctane Relay
KONOCIT6 60kV	P4-2:A2:1:_NO BF RELAY EAGLE ROCK 115KV CB 142	P5	Non-Redundant Relay	0.88	0.86	0.47	0.92	0.91	0.88	0.88	1.04	0.85	0.96	0.88	Add Redunctane Relay
KONOCIT6 60kV	P5-5A:A2:7:_EAGLE ROCK 115KV(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.88	0.85	NConv	0.92	0.90	0.86	0.88	1.04	0.85	0.96	0.88	Add Redunctane Relay
LOWR LKE 60kV	P4-2:A2:1:_NO BF RELAY EAGLE ROCK 115KV CB 142	P5	Non-Redundant Relay	0.86	0.83	0.44	0.91	0.89	0.88	0.87	1.04	0.82	0.95	0.86	Add Redunctane Relay
LOWR LKE 60kV	P5-5A:A2:7:_EAGLE ROCK 115KV(FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.86	0.83	NConv	0.91	0.89	0.85	0.86	1.04	0.82	0.95	0.86	Add Redunctane Relay
MIDDLTWN 60kV	P4-2:A2:1:_NO BF RELAY EAGLE ROCK 115KV CB 142	P5	Non-Redundant Relay	0.82	0.78	0.41	0.89	0.87	0.88	0.84	1.04	0.77	0.93	0.84	Add Redunctane Relay

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
MIDDLTWN 60kV	P5-5A:A2:11:_ MENDOCINO 115 KV BUS 1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.94	0.93	0.81	0.98	0.97	0.95	0.96	1.04	0.93	0.98	0.96	Add Redunctane Relay
MIDDLTWN 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.95	0.94	0.55	0.99	0.99	1.03	0.96	1.04	0.95	0.99	0.96	Add Redunctane Relay
MIDDLTWN 60kV	P5-5A:A2:7:_ EAGLE ROCK 115KV(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.81	0.78	NConv	0.89	0.87	0.85	0.84	1.05	0.78	0.93	0.84	Add Redunctane Relay
EGLE RCK 60kV	P5-5A:A2:7:_ EAGLE ROCK 115KV(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.88	0.85	NConv	0.92	0.90	0.86	0.88	1.04	0.85	0.96	0.88	Add Redunctane Relay
GUALALA 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.84	0.86	0.41	0.88	0.91	0.82	0.79	1.05	0.86	0.98	0.79	Add Redunctane Relay
ANNAPOLS 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.85	0.87	0.44	0.90	0.93	0.85	0.81	1.05	0.87	0.98	0.81	Add Redunctane Relay
FORT RSS 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.86	0.88	0.46	0.91	0.94	0.87	0.82	1.05	0.88	0.98	0.81	Add Redunctane Relay
SLMN CRK 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.86	0.88	0.46	0.91	0.94	0.88	0.82	1.05	0.88	0.97	0.82	Add Redunctane Relay
MONTE RO 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.87	0.89	0.49	0.93	0.96	0.91	0.83	1.04	0.89	0.98	0.83	Add Redunctane Relay
MONTE RO 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.86	0.92	NConv	1.01	1.00	0.94	0.96	1.05	0.90	1.04	0.96	Add Redunctane Battery
WOHLER 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.88	0.91	0.56	0.96	0.99	0.96	0.86	1.04	0.91	0.97	0.86	Add Redunctane Relay
WOHLER 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.87	0.94	NConv	1.04	1.03	0.99	0.98	1.05	0.91	1.04	0.98	Add Redunctane Battery
MIRABEL 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.88	0.91	0.55	0.96	0.99	0.95	0.86	1.04	0.91	0.97	0.86	Add Redunctane Relay
MIRABEL 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.87	0.93	NConv	1.04	1.03	0.98	0.98	1.05	0.91	1.04	0.98	Add Redunctane Battery
MOLINO 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.85	0.88	0.56	0.95	0.98	0.95	0.83	1.04	0.88	0.96	0.83	Add Redunctane Relay
MOLINO 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.85	0.91	NConv	1.03	1.02	0.93	0.96	1.05	0.89	1.03	0.96	Add Redunctane Battery
GYSRVLE 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.85	0.88	0.52	0.95	0.98	0.95	0.85	1.03	0.88	0.95	0.85	Add Redunctane Relay

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
GYSRVILLE 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.84	0.90	NConv	1.01	1.01	0.97	0.96	1.04	0.88	1.01	0.96	Add Redunctane Battery
GYSR 1-2 60kV	P5-5A:A2:1: FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.86	0.88	0.53	0.95	0.98	0.95	0.85	1.03	0.88	0.95	0.85	Add Redunctane Relay
GYSR 1-2 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.84	0.90	NConv	1.01	1.02	0.97	0.96	1.03	0.88	1.01	0.96	Add Redunctane Battery
WINDSOR 60kV	P5-5A:A2:1: FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.86	0.89	0.55	0.96	0.99	0.96	0.86	1.03	0.89	0.95	0.86	Add Redunctane Relay
WINDSOR 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.85	0.91	NConv	1.02	1.03	0.98	0.97	1.04	0.89	1.02	0.97	Add Redunctane Battery
FULTON 60kV	P5-5A:A2:1: FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.89	0.91	0.59	0.97	1.00	0.97	0.88	1.04	0.91	0.97	0.88	Add Redunctane Relay
FULTON 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.88	0.94	NConv	1.05	1.04	1.00	1.00	1.05	0.92	1.04	1.00	Add Redunctane Battery
FTCH MTN 60kV	P5-5A:A2:1: FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.86	0.88	0.54	0.95	0.98	0.95	0.85	1.03	0.88	0.95	0.85	Add Redunctane Relay
FTCH MTN 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.84	0.91	NConv	1.02	1.02	0.98	0.96	1.04	0.89	1.01	0.96	Add Redunctane Battery
FTCHMTNP 60kV	P5-5A:A2:1: FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.86	0.89	0.54	0.95	0.98	0.96	0.86	1.03	0.89	0.95	0.86	Add Redunctane Relay
FTCHMTNP 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.85	0.91	NConv	1.02	1.02	0.98	0.97	1.04	0.89	1.01	0.97	Add Redunctane Battery
LAGUNA 60kV	P5-5A:A2:1: FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.84	0.87	0.61	0.93	0.96	0.95	0.82	1.04	0.87	0.95	0.82	Add Redunctane Relay
LAGUNA 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.83	0.90	NConv	1.01	1.01	0.86	0.95	1.05	0.87	1.02	0.95	Add Redunctane Battery
COTATI 60kV	P5-5A:A2:1: FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.84	0.86	0.65	0.92	0.96	0.95	0.81	1.04	0.86	0.96	0.81	Add Redunctane Relay
COTATI 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.83	0.89	NConv	1.01	1.00	0.81	0.94	1.05	0.87	1.03	0.94	Add Redunctane Battery
SNMALDFL 60kV	P5-5A:A2:1: FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.84	0.86	0.65	0.93	0.96	0.95	0.81	1.04	0.86	0.96	0.81	Add Redunctane Relay
SNMALDFL 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.83	0.89	NConv	1.01	1.00	0.82	0.94	1.05	0.87	1.03	0.94	Add Redunctane Battery

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
DUNBAR 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.71	0.78	NConv	0.98	0.98	0.90	0.90	1.06	0.75	0.98	0.90	Add Redunctane Battery
SILVERDO 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.85	0.87	0.55	0.94	0.96	0.94	0.85	1.03	0.87	0.92	0.85	Add Redunctane Relay
SILVERDO 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.83	0.89	NConv	1.01	1.01	0.96	0.95	1.08	0.87	1.00	0.95	Add Redunctane Battery
MONTCLLO 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.85	0.87	0.55	0.94	0.96	0.94	0.85	1.03	0.87	0.93	0.85	Add Redunctane Relay
MONTCLLO 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.83	0.89	NConv	1.01	1.01	0.96	0.95	1.08	0.87	1.00	0.95	Add Redunctane Battery
MNTCLOPH 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.85	0.87	0.55	0.94	0.96	0.94	0.86	1.04	0.87	0.93	0.86	Add Redunctane Relay
MNTCLOPH 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.83	0.89	NConv	1.01	1.01	0.96	0.95	1.08	0.87	1.00	0.95	Add Redunctane Battery
PUEBLO 115kV	P5-5A:A2:1:_ LAKEVILLE 115 KV BUS 1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.78	0.79	0.78	1.01	1.01	0.99	0.86	1.07	0.78	0.93	0.86	Add Redunctane Relay
PUEBLO 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.89	0.90	0.73	0.94	0.95	0.94	0.89	1.00	0.90	0.94	0.89	Add Redunctane Relay
PUEBLO 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.57	0.62	NConv	0.96	0.96	0.89	0.80	1.07	0.60	0.91	0.80	Add Redunctane Battery
LS GLLNS 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.89	0.92	NConv	1.00	1.00	0.96	0.97	1.06	0.91	1.01	0.97	Add Redunctane Battery
SAN RAFL 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.89	0.92	NConv	1.00	1.00	0.96	0.97	1.06	0.90	1.01	0.97	Add Redunctane Battery
SKAGGS 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.90	0.93	NConv	1.00	1.00	0.96	0.97	1.06	0.91	1.02	0.97	Add Redunctane Battery
HIGHWAY 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.95	0.95	0.86	1.03	1.04	1.01	0.98	1.07	0.95	0.99	0.98	Add Redunctane Relay
HIGHWAY 115kV	P5-5c(DC):A2:1: Station DC Battery Supply "FULTON 230-115-60kV Batt"	P5	Non-Redundant Relay	0.94	0.95	0.88	1.03	1.04	1.01	0.98	1.06	0.95	0.98	0.98	Add Redunctane Battery
HIGHWAY 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.85	0.88	NConv	0.99	0.98	0.94	0.95	1.06	0.86	0.98	0.95	Add Redunctane Battery
JMSCNPMP 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.89	0.92	NConv	1.00	1.00	0.96	0.97	1.06	0.91	1.01	0.97	Add Redunctane Battery

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
NTWR ALT 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.95	0.95	0.86	1.03	1.04	1.01	0.98	1.07	0.95	0.99	0.98	Add Redunctane Relay
NTWR ALT 115kV	P5-5c(DC):A2:1: Station DC Battery Supply "FULTON 230-115-60kV Batt"	P5	Non-Redundant Relay	0.94	0.95	0.88	1.03	1.04	1.01	0.97	1.06	0.95	0.98	0.97	Add Redunctane Battery
NTWR ALT 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.85	0.87	NConv	0.99	0.98	0.93	0.95	1.06	0.86	0.98	0.95	Add Redunctane Battery
CARQUINZ 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.89	0.92	NConv	1.00	1.00	0.96	0.97	1.06	0.91	1.01	0.97	Add Redunctane Battery
MEYERTP1 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.89	0.92	NConv	1.00	1.00	0.96	0.97	1.06	0.91	1.01	0.97	Add Redunctane Battery
MEYERTP2 115kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.95	0.95	0.86	1.03	1.04	1.01	0.98	1.06	0.95	0.99	0.98	Add Redunctane Relay
MEYERTP2 115kV	P5-5c(DC):A2:1: Station DC Battery Supply "FULTON 230-115-60kV Batt"	P5	Non-Redundant Relay	0.94	0.95	0.88	1.03	1.04	1.01	0.97	1.06	0.95	0.98	0.97	Add Redunctane Battery
MEYERTP2 115kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.85	0.87	NConv	0.99	0.98	0.93	0.95	1.06	0.86	0.98	0.95	Add Redunctane Battery
ST.HELNA 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.82	0.85	0.51	0.93	0.96	0.92	0.84	1.03	0.85	0.93	0.84	Add Redunctane Relay
ST.HELNA 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.74	0.81	NConv	0.99	0.98	0.92	0.92	1.05	0.78	0.99	0.92	Add Redunctane Battery
CALISTGA 60kV	P5-5A:A2:10:_ LAKEVILLE 115 KV BUS 1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.95	0.93	0.89	0.97	0.97	0.94	0.97	1.03	0.93	0.97	0.97	Add Redunctane Relay
CALISTGA 60kV	P5-5A:A2:11:_ MENDOCINO 115 KV BUS 1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.95	0.95	0.90	0.97	0.96	0.93	0.98	1.03	0.94	0.98	0.98	Add Redunctane Relay
CALISTGA 60kV	P5-5A:A2:1:_ FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.76	0.78	0.43	0.89	0.92	0.86	0.80	1.02	0.78	0.89	0.80	Add Redunctane Relay
CALISTGA 60kV	P5-5A:A2:2:_ FULTON 230 KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.94	0.93	0.81	0.97	0.96	0.93	0.95	1.02	0.94	0.97	0.95	Add Redunctane Relay
CALISTGA 60kV	P5-5c(DC):A2:2: Station DC Battery Supply "LAKEVILLE 230-115-60kV Batt"	P5	Non-Redundant Relay	0.67	0.74	NConv	0.95	0.94	0.85	0.88	1.04	0.70	0.95	0.88	Add Redunctane Battery
2365-WD 60kV	P1-3:A2:2:_ FULTON 230/115KV TB 9 & P1-3:A2:1:_ FULTON 230/115KV TB 4	P6	N-1-1	NA	0.86	NA	NA	NA	NA	NA	NA	0.86	NA	NA	Continue to Monitor
2606-WD 115kV	P1-2:A2:34:_LAKEVILLE-SONOMA #2 115KV [2070] & P1-2:A2:33:_LAKEVILLE-SONOMA #1 115KV [2063]	P6	N-1-1	NA	0.76	NA	NA	NA	NA	NA	NA	0.75	NA	NA	Continue to Monitor
AIDLINGYSR 115kV	P1-3:A2:2:_ FULTON 230/115KV TB 9 & P1-3:A2:1:_ FULTON 230/115KV TB 4	P6	N-1-1	NA	NA	0.70	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
ANNAPOLS 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.26	NA	NA	0.28	NA	0.62	NA	0.39	NA	Continue to Monitor
BELLVUE 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	0.87	0.89	0.70	NA	NA	NA	0.86	NA	0.89	NA	0.86	Operating Solution
BIG RIVR 60kV	P1-2:A2:24: EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.49	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
CALISTGA 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.25	NA	NA	0.29	NA	0.58	NA	0.32	NA	Continue to Monitor
CALPELLA 115kV	P1-2:A2:11: MENDOCINO-UKIAH 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	0.76	0.74	0.50	0.80	0.80	0.72	0.76	0.88	0.74	0.83	0.76	Continue to Monitor
CARQUINZ 115kV	P1-3:A6:5: IGNACIO 230/115KV TB 6 & P1-2:A6:20: JAMESON CANYON PUMPING PLANT TAP 115KV [1833] MOAS OPENED ON SKGGS J1_HGHWY J1	P6	N-1-1	NA	NA	0.90	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
CLER LKE 60kV	P1-3:A2:25: EGLE RCK 115/60KV TB 1 & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	0.90	0.90	0.47	NA	NA	0.57	NA	NA	0.90	NA	NA	Operating Solution
CLOVRDLE 115kV	P1-2:A2:11: MENDOCINO-UKIAH 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	0.77	0.76	0.53	0.81	0.81	0.73	0.77	0.89	0.76	0.84	0.77	Operating Solution
CORONA 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
COTATI 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.52	NA	NA	0.55	NA	0.62	NA	0.38	NA	Continue to Monitor
COVELO6 60kV	P1-2:A2:24: EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.49	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
DUNBAR 60kV	P1-4:A2:6: FULTON SVD=V & P1-2:A2:67: LAKEVILLE #1 60KV [7360]	P6	N-1-1	NA	NA	0.82	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
EGLE RCK 60kV	P1-3:A2:25: EGLE RCK 115/60KV TB 1 & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	0.84	0.41	NA	NA	0.52	NA	NA	0.83	NA	NA	Continue to Monitor
ELK 60kV	P1-2:A2:24: EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.50	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
FORT RSS 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.27	NA	NA	0.29	NA	0.62	NA	0.39	NA	Continue to Monitor
FRT BRGG 60kV	P1-2:A2:24: EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.48	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
FTCH MTN 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.34	NA	NA	0.38	NA	0.61	NA	0.41	NA	Continue to Monitor
FTCHMTNP 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.36	NA	NA	0.39	NA	0.62	NA	0.42	NA	Continue to Monitor
FULTON 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.34	NA	NA	0.38	NA	0.61	NA	0.39	NA	Continue to Monitor
GARCIA 60kV	P1-2:A2:24: EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.50	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
GEYSERS34 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	NA	NA	0.70	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
GEYSERS56 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	NA	NA	0.70	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
GEYSR11 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	NA	NA	0.71	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
GRANITE 60kV	P1-3:A2:25: EAGLE RCK 115/60KV TB 1 & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.52	NA	NA	0.61	NA	NA	NA	NA	NA	Continue to Monitor
GUALALA 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.24	NA	NA	0.26	NA	0.63	NA	0.39	NA	Continue to Monitor
GYSR 1-2 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.34	NA	NA	0.38	NA	0.61	NA	0.41	NA	Continue to Monitor
GYSRVLL 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.34	NA	NA	0.38	NA	0.61	NA	0.40	NA	Continue to Monitor
HARTLEY 60kV	P1-3:A2:25: EAGLE RCK 115/60KV TB 1 & P1-2:A2:42: MENDOCINO-HARTLEY 60KV [7510]	P6	N-1-1	0.85	0.85	0.48	0.88	0.87	0.51	0.87	NA	0.84	NA	0.87	Operating Solution
HIGHLAND 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	NA	NA	0.79	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
HIGHWAY 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
HOMEGRND 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	NA	NA	0.77	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
HOMEPROC 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	NA	NA	0.77	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
INDIN VL 115kV	P1-2:A2:24: EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
KONOC16 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1 & P1-2:A2:15:_GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	0.84	0.41	NA	NA	0.52	NA	NA	0.83	NA	NA	Continue to Monitor
LAGUNA 60kV	P1-3:A2:27:_FULTON 115/60KV TB 2 & P1-3:A2:26:_FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.44	NA	NA	0.47	NA	0.61	NA	0.37	NA	Continue to Monitor
LAKEVILLE 115kV	P1-3:A2:4:_LAKEVILLE 230/115KV TB 2 & P1-3:A2:3:_LAKEVILLE 230/115KV TB 1	P6	N-1-1	0.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Operating Solution
LOWR LKE 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1 & P1-2:A2:15:_GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	0.81	0.40	NA	NA	0.51	NA	NA	NA	NA	NA	Continue to Monitor
LUCERNE 115kV	P1-2:A2:21:_EAGLE ROCK-REDBUD 115KV [1480] & P1-2:A2:18:_CORTINA-MENDOCINO #1 115KV [1330] MOAS OPENED ON LUCERNJ1_LUCERNE	P6	N-1-1	NA	NA	0.57	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
LYTNVILLE 60kV	P1-2:A2:24:_EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15:_GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.50	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
MASONITE 60kV	P1-2:A2:24:_EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15:_GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.61	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
MCDWLLSW 60kV	P1-3:A2:6:_LAKEVILLE 230/60KV TB 5 & P1-3:A2:5:_LAKEVILLE 230/60KV TB 3	P6	N-1-1	NA	NA	NA	NA	NA	0.47	NA	NA	NA	NA	NA	Continue to Monitor
MENDOCNO 115kV	P1-2:A2:24:_EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15:_GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.58	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
MEYERTP2 115kV	P1-3:A2:2:_FULTON 230/115KV TB 9 & P1-3:A2:1:_FULTON 230/115KV TB 4	P6	N-1-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
MIDDLTWN 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1 & P1-2:A2:15:_GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	0.76	0.37	NA	NA	0.49	NA	NA	NA	NA	NA	Operating Solution
MIRABEL 60kV	P1-3:A2:27:_FULTON 115/60KV TB 2 & P1-3:A2:26:_FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.31	NA	NA	0.35	NA	0.62	NA	0.39	NA	Continue to Monitor
MNTCLOPH 115kV	P1-3:A2:2:_FULTON 230/115KV TB 9 & P1-3:A2:1:_FULTON 230/115KV TB 4	P6	N-1-1	0.85	0.87	0.58	NA	NA	NA	0.86	NA	0.87	NA	0.86	Operating Solution
MOLINO 60kV	P1-3:A2:27:_FULTON 115/60KV TB 2 & P1-3:A2:26:_FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.36	NA	NA	0.40	NA	0.62	NA	0.38	NA	Continue to Monitor
MONROE1 115kV	P1-3:A2:2:_FULTON 230/115KV TB 9 & P1-3:A2:1:_FULTON 230/115KV TB 4	P6	N-1-1	0.84	0.86	0.63	NA	NA	NA	0.83	NA	0.86	NA	0.83	Operating Solution
MONROE2 115kV	P1-3:A2:2:_FULTON 230/115KV TB 9 & P1-3:A2:1:_FULTON 230/115KV TB 4	P6	N-1-1	0.83	0.86	0.62	NA	NA	NA	0.83	NA	0.86	NA	0.83	Operating Solution
MONTCLLO 115kV	P1-3:A2:2:_FULTON 230/115KV TB 9 & P1-3:A2:1:_FULTON 230/115KV TB 4	P6	N-1-1	0.85	0.87	0.58	NA	NA	NA	0.86	NA	0.87	NA	0.86	Operating Solution

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
MONTE RO 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.29	NA	NA	0.32	NA	0.62	NA	0.39	NA	Continue to Monitor
NTWR ALT 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
PENNGRVE 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	0.90	NA	0.78	NA	NA	NA	0.90	NA	NA	NA	0.90	Operating Solution
PETLMA A 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.70	NA	NA	0.71	NA	NA	NA	NA	NA	Continue to Monitor
PETLMA C 60kV	P1-3:A2:6: LAKEVILLE 230/60KV TB 5 & P1-3:A2:5: LAKEVILLE 230/60KV TB 3	P6	N-1-1	NA	NA	NA	NA	NA	0.46	NA	NA	NA	NA	NA	Continue to Monitor
PHILO 60kV	P1-4:A2:5: BIG RIVR SVD=V & P1-2:A2:41: MENDOCINO-PHILO JCT-HOPLAND 60KV [7520] MOAS OPENED ON PHLO JCT HPLND JT	P6	N-1-1	NA	NA	0.50	NA	0.90	0.46	NA	NA	NA	NA	NA	Continue to Monitor
PNT ARNA 60kV	P1-2:A2:24: EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.50	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
PTTR VLY 60kV	P1-2:A2:24: EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.61	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
PUEBLO 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	0.89	0.90	0.77	NA	NA	NA	0.89	NA	0.90	NA	0.89	Operating Solution
Q1700 60kV	P1-3:A2:6: LAKEVILLE 230/60KV TB 5 & P1-3:A2:5: LAKEVILLE 230/60KV TB 3	P6	N-1-1	NA	NA	NA	NA	NA	0.48	NA	NA	NA	NA	NA	Continue to Monitor
REDBUD 115kV	P1-2:A2:24: EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15: GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.56	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
RINCON 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	0.85	0.87	0.61	NA	NA	NA	0.85	NA	0.87	NA	0.85	Switch in Fulton 230kV SVD
SILVERDO 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	0.85	0.87	0.59	NA	NA	NA	0.85	NA	0.87	NA	0.85	Switch in Fulton 230kV SVD
SLMN CRK 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.27	NA	NA	0.30	NA	0.62	NA	0.39	NA	Continue to Monitor
SNMALDFL 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.52	NA	NA	0.55	NA	0.62	NA	0.38	NA	Continue to Monitor
SNTA RSA 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	0.84	0.87	0.64	NA	NA	NA	0.84	NA	0.87	NA	0.84	Operating Solution
SONOMA 115kV	P1-2:A2:34: LAKEVILLE-SONOMA #2 115KV [2070] & P1-2:A2:33: LAKEVILLE-SONOMA #1 115KV [2063]	P6	N-1-1	0.75	0.76	0.76	NA	NA	NA	0.85	NA	0.75	NA	0.85	Operating Solution
ST.HELNA 60kV	P1-3:A2:27: FULTON 115/60KV TB 2 & P1-3:A2:26: FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.29	NA	NA	0.33	NA	0.60	NA	0.36	NA	Continue to Monitor
STNY PTP 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	0.86	0.88	0.68	NA	NA	NA	0.85	NA	0.88	NA	0.85	Operating Solution
STONY PT 115kV	P1-3:A2:2: FULTON 230/115KV TB 9 & P1-3:A2:1: FULTON 230/115KV TB 4	P6	N-1-1	0.86	0.88	0.68	NA	NA	NA	0.85	NA	0.88	NA	0.85	Operating Solution

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
UKIAH 115kV	P1-2:A2:11:_MENDOCINO-UKIAH 115KV [2420] MOAS OPENED ON MENDOCNO_CALPELLA & P1-2:A2:15:_GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	0.76	0.74	0.51	0.80	0.80	0.72	0.76	0.88	0.74	0.83	0.76	Operating Solution
UPPR LKE 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1 & P1-2:A2:15:_GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.54	NA	NA	0.63	NA	NA	NA	NA	NA	Continue to Monitor
WILLITS 60kV	P1-2:A2:24:_EAGLE ROCK-REDBUD 115KV [1480] (2) & P1-2:A2:15:_GEYSERS #3-CLOVERDALE 115KV [1650] MOAS OPENED ON AIDLINJCT_AIDLINGYSR	P6	N-1-1	NA	NA	0.55	NA	NA	NA	NA	NA	NA	NA	NA	Continue to Monitor
WINDSOR 60kV	P1-3:A2:27:_FULTON 115/60KV TB 2 & P1-3:A2:26:_FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.34	NA	NA	0.38	NA	0.61	NA	0.40	NA	Continue to Monitor
WOHLER 60kV	P1-3:A2:27:_FULTON 115/60KV TB 2 & P1-3:A2:26:_FULTON 115/60KV TB 1	P6	N-1-1	NA	NA	0.32	NA	NA	0.36	NA	0.61	NA	0.39	NA	Continue to Monitor
PENNGRVE 115kV	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	0.90	0.94	0.89	0.92	0.97	0.96	0.89	1.00	0.94	0.93	0.89	Operating Solution
MONROE1 115kV	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	0.84	0.92	0.83	0.89	0.97	0.96	0.82	1.01	0.91	0.89	0.83	Operating Solution
MONROE2 115kV	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	0.84	0.91	0.83	0.89	0.97	0.96	0.82	1.01	0.91	0.89	0.83	Operating Solution
SNTA RSA 115kV	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	0.84	0.92	0.83	0.89	0.97	0.96	0.82	1.01	0.91	0.89	0.83	Operating Solution
STNY PTP 115kV	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	0.86	0.92	0.85	0.90	0.97	0.96	0.84	1.01	0.92	0.91	0.85	Operating Solution
STONY PT 115kV	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	0.86	0.92	0.85	0.89	0.97	0.96	0.84	1.01	0.92	0.91	0.85	Operating Solution
BELLVUE 115kV	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	0.87	0.93	0.85	0.90	0.97	0.96	0.85	1.01	0.92	0.91	0.86	Operating Solution
SONOMA 115kV	P7-1:A2:16:_LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 LINES	P7	DCTL	0.75	0.76	0.76	1.00	1.00	0.98	0.85	1.06	0.75	0.90	0.85	Operating Solution
PUEBLO 115kV	P7-1:A2:16:_LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 LINES	P7	DCTL	0.80	0.81	0.80	1.01	1.00	0.99	0.87	1.06	0.80	0.93	0.87	Operating Solution
CALISTGA 60kV	P7-1:A2:10:_FULTON-IGNACIO #1 & FULTON-LAKEVILLE LINES	P7	DCTL	0.94	0.94	0.90	0.97	0.96	0.93	0.98	1.02	0.94	0.98	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P7-1:A2:11:_GEYSERS #12-FULTON & GEYSERS #9-LAKEVILLE LINES	P7	DCTL	0.94	0.94	0.90	0.97	0.97	0.94	0.97	1.02	0.94	0.97	0.97	Switch in Fulton 230kV SVD
CALISTGA 60kV	P7-1:A2:16:_LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 LINES	P7	DCTL	0.94	0.94	0.90	0.97	0.96	0.94	0.97	1.03	0.93	0.97	0.97	Switch in Fulton 230kV SVD
CALISTGA 60kV	P7-1:A2:21:_FULTON - HOPLAND 60 KV & GEYSER 12 - FULTON & GEYSER 17 - FULTON 230 KV LINES	P7	DCTL	0.94	0.94	0.90	0.97	0.96	0.93	0.96	1.03	0.93	0.97	0.96	Switch in Fulton 230kV SVD
CALISTGA 60kV	P7-1:A2:6:_GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	0.95	0.93	0.90	0.96	0.96	0.93	0.98	1.03	0.94	0.97	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P7-1:A6:10:_LAKEVILLE-SOBRAANTE #2 & IGNACIO-SOBRAANTE 230KV LINES	P7	DCTL	0.94	0.93	0.90	0.97	0.97	0.93	0.98	1.03	0.93	0.98	0.98	Switch in Fulton 230kV SVD

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
CALISTGA 60kV	P7-1:A6:17:_IGNACIO-SOBRAANTE 230KV & LAKEVILLE-SOBRAANTE #2 230KV & IGNACIO-MARE ISLAND #1 115KV LINES	P7	DCTL	0.94	0.94	0.90	0.97	0.97	0.93	0.98	1.03	0.93	0.98	0.98	Switch in Fulton 230kV SVD
CALISTGA 60kV	P7-1:A6:20:_VACA- LAKEVILLE #1 & TULLUCAY - VACA 230 KV LINE	P7	DCTL	0.95	0.94	0.90	0.97	0.97	0.93	0.97	1.03	0.94	0.98	0.97	Switch in Fulton 230kV SVD
CALISTGA 60kV	P7-1:A6:2:_LAKEVILLE-IGNACIO #1 & IGNACIO-SOBRAANTE LINES	P7	DCTL	0.94	0.94	0.90	0.97	0.97	0.93	0.98	1.03	0.93	0.98	0.98	Switch in Fulton 230kV SVD
ALTO 60kV	P7-1:A6:6:_IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 LINES	P7	DCTL	0.94	0.94	0.90	0.95	0.94	0.94	0.93	1.05	0.94	0.99	0.93	Operating Solution

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
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
CALISTGA 60kV	P1-2:A2:67:_LAKEVILLE #1 60KV [7360]	P1	N-1	< 8	< 8	11	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	Continue to Monitor
CLER LKE 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	< 8	< 8	20	< 8	< 8	11	< 8	< 8	< 8	< 8	< 8	Continue to Monitor
CLER LKE 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	< 8	< 8	20	< 8	< 8	11	< 8	< 8	< 8	< 8	< 8	Continue to Monitor
COVELO6 60kV	P1-2:A2:45:_LAYTONVILLE-WILLITS 60KV [8360]	P1	N-1	26	12	< 8	44	46	< 8	21	12	13	21	< 8	Project: Garberville area reinforcement project
DUNBAR 60kV	P1-2:A2:67:_LAKEVILLE #1 60KV [7360]	P1	N-1	< 8	< 8	15	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	Continue to Monitor
EGLE RCK 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	17	17	33	< 8	< 8	17	15	< 8	18	15	< 8	Operating Solution
GRANITE 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	< 8	< 8	16	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	Continue to Monitor
GRANITE 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	< 8	< 8	15	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	Continue to Monitor
HARTLEY 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	< 8	< 8	16	< 8	< 8	10	< 8	< 8	< 8	< 8	< 8	Continue to Monitor
HARTLEY 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	< 8	< 8	16	< 8	< 8	9	< 8	< 8	< 8	< 8	< 8	Continue to Monitor
KONOCTI6 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	14	15	30	< 8	11	16	13	< 8	15	13	< 8	Existing Middletown UVLS
KONOCTI6 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	14	15	30	< 8	< 8	16	12	< 8	15	12	< 8	Existing Middletown UVLS
LOWR LKE 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	15	15	32	11	12	17	13	< 8	16	13	< 8	Existing Middletown UVLS
LOWR LKE 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	15	15	32	11	11	17	13	< 8	16	13	< 8	Existing Middletown UVLS
LYTNVLE 60kV	P1-2:A2:45:_LAYTONVILLE-WILLITS 60KV [8360]	P1	N-1	25	11	< 8	44	46	< 8	20	12	12	21	< 8	Project: Garberville area reinforcement project
MIDDLTWN 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	15	16	36	12	12	18	13	< 8	17	13	< 8	Existing Middletown UVLS
MIDDLTWN 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	15	16	35	11	12	17	13	< 8	17	13	< 8	Existing Middletown UVLS
ST.HELNA 60kV	P1-2:A2:67:_LAKEVILLE #1 60KV [7360]	P1	N-1	< 8	< 8	10	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	Continue to Monitor
UPPR LKE 60kV	P1-2:A2:56:_KONOCTI-EAGLE ROCK 60KV [6861]	P1	N-1	< 8	< 8	13	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	Continue to Monitor
UPPR LKE 60kV	P1-3:A2:25:_EGLE RCK 115/60KV TB 1	P1	N-1	< 8	< 8	13	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	Continue to Monitor

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2025 Spring Off-Peak	2028 Summer Peak	2035 Summer Peak	2028 SP High CEC Forecast	2025 OP Sensitivity	
In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2019-20 Transmission Planning Process for transient stability studies: <a href="http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf">http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf</a>								

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)													Potential Mitigation Solutions	
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		

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

Substation	Load Served (MW)												Potential Mitigation Solutions	
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP Sensitivity

No single source substation with more than 100 MW



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Benton-Deschutes 60 kV Line	P2-4:A3:26:_COTWD_2D SECTION 2D & COTWD_2E SECTION 2E 115KV	P2-4	Bus-Tie-Breaker	62	32	48	117	53	31	46	62	Generation Redispatch
	P5-5(DC):A3:24: Station DC Battery Supply "Cottonwood 115kV Batt"	P5	Non-Redundant Relay	30	75	71	148	23	75	36	23	Operating solution
	P5-5:A3:3: "LOGAN CREEK 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)"	P5	Non-Redundant Relay	NConv	NConv	NConv	30	NConv	NConv	NConv	NConv	Install redundant relay
	P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	NConv	29	NConv	NConv	NConv	NConv	Install redundant relay
	P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P6	N-1-1	191	259	228	30	28	322	122	280	Operating solution
Caribou No.11 230/115/60 kV Transformer	P2-4:A3:21:_TABLE MTN D SECTION 1D & TABLE MTN E SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	NConv	NConv	NConv	29	NConv	NConv	NConv	NConv	Evaluate Caribou RAS
	P2-3:A3:27:_TABLE MTN D - 1D 230KV & LINE	P2-3	Non-Bus-Tie Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	Evaluate Caribou RAS
	P2-1:A3:23:_CARIBOU-TABLE MTN 230KV [4440] (BELDENTP-TABLE MTN D)	P2-1	Line Section w/o Fault	NConv	NConv	NConv	29	NConv	NConv	NConv	NConv	Evaluate Caribou RAS
	P2-2:A3:28:_TABLE MTN D 230KV SECTION 1D	P2-2	Bus	NConv	NConv	NConv	29	NConv	NConv	NConv	NConv	Evaluate Caribou RAS
Caribou-Plumas Jct 60 kV Line	P2-4:A3:21:_TABLE MTN D SECTION 1D & TABLE MTN E SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	NConv	NConv	NConv	40	NConv	NConv	NConv	NConv	Evaluate Caribou RAS
	P2-3:A3:27:_TABLE MTN D - 1D 230KV & LINE	P2-3	Non-Bus-Tie Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	Evaluate Caribou RAS
	P2-1:A3:23:_CARIBOU-TABLE MTN 230KV [4440] (BELDENTP-TABLE MTN D)	P2-1	Line Section w/o Fault	NConv	NConv	NConv	41	NConv	NConv	NConv	NConv	Evaluate Caribou RAS
	P2-2:A3:28:_TABLE MTN D 230KV SECTION 1D	P2-2	Bus	NConv	NConv	NConv	40	NConv	NConv	NConv	NConv	Evaluate Caribou RAS
Cascade-Benton-Deschute 60 kV line	P2-4:A3:20:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2-4	Bus-Tie-Breaker	37	52	11	121	27	51	14	27	Generation Redispatch
	P5-5:A3:3: "LOGAN CREEK 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)"	P5	Non-Redundant Relay	NConv	NConv	NConv	11	NConv	NConv	NConv	NConv	Install redundant relay
	P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	NConv	11	NConv	NConv	NConv	NConv	Install redundant relay
	P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P6	N-1-1	92	124	109	11	16	154	60	134	Operating solution
	P1-3:A3:7:_COTWD_E2 230/115KV TB 1 & P1-3:A3:8:_COTWD_F2 230/115KV TB 4	P6	N-1-1	38	52	25	125	30	50	16	30	Operating solution
Cascade-Cottonwood 115 kV Line	P2-4:A3:20:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2-4	Bus-Tie-Breaker	86	47	67	104	62	46	53	63	Generation Redispatch
	P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NA	NConv	NA	NConv	NA	NConv	NConv	Install redundant relay
	P1-3:A3:37:_CASCADE 115/60KV TB 1 & Base Case	P6	N-1-1	94	70	106	89	33	70	107	73	Continue to Monitor
	P5-5:A3:1: "BUTT 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)"	P5	Non-Redundant Relay	NConv	NConv	NConv	60	45	NConv	NConv	45	Install redundant relay

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Cascade-Craig View 115 kV Line (Path 25)	P5-5:A3:3: "LOGAN CREEK 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)"	P5	Non-Redundant Relay	NConv	NConv	NConv	93	NConv	NConv	NConv	NConv	Install redundant relay
	P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	NConv	93	NConv	NConv	NConv	NConv	Install redundant relay
Cascade-Deschutes 60 kV Line	P2-4:A3:26:_COTWD_2D SECTION 2D & COTWD_2E SECTION 2E 115KV	P2-4	Bus-Tie-Breaker	69	70	38	137	56	69	32	69	Generaltion Redispatch
	P2-1:A3:49:_CASCADE-COTTONWOOD 115KV [1240] (CASCADE-OREGNTRL)	P2-1	Line Section w/o Fault	100	92	100	101	68	92	100	68	Generaltion Redispatch
	P1-1:A3:62:_VOLTA1-2 9.11KV GEN UNIT 1 & P1-2:A3:38:_CASCADE-COTTONWOOD 115KV [1240]	P3	G-1/N-1	94	82	103	102	60	82	103	60	Generaltion Redispatch
	P1-1:A3:64:_SOUTH G 4.16KV GEN UNIT 1 & P1-2:A3:38:_CASCADE-COTTONWOOD 115KV [1240]	P3	G-1/N-1	92	82	101	99	60	82	101	60	Continue to Monitor
	P1-1:A3:75:_OLSENHYDRO 4.16KV GEN UNIT 1 & P1-2:A3:38:_CASCADE-COTTONWOOD 115KV [1240]	P3	G-1/N-1	93	86	102	104	63	82	102	63	Generaltion Redispatch
	P1-1:A3:76:_TKO 9.11KV GEN UNIT 3 & P1-2:A3:38:_CASCADE-COTTONWOOD 115KV [1240]	P3	G-1/N-1	93	85	102	102	63	82	102	63	Generaltion Redispatch
	P1-1:A3:92:_COLEMAN 6.60KV GEN UNIT 1 & P1-2:A3:38:_CASCADE-COTTONWOOD 115KV [1240]	P3	G-1/N-1	93	82	99	102	60	82	99	60	Generaltion Redispatch
	P5-5(DC):A3:13: Station DC Battery Supply "Oregon Trail 115kV Batt"	P5	Non-Redundant Relay	58	92	100	101	46	92	33	46	Install redundant battery
	P5-5(DC):A3:14: Station DC Battery Supply "Jessup 115kV Batt"	P5	Non-Redundant Relay	58	92	100	101	46	92	33	46	Install redundant battery
	P5-5:A3:1: "BUTT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)"	P5	Non-Redundant Relay	NConv	NConv	NConv	46	36	NConv	NConv	36	Install redundant relay
	P5-5:A3:3: "LOGAN CREEK 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)"	P5	Non-Redundant Relay	NConv	NConv	NConv	53	NConv	NConv	NConv	NConv	Install redundant relay
	P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	NConv	100	53	NConv	NConv	NConv	NConv	Install redundant relay
	P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	NConv	133	NConv	182	NConv	131	NConv	NConv	Install redundant relay
P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P6	N-1-1	273	384	278	35	56	474	36	382	Operating solution	
Cottonwood-Benton No.1 60 kv	P2-4:A3:25:_COTWD_1E SECTION 1E & COTWD_2E SECTION 2E 115KV	P2-4	Bus-Tie-Breaker	41	45	30	101	22	44	47	41	Generaltion Redispatch
	P2-4:A3:20:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2-4	Bus-Tie-Breaker	58	48	23	128	41	47	22	42	Generaltion Redispatch
	P5-5:A3:3: "LOGAN CREEK 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)"	P5	Non-Redundant Relay	NConv	NConv	NConv	12	NConv	NConv	NConv	NConv	Install redundant relay

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Line	P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NConv	NConv	NConv	12	NConv	NConv	NConv	NConv	Install redundant relay
	P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P6	N-1-1	109	144	120	12	24	181	65	154	Operating solution
	P1-3:A3:7:_COTWD_E2 230/115KV TB 1 & P1-3:A3:8:_COTWD_F2 230/115KV TB 4	P6	N-1-1	59	47	30	132	44	47	4	45	Operating solution
Cottonwood-Round Mountain 230 kV Line	P5-5(DC):A3:2: Station DC Battery Supply "Table Mtn 500-230-115-60kV Batt"	P5	Non-Redundant Relay	NConv	NConv	NConv	22	2	NConv	NConv	3	Install redundant battery
Delevan-Cortina 230 kV Line	P5-5(DC):A3:2: Station DC Battery Supply "Table Mtn 500-230-115-60kV Batt"	P5	Non-Redundant Relay	NConv	NConv	NConv	3	57	NConv	NConv	57	Install redundant battery
Keswick-Cascade 60 kV Line	P5-5(DC):A3:24: Station DC Battery Supply "Cottonwood 115kV Batt"	P5	Non-Redundant Relay	35	66	109	157	38	64	47	38	Install redundant battery
Round Mountain 500/230 kV Bank	P5-5(DC):A3:2: Station DC Battery Supply "Table Mtn 500-230-115-60kV Batt"	P5	Non-Redundant Relay	NConv	NConv	NConv	12	50	NConv	NConv	49	Install redundant battery
Round Mountain-Cottonwood(E) No.3 230 kV Line	P5-5(DC):A3:2: Station DC Battery Supply "Table Mtn 500-230-115-60kV Batt"	P5	Non-Redundant Relay	NConv	NConv	NConv	28	5	NConv	NConv	5	Install redundant battery
	P1-2:A3:5:_ROUND MTN-COTTONWOOD #2 230KV [5640] & P1-3:A3:1:_ROUND MT 500/230KV TB 1	P6	N-1-1	110	98	95	23	83	98	98	83	Operating solution
Sycamore Creek-Notre Dame-Table Mountain 115 kV Line	P2-4:A3:11:_BUTTE 115KV - SECTION MD & ME	P2-4	Bus-Tie-Breaker	103	109	104	10	63	111	53	63	Table Mountain 115 kV RAS (recommended in previous cycle)
	P2-3:A3:48:_BUTTE - MD 115KV & TABLE MTN-BUTTE #1 LINE	P2-3	Non-Bus-Tie Breaker	126	132	132	17	83	134	69	83	Table Mountain 115 kV RAS (recommended in previous cycle)
	P2-2:A3:45:_BUTTE 115KV SECTION MD	P2-2	Bus	99	104	108	10	61	106	52	61	Table Mountain 115 kV RAS (recommended in previous cycle)
Trinity-Keswick 60 kV Line	P1-2:A3:50:_TABLE MTN-BUTTE #2 115KV [3920] & P1-2:A3:47:_SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV [4314]	P6	N-1-1	125	131	132	23	86	133	65	86	Table Mountain 115 kV RAS (recommended in previous cycle)
	P7-1:A3:4_Sycamore Creek-Notre Dame-Table Mountain & Table Mountain-Butte No.2 115 kV Lines	P7	DCTL	109	115	108	17	72	116	53	72	Table Mountain 115 kV RAS (recommended in previous cycle)
	P7-1:A3:4_Sycamore Creek-Notre Dame-Table Mountain & Table Mountain-Butte No.2 115 kV Lines	P7	DCTL	125	131	121	24	86	133	65	86	Table Mountain 115 kV RAS (recommended in previous cycle)
Trinity-Keswick 60 kV Line	P5-5(DC):A3:24: Station DC Battery Supply "Cottonwood 115kV Batt"	P5	Non-Redundant Relay	20	65	90	139	27	64	37	28	Install redundant battery
Caribou-Westwood 60 kV Line	P2-4:A3:21:_TABLE MTN D SECTION 1D & TABLE MTN E SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	NConv	NConv	NConv	10	NConv	NConv	NConv	NConv	Load Power Factor under review
	P2-3:A3:27:_TABLE MTN D - 1D 230KV & LINE	P2-3	Non-Bus-Tie Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	Load Power Factor under review
	P2-1:A3:23:_CARIBOU-TABLE MTN 230KV [4440] (BELDENTP-TABLE MTN D)	P2-1	Line Section w/o Fault	NConv	NConv	NConv	11	NConv	NConv	NConv	NConv	Load Power Factor under review
	P2-2:A3:28:_TABLE MTN D 230KV SECTION 1D	P2-2	Bus	NConv	NConv	NConv	11	NConv	NConv	NConv	NConv	Load Power Factor under review

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
	P5-5:A3:1: "BUTT 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)"	P5	Non-Redundant Relay	NConv	NConv	NConv	66	30	NConv	NConv	30	Load Power Factor under review
	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	60	NConv	48	31	53	NConv	44	53	Load Power Factor under review
Cottonwood No.2 60 kV Line	P1-3:A3:48:_RBPPCPH 60/13.8KV TB 1	P1	N-1	103	88	78	47	83	90	78	83	Project: Red Bluff-Coleman 60 kV Reinforcement Project
	P1-1:A3:2:_RBPPCPH 13.80KV GEN UNIT 16 & Base Case	P3	G-1/N-1	19	12	96	35	101	13	53	91	Operating solution
Table Mountain-Pease 60 kV Line (Tres Vias-Biggsjct)	P7-1:A3:15_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	P7	DCTL	22	32	168	22	31	32	168	31	Continue to Monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
CARIBOU 230kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.58	0.52	0.71	0.77	0.69	0.71	0.69	0.52	Evaluate Caribou RAS
CARIBOU 115kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.58	0.52	0.71	0.77	0.69	0.71	0.69	0.52	Evaluate Caribou RAS
WESTWOOD 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.60	0.54	0.72	0.76	0.71	0.72	0.70	0.54	Evaluate Caribou RAS
ULTR WSD 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.59	0.54	0.72	0.76	0.70	0.72	0.70	0.54	Evaluate Caribou RAS
CHESTER 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.52	0.48	0.64	0.70	0.62	0.64	0.62	0.48	Evaluate Caribou RAS
HMLTN BR 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.58	0.53	0.70	0.75	0.68	0.70	0.68	0.53	Evaluate Caribou RAS
COLLINSPINE 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.52	0.47	0.63	0.69	0.61	0.63	0.61	0.47	Evaluate Caribou RAS
BIG MDWSS 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.57	0.52	0.69	0.75	0.68	0.70	0.68	0.52	Evaluate Caribou RAS
GRAYSFLAT 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.56	0.51	0.69	0.76	0.67	0.69	0.67	0.51	Evaluate Caribou RAS
GANSNER 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.55	0.50	0.68	0.76	0.67	0.69	0.67	0.50	Evaluate Caribou RAS
SPANSHCK 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.56	0.51	0.69	0.76	0.67	0.69	0.67	0.51	Evaluate Caribou RAS
EST Q1 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.57	0.51	0.69	0.76	0.67	0.70	0.67	0.51	Evaluate Caribou RAS
EST QNCY 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.57	0.51	0.70	0.76	0.67	0.70	0.67	0.51	Evaluate Caribou RAS
ELIZ TWN 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.57	0.51	0.69	0.76	0.67	0.70	0.67	0.51	Evaluate Caribou RAS
CARIBOU 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	0.57	0.51	0.69	0.76	0.67	0.70	0.67	0.51	Evaluate Caribou RAS
STLLWATR 60kV	P1-2:A3:68:_KESWICK-CASCADE 60KV [7260] MOAS OPENED ON CASCADE_STLLWATR	P1	N-1	0.92	0.90	0.96	1.01	0.98	0.97	0.98	0.90	Operating Solution
RED BLFF 60kV	P1-2:A3:78:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT_RED BLFF	P1	N-1	0.88	0.86	0.97	1.04	0.91	0.97	0.91	0.86	Operating Solution
DIRYVLE 60kV	P1-2:A3:78:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT_RED BLFF	P1	N-1	0.90	0.89	0.98	1.04	0.92	0.98	0.92	0.88	Operating Solution
LS MLNSJ 60kV	P1-2:A3:78:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT_RED BLFF	P1	N-1	0.89	0.87	0.97	1.04	0.90	0.98	0.90	0.87	Operating Solution
VINA 60kV	P1-2:A3:78:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT_RED BLFF	P1	N-1	0.87	0.86	0.96	1.04	0.89	0.97	0.89	0.86	Operating Solution
ANTLER 60kV	P1-3:A3:37:_CASCADE 115/60KV TB 1	P1	N-1	0.91	0.89	0.93	0.98	0.96	0.93	0.96	0.89	Continue to Monitor
PPL 60kV	P1-3:A3:37:_CASCADE 115/60KV TB 1	P1	N-1	0.91	0.89	0.93	0.98	0.96	0.94	0.96	0.89	Continue to Monitor
RBPPCPH 60kV	P1-3:A3:48:_RBPPCPH 60/13.8KV TB 1	P1	N-1	0.87	0.97	0.91	1.04	0.91	0.91	0.91	0.97	Project: Tyler 60 kV Shunt Capacitor
CR CANAL 60kV	P1-3:A3:48:_RBPPCPH 60/13.8KV TB 1	P1	N-1	0.86	0.97	0.90	1.04	0.91	0.91	0.91	0.97	Project: Tyler 60 kV Shunt Capacitor

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
TYLER 60kV	P1-3:A3:48:_RBPPCPH 60/13.8KV TB 1	P1	N-1	0.87	0.97	0.91	1.05	0.91	0.91	0.91	0.91	Project: Tyler 60 kV Shunt Capacitor
CARIBOU 230kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.58	0.52	0.71	0.77	0.69	0.71	0.69	0.52	Evaluate Caribou RAS
CARIBOU 115kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.58	0.52	0.71	0.77	0.69	0.71	0.69	0.52	Evaluate Caribou RAS
WESTWOOD 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.60	0.54	0.72	0.76	0.71	0.72	0.71	0.54	Evaluate Caribou RAS
ULTR WSD 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.59	0.54	0.72	0.76	0.70	0.72	0.70	0.54	Evaluate Caribou RAS
CHESTER 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.52	0.48	0.64	0.70	0.62	0.64	0.62	0.47	Evaluate Caribou RAS
HMLTN BR 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.58	0.53	0.70	0.75	0.68	0.70	0.68	0.52	Evaluate Caribou RAS
COLLINSPINE 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.52	0.47	0.63	0.69	0.61	0.63	0.61	0.47	Evaluate Caribou RAS
BIG MDWS 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.57	0.52	0.69	0.75	0.68	0.70	0.68	0.51	Evaluate Caribou RAS
GRAYSFLAT 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.56	0.51	0.69	0.76	0.67	0.69	0.67	0.50	Evaluate Caribou RAS
GANSNER 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.55	0.50	0.68	0.76	0.67	0.69	0.67	0.50	Evaluate Caribou RAS
SPANSHCK 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.56	0.51	0.69	0.76	0.67	0.69	0.67	0.50	Evaluate Caribou RAS
EST Q1 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.57	0.51	0.70	0.76	0.67	0.70	0.67	0.51	Evaluate Caribou RAS
EST QNCY 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.57	0.51	0.70	0.76	0.67	0.70	0.67	0.51	Evaluate Caribou RAS
ELIZ TWN 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.57	0.51	0.69	0.76	0.67	0.70	0.67	0.51	Evaluate Caribou RAS
CARIBOU 60kV	P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP)	P2-1	Line Section w/o Fault	0.57	0.51	0.69	0.76	0.67	0.70	0.67	0.51	Evaluate Caribou RAS
CARIBOU 115kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.57	0.52	0.70	0.78	0.68	0.70	0.68	0.52	Evaluate Caribou RAS
WESTWOOD 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.59	0.54	0.71	0.77	0.70	0.72	0.70	0.54	Evaluate Caribou RAS
ULTR WSD 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.59	0.54	0.71	0.77	0.70	0.71	0.70	0.54	Evaluate Caribou RAS
CHESTER 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.52	0.48	0.63	0.71	0.62	0.63	0.62	0.47	Evaluate Caribou RAS
HMLTN BR 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.57	0.52	0.70	0.76	0.68	0.70	0.68	0.52	Evaluate Caribou RAS
COLLINSPINE 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.51	0.47	0.63	0.71	0.61	0.63	0.61	0.47	Evaluate Caribou RAS
BIG MDWS 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.56	0.51	0.69	0.77	0.67	0.69	0.67	0.51	Evaluate Caribou RAS
GRAYSFLAT 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.56	0.51	0.68	0.77	0.67	0.69	0.67	0.51	Evaluate Caribou RAS
GANSNER 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.55	0.50	0.68	0.77	0.66	0.68	0.66	0.50	Evaluate Caribou RAS

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
SPANSHCK 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.55	0.50	0.68	0.77	0.66	0.68	0.66	0.50	Evaluate Caribou RAS
EST Q1 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.56	0.51	0.69	0.77	0.66	0.69	0.66	0.51	Evaluate Caribou RAS
EST QNCY 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.56	0.51	0.69	0.77	0.66	0.69	0.66	0.51	Evaluate Caribou RAS
ELIZ TWN 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.56	0.51	0.69	0.77	0.66	0.69	0.66	0.51	Evaluate Caribou RAS
CARIBOU 60kV	P2-2:A3:21:_CARIBOU 230KV SECTION 1D	P2-2	Bus	0.56	0.51	0.69	0.77	0.67	0.69	0.67	0.51	Evaluate Caribou RAS
CASCADE 115kV	P2-2:A3:37:_CASCADE 115KV SECTION MA	P2-2	Bus	0.89	0.88	0.91	1.04	1.01	0.91	1.01	0.87	Operating Solution
ANTLER 60kV	P2-2:A3:37:_CASCADE 115KV SECTION MA	P2-2	Bus	0.91	0.89	0.93	1.01	0.98	0.94	0.98	0.89	Operating Solution
PPL 60kV	P2-2:A3:37:_CASCADE 115KV SECTION MA	P2-2	Bus	0.91	0.89	0.93	1.01	0.98	0.94	0.98	0.89	Operating Solution
CASCADE 115kV	P2-3:A3:38:_CASCADE - MA 115KV & CASCADE-COTTONWOOD LINE	P2-3	Non-Bus-Tie Breaker	0.89	0.88	0.91	1.04	1.01	0.91	1.01	0.87	Operating Solution
ANTLER 60kV	P2-3:A3:38:_CASCADE - MA 115KV & CASCADE-COTTONWOOD LINE	P2-3	Non-Bus-Tie Breaker	0.91	0.89	0.93	1.01	0.98	0.94	0.98	0.89	Operating Solution
PPL 60kV	P2-3:A3:38:_CASCADE - MA 115KV & CASCADE-COTTONWOOD LINE	P2-3	Non-Bus-Tie Breaker	0.91	0.89	0.93	1.01	0.98	0.94	0.98	0.89	Operating Solution
WESTWOOD 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	1.00	0.99	1.00	0.78	1.00	1.00	1.00	0.99	Continue to Monitor
ULTR WSD 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	1.00	1.00	1.00	0.78	1.00	1.00	1.00	1.00	Continue to Monitor
CHESTER 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.99	0.98	0.99	0.72	0.99	0.99	0.99	0.98	Continue to Monitor
HMLTN BR 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	1.01	1.00	1.01	0.77	1.00	1.01	1.00	1.00	Continue to Monitor
COLLINSPINE 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.99	0.98	0.99	0.72	0.99	0.99	0.99	0.98	Continue to Monitor
BIG MDWS 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	1.01	1.01	1.01	0.78	1.01	1.01	1.01	1.01	Continue to Monitor
GRAYSFLAT 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	1.02	1.02	1.02	0.78	1.02	1.02	1.02	1.02	Continue to Monitor
GANSNER 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	1.02	1.02	1.02	0.78	1.02	1.02	1.02	1.02	Continue to Monitor
SPANSHCK 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	1.02	1.02	1.02	0.78	1.02	1.02	1.02	1.02	Continue to Monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
EST Q1 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	1.03	1.02	1.03	0.78	1.02	1.03	1.02	1.02	Continue to Monitor
EST QNCY 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	1.03	1.02	1.03	0.78	1.02	1.03	1.02	1.02	Continue to Monitor
BIG BAR 60kV	P1-1:A3:19:_SPIANDERSON2 12.50KV GEN UNIT 1 & P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P3	G-1/N-1	0.98	1.01	0.73	0.99	0.99	0.95	0.99	1.01	Continue to Monitor
TAP 65 60kV	P1-1:A3:19:_SPIANDERSON2 12.50KV GEN UNIT 1 & P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P3	G-1/N-1	1.00	1.00	0.82	0.98	1.00	0.97	1.00	1.00	Continue to Monitor
TRINITY 60kV	P1-1:A3:19:_SPIANDERSON2 12.50KV GEN UNIT 1 & P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P3	G-1/N-1	1.00	1.00	0.82	0.98	1.01	0.97	1.00	1.00	Continue to Monitor
ELIZ TWN 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	1.03	1.02	1.03	0.78	1.02	1.03	1.02	1.02	Continue to Monitor
CARIBOU 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	1.02	1.02	1.02	0.78	1.02	1.02	1.02	1.02	Continue to Monitor
WESTWOOD 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:41:_CARIBOU 115/11.5KV TB 1	P3	G-1/N-1	0.94	0.89	0.94	0.92	0.96	0.94	0.96	0.89	Evaluate Caribou RAS
ULTR WSD 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:41:_CARIBOU 115/11.5KV TB 1	P3	G-1/N-1	0.94	0.90	0.94	0.92	0.97	0.94	0.97	0.90	Evaluate Caribou RAS
CHESTER 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:41:_CARIBOU 115/11.5KV TB 1	P3	G-1/N-1	0.89	0.87	0.89	0.89	0.95	0.89	0.95	0.87	Evaluate Caribou RAS
RBPPCPH 60kV	P1-1:A3:27:_PIT 4 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.91	0.99	0.91	1.01	Continue to Monitor
RBPPCPH 60kV	P1-1:A3:28:_PIT 4 13.80KV GEN UNIT 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.91	0.99	0.91	1.01	Continue to Monitor
RBPPCPH 60kV	P1-1:A3:29:_JBBLACK1 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.02	0.89	1.04	0.91	0.99	0.91	1.01	Continue to Monitor
RBPPCPH 60kV	P1-1:A3:2:_RBPPCPH 13.80KV GEN UNIT 16 & P1-3:A3:12:_COTWD_E2 230/60KV TB 2	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.89	0.99	0.91	1.01	Continue to Monitor
RBPPCPH 60kV	P1-1:A3:2:_RBPPCPH 13.80KV GEN UNIT 16 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.90	1.04	0.89	0.99	0.91	1.01	Continue to Monitor



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
RBPPCPH 60kV	P1-1:A3:2:_RBPPCPH 13.80KV GEN UNIT 16 & P1-3:A3:1:_ROUND MT 500/230KV TB 1	P3	G-1/N-1	1.00	1.01	0.90	1.04	0.89	0.99	0.91	1.01	Continue to Monitor
RBPPCPH 60kV	P1-1:A3:30:_JBBLACK2 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.02	0.89	1.04	0.91	0.99	0.91	1.01	Continue to Monitor
RBPPCPH 60kV	P1-1:A3:62:_VOLTA1-2 9.11KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.91	0.99	0.91	1.01	Continue to Monitor
RBPPCPH 60kV	P1-1:A3:64:_SOUTH G 4.16KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.91	0.99	0.91	1.01	Continue to Monitor
RBPPCPH 60kV	P1-1:A3:75:_OLSENHYDRO 4.16KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.91	0.99	0.91	1.01	Continue to Monitor
RBPPCPH 60kV	P1-1:A3:76:_TKO 9.11KV GEN UNIT 3 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.91	0.99	0.91	1.01	Continue to Monitor
COLLINSPINE 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:41:_CARIBOU 115/11.5KV TB 1	P3	G-1/N-1	0.89	0.86	0.88	0.89	0.95	0.88	0.95	0.86	Evaluate Caribou RAS
WESTWOOD 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:5:_CARIBOU 230/13.8KV TB 1	P3	G-1/N-1	0.94	0.90	0.94	0.93	0.97	0.94	0.97	0.90	Evaluate Caribou RAS
CHESTER 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:5:_CARIBOU 230/13.8KV TB 1	P3	G-1/N-1	0.90	0.87	0.89	0.89	0.95	0.90	0.95	0.87	Evaluate Caribou RAS
CR CANAL 60kV	P1-1:A3:27:_PIT 4 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.90	0.99	0.90	1.01	Continue to Monitor
CR CANAL 60kV	P1-1:A3:28:_PIT 4 13.80KV GEN UNIT 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.90	0.99	0.90	1.01	Continue to Monitor
CR CANAL 60kV	P1-1:A3:29:_JBBLACK1 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.90	0.99	0.90	1.01	Continue to Monitor
CR CANAL 60kV	P1-1:A3:2:_RBPPCPH 13.80KV GEN UNIT 16 & P1-3:A3:12:_COTWD_E2 230/60KV TB 2	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.89	0.99	0.90	1.01	Continue to Monitor
CR CANAL 60kV	P1-1:A3:2:_RBPPCPH 13.80KV GEN UNIT 16 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.90	1.04	0.88	0.99	0.90	1.01	Continue to Monitor
CR CANAL 60kV	P1-1:A3:2:_RBPPCPH 13.80KV GEN UNIT 16 & P1-3:A3:1:_ROUND MT 500/230KV TB 1	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.89	0.99	0.91	1.01	Continue to Monitor
CR CANAL 60kV	P1-1:A3:30:_JBBLACK2 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.90	0.99	0.90	1.01	Continue to Monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
CR CANAL 60kV	P1-1:A3:62:_VOLTA1-2 9.11KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.90	0.99	0.90	1.01	Continue to Monitor
CR CANAL 60kV	P1-1:A3:64:_SOUTH G 4.16KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.90	0.99	0.90	1.01	Continue to Monitor
CR CANAL 60kV	P1-1:A3:75:_OLSENHYDRO 4.16KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.90	0.99	0.90	1.01	Continue to Monitor
CR CANAL 60kV	P1-1:A3:76:_TKO 9.11KV GEN UNIT 3 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.90	0.99	0.90	1.01	Continue to Monitor
COLLINSPINE 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:5:_CARIBOU 230/13.8KV TB 1	P3	G-1/N-1	0.89	0.87	0.89	0.93	0.95	0.89	0.95	0.87	Evaluate Caribou RAS
TYLER 60kV	P1-1:A3:27:_PIT 4 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.05	0.90	0.99	0.90	1.01	Continue to Monitor
TYLER 60kV	P1-1:A3:28:_PIT 4 13.80KV GEN UNIT 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.05	0.90	0.99	0.90	1.01	Continue to Monitor
TYLER 60kV	P1-1:A3:29:_JBBLACK1 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.05	0.90	0.99	0.90	1.01	Continue to Monitor
TYLER 60kV	P1-1:A3:2:_RBPPCPH 13.80KV GEN UNIT 16 & P1-3:A3:12:_COTWD_E2 230/60KV TB 2	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.89	0.99	0.90	1.01	Continue to Monitor
TYLER 60kV	P1-1:A3:2:_RBPPCPH 13.80KV GEN UNIT 16 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.90	1.04	0.89	0.99	0.90	1.01	Continue to Monitor
TYLER 60kV	P1-1:A3:2:_RBPPCPH 13.80KV GEN UNIT 16 & P1-3:A3:1:_ROUND MT 500/230KV TB 1	P3	G-1/N-1	1.00	1.01	0.89	1.04	0.89	0.99	0.91	1.01	Continue to Monitor
TYLER 60kV	P1-1:A3:30:_JBBLACK2 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.05	0.90	0.99	0.90	1.01	Continue to Monitor
TYLER 60kV	P1-1:A3:62:_VOLTA1-2 9.11KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.05	0.90	0.99	0.90	1.01	Continue to Monitor
TYLER 60kV	P1-1:A3:64:_SOUTH G 4.16KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.05	0.90	0.99	0.90	1.01	Continue to Monitor
TYLER 60kV	P1-1:A3:75:_OLSENHYDRO 4.16KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.05	0.90	0.99	0.90	1.01	Continue to Monitor
TYLER 60kV	P1-1:A3:76:_TKO 9.11KV GEN UNIT 3 & P1-3:A3:13:_COTWD_E 230/60KV TB 3	P3	G-1/N-1	1.00	1.01	0.89	1.05	0.90	0.99	0.90	1.01	Continue to Monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
CHESTER 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:51:_CARIBOU 60/11.5KV TB 1	P3	G-1/N-1	0.90	0.87	0.89	0.89	0.95	0.89	0.95	0.87	Evaluate Caribou RAS
COLLINSPINE 60kV	P1-1:A3:17:_COLLINSPINE2 13.80KV GEN UNIT 1 & P1-3:A3:51:_CARIBOU 60/11.5KV TB 1	P3	G-1/N-1	0.89	0.87	0.89	0.89	0.95	0.89	0.95	0.87	Evaluate Caribou RAS
TRINITY 115kV	P1-1:A3:19:_SPIANDERSON2 12.50KV GEN UNIT 1 & P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P3	G-1/N-1	1.00	1.00	0.82	0.98	1.01	0.98	1.00	1.00	Continue to Monitor
COLLINSPINE 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-1:A3:87:_SPIQUINCY 13.80KV GEN UNIT 1	P3	G-1/N-1	0.93	0.89	0.93	0.91	0.95	0.93	0.95	0.90	Evaluate Caribou RAS
WESTWOOD 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.84	0.60	1.00	0.93	0.89	1.00	0.89	0.99	Evaluate Caribou RAS
ULTR WSD 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.84	0.59	1.00	0.93	0.89	1.00	0.89	1.00	Evaluate Caribou RAS
CHESTER 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.81	0.56	0.89	0.91	0.86	0.89	0.86	0.98	Evaluate Caribou RAS
HMLTN BR 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.83	0.59	1.01	0.93	0.88	1.01	0.88	1.00	Evaluate Caribou RAS
COLLINSPINE 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.81	0.56	0.89	0.91	0.86	0.89	0.86	0.98	Evaluate Caribou RAS
BIG MDWS 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.82	0.58	1.01	0.93	0.88	1.01	0.88	1.01	Evaluate Caribou RAS
GRAYSFLAT 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.82	0.57	0.90	0.93	0.87	0.90	0.87	1.02	Evaluate Caribou RAS
GANSNER 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.81	0.56	0.90	0.93	0.87	0.90	0.87	1.02	Evaluate Caribou RAS
SPANSHCK 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.82	0.56	0.90	0.93	0.87	0.90	0.87	1.02	Evaluate Caribou RAS
EST Q1 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.82	0.57	1.03	0.93	0.87	1.03	0.87	1.02	Evaluate Caribou RAS
EST QNCY 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.82	0.57	1.03	0.93	0.87	1.03	0.87	1.02	Evaluate Caribou RAS
ELIZ TWN 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.82	0.57	1.03	0.93	0.87	1.03	0.87	1.02	Evaluate Caribou RAS

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
CARIBOU 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:4:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	0.82	0.57	1.02	0.93	0.87	1.02	0.87	1.02	Evaluate Caribou RAS
WESTWOOD 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:41:_CARIBOU 115/11.5KV TB 1	P3	G-1/N-1	0.94	0.90	0.94	0.94	0.96	0.94	0.96	0.91	Evaluate Caribou RAS
ULTR WSD 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:41:_CARIBOU 115/11.5KV TB 1	P3	G-1/N-1	0.94	0.90	0.94	0.94	0.97	0.94	0.97	0.92	Evaluate Caribou RAS
CHESTER 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:41:_CARIBOU 115/11.5KV TB 1	P3	G-1/N-1	0.93	0.89	0.93	0.94	0.95	0.93	0.95	0.91	Evaluate Caribou RAS
COLLINSPINE 60kV	P1-1:A3:54:_CRBU 1 11.50KV GEN UNIT 1 & P1-3:A3:41:_CARIBOU 115/11.5KV TB 1	P3	G-1/N-1	0.93	0.89	0.93	0.93	0.95	0.93	0.95	0.91	Evaluate Caribou RAS
MTN GATE 60kV	P1-1:A3:62:_VOLTA1-2 9.11KV GEN UNIT 1 & P1-3:A3:37:_CASCADE 115/60KV TB 1	P3	G-1/N-1	0.92	0.90	0.94	0.98	0.96	0.94	0.96	0.90	Operating Solution
ANTLER 60kV	P1-1:A3:62:_VOLTA1-2 9.11KV GEN UNIT 1 & P1-3:A3:37:_CASCADE 115/60KV TB 1	P3	G-1/N-1	0.91	0.89	0.93	0.98	0.96	0.93	0.96	0.89	Operating Solution
PPL 60kV	P1-1:A3:62:_VOLTA1-2 9.11KV GEN UNIT 1 & P1-3:A3:37:_CASCADE 115/60KV TB 1	P3	G-1/N-1	0.91	0.89	0.93	0.98	0.96	0.94	0.96	0.89	Operating Solution
VINA 60kV	P1-1:A3:64:_SOUTH G 4.16KV GEN UNIT 1 & P1-2:A3:78:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT_RED BLFF	P3	G-1/N-1	0.87	0.85	0.96	1.03	0.89	0.97	0.89	0.86	Evaluate Caribou RAS
MTN GATE 60kV	P1-1:A3:75:_OLSENHYDRO 4.16KV GEN UNIT 1 & P1-3:A3:37:_CASCADE 115/60KV TB 1	P3	G-1/N-1	0.92	0.90	0.94	0.98	0.96	0.94	0.96	0.90	Operating Solution
ANTLER 60kV	P1-1:A3:75:_OLSENHYDRO 4.16KV GEN UNIT 1 & P1-3:A3:37:_CASCADE 115/60KV TB 1	P3	G-1/N-1	0.91	0.89	0.93	0.98	0.96	0.93	0.96	0.89	Operating Solution
PPL 60kV	P1-1:A3:75:_OLSENHYDRO 4.16KV GEN UNIT 1 & P1-3:A3:37:_CASCADE 115/60KV TB 1	P3	G-1/N-1	0.91	0.89	0.93	0.98	0.96	0.94	0.96	0.89	Operating Solution
MTN GATE 60kV	P1-1:A3:76:_TKO 9.11KV GEN UNIT 3 & P1-3:A3:37:_CASCADE 115/60KV TB 1	P3	G-1/N-1	0.92	0.90	0.94	0.98	0.96	0.94	0.96	0.90	Operating Solution
ANTLER 60kV	P1-1:A3:76:_TKO 9.11KV GEN UNIT 3 & P1-3:A3:37:_CASCADE 115/60KV TB 1	P3	G-1/N-1	0.91	0.89	0.93	0.98	0.96	0.93	0.96	0.89	Operating Solution
PPL 60kV	P1-1:A3:76:_TKO 9.11KV GEN UNIT 3 & P1-3:A3:37:_CASCADE 115/60KV TB 1	P3	G-1/N-1	0.91	0.89	0.93	0.98	0.96	0.94	0.96	0.89	Operating Solution
CARIBOU 230kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.57	NConv	0.70	0.81	0.68	0.76	0.68	NConv	Install redundant relay

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
CARIBOU 115kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.57	NConv	0.70	0.81	0.68	0.76	0.68	NConv	Install redundant relay
WESTWOOD 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.59	0.54	0.71	0.78	0.70	0.72	0.70	0.54	Install redundant relay
WESTWOOD 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.59	NConv	0.72	0.81	0.70	0.77	0.70	NConv	Install redundant relay
ULTR WSD 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.59	0.54	0.71	0.78	0.70	0.71	0.70	0.54	Install redundant relay
ULTR WSD 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.59	NConv	0.72	0.81	0.70	0.77	0.70	NConv	Install redundant relay
CHESTER 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.52	0.47	0.63	0.72	0.61	0.64	0.61	0.47	Install redundant relay
CHESTER 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.52	NConv	0.64	0.75	0.61	0.70	0.61	NConv	Install redundant relay
HMLTN BR 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.57	0.52	0.70	0.77	0.68	0.70	0.68	0.52	Install redundant relay
HMLTN BR 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.57	NConv	0.70	0.80	0.68	0.75	0.68	NConv	Install redundant relay
COLLINSPINE 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.51	0.47	0.63	0.72	0.61	0.63	0.61	0.47	Install redundant relay
COLLINSPINE 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.51	NConv	0.63	0.75	0.61	0.69	0.61	NConv	Install redundant relay
BIG MDWS 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.56	0.51	0.69	0.78	0.67	0.69	0.67	0.51	Install redundant relay
BIG MDWS 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.56	NConv	0.69	0.80	0.67	0.75	0.67	NConv	Install redundant relay
GRAYSFLAT 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.55	0.51	0.68	0.78	0.67	0.69	0.67	0.51	Install redundant relay
GRAYSFLAT 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.55	NConv	0.69	0.80	0.66	0.74	0.66	NConv	Install redundant relay
GANSNER 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.55	0.50	0.68	0.78	0.66	0.68	0.66	0.50	Install redundant relay

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
GANSNER 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.55	NConv	0.68	0.80	0.66	0.74	0.66	NConv	Install redundant relay
SPANSHCK 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.55	0.50	0.68	0.78	0.66	0.69	0.66	0.50	Install redundant relay
SPANSHCK 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.55	NConv	0.69	0.80	0.66	0.74	0.66	NConv	Install redundant relay
EST Q1 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.56	0.51	0.69	0.78	0.66	0.69	0.66	0.51	Install redundant relay
EST Q1 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.56	NConv	0.69	0.80	0.66	0.75	0.66	NConv	Install redundant relay
EST QNCY 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.56	0.51	0.69	0.78	0.66	0.69	0.66	0.51	Install redundant relay
EST QNCY 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.56	NConv	0.69	0.80	0.66	0.75	0.66	NConv	Install redundant relay
ELIZ TWN 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.56	0.51	0.69	0.78	0.66	0.69	0.66	0.51	Install redundant relay
ELIZ TWN 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.56	NConv	0.69	0.80	0.66	0.75	0.66	NConv	Install redundant relay
CARIBOU 60kV	P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.56	0.51	0.69	0.78	0.67	0.69	0.67	0.51	Install redundant relay
CARIBOU 60kV	P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant Relay	0.56	NConv	0.69	0.80	0.67	0.75	0.67	NConv	Install redundant relay
SYCAMORE 115kV	P7-1:A3:4_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	P7	DCTL	0.91	0.89	0.96	1.06	0.97	0.96	0.97	0.89	Install Table Mountain 115 kV RAS

2023-2024 ISO Reliability Assessment - Study Results

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

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
BIG MDWS 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	41	45	28	21	31	27	31	45	Evaluate Caribou RAS
CARIBOU 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	132	146	93	73	101	92	101	146	Evaluate Caribou RAS
CARIBOU 115kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	44	49	31	24	34	31	34	49	Evaluate Caribou RAS
CARIBOU 230kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	45	50	32	26	34	32	34	50	Evaluate Caribou RAS
CHESTER 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	42	45	30	24	34	30	34	45	Evaluate Caribou RAS
COLLINSPINE 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	42	45	31	24	34	31	34	45	Evaluate Caribou RAS
ELIZ TWN 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	43	47	25	24	33	25	33	47	Evaluate Caribou RAS
EST Q1 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	43	47	25	24	33	24	33	47	Evaluate Caribou RAS
EST QNCY 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	43	47	25	24	33	24	33	47	Evaluate Caribou RAS
GANSNER 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	43	48	30	23	33	29	33	48	Evaluate Caribou RAS
GRAYSFLAT 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	43	48	30	23	33	29	33	48	Evaluate Caribou RAS
HMLTN BR 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	38	42	26	20	29	26	29	42	Evaluate Caribou RAS
SPANSHCK 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	43	48	30	23	33	29	33	48	Evaluate Caribou RAS
ULTR WSD 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	36	39	24	18	27	23	27	39	Evaluate Caribou RAS
WESTWOOD 60kV	P1-2:A3:20:_CARIBOU-TABLE MTN 230KV [4440]	P1	N-1	36	39	23	17	27	23	27	39	Evaluate Caribou RAS
BIG BAR 60kV	P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	<8	<8	28	<8	<8	<8	<8	<8	Continue to Monitor
FRNCHGLH 60kV	P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	<8	<8	11	<8	<8	<8	<8	<8	Continue to Monitor
GROUSCRK 60kV	P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	<8	<8	35	<8	<8	<8	<8	<8	Continue to Monitor
HYAMPOM 60kV	P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	<8	<8	35	<8	<8	<8	<8	<8	Continue to Monitor
HYMPOMJT 60kV	P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	<8	<8	35	<8	<8	<8	<8	<8	Continue to Monitor
TAP 65 60kV	P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	<8	<8	19	<8	<8	<8	<8	<8	Continue to Monitor
TRINITY 60kV	P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	<8	<8	37	<8	<8	<8	<8	<8	Continue to Monitor
TRINITY 115kV	P1-2:A3:36:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P1	N-1	<8	<8	18	<8	<8	<8	<8	<8	Continue to Monitor
STLLWATR 60kV	P1-2:A3:68:_KESWICK-CASCADE 60KV [7260] MOAS OPENED ON CASCADE_STLLWATR	P1	N-1	<8	11	<8	<8	<8	<8	<8	11	Disable automatics at Stillwater

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	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		
ANTLER 60kV	P1-3:A3:37:_CASCADE 115/60KV TB 1	P1	N-1	<8	8	<8	<8	<8	<8	<8	<8	8	Continue to Monitor
MTN GATE 60kV	P1-3:A3:37:_CASCADE 115/60KV TB 1	P1	N-1	<8	<8	<8	<8	<8	<8	<8	<8	8	Continue to Monitor
PPL 60kV	P1-3:A3:37:_CASCADE 115/60KV TB 1	P1	N-1	<8	8	<8	<8	<8	<8	<8	<8	8	Continue to Monitor
CR CANAL 60kV	P1-3:A3:48:_RBPPCPH 60/13.8KV TB 1	P1	N-1	13	<8	<8	<8	<8	<8	<8	<8	<8	Project: Tyler 60 kV Shunt Capacitor
RBPPCPH 60kV	P1-3:A3:48:_RBPPCPH 60/13.8KV TB 1	P1	N-1	13	<8	<8	<8	<8	<8	<8	<8	<8	Project: Tyler 60 kV Shunt Capacitor
RBPPJCT 60kV	P1-3:A3:48:_RBPPCPH 60/13.8KV TB 1	P1	N-1	13	<8	<8	<8	<8	<8	<8	<8	<8	Project: Tyler 60 kV Shunt Capacitor
TYLER 60kV	P1-3:A3:48:_RBPPCPH 60/13.8KV TB 1	P1	N-1	13	<8	<8	<8	<8	<8	<8	<8	<8	Project: Tyler 60 kV Shunt Capacitor



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2025 Spring Off-Peak	2028 Summer Peak	2035 Summer Peak	2028 SP High CEC Forecast	2025 OP Sensitivity	
In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2019-20 Transmission Planning Process for transient stability studies: <a href="http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf">http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf</a>								

Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)												Potential Mitigation Solutions		
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP Sensitivity	

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

Substation	Load Served (MW)												Potential Mitigation Solutions	
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP Sensitivity

No single source substation with more than 100 MW



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Atlantic 230/60 kV Transformer No. 1	Base Case	P0	N-0	64	79	101	48	13	9	80	35	48	Continue to Monitor
ATLANTIC-PLEASANT GROVE #1 115 kV Line	RIO OSO-LINCLN-SPI-LINC 115KV [0] & ATLANTIC-PLEASANT GROVE #1 115KV [6190]	P6	N-1-1	<100	<100	105	<100	<100	<100	<100	<100	<100	Continue to Monitor
Bell - Placer 115 kV Line	P2-4:A5:1:_GOLDHILL 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	NConv	NConv	NA	NConv	60	7	NConv	155	NConv	Project: Gold Hill 230/115 kV Transformer Additoin Project. Short term: Action Plan
	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2-4	Bus-Tie-Breaker	90	134	NA	73	20	14	148	55	73	Project: Gold Hill 230/115 kV Transformer Additoin Project. Short term: Action Plan
	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundant battery supply/Relay	55	74	127	43	18	13	77	32	43	Add Redundant relay
	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	55	74	126	43	18	13	76	32	43	Continue to Monitor
BELLOTA #1 BANK	P2-3:A11:47:_BELLOTA - 2D 115KV & BELLOTA-RVRBANK-TULLOCH-MELONES LINE	P2-3	Non-Bus-Tie Breaker	52	63	65	106	40	23	37	64	106	Operation Solution
	BELLOTA 230/115KV TB 2 & BELLOTA-RVRBANK-TULLOCH-MELONES 115KV [0]	P6	N-1-1	<100	<100	<100	108	<100	<100	<100	<100	108	Continue to Monitor
BELLOTA #2 230/115KV BANK	P2-3:A11:44:_BELLOTA - 1D 115KV & GOLD HILL-BELLOTA-LOCKEFORD LINE	P2-3	Non-Bus-Tie Breaker	48	53	85	100	25	9	46	58	99	Operation Solution
	BELLOTA 230/115KV TB 1 & BELLOTA-RVRBANK-TULLOCH-MELONES 115KV [0]	P6	N-1-1	<100	<100	<100	108	<100	<100	<100	<100	108	RAS recommended in 2019-2020 TPP
BELLOTA-RIVERBANK 115 kV Line	P2-4:A11:30:_TESLA 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	NConv	NConv	NConv	45	6	160	NConv	NConv	45	Project: Tesla 115 kV Bus Reconfiguration Project
	P2-2:A11:34:_BELLOTA 115KV SECTION 2D	P2-2	Bus	20	23	39	27	101	43	24	44	30	Operation Solution
BELLOTA-RIVERBANK-MELONES SW STA 115kV Line	P2-4:A11:30:_TESLA 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	NConv	NConv	NConv	60	17	327	NConv	NConv	60	Project: Tesla 115 kV Bus Reconfiguration Project
	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	17	12	19	28	113	38	15	23	31	RAS recommended in 2019-2020 TPP
	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	126	207	81	NConv	76	48	41	131	NConv	RAS recommended in 2019-2020 TPP
	P5-5A:A11:11:_TESLA 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	3	178	42	NConv	NConv	11	Add Redundant relay
	P5-5C:A11:9:_TESLA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	17	233	79	NConv	NConv	18	Add Redundant battery
	P5-5C:A11:12:_MANTECA 115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	116	96	91	108	147	138	102	118	108	Add Redundant battery
	P7-1:A11:8:_STANISLAUS-MANTECA #2 115KV [3820] & MANTECA-RIPON 115KV [0]	P7	DCTL	NA	62	48	NA	105	79	61	NA	NA	Operation Solution
Brighton - Howard ICTR 115 kV Line	P2-1:A4:27:_WEST SACRAMENTO-BRIGHTON 115KV [4110] (DPWT_TP2-BRIGHTN)	P2-1	Line Section w/o Fault	105	103	99	70	9	16	105	65	69	Project: Vaca Dixon Area Reinforcement Project
	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	157	156	161	86	30	24	155	72	86	Add Redundant battery
	BRIGHTN-W.SCRMNO 115KV [0] & WOODLAND-DAVIS 115KV [4210]	P6	N-1-1	<100	<100	176	96	<100	<100	<100	111	96	Project: Vaca Dixon Area Reinforcement Project

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



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Brighton - Howard JCT3 115 kV Line	WOODLAND-DAVIS 115KV [4210] & W.SCRMNO-DAVIS 115KV [0]	P6	N-1-1	<100	<100	165	<100	<100	<100	<100	113	<100	Project: Vaca Dixon Area Reinforcement Project
	P7-1:A4:16_Rio Oso-Woodland #1 115 kV Line & Rio Oso-Woodland #2 115 kV Line	P7	DCTL	95	114	96	75	24	20	116	57	75	Project: Vaca Dixon Area Reinforcement Project
	P7-1:A5:15_Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	P7	DCTL	95	114	96	75	24	20	116	57	75	Project: Vaca Dixon Area Reinforcement Project
	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	140	146	130	88	10	22	150	84	88	Project: Vaca Dixon Area Reinforcement Project
Brighton 230/115 kV Transformer No. 1	P4-2:A5:1:_STUCK BREAKER & NO BF RELAY RIO OSO 115KV CB 402 412 422 432 442 462 OR 472	P5	Non-Redundant battery supply/Relay	76	104	80	57	17	18	106	44	57	Add Redundant relay
BRIGHTON-BELOTA 230kV Line	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	152	NA	NA	81	NA	NA	NA	68	81	Add Redundant battery
BRIGHTON-DAVIS 115kV Line	P2-3:A4:22:_W.SCRMNO - DE 115KV & BRIGHTN-W.SCRMNO LINE	P2-3	Non-Bus-Tie Breaker	103	107	96	65	<100	14	109	62	64	Project: Vaca Dixon Area Reinforcement Project
	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	107	106	109	58	18	15	106	49	58	Add Redundant battery
	WOODLAND-DAVIS 115KV [4210] & BRIGHTN-W.SCRMNO 115KV [0]	P6	N-1-1	153	195	<100	<100	<100	<100	205	96	<100	Project: Vaca Dixon Area Reinforcement Project
	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	97	101	89	60	<100	14	103	58	59	Project: Vaca Dixon Area Reinforcement Project
C.COSTAPPE - BDLSWSTA 230 kV Line	P5-5C:A11:1:_TESLA 500KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	76	NConv	NConv	29	23	48	NConv	102	29	Add Redundant battery
Carbona - Carbona JC 60 kV Line	Base Case	P0	N-0	62	78	106	40	23	29	79	48	40	Continue to Monitor
	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	91	90	169	49	23	29	91	55	49	Add Redundant relay
COLGATE-SMARTVILLE #2 60kV Line	COLGATE-SMARTVILLE #1 60KV [6510] MOAS OPENED ON COLGATE_NRRWS1TP & BELLOTA 1-25 25.00KV GEN UNIT VS	P3	G-1 / N-1	<100	<100	101	<100	<100	<100	<100	<100	<100	Continue to Monitor
Cortina - Cortina M 115 kV Line	CORTINA 230/115KV TB 4 & WADHAM 13.80KV GEN UNIT 1	P3	G-1 / N-1	96	<100	<100	100	<100	<100	<100	<100	100	Operation Solution
CURTISS-MI-WUK 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	85	100	97	NConv	78	76	92	90	NConv	Continue to Monitor
Deepwater TP - Davis 115 kV Line	WOODLAND-DAVIS 115KV [4210] & BRKR SLG-HOWARDJCT3_UCD_TP2 115KV [0] MOAS OPENED ON BRKRJCT_UCD_TP2	P6	N-1-1	102	130	103	<100	<100	<100	133	<100	<100	Project: Vaca Dixon Area Reinforcement Project
Deepwater TP - W Sacramento 115 kV Line	WOODLAND-DAVIS 115KV [4210] & BRIGHTON-DAVIS 115KV [1140] MOAS OPENED ON HOWARDJCT3_BRKRJCT	P6	N-1-1	103	131	105	<100	<100	<100	135	<100	<100	Project: Vaca Dixon Area Reinforcement Project
	BRIGHTON-DAVIS 115KV [1140] MOAS OPENED ON HOWARDJCT3_BRKRJCT & WOODLAND-DAVIS 115KV [4210]	P6	N-1-1	103	129	106	<100	<100	<100	133	<100	<100	Project: Vaca Dixon Area Reinforcement Project
	Base Case	P0	N-0	63	76	113	48	25	15	77	41	48	Continue to Monitor
	P1-4:A5:1:_RIO OSO SVC	P1	N-1	55	65	101	41	22	13	67	35	41	Continue to Monitor



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		
DEL MAR-ATLANTIC #2 60kV Line	P2-3:A5:10:_GOLDHILL - 1E 230KV & MIDDLE FORK-GOLD HILL LINE	P2-3	Non-Bus-Tie Breaker	NA	NA	101	NA	NA	NA	NA	NA	NA	Continue to Monitor	
	P2-3:A5:5:_RIO OSO 230KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie Breaker	55	65	101	41	22	13	67	35	41	Continue to Monitor	
	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	55	65	102	41	22	13	67	35	41	Continue to Monitor	
	P2-4:A11:7:_TESLA E 230KV - SECTION 2E & 1E	P2-4	Bus-Tie-Breaker	55	65	102	41	22	13	67	35	41	Continue to Monitor	
	P2-4:A5:1:_GOLDHILL 230KV - SECTION 1D & 1E	P2-4	Bus-Tie-Breaker	NA	NA	101	NA	NA	NA	NA	NA	NA	Continue to Monitor	
	P5-5A:A5:2:_RIO OSO 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	55	65	105	41	22	13	67	35	41	Add Redundant relay	
	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	58	74	108	43	11	4	76	29	43	Add Redundant battery	
	ATLANTIC-GOLD HILL 230KV [4330] & RIO OSO-ATLANTIC 230KV [5590]	P6	N-1-1	<100	<100	119	<100	<100	<100	<100	<100	<100	<100	Continue to Monitor
	P7-1:A11:12:_LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	NA	65	102	NA	22	13	67	NA	NA	Continue to Monitor	
P7-1:A11:17:_GOLD HILL-EIGHT MILE ROAD 230KV [4800] & GOLD HILL-LODI STIG 230KV [4810]	P7	DCTL	55	65	102	41	22	13	67	35	41	Continue to Monitor		
Dixon-Vaca #1 60 kV Line	P1-2:A4:56:_VACA-DXN-DIXON-J1-TRAVIS 60KV [0] MOAS OPENED ON TRAVIS_TRAVISJT	P1	N-1	103	53	50	79	10	15	54	72	79	Project: Vaca Dixon Area Reinforcement Project	
	P1-2:A4:55:_DIXON-VACA #2 60KV [6740]	P1	N-1	93	110	102	67	13	25	111	65	67	Project: Vaca Dixon Area Reinforcement Project	
	DIXON-VACA #2 60KV [6740] & GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS	P3	G-1 / N-1	<100	<100	103	<100	<100	<100	<100	<100	<100	Project: Vaca Dixon Area Reinforcement Project	
Drum - Higgins 115 kV Line	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2-4	Bus-Tie-Breaker	120	193	NA	89	74	42	217	52	89	Project: Gold Hill 230/115 kV Transformer Additoin Project. Short term: Action Plan	
	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundant battery supply/Relay	77	113	206	53	71	46	117	26	53	Add Redundant relay	
	P5-5A:A5:3:_GOLD HILL 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	NConv	123	50	NConv	173	NConv	Add Redundant relay	
	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	113	107	80	77	64	37	108	84	77	Add Redundant battery	
	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	92	117	178	65	21	16	121	54	65	Operation Solution	
P2-3:A5:88:_DRUMPH1 115KV - RING R3 & R4	P2-3	Non-Bus-Tie Breaker	111	80	55	81	82	38	80	68	81	Generation Redispatch		



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Drum - Rio Oso 115 kV No. 1 Line	P5-5A:A5:3:_GOLD HILL 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	54	156	43	NConv	43	54	Add Redundant relay
	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundant battery supply/Relay	13	57	108	5	83	35	60	<100	5	Add Redundant relay
	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	7	50	106	3	82	35	52	2	3	Continue to Monitor
Drum 115/60 kV Transformer No. 1	P2-4:A5:1:_GOLDHILL 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	NA	NA	NA	NConv	108	33	NConv	37	NConv	Operation Solution
	RIO OSO-DRUMPH1-BRUNSWCK 115KV [0] & DRUM-HIGGINS 115KV [4393] MOAS OPENED ON CHCGO PK_HIGGINS	P6	N-1-1	<100	<100	<100	<100	107	<100	<100	<100	<100	Operation Solution
Eight Mile - Stagg 230 kV Line	P5-5C:A11:1:_TESLA 500KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	101	NConv	NConv	73	35	42	NConv	73	72	Add Redundant battery
Eldorado - Missouri Flat 115 kV No. 1 Line	P2-1:A5:13:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (GOLDHILL-CPM TAP)	P2-1	Line Section w/o Fault	84	102	143	64	4	12	104	44	64	Continue to Monitor
	P2-1:A5:51:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (SHPRING1-CLRKSFLT)	P2-1	Line Section w/o Fault	84	102	144	64	4	12	104	44	64	Continue to Monitor
	P2-2:A5:7:_GOLDHILL 115KV SECTION 2F	P2-2	Bus	8	10	147	8	17	9	10	5	8	Continue to Monitor
	P2-4:A5:18:_GOLDHILL 115KV - SECTION 2G & 2F	P2-4	Bus-Tie-Breaker	NA	NA	157	NA	NA	NA	NA	NA	NA	Continue to Monitor
Gold Hill #1 230/115 kV Bank	GOLDHILL 230/115KV TB 2 & DRUM-HIGGINS 115KV [4393] MOAS OPENED ON CHCGO PK_HIGGINS	P6	N-1-1	<100	104	<100	<100	<100	<100	106	<100	<100	Project: Gold Hill 230/115 kV Transformer Additoin Project. Short term: Action Plan
HAMMER-COUNTRY CLUB 60kV Line	P2-4:A11:22:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	<100	146	139	<100	19	52	146	<100	<100	Existing RAS
	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	88	51	101	54	19	7	53	63	54	RAS recommended in 2019-2020 TPP
	P2-4:A11:22:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	<100	192	184	<100	25	68	192	<100	<100	Existing RAS
	P4-2:A11:1:_STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundant battery supply/Relay	<100	116	110	<100	14	40	116	<100	<100	Add Redundant relay
	P5-5A:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	<100	116	110	<100	14	40	116	<100	<100	Add Redundant relay
	STAGG-TESLA 230KV [5680] & EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	<100	206	177	<100	<100	99	204	<100	<100	Existing RAS
	EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P6	N-1-1	<100	206	177	<100	<100	99	204	<100	<100	Existing RAS
	P7-1:A11:34:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	<100	129	111	<100	21	55	129	<100	<100	Existing RAS
P7-1:A11:18:_STAGG-COUNTRY CLUB #1 60KV [8080] & STAGG-COUNTRY CLUB #2 60KV [8090]	P7	DCTL	116	72	84	80	12	3	71	76	80	Existing RAS	



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Higgins - Bell 115 kV Line	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2-4	Bus-Tie-Breaker	98	142	NA	76	17	14	157	59	76	Project: Gold Hill 230/115 kV Transformer Additoin Project. Short term: Action Plan
	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundant battery supply/Relay	69	89	149	51	14	12	92	41	51	Add Redundant relay
	P5-5A:A5:6:_GOLD HILL 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	69	89	149	51	14	12	92	41	51	Add Redundant relay
	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	69	89	149	51	14	12	92	41	51	Continue to Monitor
Howard JCT3 - Breaker JCT 115 kV Line	P2-1:A4:27:_WEST SACRAMENTO-BRIGHTON 115KV [4110] (DPWT_TP2-BRIGHTN)	P2-1	Line Section w/o Fault	106	103	99	70	8	16	106	66	69	Operation Solution
	P2-3:A4:22:_W.SCRMNO - DE 115KV & BRIGHTN-W.SCRMNO LINE	P2-3	Non-Bus-Tie Breaker	121	126	114	77	4	17	128	73	76	Operation Solution
	P5-5c(DC):A4:12:_Station DC Battery Supply ZAMORA 115kV Batt	P5	Non-Redundant battery supply/Relay	96	114	96	75	23	19	117	57	75	Add Redundant battery
	P4-2:A5:1:_STUCK BREAKER & NO BF RELAY RIO OSO 115KV CB 402 412 422 432 442 462 OR 472	P5	Non-Redundant battery supply/Relay	125	192	124	92	28	26	199	72	92	Add Redundant relay
	P5-5A:A5:5:_RIO OSO 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	109	139	112	86	30	24	145	64	86	Add Redundant relay
	BRIGHTN-W.SCRMNO 115KV [0] & WOODLAND-DAVIS 115KV [4210]	P6	N-1-1	<100	<100	177	96	<100	<100	<100	112	96	Continue to Monitor
	WOODLAND-DAVIS 115KV [4210] & W.SCRMNO-DAVIS 115KV [0]	P6	N-1-1	<100	<100	166	<100	<100	<100	<100	114	<100	Continue to Monitor
	P7-1:A4:16_Rio Oso-Woodland #1 115 kV Line & Rio Oso-Woodland #2 115 kV Line	P7	DCTL	96	114	96	75	23	19	117	57	75	Project: Vaca Dixon Area Reinforcement Project
Kasson - Carbona 60 kV Line	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	141	147	130	89	10	22	151	85	88	Project: Vaca Dixon Area Reinforcement Project
	Base Case	P0	N-0	63	78	105	42	27	32	78	49	42	Continue to Monitor
	P1-3:A11:26:_KASSON 115/60KV TB 1	P1	N-1	107	126	192	75	40	56	128	85	75	RAS recommended in 2019-2020 TPP
Kasson 115/60 kV Transformer No. 1	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	141	131	234	85	40	57	133	90	85	Add Redundant relay
	P1-2:A11:83:_LOUISE-MANTECA 60KV [0]	P1	N-1	70	82	105	50	28	40	82	57	50	Continue to Monitor
	P2-3:A11:108:_MANTECA 115KV - RING R4 & R3	P2-3	Non-Bus-Tie Breaker	72	84	108	53	31	42	85	59	53	Continue to Monitor
	P5-5C:A11:12:_MANTECA 115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	70	82	106	50	28	40	82	57	50	Add Redundant battery
Lambie - Birds Landing 230 kV Line	P7-1:A11:27:_TESLA-STOCKTON COGEN JCT 115KV [4010] & KASSON-LOUISE 60KV [7250]	P7	DCTL	67	79	103	48	25	37	80	54	48	Continue to Monitor
	P2-3:A4:4:_BDLSWSTA 230KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	72	73	69	62	31	46	73	117	62	Sensitivity Only





Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
LLNLU450 - LLNL TAP 115 kV Line	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	112	120	146	36	168	19	118	129	36	Operation Solution
	TESLA D 230/115KV TB 1 & GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS	P3	G-1 / N-1	100	100	110	<100	<100	<100	99	<100	<100	Continue to Monitor
	P5-5A:A11:4:_TESLA 230KV BUS C&D&E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	44	57	NConv	24	130	27	53	NConv	16	Add Redundant relay
	TESLA D 230/115KV TB 1 & TESLA D 230/115KV TB 3	P6	N-1-1	99	122	147	<100	100	<100	120	96	<100	Operation Solution
LOCKEFORD #1 60kV Line	P2-4:A11:22:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	<100	311	296	<100	24	87	311	<100	<100	Existing RAS
	P5-5C:A11:3:_STAGG 230-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	<100	287	284	<100	17	50	288	<100	<100	Add Redundant battery
	P4-2:A11:1:_STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundant battery supply/Relay	<100	310	296	<100	24	87	310	<100	<100	Add Redundant relay
	P5-5A:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	<100	310	296	<100	24	87	310	<100	<100	Add Redundant relay
	STAGG-TESLA 230KV [5680] & EIGHT MILE ROAD-STAGG 230KV [5002]	P6	N-1-1	<100	319	291	<100	<100	118	318	<100	<100	Existing RAS
	EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P6	N-1-1	<100	319	291	<100	<100	118	317	<100	<100	Existing RAS
	P7-1:A11:34:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	<100	328	294	<100	38	118	328	<100	<100	Existing RAS
Manteca - Louise 60 kV Line	P1-3:A11:26:_KASSON 115/60KV TB 1	P1	N-1	105	124	188	74	40	56	125	84	74	RAS recommended in 2019-2020 TPP
	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	138	128	229	84	40	56	130	89	84	Add Redundant relay
	P1-2:A11:46:_VIERRA-TRACY-KASSON 115KV [4310]	P1	N-1	102	15	11	83	40	28	15	68	83	Project: Vierra 115 kV Looping Project
	P2-1:A11:235:_VIERRA-TRACY-KASSON 115KV [4310] (CROSRDJT-BANTA)	P2-1	Line Section w/o Fault	105	NA	NA	87	NA	NA	NA	71	87	Generation Redispatch
	P2-1:A12:34:_BELLOTA-RIVERBANK-MELONES SW STA 115KV [1070] (RVRBK TP-TULLOCH_JCT)	P2-1	Line Section w/o Fault	30	27	<100	30	103	68	27	65	30	Generation Redispatch
	P2-2:A11:26:_KASSON 115KV SECTION 1D	P2-2	Bus	117	21	49	68	85	62	25	81	66	Generation Redispatch
	P2-3:A11:108:_MANTECA 115KV - RING R4 & R3	P2-3	Non-Bus-Tie Breaker	81	9	58	43	110	106	18	117	40	Generation Redispatch
	P2-4:A11:30:_TESLA 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	NConv	NConv	NConv	36	71	62	NConv	NConv	36	Project : Tesla 115 kV Bus Reconfiguration Project
	P2-4:A11:12:_BELLOTA 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	8	42	33	22	110	66	41	61	22	Generation Redispatch
	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	37	128	54	NConv	61	41	41	7	NConv	Generation Redispatch



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Manteca - Vierra 115 kV Line	P5-5A:A11:11:_TESLA 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	9	27	106	NConv	NConv	9	Add Redundant relay
	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	99	20	27	65	107	80	14	104	63	Add Redundant battery
	P5-5C:A11:15:_KASSON 115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	108	50	23	89	82	61	45	69	89	Add Redundant battery
	P7-1:A11:15:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & KASSON-LOUISE 60KV [7250]	P7	DCTL	25	65	23	32	113	88	58	73	32	Generation Redispatch
	P7-1:A11:31:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & TESLA-SALADO-MANTECA 115KV [4000]	P7	DCTL	53	113	74	55	114	69	106	32	56	Generation Redispatch
Manteca 115/60 kV Transformer No. 1	P1-3:A11:26:_KASSON 115/60KV TB 1	P1	N-1	71	84	125	50	29	38	85	57	50	Continue to Monitor
Missouri Flat - Gold Hill 115 kV No. 2 Line	P2-1:A5:13:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (GOLDHILL-CPM TAP)	P2-1	Line Section w/o Fault	70	85	113	48	13	5	86	40	48	Continue to Monitor
	P2-4:A5:3:_GOLDHILL 115KV - SECTION 1F & 2F	P2-4	Bus-Tie-Breaker	NA	NA	114	NA	NA	NA	NA	NA	NA	Continue to Monitor
New BANTA-TRACY 115 kV Line	P1-2:A11:51:_TESLA-LEPRINO_JCT 115KV [0] MOAS OPENED ON LEPRINO_JCT_TRACY JC	P1	N-1	90	92	108	61	14	34	94	71	61	Continue to Monitor
	P2-1:A11:58:_TESLA-TRACY 115KV [4020] (TESLA-ELLIS_JCT)	P2-1	Line Section w/o Fault	91	93	108	62	14	34	94	71	62	Continue to Monitor
	P2-3:A11:34:_TESLA 115KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie Breaker	3	18	108	15	40	21	19	7	14	Continue to Monitor
	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	142	91	100	110	29	7	91	77	111	Add Redundant battery
New Brighton-Lockeford 230 kV Line	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NA	155	167	NA	25	24	155	NA	NA	Add Redundant battery
NEW LOCKEFORD-BELOTA 230kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NA	102	120	NA	29	33	103	NA	NA	Add Redundant battery
New Pease TP - E Marysville 60 kV Line	PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E_MRY J2 & RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	<100	189	277	<100	<100	<100	193	<100	<100	Operation Solution
	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	NA	53	9	NA	76	111	53	NA	NA	Operation Solution
New TESLA - STOCKTON CO-GEN JCT 115KV Line	SCHULTE SW STA-LAMMERS 115KV [3993] & SCHULTE SW STA-KASSON-MANTECA 115KV [7472]	P6	N-1-1	<100	99	108	<100	<100	<100	98	<100	<100	Continue to Monitor
	P1-2:A5:86:_PEASE-MARYSVILLE-HARTER 60KV [7770]	P1	N-1	106	NA	NA	NA	NA	NA	NA	NA	NA	Disable Automatics
	P1-2:A5:48:_E.MRYSVE-MRYSVLE #1 60KV [0]	P1	N-1	NA	192	227	NA	13	40	196	NA	NA	Disable Automatics

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



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Nicolaus - Marysville 60 kV Line (Plumas-East Nicolaus)	E.MRYSVE-MRYSVLE #1 60KV [0] & RBROCKLIN 12.47KV GEN UNIT 1	P3	G-1 / N-1	<100	<100	228	<100	<100	<100	<100	<100	<100	Continue to Monitor
	P5-5C:A5:4:_PEASE 115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	106	NA	NA	NA	NA	NA	NA	NA	NA	Add Redundant battery
	PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	<100	<100	111	<100	<100	<100	<100	<100	<100	Continue to Monitor
Pease - Marysville - Harter 60 kV Line	P2-1:A5:16:_PALERMO-NICOLAUS 115KV [3210] (E.MRYSVE-E.MRY J2)	P2-1	Line Section w/o Fault	53	20	101	78	54	87	53	81	78	Continue to Monitor
Pease - Pease Tap 60 kV Line	PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & YUBA CTY 13.80KV GEN UNIT 1	P3	G-1 / N-1	<100	<100	100	<100	<100	<100	<100	<100	<100	Continue to Monitor
	RIO OSO-NICOLAUS 115KV [3440] & PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2	P6	N-1-1	<100	144	219	<100	<100	<100	148	<100	<100	Operation Solution
Placer 115/60 kV Transformer No. 1	Base Case	P0	N-0	67	85	105	51	16	8	86	36	51	Continue to Monitor
PLACER-GOLD HILL #1 115KV Line	PLACER-GOLD HILL #2 115KV [4290] & DRUM-HIGGINS 115KV [4393] MOAS OPENED ON CHCGO PK_HIGGINS	P6	N-1-1	<100	<100	100	<100	<100	<100	<100	<100	<100	Continue to Monitor
Post Office JCT - Deepwater TP 115 kV Line	WOODLAND-DAVIS 115KV [4210] & BRIGHTN-W.SCRMNO 115KV [0]	P6	N-1-1	<100	110	<100	<100	<100	<100	117	<100	<100	Project: Vaca Dixon Area Reinforcement Project
	BRIGHTN-W.SCRMNO 115KV [0] & WOODLAND-DAVIS 115KV [4210]	P6	N-1-1	<100	100	<100	<100	<100	<100	104	<100	<100	Continue to Monitor
Rio Oso - Atlantic 230 kV Line No. 1	P2-2:A5:3:_GOLDHILL 230KV SECTION 2D	P2-2	Bus	93	100	87	60	28	20	102	76	60	Continue to Monitor
	P4-2:A5:1:_STUCK BREAKER & NO BF RELAY RIO OSO 115KV CB 402 412 422 432 442 462 OR 472	P5	Non-Redundant battery supply/Relay	91	121	80	66	36	20	123	65	68	Add Redundant relay
Rio Oso - Linkcon 115 kV Line	P7-1:A5:2_Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	91	114	71	55	18	13	117	70	55	Project: Reconductor Rio Oso-SPI Jct-Lincoln 115kV line
Rio Oso - W. Sacramento 115 kV Line	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2-2	Bus	104	117	97	71	20	22	124	66	71	Project: Vaca Dixon Area Reinforcement Project
	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2-4	Bus-Tie-Breaker	104	118	97	71	20	22	124	66	71	Project: Vaca Dixon Area Reinforcement Project
	P5-5A:A4:7:_BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	146	146	116	79	22	24	152	70	79	Add Redundant relay
	P5-5c(DC):A4:2:_Station DC Battery Supply BRIGHTON 230kV Batt	P5	Non-Redundant battery supply/Relay	146	146	116	79	22	24	152	70	79	Add Redundant battery
	RIO OSO-BRIGHTON 230KV [5600] & BRIGHTON-LOCKFORD 230KV [0]	P6	N-1-1	<100	117	121	<100	<100	<100	122	<100	<100	Project: Vaca Dixon Area Reinforcement Project
	BRIGHTON-BELLOTA 230KV [4420] & RIO OSO-BRIGHTON 230KV [5600]	P6	N-1-1	129	<100	<100	<100	<100	<100	<100	<100	<100	Project: Vaca Dixon Area Reinforcement Project
	WOODLAND-DAVIS 115KV [4210] & BRIGHTN-W.SCRMNO 115KV [0]	P6	N-1-1	108	155	<100	<100	<100	<100	165	<100	<100	Project: Vaca Dixon Area Reinforcement Project



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Rio Oso - Woodland 115 kv No. 1	P5-5A:A4:7:_BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	93	103	79	54	18	17	107	44	54	Add Redundant relay
	P5-5c(DC):A4:2:_Station DC Battery Supply BRIGHTON 230kv Batt	P5	Non-Redundant battery supply/Relay	100	110	86	58	17	18	115	49	58	Add Redundant battery
Rio Oso 230/115 kv Bank No. 1	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2-2	Bus	105	58	57	79	6	5	59	82	78	Project: Rio oso 230/115 kv Transfor upgrade Project
	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2-4	Bus-Tie-Breaker	105	58	57	79	6	5	59	82	78	Project: Rio oso 230/115 kv Transfor upgrade Project
	P5-5c(DC):A4:2:_Station DC Battery Supply BRIGHTON 230kv Batt	P5	Non-Redundant battery supply/Relay	135	62	61	86	2	4	63	87	85	Add Redundant battery
	P7-1:A5:2:_Rio Oso-Atlantic 230 kv Line & Rio Oso-Gold Hill 230 kv Line	P7	DCTL	115	48	57	78	4	5	48	93	78	Project: Rio oso 230/115 kv Transfor upgrade Project
Rio Oso 230/115 kv Bank No. 2	P2-3:A5:3:_RIO OSO 230KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie Breaker	101	61	80	75	7	12	64	80	75	Project: Rio oso 230/115 kv Transfor upgrade Project
Ripon - Manteca 115 kv Line	P2-1:A12:34:_BELLOTA-RIVERBANK-MELONES SW STA 115KV [1070] (RVRBK TP-TULLOCH_JCT)	P2-1	Line Section w/o Fault	69	60	51	62	115	100	63	79	62	Continue to Monitor
	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	69	68	50	NConv	35	16	23	30	NConv	Operation Solution
	MANTECA-MELONES 115KV [0] MOAS OPENED ON STANISLS_FRGTNTP1 & GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS	P3	G-1 / N-1	103	<100	<100	<100	87	<100	<100	<100	<100	Project: Manteca-Ripon-Riverbank-Melones Area 115 kv Line Reconductoring Stanislaus-Manteca rebuild project
	P5-5A:A11:11:_TESLA 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	49	57	140	NConv	NConv	49	Add Redundant relay
Riverbank Jct - Ripon 115 kv Line	P2-1:A12:34:_BELLOTA-RIVERBANK-MELONES SW STA 115KV [1070] (RVRBK TP-TULLOCH_JCT)	P2-1	Line Section w/o Fault	66	57	49	59	110	96	61	76	59	Continue to Monitor
	P2-4:A11:30:_TESLA 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	NConv	NConv	NConv	112	41	49	NConv	NConv	112	Project: Tesla 115 kv Bus Reconfiguration Project
	P2-4:A11:12:_BELLOTA 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	50	38	20	44	119	93	36	72	44	Continue to Monitor
	MANTECA-MELONES 115KV [0] MOAS OPENED ON STANISLS_FRGTNTP1 & GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS	P3	G-1 / N-1	113	<100	<100	94	<100	<100	<100	<100	<100	Project: Manteca-Ripon-Riverbank-Melones Area 115 kv Line Reconductoring Stanislaus-Manteca rebuild project
	P5-5A:A11:11:_TESLA 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	14	24	48	36	NConv	14	Add Redundant relay
	P5-5C:A11:9:_TESLA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	12	20	55	NConv	NConv	12	Add Redundant battery
	MANTECA-MELONES 115KV [0] MOAS OPENED ON STANISLS_FRGTNTP1 & STANISLAUS-MANTECA #2 115KV [3820]	P6	N-1-1	107	<100	<100	<100	87	104	68	91	<100	Project: Manteca-Ripon-Riverbank-Melones Area 115 kv Line Reconductoring Stanislaus-Manteca rebuild project

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



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Rocklin - Taylor 60 kV Line	ATLANTIC-GOLD HILL 230KV [4330] & RIO OSO-ATLANTIC 230KV [5590]	P6	N-1-1	<100	<100	147	<100	<100	<100	<100	<100	<100	Continue to Monitor
SCHULTE SW STA-KASSON-MANTECA 115kV Line	P2-3:A11:39:_SCHULTE 115KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	93	83	98	102	21	20	83	56	103	Operation Solution
	SCHULTE SW STA-LAMMERS 115KV [3993] & RIPON 1-25 25.00KV GEN UNIT VE	P3	G-1 / N-1	<100	<100	110	<100	<100	<100	<100	<100	<100	Continue to Monitor
	SCHULTE SW STA-LAMMERS 115KV [3993] & STANISLS 13.80KV GEN UNIT 1	P3	G-1 / N-1	102	<100	98	122	<100	<100	<100	<100	123	Operation Solution
	VIERRA-TESLA 115KV [0] & SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	<100	131	131	<100	<100	<100	130	<100	<100	Generation Redispatch
	SCHULTE SW STA-LAMMERS 115KV [3993] & TESLA-LEPRINO_JCT 115KV [0] MOAS OPENED ON LEPRINO_JCT_TRACY JC	P6	N-1-1	136	116	124	98	<100	<100	118	<100	93	Generation Redispatch
Spaulding - Summit 60 kV Line	P2-3:A5:90:_BRNSWALT 115KV - RING R5 & R6	P2-3	Non-Bus-Tie Breaker	101	94	27	52	84	76	93	49	52	Generation Redispatch
Stagg - Hammer 60 kV Line No. 1	P7-1:A11:18:_STAGG-COUNTRY CLUB #1 60KV [8080] & STAGG-COUNTRY CLUB #2 60KV [8090]	P7	DCTL	146	111	127	99	10	19	112	101	99	Operation Solution
Stanislaus - Manteca 115 kV Line No. 2	P5-5A:A11:11:_TESLA 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	42	12	81	NConv	NConv	42	Add Redundant relay
	P5-5C:A11:9:_TESLA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	45	8	88	NConv	NConv	45	Add Redundant battery
Stanislaus - Melones Sw- Riverbank JCT SW STA 115 kV Line	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	37	116	107	NConv	26	43	19	45	NConv	Operation Solution
	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	107	42	51	78	22	46	49	50	76	Add Redundant relay
	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	102	35	35	86	34	42	38	74	84	Add Redundant battery
	P5-5A:A11:11:_TESLA 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	39	120	130	NConv	NConv	39	Add Redundant relay
STANISLAUS-MELONES SW STA-MANTECA #1 115kV Line	P2-4:A11:30:_TESLA 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	NConv	NConv	NConv	112	41	49	NConv	NConv	112	Project: Tesla 115 kV Bus Reconfiguration Project
	MELONES-RIVRBKJT-STANISLS 115KV [0] & GWFR3Y3 18.00KV & GWFR3Y1 13.80KV & GWFR3Y2 13.80KV GEN UNITS	P3	G-1 / N-1	104	<100	<100	<100	<100	<100	<100	<100	<100	Project: Manteca-Ripon-Riverbank-Melones Area 115 kV Line Reconductoring Stanislaus-Manteca rebuild project
	STANISLS-MELONES-RIVRBKJT 115KV [0] & STANISLAUS-MANTECA #2 115KV [3820]	P6	N-1-1	111	<100	<100	81	85	105	<100	91	77	Project: Manteca-Ripon-Riverbank-Melones Area 115 kV Line Reconductoring Stanislaus-Manteca rebuild project
STANISLAUS-MELONES SW STA-RIVERBANK	P2-4:A11:30:_TESLA 115KV - SECTION 2D & 1D	P2-4	NConv	NConv	NConv	117	41	49	NConv	NConv	117	Project: Tesla 115 kV Bus Reconfiguration Project	
	P2-4:A11:12:_BELLOTA 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	56	40	28	51	100	83	37	72	51	Continue to Monitor
	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	30	100	104	NConv	22	34	20	40	NConv	Operation Solution

Study Area: **PG&E Central Valley**  
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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Stanislaus-Melones-Manteca 115 kV Line No. 1	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	106	50	56	84	48	60	55	69	83	Add Redundant relay
	P5-5A:A11:11:_TESLA 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	55	48	117	NConv	NConv	55	Add Redundant relay
	P5-5C:A11:9:_TESLA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	59	40	130	NConv	NConv	59	Add Redundant battery
	P7-1:A11:3:_STANISLAUS-MANTECA #2 115KV [3820] & STANISLAUS-MELONES SW STA-RIVERBANK JCT SW STA 115KV [3841]	P7	DCTL	97	55	55	81	98	115	65	91	77	Continue to Monitor
	P7-1:A11:8:_STANISLAUS-MANTECA #2 115KV [3820] & MANTECA-RIPON 115KV [0]	P7	DCTL	NA	59	68	NA	111	122	69	NA	NA	Operation Solution
Stockton 'A' - Lockeford - Bellota 115 kV Line No. 2	P2-2:A11:33:_BELLOTA 115KV SECTION 1D	P2-2	Bus	84	97	137	70	18	44	99	65	70	Continue to Monitor
	P2-3:A11:44:_BELLOTA - 1D 115KV & GOLD HILL-BELLOTA-LOCKEFORD LINE	P2-3	Non-Bus-Tie Breaker	96	109	152	76	22	49	111	70	76	Operation Solution
	P2-3:A11:45:_BELLOTA - 1D 115KV & BELLOTA-RIVERBANK LINE	P2-3	Non-Bus-Tie Breaker	84	97	137	70	18	44	99	65	70	Continue to Monitor
STOCKTON A-LOCKEFORD-BELLOTA #1 115KV Line	P2-1:A11:79:_STOCKTON A-LOCKEFORD-BELLOTA #1 115KV [3880] (LCKFRDJA-BELLOTA)	P2-1	Line Section w/o Fault	65	75	107	48	15	31	76	51	48	Continue to Monitor
	P2-2:A11:33:_BELLOTA 115KV SECTION 1D	P2-2	Bus	68	79	120	50	15	31	80	53	50	Continue to Monitor
	STOCKTON A-LOCKEFORD-BELLOTA #2 115KV [3890] MOAS OPENED ON KYOHOTAP_LCKFRDJB & GOLD HILL-BELLOTA-LOCKEFORD 115KV [1690]	P6	N-1-1	<100	<100	105	<100	<100	<100	<100	<100	<100	Continue to Monitor
Table Mountain-Pease 60 kV Line (Peachton-Gridley)	P5-5A:A5:4:_PEASE 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	105	40	32	132	47	56	40	140	132	Add Redundant relay
	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	50	26	29	87	47	54	25	156	87	Continue to Monitor
Tesla - Tracy 115 kV Line	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	146	116	132	106	15	21	116	91	107	Add Redundant battery
TESLA-SALADO-MANTECA 115kV Line	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	146	64	68	103	21	5	63	69	104	Add Redundant relay
TESLA-SCHULTE SW STA #1 115kV Line	P2-2:A11:65:_TESLA 115KV SECTION 1D	P2-2	Bus	88	35	NA	27	74	23	35	111	27	Sensitivity Only
	TESLA-SCHULTE SW STA #2 115KV [3970] & GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS	P3	G-1 / N-1	137	121	125	110	<100	<100	121	<100	109	Operation Solution
	TESLA-SCHULTE SW STA #1 115KV [3980] & GWF TRACY-SCHULTE 115KV	P6	N-1-1	128	110	120	99	<100	<100	109	<100	98	Operation Solution
UCD TP2 - Davis 115 kV Line	WOODLAND-DAVIS 115KV [4210] & BRIGHTN-W.SCRMNO 115KV [0]	P6	N-1-1	124	157	<100	<100	<100	<100	166	<100	<100	Project: Vaca Dixon Area Reinforcement Project

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Vaca - Bahia 230 kV Line	P5-5C:A11:1:_TESLA 500KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	107	NConv	NConv	61	44	70	NConv	117	61	Add Redundant battery
Vaca - Lambie 230 kV Line	P5-5A:A11:4:_TESLA 230KV BUS C&D&E (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	90	48	NConv	79	33	45	50	NConv	79	Add Redundant relay
Vaca-Plainfield 60 kV line	Base Case	P0	N-0	>100	109	128	54	43	10	110	17	54	Project: Vaca Dixon Area Reinforcement Project
	P1-4:A4:18:_PLAINFLDE SVD=V	P1	N-1	NA	97	117	NA	37	8	98	NA	NA	Continue to Monitor
	PLAINFLDE SVD=V & GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS	P3	G-1 / N-1	<100	<100	117	<100	<100	<100	<100	<100	<100	Continue to Monitor
Valley Springs - Martell 60 kV Line No. 1	P1-2:A11:76:_VALLEY SPRINGS-CLAY 60KV [8264]	P1	N-1	124	139	152	98	17	50	140	86	98	Operation Solution
	P7-1:A11:14:_VALLEY SPRINGS-CLAY 60KV [8252] & VALLEY SPRINGS #2 60KV [8231]	P7	DCTL	124	139	152	98	17	50	140	86	97	Existing operating procedure
Weber 60 kV Line No. 2 (Weber - French Camp)	P1-2:A11:79:_WEBER-FRENCH CAMP #1 60KV [8320]	P1	N-1	109	124	154	80	23	54	126	89	80	Project: French Camp Reinforment Project
West Sacramento - Brighton 115 kV Line	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	121	123	128	61	16	19	123	54	61	Add Redundant battery
West Sacramento - Davis 115 kV Line	P4-2:A5:1:_STUCK BREAKER & NO BF RELAY RIO OSO 115KV CB 402 412 422 432 442 462 OR 472	P5	Non-Redundant battery supply/Relay	74	115	64	51	21	13	118	47	51	Add Redundant relay
West Sacramento - Deepwater 115 kV Line	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	100	104	87	38	34	13	104	57	38	Add Redundant battery
	P5-5c(DC):A4:2:_Station DC Battery Supply BRIGHTON 230kv Batt	P5	Non-Redundant battery supply/Relay	97	102	65	35	34	13	107	60	35	Add Redundant battery
Woodland - Davis 115 kV Line	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2-2	Bus	137	104	81	78	11	10	110	70	78	Project: Vaca Dixon Area Reinforcement Project
	P2-3:A4:21:_BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2-3	Non-Bus-Tie Breaker	138	105	81	78	11	10	111	71	78	Project: Vaca Dixon Area Reinforcement Project
	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2-4	Bus-Tie-Breaker	155	117	96	90	23	19	123	87	90	Project: Vaca Dixon Area Reinforcement Project
	P5-5A:A4:7:_BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	174	133	101	89	15	13	139	75	89	Add Redundant relay
	P5-5c(DC):A4:16:_Station DC Battery Supply BRIGHTON 115KV Batt	P5	Non-Redundant battery supply/Relay	150	105	81	78	11	10	111	72	78	Add Redundant battery

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
	P4-2:A5:1_ STUCK BREAKER & NO BF RELAY RIO OSO 115KV CB 402 412 422 432 442 462 OR 472	P5	Non-Redundant battery supply/Relay	90	98	57	69	16	20	102	55	69	Add Redundant relay
	BRIGHTON-BELLOTA 230KV [4420] & RIO OSO-BRIGHTON 230KV [5600]	P6	N-1-1	174	<100	<100	<100	<100	<100	<100	<100	<100	Project: Vaca Dixon Area Reinforcement Project
	RIO OSO-BRIGHTON 230KV [5600] & BRIGHTON-LOCKFORD 230KV [0]	P6	N-1-1	<100	118	105	<100	<100	<100	124	<100	<100	Project: Vaca Dixon Area Reinforcement Project



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
ALLEGHNY 60 kV	Base Case	P0	N-0	1.03	1.02	0.94	1.02	1.06	1.07	1.02	1.04	1.02	Continue to monitor future load forecast
ATLANTC 230 kV	Base Case	P0	N-0	0.99	0.97	0.93	0.98	1.03	1.03	0.97	1.00	0.98	Continue to monitor future load forecast
BRIGHTON 230 kV	Base Case	P0	N-0	0.97	0.95	0.93	0.97	1.03	1.02	0.94	0.98	0.97	Vaca Dixon Area Reinforcement project
DEL MAR 60 kV	Base Case	P0	N-0	1.01	1.01	0.90	1.00	1.05	1.04	1.01	1.04	1.00	Continue to monitor future load forecast
DIST2047 60 kV	Base Case	P0	N-0	0.93	0.88	0.89	0.98	0.96	0.96	0.88	0.95	0.98	System adjustments or voltage support if needed
DUNNIGAN 60 kV	Base Case	P0	N-0	0.95	0.97	0.95	1.01	1.02	1.02	0.97	0.97	1.01	Continue to monitor future load forecast
FORST HL 60 kV	Base Case	P0	N-0	0.98	0.97	0.95	1.00	1.03	1.02	0.97	0.99	1.00	Continue to monitor future load forecast
GOLDHILL 230 kV	Base Case	P0	N-0	1.00	0.98	0.93	0.99	1.02	1.03	0.98	1.00	0.99	Continue to monitor future load forecast
GRSS VLY 60 kV	Base Case	P0	N-0	1.03	1.02	0.94	1.02	1.07	1.08	1.02	1.05	1.02	Continue to monitor future load forecast
MDDLE FK 60 kV	Base Case	P0	N-0	0.98	0.98	0.95	0.98	0.99	0.99	0.98	0.98	0.98	Continue to monitor future load forecast
MDDLK M 230 kV	Base Case	P0	N-0	0.98	0.98	0.95	0.98	0.99	0.99	0.98	0.98	0.98	Continue to monitor future load forecast
PLAINFLDE 60 kV	Base Case	P0	N-0	0.95	0.92	0.89	0.97	0.99	1.04	0.93	1.01	0.97	Vaca Dixon Area Reinforcement project
RIO OSO 230 kV	Base Case	P0	N-0	1.00	0.97	0.94	0.99	1.03	1.03	0.97	1.01	0.99	Continue to monitor future load forecast
ROCKLIN 60 kV	Base Case	P0	N-0	1.02	1.02	0.93	1.01	1.05	1.04	1.02	1.04	1.01	Continue to monitor future load forecast
SIERRAPI 60 kV	Base Case	P0	N-0	1.01	1.01	0.90	1.00	1.05	1.04	1.01	1.04	1.00	Continue to monitor future load forecast
TAYLOR 60 kV	Base Case	P0	N-0	1.02	1.02	0.93	1.01	1.04	1.04	1.02	1.04	1.01	Continue to monitor future load forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
WILKINS 60 kV	Base Case	P0	N-0	0.96	0.91	0.90	1.00	0.98	0.98	0.91	0.98	1.00	System adjustments or voltage support if needed
CALVO 60 kV	P1-3:A11:26:_KASSON 115/60KV TB 1	P1	N-1	0.96	0.95	0.84	0.98	0.99	1.03	0.95	0.98	0.98	Continue to monitor future load forecast
CAMPUS 115 kV	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	0.97	0.93	0.99	1.03	1.11	1.08	0.93	0.99	1.03	System adjustments or voltage support if needed
CARBONA 60 kV	P1-3:A11:26:_KASSON 115/60KV TB 1	P1	N-1	0.92	0.90	0.75	0.95	0.97	1.03	0.90	0.94	0.95	System adjustments or voltage support if needed
DAVIS 115 kV	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	0.98	0.94	0.99	1.03	1.10	1.08	0.93	1.00	1.03	System adjustments or voltage support if needed
DEL MAR 60 kV	P1-4:A5:1:_RIO OSO SVC	P1	N-1	0.99	0.99	0.88	1.00	1.05	1.04	0.98	1.02	1.00	Continue to monitor future load forecast
DEL MAR 60 kV	P1-2:A11:107:_LOCKFORD-BRIGHTON 230KV [0]	P1	N-1	NA	1.01	0.90	NA	1.05	1.04	1.01	NA	NA	Continue to monitor future load forecast
DIST2047 60 kV	P1-2:A4:49:_CORTINA #1 60KV [6580] MOAS OPENED ON CORTINA ARBUCKLE	P1	N-1	0.91	0.85	0.85	0.94	1.00	0.96	0.85	0.95	0.94	System adjustments or voltage support if needed
DIST2047 60 kV	P1-2:A4:27:_CORTINA-MENDOCINO #1 115KV [1330]	P1	N-1	0.93	0.88	0.88	0.98	0.96	0.96	0.88	0.95	0.98	System adjustments or voltage support if needed
ENVRO_HY 60kV	P1-3:A5:37:_OXBOW 60/9.11KV TB 1	P1	N-1	0.93	0.92	0.88	0.96	1.02	1.01	0.91	0.95	0.96	System adjustments or voltage support if needed
ENVRO_HY 60kV	P1-1:A5:23:_OXBOW F 9.11KV GEN UNIT 1	P1	N-1	0.93	0.92	0.88	0.96	1.02	1.01	0.91	0.95	0.96	System adjustments or voltage support if needed
FORST HL 60 kV	P1-2:A5:50:_OXBOW TAP 60KV [7561] MOAS OPENED ON ENVRO HY FORST HL	P1	N-1	0.93	0.91	0.89	0.96	1.02	1.01	0.91	0.95	0.96	System adjustments or voltage support if needed
FORST HL 60 kV	P1-1:A5:23:_OXBOW F 9.11KV GEN UNIT 1	P1	N-1	0.93	0.92	0.88	0.96	1.02	1.01	0.91	0.95	0.96	System adjustments or voltage support if needed
FORST HL 60 kV	P1-3:A5:37:_OXBOW 60/9.11KV TB 1	P1	N-1	0.93	0.92	0.88	0.96	1.02	1.01	0.91	0.95	0.96	System adjustments or voltage support if needed
FORST HL 60 kV	P1-1:A5:20:_ROLLINSF 6.60KV GEN UNIT 1	P1	N-1	0.94	0.93	0.90	0.96	1.02	1.01	0.92	0.95	0.96	System adjustments or voltage support if needed
FORST HL 60 kV	P1-3:A5:34:_ROLLINS 60/6.6KV TB 1	P1	N-1	0.94	0.93	0.90	0.96	1.02	1.01	0.92	0.95	0.96	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
GUSTINE 60kV	P1-2:A12:19:_CROW CREEK SW STA-FRONTIER SOLAR PV 60KV [7859]	P1	N-1	0.93	0.89	0.95	0.97	1.09	1.07	0.89	0.98	0.97	System adjustments or voltage support if needed
LOCKFORD 230 kV	P1-2:A11:5:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	0.91	0.97	0.94	0.89	1.02	1.02	0.97	0.91	0.89	System adjustments or voltage support if needed
LYOTH-SP 60 kV	P1-3:A11:26:_KASSON 115/60KV TB 1	P1	N-1	0.94	0.92	0.78	0.96	0.98	1.03	0.92	0.95	0.96	System adjustments or voltage support if needed
MRYSVLE 60 kV	P1-2:A5:48:_E.MRYSVE-MRYSVLE #1 60KV [0]	P1	N-1	NA	0.90	0.84	NA	1.03	1.03	0.89	NA	NA	System adjustments or voltage support if needed
OXBOW 60 kV	P1-3:A5:37:_OXBOW 60/9.11KV TB 1	P1	N-1	0.93	0.92	0.88	0.96	1.02	1.01	0.91	0.95	0.96	System adjustments or voltage support if needed
OXBOW 60 kV	P1-1:A5:23:_OXBOW F 9.11KV GEN UNIT 1	P1	N-1	0.93	0.92	0.88	0.96	1.02	1.01	0.91	0.95	0.96	System adjustments or voltage support if needed
PLAINFLDE 60 kV	P1-3:A4:25:_VACA-DIX 115/60KV TB 5	P1	N-1	0.94	0.93	0.89	0.97	0.99	1.04	0.92	1.00	0.97	Vaca Dixon Area Reinforcement project
PLAINFLDE 60 kV	P1-3:A4:26:_VACA-DIX 115/60KV TB 9	P1	N-1	0.94	0.92	0.89	0.97	0.99	1.04	0.91	1.01	0.97	Vaca Dixon Area Reinforcement project
PLAINFLDE 60 kV	P1-3:A4:7:_VACA-DIX 230/115KV TB 3	P1	N-1	0.94	0.93	0.89	0.97	0.99	1.04	0.93	1.01	0.97	Vaca Dixon Area Reinforcement project
SIERRAPI 60 kV	P1-4:A5:1:_RIO OSO SVC	P1	N-1	0.99	0.99	0.88	1.00	1.05	1.04	0.98	1.02	1.00	Continue to monitor future load forecast
SIERRAPI 60 kV	P1-2:A11:33:_LODI STIG-EIGHT MILE ROAD 230KV [5001]	P1	N-1	1.01	1.01	0.90	0.99	1.05	1.04	1.00	1.04	0.99	Continue to monitor future load forecast
SIERRAPI 60 kV	P1-2:A5:43:_LINCOLN-PLEASANT GROVE 115KV [7400] MOAS OPENED ON RBROCKLINJCT PLSNT	P1	N-1	1.01	1.01	0.89	1.00	1.05	1.04	1.00	1.04	1.00	Continue to monitor future load forecast
SIERRAPI 60 kV	P1-2:A5:4:_PALERMO-COLGATE 230KV [5360]	P1	N-1	1.01	1.01	0.90	1.00	1.05	1.04	1.01	1.04	1.00	Continue to monitor future load forecast
SIERRAPI 60 kV	P1-2:A11:107:_LOCKFORD-BRIGHTON 230KV [0]	P1	N-1	NA	1.01	0.90	NA	1.05	1.04	1.01	NA	NA	Continue to monitor future load forecast
SIERRAPI 60 kV	P1-2:A4:60:_BRIGHTON-LOCKFORD 230KV [0]	P1	N-1	NA	1.01	0.90	NA	1.05	1.04	1.01	NA	NA	Continue to monitor future load forecast
UCDAVSJ1 115 kV	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	0.98	0.94	0.99	1.03	1.10	1.08	0.93	1.00	1.03	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
WESTLEY 60 kV	P1-3:A11:26:_KASSON 115/60KV TB 1	P1	N-1	0.94	0.93	0.75	0.94	0.99	1.01	0.92	0.96	0.94	System adjustments or voltage support if needed
WHEATLND 60 kV	P1-2:A5:28:_RIO OSO-NICOLAUS 115KV [3440]	P1	N-1	0.97	0.94	0.89	0.97	1.04	1.04	0.94	0.99	0.97	System adjustments or voltage support if needed
WHEATLND 60 kV	P1-2:A5:28:_RIO OSO-NICOLAUS 115KV [3440]	P1	N-1	0.97	0.94	0.89	0.97	1.04	1.04	0.94	0.99	0.97	System adjustments or voltage support if needed
WILKINS 60 kV	P1-2:A4:49:_CORTINA #1 60KV [6580] MOAS OPENED ON CORTINA ARBUCKLE	P1	N-1	0.94	0.88	0.86	0.95	1.01	0.98	0.88	0.98	0.95	System adjustments or voltage support if needed
WILKINS 60 kV	P1-2:A4:27:_CORTINA-MENDOCINO #1 115KV [1330]	P1	N-1	0.95	0.91	0.90	1.00	0.98	0.98	0.91	0.98	1.00	System adjustments or voltage support if needed
APPLE HL 115 kV	P2-1:A5:51:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (SHPRING1-CLRSVLT)	P2	Bus/Breaker	1.01	0.99	0.83	0.99	1.05	1.06	0.99	1.04	0.99	Continue to monitor future load forecast
APPLE HL 115 kV	P2-1:A5:13:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (GOLDHILL-CPM TAP)	P2	Bus/Breaker	1.01	0.99	0.83	0.99	1.05	1.06	0.99	1.04	0.99	Continue to monitor future load forecast
APPLE HL 115 kV	P2-2:A5:7:_GOLDHILL 115KV SECTION 2F	P2	Bus/Breaker	1.04	1.04	0.82	1.03	1.05	1.05	1.04	1.05	1.03	Continue to monitor future load forecast
APPLE HL 115 kV	P2-4:A5:18:_GOLDHILL 115KV - SECTION 2G & 2F	P2	Bus/Breaker	NA	NA	0.82	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
APPLE HL 115 kV	P2-4:A5:3:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	NA	NA	0.83	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
ATLANTC 230 kV	P2-4:A11:7:_TESLA E 230KV - SECTION 2E & 1E	P2	Bus/Breaker	0.99	0.97	0.90	0.98	1.03	1.03	0.97	1.00	0.98	Continue to monitor future load forecast
ATLANTI 60 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	1.01	1.00	0.90	NConv	1.04	1.04	1.00	1.03	NConv	Continue to monitor future load forecast
ATLANTI 60 kV	P2-4:A11:7:_TESLA E 230KV - SECTION 2E & 1E	P2	Bus/Breaker	1.02	1.02	0.90	1.00	1.04	1.04	1.02	1.03	1.00	Continue to monitor future load forecast
AUBURN 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.99	0.83	NA	0.99	1.03	1.03	0.76	1.02	0.99	System adjustments or voltage support if needed
AUBURN 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.99	0.83	NA	0.99	1.03	1.03	0.77	1.02	0.99	System adjustments or voltage support if needed
AVENA 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.97	0.89	0.96	NConv	1.04	1.05	0.99	1.00	NConv	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
BANTA 115 kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.96	0.97	0.96	0.98	1.03	1.03	0.96	0.90	0.98	System adjustments or voltage support if needed
BEARDSLY 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	1.02	0.85	1.04	NConv	1.05	1.05	1.04	1.03	NConv	System adjustments or voltage support if needed
BELL PGE 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.92	0.79	NA	0.93	1.08	1.10	0.73	1.00	0.93	System adjustments or voltage support if needed
BELLOTA 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.88	0.58	0.95	NConv	1.03	1.08	1.03	1.01	NConv	System adjustments or voltage support if needed
BRIGHTON 230 kV	P2-3:A5:5:_RIO OSO 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	0.92	0.90	0.91	0.94	1.03	1.02	0.90	0.93	0.94	Vaca Dixon Area Reinforcement project
CAMANCHE 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.89	0.58	0.94	NConv	1.04	1.09	1.03	1.01	NConv	System adjustments or voltage support if needed
CAMPUS 115 kV	P2-3:A4:21:_BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2	Bus/Breaker	0.78	0.77	0.93	0.97	1.09	1.05	0.74	0.87	0.97	System adjustments or voltage support if needed
CATARACT 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.97	0.84	0.99	NConv	1.05	1.06	1.02	1.01	NConv	System adjustments or voltage support if needed
CHCGO PK 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.99	0.91	NA	1.00	1.07	1.08	0.88	1.03	1.00	System adjustments or voltage support if needed
CL AMMNA 115kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.96	0.96	0.96	0.98	1.03	1.03	0.96	0.90	0.98	System adjustments or voltage support if needed
CLRKSFLT 115	P2-1:A5:13:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (GOLDHILL-CPM TAP)	P2	Bus/Breaker	0.99	0.97	0.79	0.97	1.06	1.07	0.97	1.03	0.97	Continue to monitor future load forecast
CLRKSFLT 115	P2-2:A5:7:_GOLDHILL 115KV SECTION 2F	P2	Bus/Breaker	1.04	1.04	0.78	1.04	1.05	1.05	1.04	1.05	1.04	Continue to monitor future load forecast
CLRKSFLT 115	P2-4:A5:18:_GOLDHILL 115KV - SECTION 2G & 2F	P2	Bus/Breaker	NA	NA	0.79	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
CLRKSFLT 115	P2-4:A5:3:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	NA	NA	0.79	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
CORTINA 115 kV	P2-3:A4:56:_CORTINA 230KV - RING R1 & R4	P2	Bus/Breaker	0.99	1.03	1.02	0.97	1.11	1.09	1.03	1.01	0.97	System adjustments or voltage support if needed
CORTINA 115 kV	P2-3:A4:53:_CORTINA 230KV - RING R2 & R3	P2	Bus/Breaker	0.99	1.02	1.01	0.97	1.10	1.09	1.02	1.01	0.97	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
CORTINA 230 kV	P2-3:A4:53:_CORTINA 230KV - RING R2 & R3	P2	Bus/Breaker	0.97	0.99	0.96	0.95	1.10	1.08	0.99	0.99	0.95	System adjustments or voltage support if needed
CPM 115 kV	P2-1:A5:13:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (GOLDHILL-CPM TAP)	P2	Bus/Breaker	0.99	0.97	0.79	0.97	1.06	1.07	0.97	1.03	0.97	Continue to monitor future load forecast
CPM 115 kV	P2-2:A5:7:_GOLDHILL 115KV SECTION 2F	P2	Bus/Breaker	1.04	1.04	0.78	1.04	1.05	1.05	1.04	1.05	1.04	Continue to monitor future load forecast
CPM 115 kV	P2-4:A5:18:_GOLDHILL 115KV - SECTION 2G & 2F	P2	Bus/Breaker	NA	NA	0.79	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
CPM 115 kV	P2-4:A5:3:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	NA	NA	0.79	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
CURTISS 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.97	0.79	0.99	NConv	1.04	1.05	1.01	0.99	NConv	System adjustments or voltage support if needed
DAVIS 115 kV	P2-3:A4:21:_BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2	Bus/Breaker	0.79	0.77	0.93	0.98	1.08	1.05	0.75	0.87	0.98	Vaca Dixon Area Reinforcement project
DEEPWATR 115KV	P2-3:A4:21:_BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2	Bus/Breaker	0.78	0.76	0.92	0.98	1.07	1.05	0.74	0.87	0.98	Vaca Dixon Area Reinforcement project
DEEPWATR 115KV	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus/Breaker	0.78	0.77	0.92	0.98	1.07	1.05	0.74	0.87	0.98	Vaca Dixon Area Reinforcement project
DIMOND_1 115 kV	P2-2:A5:8:_GOLDHILL 115KV SECTION 1E	P2	Bus/Breaker	>.95	>.95	0.88	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
DIMOND_1 115 kV	P2-1:A5:51:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (SHPRING1-CLRKSFLT)	P2	Bus/Breaker	0.99	0.97	0.79	0.97	1.06	1.06	0.97	1.03	0.97	Continue to monitor future load forecast
DMND SPR 115 kV	P2-2:A5:8:_GOLDHILL 115KV SECTION 1E	P2	Bus/Breaker	>.95	>.95	0.88	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
DMND SPR 115 kV	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2	Bus/Breaker	1.02	1.01	0.88	1.00	1.03	1.06	1.01	1.04	1.00	Continue to monitor future load forecast
DMND SPR 115 kV	P2-4:A5:17:_GOLDHILL 115KV - SECTION 2G & 1G	P2	Bus/Breaker	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
DMND SPR 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1G	P2	Bus/Breaker	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
DONNELLS 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	1.02	0.86	1.04	NConv	1.05	1.05	1.04	1.03	NConv	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
E.MRYSVE 115 kV	P2-1:A5:16:_PALERMO-NICOLAUS 115KV [3210] (E.MRYSVE-E.MRY J2)	P2	Bus/Breaker	>.95	0.89	0.87	>.95	1.11	1.13	0.89	>.95	>.95	System adjustments or voltage support if needed
ELDORAD 115 kV	P2-4:A5:18:_GOLDHILL 115KV - SECTION 2G & 2F	P2	Bus/Breaker	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
ELDORAD 115 kV	P2-4:A5:3:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
FROGTOWN 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.96	0.81	0.98	NConv	1.05	1.06	1.01	1.00	NConv	System adjustments or voltage support if needed
GOLDHILL 230 kV	P2-4:A11:7:_TESLA E 230KV - SECTION 2E & 1E	P2	Bus/Breaker	1.00	0.97	0.90	0.98	1.02	1.03	0.97	0.99	0.98	Continue to monitor future load forecast
HALSEY 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.99	0.83	NA	0.99	1.04	1.03	0.77	1.02	0.99	System adjustments or voltage support if needed
HIGGINS 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.94	0.82	NA	0.95	1.08	1.09	0.77	1.01	0.95	System adjustments or voltage support if needed
HJ HEINZ 115kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.96	0.96	0.95	0.98	1.03	1.03	0.96	0.90	0.98	System adjustments or voltage support if needed
HORSESHE 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.91	0.77	NA	0.92	1.08	1.10	0.71	1.00	0.92	System adjustments or voltage support if needed
HORSESHE 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.91	0.77	NA	0.92	1.08	1.10	0.71	1.00	0.92	System adjustments or voltage support if needed
HORSESHE 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.92	0.78	NA	0.93	1.08	1.10	0.72	1.00	0.93	System adjustments or voltage support if needed
KASSON 115kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.96	0.97	0.96	0.98	1.03	1.03	0.97	0.90	0.98	System adjustments or voltage support if needed
LEPRINO 115 kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.96	0.96	0.95	0.98	1.03	1.03	0.96	0.90	0.98	System adjustments or voltage support if needed
LID 115 kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.96	0.97	0.96	0.98	1.03	1.03	0.96	0.90	0.98	System adjustments or voltage support if needed
LOCKFORD 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.88	0.57	0.93	NConv	1.04	1.08	1.03	1.01	NConv	System adjustments or voltage support if needed
LOCKFORD 115 kV	P2-3:A11:44:_BELLOTA - 1D 115KV & GOLD HILL-BELLOTA-LOCKEFORD LINE	P2	Bus/Breaker	0.99	0.98	0.90	0.99	1.05	1.04	0.98	1.01	0.99	Continue to monitor future load forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
LOCKFORD 230 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.90	0.89	0.85	NConv	1.02	1.01	0.89	0.91	NConv	System adjustments or voltage support if needed
MANTECA 115kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.96	0.96	0.95	0.97	1.03	1.03	0.96	0.90	0.97	System adjustments or voltage support if needed
MELONES 115	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.95	0.77	0.98	NConv	1.05	1.06	1.02	0.99	NConv	System adjustments or voltage support if needed
MI-WUK 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.99	0.81	1.01	NConv	1.05	1.05	1.02	1.01	NConv	System adjustments or voltage support if needed
MIZOU_T2 115 kV	P2-4:A5:17:_GOLDHILL 115KV - SECTION 2G & 1G	P2	Bus/Breaker	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
MIZOU_T2 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1G	P2	Bus/Breaker	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
MOBILCHE 115 kV	P2-3:A4:21:_BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2	Bus/Breaker	0.88	0.88	0.97	0.99	1.07	1.05	0.86	0.93	0.99	System adjustments or voltage support if needed
MOBILCHE 115 kV	P2-3:A4:18:_BRIGHTN - ME 115KV & BRIGHTN-W.SCRMNO LINE	P2	Bus/Breaker	0.88	0.88	0.97	0.99	1.07	1.05	0.86	0.93	0.99	System adjustments or voltage support if needed
MSHR 60V 60 kV	P2-4:A11:22:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus/Breaker	>.95	0.53	0.50	>.95	1.07	1.00	0.52	>.95	>.95	System adjustments or voltage support if needed
MTN_QUAR 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.99	0.83	NA	0.99	1.04	1.03	0.76	1.02	0.99	System adjustments or voltage support if needed
NEW HOPE 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.98	0.99	0.89	NConv	1.04	1.03	0.98	0.99	NConv	Continue to monitor future load forecast
NEWCSTL1 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.91	0.78	NA	0.92	1.08	1.10	0.72	1.00	0.92	System adjustments or voltage support if needed
NEWCSTL2 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.92	0.78	NA	0.93	1.08	1.10	0.72	1.00	0.93	System adjustments or voltage support if needed
NEWCASTLE 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.92	0.78	NA	0.92	1.08	1.10	0.72	1.00	0.92	System adjustments or voltage support if needed
PENRYN 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.98	0.82	NA	0.98	1.03	1.03	0.75	1.02	0.98	System adjustments or voltage support if needed
PEORIA 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.95	0.77	0.98	NConv	1.04	1.06	1.01	0.99	NConv	System adjustments or voltage support if needed



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
PLACER 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.92	0.78	NA	0.93	1.08	1.10	0.72	1.00	0.93	System adjustments or voltage support if needed
PLACER 60 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	0.99	0.83	NA	0.99	1.03	1.03	0.77	1.02	0.99	System adjustments or voltage support if needed
POST 115 kV	P2-3:A4:18:_BRIGHTN - ME 115KV & BRIGHTN-W.SCRMNO LINE	P2	Bus/Breaker	0.79	0.78	0.93	0.98	1.07	1.05	0.75	0.87	0.98	System adjustments or voltage support if needed
POST 115 kV	P2-3:A4:21:_BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2	Bus/Breaker	0.79	0.78	0.93	0.98	1.07	1.05	0.75	0.88	0.98	System adjustments or voltage support if needed
R.TRACK 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.95	0.77	0.98	NConv	1.05	1.06	1.01	0.98	NConv	System adjustments or voltage support if needed
RCTRK J. 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.96	0.78	0.99	NConv	1.04	1.06	1.01	0.99	NConv	System adjustments or voltage support if needed
RIPON 115 kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.95	0.95	0.96	0.96	1.03	1.03	0.95	0.90	0.96	System adjustments or voltage support if needed
ROCKLIN 60 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	1.01	1.00	0.89	NConv	1.05	1.04	0.99	1.03	NConv	Continue to monitor future load forecast
RVRBANK 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.89	0.60	0.94	NConv	1.04	1.08	1.03	1.00	NConv	System adjustments or voltage support if needed
RVRBK J1 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.89	0.59	0.94	NConv	1.04	1.08	1.03	1.00	NConv	System adjustments or voltage support if needed
SANDBAR 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	1.02	0.85	1.03	NConv	1.05	1.05	1.04	1.03	NConv	System adjustments or voltage support if needed
SEBASTIA 60 kV	P2-4:A11:22:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus/Breaker	>.95	0.38	0.31	>.95	1.05	0.95	0.38	>.95	>.95	System adjustments or voltage support if needed
SHPRING 115 kV	P2-1:A5:51:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (SHPRING1-CLRSVLT)	P2	Bus/Breaker	0.99	0.97	0.79	0.97	1.06	1.07	0.97	1.03	0.97	Continue to monitor future load forecast
SHPRING 115 kV	P2-1:A5:13:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (GOLDHILL-CPM TAP)	P2	Bus/Breaker	0.99	0.97	0.79	0.97	1.06	1.07	0.97	1.03	0.97	Continue to monitor future load forecast
SHPRING2 115 kV	P2-4:A5:17:_GOLDHILL 115KV - SECTION 2G & 1G	P2	Bus/Breaker	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
SHPRING2 115 kV	P2-4:A5:2:_GOLDHILL 115KV - SECTION 1F & 1G	P2	Bus/Breaker	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
SHW 60 kV	P2-4:A11:22:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus/Breaker	>.95	0.38	0.31	>.95	1.05	0.95	0.37	>.95	>.95	System adjustments or voltage support if needed
SHWSS 60 kV	P2-4:A11:22:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus/Breaker	>.95	0.38	0.31	>.95	1.05	0.95	0.37	>.95	>.95	System adjustments or voltage support if needed
SIERRAPI 60 kV	P2-3:A5:5:_RIO OSO 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	0.99	0.99	0.87	1.00	1.05	1.04	0.98	1.02	1.00	Continue to monitor future load forecast
SIERRAPI 60 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	1.00	0.99	0.86	NConv	1.05	1.04	0.99	1.03	NConv	Continue to monitor future load forecast
SJ COGEN 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.87	0.55	0.91	NConv	1.04	1.08	1.02	1.00	NConv	System adjustments or voltage support if needed
SJ COGEN 115 kV	P2-3:A11:44:_BELLOTA - 1D 115KV & GOLD HILL-BELLOTA-LOCKEFORD LINE	P2	Bus/Breaker	0.96	0.95	0.83	0.97	1.05	1.03	0.94	0.99	0.97	System adjustments or voltage support if needed
SJ COGEN 115 kV	P2-3:A11:45:_BELLOTA - 1D 115KV & BELLOTA-RIVERBANK LINE	P2	Bus/Breaker	0.98	0.95	0.84	0.97	1.05	1.04	0.96	0.99	0.97	Continue to monitor future load forecast
SJ COGEN 115 kV	P2-2:A11:33:_BELLOTA 115KV SECTION 1D	P2	Bus/Breaker	0.98	0.96	0.85	0.97	1.05	1.04	0.96	0.99	0.97	Continue to monitor future load forecast
SPICAMIN 115 kV	P2-1:A5:51:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (SHPRING1-CLRKSVLT)	P2	Bus/Breaker	1.01	0.99	0.83	0.99	1.05	1.06	0.99	1.04	0.99	Continue to monitor future load forecast
SPICAMIN 115 kV	P2-1:A5:13:_MISSOURI FLAT-GOLD HILL #1 115KV [2660] (GOLDHILL-CPM TAP)	P2	Bus/Breaker	1.01	0.99	0.83	0.99	1.05	1.06	0.99	1.04	0.99	Continue to monitor future load forecast
SPICAMIN 115 kV	P2-2:A5:7:_GOLDHILL 115KV SECTION 2F	P2	Bus/Breaker	1.04	1.04	0.82	1.03	1.05	1.05	1.04	1.05	1.03	Continue to monitor future load forecast
SPICAMIN 115 kV	P2-4:A5:18:_GOLDHILL 115KV - SECTION 2G & 2F	P2	Bus/Breaker	NA	NA	0.83	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
SPICAMIN 115 kV	P2-4:A5:3:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus/Breaker	NA	NA	0.83	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
SPISONORA 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.97	0.79	0.99	NConv	1.04	1.05	1.01	0.99	NConv	System adjustments or voltage support if needed
SPRNG GJ 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	1.01	0.84	1.03	NConv	1.05	1.05	1.03	1.03	NConv	System adjustments or voltage support if needed
SPRNG GP 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	1.01	0.85	1.03	NConv	1.05	1.05	1.04	1.03	NConv	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
STAGG 60 kV	P2-4:A11:22:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus/Breaker	>.95	0.42	0.35	>.95	1.07	0.98	0.42	>.95	>.95	System adjustments or voltage support if needed
STAGG-D 230 kV	P2-4:A11:7:_TESLA E 230KV - SECTION 2E & 1E	P2	Bus/Breaker	0.98	0.97	0.89	0.97	1.04	1.04	0.97	0.97	0.97	Continue to monitor future load forecast
STAGG-H 230 kV	P2-4:A11:7:_TESLA E 230KV - SECTION 2E & 1E	P2	Bus/Breaker	0.98	0.98	0.89	0.97	1.04	1.04	0.98	0.97	0.97	Continue to monitor future load forecast
STANISLS 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.98	0.84	0.99	NConv	1.06	1.06	1.02	1.01	NConv	System adjustments or voltage support if needed
STCKTNJB 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.87	0.57	0.93	NConv	1.04	1.08	1.03	1.00	NConv	System adjustments or voltage support if needed
STKTON A 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.87	0.55	0.90	NConv	1.04	1.08	1.02	1.00	NConv	System adjustments or voltage support if needed
STN COGN 115	P2-3:A11:45:_BELLOTA - 1D 115KV & BELLOTA-RIVERBANK LINE	P2	Bus/Breaker	0.98	0.95	0.84	0.97	1.05	1.03	0.96	0.99	0.97	Continue to monitor future load forecast
STN COGN 115	P2-2:A11:33:_BELLOTA 115KV SECTION 1D	P2	Bus/Breaker	0.98	0.95	0.84	0.97	1.05	1.04	0.96	0.99	0.97	Continue to monitor future load forecast
TAYLOR 60 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	1.01	1.00	0.89	NConv	1.04	1.04	1.00	1.03	NConv	Continue to monitor future load forecast
TAYLOR 60 kV	P2-4:A11:7:_TESLA E 230KV - SECTION 2E & 1E	P2	Bus/Breaker	1.02	1.02	0.89	1.00	1.04	1.04	1.01	1.03	1.00	Continue to monitor future load forecast
TAYLOR 60 kV	P2-3:A5:10:_GOLDHILL - 1E 230KV & MIDDLE FORK-GOLD HILL LINE	P2	Bus/Breaker	NA	NA	0.90	NA	NA	NA	NA	NA	NA	Continue to monitor future load forecast
TERMNOUS 60	P2-4:A11:22:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus/Breaker	>.95	0.38	0.31	>.95	1.05	0.96	0.37	>.95	>.95	System adjustments or voltage support if needed
THURMAN SS 230 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	NA	0.89	0.85	NA	1.02	1.01	0.88	NA	NA	System adjustments or voltage support if needed
TRACY 115 kV	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.96	0.96	0.95	0.98	1.03	1.03	0.96	0.90	0.98	System adjustments or voltage support if needed
TULLOCH 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.93	0.71	0.98	NConv	1.04	1.06	1.02	0.98	NConv	System adjustments or voltage support if needed
UCDAVSJ1 115 kV	P2-3:A4:21:_BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2	Bus/Breaker	0.79	0.77	0.93	0.98	1.08	1.05	0.75	0.87	0.98	Vaca Dixon Area Reinforcement project

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
UOP 60 kV	P2-4:A11:22:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus/Breaker	>.95	0.42	0.35	>.95	1.07	0.99	0.42	>.95	>.95	System adjustments or voltage support if needed
VALLY HM 115 kV	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.97	0.87	0.97	NConv	1.05	1.05	1.00	1.00	NConv	System adjustments or voltage support if needed
W.SCRMNO 115 kV	P2-3:A4:21:_BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2	Bus/Breaker	0.79	0.78	0.93	0.99	1.07	1.05	0.75	0.88	0.98	Vaca Dixon Area Reinforcement project
W.SCRMNO 115 kV	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus/Breaker	0.79	0.78	0.93	0.99	1.07	1.05	0.75	0.88	0.99	Vaca Dixon Area Reinforcement project
W.SCRMNO 115 kV	P2-3:A4:19:_BRIGHTN - ME 115KV & BRIGHTON-GRAND ISLAND #1 LINE	P2	Bus/Breaker	0.79	0.78	0.93	0.99	1.07	1.05	0.75	0.88	0.99	Vaca Dixon Area Reinforcement project
W.SCRMNO 115 kV	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTON-GRAND ISLAND #2 LINE	P2	Bus/Breaker	0.79	0.78	0.93	0.99	1.07	1.05	0.75	0.88	0.99	Vaca Dixon Area Reinforcement project
W.SCRMNO 115 kV	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus/Breaker	0.79	0.78	0.93	0.99	1.07	1.05	0.76	0.88	0.99	Vaca Dixon Area Reinforcement project
WHEATLND 60 kV	P2-3:A5:84:_E.NICOLS 115KV - RING R1 & R2	P2	Bus/Breaker	0.97	0.94	0.89	0.97	1.04	1.04	0.94	0.99	0.97	System adjustments or voltage support if needed
WILKINS 60 kV	P2-4:A4:2:_VACA-DIX 230KV - SECTION 2F & 1F	P2	Bus/Breaker	0.96	0.91	0.90	0.99	0.98	0.97	0.91	0.98	0.99	System adjustments or voltage support if needed
WILKINS 60 kV	P2-4:A4:3:_VACA-DIX 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.96	0.90	0.90	1.00	0.98	0.98	0.90	0.98	1.00	System adjustments or voltage support if needed
WOODLANDBIOM 115 kV	P2-3:A4:21:_BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2	Bus/Breaker	0.87	0.86	0.96	0.99	1.07	1.05	0.84	0.92	0.99	Vaca Dixon Area Reinforcement project
WOODLANDBIOM 115 kV	P2-3:A4:18:_BRIGHTN - ME 115KV & BRIGHTN-W.SCRMNO LINE	P2	Bus/Breaker	0.87	0.86	0.96	0.99	1.07	1.05	0.85	0.92	0.99	Vaca Dixon Area Reinforcement project
WOODLANDBIOM 115 kV	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus/Breaker	0.87	0.86	0.97	0.99	1.07	1.05	0.84	0.92	0.99	Vaca Dixon Area Reinforcement project
WOODLD 115 kV	P2-3:A4:21:_BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2	Bus/Breaker	0.87	0.87	0.97	0.99	1.07	1.05	0.85	0.93	0.99	Vaca Dixon Area Reinforcement project
WOODLD 115 kV	P2-3:A4:18:_BRIGHTN - ME 115KV & BRIGHTN-W.SCRMNO LINE	P2	Bus/Breaker	0.88	0.87	0.97	0.99	1.07	1.05	0.86	0.93	0.99	Vaca Dixon Area Reinforcement project
WOODLD 115 kV	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus/Breaker	0.88	0.87	0.97	0.99	1.07	1.05	0.86	0.93	0.99	Vaca Dixon Area Reinforcement project

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
WOODLD 115 kV	P2-3:A4:19:_BRIGHTN - ME 115KV & BRIGHTON-GRAND ISLAND #1 LINE	P2	Bus/Breaker	0.88	0.87	0.97	0.99	1.07	1.05	0.86	0.93	0.99	Vaca Dixon Area Reinforcement project
WOODLD 115 kV	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTON-GRAND ISLAND #2 LINE	P2	Bus/Breaker	0.88	0.87	0.97	0.99	1.07	1.05	0.86	0.93	0.99	Vaca Dixon Area Reinforcement project
WOODLD 115 kV	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus/Breaker	0.88	0.87	0.97	0.99	1.07	1.05	0.86	0.93	0.99	Vaca Dixon Area Reinforcement project
WSTLNESW 60 kV	P2-4:A11:22:_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus/Breaker	>.95	0.43	0.36	>.95	1.07	0.99	0.42	>.95	>.95	System adjustments or voltage support if needed
BEALE_2 60kV	P1-1:A5:14:_NARROWSPH2 13.80KV GEN UNIT 1 & P1-2:A5:56:_COLGATE-SMARTVILLE #1	P3	G-1/N-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
BRIGHTON 230 kV	P1-1:A4:18:_WOODLANDBIOM 13.80KV GEN UNIT 1 & P1-2:A4:7:_RIO OSO-BRIGHTON 230KV	P3	G-1/N-1	>.95	>.95	>.95	>.95	>.95	>.95	0.90	>.95	>.95	System adjustments or voltage support if needed
BRWNS VY 60kV	P1-1:A5:14:_NARROWSPH2 13.80KV GEN UNIT 1 & P1-2:A5:56:_COLGATE-SMARTVILLE #1	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
DEEPWATR 115kV	P1-1:A4:18:_WOODLANDBIOM 13.80KV GEN UNIT 1 & P1-2:A4:34:_BRIGHTN-W.SCRMNO	P3	G-1/N-1	>.95	>.95	>.95	>.95	>.95	>.95	0.90	>.95	>.95	System adjustments or voltage support if needed
DIST2047 60 kV	P1-1:A5:5:_COLGATE2 13.80KV GEN UNIT 1 & P1-3:A4:24:_CORTINA 115/60KV TB 5	P3	G-1/N-1	0.90	>.95	>.95	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
DIST2047 60 kV	P1-1:A4:30:_CORTINA 1-25 25.00KV GEN UNIT VE & P1-2:A4:49:_CORTINA #1 60KV [6580]	P3	G-1/N-1	>.95	>.95	0.84	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
DIST2047 60 kV	P1-1:A4:15:_MONTEZUMA2W 0.69KV GEN UNIT 1 & P1-2:A4:3:_DELEVAN-CORTINA 230KV	P3	G-1/N-1	>.95	0.88	0.88	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
ENVRO_HY 60kV	P1-1:A5:20:_ROLLINSF 6.60KV GEN UNIT 1 & P1-3:A5:37:_OXBOW 60/9.11KV TB 1	P3	G-1/N-1	0.88	0.86	>.95	>.95	>.95	>.95	0.86	>.95	>.95	System adjustments or voltage support if needed
ENVRO_HY 60kV	P1-1:A5:23:_OXBOW F 9.11KV GEN UNIT 1 & P1-1:A5:20:_ROLLINSF 6.60KV GEN	P3	G-1/N-1	0.88	0.86	>.95	>.95	>.95	>.95	0.86	>.95	>.95	System adjustments or voltage support if needed
FORST HL 60 kV	P1-1:A5:23:_OXBOW F 9.11KV GEN UNIT 1 & P1-1:A5:20:_ROLLINSF 6.60KV GEN	P3	G-1/N-1	0.88	0.86	>.95	>.95	>.95	>.95	0.86	>.95	>.95	System adjustments or voltage support if needed
GRSS VLY 60 kV	P1-1:A5:14:_NARROWSPH2 13.80KV GEN UNIT 1 & P1-2:A5:4:_PALERMO-COLGATE 230KV	P3	G-1/N-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
GUSTINE 60kV	P1-1:A11:14:_RIPONCOGEN 13.80KV GEN UNIT 1 & P1-2:A12:19:_CROW CREEK SW STA-	P3	G-1/N-1	>.95	0.89	>.95	>.95	>.95	>.95	0.89	>.95	>.95	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
GUSTINE 60kV	P1-1:A11:29:_GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS & P1-	P3	G-1/N-1	>.95	0.88	>.95	>.95	>.95	>.95	0.87	>.95	>.95	System adjustments or voltage support if needed
GUSTINE 60kV	P1-1:A12:13:_STANISLS 13.80KV GEN UNIT 1 & P1-2:A12:19:_CROW CREEK SW STA-FRONTIER SOLAR PV	P3	G-1/N-1	>.95	0.89	>.95	>.95	>.95	>.95	0.89	>.95	>.95	System adjustments or voltage support if needed
LINCLN 115kV	P1-1:A5:30:_RBROCKLIN 12.47KV GEN UNIT 1 & P1-2:A5:34:_RIO OSO-LINCLN-SPI-LINC 115KV [0]	P3	G-1/N-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
LINCLN 115kV	P1-1:A5:9:_RALSTON 13.80KV GEN UNIT 1 & P1-2:A5:34:_RIO OSO-LINCLN-SPI-LINC 115KV [0]	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
LINCLN 115kV	P1-1:A5:38:_WISE 12.47KV GEN UNIT 1 & P1-2:A5:34:_RIO OSO-LINCLN-SPI-LINC 115KV [0]	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
LINCLN 115kV	P1-1:A11:34:_BELLOTA 1-25 25.00KV GEN UNIT VS & P1-2:A5:34:_RIO OSO-LINCLN-SPI-LINC	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
MRYSVLLE 60 kV	P1-1:A5:30:_RBROCKLIN 12.47KV GEN UNIT 1 & P1-2:A5:48:_E.MRYSVLLE-MRYSVLLE #1	P3	G-1/N-1	>.95	0.89	0.84	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
MRYSVLLE 60 kV	P1-1:A5:29:_SPILINCF 12.50KV GEN UNIT 1 & P1-2:A5:48:_E.MRYSVLLE-MRYSVLLE #1 60KV [0]	P3	G-1/N-1	>.95	0.89	0.84	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
MRYSVLLE 60 kV	P1-1:A5:9:_RALSTON 13.80KV GEN UNIT 1 & P1-2:A5:48:_E.MRYSVLLE-MRYSVLLE #1 60KV [0]	P3	G-1/N-1	>.95	0.90	0.84	>.95	>.95	>.95	0.89	>.95	>.95	System adjustments or voltage support if needed
NARRWS 1 60kV	P1-1:A5:14:_NARROWSPH2 13.80KV GEN UNIT 1 & P1-2:A5:56:_COLGATE-SMARTVILLE #1	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
NARRWS 2 60kV	P1-1:A5:14:_NARROWSPH2 13.80KV GEN UNIT 1 & P1-2:A5:56:_COLGATE-SMARTVILLE #1	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
OXBOW 60 kV	P1-1:A5:20:_ROLLINSF 6.60KV GEN UNIT 1 & P1-3:A5:37:_OXBOW 60/9.11KV TB 1	P3	G-1/N-1	0.88	0.86	>.95	>.95	>.95	>.95	0.86	>.95	>.95	System adjustments or voltage support if needed
OXBOW 60 kV	P1-1:A5:23:_OXBOW F 9.11KV GEN UNIT 1 & P1-1:A5:20:_ROLLINSF 6.60KV GEN	P3	G-1/N-1	0.88	0.86	>.95	>.95	>.95	>.95	0.86	>.95	>.95	System adjustments or voltage support if needed
PIKE CTY 60kV	P1-1:A5:14:_NARROWSPH2 13.80KV GEN UNIT 1 & P1-2:A5:4:_PALERMO-COLGATE 230KV	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
PLSNT GR 115kV	P1-1:A5:30:_RBROCKLIN 12.47KV GEN UNIT 1 & P1-2:A5:34:_RIO OSO-LINCLN-SPI-LINC 115KV [0]	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
PLUMAS 60kV	P1-1:A5:30:_RBROCKLIN 12.47KV GEN UNIT 1 & P1-2:A5:48:_E.MRYSVLLE-MRYSVLLE #1	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		
PLUMAS 60kV	P1-1:A5:29:_SPILINCF 12.50KV GEN UNIT 1 & P1-2:A5:48:_E.MRYSVE-MRYSVLE #1 60KV [0]	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
RBROCKLIN 115kV	P1-1:A5:30:_RBROCKLIN 12.47KV GEN UNIT 1 & P1-2:A5:34:_RIO OSO-LINCLN-SPI-LINC 115KV [0]	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
ROCKLIN 60 kV	P1-1:A5:30:_RBROCKLIN 12.47KV GEN UNIT 1 & P1-2:A5:34:_RIO OSO-LINCLN-SPI-LINC 115KV [0]	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
ROCKLIN 60 kV	P1-1:A5:9:_RALSTON 13.80KV GEN UNIT 1 & P1-4:A5:1:_RIO OSO SVC	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
SIERRAPI 60 kV	P1-1:A5:30:_RBROCKLIN 12.47KV GEN UNIT 1 & P1-4:A5:1:_RIO OSO SVC	P3	G-1/N-1	>.95	>.95	0.87	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
TAYLOR 60 kV	P1-1:A5:30:_RBROCKLIN 12.47KV GEN UNIT 1 & P1-4:A5:1:_RIO OSO SVC	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
WEMR SWS 60kV	P1-1:A5:20:_ROLLINSF 6.60KV GEN UNIT 1 & P1-3:A5:10:_DRUMPH1 115/115KV TB 1	P3	G-1/N-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
WHEATLND 60 kV	P1-1:A4:25:_WOODLD 2-25 25.00KV GEN UNIT VS & P1-2:A5:28:_RIO OSO-NICOLAUS 115KV	P3	G-1/N-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
WHEATLND 60 kV	P1-1:A4:25:_WOODLD 2-25 25.00KV GEN UNIT VS & P1-2:A5:28:_RIO OSO-NICOLAUS 115KV	P3	G-1/N-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
WILKINS 60 kV	P1-1:A4:30:_CORTINA 1-25 25.00KV GEN UNIT VE & P1-2:A4:49:_CORTINA #1 60KV [6580]	P3	G-1/N-1	>.95	>.95	0.86	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
WILKINS 60 kV	P1-1:A11:29:_GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS & P1-1:A4:11:_HIGHWINDS 0.69KV	P3	G-1/N-1	>.95	>.95	0.86	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
WILKINS 60 kV	P1-1:A4:11:_HIGHWINDS 0.69KV GEN UNIT 1 & P1-2:A4:49:_CORTINA #1 60KV [6580] MOAS OPENED ON	P3	G-1/N-1	>.95	>.95	0.86	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
YUBACITY 60 kV	P1-1:A5:14:_NARROWSPH2 13.80KV GEN UNIT 1 & P1-2:A5:56:_COLGATE-SMARTVILLE #1	P3	G-1/N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor future load forecast
ALMENDRA 60 kV	P5-5A:A5:4:_PEASE 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	1.01	1.02	1.01	0.99	1.02	1.02	1.02	0.59	0.99	Sensitivity only	
ATLANTC 230 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0.97	0.94	0.81	0.97	1.03	1.04	0.93	0.99	0.97	System adjustments or voltage support if needed	
ATLANTC 230 kV	P5-5C:A11:5:_BELLOTA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0.98	0.95	0.88	0.97	1.03	NConv	0.94	0.99	0.97	System adjustments or voltage support if needed	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
ATLANTIC 115 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	0.99	0.95	0.82	0.99	1.05	1.07	0.95	1.01	0.99	System adjustments or voltage support if needed
AUBURN 60 kV	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundent battery supply	1.02	0.97	0.57	1.02	1.03	1.03	0.96	1.02	1.02	System adjustments or voltage support if needed
AVENA 115 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent battery supply	0.84	0.96	0.92	0.89	1.03	1.04	0.96	0.94	0.89	System adjustments or voltage support if needed
BANTA 115 kV	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	0.89	0.92	0.90	0.93	1.04	1.05	0.92	0.93	0.93	System adjustments or voltage support if needed
BOGUE 115 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	1.00	0.99	0.84	1.01	1.02	1.05	0.99	0.99	1.01	System adjustments or voltage support if needed
BRIGHTN 115 kV	P4-2:A5:1:_STUCK BREAKER & NO BF RELAY RIO OSO 115KV CB 402 412 422 432 442 462 OR 472	P5	Non-Redundent battery supply	1.03	0.91	1.03	1.06	1.07	1.07	0.89	1.06	1.06	System adjustments or voltage support if needed
BRIGHTON 230 kV	P4-2:A5:1:_STUCK BREAKER & NO BF RELAY RIO OSO 115KV CB 402 412 422 432 442 462 OR 472	P5	Non-Redundent battery supply	0.93	0.84	0.92	0.96	1.04	1.02	0.83	0.97	0.96	Vaca Dixon Area Reinforcement project
BRIGHTON 230 kV	P5-5A:A5:5:_RIO OSO 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent battery supply	0.95	0.90	0.93	0.96	1.04	1.02	0.89	0.97	0.96	Vaca Dixon Area Reinforcement project
BRUNSWCK 115 kV	P5-5C:A5:3:_GOLD HILL 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	1.01	1.00	0.89	1.02	1.07	1.06	1.00	1.04	1.02	System adjustments or voltage support if needed
CALVO 60 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent battery supply	0.75	0.93	0.70	0.87	0.99	1.02	0.92	0.93	0.87	System adjustments or voltage support if needed
CAMPUS 115 kV	P5-5c(DC):A4:17:_Station DC Battery Supply WEST SACRAMENTO 115kv Batt	P5	Non-Redundent battery supply	0.95	0.95	0.99	1.01	1.10	1.06	0.95	0.98	1.01	System adjustments or voltage support if needed
CAMPUS 115 kV	P5-5c(DC):A4:11:_Station DC Battery Supply WOODLAND 115kv Batt	P5	Non-Redundent battery supply	0.98	0.94	1.00	1.04	1.11	1.08	0.93	1.00	1.04	System adjustments or voltage support if needed
CARBONA 60 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent battery supply	0.70	0.87	0.59	0.84	0.97	1.02	0.86	0.89	0.84	System adjustments or voltage support if needed
CL AMMNA 115kV	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	0.89	0.94	0.92	0.93	1.04	1.05	0.94	0.93	0.93	System adjustments or voltage support if needed
COLGTE2 230 kV	P5-5C:A11:5:_BELLOTA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	1.01	0.99	0.90	1.01	1.03	NConv	0.98	1.01	1.01	System adjustments or voltage support if needed
COLGTE2 230 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	1.01	1.00	0.90	1.01	1.03	1.02	1.00	1.02	1.01	System adjustments or voltage support if needed



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
DAVIS 115 kV	P5-5A:A5:5:_RIO OSO 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.94	0.85	0.99	1.01	1.11	1.08	0.83	0.98	1.01	System adjustments or voltage support if needed
DEEPWATR 115kV	P5-5A:A5:5:_RIO OSO 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.99	0.90	1.01	1.03	1.09	1.08	0.89	1.02	1.03	System adjustments or voltage support if needed
DRUMPH1 115 kV	P5-5C:A5:3:_GOLD HILL 230-115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	1.03	1.01	0.88	1.04	1.07	1.06	1.01	1.05	1.04	System adjustments or voltage support if needed
DRUMPH1MP2 115 kV	P5-5C:A5:3:_GOLD HILL 230-115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	0.97	0.96	0.89	0.98	0.99	0.99	0.96	0.99	0.98	System adjustments or voltage support if needed
DRUMPH2 115 kV	P5-5C:A5:3:_GOLD HILL 230-115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	1.03	1.01	0.88	1.04	1.07	1.06	1.01	1.05	1.04	System adjustments or voltage support if needed
DTCH FL2 115 kV	P5-5C:A5:3:_GOLD HILL 230-115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	1.03	1.02	0.89	1.03	1.07	1.06	1.01	1.05	1.03	System adjustments or voltage support if needed
E.MRY J2 115 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	1.03	1.02	0.90	1.02	1.06	1.08	1.02	1.04	1.02	System adjustments or voltage support if needed
E.MRYSVE 115 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	1.03	1.02	0.90	1.02	1.06	1.08	1.02	1.04	1.02	System adjustments or voltage support if needed
E.NICOLS 115 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	1.01	1.00	0.85	1.00	1.06	1.08	1.00	1.03	1.00	System adjustments or voltage support if needed
ENCINAL 60 kV	P5-5A:A5:4:_PEASE 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.99	1.01	0.98	0.96	1.02	1.01	1.01	0.62	0.96	System adjustments or voltage support if needed
GLEAF2 60 kV	P5-5A:A5:4:_PEASE 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	1.02	1.02	1.02	1.00	1.03	1.02	1.02	0.59	1.00	Sensitivity only
GRAND IS 115 kV	P5-5A:A4:7:_BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.65	0.68	0.85	0.96	1.11	1.06	0.65	0.88	0.96	System adjustments or voltage support if needed
GRONMYER 60 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.82	0.99	0.84	0.91	1.01	1.03	0.98	0.97	0.91	System adjustments or voltage support if needed
HALSEY 60 kV	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundent battery supply	1.02	0.97	0.57	1.02	1.04	1.03	0.96	1.02	1.02	System adjustments or voltage support if needed
HARTER 60 kV	P5-5A:A5:4:_PEASE 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	1.01	1.01	1.00	0.99	1.02	1.02	1.01	0.58	0.99	System adjustments or voltage support if needed
HIGGINS 115 kV	P5-5C:A5:3:_GOLD HILL 230-115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	0.97	0.93	0.64	0.98	1.10	1.09	0.92	1.02	0.98	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
KASSON 60kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.74	0.91	0.67	0.86	0.99	1.02	0.90	0.92	0.87	System adjustments or voltage support if needed
KNIGHT1 115 kV	P5-5A:A4:7:_BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.84	0.89	0.96	0.99	1.07	1.06	0.87	0.96	0.99	System adjustments or voltage support if needed
KNIGHT1 115 kV	P5-5c(DC):A4:2:_Station DC Battery Supply BRIGHTON 230kV Batt	P5	Non-Redundent battery supply	0.84	0.89	0.96	0.99	1.07	1.06	0.87	0.96	0.99	System adjustments or voltage support if needed
LINCLN 115kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	0.98	0.94	0.79	0.97	1.05	1.07	0.94	1.00	0.97	System adjustments or voltage support if needed
LIVE OAK 60 kV	P5-5A:A5:4:_PEASE 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.99	1.01	0.98	0.96	1.02	1.01	1.01	0.64	0.96	System adjustments or voltage support if needed
LOUISE 60 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.80	0.97	0.80	0.90	1.01	1.03	0.96	0.96	0.90	System adjustments or voltage support if needed
LYOTH-SP 60 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.72	0.89	0.63	0.85	0.98	1.02	0.88	0.91	0.85	System adjustments or voltage support if needed
MANTECA 115kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.81	0.95	0.91	0.87	1.03	1.04	0.95	0.92	0.87	System adjustments or voltage support if needed
MANTECA 115kV	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	0.89	0.94	0.92	0.93	1.04	1.05	0.94	0.94	0.93	System adjustments or voltage support if needed
MANTECA 60 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.84	1.00	0.88	0.92	1.02	1.03	1.00	0.98	0.92	System adjustments or voltage support if needed
MIDDLE FK 60 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	0.98	0.96	0.86	0.98	0.99	0.99	0.96	0.98	0.98	System adjustments or voltage support if needed
MDDLK M 230 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	0.98	0.96	0.86	0.98	0.99	0.99	0.96	0.98	0.98	System adjustments or voltage support if needed
MIDLFORK 230 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	1.01	0.98	0.87	1.01	1.03	1.04	0.98	1.01	1.01	System adjustments or voltage support if needed
MOBILCHE 115 kV	P5-5c(DC):A4:16:_Station DC Battery Supply BRIGHTON 115kV Batt	P5	Non-Redundent battery supply	0.81	0.88	0.97	0.99	1.07	1.05	0.86	0.93	0.99	System adjustments or voltage support if needed
MOBILCHE 115 kV	P4-2:A5:1:_STUCK BREAKER & NO BF RELAY RIO OSO 115KV CB 402 412 422 432 442 462 OR 472	P5	Non-Redundent battery supply	0.87	0.63	0.97	0.99	1.11	1.07	0.60	0.95	0.99	System adjustments or voltage support if needed
MRYSVLL 60 kV	P5-5A:A5:4:_PEASE 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.99	1.01	1.00	0.96	1.01	1.01	1.01	0.57	0.96	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
MSHR 60V 60 kV	P4-2:A11:1:_STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundent battery supply	>.95	0.53	0.50	>.95	1.07	1.00	0.52	>.95	>.95	System adjustments or voltage support if needed
MSSDLESW 60 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent battery supply	0.80	0.96	0.78	0.90	1.00	1.03	0.96	0.95	0.90	System adjustments or voltage support if needed
OI GLASS 115kV	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	0.86	0.90	0.87	0.92	1.05	1.06	0.90	0.91	0.92	System adjustments or voltage support if needed
OLIVH J3 115 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	1.01	1.00	0.87	1.02	1.03	1.05	1.00	1.01	1.02	System adjustments or voltage support if needed
OLIVHRST 115 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	1.02	1.00	0.87	1.02	1.03	1.05	1.00	1.01	1.02	System adjustments or voltage support if needed
PEASE 60 kV	P5-5A:A5:4:_PEASE 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent battery supply	1.00	1.01	1.00	0.98	1.02	1.01	1.01	0.59	0.98	System adjustments or voltage support if needed
PENRYN 60 kV	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundent battery supply	1.01	0.96	0.54	1.01	1.03	1.03	0.95	1.01	1.01	System adjustments or voltage support if needed
PIKE CTY 60kV	P5-5C:A11:5:_BELLOTA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	1.03	1.01	0.90	1.03	1.06	NConv	1.01	1.04	1.03	System adjustments or voltage support if needed
PIKE CTY 60kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	1.04	1.03	0.90	1.03	1.06	1.07	1.03	1.05	1.03	System adjustments or voltage support if needed
PLACER 115 kV	P5-5C:A5:3:_GOLD HILL 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	0.95	0.90	0.57	0.97	1.10	1.10	0.89	1.01	0.97	System adjustments or voltage support if needed
PLACER 115 kV	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundent battery supply	0.95	0.90	0.58	0.97	1.10	1.10	0.90	1.01	0.97	System adjustments or voltage support if needed
PLACER 115 kV	P5-5A:A5:6:_GOLD HILL 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent battery supply	0.95	0.90	0.58	0.97	1.10	1.10	0.90	1.01	0.97	System adjustments or voltage support if needed
PLACER 60 kV	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundent battery supply	1.02	0.97	0.58	1.02	1.03	1.03	0.96	1.02	1.02	System adjustments or voltage support if needed
PLSNT GR 115kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	0.98	0.95	0.80	0.98	1.05	1.07	0.94	1.00	0.98	System adjustments or voltage support if needed
POST 115 kV	P4-2:A5:1:_STUCK BREAKER & NO BF RELAY RIO OSO 115KV CB 402 412 422 432 442 462 OR 472	P5	Non-Redundent battery supply	0.95	0.76	1.00	1.02	1.09	1.08	0.73	1.01	1.02	System adjustments or voltage support if needed
POST 115 kV	P5-5A:A5:5:_RIO OSO 115 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent battery supply	0.99	0.90	1.02	1.03	1.09	1.08	0.88	1.02	1.03	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
RALSTON 230 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	1.00	0.98	0.87	1.00	1.03	1.04	0.98	1.01	1.00	System adjustments or voltage support if needed
RBROCKLIN 115 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0.98	0.95	0.80	0.98	1.05	1.07	0.94	1.00	0.98	System adjustments or voltage support if needed
RIO OSO 230 kV	P5-5C:A11:5:_BELLOTA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0.98	0.93	0.89	0.97	1.03	NConv	0.93	0.99	0.97	System adjustments or voltage support if needed
RIO OSO 230 kV	P5-5A:A5:2:_RIO OSO 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	1.04	0.88	0.87	0.94	1.03	1.03	0.88	1.08	0.94	System adjustments or voltage support if needed
RIPON 115 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	0.81	0.94	0.92	0.86	1.03	1.04	0.94	0.91	0.86	System adjustments or voltage support if needed
RIPON 115 kV	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0.89	0.93	0.94	0.92	1.04	1.05	0.93	0.93	0.92	System adjustments or voltage support if needed
ROLLINS 60 kV	P5-5C:A5:3:_GOLD HILL 230-115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0.99	0.98	0.89	1.01	1.02	1.02	0.98	1.01	1.01	System adjustments or voltage support if needed
RPN JNCN 115 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	0.82	0.95	0.92	0.87	1.03	1.04	0.95	0.92	0.87	System adjustments or voltage support if needed
RPN JNCN 115	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0.90	0.94	0.93	0.93	1.04	1.05	0.94	0.94	0.93	System adjustments or voltage support if needed
RPNJ2 115 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	0.81	0.95	0.91	0.87	1.03	1.04	0.95	0.92	0.87	System adjustments or voltage support if needed
RPNJ2 115 kV	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0.89	0.94	0.93	0.93	1.04	1.05	0.94	0.94	0.93	System adjustments or voltage support if needed
RVRBK J2 115 kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	0.85	0.97	0.93	0.90	1.04	1.05	0.97	0.94	0.90	System adjustments or voltage support if needed
SEBASTIA 60 kV	P4-2:A11:1:_STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundant battery supply	>.95	0.38	0.31	>.95	1.05	0.95	0.38	>.95	>.95	System adjustments or voltage support if needed
SHW 60 kV	P4-2:A11:1:_STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundant battery supply	>.95	0.38	0.31	>.95	1.05	0.95	0.37	>.95	>.95	System adjustments or voltage support if needed
SHW 60 kV	P5-5A:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	>.95	0.38	0.31	>.95	1.05	0.95	0.37	>.95	>.95	System adjustments or voltage support if needed
STAGG 60 kV	P4-2:A11:1:_STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundant battery supply	>.95	0.42	0.35	>.95	1.07	0.98	0.42	>.95	>.95	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
STAGG 60 kV	P5-5A:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	>.95	0.42	0.35	>.95	1.07	0.98	0.42	>.95	>.95	System adjustments or voltage support if needed
TERMNOUS 60	P4-2:A11:1:_STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundent battery supply	>.95	0.38	0.31	>.95	1.05	0.96	0.37	>.95	>.95	System adjustments or voltage support if needed
THURMAN SS 230 kV	P5-5C:A11:5:_BELLOTA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	NA	0.88	0.83	NA	1.02	NConv	0.87	NA	NA	System adjustments or voltage support if needed
THURMAN SS 230 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	NA	0.89	0.85	NA	1.02	1.02	0.89	NA	NA	System adjustments or voltage support if needed
UCDAVSJ1 115 kV	P5-5c(DC):A4:12:_Station DC Battery Supply ZAMORA 115kV Batt	P5	Non-Redundent battery supply	0.95	0.89	0.99	1.01	1.11	1.06	0.88	0.99	1.01	System adjustments or voltage support if needed
UCDAVSJ1 115 kV	P5-5A:A4:15:_WOODLAND (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.98	0.94	1.00	1.04	1.10	1.08	0.94	1.00	1.04	System adjustments or voltage support if needed
UCDAVSJ1 115 kV	P5-5c(DC):A4:11:_Station DC Battery Supply WOODLAND 115KV Batt	P5	Non-Redundent battery supply	0.98	0.94	1.00	1.04	1.10	1.08	0.94	1.00	1.04	System adjustments or voltage support if needed
UOP 60 kV	P4-2:A11:1:_STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundent battery supply	>.95	0.42	0.35	>.95	1.07	0.98	0.42	>.95	>.95	System adjustments or voltage support if needed
UOP 60 kV	P5-5A:A11:3:_STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	>.95	0.42	0.35	>.95	1.07	0.98	0.42	>.95	>.95	System adjustments or voltage support if needed
UOP 60 kV	P5-5C:A11:3:_STAGG 230-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	>.95	0.53	0.46	>.95	1.09	1.04	0.52	>.95	>.95	System adjustments or voltage support if needed
VALLY HM 115	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.85	0.97	0.94	0.89	1.04	1.05	0.97	0.94	0.89	System adjustments or voltage support if needed
VIERRA 115kV	P5-5A:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.81	0.96	0.92	0.86	1.03	1.04	0.96	0.91	0.86	System adjustments or voltage support if needed
VIERRA 115kV	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	0.89	0.94	0.92	0.93	1.04	1.05	0.94	0.93	0.93	System adjustments or voltage support if needed
WEMR SWS 60kV	P5-5C:A5:3:_GOLD HILL 230-115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent battery supply	0.98	0.97	0.88	1.00	1.02	1.02	0.97	1.00	1.00	System adjustments or voltage support if needed
WEMR SWS 60kV	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundent battery supply	0.98	0.97	0.89	1.00	1.02	1.02	0.97	1.00	1.00	System adjustments or voltage support if needed
WEMR SWS 60kV	P5-5A:A5:6:_GOLD HILL 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent battery supply	0.98	0.97	0.89	1.00	1.02	1.02	0.97	1.00	1.00	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
WESTLEY 60 kV	P5-5A:A11:14: KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	0.72	0.90	0.60	0.83	0.98	1.00	0.89	0.91	0.83	System adjustments or voltage support if needed
WOODLD 115 kV	P5-5C:A5:1: RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	0.55	0.48	0.54	0.99	1.12	1.07	0.48	0.87	0.99	Vaca Dixon Area Reinforcement project
WOODLD 115 kV	P5-5A:A4:7: BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	0.77	0.81	0.93	0.97	1.08	1.06	0.79	0.93	0.97	Vaca Dixon Area Reinforcement project
WOODLD 115 kV	P5-5c(DC):A4:12: Station DC Battery Supply ZAMORA 115kv Batt	P5	Non-Redundant battery supply	0.94	0.87	0.99	1.00	1.11	1.07	0.86	0.98	0.99	System adjustments or voltage support if needed
WSTLNESW 60 kV	P4-2:A11:1: STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundant battery supply	>.95	0.43	0.36	>.95	1.07	0.99	0.42	>.95	>.95	System adjustments or voltage support if needed
WSTLNESW 60 kV	P5-5A:A11:3: STAGG 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	>.95	0.43	0.36	>.95	1.07	0.99	0.42	>.95	>.95	System adjustments or voltage support if needed
WSTLNESW 60 kV	P5-5C:A11:3: STAGG 230-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply	>.95	0.53	0.47	>.95	1.09	1.04	0.52	>.95	>.95	System adjustments or voltage support if needed
YUBACITY 60 kV	P5-5A:A5:4: PEASE 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	1.01	1.02	1.00	0.99	1.02	1.02	1.02	0.58	0.99	Sensitivity only
YUBACITY 60 kV	P5-5A:A5:4: PEASE 115 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	1.01	1.02	1.00	0.99	1.02	1.02	1.02	0.58	0.99	Sensitivity only
ZAMORA 115 kV	P5-5A:A4:7: BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply	0.82	0.86	0.95	0.98	1.06	1.06	0.85	0.95	0.98	System adjustments or voltage support if needed
ZAMORA 115 kV	P5-5c(DC):A4:2: Station DC Battery Supply BRIGHTON 230kv Batt	P5	Non-Redundant battery supply	0.82	0.86	0.95	0.98	1.06	1.06	0.85	0.95	0.98	System adjustments or voltage support if needed
BANTA 115 kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.52	0.87	0.81	0.66	>.95	>.95	0.87	0.77	0.72	System adjustments or voltage support if needed
BANTA 115 kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.52	0.87	0.81	0.66	>.95	>.95	0.87	0.77	0.67	System adjustments or voltage support if needed
CALVO 60 kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.55	>.95	0.87	0.71	>.95	>.95	>.95	0.84	0.78	System adjustments or voltage support if needed
CALVO 60 kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.56	>.95	0.87	0.72	>.95	>.95	>.95	0.84	0.72	System adjustments or voltage support if needed
CARBONA 60 kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.50	>.95	0.80	0.68	>.95	>.95	>.95	0.80	0.75	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
CARBONA 60 kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.51	>.95	0.80	0.69	>.95	>.95	>.95	0.80	0.69	System adjustments or voltage support if needed
CL AMMNA 115kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.53	>.95	>.95	0.66	>.95	>.95	>.95	0.78	0.72	System adjustments or voltage support if needed
CL AMMNA 115kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.53	>.95	>.95	0.67	>.95	>.95	>.95	0.78	0.67	System adjustments or voltage support if needed
HJ HEINZ 115kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.52	0.87	0.81	0.66	>.95	>.95	0.87	0.77	0.72	System adjustments or voltage support if needed
HJ HEINZ 115kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.52	0.87	0.81	0.66	>.95	>.95	0.87	0.77	0.67	System adjustments or voltage support if needed
KASSON 60kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.55	>.95	0.86	0.71	>.95	>.95	>.95	0.83	0.77	System adjustments or voltage support if needed
KASSON 60kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.55	>.95	0.86	0.71	>.95	>.95	>.95	0.83	0.72	System adjustments or voltage support if needed
LAMMERS 115kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.49	0.85	0.78	0.64	>.95	>.95	0.84	0.74	0.70	System adjustments or voltage support if needed
LAMMERS 115kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.49	0.85	0.78	0.65	>.95	>.95	0.84	0.74	0.65	System adjustments or voltage support if needed
LYOTH-SP 60 kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.53	>.95	0.83	0.69	>.95	>.95	>.95	0.82	0.76	System adjustments or voltage support if needed
LYOTH-SP 60 kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.53	>.95	0.83	0.70	>.95	>.95	>.95	0.82	0.70	System adjustments or voltage support if needed
MANTECA 115kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.56	>.95	0.86	0.69	>.95	>.95	>.95	0.80	0.74	System adjustments or voltage support if needed
MANTECA 115kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.56	>.95	0.86	0.69	>.95	>.95	>.95	0.80	0.69	System adjustments or voltage support if needed
OI GLASS 115kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.49	0.85	0.78	0.64	>.95	>.95	0.84	0.74	0.70	System adjustments or voltage support if needed
OI GLASS 115kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.49	0.85	0.78	0.65	>.95	>.95	0.84	0.74	0.65	System adjustments or voltage support if needed
RIPON 115kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.55	>.95	0.88	0.68	>.95	>.95	0.90	0.80	0.74	System adjustments or voltage support if needed



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
RIPON 115kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.56	>.95	0.88	0.69	>.95	>.95	0.90	0.80	0.69	System adjustments or voltage support if needed
RPNJ2 115kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.56	>.95	0.87	0.69	>.95	>.95	>.95	0.80	0.75	System adjustments or voltage support if needed
VIERRA 115kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.53	>.95	0.86	0.67	>.95	>.95	>.95	0.78	0.73	System adjustments or voltage support if needed
VIERRA 115kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.54	>.95	0.86	0.67	>.95	>.95	>.95	0.78	0.68	System adjustments or voltage support if needed
WESTLEY 60 kV	P1-2:A11:55: SCHULTE SW STA-LAMMERS 115KV [3993] & P1-2:A11:42: SCHULTE SW STA-	P6	N-1-1	0.52	>.95	0.80	0.66	>.95	>.95	>.95	0.82	0.73	System adjustments or voltage support if needed
WESTLEY 60 kV	P1-2:A11:42: SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:55: SCHULTE SW STA-	P6	N-1-1	0.53	>.95	0.80	0.67	>.95	>.95	>.95	0.82	0.67	System adjustments or voltage support if needed
ALMENDRA 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	1.03	1.01	0.99	1.04	1.03	1.03	0.52	0.99	Sensitivity only
ALMENDRA 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	1.03	1.01	0.99	1.04	1.03	1.03	0.52	0.99	Sensitivity only
AUBURN 60 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.02	0.97	0.57	1.02	1.03	1.03	0.96	1.02	1.02	Continue to monitor future load forecast
AUBURN 60 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.02	0.97	0.57	1.02	1.03	1.03	0.96	1.02	1.02	Continue to monitor future load forecast
BELL PGE 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.96	0.91	0.59	0.97	1.10	1.10	0.90	1.01	0.97	System adjustments or voltage support if needed
BRIGHTON 230 kV	P7-1:A11:12: LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	NA	0.90	0.87	NA	1.03	1.02	0.89	NA	NA	Vaca Dixon Area Reinforcement project
BRIGHTON 230 kV	P7-1:A11:12: LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	NA	0.90	0.87	NA	1.03	1.02	0.89	NA	NA	Vaca Dixon Area Reinforcement project
BRUNSWCK 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.02	1.00	0.90	1.02	1.07	1.06	1.00	1.04	1.02	Continue to monitor future load forecast
BRUNSWCK 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.02	1.00	0.90	1.02	1.07	1.06	1.00	1.04	1.02	Continue to monitor future load forecast
CAMPUS 115 kV	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	0.88	0.85	0.96	1.02	1.09	1.06	0.84	0.95	1.01	System adjustments or voltage support if needed



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
CAMPUS 115 kV	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	0.88	0.85	0.96	1.02	1.09	1.06	0.84	0.95	1.01	System adjustments or voltage support if needed
CAMPUS 115 kV	P7-1:A4:16_Rio Oso-Woodland #1 115 kV Line & Rio Oso-Woodland #2 115 kV Line	P7	DCTL	0.95	0.88	0.99	1.01	1.11	1.06	0.87	0.98	1.01	System adjustments or voltage support if needed
CAMPUS 115 kV	P7-1:A5:15_Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	P7	DCTL	0.95	0.88	0.99	1.01	1.11	1.06	0.87	0.98	1.01	System adjustments or voltage support if needed
CAMPUS 115 kV	P7-1:A4:16_Rio Oso-Woodland #1 115 kV Line & Rio Oso-Woodland #2 115 kV Line	P7	DCTL	0.95	0.88	0.99	1.01	1.11	1.06	0.87	0.98	1.01	System adjustments or voltage support if needed
CAMPUS 115 kV	P7-1:A5:15_Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	P7	DCTL	0.95	0.88	0.99	1.01	1.11	1.06	0.87	0.98	1.01	System adjustments or voltage support if needed
CHCGO PK 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.01	0.99	0.78	1.02	1.08	1.08	0.98	1.04	1.02	Continue to monitor future load forecast
CHCGO PK 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.01	0.99	0.78	1.02	1.08	1.08	0.98	1.04	1.02	Continue to monitor future load forecast
DAVIS 115 kV	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	0.89	0.85	0.96	1.02	1.08	1.06	0.84	0.95	1.02	System adjustments or voltage support if needed
DAVIS 115 kV	P7-1:A4:16_Rio Oso-Woodland #1 115 kV Line & Rio Oso-Woodland #2 115 kV Line	P7	DCTL	0.95	0.89	0.99	1.01	1.11	1.06	0.88	0.99	1.01	System adjustments or voltage support if needed
DEEPWATR 115kV	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	0.85	0.81	0.94	1.02	1.07	1.06	0.80	0.93	1.02	Vaca Dixon Area Reinforcement project
DEEPWATR 115kV	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	0.85	0.81	0.94	1.02	1.07	1.06	0.80	0.93	1.02	Vaca Dixon Area Reinforcement project
DEL MAR 60 kV	P7-1:A5:2_Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	1.01	1.01	0.87	1.00	1.05	1.04	1.01	1.03	1.00	Continue to monitor future load forecast
DEL MAR 60 kV	P7-1:A11:34_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	1.01	1.01	0.90	1.00	1.05	1.04	1.00	1.04	1.00	Continue to monitor future load forecast
DEL MAR 60 kV	P7-1:A11:9_EIGHT MILE ROAD-TESLA 230KV [4660] & STAGG-TESLA 230KV [5680]	P7	DCTL	1.01	1.01	0.87	0.99	1.05	1.04	1.01	1.03	0.99	Continue to monitor future load forecast
DIST2047 60 kV	P7-1:A4:5_Logan Creek-Delevan 230 kV Line & Delevan-Cortina 230 kV Line	P7	DCTL	0.93	0.88	0.88	0.97	0.96	0.95	0.88	0.95	0.97	System adjustments or voltage support if needed
DRUMPH2 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.03	1.02	0.88	1.04	1.07	1.06	1.02	1.05	1.04	Continue to monitor future load forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
DTCH FL2 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.03	1.02	0.90	1.04	1.07	1.06	1.02	1.05	1.04	Continue to monitor future load forecast
DTCH FL2 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.03	1.02	0.90	1.04	1.07	1.06	1.02	1.05	1.04	Continue to monitor future load forecast
ENCINAL 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.00	1.02	0.98	0.97	1.03	1.03	1.02	0.55	0.97	Sensitivity only
ENCINAL 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.00	1.02	0.98	0.97	1.03	1.03	1.02	0.55	0.97	Sensitivity only
ENVRO_HY 60kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.98	0.97	0.88	1.00	1.03	1.02	0.96	1.00	1.00	Continue to monitor future load forecast
GLEAF2 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.02	1.03	1.02	1.00	1.04	1.04	1.03	0.52	1.00	Continue to monitor future load forecast
GLEAF2 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.02	1.03	1.02	1.00	1.04	1.04	1.03	0.52	1.00	Continue to monitor future load forecast
GOLDHILL 230 kV	P7-1:A4:3_GOLD HILL-EIGHT MILE ROAD 230KV [4800] & GOLD HILL-LODI STIG 230KV [4810]	P7	DCTL	0.99	0.97	0.90	0.98	1.02	1.03	0.96	1.00	0.98	Continue to monitor future load forecast
GOLDHILL 230 kV	P7-1:A11:9_EIGHT MILE ROAD- TESLA 230KV [4660] & STAGG- TESLA 230KV [5680]	P7	DCTL	1.00	0.98	0.90	0.98	1.02	1.03	0.98	1.00	0.98	Continue to monitor future load forecast
GOLDHILL 230 kV	P7-1:A11:9_EIGHT MILE ROAD- TESLA 230KV [4660] & STAGG- TESLA 230KV [5680]	P7	DCTL	1.00	0.98	0.90	0.98	1.02	1.03	0.98	1.00	0.98	Continue to monitor future load forecast
HARTER 60 kV	P7-1:A11:34_EIGHT MILE ROAD- STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.34	0.33	>.95	1.07	1.03	0.34	>.95	>.95	System adjustments or voltage support if needed
HARTER 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	1.02	1.00	0.99	1.04	1.03	1.02	0.51	0.99	Sensitivity only
HIGGINS 115 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	1.02	1.00	0.99	1.04	1.03	1.02	0.51	0.99	Sensitivity only
HIGGINS 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.97	0.93	0.64	0.98	1.10	1.09	0.92	1.02	0.98	System adjustments or voltage support if needed
HIGGINS 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.97	0.93	0.64	0.98	1.10	1.09	0.92	1.02	0.98	System adjustments or voltage support if needed
LIVE OAK 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.00	1.02	0.98	0.97	1.03	1.02	1.02	0.57	0.97	Sensitivity only

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
LIVE OAK 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.00	1.02	0.98	0.97	1.03	1.02	1.02	0.57	0.97	Sensitivity only
LOCKFORD 230 kV	P7-1:A11:12:_LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	NA	0.89	0.85	NA	1.02	1.01	0.89	NA	NA	Continue to monitor future load forecast
LOCKFORD 230 kV	P7-1:A11:12:_LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	NA	0.89	0.85	NA	1.02	1.01	0.89	NA	NA	Continue to monitor future load forecast
MRYSVLE 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	0.99	1.01	1.00	0.96	1.02	1.02	1.01	0.50	0.96	System adjustments or voltage support if needed
MRYSVLE 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	0.99	1.01	1.00	0.96	1.02	1.02	1.01	0.50	0.96	System adjustments or voltage support if needed
MSHR 60V 60 kV	P7-1:A11:34:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	>.95	0.46	0.48	>.95	1.06	1.02	0.46	>.95	>.95	System adjustments or voltage support if needed
MSHR 60V 60 kV	P7-1:A11:34:_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	>.95	0.46	0.48	>.95	1.06	1.02	0.46	>.95	>.95	System adjustments or voltage support if needed
MTN_QUAR 60 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.02	0.97	0.56	1.02	1.04	1.03	0.96	1.02	1.02	Continue to monitor future load forecast
MTN_QUAR 60 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.02	0.97	0.56	1.02	1.04	1.03	0.96	1.02	1.02	Continue to monitor future load forecast
NEW HOPE 60	P7-1:A11:12:_LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	NA	0.99	0.89	NA	1.04	1.03	0.98	NA	NA	Continue to monitor future load forecast
PEASE 115 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	0.95	0.97	0.95	0.92	1.03	0.99	0.98	0.49	0.92	System adjustments or voltage support if needed
PEASE 115 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	0.95	0.97	0.95	0.92	1.03	0.99	0.98	0.49	0.92	System adjustments or voltage support if needed
PEASE 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	1.02	1.00	0.98	1.03	1.03	1.03	0.52	0.98	Sensitivity only
PEASE 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	1.02	1.00	0.98	1.03	1.03	1.03	0.52	0.98	Sensitivity only
PENRYN 60 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.01	0.96	0.53	1.01	1.03	1.03	0.95	1.01	1.01	Continue to monitor future load forecast
PLACER 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.95	0.90	0.58	0.97	1.10	1.10	0.90	1.01	0.97	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
PLACER 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.95	0.90	0.58	0.97	1.10	1.10	0.90	1.01	0.97	System adjustments or voltage support if needed
PLACER 60 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.02	0.97	0.57	1.02	1.03	1.03	0.96	1.02	1.02	Continue to monitor future load forecast
PLACER 60 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.02	0.97	0.57	1.02	1.03	1.03	0.96	1.02	1.02	Continue to monitor future load forecast
PLAINFLDE 60 kV	P7-1:A4:12_Lambie Sw Sta-Birds Landing Sw Sta 230 kV Line & Peabody-Birds Landing Sw Sta 230	P7	DCTL	NA	0.93	0.89	NA	0.99	1.04	0.93	NA	NA	Vaca Dixon Area Reinforcement project
PLAINFLDE 60 kV	P7-1:A4:15_Vaca-Vacaville-Jameson-North Tower 115 kV Line & Vaca-Vacaville-Coredelia 115 kV Line	P7	DCTL	NA	0.93	0.90	NA	0.99	1.04	0.93	NA	NA	Vaca Dixon Area Reinforcement project
POST 115 kV	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	0.86	0.82	0.95	1.02	1.07	1.06	0.80	0.93	1.02	System adjustments or voltage support if needed
POST 115 kV	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	0.86	0.82	0.95	1.02	1.07	1.06	0.80	0.93	1.02	System adjustments or voltage support if needed
Q653F 115 kV	P7-1:A5:15_Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	P7	DCTL	0.95	0.89	0.99	1.00	1.11	1.07	0.88	0.99	1.00	Vaca Dixon Area Reinforcement project
Q653F 115 kV	P7-1:A4:16_Rio Oso-Woodland #1 115 kV Line & Rio Oso-Woodland #2 115 kV Line	P7	DCTL	0.95	0.89	0.99	1.00	1.11	1.07	0.88	0.99	1.00	Vaca Dixon Area Reinforcement project
Q653F 115 kV	P7-1:A5:15_Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	P7	DCTL	0.95	0.89	0.99	1.00	1.11	1.07	0.88	0.99	1.00	Vaca Dixon Area Reinforcement project
ROCKLIN 60 kV	P7-1:A11:9_EIGHT MILE ROAD- TESLA 230KV [4660] & STAGG- TESLA 230KV [5680]	P7	DCTL	1.02	1.02	0.89	1.00	1.05	1.04	1.02	1.03	1.00	Continue to monitor future load forecast
ROLLINS 60 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.99	0.98	0.90	1.01	1.02	1.02	0.98	1.01	1.01	Continue to monitor future load forecast
RPN JNCN 115 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.99	0.98	0.90	1.01	1.02	1.02	0.98	1.01	1.01	Continue to monitor future load forecast
SHADYGLN 60 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.99	0.98	0.89	1.00	1.02	1.02	0.97	1.01	1.00	Continue to monitor future load forecast
SHADYGLN 60 kV	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.99	0.98	0.89	1.00	1.02	1.02	0.97	1.01	1.00	Continue to monitor future load forecast
SHW 60 kV	P7-1:A11:34_EIGHT MILE ROAD- STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.31	0.27	>.95	1.04	1.01	0.31	>.95	>.95	System adjustments or voltage support if needed

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
SHW 60 kV	P7-1:A11:34_ EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.31	0.27	>.95	1.04	1.01	0.31	>.95	>.95	System adjustments or voltage support if needed
SHWSS 60 kV	P7-1:A11:34_ EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.31	0.27	>.95	1.04	1.01	0.31	>.95	>.95	System adjustments or voltage support if needed
SIERRAPI 60 kV	P7-1:A12:3_ BELLOTA-COTTLE 230KV [4360] & BELLOTA- WARNERVILLE 230KV [4380]	P7	DCTL	1.01	1.01	0.90	1.00	1.05	NConv	1.01	1.04	1.00	Continue to monitor future load forecast
SIERRAPI 60 kV	P7-1:A12:8_ COTTLE-MELONES 230KV [4530] & BELLOTA- WARNERVILLE 230KV [4380]	P7	DCTL	1.01	1.01	0.90	1.00	1.05	NConv	1.01	1.04	1.00	Continue to monitor future load forecast
SIERRAPI 60 kV	P7-1:A4:3_ GOLD HILL-EIGHT MILE ROAD 230KV [4800] & GOLD HILL- LODI STIG 230KV [4810]	P7	DCTL	1.01	1.00	0.87	0.99	1.05	1.04	1.00	1.04	0.99	Continue to monitor future load forecast
STAGG 60 kV	P7-1:A11:34_ EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.34	0.31	>.95	1.07	1.04	0.35	>.95	>.95	System adjustments or voltage support if needed
STAGG 60 kV	P7-1:A11:34_ EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.34	0.31	>.95	1.07	1.04	0.35	>.95	>.95	System adjustments or voltage support if needed
STAGG-F 230 kV	P7-1:A11:34_ EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.32	0.27	>.95	1.18	0.94	0.32	>.95	>.95	System adjustments or voltage support if needed
STAGG-F 230 kV	P7-1:A11:34_ EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.32	0.27	>.95	1.18	0.94	0.32	>.95	>.95	System adjustments or voltage support if needed
STAGG-F 230 kV	P7-1:A11:9_ EIGHT MILE ROAD- TESLA 230KV [4660] & STAGG- TESLA 230KV [5680]	P7	DCTL	0.98	0.98	0.89	0.97	1.04	1.04	0.98	0.97	0.97	Continue to monitor future load forecast
STAGG-F 230 kV	P7-1:A11:9_ EIGHT MILE ROAD- TESLA 230KV [4660] & STAGG- TESLA 230KV [5680]	P7	DCTL	0.98	0.98	0.89	0.97	1.04	1.04	0.98	0.97	0.97	Continue to monitor future load forecast
STAGG-H 230 kV	P7-1:A11:34_ EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.32	0.27	>.95	1.18	0.94	0.32	>.95	>.95	System adjustments or voltage support if needed
STAGG-H 230 kV	P7-1:A11:34_ EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.32	0.27	>.95	1.18	0.94	0.32	>.95	>.95	System adjustments or voltage support if needed
STAGG-H 230 kV	P7-1:A11:9_ EIGHT MILE ROAD- TESLA 230KV [4660] & STAGG- TESLA 230KV [5680]	P7	DCTL	0.98	0.98	0.89	0.97	1.04	1.04	0.98	0.97	0.97	Continue to monitor future load forecast
STAGG-H 230 kV	P7-1:A11:9_ EIGHT MILE ROAD- TESLA 230KV [4660] & STAGG- TESLA 230KV [5680]	P7	DCTL	0.98	0.98	0.89	0.97	1.04	1.04	0.98	0.97	0.97	Continue to monitor future load forecast
TAYLOR 60 kV	P7-1:A4:3_ GOLD HILL-EIGHT MILE ROAD 230KV [4800] & GOLD HILL- LODI STIG 230KV [4810]	P7	DCTL	1.02	1.01	0.90	1.00	1.04	1.04	1.01	1.04	1.00	Continue to monitor future load forecast

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
TAYLOR 60 kV	P7-1:A11:12_ LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	NA	1.00	0.89	NA	1.04	1.04	1.00	NA	NA	Continue to monitor future load forecast
TAYLOR 60 kV	P7-1:A11:12_ LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	NA	1.00	0.89	NA	1.04	1.04	1.00	NA	NA	Continue to monitor future load forecast
THURMAN SS 230 kV	P7-1:A11:12_ LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	NA	0.89	0.85	NA	1.02	1.01	0.88	NA	NA	Continue to monitor future load forecast
THURMAN SS 230 kV	P7-1:A11:12_ LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	NA	0.89	0.85	NA	1.02	1.01	0.88	NA	NA	Continue to monitor future load forecast
UCDAVSJ1 115 kV	P7-1:A4:17_ Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	0.89	0.85	0.96	1.02	1.08	1.06	0.84	0.95	1.02	Vaca Dixon Area Reinforcement project
UCDAVSJ1 115 kV	P7-1:A4:17_ Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	0.89	0.85	0.96	1.02	1.08	1.06	0.84	0.95	1.02	Vaca Dixon Area Reinforcement project
UOP 60 kV	P7-1:A11:34_ EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	>.95	0.34	0.32	>.95	1.07	1.04	0.34	>.95	>.95	System adjustments or voltage support if needed
VALLY HM 115 kV	P7-1:A11:34_ EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	>.95	0.34	0.32	>.95	1.07	1.04	0.34	>.95	>.95	System adjustments or voltage support if needed
W.SCRMNO 115 kV	P7-1:A4:17_ Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	0.86	0.82	0.95	1.03	1.08	1.06	0.81	0.94	1.03	Vaca Dixon Area Reinforcement project
WEMR SWS 60kV	P7-1:A5:19_ Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.98	0.97	0.88	1.00	1.02	1.02	0.97	1.00	1.00	Continue to monitor future load forecast
WEMR SWS 60kV	P7-1:A5:19_ Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	0.98	0.97	0.88	1.00	1.02	1.02	0.97	1.00	1.00	Continue to monitor future load forecast
WHEATLND 60 kV	P7-1:A5:12_ Rio Oso-Nicolaus 115 kV Line & Bogue-Rio Oso 115 kV Line	P7	DCTL	0.96	0.94	0.89	0.97	1.03	1.04	0.94	0.98	0.97	System adjustments or voltage support if needed
WILKINS 60 kV	P7-1:A4:5_ Logan Creek-Delevan 230 kV Line & Delevan-Cortina 230 kV Line	P7	DCTL	0.95	0.91	0.90	0.99	0.98	0.97	0.91	0.97	0.99	System adjustments or voltage support if needed
WOODLANDBIOM 115 kV	P7-1:A5:15_ Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	P7	DCTL	0.94	0.88	0.99	1.00	1.11	1.07	0.86	0.98	1.00	Vaca Dixon Area Reinforcement project
WOODLD 115 kV	P7-1:A4:16_ Rio Oso-Woodland #1 115 kV Line & Rio Oso-Woodland #2 115 kV Line	P7	DCTL	0.94	0.87	0.99	1.00	1.11	1.07	0.86	0.98	0.99	Vaca Dixon Area Reinforcement project
WOODLD 115 kV	P7-1:A5:15_ Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	P7	DCTL	0.94	0.87	0.99	1.00	1.11	1.07	0.86	0.98	0.99	Vaca Dixon Area Reinforcement project

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
WOODLD 115 kV	P7-1:A4:16_Rio Oso-Woodland #1 115 kV Line & Rio Oso-Woodland #2 115 kV Line	P7	DCTL	0.94	0.87	0.99	1.00	1.11	1.07	0.86	0.98	0.99	Vaca Dixon Area Reinforcement project
WOODLD 115 kV	P7-1:A5:15_Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	P7	DCTL	0.94	0.87	0.99	1.00	1.11	1.07	0.86	0.98	0.99	Vaca Dixon Area Reinforcement project
WSTLNSW 60 kV	P7-1:A11:34_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.34	0.33	>.95	1.07	1.03	0.34	>.95	>.95	System adjustments or voltage support if needed
WSTLNSW 60 kV	P7-1:A11:34_EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG- TESLA 230KV [5680]	P7	DCTL	>.95	0.34	0.33	>.95	1.07	1.03	0.34	>.95	>.95	System adjustments or voltage support if needed
YUBACITY 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	1.03	1.01	0.99	1.04	1.03	1.03	0.52	0.99	Sensitivity only
YUBACITY 60 kV	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	1.03	1.01	0.99	1.04	1.03	1.03	0.52	0.99	Sensitivity only

Substation	Contingency	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)						Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		
BNTA CRB 60kV	P1-3:A11:26:_KASSON 115/60KV TB 1	P1		<8	<8	22					<8	<8	<8	Continue to Monitor
CALVO 60kV	P1-3:A11:26:_KASSON 115/60KV TB 1	P1		<8	<8	19	<8	<8	<8	<8	<8	<8	<8	Continue to Monitor
CARBONA 60kV	P1-3:A11:26:_KASSON 115/60KV TB 1	P1		<8	<8	23	<8	<8	<8	10.231	<8	<8	<8	Continue to Monitor
CRBNA JC 60kV	P1-3:A11:26:_KASSON 115/60KV TB 1	P1		<8	<8	23	<8	<8	<8	<8	<8	<8	<8	Continue to Monitor
KASSON 60kV	P1-3:A11:26:_KASSON 115/60KV TB 1	P1		<8	<8	21	<8	<8	<8	<8	<8	<8	<8	Continue to Monitor
MRYSVLLE 60kV	P1-2:A5:48:_E.MRYSVLLE-MRYSVLLE #1	P1		<8	11	16	<8	<8	<8	11.594	<8	<8	<8	Existing Procedure
WESTLEY 60kV	P1-3:A11:26:_KASSON 115/60KV TB 1	P1		<8	<8	23	<8	<8	<8	<8	<8	<8	<8	Continue to Monitor



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2025 Spring Off-Peak	2028 Summer Peak	2035 Summer Peak	2028 SP High CEC Forecast	2025 OP Sensitivity	
In accordance with TPL-001-5- Requirement R2.6, this area relies on the past studies from the 2019-20 Transmission Planning Process for transient stability studies:								
<a href="http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf">http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf</a>								

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)													Potential Mitigation Solutions	
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		

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

Substation	Load Served (MW)												Potential Mitigation Solutions	
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP Sensitivity

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Alhambra - Martinez 115 kV Line	P2-4:A8:6:_PITTSBURG-E 230KV - SECTION 1E & 2E	P2	Breaker	1	23	20	35	49	53	47	41	124	35	22	Sensitivity only	
	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	< 100	< 100	123	< 100	< 100	< 100	< 100	< 100	145	< 100	< 100	Install redundant battery supply	
AMES-Mountain View 115 kV	P2-4:A17:1:_MONTAVIS 230KV - SECTION 1D & 2D	P2	Breaker	104	NA	NA	90	NA	71	NA	NA	Diverge	90	NA	Project: Monta Vista 230 kV Bus Upgrade	
AMES-Whisman 115 kV	P2-4:A17:1:_MONTAVIS 230KV - SECTION 1D & 2D	P2	Breaker	111	NA	NA	87	NA	65	NA	NA	Diverge	87	NA	Project: Monta Vista 230 kV Bus Upgrade	
	RAVENSWD 230/115KV TB 2 & MTN VIEW-MONTA VISTA 115KV [2920]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102	< 100	< 100	Sensitivity only	
Bahia - Moraga 230 kV	P5-5C:A8:2:_CONTRA COSTA PP 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	89	59	59	69	34	56	37	50	104	69	57	Sensitivity only	
Bair 115/60kV Transformer #1	CLY LND2 115/60KV TB 2 & CLY LND 115/60KV TB 1	P6	N-1-1	163	195	330	146	< 100	185	194	261	157	144	199	Operating solution	
Bair-Cooley Landing #1 60kV Line	CLY LND2 115/60KV TB 2 & CLY LND 115/60KV TB 1	P6	N-1-1	140	182	346	121	< 100	149	164	230	134	120	186	Operating solution	
	P2-2:A10:16:_BAIR 115KV SECTION 1D	P2	Bus	60	73	102	50	28	64	67	87	62	50	74	Continue to monitor	
	P2-3:A10:22:_BAIR - 1D 115KV & BAIR-RVNSWD D-LONESTAR LINE	P2	Breaker	60	73	102	51	29	64	67	87	62	51	74	Continue to monitor	
Bair-Cooley Landing #2 60kV Line	CLY LND2 115/60KV TB 2 & CLY LND 115/60KV TB 1	P6	N-1-1	138	178	298	115	< 100	116	127	171	146	113	182	Operating solution	
	Base Case	P0	Normal	62	85	111	51	45	54	59	75	77	51	86	Continue to monitor	
	P2-4:A16:24:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Breaker	54	75	100	45	39	50	56	70	Diverge	45	76	Continue to monitor	
	P2-4:A16:25:_NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Breaker	54	75	100	45	39	50	56	70	71	45	76	Continue to monitor	
	CLY LND2 115/60KV TB 2 & CLY LND 115/60KV TB 1	P6	N-1-1	112	134	< 100	< 100	< 100	108	117	159	104	< 100	137	Operating solution	
	P2-2:A10:16:_BAIR 115KV SECTION 1D	P2	Bus	63	74	105	52	32	66	67	90	68	52	74	Continue to monitor	
	P2-2:A17:15:_AMES BS2 115KV SECTION 2D	P2	Bus	78	109	69	30	31	41	41	54	98	30	111	Operating solution	
Birds Landing - Contra Costa Sub 230 kV Line	P2-3:A10:22:_BAIR - 1D 115KV & BAIR-RVNSWD D-LONESTAR LINE	P2	Breaker	63	74	105	52	32	66	67	90	68	52	74	Continue to monitor	
	P1-2:A8:14:_BIRDS LANDING SW STA-CONTRA COSTA PP 230KV [5830]	P1	N-1	56	67	41	33	40	36	5	25	100	33	58	Sensitivity only	
	P2-2:A8:25:_C.COSTAPPE 230KV SECTION 2E	P2	Bus	54	64	14	31	41	40	4	4	107	31	54	Sensitivity only	
	P2-3:A8:18:_C.COSTAPPE - 2E 230KV & BVSTAWNDC1-DELTAPMP-C.COSTAPPE LINE	P2	Breaker	54	38	39	31	28	40	3	23	107	31	32	Sensitivity only	
Castro Valley-Newark 230kV Line	P2-4:A8:39:_C.COSTAPPD SECTION 2D & C.COSTAPPE SECTION 2E 230KV	P2	Breaker	52	59	42	35	38	41	8	26	102	35	57	Sensitivity only	
	P2-4:A16:25:_NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Breaker	61	100	97	41	44	3	30	49	46	42	101	Sensitivity only	
Cayetano-Lone Tree (Lone Tree-USWP) 230kV Line	P1-2:A16:4:_CONTRA COSTA-LAS POSITAS 230KV [4510]	P1	N-1	101	74	89	93	28	52	67	80	57	90	79	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P2-2:A16:10:_NEWARK D 230KV SECTION 1D	P2	Bus	100	74	90	92	31	52	66	80	63	90	79	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2	Breaker	113	75	83	105	29	64	73	77	Diverge	103	81	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	115	77	102	107	30	65	75	82	Diverge	104	83	Install redundant battery supply	
	TESLA-NEWARK #1 230KV [5720] & TESLA-NEWARK #2 230KV [5354]	P6	N-1-1	< 100	< 100	102	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
California ISO/IOP	Base Case	P0	Normal	105	81	96	97	32	50	64	79	71	97	86	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P1-2:A16:19:_LAS POSITAS-NEWARK 230KV [4980]	P1	N-1	101	79	93	94	32	51	66	82	69	94	84	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P1-2:A16:20:_TESLA-NEWARK #1 230KV [5720]	P1	N-1	102	78	92	94	33	56	67	83	75	94	82	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P1-2:A16:24:_TESLA-NEWARK #2 230KV [5354]	P1	N-1	102	81	96	93	33	54	67	84	72	93	85	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P1-2:A16:4:_CONTRA COSTA-LAS POSITAS 230KV [4510]	P1	N-1	108	84	96	99	34	56	71	84	73	99	89	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Cayetano-Lone Tree (USWP-Cayetano) 230kV Line	P1-2:A8:15:_CONTRA COSTA-LAS POSITAS 230KV [4510]	P1	N-1	108	84	96	99	34	56	71	84	73	99	89	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P2-2:A16:10:_NEWARK D 230KV SECTION 1D	P2	Bus	107	84	98	99	36	56	71	84	79	99	89	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P2-2:A16:7:_LS PSTAS 230KV SECTION 1D	P2	Bus	106	83	98	98	33	55	70	86	72	98	88	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P2-3:A8:15:_MORAGA - 2D 230KV & CONTRA COSTA-MORAGA #2 LINE	P2	Breaker	105	81	96	97	32	55	69	85	72	97	85	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P2-4:A16:24:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Breaker	104	99	115	96	60	52	87	100	Diverge	96	103	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation. Continue to monitor	
	P2-4:A16:7:_NEWARK E 230KV - SECTION 1E & 2E	P2	Breaker	101	88	99	92	39	52	73	86	67	92	93	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P2-4:A8:40:_C.COSTAPPD SECTION 1D & C.COSTAPPE SECTION 1E 230KV	P2	Breaker	106	88	98	98	34	54	70	87	79	98	95	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P2-4:A8:42:_C.COSTAPPE SECTION 1E & C.COSTAPPF SECTION 1F 230KV	P2	Breaker	101	76	100	95	26	50	68	86	63	95	82	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2	Breaker	120	85	90	112	34	68	78	81	Diverge	112	91	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P5-5C:A16:6:_LAS POSITAS 230-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	106	83	98	98	33	54	70	86	72	98	88	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	121	87	109	113	35	69	80	85	Diverge	113	93	Install redundant battery supply		
Christie-Franklin #2 60kV Line	Base Case	P0	Normal	63	60	97	78	40	87	91	104	42	78	61	Continue to monitor	
	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	70	62	92	112	40	119	105	112	46	112	63	Install redundant battery supply	
Christie-Sobrante (Oleum-Sobrante) 115kV Line	P2-4:A8:14:_PITTSBURG-E 115KV - SECTION 2E & 1E	P2	Breaker	100	67	46	106	29	104	65	56	99	106	68	Project: Christie-Sobrante 115 kV Line Reconnector	
	P2-4:A8:6:_PITTSBURG-E 230KV - SECTION 1E & 2E SOBRANTE-G #1 115KV [3720] & SOBRANTE-G #2 115KV [3730]	P6	N-1-1	139	< 100	< 100	148	< 100	142	< 100	< 100	104	126	< 100	Project: Christie-Sobrante 115 kV Line Reconnector	
Claremont K - Oakland D #1 115kV Cable	K-D #2 115KV [9967] & MORAGA-OAKLAND #2 115KV [2730]	P6	N-1-1	< 100	< 100	123	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103	Continue to monitor	
	P1-2:A7:25:_K-D #2 115KV [9967]	P1	N-1	77	93	120	65	78	78	93	112	71	65	102	Continue to monitor	
	P2-2:A7:17:_STATIN D 115KV SECTION ME	P2	Bus	68	85	110	57	72	69	83	102	63	57	93	Continue to monitor	
	P2-2:A8:75:_MORAGA.D 115KV SECTION 1E	P2	Bus	64	83	100	54	69	66	81	96	59	54	88	Continue to monitor	
	P2-4:A8:30:_MORAGA.D 115KV - SECTION 2D & 1D	P2	Breaker	64	83	100	54	69	66	81	96	59	54	88	Continue to monitor	
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	103	123	152	88	95	105	125	145	Diverge	88	128	Install redundant battery supply	
	MORAGA-OAKLAND #1 115KV [2720] & K-D #1 115KV [9966]	P6	N-1-1	< 100	< 100	122	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	P1-2:A7:24:_K-D #1 115KV [9966]	P1	N-1	75	92	118	64	76	77	91	109	70	64	100	Continue to monitor	
	P2-2:A7:15:_CLARMNT 115KV SECTION 1D	P2	Bus	67	90	114	56	75	67	85	103	58	56	97	Continue to monitor	
P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	100	119	148	86	93	101	121	141	Diverge	86	125	Install redundant battery supply		
Claremont-East Portal 115kV section	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	117	140	179	104	107	97	116	135	Diverge	104	147	Install redundant battery supply	
Collinsville - Pittsburg 230 kV Line	Base Case	P0	Normal	NA	95	113	NA	43	NA	94	114	NA	NA	95	Existing series compensation adjustment. Add reactor.	
	P1-2:A8:84:_COLLINSVILLE-PITTSBURG-F #1 230KV [0]	P1	N-1	NA	106	128	NA	48	NA	108	131	NA	NA	105	Existing series compensation adjustment. Add reactor.	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Collinsville - Pittsburg 230 kV Line	P2-4:A8:57:_PITTSBURG-F 230KV - SECTION 2F & 1F	P2	Breaker	NA	94	107	NA	36	NA	80	98	NA	NA	93	Existing series compensation adjustment. Add reactor.	
	P2-3:A8:62:_COLLINSVILLE 230KV - MIDDLE BREAKER BAY 1	P2	Breaker	NA	102	123	NA	47	NA	104	126	NA	NA	101	Existing series compensation adjustment. Add reactor.	
Collinsville 230/115 kV Transformer #2	DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS & MORAGA 230/115KV TB 3	P3	N-1-1	< 100	< 100	< 100	< 100	< 100	104	< 100	< 100	< 100	< 100	< 100	Project: New Collinsville 500 kV substation	
	MORAGA 230/115KV TB 1 & MORAGA 230/115KV TB 3	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	118	< 100	< 100	< 100	< 100	< 100	Project: New Collinsville 500 kV substation	
	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	73	44	48	81	41	106	69	76	74	81	46	Install redundant battery supply	
Collinsville 500/230kV Transformer #1	DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS & COLLINSVILLE 500/230KV TB 2	P3	N-1-1	NA	111	< 100	NA	< 100	NA	126	< 100	NA	NA	114	Existing series compensation adjustment. Add reactor.	
	DEC STG1 18/230KV TB 1 & COLLINSVILLE 500/230KV TB 2	P6	N-1-1	NA	< 100	< 100	NA	< 100	NA	105	< 100	NA	NA	< 100	Existing series compensation adjustment. Add reactor.	
	P1-3:A8:33:_COLLINSVILLE 500/230KV TB 2	P1	N-1	NA	89	107	NA	43	NA	93	112	NA	NA	88	Existing series compensation adjustment. Add reactor.	
	P2-3:A8:63:_COLLINSVILLE 230KV - MIDDLE BREAKER BAY 2	P2	Breaker	NA	89	107	NA	43	NA	93	112	NA	NA	88	Existing series compensation adjustment. Add reactor.	
Collinsville 500/230kV Transformer #2	DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS & COLLINSVILLE 500/230KV TB 1	P3	N-1-1	NA	111	< 100	NA	< 100	NA	126	< 100	NA	NA	114	Existing series compensation adjustment. Add reactor.	
	DEC STG1 18/230KV TB 1 & COLLINSVILLE 500/230KV TB 1	P6	N-1-1	NA	< 100	< 100	NA	< 100	NA	105	< 100	NA	NA	< 100	Existing series compensation adjustment. Add reactor.	
	P1-3:A8:32:_COLLINSVILLE 500/230KV TB 1	P1	N-1	NA	89	107	NA	43	NA	93	112	NA	NA	88	Existing series compensation adjustment. Add reactor.	
	P2-3:A8:62:_COLLINSVILLE 230KV - MIDDLE BREAKER BAY 1	P2	Breaker	NA	84	102	NA	41	NA	89	107	NA	NA	84	Existing series compensation adjustment. Add reactor.	
Contra Costa - BDLSWSTA 230 kV Line	P1-2:A8:8:_BIRDS LANDING SW STA-CONTRA COSTA SUB 230KV [6161]	P1	N-1	57	68	42	33	41	36	5	25	102	33	59	Sensitivity only	
Cooley Landing - Ravenswood 115 kV Line (Tap CLY LND2)	CLY LND 115/60KV TB 1 & RAVENSWOOD-COOLEY LANDING #2 115KV [3400]	P6	N-1-1	< 100	< 100	142	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103	Continue to monitor	
Cooley Landing 115/60kV Transformer #1	P1-3:A10:12:_CLY LND2 115/60KV TB 2	P1	N-1	63	74	104	55	30	68	71	92	65	55	74	Continue to monitor	
	P2-2:A10:19:_CLY LND2 115KV SECTION 1E	P2	Bus	62	72	102	54	29	66	70	91	65	54	74	Continue to monitor	
Cooley Landing 115/60kV Transformer #2	P1-3:A10:13:_CLY LND 115/60KV TB 1	P1	N-1	63	74	104	55	30	68	71	92	65	55	74	Continue to monitor	
	P2-2:A10:20:_CLY LND 115KV SECTION 1D	P2	Bus	62	72	103	54	29	66	70	90	65	54	74	Continue to monitor	
Cooley Landing-Palo Alto 115kV Line	P7-1:A10:20_Ravenswood-Cooley Landing Nos. 1 & 2 115 kV lines	P7	DCTL	72	84	120	60	31	67	72	94	76	60	86	Continue to monitor	
	P7-1:A10:22_Ravenswood-Palo Alto Nos. 1 & 2 115 kV lines	P7	DCTL	87	88	102	82	80	74	75	83	89	82	88	Continue to monitor	
	RAVENSWOOD-COOLEY LANDING #2 115KV [3400] & RAVENSWOOD-COOLEY LANDING #1 115KV [3390]	P6	N-1-1	< 100	< 100	120	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Cooley Landing-Stanford 60kV Line (Cooley Landing-SRI)	Base Case	P0	Normal	57	65	117	62	20	61	66	87	45	62	67	Continue to monitor	
	P1-1:A10:3:_SRI INTL 9.11KV GEN UNIT 1	P1	N-1	56	63	109	59	23	66	71	93	39	59	65	Continue to monitor	
	P1-3:A10:12:_CLY LND2 115/60KV TB 2	P1	N-1	50	57	105	54	18	61	66	87	39	54	59	Continue to monitor	
	P1-3:A10:13:_CLY LND 115/60KV TB 1	P1	N-1	50	57	105	54	18	61	66	87	39	54	59	Continue to monitor	
	P2-2:A10:19:_CLY LND2 115KV SECTION 1E	P2	Bus	50	57	105	54	18	61	66	87	39	54	59	Continue to monitor	
	P2-2:A10:20:_CLY LND 115KV SECTION 1D	P2	Bus	50	57	105	54	18	61	66	87	39	54	59	Continue to monitor	
	P2-2:A9:7:_POTRERO 115KV SECTION 1E	P2	Bus	50	57	105	54	18	61	66	87	39	54	59	Continue to monitor	
	P2-3:A9:18:_POTRERO - 1E 115KV & LINE	P2	Breaker	50	57	105	54	18	61	66	87	39	54	59	Continue to monitor	
	P2-4:A16:24:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Breaker	50	57	105	54	18	61	66	87	Diverge	54	59	Continue to monitor	
	P7-1:A10:20_Ravenswood-Cooley Landing Nos. 1 & 2 115 kV lines	P7	DCTL	50	57	105	54	18	61	66	87	39	54	59	Continue to monitor	
P1-2:A18:52:_PIERCY-METCALF 115KV [4318]	P1	N-1	76	72	115	63	29	63	66	81	57	63	74	Continue to monitor		
	P2-2:A18:43:_MTCALF E 115KV SECTION 2E	P2	Bus	76	72	115	63	29	63	66	81	57	63	73	Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Dixon Landing-McKee 115 kV Line	P2-4:A18:31:_MTCALF D SECTION 2D & MTCALF E SECTION 2E 115KV	P2	Breaker	76	72	115	63	29	63	66	81	57	63	73	Continue to monitor	
	P7-1:A18:6_Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	77	73	116	63	29	63	66	82	58	63	74	Continue to monitor	
Dumbarton-Newark 115kV Line	E. SHORE 230/115KV TB 2 & E. SHORE 230/115KV TB 1	P6	N-1-1	< 100	< 100	101	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Eastshore 230/115kV Transformer #1	P1-3:A16:2:_E. SHORE 230/115KV TB 2	P1	N-1	84	84	105	66	25	73	78	81	75	66	84	Continue to monitor	
	P2-2:A16:27:_EASTSHRE 115KV SECTION 1E	P2	Bus	84	84	105	66	25	73	78	81	75	66	84	Continue to monitor	
	P2-3:A16:5:_E. SHORE 230KV - MIDDLE BREAKER BAY 3	P2	Breaker	84	84	105	66	25	73	78	81	75	66	84	Continue to monitor	
Eastshore 230/115kV Transformer #2	P1-3:A16:1:_E. SHORE 230/115KV TB 1	P1	N-1	84	84	106	66	25	73	77	81	73	66	84	Continue to monitor	
	P2-2:A16:26:_EASTSHRE 115KV SECTION 1D	P2	Bus	84	84	106	66	25	73	77	81	73	66	84	Continue to monitor	
	P2-3:A16:6:_E. SHORE 230KV - MIDDLE BREAKER BAY 2	P2	Breaker	115	83	106	95	25	105	77	81	43	95	84	Project: East Shore 230 kV Bus Terminals Reconfiguration. Continue to monitor	
Eastshore-San Mateo 230kV Line	P2-4:A16:14:_EASTSHRE 115KV - SECTION MD & 1D	P2	Breaker	82	81	102	64	25	71	75	79	72	64	82	Continue to monitor	
	P2-4:A16:12:_EASTSHRE 115KV - SECTION ME & MD	P2	Breaker	82	106	110	69	30	68	89	98	8	69	106	Generation redispatch	
	P2-4:A16:15:_EASTSHRE 115KV - SECTION 1D & 1E	P2	Breaker	82	106	111	69	30	69	90	100	8	70	106	Generation redispatch	
	P5-5C:A16:11:_EASTSHORE 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	82	106	110	69	30	68	89	98	8	69	106	Install redundant battery supply	
	P7-1:A10:2:_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	P7	DCTL	91	105	107	78	42	73	89	90	Diverge	78	105	Existing series compensation adjustment. Add reactor.	
	TESLA-RAVENSWOOD 230KV [5730] & NEWARK-RAVENSWOOD 230KV [5936]	P6	N-1-1	< 100	< 100	104	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
El Patio-San Jose Sta. 'A' 115 kV Line	P7-1:A18:20:_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	87	23	56	73	41	91	37	47	109	73	25	Sensitivity only	
Evergreen-Almaden 60 kV Line	Base Case	P0	Normal	74	71	113	57	15	54	59	69	48	57	72	Continue to monitor	
	P1-2:A18:38:_SAN JOSE B-STONE-EVERGREEN 115KV [1550]	P1	N-1	66	63	102	50	13	54	59	69	43	50	64	Continue to monitor	
	P1-2:A18:99:_SANJOSEBHVC VSC	P1	N-1	NA	63	104	NA	13	NA	57	69	NA	NA	64	Continue to monitor	
	P2-1:A18:22:_SAN JOSE B-STONE-EVERGREEN 115KV [1550] (MARKHM J-EVRGRN 1)	P2	Line Section w/o Fault	66	63	102	50	13	54	59	69	43	50	64	Continue to monitor	
	P2-2:A18:33:_EVRGRN 1 115KV SECTION 1D	P2	Bus	66	66	110	50	13	54	59	69	43	50	67	Continue to monitor	
	P2-3:A18:24:_EVRGRN 1 - 1D 115KV & SAN JOSE B-STONE-EVERGREEN LINE	P2	Breaker	66	66	110	50	13	54	59	69	43	50	67	Continue to monitor	
FMC-San Jose 'B' 115 kV Line	P7-1:A18:17:_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	70	63	102	53	13	54	59	69	46	53	64	Continue to monitor	
	LOS ESTEROS-NORTECH 115KV [4032] & SSS 230/230KV TB 1	P6	N-1-1	< 100	< 100	102	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Grant-Eastshore #1 115kV Line	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	142	NA	NA	105	NA	101	NA	NA	153	105	NA	Project: NRS rebuild project	
	P2-4:A8:31:_MORAGA.E 115KV - SECTION 2E & 1E	P2	Breaker	90	87	109	78	56	92	95	104	78	78	88	Continue to monitor	
Grant-Eastshore #2 115kV Line	P2-4:A8:31:_MORAGA.E 115KV - SECTION 2E & 1E	P2	Breaker	92	88	111	79	57	94	96	106	79	79	89	Continue to monitor	
	P2-4:A8:31:_MORAGA.E 115KV - SECTION 2E & 1E	P2	Breaker	84	82	110	75	55	78	81	89	72	75	83	Continue to monitor	
Grant-Oakland J 115 kV Line	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	90	63	95	101	37	97	81	81	Diverge	101	65	Install redundant battery supply	
	OX & SAN MATEO-HILLSDALE JCT 60KV [7950] MOAS OPENED ON SAN MATO	P3	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Jefferson-Las Pulgas 60kV Line (Jefferson-Woodside)	Base Case	P0	Normal	52	59	102	70	30	60	71	82	26	70	60	Continue to monitor	
Juliette-Mission 60 kV (SVP)	SVP2-2:3:_SRS 115 kV bus	P2	Bus/Breaker	107	NA	NA	87	NA	79	NA	NA	106	87	NA	Project: SRS rebuild project	
	SVP5-5:3_Single Control Circuitry Failure at SRS 115kV bus	P5	Non-Redundant battery supply/Relay	107	NA	NA	87	NA	79	NA	NA	106	87	NA	Project: SRS rebuild project	
	SVP2-2:3:_SRS 115 kV bus	P2	Bus/Breaker	107	NA	NA	87	NA	79	NA	NA	106	87	NA	Project: SRS rebuild project	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
	SVP5-5:3_Single Control Circuitry Failure at SRS 115kV bus	P5	Non-Redundant battery supply/Relay	107	NA	NA	87	NA	79	NA	NA	106	87	NA	Project: SRS rebuild project	
Kifer-FMC 115 kV Line	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	112	NA	NA	81	NA	79	NA	NA	123	81	NA	Project: NRS rebuild project	
	LOS ESTEROS-NORTECH 115KV [4032] & SSS 230/230KV TB 1	P6	N-1-1	< 100	< 100	114	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	31	63	Diverge	28	79	40	65	113	Diverge	28	62	Install redundant battery supply	
	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	182	NA	NA	132	NA	137	NA	NA	200	132	NA	Project: KRS rebuild project	
	TRIMBLE-SAN JOSE B 115KV [4030] & SAN JOSE A-SAN JOSE B 115KV [3510]	P6	N-1-1	< 100	< 100	< 100	< 100	101	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
KRS 115/60 kV Bank #1 (SVP)	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	109	NA	NA	34	NA	33	NA	NA	110	34	NA	Project: KRS rebuild project	
KRS 115/60 kV Bank #2 (SVP)	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	111	NA	NA	34	NA	33	NA	NA	112	34	NA	Project: KRS rebuild project	
Lakewood-Meadow Lane-Clayton 115kV Line	MORAGA 230/115KV TB 2 & LAKEWOOD-CLAYTON 115KV [2082]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102	< 100	< 100	Continue to monitor	
	P1-2:A8:66:_LAKEWOOD-CLAYTON 115KV [2082]	P1	N-1	65	94	117	55	58	55	76	86	37	55	94	Continue to monitor	
Las Positas-Newark 230kV Line	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2	Breaker	108	82	83	97	39	47	60	59	Diverge	98	90	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	110	85	96	99	40	49	62	73	Diverge	99	93	Project: Lone Tree – Cayetano – Newark Corridor Series Compensation	
Los Esteros-Metcalf 230 kV Line	P2-4:A16:7:_NEWARK E 230KV - SECTION 1E & 2E	P2	Breaker	86	67	86	71	48	83	70	81	105	71	68	Sensitivity only	
	P2-4:A17:1:_MONTAVIS 230KV - SECTION 1D & 2D	P2	Breaker	79	NA	NA	76	NA	105	NA	NA	Diverge	76	NA	Project: Monta Vista 230 kV Bus Upgrade	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	102	76	Diverge	83	52	93	75	108	Diverge	83	78	Install redundant battery supply	
Los Esteros-Silicon Switching Station 230 kV Line	LOS ESTEROS-NORTECH 115KV [4032] & FMC-SAN JOSE B 115KV [2021]	P6	N-1-1	< 100	< 100	< 100	101	< 100	104	< 100	< 100	< 100	101	< 100	Project: San Jose area HVDC Lines	
	P1-2:A16:99:_NRS-NEWARK HVDC VSC	P1	N-1	98	112	116	86	101	85	114	115	99	86	111	Mitigation under development	
	P1-2:A18:20:_LOS ESTEROS-NORTECH 115KV [4032]	P1	N-1	109	91	102	98	77	97	90	97	105	98	92	Project: San Jose area HVDC Lines. Continue to monitor	
	P1-2:A18:58:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551]	P1	N-1	105	87	98	94	74	93	85	93	101	94	88	Project: San Jose area HVDC Lines	
	P1-3:A16:3:_NEWARK D 230/115KV TB 9	P1	N-1	101	87	89	90	73	89	88	89	102	90	87	Project: San Jose area HVDC Lines	
	P1-3:A16:5:_NEWARK E 230/115KV TB 11	P1	N-1	101	88	89	89	73	88	88	89	101	89	88	Project: San Jose area HVDC Lines	
	P1-3:A18:10:_LS ESTRS 230/115KV TB 4	P1	N-1	101	86	87	89	71	86	85	87	103	89	86	Project: San Jose area HVDC Lines	
	P1-3:A18:9:_LS ESTRS 230/115KV TB 3	P1	N-1	101	86	87	89	71	86	85	87	103	89	86	Project: San Jose area HVDC Lines	
	P2-2:A18:56:_NORTECH 115KV SECTION 1F	P2	Bus	107	90	100	96	76	95	88	95	104	96	90	Project: San Jose area HVDC Lines. Continue to monitor	
	P2-2:A18:57:_NORTECH 115KV SECTION 1E	P2	Bus	106	88	98	94	74	94	86	94	102	94	88	Project: San Jose area HVDC Lines	
	P2-3:A18:4:_LS ESTRS 230KV - MIDDLE BREAKER BAY 6	P2	Breaker	101	86	87	89	71	86	85	87	103	89	86	Project: San Jose area HVDC Lines	
	P2-3:A18:41:_LS ESTRS 115KV - MIDDLE BREAKER BAY 1	P2	Breaker	109	91	102	98	77	97	90	97	105	98	92	Project: San Jose area HVDC Lines. Continue to monitor	
	P2-4:A16:22:_NEWARK F 115KV - SECTION 1F & 2F	P2	Breaker	102	84	87	90	69	86	80	85	105	90	84	Project: San Jose area HVDC Lines	
	P2-4:A18:26:_NORTECH 115KV - SECTION 1F & 1E	P2	Breaker	106	88	99	95	75	94	87	94	102	95	88	Project: San Jose area HVDC Lines	
	P5-5C:A16:16:_NEWARK D 115 & 60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	101	84	86	88	71	85	83	85	103	88	86	Project: San Jose area HVDC Lines	
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	103	83	85	90	69	86	79	85	106	90	83	Project: San Jose area HVDC Lines	



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
	P5-5C:A16:7:1_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	83	75	Diverge	78	69	84	85	103	Diverge	78	75	Install redundant battery supply	
	P7-1:A10:2_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	P7	DCTL	101	88	89	91	74	91	90	90	Diverge	91	88	Project: San Jose area HVDC Lines	
	P7-1:A10:3_Ravenswood-San Mateo Nos. 1 & 2 230 kV lines	P7	DCTL	98	84	84	86	71	84	85	85	101	86	84	Sensitivity only	
	P7-1:A18:1_Newark - Northern #1 & #2 115 kV Lines	P7	DCTL	100	82	84	88	68	83	78	83	103	88	82	Project: San Jose area HVDC Lines	
	P7-1:A18:11_Trimble - San Jose B & FMC - San Jose B 115 kV Lines	P7	DCTL	100	91	84	89	79	89	93	85	102	89	91	Sensitivity only	
	P7-1:A18:14_Newark - Kifer & FMC - Kifer 115 kV Lines	P7	DCTL	98	87	89	86	76	87	87	90	101	86	87	Sensitivity only	
	P7-1:A18:16_Metcalf - El Patio No. 1 & 2 115 kV Lines	P7	DCTL	101	86	88	89	71	89	87	88	101	89	86	Project: San Jose area HVDC Lines	
SVP5-5:2_Single DC Supply Failure at NRS300 115kV bus	P5	Non-Redundant battery supply/Relay	105	84	98	86	71	85	78	90	101	86	84	Project: San Jose area HVDC Lines		
Loyola-Monta Vista 60 kV Line	Base Case	P0	Normal	63	56	106	70	25	66	68	85	35	70	57	Continue to monitor	
Martin 115/60kV Transformer #6	P1-3:A10:8:_MILLBRAE 115/60KV TB 5	P2	Bus	38	46	101	51	31	80	87	112	27	51	47	Continue to monitor	
	P2-2:A10:12:_MILLBRAE 115KV SECTION 1E	P2	Bus	38	46	101	51	31	80	87	112	27	51	47	Continue to monitor	
	P2-4:A10:7:_MILLBRAE 115KV - SECTION 1F & 1E	P2	Breaker	37	46	101	51	31	80	87	113	27	51	47	Continue to monitor	
	P2-4:A10:8:_MILLBRAE 115KV - SECTION 1E & 1D	P2	Breaker	37	46	101	51	31	80	87	113	27	51	47	Continue to monitor	
Martin C - Martin S1 230 kV Line	EGBERTSWSTA-JEFFERSN 230KV [0] & POTRERO-TBC	P6	N-1-1	< 100	< 100	106	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Martin-Daly City #2 115kV Line	P2-3:A9:26:_MARTIN C 115KV - MIDDLE BREAKER BAY 1	P2	Breaker	55	53	101	59	31	62	66	85	39	59	55	Continue to monitor	
Martinez-Oleum 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	326	259	128	492	121	359	281	137	214	492	263	Install redundant battery supply	
Martinez-Sobrante 115kV Line	P1-2:A7:38:_OLEUM-MARTINEZ 115KV [3170]	P1	N-1	36	73	100	59	63	75	103	109	38	59	72	Mitigation under development	
	P2-1:A8:46:_OLEUM-MARTINEZ 115KV [3170] (MARTNZ D-ALHAMTP2)	P2	Line Section w/o Fault	36	73	100	59	63	75	103	109	37	59	72	Mitigation under development	
	P2-2:A8:17:_SOBRANTE 230KV SECTION 1D	P2	Bus	65	113	153	77	80	90	116	143	15	76	112	Mitigation under development	
	P2-4:A8:57:_PITTSBURG-F 230KV - SECTION 2F & 1F	P2	Breaker	24	68	84	49	55	51	111	102	28	49	72		
	P2-3:A8:13:_SOBRANTE - 1D 230KV & IGNACIO-SOBRANTE LINE	P2	Breaker	63	113	154	75	80	90	116	143	15	75	112	Mitigation under development	
	P2-4:A7:23:_OLEUM 115KV - SECTION 1E & 1F	P2	Breaker	25	61	108	38	45	49	80	88	19	38	61	Continue to monitor	
	P2-4:A8:51:_SOBRANTE 115KV - SECTION 1D & 1E	P2	Breaker	60	73	107	77	46	81	95	115	16	77	74	Continue to monitor	
	P2-4:A8:6:_PITTSBURG-E 230KV - SECTION 1E & 2E	P2	Breaker	17	37	70	50	49	69	63	79	111	50	37	Sensitivity only	
	P2-4:A8:8:_SOBRANTE 230KV - SECTION 2D & 1D	P2	Breaker	57	112	154	72	80	90	118	145	9	72	111	Mitigation under development	
	P5-5C:A8:14:_CLAYTON 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	49	75	103	60	53	69	90	95	9	60	75	Install redundant battery supply	
P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	59	73	122	82	59	87	108	128	Diverge	82	74	Install redundant battery supply		
SOBRANTE 230/115KV TB 1 & SOBRANTE 230/115KV TB 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109	Sensitivity only	
Millbrae 115/60kV Transformer #5	P1-3:A9:4:_MARTIN C 115/60KV TB 6	P1	N-1	41	50	103	54	34	85	91	115	30	54	50	Continue to monitor	
	P2-3:A9:24:_MARTIN C 115KV - MIDDLE BREAKER BAY B	P2	Breaker	41	50	103	54	34	85	91	115	30	54	50	Continue to monitor	
Millbrae-Sneath Lane 60kV Line	P1-2:A9:33:_MARTIN-SNEATH LANE 60KV [7210]	P1	N-1	52	69	164	78	34	104	109	142	31	78	70	Mitigation under development	
	P1-3:A9:4:_MARTIN C 115/60KV TB 6	P1	N-1	52	68	164	78	34	104	109	142	31	78	70	Mitigation under development	
	P2-3:A9:24:_MARTIN C 115KV - MIDDLE BREAKER BAY B	P2	Breaker	52	69	164	78	34	104	109	142	31	78	70	Mitigation under development	
	P1-3:A10:8:_MILLBRAE 115/60KV TB 5	P1	N-1	68	84	181	92	56	114	124	157	50	92	85	Mitigation under development	
P1-2:A10:43:_MILLBRAE-SNEATH LANE 60KV [7570] MOAS OPENED ON SN BRUNO JCT SNTH LINE	P1	N-1	36	49	126	57	24	81	85	110	22	57	50	Continue to monitor		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Martin-Sneath Lane 60kV Line	P1-2:A10:44:_MILLBRAE-SNEATH LANE 60KV [7570] MOAS OPENED ON SN BRUNO JCT SNTH LINE (2)	P1	N-1	36	49	126	57	24	81	85	110	22	57	50	Continue to monitor	
	P2-2:A10:12:_MILLBRAE 115KV SECTION 1E	P2	Bus	68	84	181	92	56	114	124	155	50	92	85	Mitigation under development	
	P2-4:A10:7:_MILLBRAE 115KV - SECTION 1F & 1E	P2	Breaker	68	83	181	92	56	114	124	158	50	92	84	Mitigation under development	
	P2-4:A10:8:_MILLBRAE 115KV - SECTION 1E & 1D	P2	Breaker	68	83	181	92	56	114	124	158	50	92	84	Mitigation under development	
Martinez E - D 115 kV	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	105	85	101	149	38	153	123	148	83	149	86	Install redundant battery supply	
Mckee-Piercy 115 kV Line (section #1)	P1-2:A16:52:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	108	103	136	81	NA	77	NA	NA	88	81	105	Line section rating under review	
	P2-4:A16:22:_NEWARK F 115KV - SECTION 1F & 2F	P2	Breaker	109	104	139	82	NA	77	NA	NA	90	82	106	Line section rating under review	
	P7-1:A16:1:_NEWARK-DIXON LANDING & NEWARK-MILPITAS #1 LINES	P7	DCTL	108	103	137	81	NA	77	NA	NA	89	81	105	Line section rating under review	
Mckee-Piercy 115 kV Line (section #2)	P1-2:A16:52:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	NA	77	101	NA	34	NA	58	69	NA	NA	78	Continue to monitor	
	P2-4:A16:22:_NEWARK F 115KV - SECTION 1F & 2F	P2	Breaker	NA	77	101	NA	34	NA	58	69	NA	NA	78	Continue to monitor	
	P7-1:A16:1:_NEWARK-DIXON LANDING & NEWARK-MILPITAS #1 LINES	P7	DCTL	NA	77	101	NA	34	NA	58	69	NA	NA	78	Continue to monitor	
Metcalf 230/115 kV Trans No. 1	P2-4:A18:4:_METCALF 230KV - SECTION 2D & 2E	P2	Breaker	123	56	82	119	44	112	58	70	123	119	57	Project: Metcalf 230/115 kV Transformers CB Addition	
Metcalf 230/115 kV Trans No. 2	METCALF 230/115KV TB 1 & METCALF 230/115KV TB 4	P6	N-1-1	108	< 100	< 100	< 100	< 100	102	< 100	< 100	< 100	< 100	< 100	Project: San Jose area HVDC Lines	
	METCALF 230/115KV TB 3 & METCALF 230/115KV TB 4	P6	N-1-1	109	< 100	113	< 100	< 100	102	< 100	< 100	< 100	< 100	< 100	Project: San Jose area HVDC Lines. Continue to monitor	
	P2-4:A18:3:_METCALF 230KV SECTION 2D	P2	Bus	101	65	98	99	50	93	71	84	96	99	67	Project: Metcalf 230/115 kV Transformers CB Addition	
	P2-4:A18:1:_METCALF 230KV - SECTION 1D & 1E	P2	Breaker	127	45	68	125	35	114	48	60	119	125	46	Project: Metcalf 230/115 kV Transformers CB Addition	
	SSS 230/230KV TB 1 & METCALF 230/115KV TB 4	P6	N-1-1	< 100	< 100	113	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: San Jose area HVDC Lines. Continue to monitor	
Metcalf 230/115 kV Trans No. 3	METCALF 230/115KV TB 2 & METCALF 230/115KV TB 4	P6	N-1-1	107	< 100	111	< 100	< 100	102	< 100	< 100	< 100	< 100	< 100	Project: San Jose area HVDC Lines. Continue to monitor	
	P2-4:A18:4:_METCALF 230KV - SECTION 2D & 2E	P2	Breaker	136	62	91	131	49	124	65	78	136	131	64	Project: Metcalf 230/115 kV Transformers CB Addition	
Metcalf 230/115 kV Trans No. 4	P2-4:A18:1:_METCALF 230KV - SECTION 1D & 1E	P2	Breaker	115	41	61	113	35	103	42	54	108	113	42	Project: Metcalf 230/115 kV Transformers CB Addition	
	SSS 230/230KV TB 1 & METCALF 230/115KV TB 2	P6	N-1-1	< 100	< 100	101	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Metcalf 500/230 kV Trans No. 12	METCALF 500/230KV TB 13 & METCALF 500/230KV TB 11	P6	N-1-1	< 100	< 100	102	< 100	< 100	102	< 100	< 100	< 100	< 100	< 100	Project: San Jose area HVDC Lines. Continue to monitor	
Metcalf 500/230 kV Trans No. 13	METCALF 500/230KV TB 12 & METCALF 500/230KV TB 11	P6	N-1-1	< 100	< 100	104	< 100	< 100	104	< 100	< 100	< 100	< 100	< 100	Project: San Jose area HVDC Lines. Continue to monitor	
Metcalf-El Patio No. 1 115 kV Line	METCALF-EL PATIO #2 115KV [2510] & SAN JOSE B-STONE- EVERGREEN 115KV [1550]	P6	N-1-1	103	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: South Bay Area Limiting Elements Upgrade	
	SAN JOSE A-SAN JOSE B 115KV [3510] & METCALF-EL PATIO #2 115KV [2510]	P6	N-1-1	< 100	< 100	105	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: South Bay Area Limiting Elements Upgrade. Continue to monitor	
	P1-2:A18:40:_METCALF-EL PATIO #2 115KV [2510]	P1	N-1	109	35	62	88	29	85	39	48	112	88	37	Project: South Bay Area Limiting Elements Upgrade	
	P2-1:A18:15:_METCALF-EL PATIO #2 115KV [2510] (EL PATIO-BAILY J3)	P2	Line Section w/o Fault	109	35	62	88	29	85	39	48	112	88	37	Project: South Bay Area Limiting Elements Upgrade	
	P2-2:A18:39:_METCALF D 115KV SECTION 2D	P2	Bus	115	42	73	93	31	97	46	57	120	93	44	Project: South Bay Area Limiting Elements Upgrade	
	P2-3:A18:31:_METCALF D - 2D 115KV & METCALF-EL PATIO #2 LINE	P2	Breaker	115	42	73	93	31	97	46	57	120	93	44	Project: South Bay Area Limiting Elements Upgrade	
	P2-4:A18:31:_METCALF D SECTION 2D & METCALF E SECTION 2E 115KV	P2	Breaker	132	47	83	105	33	108	51	64	135	105	49	Project: South Bay Area Limiting Elements Upgrade	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	109	40	Diverge	84	26	74	36	56	Diverge	84	41	Project: South Bay Area Limiting Elements Upgrade	
	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	114	37	66	91	26	88	40	50	115	91	39	Project: South Bay Area Limiting Elements Upgrade	
P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	108	40	63	88	28	82	40	50	119	88	41	Project: South Bay Area Limiting Elements Upgrade		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
	SAN JOSE A-SAN JOSE B 115KV [3510] & METCALF-EL PATIO #2 115KV [2510]	P6	N-1-1	< 100	< 100	105	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: South Bay Area Limiting Elements Upgrade. Continue to monitor
	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	118	NA	NA	90	NA	79	NA	NA	123	90	NA	Project: NRS rebuild project	
Metcalf-El Patio No. 2 115 kV Line	P2-4:A18:30:_MTCALF D SECTION 1D & MTCALF E SECTION 1E 115KV	P2	Breaker	100	53	90	81	35	98	57	71	99	81	55	Project: South Bay Area Limiting Elements Upgrade	
	SAN JOSE A-SAN JOSE B 115KV [3510] & METCALF-EL PATIO #1 115KV [2500]	P6	N-1-1	< 100	< 100	105	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: South Bay Area Limiting Elements Upgrade. Continue to monitor	
	SAN JOSE A-SAN JOSE B 115KV [3510] & METCALF-EL PATIO #1 115KV [2500]	P6	N-1-1	< 100	< 100	105	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: South Bay Area Limiting Elements Upgrade. Continue to monitor	
Metcalf-Evergreen No. 1 115 kV Line	SAN JOSE B-STONE-EVERGREEN 115KV [1550] & EVRGRN 1-MTCALF E #2 115KV [0]	P6	N-1-1	< 100	< 100	117	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	SAN JOSE B-STONE-EVERGREEN 115KV [1550] & EVRGRN 1-MTCALF E #2 115KV [0]	P6	N-1-1	< 100	< 100	111	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Metcalf-Evergreen No. 2 115 kV Line	SAN JOSE B-STONE-EVERGREEN 115KV [1550] & METCALF-EVERGREEN #1 115KV [2520]	P6	N-1-1	< 100	< 100	116	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	SAN JOSE B-STONE-EVERGREEN 115KV [1550] & METCALF-EVERGREEN #1 115KV [2520]	P6	N-1-1	< 100	< 100	111	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Metcalf-Hicks 230 kV Line	P2-4:A18:1:_MTCALF 230KV - SECTION 1D & 1E	P2	Breaker	85	71	106	78	51	96	90	98	79	78	72	Continue to monitor	
Metcalf-Llagas 115 kV Line	LLAGAS-GILROY F-GILROYENG-GILROYPK 115KV [0] & METCALF-MORGAN HILL 115KV [2570]	P6	N-1-1	167	< 100	< 100	129	< 100	< 100	< 100	< 100	146	129	< 100	Project: Morgan Hill area reinforcement	
	MTCALF-MORGAN HILL 115KV [2570] & GILROYENG 115/13.8KV TB 1	P6	N-1-1	< 100	< 100	< 100	129	< 100	< 100	< 100	< 100	146	129	< 100	Project: Morgan Hill area reinforcement	
	MGRN HIL-AWSGILROYSS #1 115KV [0] & LLAGAS-GILROY F-GILROYENG-GILROYPK 115KV [0]	P6	N-1-1	< 100	< 100	117	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101	Project: Morgan Hill area reinforcement. Continue to monitor	
	SSS 230/230KV TB 1 & MRGN HIL-AWSGILROYSS #1 115KV [0]	P6	N-1-1	< 100	< 100	118	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: Morgan Hill area reinforcement. Continue to monitor	
Metcalf-Morgan Hill 115 kV Line	MTCALF D-LLAGAS 115KV [0] & LLAGAS-GILROY F-GILROYENG-GILROYPK 115KV [0]	P6	N-1-1	130	< 100	< 100	107	< 100	< 100	< 100	< 100	119	107	< 100	Project: Morgan Hill area reinforcement	
Millbrae 115/60kV Transformer #5	P2-3:A9:24:_MARTIN C 115KV - MIDDLE BREAKER BAY B	P2	Breaker	41	50	103	54	34	85	91	115	30	54	50	Continue to monitor	
Millbrae-San Mateo #1 115kV Line	EGBERTSWSTA-EMBRCDRD 230KV [0] & SAN MATEO-MARTIN 230KV [9980]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	114	< 100	< 100	Continue to monitor	
	POTRERO-TBC & SAN MATEO-MARTIN 230KV [9980] (2)	P6	N-1-1	< 100	< 100	102	< 100	< 100	< 100	< 100	101	< 100	< 100	< 100	Continue to monitor	
Millbrae-Sneath Lane 60kV Line	Base Case	P0	Normal	48	56	104	53	25	68	73	91	39	53	57	Continue to monitor	
	P2-3:A9:24:_MARTIN C 115KV - MIDDLE BREAKER BAY B	P2	Breaker	52	69	164	78	34	104	109	142	31	78	70	Mitigation under development	
Milpitas-Swift 115 kV Line	NEWARK F-RINGWOODSWST #1 115KV [0] & NEWARK-MILPITAS #1 115KV [3070] MOAS OPENED ON NEWARK F	P6	N-1-1	< 100	< 100	126	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	P2-2:A16:41:_NEWARK F 115KV SECTION 1F	P2	Bus	68	71	126	60	46	56	63	94	58	60	71	Continue to monitor	
	P2-3:A16:13:_NEWARK F - 1F 115KV & NEWARK F-ZANKER-KRS LINE	P2	Breaker	68	71	126	60	46	56	63	94	58	60	71	Continue to monitor	
	P2-3:A16:14:_NEWARK F - 1F 115KV & NEWARK-MILPITAS #1 LINE	P2	Breaker	68	71	126	60	46	56	63	94	58	60	71	Continue to monitor	
	P2-4:A16:22:_NEWARK F 115KV - SECTION 1F & 2F	P2	Breaker	69	71	128	61	46	56	63	94	59	61	72	Continue to monitor	
	P2-4:A16:27:_NEWARK E SECTION 1E & NEWARK F SECTION 1F 115KV	P2	Breaker	68	71	126	60	46	56	63	94	58	60	71	Continue to monitor	
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	69	71	128	61	46	56	63	94	58	61	72	Continue to monitor	
Monta Vista 230/115 kV Trans No. 2	MONTAVIS 230/115KV TB 4 & MONTAVIS 230/115KV TB 3	P6	N-1-1	107	< 100	122	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade. Continue to monitor	
	P2-2:A17:2:_MONTAVIS 230KV SECTION 2D	P2	Bus	102	NA	NA	79	NA	96	NA	NA	99	79	NA	Project: Monta Vista 230 kV Bus Upgrade	
	P2-3:A17:2:_MONTAVIS - 2D 230KV & MONTA VISTA-JEFFERSON #2 LINE	P2	Breaker	102	NA	NA	79	NA	96	NA	NA	99	79	NA	Project: Monta Vista 230 kV Bus Upgrade	
	P2-4:A17:21:_MONTAVIS 230KV - SECTION 2E & 2D	P2	Breaker	NA	87	119	NA	54	NA	86	89	NA	NA	89	Project: Monta Vista 230 kV Bus Upgrade. Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Monta Vista 230/115 kV Trans No. 3	MONTAVIS 230/115KV TB 4 & MONTAVIS 230/115KV TB 2	P6	N-1-1	103	< 100	116	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade. Continue to monitor
	P2-4:A17:2:_MONTAVIS 230KV - SECTION 1D & 2D	P2	Breaker	NA	81	108	NA	54	NA	84	88	NA	NA	82	Project: Monta Vista 230 kV Bus Upgrade. Continue to monitor	
Monta Vista 230/115 kV Trans No. 4	MONTAVIS 230/115KV TB 2 & MONTAVIS 230/115KV TB 3	P6	N-1-1	107	< 100	121	< 100	< 100	< 100	< 100	< 100	100	< 100	< 100	Project: Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade. Continue to monitor	
Monta Vista-Hicks 230 kV Line	P2-4:A18:1:_METCALF 230KV - SECTION 1D & 1E	P2	Breaker	88	70	104	83	62	106	95	103	90	83	71	Generation redispatch	
Monta Vista-Jefferson #1 230kV Line	POTRERO-TBC & MONTA VISTA-JEFFERSON #2 230KV [5230]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105	< 100	< 100	Continue to monitor	
Monta Vista-Jefferson #2 230kV Line	POTRERO-TBC & MONTAVIS-JEFFERSN 230KV [0]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105	< 100	< 100	Continue to monitor	
Moraga - San Leandro 115 kV Line	MORAGA-SAN LEANDRO #1 115KV [2770] & MORAGA-SAN LEANDRO #2 115KV [2780]	P6	N-1-1	< 100	< 100	118	< 100	< 100	< 100	< 100	< 100	102	< 100	< 100	Continue to monitor	
	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	35	34	Diverge	79	59	36	37	42	82	79	Diverge	Continue to monitor	
Moraga - Sobrante 115 kV Line	P2-2:A8:17:_SOBRANTE 230KV SECTION 1D	P2	Bus	91	< 100	< 100	98	< 100	93	< 100	< 100	104	98	< 100	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate	
	P2-3:A8:13:_SOBRANTE - 1D 230KV & IGNACIO-SOBRANTE LINE	P2	Breaker	92	< 100	< 100	98	< 100	93	< 100	< 100	104	98	< 100	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate	
	P2-4:A8:8:_SOBRANTE 230KV - SECTION 2D & 1D	P2	Breaker	94	< 100	< 100	100	< 100	93	< 100	< 100	112	100	< 100	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate	
	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2	Breaker	100	123	108	91	95	81	103	64	Diverge	91	123	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate	
	P2-2:A7:14:_CLARMNT 115KV SECTION 2D	P2	Bus	< 100	114	129	< 100	93	< 100	34	46	< 100	< 100	113	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate	
	P2-3:A7:19:_CLARMNT - 2D 115KV & SOBRANTE-GRIZZLY-CLAREMONT #2 LINE	P2	Breaker	< 100	114	129	< 100	93	< 100	34	46	< 100	< 100	113	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate	
	P2-3:A7:20:_CLARMNT - 2D 115KV & SOBRANTE-GRIZZLY-CLAREMONT #1 LINE	P2	Breaker	< 100	114	129	< 100	93	< 100	34	46	< 100	< 100	113	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate	
	P2-4:A7:8:_CLARMNT 115KV - SECTION 2D & 1D	P2	Breaker	< 100	112	124	< 100	92	< 100	30	40	< 100	< 100	111	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate	
	P2-4:A8:57:_PITTSBURG-F 230KV - SECTION 2F & 1F	P2	Breaker	< 100	22	27	< 100	25	< 100	87	101	< 100	< 100	14	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate	
	SOBRANTE-GRIZZLY-CLAREMONT #1 115KV [3740] & SOBRANTE-GRIZZLY-CLAREMONT #2 115KV [3750]	P6	N-1-1	< 100	< 100	107	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate	
	P5-5C:A7:7:_CLAREMONT (OAKLAND K) 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	< 100	112	124	< 100	92	< 100	30	40	< 100	< 100	111	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate	
P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	< 100	109	Diverge	< 100	83	< 100	35	43	< 100	< 100	Diverge	Project: Moraga-Sobrante 115 kV Line Reconductor. Reactivate		
Moraga 230/115kV Transformer #1	MORAGA 230/115KV TB 3 & MORAGA 230/115KV TB 2	P6	N-1-1	103	< 100	< 100	< 100	< 100	113	< 100	< 100	< 100	< 100	< 100	Operating solution	
	P2-4:A8:45:_MORAGA.D SECTION 2D & MORAGA.E SECTION 2E 115KV	P2	Breaker	112	60	82	114	31	118	85	92	122	114	65	Operating solution	
	MORAGA 230/115KV TB 2 & MORAGA 230/115KV TB 3	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	112	< 100	< 100	< 100	< 100	< 100	Operating solution	
	P2-4:A8:45:_MORAGA.D SECTION 2D & MORAGA.E SECTION 2E 115KV	P2	Breaker	107	63	57	111	34	121	95	58	118	111	67	Operating solution	
Moraga 230/115kV Transformer #2	MORAGA 230/115KV TB 1 & MORAGA 230/115KV TB 3	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	115	< 100	< 100	< 100	< 100	< 100	Operating solution	
Moraga-Castro Valley 230kV Line	P2-4:A16:25:_NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Breaker	65	95	105	48	44	23	48	69	49	49	96	Continue to monitor	
	TESLA-NEWARK #2 230KV [5354] & TESLA-NEWARK #1 230KV [5720]	P6	N-1-1	< 100	< 100	110	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	C-X #2 115KV [9962] & C-X #3 115KV [9925]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110	< 100	< 100	Sensitivity only	
	SOBRANTE 230/115KV TB 1 & SOBRANTE 230/115KV TB 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	113	< 100	< 100	Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Moraga-Claremont #1 115kV Line	P2-2:A7:14:_CLARMNT 115KV SECTION 2D	P2	Bus	99	96	143	96	76	109	114	140	94	96	107	Load forecast under review	
	P2-2:A7:19:_OAK C115 115KV SECTION ME	P2	Bus	93	43	62	91	25	103	80	84	102	91	47	Operating solution	
	P2-3:A7:19:_CLARMNT - 2D 115KV & SOBRANTE-GRIZZLY-CLAREMONT #2 LINE	P2	Breaker	99	96	143	96	76	109	114	140	94	96	107	Load forecast under review	
	P2-3:A7:20:_CLARMNT - 2D 115KV & SOBRANTE-GRIZZLY-CLAREMONT #1 LINE	P2	Breaker	99	96	143	96	76	109	114	140	94	96	107	Load forecast under review	
	P2-3:A7:21:_OAK C115 - ME 115KV & OAKLAND C-MARITIME LINE	P2	Breaker	93	43	62	91	25	103	80	84	102	91	47	Load forecast under review	
	P2-3:A8:13:_SOBRANTE - 1D 230KV & IGNACIO-SOBRANTE LINE	P2	Breaker	93	74	98	95	48	102	96	116	97	95	80	Load forecast under review	
	P2-4:A8:57:_PITTSBURG-F 230KV - SECTION 2F & 1F	P2	Breaker	62	39	76	70	26	72	98	116	72	70	47	Continue to monitor	
	P2-4:A8:8:_SOBRANTE 230KV - SECTION 2D & 1D	P2	Breaker	94	74	98	95	48	102	95	116	102	95	80	Load forecast under review	
P5-5C:A7:11:_OAKLAND X 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	94	44	67	103	35	106	85	90	112	103	59	Install redundant battery supply		
Moraga-Claremont #2 115kV Line	C-X #2 115KV [9962] & C-X #3 115KV [9925]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110	< 100	< 100	Sensitivity only	
	SOBRANTE 230/115KV TB 1 & SOBRANTE 230/115KV TB 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	113	< 100	< 100	Continue to monitor	
	P2-2:A7:19:_OAK C115 115KV SECTION ME	P2	Bus	93	43	62	91	25	103	80	84	102	91	47	Load forecast under review	
	P2-2:A8:17:_SOBRANTE 230KV SECTION 1D	P2	Bus	92	74	98	94	48	102	96	116	97	94	80	Load forecast under review	
	P2-3:A7:21:_OAK C115 - ME 115KV & OAKLAND C-MARITIME LINE	P2	Breaker	93	43	62	91	25	103	80	84	102	91	47	Load forecast under review	
	P2-3:A8:13:_SOBRANTE - 1D 230KV & IGNACIO-SOBRANTE LINE	P2	Breaker	93	74	98	95	48	102	96	116	97	95	80	Load forecast under review	
	P2-4:A8:57:_PITTSBURG-F 230KV - SECTION 2F & 1F	P2	Breaker	62	39	76	70	26	72	98	116	72	70	47	Continue to monitor	
	P2-4:A8:8:_SOBRANTE 230KV - SECTION 2D & 1D	P2	Breaker	94	74	98	95	48	102	95	116	102	95	80	Load forecast under review	
P5-5C:A7:11:_OAKLAND X 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	94	44	67	103	35	106	85	90	112	103	59	Operating solution		
Moraga-Lakewood 115kV Line (Lakewood Reactors)	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	62	10	Diverge	84	1	104	37	43	58	84	Diverge	Install redundant battery supply	
	P2-4:A8:32:_PITTSBURG-D 115KV - SECTION 1D & 2D	P2	Breaker	70	29	159	55	13	27	2	13	71	55	31	Continue to monitor	
Moraga-Oakland J 115kV Line	P2-4:A8:6:_PITTSBURG-E 230KV - SECTION 1E & 2E	P2	Breaker	40	13	17	23	47	8	24	33	131	23	12	Sensitivity only	
	P1-2:A16:30:_SAN LEANDRO-OAKLND J #1 115KV [3520]	P1	N-1	84	92	115	62	79	61	77	101	96	62	94	Continue to monitor	
	P2-2:A16:21:_SN LNDRO 115KV SECTION MD	P2	Bus	84	92	115	62	79	61	77	101	96	62	94	Continue to monitor	
	P2-4:A16:11:_SN LNDRO 115KV - SECTION MD & 1D	P2	Breaker	90	97	121	66	82	66	83	107	100	66	99	Continue to monitor	
Moraga-San Leandro #1 115kV Line	P2-4:A16:12:_EASTSHRE 115KV - SECTION ME & MD	P2	Breaker	92	88	119	80	59	97	100	111	81	80	89	Operating solution	
	P1-2:A16:27:_MORAGA-SAN LEANDRO #3 115KV [2790]	P1	N-1	83	86	113	63	63	72	83	101	83	63	88	Continue to monitor	
	P1-2:A16:28:_MORAGA-SAN LEANDRO #2 115KV [2780]	P1	N-1	80	84	110	61	61	70	80	98	81	61	85	Continue to monitor	
	P2-2:A16:20:_SN LNDRO 115KV SECTION 2E	P2	Bus	80	84	110	61	61	70	80	98	81	61	85	Continue to monitor	
	P2-2:A8:64:_MORAGA.E 115KV SECTION 2E	P2	Bus	95	102	125	70	76	80	95	114	96	70	103	Operating solution	
	P2-4:A16:12:_EASTSHRE 115KV - SECTION ME & MD	P2	Breaker	86	83	114	74	51	90	93	103	75	74	83	Continue to monitor	
	P2-4:A16:15:_EASTSHRE 115KV - SECTION 1D & 1E	P2	Breaker	98	99	128	76	57	84	94	109	81	76	100	Continue to monitor	
	P2-4:A8:45:_MORAGA.D SECTION 2D & MORAGA.E SECTION 2E 115KV	P2	Breaker	84	97	136	59	73	69	86	121	83	59	98	Continue to monitor	
	P5-5C:A16:11:_EASTSHORE 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	86	83	114	74	51	90	93	103	75	74	83	Continue to monitor	
	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	99	102	132	77	58	85	96	112	81	77	103	Install redundant battery supply	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	85	84	Diverge	64	57	66	74	99	Diverge	64	86	Install redundant battery supply	
	P7-1:A16:2:_GRANT-EASTSHORE #1 & GRANT-EASTSHORE #2 LINES	P7	DCTL	86	83	114	74	51	90	93	103	75	74	84	Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Moraga-San Leandro #2 115KV Line	P1-2:A16:27:_MORAGA-SAN LEANDRO #3 115KV [2790]	P1	N-1	84	87	114	64	64	73	84	102	84	64	89	Continue to monitor	
	P1-2:A16:29:_MORAGA-SAN LEANDRO #1 115KV [2770]	P1	N-1	81	84	111	62	62	70	81	99	81	62	86	Continue to monitor	
	P1-2:A8:45:_MORAGA-OAKLAND J 115KV [2760]	P1	N-1	74	77	100	56	57	63	73	89	75	56	78	Continue to monitor	
	P2-4:A16:10:_SN LNDRO 115KV - SECTION 1E & 1D	P2	Breaker	79	87	116	58	73	59	73	98	88	59	89	Continue to monitor	
	P2-4:A16:12:_EASTSHRE 115KV - SECTION ME & MD	P2	Breaker	87	83	115	74	52	91	94	104	76	74	84	Continue to monitor	
	P5-5C:A16:11:_EASTSHORE 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	87	83	115	74	52	91	94	104	76	74	84	Continue to monitor	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	86	85	Diverge	64	58	67	75	100	Diverge	65	87	Continue to monitor	
P7-1:A16:2:_GRANT-EASTSHORE #1 & GRANT-EASTSHORE #2 LINES	P7	DCTL	87	83	115	74	52	91	94	104	76	74	84	Continue to monitor		
Moraga - Station X 115 kV Line	K-D #1 115KV [9966] & K-D #2 115KV [9967]	P6	N-1-1	103	< 100	< 100	109	< 100	< 100	< 100	< 100	111	109	122	Project: Moraga - Oakland X Rebuild. Load forecast under review	
	P2-4:A7:8:_CLARMNT 115KV - SECTION 2D & 1D	P2	Breaker	110	105	66	109	87	101	104	64	111	109	121	Project: Moraga - Oakland X Rebuild. Load forecast under review	
	P2-4:A8:29:_MORAGA.C 115KV - SECTION 1C & 2C	P2	Breaker	89	31	23	101	21	92	68	38	105	101	44	Project: Moraga - Oakland X Rebuild. Load forecast under review	
	P5-5C:A7:7:_CLAREMONT (OAKLAND K) 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	110	105	66	109	87	101	104	64	111	109	121	Project: Moraga - Oakland X Rebuild. Load forecast under review	
Morgan Hill - AWS Gilroy 115 kV Line	SSS 230/230KV TB 1 & MTCALF D-LLAGAS 115KV [0]	P6	N-1-1	< 100	< 100	119	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: Morgan Hill area reinforcement. Continue to monitor	
Mountain View-Monta Vista 115 kV Line	MORAGA 230/115KV TB 3 & WHISMAN-MONTA VISTA 115KV [1010]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	107	< 100	< 100	< 100	< 100	< 100	Operating solution	
	NEWARK-RAVENSWOOD 230KV [5936] & WHISMAN-MONTA VISTA 115KV [1010]	P6	N-1-1	101	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Operating solution	
	P1-2:A17:23:_WHISMAN-MONTA VISTA 115KV [1010]	P1	N-1	90	68	89	72	61	99	81	77	103	72	70	Sensitivity only	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	103	83	Diverge	82	59	99	79	92	Diverge	82	85	Install redundant battery supply	
	P7-1:A10:2_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	P7	DCTL	90	67	89	78	60	101	80	77	Diverge	78	68	Operating solution	
	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	86	67	95	77	62	104	88	88	96	77	68	Operating solution	
	P7-1:A17:10_Britton-Monta Vista & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	89	69	91	71	58	94	77	75	101	71	70	Sensitivity only	
PITTSBURG.E-SAN MATEO 230KV [5463] & WHISMAN-MONTA VISTA 115KV [1010]	P6	N-1-1	< 100	< 100	106	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor		
RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & WHISMAN-MONTA VISTA 115KV [1010]	P3	N-1-1	106	< 100	101	< 100	< 100	103	< 100	< 100	< 100	< 100	< 100	Operating solution		
Newark 115/60kV Transformer #1	LS PSTAS 230/60KV TB 4 & SANRAMON 230/60KV TB 1	P6	N-1-1	< 100	< 100	126	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Newark 230/115kV Transformer #11	SSS 230/230KV TB 1 & NEWARK D 230/115KV TB 7	P6	N-1-1	< 100	< 100	108	< 100	< 100	< 100	< 100	101	< 100	< 100	< 100	Continue to monitor	
Newark F - Ringwood 115 kV Line	NEWARK-MILPITAS #1 115KV [3070] MOAS OPENED ON NEWARK F & SWIFT-METCALF 115KV [3900]	P6	N-1-1	108	109	179	< 100	< 100	< 100	< 100	135	< 100	< 100	110	Mitigation under development	
Newark-Milpitas #1 115kV Line	NEWARK F-RINGWOODSWST #1 115KV [0] & SWIFT-METCALF 115KV [3900]	P6	N-1-1	< 100	100	167	< 100	< 100	< 100	< 100	135	< 100	< 100	102	Mitigation under development	
	P1-2:A18:44:_MCKEE-PIERCY 115KV [2379]	P1	N-1	110	73	97	86	35	78	59	69	92	86	74	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade	
	P1-2:A18:52:_PIERCY-METCALF 115KV [4318]	P1	N-1	130	86	119	101	38	90	69	82	105	101	87	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
	P2-2:A18:43:_MTCALF E 115KV SECTION 2E	P2	Bus	130	86	119	102	38	90	69	82	104	102	87	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Newark-Dixon Landing 115kV Line	P2-2:A18:54:_PIERCY 115KV SECTION 1D	P2	Bus	110	73	97	87	35	78	59	69	92	87	74	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade	
	P2-4:A18:31:_MTCALF D SECTION 2D & MTCALF E SECTION 2E 115KV	P2	Breaker	130	86	119	102	38	90	69	82	105	102	87	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
	P7-1:A18:5_McKee - Piercy & Milpitas - Swift 115 kV Lines	P7	DCTL	111	73	97	87	35	78	59	69	93	87	74	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade	
	P7-1:A18:6_Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	131	87	120	102	38	91	69	82	105	102	88	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
Newark-Jarvis #1 115kV Line	P1-2:A16:42:_NEWARK-JARVIS #2 115KV [3030]	P1	N-1	127	92	101	83	37	106	63	71	113	83	92	Project: South Bay Area Limiting Elements Upgrade. Continue to monitor	
	P2-1:A16:14:_NEWARK-JARVIS #2 115KV [3030] (NUMI JCT-JARVIS)	P2	Line Section w/o Fault	127	92	101	83	37	106	63	71	113	83	92	Project: South Bay Area Limiting Elements Upgrade. Continue to monitor	
	P2-1:A16:7:_NEWARK-JARVIS #2 115KV [3030] (NEWARK D-NUMI JCT)	P2	Line Section w/o Fault	127	91	101	83	37	106	63	71	112	83	92	Project: South Bay Area Limiting Elements Upgrade. Continue to monitor	
Newark-Jarvis #2 115kV Line	P1-2:A16:41:_NEWARK-JARVIS #1 115KV [3020]	P1	N-1	95	91	101	62	37	61	64	71	84	62	92	Continue to monitor	
Newark-Kifer 115kV Line	FMC-SAN JOSE B 115KV [2021] & KRS-Duane 115 kV	P6	N-1-1	106	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110	< 100	< 100	Project: San Jose area HVDC Lines	
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	77	37	55	58	27	40	11	40	105	58	38	Sensitivity only	
	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	228	NA	NA	156	NA	118	NA	NA	251	156	NA	Project: NRS rebuild project	
Newark-Livermore 60kV Line	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	82	76	Diverge	64	43	31	40	70	Diverge	64	79	Install redundant battery supply	
Newark-Northern Receiving Station #1 115kV Line	LOS ESTEROS-METCALF 230KV [5353] & NEWARK E-F BUS TIE 230KV [4640]	P6	N-1-1	113	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106	< 100	< 100	Project: San Jose area HVDC Lines	
	LOS ESTEROS-NORTECH 115KV [4032] & SSS 230/230KV TB 1	P6	N-1-1	106	< 100	104	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: San Jose area HVDC Lines. Continue to monitor	
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	96	51	65	71	18	37	11	46	125	70	53	Sensitivity only	
	SSS 230/230KV TB 1 & NRS-NEWARK HVDC VSC	P6	N-1-1	< 100	< 100	104	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Newark-Northern Receiving Station #2 115kV Line	LOS ESTEROS-NORTECH 115KV [4032] & NRS T2	P6	N-1-1	108	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108	< 100	< 100	Project: San Jose area HVDC Lines	
Newark-Northern Receiving Station #2 115kV Line	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	81	33	52	60	22	40	9	37	119	60	35	Sensitivity only	
Newark-Trimble 115kV Line	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	73	39	40	49	15	31	12	33	106	49	40	Sensitivity only	
Newark-Vallecitos 60kV Line	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	68	70	Diverge	53	44	25	37	70	Diverge	53	72	Install redundant battery supply	
Nortech-NRS 115 kV Line	DVRaGT1 13.80kV & DVRbGt2 13.80kV & DVRaST3 13.80kV Gen Units & SSS 230/230KV TB 1	P3	N-1-1	105	< 100	134	< 100	< 100	< 100	< 100	< 100	102	< 100	< 100	Project: San Jose area HVDC Lines. Continue to monitor	
	NEWARK-NORTHERN RECEIVING STATION #1 115KV [3100] & NRS T2	P6	N-1-1	126	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: San Jose area HVDC Lines	
	NRS-NEWARK HVDC VSC & SSS 230/230KV TB 1	P6	N-1-1	< 100	124	160	< 100	110	< 100	101	136	< 100	< 100	124	Mitigation under development	
	SSS-NRSriser SVP 230 kV path & FMC-SAN JOSE B 115KV [2021]	P6	N-1-1	112	< 100	< 100	106	< 100	< 100	< 100	< 100	109	106	< 100	Project: San Jose area HVDC Lines	
North Dublin-Cayetano 230kV Cable	P2-4:A16:24:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Breaker	69	83	103	56	54	45	77	89	Diverge	57	87	Continue to monitor	
North Dublin-Vineyard 230 kV Line	P2-4:A16:24:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Breaker	74	90	109	59	61	46	83	95	Diverge	61	94	Continue to monitor	
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	92	79	104	76	36	66	76	79	Diverge	78	84	Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
	TESLA-NEWARK #1 230KV [5720] & TESLA-NEWARK #2 230KV [5354]	P6	N-1-1	< 100	< 100	104	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor
Northern Receiving Station 230/115 kV Transformer #3	NRS T2 & NRS T2 Spare	P6	N-1-1	< 100	< 100	< 100	< 100	102	< 100	112	< 100	< 100	< 100	< 100	< 100	Continue to monitor
	SVP5-5:1_Single DC Supply Failure at NRS400 115kV bus	P5	Non-redundant battery supply/Relay	NA	114	114	30	59	29	64	66	NA	30	114	114	Install redundant battery supply
NRS 230 kV Bus-Tie	LOS ESTEROS-NORTECH 115KV [4032] & NRS-NRSriser SVP 230 kV UG cable	P6	N-1-1	102	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102	< 100	< 100	Project: San Jose area HVDC Lines	
	NRS-NRSriser SVP 230 kV UG cable & NRS-NEWARK HVDC VSC	P6	N-1-1	< 100	103	103	< 100	< 100	< 100	102	104	< 100	< 100	103	Continue to monitor	
NRS 230/115KV TB 1	P1-2:A18:20:_LOS ESTEROS-NORTECH 115KV [4032]	P1	N-1	106	57	61	28	52	28	55	58	102	28	58	Project: NRS 230/115 kV bank addition	
	P1-2:A18:58:_NORTECH-NORTHERN RECEIVING STATION 115KV [1551]	P1	N-1	103	56	60	27	51	27	54	57	99	27	56	Project: NRS 230/115 kV bank addition	
	P1-3:A18:10:_LS ESTRS 230/115KV TB 4	P1	N-1	99	55	55	25	50	25	54	54	101	25	55	Sensitivity only	
	P1-3:A18:9:_LS ESTRS 230/115KV TB 3	P1	N-1	99	55	55	25	50	25	54	54	101	25	55	Sensitivity only	
	P2-2:A18:56:_NORTECH 115KV SECTION 1F	P2	Bus	105	57	60	28	51	28	54	58	101	28	57	Project: NRS 230/115 kV bank addition	
	P2-2:A18:57:_NORTECH 115KV SECTION 1E	P2	Bus	103	56	60	27	51	27	54	57	99	27	56	Project: NRS 230/115 kV bank addition	
	P2-3:A18:3:_LS ESTRS 230KV - MIDDLE BREAKER BAY 5	P2	Breaker	99	55	55	25	50	25	54	54	101	25	55	Sensitivity only	
	P2-3:A18:4:_LS ESTRS 230KV - MIDDLE BREAKER BAY 6	P2	Breaker	99	55	55	25	50	25	54	54	101	25	55	Sensitivity only	
	P2-3:A18:41:_LS ESTRS 115KV - MIDDLE BREAKER BAY 1	P2	Breaker	106	57	61	28	52	28	55	58	102	28	58	Project: NRS 230/115 kV bank addition	
	P2-4:A16:22:_NEWARK F 115KV - SECTION 1F & 2F	P2	Breaker	100	55	55	25	50	25	52	54	102	25	55	Project: NRS 230/115 kV bank addition	
	P2-4:A18:26:_NORTECH 115KV - SECTION 1F & 1E	P2	Breaker	103	56	60	27	51	27	54	57	100	27	56	Project: NRS 230/115 kV bank addition	
	P5-5C:A16:16:_NEWARK D 115 & 60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	99	55	55	25	50	25	54	54	100	25	55	Sensitivity only	
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	101	55	55	25	50	25	52	54	103	25	55	Project: NRS 230/115 kV bank addition	
	P7-1:A10:2:_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	P7	DCTL	99	56	57	26	50	26	55	55	Diverge	26	56	Sensitivity only	
	P7-1:A18:1:_Newark - Northern #1 & #2 115 kV Lines	P7	DCTL	98	55	55	25	50	25	52	54	100	25	55	Sensitivity only	
SVP5-5:2_Single DC Supply Failure at NRS300 115kV bus	P5	Non-Redundant battery supply/Relay	102	50	53	47	59	47	64	66	98	47	50	Project: NRS 230/115 kV bank addition		
NRS-Scott No. 1 115 kV Line	DVRaGT1 13.80kV & DVRbGt2 13.80kV & DVRaST3 13.80kV Gen Units & NRS-SRS#2 115 kV	P3	N-1-1	121	< 100	< 100	< 100	< 100	< 100	< 100	< 100	114	< 100	< 100	Project: San Jose area HVDC Lines	
	FMC-SAN JOSE B 115KV [2021] & NRS-SRS#2 115 kV	P6	N-1-1	114	< 100	< 100	< 100	< 100	< 100	< 100	< 100	114	< 100	< 100	Project: San Jose area HVDC Lines	
	NRS-SRS#2 115 kV & new SVP 115kV line - NRS-KRS 115 kV	P6	N-1-1	< 100	106	141	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109	Mitigation under development	
	SVP2-2:2:_NRS 300 115 kV bus	P2	Bus/Breaker	102	NA	NA	63	NA	50	NA	NA	99	63	NA	Project: NRS rebuild project	
SVP5-5:2_Single DC Supply Failure at NRS300 115kV bus	P5	Non-Redundant battery supply/Relay	102	85	101	63	35	50	30	47	99	63	85	Project: NRS rebuild project		
NRS-Scott No. 2 115 kV Line	DVRaGT1 13.80kV & DVRbGt2 13.80kV & DVRaST3 13.80kV Gen Units & NRS-SRS#1 115 kV	P3	N-1-1	121	< 100	< 100	< 100	< 100	< 100	< 100	< 100	114	< 100	< 100	Project: San Jose area HVDC Lines	
	FMC-SAN JOSE B 115KV [2021] & NRS-SRS#1 115 kV	P6	N-1-1	114	< 100	< 100	< 100	< 100	< 100	< 100	< 100	114	< 100	< 100	Project: San Jose area HVDC Lines	
	NRS-SRS#1 115 kV & new SVP 115kV line - NRS-KRS 115 kV	P6	N-1-1	< 100	106	141	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108	Mitigation under development	
Oakland C - Oakland L #1 115kV Cable	K-D #1 115KV [9966] & K-D #2 115KV [9967]	P6	N-1-1	129	119	147	102	< 100	128	131	142	121	102	123	Load forecast under review	
	P2-2:A8:75:_MORAGA.D 115KV SECTION 1E	P2	Bus	41	101	123	45	97	43	78	107	34	45	109	Load forecast under review	
	P2-4:A7:8:_CLARMNT 115KV - SECTION 2D & 1D	P2	Breaker	129	119	146	101	79	128	131	142	120	101	122	Load forecast under review	
	P2-4:A8:29:_MORAGA.C 115KV - SECTION 1C & 2C	P2	Breaker	85	53	65	87	60	106	36	25	108	87	51	Load forecast under review	
	P2-4:A8:30:_MORAGA.D 115KV - SECTION 2D & 1D	P2	Breaker	41	101	122	45	97	43	77	107	34	45	109	Load forecast under review	
P5-5C:A7:7:_CLAREMONT (OAKLAND K) 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	129	119	146	101	79	128	131	142	120	101	122	Install redundant battery supply		



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	134	196	246	126	164	139	189	228	NConv	126	206	Install redundant battery supply	
Oakland C - Oakland X #2 115kV Cable	C-X #3 115KV [9925] & D-L #1 115KV [9963]	P6	N-1-1	< 100	< 100	105	< 100	< 100	< 100	< 100	103	< 100	< 100	122	Continue to monitor	
	K-D #1 115KV [9966] & K-D #2 115KV [9967]	P6	N-1-1	106	< 100	120	< 100	< 100	107	110	119	< 100	< 100	117	Load forecast under review	
	P2-4:A7:8:_CLARMNT 115KV - SECTION 2D & 1D	P2	Breaker	106	99	119	97	84	107	110	119	114	97	117	Load forecast under review	
	P2-4:A8:29:_MORAGA.C 115KV - SECTION 1C & 2C	P2	Breaker	89	17	24	91	14	97	64	60	111	91	32	Sensitivity only	
	P5-5C:A7:7:_CLAREMONT (OAKLAND K) 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	106	99	119	97	84	107	110	119	114	97	117	Install redundant battery supply	
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	46	83	107	34	60	50	78	97	Diverge	34	74	Continue to monitor	
Oakland D - Oakland L 115kV Cable	C-X #3 115KV [9925] & C-X #2 115KV [9962]	P6	N-1-1	< 100	< 100	105	< 100	< 100	< 100	< 100	102	121	< 100	122	Continue to monitor	
	P2-2:A7:19:_OAK C115 115KV SECTION ME	P2	Bus	104	97	104	77	73	98	99	102	99	77	98	Load forecast under review	
	P2-2:A8:75:_MORAGA.D 115KV SECTION 1E	P2	Bus	86	141	165	74	126	84	119	148	83	74	152	Load forecast under review	
	P2-3:A7:21:_OAK C115 - ME 115KV & OAKLAND C-MARITIME LINE	P2	Breaker	104	97	104	77	73	98	99	102	99	77	98	Load forecast under review	
	P2-4:A7:11:_OAK C115 115KV - SECTION ME & 1E	P2	Breaker	101	94	101	75	71	96	97	99	97	75	96	Load forecast under review	
	P5-5C:A7:11:_OAKLAND X 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	99	94	104	98	91	95	98	102	121	98	122	Install redundant battery supply	
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	182	240	292	159	193	181	232	270	Diverge	159	252	Install redundant battery supply	
Oleum-El Cerrito STA G #1 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	90	37	50	114	19	92	35	42	72	114	37	Project: Christie-Sobrante 115 kV Line Reconnector	
Oleum-El Cerrito STA G #2 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	87	43	64	117	21	110	46	55	66	117	43	Project: Christie-Sobrante 115 kV Line Reconnector	
Oleum-Martinez 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	274	218	108	414	102	359	281	137	180	414	221	Install redundant battery supply	
Parkway - Moraga 230 kV	P2-4:A8:12:_C.COSTAPPE 230KV - SECTION 2E & 1E	P2	Breaker	76	56	53	59	29	59	35	48	101	59	54	Sensitivity only	
	P5-5C:A8:2:_CONTRA COSTA PP 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	87	57	58	71	31	71	42	56	110	71	56	Sensitivity only	
Piercy-Metcalf 115 kV Line	NEWARK-DIXON LANDING 115KV [2990] & METCALF SVD=V	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102	< 100	< 100	Sensitivity only	
	P1-2:A16:52:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	122	88	118	94	37	86	67	80	98	94	89	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
	P2-2:A16:42:_NEWARK F 115KV SECTION 2F	P2	Bus	122	88	118	94	37	86	67	80	98	94	89	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
	P2-3:A16:15:_NEWARK F - 2F 115KV & NEWARK-NUMMI LINE	P2	Breaker	122	88	118	94	37	86	67	80	98	94	89	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
	P2-3:A16:16:_NEWARK F - 2F 115KV & NEWARK F-LOCKHD 2-APP MAT LINE	P2	Breaker	122	87	118	94	37	86	67	80	97	94	89	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
	P2-4:A16:22:_NEWARK F 115KV - SECTION 1F & 2F	P2	Breaker	124	88	120	94	37	86	67	80	99	94	90	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	124	88	121	94	37	86	67	80	98	94	90	Install redundant battery supply	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	100	68	Diverge	83	40	93	66	83	Diverge	83	69	Install redundant battery supply	
	P7-1:A16:1:_NEWARK-DIXON LANDING & NEWARK-MILPITAS #1 LINES	P7	DCTL	123	88	119	94	37	86	67	80	98	94	89	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
	P7-1:A18:2_Newark - Dixon Landing & Newark - Milpitas #1 115 kV Lines	P7	DCTL	123	88	119	94	37	86	67	80	98	94	89	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
Pittsburg - Clayton 115 kV Line	P1-2:A8:43:_PITTSBURG.D-CLAYTON #3 115KV [3290]	P1	N-1	48	55	104	39	22	38	45	81	32	39	55	Continue to monitor	
	P2-1:A8:38:_PITTSBURG.D-CLAYTON #3 115KV [3290] (CLAYTN-KIRKTA#1)	P2	Line Section w/o Fault	48	55	104	39	22	38	45	81	32	39	55	Continue to monitor	
	P2-2:A8:66:_PITTSBURG-D 115KV SECTION 1D	P2	Bus	48	55	Diverge	39	22	38	46	68	33	39	55	Continue to monitor	
	P2-3:A8:53:_PITTSBURG-D - 1D 115KV & PITTSBURG-D-CLMBIAHS LINE	P2	Breaker	48	55	Diverge	39	23	38	46	65	33	39	55	Continue to monitor	
	P2-3:A8:54:_PITTSBURG-D - 1D 115KV & PITTSBURG.D-CLAYTON #3 LINE	P2	Breaker	48	55	Diverge	39	23	38	46	68	33	39	55	Continue to monitor	
	P2-4:A8:33:_PITTSBURG-D 115KV - SECTION 1D & 1E	P2	Breaker	48	54	Diverge	39	23	38	45	55	32	39	54	Continue to monitor	
Pittsburg - Kirker 115 kV Line	P2-3:A8:55:_PITTSBURG-D - 2D 115KV & PITTSBURG.D-KIRKER-COLUMBIA STEEL LINE	P2	Breaker	61	64	Diverge	49	24	46	52	60	43	49	65	Continue to monitor	
Pittsburg 230/115 kV Transformer #13	LMECC2 18.00KV & LMECC1 18.00KV & LMECS1 18.00KV GEN UNITS & PITTSBURG-D 230/115KV TB 12	P3	N-1-1	< 100	< 100	115	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Pittsburg E - Pittsburg F 115 kV Bus Tie	P2-4:A8:32:_PITTSBURG-D 115KV - SECTION 1D & 2D	P2	Breaker	40	51	88	34	22	41	53	101	32	34	51	Continue to monitor	
Pittsburg-Clayton #3 115 kV Line	P1-2:A8:44:_PITTSBURG.D-CLAYTON #4 115KV [3291]	P1	N-1	48	54	101	39	22	41	49	85	32	39	55	Continue to monitor	
	P2-2:A8:67:_PITTSBURG-D 115KV SECTION 2D	P2	Bus	48	54	Diverge	39	23	41	48	63	32	39	55	Continue to monitor	
	P2-3:A8:55:_PITTSBURG-D - 2D 115KV & PITTSBURG.D-KIRKER-COLUMBIA STEEL LINE	P2	Breaker	46	52	Diverge	38	22	40	47	94	31	38	53	Continue to monitor	
Pittsburg-Eastshore 230kV Line	P1-1:A16:4:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS	P1	N-1	57	97	115	41	65	41	78	97	41	41	97	Continue to monitor	
	P2-3:A16:1:_RUSCTYEC 230KV - MIDDLE BREAKER BAY 3	P2	Breaker	44	82	101	31	65	30	65	85	41	31	82	Continue to monitor	
	P2-4:A16:24:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Breaker	39	81	105	26	68	25	64	89	Diverge	26	81	Continue to monitor	
	P2-4:A8:31:_MORAGA.E 115KV - SECTION 2E & 1E	P2	Breaker	43	80	102	27	69	28	63	86	54	27	81	Continue to monitor	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	61	92	Diverge	40	72	36	69	103	Diverge	40	93	Install redundant battery supply	
Pittsburg-Kirker-Columbia Steel #1 115 kV Line	Base Case	P0	Normal	94	87	118	73	24	39	39	43	75	73	88	Continue to monitor	
Pittsburg-Martinez #1 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	86	72	84	111	33	106	89	107	79	111	73	Install redundant battery supply	
Pittsburg-Martinez #2 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	81	67	76	110	31	105	86	104	76	110	68	Install redundant battery supply	
Pittsburg-San Mateo 230kV Line	Base Case	P0	Normal	43	86	101	32	56	24	55	73	23	32	86	Continue to monitor	
	P1-2:A10:1:_EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	52	92	105	39	52	32	64	82	17	39	92	Continue to monitor	
	P1-2:A10:3:_NEWARK-RAVENSWOOD 230KV [5936]	P1	N-1	49	83	102	38	55	33	62	81	33	38	84	Continue to monitor	
	P2-3:A16:3:_E. SHORE 230KV - MIDDLE BREAKER BAY 4	P2	Breaker	43	92	105	32	52	24	64	82	23	32	92	Continue to monitor	
	P2-4:A10:2:_SANMATEO 230KV - SECTION 2D & 2E	P2	Breaker	57	96	110	43	55	36	68	78	24	43	96	Continue to monitor	
	P2-4:A16:24:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Breaker	53	92	112	41	60	34	67	89	Diverge	41	92	Continue to monitor	
	P2-4:A16:7:_NEWARK E 230KV - SECTION 1E & 2E	P2	Breaker	49	89	107	34	57	28	61	81	31	35	88	Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Pittsburg-San Mateo 230KV Line	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	49	95	109	36	54	30	67	85	21	36	95	Install redundant battery supply	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	70	102	Diverge	52	64	42	72	101	Diverge	52	103	Install redundant battery supply	
	P7-1:A10:2_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	P7	DCTL	69	101	112	56	70	52	80	90	Diverge	56	102	Generation redispatch	
Pittsburg-TBC 230KV section	LAS POSITAS-NEWARK 230KV [4980] & OLEUM-CHRISTIE-NRTH TWR-MARTNZ D 115KV [0]	P6	N-1-1	Diverge	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: North Tower 115 kV Looping project	
	P1-1:A8:12:_LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS	P1	N-1	95	95	95	94	92	93	92	93	101	94	95	Sensitivity only	
	P2-4:A16:25:_NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Breaker	95	95	95	94	92	93	92	93	101	94	95	Sensitivity only	
	P2-4:A8:6:_PITTSBURG-E 230KV - SECTION 1E & 2E	P2	Breaker	95	95	95	95	92	93	92	93	101	95	95	Sensitivity only	
Potrero-Larkin #2 (AY-2) 115KV Cable	P1-2:A9:11:_A-X #1 115KV [9951]	P1	N-1	88	83	101	79	64	68	71	77	84	79	83	Continue to monitor	
	P2-2:A9:6:_POTRERO 115KV SECTION 2D	P2	Bus	94	84	110	90	76	74	76	79	93	90	84	Continue to monitor	
Potrero-Mission (AX) 115KV Cable	Base Case	P0	Normal	92	86	105	82	66	82	85	92	86	82	87	Continue to monitor	
	P1-2:A9:9:_A-Y #1 115KV [9952]	P1	N-1	99	92	113	87	70	87	90	98	93	87	93	Continue to monitor	
	P2-1:A9:4:_A-Y #1 115KV [9952] (LARKIN D-POTRERO)	P2	Line Section w/o Fault	99	92	113	87	70	87	90	98	93	87	93	Continue to monitor	
	P2-2:A9:1:_LARKIN D 115KV SECTION 1D	P2	Bus	99	92	113	87	70	87	90	98	93	87	93	Continue to monitor	
	P2-2:A9:4:_POTRERO 115KV SECTION 1D	P2	Bus	101	96	115	89	73	91	94	102	95	89	97	Continue to monitor	
	P2-2:A9:5:_POTRERO 115KV SECTION 2E	P2	Bus	105	83	126	88	42	62	71	76	98	88	83	Continue to monitor	
	P2-3:A9:16:_POTRERO - 1D 115KV & A-Y #1 LINE	P2	Breaker	101	96	115	89	73	91	94	102	95	89	97	Continue to monitor	
	P2-3:A9:17:_POTRERO - 2E 115KV & POTRERO-TBC_POT #1 LINE	P2	Breaker	105	83	126	88	42	62	71	76	98	88	83	Continue to monitor	
Radum-Vallecitos 60KV Line	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	72	75	Diverge	56	48	27	40	73	Diverge	57	77	Install redundant battery supply	
Ravenswood 230/115 kV Transformer #3	RAVENSWD 230/115KV TB 2 & RAVENSWD 230/115KV TB 1	P6	N-1-1	< 100	< 100	103	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Ravenswood 230/115kV Transformer #1	P1-3:A10:5:_RAVENSWD 230/115KV TB 2	P1	N-1	103	86	67	92	56	92	79	64	95	92	87	Project: Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade	
	P2-3:A10:3:_RAVENSWD 230KV - MIDDLE BREAKER BAY 2	P2	Breaker	109	89	70	99	59	100	84	67	103	98	90	Project: Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade	
	WHISMAN-MONTA VISTA 115KV [1010] & RAVENSWD 230/115KV TB 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	101	< 100	< 100	< 100	< 100	< 100	Project: Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade	
Ravenswood 230/115kV Transformer #2	RAVENSWD 230/115KV TB 3 & RAVENSWD 230/115KV TB 1	P6	N-1-1	< 100	< 100	103	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Ravenswood-Ames #1 115 kV Line	NEWARK-RAVENSWOOD 230KV [5936] & TESLA-RAVENSWOOD 230KV [5730]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	107	< 100	< 100	< 100	< 100	< 100	Project: Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade	
	P7-1:A10:2_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	P7	DCTL	90	67	75	89	63	111	93	82	Diverge	89	69	Project: Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade	
Ravenswood-Ames #2 115kV Line	NEWARK-RAVENSWOOD 230KV [5936] & TESLA-RAVENSWOOD 230KV [5730]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	107	< 100	< 100	< 100	< 100	< 100	Project: Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade	
	P7-1:A10:2_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	P7	DCTL	90	67	75	89	63	111	93	82	Diverge	89	69	Project: Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade	
Ravenswood-Bair #1 115kV Line	SAN MATEO-BELMONT 115KV [3570] & BAIR-RVNSWD D-LONESTAR 115KV [0]	P6	N-1-1	103	108	< 100	< 100	< 100	104	108	< 100	100	< 100	111	Project: Redwood City 115 kV System Reinforcement Project	
Ravenswood-Bair #2 115kV Line	CLY LND2 115/60KV TB 2 & CLY LND 115/60KV TB 1	P6	N-1-1	< 100	< 100	123	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Operating solution	
	CLY LND2 115/60KV TB 2 & CLY LND 115/60KV TB 1	P6	N-1-1	< 100	< 100	128	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Operating solution	
Ravenswood-Palo Alto #1 115kV Line	P7-1:A10:20_Ravenswood-Cooley Landing Nos. 1 & 2 115 kV lines	P7	DCTL	78	85	110	71	53	71	74	89	81	71	86	Continue to monitor	
	RAVENSWOOD-COOLEY LANDING #2 115KV [3400] & RAVENSWOOD-COOLEY LANDING #1 115KV [3390]	P6	N-1-1	< 100	< 100	110	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	P7-1:A10:20_Ravenswood-Cooley Landing Nos. 1 & 2 115 kV lines	P7	DCTL	78	84	110	70	53	70	73	88	80	70	86	Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Ravenswood-Palo Alto #2 115kV Line	P7-1:A10:23_Ravenswood-Palo Alto No. 1 115 kV and Cooley Landing-Palo Alto 115 kV lines	P7	DCTL	87	88	101	81	80	74	74	83	89	81	88	Continue to monitor	
	RAVENSWOOD-COOLEY LANDING #2 115KV [3400] & RAVENSWOOD-COOLEY LANDING #1 115KV [3390]	P6	N-1-1	< 100	< 100	110	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Ringwood - Milpitas 115 kV Line	NEWARK-MILPITAS #1 115KV [3070] MOAS OPENED ON NEWARK F & SWIFT-METCALF 115KV [3900]	P6	N-1-1	< 100	< 100	136	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
San Jose 'B'-Stone-Evergreen 115 kV Line	METCALF-EVERGREEN #1 115KV [2520] & EVRGRN 1-MTCLF E #2 115KV [0]	P6	N-1-1	< 100	< 100	117	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	87	80	117	67	30	62	66	81	63	67	82	Continue to monitor	
	P7-1:A18:16_Metcalf - El Patio No. 1 & 2 115 kV Lines	P7	DCTL	82	9	35	65	44	79	13	26	100	65	10	Sensitivity only	
San Jose Sta 'A'-B' 115 kV Line	METCALF-EL PATIO #1 115KV [2500] & METCALF-EL PATIO #2 115KV [2510]	P6	N-1-1	< 100	< 100	105	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	P7-1:A18:11_Trimble - San Jose B & FMC - San Jose B 115 kV Lines	P7	DCTL	35	79	19	25	111	21	83	22	28	25	76	Continue to monitor	
	P7-1:A18:16_Metcalf - El Patio No. 1 & 2 115 kV Lines	P7	DCTL	85	77	105	66	44	63	66	76	74	66	78	Continue to monitor	
	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	89	6	50	74	8	89	14	33	102	74	8	Sensitivity only	
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	83	10	47	70	47	78	30	30	109	71	13	Sensitivity only	
	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	94	N/AC	N/AC	72	N/AC	74	N/AC	N/AC	110	72	N/AC	Project: NRS rebuild project	
San Leandro - Edes 115 kV Line	TRIMBLE-SAN JOSE B 115KV [4030] & FMC-SAN JOSE B 115KV [2021]	P6	N-1-1	< 100	< 100	< 100	< 100	112	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	P1-2:A7:5:_MORAGA-OAKLAND J 115KV [2760]	P1	N-1	75	83	103	54	74	48	63	85	89	55	84	Continue to monitor	
	P2-4:A16:12:_EASTSHRE 115KV - SECTION ME & MD	P2	Breaker	93	89	119	84	64	96	99	109	84	84	89	Continue to monitor	
	P2-4:A8:41:_PITTSBURG-D SECTION 1D & PITTSBURG-E SECTION 1E 230KV	P2	Breaker	70	96	118	52	82	38	71	98	74	52	97	Continue to monitor	
	P2-4:A8:6:_PITTSBURG-E 230KV - SECTION 1E & 2E	P2	Breaker	58	88	108	41	79	26	65	90	66	42	89	Continue to monitor	
	P5-5C:A16:11:_EASTSHORE 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	93	89	119	84	64	96	99	109	84	84	89	Continue to monitor	
	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	54	82	105	24	69	9	53	77	74	24	83	Continue to monitor	
San Leandro - Oakland J #1 115kV Line	P7-1:A16:2:_GRANT-EASTSHORE #1 & GRANT-EASTSHORE #2 LINES	P7	DCTL	93	89	119	84	64	96	100	109	84	84	90	Continue to monitor	
	P2-4:A8:6:_PITTSBURG-E 230KV - SECTION 1E & 2E	P2	Breaker	65	100	0	47	80	38	67	0	72	47	88	Operating solution	
	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	0	0	Diverge	91	76	0	0	0	94	91	Diverge	Install redundant battery supply	
San Mateo 230/115kV Transformer #5	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	98	102	0	72	75	55	67	0	Diverge	73	96	Operating solution	
	SANMATEO 230/115KV TB 6 & SANMATEO 230/115KV TB 7	P6	N-1-1	< 100	100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103	Project: Redwood City 115 kV System Reinforcement Project	
San Mateo 230/115kV Transformer #6	P2-4:A10:3:_SANMATEO 230KV - SECTION 1D & 1E	P2	Breaker	91	97	101	81	58	81	95	96	66	81	98	Continue to monitor	
	SANMATEO 230/115KV TB 7 & SANMATEO 230/115KV TB 5	P6	N-1-1	< 100	100	< 100	< 100	< 100	101	< 100	108	< 100	< 100	103	Project: Redwood City 115 kV System Reinforcement Project. Continue to monitor	
San Mateo 230/115kV Transformer #7	EGBERTSWSTA-JEFFERSN 230KV [0] & SANMATEO 230/115KV TB 5	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	POTRERO-TBC & SANMATEO 230/115KV TB 6	P6	N-1-1	< 100	< 100	103	< 100	< 100	< 100	102	< 100	< 100	< 100	< 100	Continue to monitor	
	SANMATEO 230/115KV TB 5 & SANMATEO 230/115KV TB 6	P6	N-1-1	< 100	104	< 100	< 100	< 100	103	< 100	< 100	< 100	< 100	106	Project: Redwood City 115 kV System Reinforcement Project	
San Mateo-Bair 60kV Line	CLY LND 115/60KV TB 1 & CLY LND2 115/60KV TB 2	P6	N-1-1	141	173	300	117	< 100	137	147	196	138	116	176	Operating solution	
	CLY LND 115/60KV TB 1 & CLY LND2 115/60KV TB 2	P6	N-1-1	145	180	322	119	< 100	128	138	186	141	117	184	Operating solution	
San Mateo-Bair 60kV Line (San Carlos-Bair)	CLY LND 115/60KV TB 1 & CLY LND2 115/60KV TB 2	P6	N-1-1	< 100	119	210	< 100	< 100	< 100	< 100	132	< 100	< 100	121	Operating solution	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
San Mateo-Belmont 115kV Line	P7-1:A10:19_Ravenswood-Bair Nos. 1 & 2 115 kV lines	P7	DCTL	96	105	68	84	55	94	99	55	91	84	107	Project: Redwood City 115 kV System Reinforcement Project	
	RAVENSWD 230/115KV TB 1 & RAVENSWD 230/115KV TB 2	P6	N-1-1	115	122	< 100	< 100	< 100	< 100	< 100	< 100	102	< 100	123		
San Mateo-Hillsdale JCT 60kV Line	P2-4:A17:5:_MONTAVIS 230KV - SECTION 1E & 2E	P2	Breaker	NA	83	139	NA	58	NA	111	143	NA	NA	84	Operating solution	
	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	67	76	128	78	50	90	103	133	42	78	77	Operating solution	
San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	78	83	139	88	58	99	111	143	54	88	84	Operating solution	
	P2-4:A17:1:_MONTAVIS 230KV - SECTION 1D & 2D	P2	Breaker	83	NA	NA	94	NA	104	NA	NA	Diverge	94	NA	Project: Monta Vista 230 kV Bus Upgrade	
	P2-4:A17:5:_MONTAVIS 230KV - SECTION 1E & 2E	P2	Breaker	NA	87	146	NA	66	NA	117	150	NA	NA	88	Operating solution	
	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	68	78	133	83	56	94	108	138	42	83	79	Operating solution	
San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	81	87	146	94	66	105	117	150	56	94	88	Operating solution	
	P2-4:A17:5:_MONTAVIS 230KV - SECTION 1E & 2E	P2	Breaker	NA	80	126	NA	63	NA	103	128	NA	NA	81	Operating solution	
	P7-1:A10:4_Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	61	70	114	74	53	82	94	117	40	74	71	Continue to monitor	
San Mateo-Martin #2 115kV Line	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	74	80	126	86	63	92	103	128	54	86	81	Operating solution	
	EGBERTSWSTA-EMBRCDRD 230KV [0] & SAN MATEO-MARTIN 230KV [9980]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
San Ramon-Moraga 230kV Line	POTRERO-TBC & SAN MATEO-MARTIN 230KV [9980] (2)	P6	N-1-1	< 100	< 100	104	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	P2-4:A8:6:_PITTSBURG-E 230KV - SECTION 1E & 2E	P2	Breaker	47	18	29	32	15	18	7	7	103	32	20	Sensitivity only	
San Ramon-Radum 60kV Line	P1-2:A16:4:_CONTRA COSTA-LAS POSITAS 230KV [4510]	P1	N-1	60	86	106	48	52	38	69	92	32	48	87	Continue to monitor	
	P1-3:A16:7:_LS PSTAS 230/60KV TB 4	P1	N-1	70	84	114	60	53	55	74	96	41	60	84	Continue to monitor	
	P2-2:A16:9:_LS PSTAS 230KV SECTION 1G	P2	Bus	70	84	114	60	53	55	74	96	41	60	84	Continue to monitor	
	P2-2:A8:6:_C.COSTAPPD 230KV SECTION 1D	P2	Bus	58	86	103	45	52	36	67	89	32	45	87	Continue to monitor	
	P2-3:A8:2:_C.COSTAPPD - 1D 230KV & MARSHLD1-C.COSTAPPD #1 LINE	P2	Breaker	58	86	103	45	52	36	67	89	32	45	87	Continue to monitor	
	P2-4:A16:5:_LS PSTAS 230KV - SECTION 1F & 1G	P2	Breaker	72	86	117	62	55	56	76	99	43	62	87	Continue to monitor	
	P2-4:A8:4:_C.COSTAPPD 230KV - SECTION 1D & 2D	P2	Breaker	64	93	109	49	55	39	71	95	37	49	92	Continue to monitor	
Saratoga-Vasona 230 kV Line	P5-5C:A16:6:_LAS POSITAS 230-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	72	85	106	58	52	50	70	90	53	58	86	Continue to monitor	
	HICKS-METCALF 230KV [4910] & METCALF-MONTA VISTA #3 230KV [5091]	P6	N-1-1	< 100	< 100	102	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Scott-Duane 115 kV Line	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	123	NA	NA	88	NA	82	NA	NA	133	88	NA	Project: NRS rebuild project	
Sobrante 230/115kV Transformer #1	MORAGA 230/115KV TB 2 & SOBRANTE 230/115KV TB 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	119	< 100	< 100	Continue to monitor	
	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	40	89	94	27	60	24	85	103	42	27	87	Continue to monitor	
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	75	77	91	77	52	87	92	109	Diverge	77	77	Continue to monitor	
Sobrante 230/115kV Transformer #2	E. SHORE 230/115KV TB 1 & SOBRANTE 230/115KV TB 1	P6	N-1-1	< 100	100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101	Generation redispatch	
	P1-3:A8:6:_SOBRANTE 230/115KV TB 1	P1	N-1	63	95	94	57	61	65	82	101	55	57	93	Continue to monitor	
	P2-2:A8:58:_SOBRANTE 115KV SECTION 1X	P2	Bus	63	95	94	57	61	65	82	101	55	57	93	Continue to monitor	
	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	45	93	95	26	63	26	88	108	43	26	92	Continue to monitor	
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	79	79	89	76	56	90	94	111	Diverge	76	80	Continue to monitor	
CHRISTIE-SOBRANTE 115KV [1260] & SOBRANTE-G #2 115KV [3730]	P6	N-1-1	108	< 100	< 100	115	< 100	103	< 100	< 100	< 100	< 100	< 100	< 100	Project: Christie-Sobrante 115 kV Line Reconnector	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Sobrante-El Cerrito STA G #1 115kV Lin	LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS & SOBRANTE-G #2 115KV [3730]	P3	N-1-1	< 100	< 100	< 100	103	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: Christie-Sobrante 115 kV Line Reconnector
	CHRISTIE-SOBRANTE 115KV [1260] & SOBRANTE-G #2 115KV [3730]	P6	N-1-1	108	< 100	< 100	115	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: Christie-Sobrante 115 kV Line Reconnector
Sobrante-El Cerrito STA G #2 115kV Line	LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS & SOBRANTE-G #2 115KV [3730]	P3	N-1-1	< 100	< 100	< 100	103	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: Christie-Sobrante 115 kV Line Reconnector
	CHRISTIE-SOBRANTE 115KV [1260] & SOBRANTE-G #1 115KV [3720]	P6	N-1-1	108	< 100	< 100	115	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: Christie-Sobrante 115 kV Line Reconnector
	LMECCT2 18.00KV & LMECCT1 18.00KV & LMECST1 18.00KV GEN UNITS & SOBRANTE-G #1 115KV [3720]	P3	N-1-1	< 100	< 100	< 100	103	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: Christie-Sobrante 115 kV Line Reconnector
	P2-2:A8:55:_SOBRANTE 115KV SECTION 1D	P2	Bus	113	77	97	123	26	99	74	99	102	123	79	Project: Christie-Sobrante 115 kV Line Reconnector	
	P2-3:A8:45:_SOBRANTE - 1D 115KV & SOBRANTE-GRIZZLY-CLAREMONT #1 LINE	P2	Breaker	113	78	98	123	26	100	75	100	102	123	79	Project: Christie-Sobrante 115 kV Line Reconnector	
	P2-3:A8:46:_SOBRANTE - 1D 115KV & SOBRANTE-G #1 LINE	P2	Breaker	113	77	97	123	26	99	74	99	102	123	79	Project: Christie-Sobrante 115 kV Line Reconnector	
	P2-3:A8:48:_SOBRANTE - 1D 115KV & SOBRANTE-SAN PBLO-STD. OIL LINE	P2	Breaker	113	77	97	123	26	99	74	99	102	123	79	Project: Christie-Sobrante 115 kV Line Reconnector	
Sobrante-Grizzly-Claremont #1 115kV Line (Hillside-Grizzly JCT)	P2-4:A8:27:_SOBRANTE 115KV - SECTION 1D & 2D	P2	Breaker	115	79	99	126	27	103	78	103	107	126	81	Project: Christie-Sobrante 115 kV Line Reconnector	
	P2-1:A8:57:_SOBRANTE-GRIZZLY-CLAREMONT #2 115KV [3750] (GRIZZLY2-SOBRANTE)	P2	Line Section w/o Fault	36	95	102	42	86	26	53	61	25	42	92	Continue to monitor	
	P2-2:A8:56:_SOBRANTE 115KV SECTION 2E	P2	Bus	37	96	103	43	86	27	54	62	26	43	93	Continue to monitor	
	P2-4:A8:28:_SOBRANTE 115KV - SECTION 2E & 2D	P2	Breaker	37	96	103	43	86	27	54	62	26	43	93	Continue to monitor	
	P2-4:A8:52:_SOBRANTE 115KV - SECTION 2E & 1E	P2	Breaker	24	106	116	30	101	17	37	42	19	30	100	Generation redispatch	
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	124	143	182	123	123	107	127	147	Diverge	123	144	Install redundant battery supply	
Sobrante-Grizzly-Claremont #2 115kV Line (Hillside-Grizzly JCT)	SOBRANTE-GRIZZLY-CLAREMONT #2 115KV [3750] & SOBRANTE-MORAGA 115KV [3742]	P6	N-1-1	< 100	< 100	112	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	P2-4:A8:29:_MORAGA.C 115KV - SECTION 1C & 2C	P2	Breaker	29	92	101	28	88	24	56	66	9	28	89	Continue to monitor	
	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2	Breaker	95	102	98	93	83	79	87	69	Diverge	93	102	Generation redispatch	
	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	12	88	102	14	76	24	51	63	14	14	85	Continue to monitor	
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	150	174	226	149	149	131	156	182	Diverge	149	175	Install redundant battery supply	
	SOBRANTE-GRIZZLY-CLAREMONT #1 115KV [3740] & SOBRANTE-MORAGA 115KV [3742]	P6	N-1-1	< 100	102	124	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104	Generation redispatch	
	P2-3:A8:46:_SOBRANTE - 1D 115KV & SOBRANTE-G #1 LINE	P2	Breaker	41	103	112	46	90	30	58	68	29	46	100	Generation redispatch	
	P2-3:A8:47:_SOBRANTE - 1D 115KV & SOBRANTE-R #1 LINE	P2	Breaker	41	103	112	47	91	30	59	68	29	47	100	Generation redispatch	
Sobrante-Grizzly-Claremont #2 115kV Line (Hillside-Grizzly JCT)	P2-3:A8:48:_SOBRANTE - 1D 115KV & SOBRANTE-SAN PBLO-STD. OIL LINE	P2	Breaker	41	103	112	46	90	30	58	68	29	46	100	Generation redispatch	
	P2-4:A8:27:_SOBRANTE 115KV - SECTION 1D & 2D	P2	Breaker	55	113	115	53	94	40	69	79	46	53	110	Generation redispatch	
	P2-4:A8:51:_SOBRANTE 115KV - SECTION 1D & 1E	P2	Breaker	27	113	125	32	103	19	41	48	18	32	107	Generation redispatch	
	NEWARK F-RINGWOODSWST #1 115KV [0] & NEWARK-MILPITAS #1 115KV [3070] MOAS OPENED ON NEWARK F	P6	N-1-1	106	< 100	142	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor
P2-2:A16:41:_NEWARK F 115KV SECTION 1F	P2	Bus	107	83	142	93	44	89	71	98	85	93	84	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor		
P2-3:A16:13:_NEWARK F - 1F 115KV & NEWARK F-ZANKER-KRS LINE	P2	Breaker	107	83	142	93	44	89	71	98	85	93	84	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast		
Swift-Metcalf 115 kV Line	P2-3:A16:14:_NEWARK F - 1F 115KV & NEWARK-MILPITAS #1 LINE	P2	Breaker	107	83	142	93	44	89	71	98	85	93	84	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
	P2-4:A16:22:_NEWARK F 115KV - SECTION 1F & 2F	P2	Breaker	108	84	144	93	44	90	71	99	86	93	85	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
	P2-4:A16:27:_NEWARK E SECTION 1E & NEWARK F SECTION 1F 115KV	P2	Breaker	107	83	142	93	44	89	71	98	85	93	84	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	108	84	144	93	44	89	71	98	85	93	85	Project: Metcalf – Piercy & Swift – Metcalf and Newark – Dixon Landing 115 kV Upgrade. Continue to monitor	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	92	65	Diverge	78	42	94	65	83	Diverge	78	66	Install redundant battery supply	
Tassajara-Newark 230kV Line	P2-2:A8:8:_PITTSBURG-D 230KV SECTION 2D	P2	Bus	28	71	100	17	46	8	33	74	4	17	70	Continue to monitor	
	P2-3:A8:5:_PITTSBURG-D - 2D 230KV & PITTSBURG-D-TBC PTB1 #1 LINE	P2	Breaker	28	71	100	17	46	8	33	74	4	17	70	Continue to monitor	
	TESLA-NEWARK #2 230KV [5354] & TESLA-NEWARK #1 230KV [5720]	P6	N-1-1	< 100	< 100	105	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Tesla - Newark 230 kV Line No. 2	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant battery supply/Relay	77	74	101	65	44	68	61	79	88	65	74	Continue to monitor	
	TESLA-RAVENSWOOD 230KV [5730] & TESLA-NEWARK #1 230KV [5720]	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Diverge	< 100	< 100	Sensitivity only	
Trimble-San Jose 'B' 115 kV Line	LOS ESTEROS-MONTAGUE 115KV [2380] & LOS ESTEROS-TRIMBLE 115KV [2550]	P6	N-1-1	< 100	< 100	113	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
	P7-1:A18:8_Los Esteros - Trimble & Los Esteros - Montague 115 kV	P7	DCTL	NA	96	113	NA	88	NA	92	95	NA	NA	96	Continue to monitor	
	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	124	NA	NA	83	NA	57	NA	NA	101	83	NA	Project: NRS rebuild project	
Whisman-Monta Vista 115 kV Line	P1-2:A17:24:_MTN VIEW-MONTA VISTA 115KV [2920]	P1	N-1	87	66	82	68	61	95	75	70	103	68	67	Sensitivity only	
	P2-2:A17:20:_MT VIEW 115KV SECTION 1C	P2	Bus	87	66	82	68	61	95	75	70	103	68	67	Sensitivity only	
	P2-3:A17:5:_MNTA VSA 115KV - MIDDLE BREAKER BAY 2	P2	Breaker	92	69	86	68	66	96	78	72	109	69	70	Sensitivity only	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	98	80	Diverge	75	58	91	70	81	Diverge	75	81	Continue to monitor	
	RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & MTN VIEW-MONTA VISTA 115KV [2920]	P3	N-1-1	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor	
Wind Master - Delta 230 kV Line	P2-2:A8:26:_C.COSTAPPE 230KV SECTION 1E	P2	Bus	31	58	102	32	5	15	54	70	29	33	72	Continue to monitor	



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions	
					2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast	2028 SP Reduced Series Compensation in Table Mountain - Tesla 500 kV corridor		2035 SP Reduced Series Compensation in Table Mountain - Tesla 500 kV corridor
DIXON LD 115 kV	P1-2:A16:52:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	Low	0.86	0.88	0.88	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.87	> 0.9	0.88	0.88	0.88	Mitigation under development
DIXON LD 115 kV	P1-2:A18:27:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	Low	0.86	0.88	0.88	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.87	> 0.9	0.88	0.88	0.88	Mitigation under development
DIXON LD 115 kV	P2-2:A16:42:_NEWARK F 115KV SECTION 2F	P2	Bus/Breaker	Low	0.86	0.88	0.88	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.87	> 0.9	0.88	0.88	0.88	Mitigation under development
BARTLP 115 kV	P2-4:A16:22:_NEWARK F 115KV - SECTION 1F & 2F	P2	Bus/Breaker	Low	0.87	0.90	0.88	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.88	> 0.9	0.90	0.90	0.88	Mitigation under development
DIXON LD 115 kV	P2-4:A16:22:_NEWARK F 115KV - SECTION 1F & 2F	P2	Bus/Breaker	Low	0.85	0.87	0.87	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.86	> 0.9	0.87	0.88	0.86	Mitigation under development
MABURY 115 kV	P2-4:A16:22:_NEWARK F 115KV - SECTION 1F & 2F	P2	Bus/Breaker	Low	0.87	0.90	0.88	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.88	> 0.9	0.90	0.90	0.88	Mitigation under development
DIXON LD 115 kV	NEWARK-DIXON LANDING 115KV [2990] & MEC CTG1 18.00KV & MEC CTG2 18.00KV & MEC STG1 18.00KV GEN UNITS	P3	G-1/N-1	Low	0.86	0.88	0.87	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.88	0.88	0.87	Mitigation under development
DIXON LD 115 kV	NEWARK-DIXON LANDING 115KV [2990] & METCALF_SVD=V	P6	N-1-1	Low	0.85	0.87	0.87	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.83	> 0.9	0.87	0.87	0.87	Mitigation under development
SWIFT 115 kV	SWIFT-METCALF 115KV [3900] & NEWARK F-RINGWOODSWST #1 115KV [0]	P6	N-1-1	Low	0.88	0.89	0.82	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.88	> 0.9	0.89	0.89	0.82	Mitigation under development
DIXON LD 115 kV	P7-1:A18:2_Newark - Dixon Landing & Newark - Milpitas #1 115 kV Lines	P7	DCTL	Low	0.86	0.88	0.88	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.87	> 0.9	0.88	0.88	0.88	Mitigation under development



Substation	Contingency	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)									Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Heavy Renewable & Min Gas Gen	2028 SP High CEC Forecast	2028 SP Reduced Series Compensation in Table Mountain - Tesla 500 kV corridor	2035 SP Reduced Series Compensation in Table Mountain - Tesla 500 kV corridor	
BARTLP 115 kV	P1-2:A16:52:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	9	< 8	< 8	< 8	< 8	< 8	< 8	< 8	7	< 8	< 8	< 8	8	System adjustments or voltage support if needed
DIXON LD 115 kV	P1-2:A16:52:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	11	10	10	< 8	< 8	< 8	< 8	< 8	9	< 8	10	10	10	System adjustments or voltage support if needed
MABURY 115 kV	P1-2:A16:52:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	9	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	8	System adjustments or voltage support if needed
MCKEE 115 kV	P1-2:A18:52:_PIERCY-METCALF 115KV [4318]	P1	N-1	< 8	< 8	9	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	9	System adjustments or voltage support if needed
PIERCY 115 kV	P1-2:A18:52:_PIERCY-METCALF 115KV [4318]	P1	N-1	11	< 8	13	< 8	< 8	< 8	< 8	< 8	10	< 8	< 8	< 8	13	System adjustments or voltage support if needed
AMAZONHYWD 230 kV	P1-2:A10:1:_EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	< 8	< 8	9	< 8	< 8	< 8	< 8	< 8	9	< 8	< 8	< 8	9	System adjustments or voltage support if needed
E. SHORE 230 kV	P1-2:A10:1:_EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	< 8	< 8	9	< 8	< 8	< 8	< 8	< 8	9	< 8	< 8	< 8	9	System adjustments or voltage support if needed
RUSCTYEC 230 kV	P1-2:A10:1:_EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	< 8	< 8	9	< 8	< 8	< 8	< 8	< 8	9	< 8	< 8	< 8	9	System adjustments or voltage support if needed

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2025 Spring Off-Peak	2028 Summer Peak	2035 Summer Peak	2028 SP High CEC Forecast	2025 OP Sensitivity	
CAL MEC 3Ø fault with normal clearing time (3 units)	P1	N-1	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
DEC Pittsburg 3Ø fault with normal clearing time (4 units)	P1	N-1	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
Sobrante 230/115 kV #2 transformer 3Ø fault with normal clearing time	P1	N-1	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
Pittsburg (Sec 1E) 230 kV bus SLG fault with normal clearing time	P2	Bus/Breaker	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
Sobrante 230/115 kV #2 transformer 3Ø fault with normal clearing time and DEC Pittsburg (4 units) offline in the base case	P3	G-1/N-1	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
Ravenswood 230 kV SVC 3Ø fault with normal clearing time	P1	N-1	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
Internal fault at Bus-tie Breaker 200 at Newark (Sec 1D) 230 kV	P2	Bus/Breaker	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
DEC STG1 24 kV unit 1 3Ø fault with normal clearing time and RUSCTYECCT (3 units) offline in the base case	P3	G-1/N-1	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
Sobrante 500/230 kV #13 transformer 3Ø fault with normal clearing time	P1	N-1	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
Newark 230 kV SVC 3Ø fault with normal clearing time	P1	N-1	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
Internal fault at non-Bus-tie Breaker 262 at Metcalf 230 kV Bus D (Metcalf-Los Esteros)	P2	Bus/Breaker	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
Sobrante 230 kV bus SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with delayed clearing time	P4	Stuck Breaker	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
Los Esteros 115 kV 3Ø fault and CB 582 protecting generation at LECEF with delayed clearing time	P5	Non-Redundant battery supply/Relay	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Install redundant relay
Metcalf 230 kV 3Ø fault and CB 232 protecting Line Metcalf - Moss Landing 230 kV with delayed clearing time	P5	Non-Redundant battery supply/Relay	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Install redundant relay
Tesla - Newark 230 kV line 3Ø fault with normal clearing time and Pittsburg- Tassajara 230 kV line offline in the base case	P6	N-1-1	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
Los Esteros 230 kV SVD 3Ø fault with normal clearing and 230 kV line Newark Dist - Los Esteros offline in the base case	P6	N-1-1	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
NRS - SRS 115 kV line 3Ø fault with normal clearing time	P1	N-1	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)													Potential Mitigation Solutions	
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		

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

Substation	Load Served (MW)												Potential Mitigation Solutions	
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer-Off Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP Sensitivity

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
(New)Mercy Spring-Oro Loma 70 kV Line	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2-1	Line Section w/o Fault	NA	NA	109	NA	NA	NA	NA	NA	NA	Project: Losbanos Area reinforcement project review
	P2-1:A13:50:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2-1	Line Section w/o Fault	NA	NA	101	NA	NA	NA	NA	NA	NA	Project: Losbanos Area reinforcement project review
	P2-2:A13:25:_PANOCHÉ2 115KV SECTION 2D	P2-2	Bus	NA	NA	110	NA	NA	NA	NA	NA	NA	Continue to monitor
	P2-3:A13:42:_PANOCHÉ2 - 2D 115KV & PANOCHÉ-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	NA	NA	110	NA	NA	NA	NA	NA	NA	Continue to monitor
	P2-4:A13:13:_PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NA	NA	124	NA	NA	NA	NA	NA	NA	Continue to monitor
(New)Mercy Springs-Canal 70 kV Line #1	P1-2:A13:61:_PANOCHÉ-ORO LOMA 115KV [3240] & P1-2:A13:48:_WILSON-ORO LOMA 115KV [4200]	P6	N-1-1	<100	<100	107	<100	<100	<100	<100	<100	<100	Continue to monitor
	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1-2	N-1	169	91	89	18	111	6	88	107	93	Project: Losbanos Area reinforcement
(New)Oro Loma-Elnido 115kV Line	P2-3:A13:52:_LOS BANS - MA 70KV & LOS BANOS-O'NEILL PGP LINE	P2-3	Non-Bus-Tie Breaker	0	0	116	0	0	0	0	0	0	Continue to monitor
	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2-1	Line Section w/o Fault	140	137	53	25	71	28	38	72	140	Project: Losbanos Area reinforcement
	P2-1:A13:50:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2-1	Line Section w/o Fault	105	102	48	16	58	32	21	58	104	Project: Losbanos Area reinforcement
	P2-2:A13:25:_PANOCHÉ2 115KV SECTION 2D	P2-2	Bus	140	137	53	25	71	28	38	72	140	Project: Oroloma Area reinforcement
	P2-3:A13:42:_PANOCHÉ2 - 2D 115KV & PANOCHÉ-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	140	137	53	25	71	28	38	72	140	Project: Oroloma Area reinforcement
	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie Breaker	NConv	NConv	108	54	39	49	37	47	NConv	Helms 3 Gen RAS
	P2-4:A13:13:_PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	143	138	47	25	72	28	38	74	141	Project: Oroloma Area reinforcement
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	14	28	NConv	NConv	NConv	NConv	46	NConv	NConv	Install Redundant battery
Atwater-EI Capitan No 1 115kV line	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7-1	DCTL	NConv	NConv	108	54	39	49	37	47	NConv	Continue to monitor
	P7-1:A13:6:_PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7-1	DCTL	20	NA	NA	NA	82	NA	17	100	NA	Sensitivity only
Atwater-Merced 115 kV Line	P1-2:A13:52:_WILSON-ATWATER #2 115KV [4160] & P1-2:A13:44:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J MERCED	P6	N-1-1	91	<100	107	<100	<100	<100	<100	<100	<100	Continue to monitor
	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Project: Wilson 115kV reinforcement
	P5-5a:A13:1:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant Relay	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Install Redundant Relay
Barton-Airways-Sanger 115 kV Line	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	20	NConv	33	NConv	NConv	NConv	Install Redundant battery
	P2-2:A14:48:_HERNDON 115KV SECTION 2D	P2-2	Bus	40	37	10	42	12	113	40	16	35	Generation Re-dispatch
	P2-3:A14:65:_HERNDON - 2D 115KV & HERNDON-BULLARD #2 LINE	P2-3	Non-Bus-Tie Breaker	40	38	9	42	12	113	40	16	35	Generation Re-dispatch
	P2-3:A14:66:_HERNDON - 2D 115KV & HERNDON-WOODWARD LINE	P2-3	Non-Bus-Tie Breaker	39	37	27	42	12	113	40	16	34	Generation Re-dispatch
	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	83	80	107	36	70	17	49	63	82	Continue to monitor
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	16	13	NConv	NConv	NConv	NConv	39	NConv	NConv	Install Redundant battery
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7-1	DCTL	31	27	NConv	59	43	108	67	72	34	Continue to monitor
P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7-1	DCTL	51	47	NConv	64	57	109	77	87	54	Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P7-1:A14:25: HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7-1	DCTL	93	90	119	23	67	11	54	67	92	Continue to monitor
	P7-1:A14:26: HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7-1	DCTL	58	53	NConv	66	63	107	78	94	61	Continue to monitor
Bellota - Warnerville 230 kV Line	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	35	16	NConv	NConv	NConv	NConv	20	NConv	NConv	Install Redundant battery
Borden 230/70 kV Bank 4	P2-3:A13:15: BORDEN 230KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	75	73	104	13	52	41	27	52	73	Continue to monitor
Borden 230/70 kV Transformer #1	P1-3:A13:10: BORDEN 230/70KV TB 4	P1-3	N-1	116	72	103	12	81	40	39	81	73	Project: Borden capacity increase insufficient for 2035 Loading
	P2-3:A13:17: BORDEN 230KV - MIDDLE BREAKER BAY 4	P2-3	Non-Bus-Tie Breaker	114	71	101	12	81	40	41	81	71	Project: Borden capacity increase insufficient for 2035 Loading
Borden-Gregg 230 kV Line	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	18	10	NConv	NConv	NConv	NConv	24	NConv	NConv	Install Redundant battery
Borden-Madera #2 70 kV Line	P1-2:A13:68: BORDEN-GLASS 70KV [8510]	P1-2	N-1	71	71	106	25	51	7	45	51	72	Continue to monitor
	P2-3:A14:1: GREGG 230KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie Breaker	NConv	NConv	104	21	42	7	37	42	NConv	Helms 3 Gen RAS
	P1-2:A14:14: BORDEN-GREGG #2 230KV [4400] & P1-2:A14:13: BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	<100	<100	101	<100	<100	<100	<100	<100	<100	Continue to monitor
	P7-1:A13:13: BORDEN-GREGG 230KV #1 & #2 [4400]	P7-1	DCTL	NConv	NConv	104	21	42	7	37	42	NConv	Continue to monitor
Borden-Storey 230kV Line No 1	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	25	19	NConv	NConv	NConv	NConv	16	NConv	NConv	Install Redundant battery
Borden-Storey 230kV Line No 2	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	25	20	NConv	NConv	NConv	NConv	10	NConv	NConv	Install Redundant battery
California Ave.-Sanger 115 kV Line	P1-2:A14:69: MCCALL-WEST FRESNO #2 115KV [2370]	P1-2	N-1	81	80	101	24	52	4	65	49	81	Continue to monitor
	P2-3:A14:52: MC CALL 115KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie Breaker	82	80	101	24	52	4	65	49	81	Continue to monitor
	P5-5c:A14:10: Mccall 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	44	0	14	0	0	NConv	Install Redundant battery
	P7-1:A14:11: CALIFORNIA AVE-MCCALL 115KV [2360] & MCCALL-WEST FRESNO #2 115KV [2370]	P7-1	DCTL	128	125	163	44	82	14	102	82	127	Operating solution
California Ave.-West Fresno 115 kV Line	P1-2:A14:69: MCCALL-WEST FRESNO #2 115KV [2370]	P1-2	N-1	86	81	114	30	56	10	72	57	82	Continue to monitor
	P2-3:A14:52: MC CALL 115KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie Breaker	86	81	113	30	56	10	72	57	82	Continue to monitor
	P1-2:A14:67: SANGER-CALIFORNIA AVE 115KV [9130] & P1-2:A14:63: CALIFORNIA AVE-MCCALL 115KV [2360]	P6	N-1-1	101	103	<100	<100	<100	<100	<100	<100	107	Operating solution
	P7-1:A14:11: CALIFORNIA AVE-MCCALL 115KV [2360] & MCCALL-WEST FRESNO #2 115KV [2370]	P7-1	DCTL	89	84	119	30	57	10	74	57	85	Continue to monitor
Chowchilla-Kerckhoff #2 115 kV Line	Base Case	P0	Base Case	85	88	118	12	54	19	44	55	89	Continue to monitor
	P2-4:A13:12: WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Project:Wilson 115kV area reinforcement
	P2-4:A14:1: HERNDON 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	62	66	64	38	29	118	16	32	59	Generation Re-dispatch
	P2-4:A14:21: HERNDON 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	66	70	73	47	17	127	17	32	64	Generation Re-dispatch
	P5-5a:A13:1: WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Install Redundant Relay
	P5-5a:A14:2: HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	67	65	97	47	16	127	18	31	69	Install Redundant Relay
	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	36	36	NConv	NConv	NConv	NConv	17	NConv	NConv	Install Redundant battery
	P5-5c:A13:2: Wilson 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	51	NConv	14	NConv	NConv	NConv	Install Redundant battery

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	15	25	28	30	60	NConv	Install Redundant battery
	P5-5c:A14:21:_Sanger 115kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	132	138	15	12	153	148	18	7	138	Install Redundant battery
	P5-5c:A14:2:_Gregg 230kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	56	26	116	16	39	NConv	Install Redundant battery
	P5-5c:A14:5:_Herndon 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	60	58	86	51	16	140	24	26	63	Install Redundant battery
	P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115KV [1900]	P7-1	DCTL	132	138	15	12	153	147	18	7	138	Project: Wilson 115kV reinforcement
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	17	29	100	42	27	62	6	13	36	Continue to monitor
	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:13:_GATES D 230/70KV TB 5	P3	G-1/N-1	<100	<100	112	<100	<100	<100	<100	<100	<100	Continue to monitor
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	20	32	NConv	54	57	61	11	55	25	Install Redundant Relay
Coalinga #1-San Miguel 70 kV Line	P1-2:A13:59:_PANOCHÉ-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHÉ1_KAMM_JCT & P1-3:A14:13:_GATES D 230/70KV TB 5	P6	N-1-1	<100	<100	135	<100	<100	<100	<100	<100	90	Continue to monitor
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	48	58	NConv	NConv	NConv	NConv	38	NConv	NConv	Install Redundant battery
	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Project:Wilson 115kV area reinforcement
Dairyland-Mendota 115 kV Line	P5-5a:A13:1:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Install Redundant Relay
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	7	6	NConv	NConv	NConv	NConv	40	NConv	NConv	Install Redundant battery
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	30	NConv	26	NConv	NConv	NConv	Install Redundant battery
	P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P1-2	N-1	54	142	167	46	43	8	39	49	145	Project:Reedley reinforcement project review
El Capitan-Wilson 115 kV Line	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	<100	<100	103	<100	<100	<100	<100	<100	<100	Continue to monitor
	P1-2:A13:44:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATER J_MERCED & P1-2:A13:52:_WILSON-ATWATER #2 115KV [4160]	P6	N-1-1	126	<100	<100	<100	97	<100	<100	97	<100	Operating solution
EXCELSIORSS-SCHINDLER #1 115kV Line	P1-2:A14:65:_EXCELSIOR SW STA-SCHINDLER #2 115KV [3249] & P1-3:A14:13:_GATES D 230/70KV TB 5	P6	N-1-1	150	139	142	<100	119	<100	<100	<100	137	Project:Potential Gates Bank installation
EXCELSIORSS-SCHINDLER #2 115kV Line	P1-2:A14:64:_EXCELSIOR SW STA-SCHINDLER #1 115KV [3248] & P1-3:A14:13:_GATES D 230/70KV TB 5	P6	N-1-1	150	139	142	<100	119	<100	<100	<100	137	Project:Potential Gates Bank installation
Exchequer 115/70/13.8 kV Transformer	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Project:Wilson 115kV area reinforcement
	P5-5a:A13:1:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Install Redundant Relay
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	24	NConv	13	NConv	NConv	NConv	Install Redundant battery
Exchequer-Le Grand 115 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Project:Wilson 115kV area reinforcement
	P1-1:A14:53:_HELMS 3 18.00KV GEN UNIT 1 & P1-3:A13:32:_MERCED 115/70KV TB 2	P3	G-1/N-1	<100	<100	<100	<100	101	<100	<100	<100	<100	Generation Re-dispatch
	P5-5a:A13:1:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Install Redundant Relay
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	81	NConv	31	NConv	NConv	NConv	Install Redundant battery
	P1-3:A14:2:_GATES 500/230KV TB 12	P1-3	N-1	19	22	14	100	14	50	99	14	20	Generation Re-dispatch

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
Fifth standard solar-Gates 230kV line	P2-3:A14:23:_GATES E 230KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie Breaker	47	50	14	104	14	60	95	14	49	Generation Re-dispatch
	P5-5:A14:1:_Gates 500kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	28	30	14	101	14	53	98	14	36	Install Redundant battery
	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7-1	DCTL	37	34	NConv	97	14	56	95	14	32	Continue to monitor
	P7-1:A14:9:_GATES-ARCO 230KV [4690] & GATES-MIDWAY 230KV [4891]	P7-1	DCTL	44	40	14	102	14	51	99	0	44	Generation Re-dispatch
Five Points Sw Sta-Huron-Gates 70kV Line(Five Points Sw Sta-Calflax section)	P1-3:A14:13:_GATES D 230/70KV TB 5	P1-3	N-1	128	118	121	23	104	37	15	98	117	Project:Potential Gates Bank installation
	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	129	121	120	31	106	35	14	100	119	Project:Potential Gates Bank installation
	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	41	23	65	116	5	113	93	33	23	Generation Re-dispatch
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	136	127	120	39	114	33	14	109	124	Project:Potential Gates Bank installation
	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:13:_GATES D 230/70KV TB 5	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	104	<100	Generation Re-dispatch
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant Relay	139	126	NConv	44	104	33	14	96	128	Install Redundant Relay
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	63	38	NConv	NConv	NConv	NConv	50	NConv	NConv	Install Redundant battery
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	83	73	65	86	58	113	93	NConv	73	Install Redundant battery
	P7-1:A13:14:_EXCELSIORSS-PANOCH1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7-1	DCTL	60	50	42	83	43	104	97	26	50	Generation Re-dispatch
	P7-1:A14:10:_PANOCH1-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7-1	DCTL	83	74	65	87	58	113	93	32	74	Generation Re-dispatch
Gates-Gregg 230 kV Line	P2-4:A13:5:_PANOCH2 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	2	NA	NA	NA	73	NA	11	106	NA	Sensitivity only
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	29	19	NConv	NConv	NConv	NConv	19	NConv	NConv	Install Redundant battery
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	18	18	46	20	82	26	11	NConv	18	Install Redundant battery
	P7-1:A13:6:_PANOCH1-TRANQLTYSS #1 230KV [0] & PANOCH1-TRANQLTYSS #2 230KV [0]	P7-1	DCTL	16	NA	NA	NA	72	NA	11	104	NA	Sensitivity only
Gates-Midway 230kV	P2-3:A14:30:_GATES F 230KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie Breaker	9	17	12	27	101	5	64	107	10	Generation Re-dispatch
	P5-5c:A14:1:_Gates 500kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	9	12	6	30	151	60	67	149	26	Install Redundant battery
Gregg-Ashlan 230 kV Line	P1-2:A14:22:_HERNDON-FIGRDN 1-ASHLAN 230KV [0]	P1-2	N-1	100	97	130	40	66	38	53	67	98	Continue to monitor
	P2-1:A14:7:_HERNDON-ASHLAN 230KV [4890] (HERNDON-FGRDN T1)	P2-1	Line Section w/o Fault	101	97	130	42	66	40	54	67	98	Review Ashlan load increase
	P2-2:A14:5:_HERNDON 230KV SECTION 2E	P2-2	Bus	100	96	131	42	66	40	54	67	98	Continue to monitor
	P2-3:A14:6:_HERNDON - 2E 230KV & HERNDON-FIGRDN 1-ASHLAN LINE	P2-3	Non-Bus-Tie Breaker	99	96	131	40	66	38	53	67	97	Continue to monitor
	P2-3:A14:7:_FIGRDN 1 - 1D 230KV & HERNDON-FIGRDN 1-ASHLAN LINE	P2-3	Non-Bus-Tie Breaker	100	97	130	40	66	38	53	67	98	Review Ashlan load increase
	P2-4:A14:3:_HERNDON 230KV - SECTION 2E & 2D	P2-4	Bus-Tie-Breaker	100	96	132	42	66	40	54	67	98	Continue to monitor
	P5-5c:A14:5:_Herndon 230-115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	97	94	124	40	65	38	53	66	95	Install Redundant battery
	P5-5c:A14:6:_Figarden 230kV Batt #1(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	100	97	132	40	66	38	53	67	98	Install Redundant battery



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast		
	P1-2:A14:18:_GREGG-HERNDON #2 230KV [4840] & P1-2:A14:17:_GREGG-HERNDON #1 230KV [4830]	P6	N-1-1	100	80	169	<100	83	106	<100	<100	65	Continue to monitor	
Gregg-Helms 230kV Line No 1	P2-1:A14:3:_HELMS-GREGG #2 230KV [4880] (GREGG-HELMS PP3)	P2-1	Line Section w/o Fault	94	94	NConv	3	2	NConv	3	3	94	Continue to monitor	
Gregg-Helms 230kV Line No 2	P2-1:A14:2:_HELMS-GREGG #1 230KV [4870] (GREGG-HELMS PP1)	P2-1	Line Section w/o Fault	94	94	79	3	44	NConv	3	3	94	Generation Re-dispatch	
GWF-Kingsburg 115 kV Line	P1-2:A14:26:_MUSTANG SW STA-MCCALL 230KV [4710]	P1-2	N-1	65	62	84	22	74	11	33	102	68	Generation Re-dispatch	
	P2-2:A14:17:_MC CALL 230KV SECTION 1D	P2-2	Bus	70	66	NConv	21	76	10	34	103	73	Continue to monitor	
	P2-3:A14:14:_MC CALL - 1D 230KV & MUSTANG SW STA-MCCALL LINE	P2-3	Non-Bus-Tie Breaker	70	66	NConv	21	76	10	34	103	73	Continue to monitor	
	P2-4:A13:5:_PANOCH 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	59	NA	NA	NA	102	NA	20	123	NA	Generation Re-dispatch	
	P2-4:A14:6:_MC CALL 230KV - SECTION 2E & 1E	P2-4	Bus-Tie-Breaker	98	93	NConv	26	86	4	56	102	98	Continue to monitor	
	P2-4:A14:8:_MC CALL 230KV - SECTION 1E & 1D	P2-4	Bus-Tie-Breaker	94	88	NConv	30	95	12	53	118	95	Continue to monitor	
	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	79	75	NConv	23	80	9	40	108	82	Continue to monitor	
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	45	56	NConv	NConv	NConv	NConv	30	NConv	NConv	NA	Install Redundant battery
	P5-5c:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	62	59	65	17	109	15	18	NConv	59	NA	Install Redundant battery
	P5-5c:A14:10:_Mccall 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	28	96	61	14	91	NConv	NA	Install Redundant battery
	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7-1	DCTL	116	104	180	28	97	61	14	93	106	NA	Operating solution
	P7-1:A14:17:_HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7-1	DCTL	86	77	NConv	3	74	36	37	118	86	NA	Continue to monitor
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7-1	DCTL	73	68	NConv	29	74	24	45	104	75	NA	Continue to monitor
P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7-1	DCTL	75	71	NConv	29	76	24	46	106	78	NA	Continue to monitor	
P7-1:A13:6:_PANOCH 230KV - SECTION 1D & 2D	P7-1	DCTL	62	NA	NA	NA	86	NA	19	103	NA	NA	Sensitivity only	
Helm 230/70 kV Transformer #1	P1-1:A14:72:_AGRICO 13.80KV & AGRICO 13.80KV GEN UNITS & Base Case	P3	G-1/N-1	<100	<100	106	<100	<100	<100	<100	<100	<100	Continue to monitor	
Helm-Kerman 70 kV Line	P1-1:A14:72:_AGRICO 13.80KV & AGRICO 13.80KV GEN UNITS	P1-1	N-1	65	60	103	19	76	4	56	77	59	Continue to monitor	
Henrietta-GWF 115 kV Line	P2-4:A14:6:_MC CALL 230KV - SECTION 2E & 1E	P2-4	Bus-Tie-Breaker	34	30	NConv	29	33	39	11	50	34	Continue to monitor	
	P5-5c:A14:10:_Mccall 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	39	NConv	NConv	13	41	94	59	44	NConv	Install Redundant battery	
	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7-1	DCTL	46	38	156	13	41	94	58	43	39	Continue to monitor	
Herndon 230/115 kV Transformer #1	P7-1:A14:17:_HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7-1	DCTL	26	19	NConv	15	23	72	25	64	26	Continue to monitor	
	P2-4:A14:3:_HERNDON 230KV - SECTION 2E & 2D	P2-4	Bus-Tie-Breaker	100	94	110	9	51	87	35	48	94	Continue to monitor	
Herndon-Ashlan 230 kV Line	P1-2:A14:19:_GREGG-ASHLAN 230KV [4820]	P1-2	N-1	99	96	130	40	66	38	53	67	97	Continue to monitor	
	P2-1:A14:4:_GREGG-ASHLAN 230KV [4820] (GREGG-FGRDN T2)	P2-1	Line Section w/o Fault	100	96	130	42	66	40	54	67	98	Continue to monitor	
	P2-3:A14:4:_GREGG 230KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie Breaker	100	96	NConv	40	66	38	53	67	98	Disable Automatics	
	P2-3:A14:8:_FIGRDN 2 - 1F 230KV & GREGG-ASHLAN LINE	P2-3	Non-Bus-Tie Breaker	99	96	130	40	66	38	53	67	97	Continue to monitor	
	P5-5c:A14:2:_Gregg 230KV Batt(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	40	71	39	54	71	NConv	Install Redundant battery	
P5-5c:A14:7:_Figarden 230KV Batt #2(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	99	96	130	40	66	38	53	67	97	Install Redundant battery		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P1-2:A14:18:_GREGG-HERNDON #2 230KV [4840] & P1-2:A14:17:_GREGG-HERNDON #1 230KV [4830]	P6	N-1-1	56	41	108	<100	<100	97	<100	<100	31	Continue to monitor
Herndon-Barton 115 kV Line	P2-2:A14:48:_HERNDON 115KV SECTION 2D	P2-2	Bus	86	81	84	29	25	113	21	20	79	Generation Re-dispatch
	P2-3:A14:65:_HERNDON - 2D 115KV & HERNDON-BULLARD #2 LINE	P2-3	Non-Bus-Tie Breaker	86	81	85	29	25	113	21	20	79	Generation Re-dispatch
	P2-3:A14:66:_HERNDON - 2D 115KV & HERNDON-WOODWARD LINE	P2-3	Non-Bus-Tie Breaker	85	81	84	29	25	113	21	20	79	Generation Re-dispatch
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	61	56	NConv	NConv	NConv	NConv	6	NConv	NConv	Install Redundant battery
	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	34	54	33	57	75	NConv	Install Redundant battery
	P7-1:A14:17:_HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7-1	DCTL	74	65	NConv	24	22	93	18	38	67	Continue to monitor
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7-1	DCTL	24	25	22	43	5	109	37	37	21	Generation Re-dispatch
Herndon-Bullard #1 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7-1	DCTL	19	20	NConv	44	18	107	38	41	16	Continue to monitor
	P2-1:A14:87:_HERNDON-BULLARD #1 115KV [1760] (HERNDON-PNDLJ1)	P2-1	Line Section w/o Fault	148	79	99	20	94	8	90	95	81	Project:Herndon-bullard line reconductoring
Herndon-Bullard #2 115 kV Line	P2-2:A14:47:_HERNDON 115KV SECTION 1D	P2-2	Bus	148	79	99	20	94	8	90	95	81	Project: Herndon-Bullard Line reconductoring
	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A14:73:_HERNDON-BULLARD #1 115KV [1760]	P3	G-1/N-1	<100	<100	100	<100	<100	<100	<100	<100	<100	Continue to monitor
	P2-1:A14:86:_HERNDON-BULLARD #2 115KV [1770] (HERNDON-PNDLJ2)	P2-1	Line Section w/o Fault	120	64	78	18	74	6	80	75	66	Project:Herndon-bullard line reconductoring
Herndon-Manchester 115 kV Line	P2-2:A14:48:_HERNDON 115KV SECTION 2D	P2-2	Bus	121	65	76	18	74	6	80	75	66	Project: Herndon-Bullard Line reconductoring
	P2-3:A14:66:_HERNDON - 2D 115KV & HERNDON-WOODWARD LINE	P2-3	Non-Bus-Tie Breaker	121	65	79	18	74	6	80	75	66	Project: Herndon-Bullard Line reconductoring
	P2-4:A14:25:_BULLARD 115KV - SECTION 1F & 1E	P2-4	Bus-Tie-Breaker	101	53	65	14	56	5	66	57	55	Project: Herndon-Bullard Line reconductoring
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	66	61	NConv	NConv	NConv	NConv	5	NConv	NConv	Install Redundant battery
Herndon-Woodward 115 kV Line	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	35	55	29	59	75	NConv	Install Redundant battery
	P7-1:A14:17:_HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7-1	DCTL	78	70	NConv	19	26	84	20	41	72	Continue to monitor
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7-1	DCTL	31	33	NConv	36	15	99	29	30	28	Continue to monitor
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7-1	DCTL	26	27	NConv	37	15	98	29	33	23	Continue to monitor
Herndon-Woodward 115 kV Line	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	24	41	49	30	57	NConv	Install Redundant battery
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	56	51	NConv	NConv	NConv	NConv	22	NConv	NConv	Install Redundant battery
	P7-1:A14:16:_HERNDON-BARTON 115KV [1750] & HERNDON-MANCHESTER 115KV [1780]	P7-1	DCTL	89	84	91	22	27	114	21	25	83	Generation Re-dispatch
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7-1	DCTL	33	33	NConv	27	6	101	38	13	30	Continue to monitor
	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7-1	DCTL	71	67	77	28	15	116	29	13	65	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7-1	DCTL	29	29	NConv	28	4	100	38	15	26	Continue to monitor

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P7-1:A14:7:_BARTON-AIRWAYS-SANGER 115KV [1060] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7-1	DCTL	47	44	49	33	4	114	39	4	43	Generation Re-dispatch
Kingsburg D-Kingsburg E Bus tie 115kV	P1-2:A14:79:_MCCALL-KINGSBURG #2 115KV [2300]	P1-2	N-1	91	85	111	7	75	35	21	73	86	Continue to monitor
	P2-1:A14:92:_MCCALL-KINGSBURG #2 115KV [2300] (KINGSBURGE-GAURD J1)	P2-1	Line Section w/o Fault	91	85	111	7	75	35	21	73	86	Continue to monitor
	P2-1:A14:95:_MCCALL-KINGSBURG #2 115KV [2300] (GAURD J1-MC CALL)	P2-1	Line Section w/o Fault	99	92	119	3	81	28	27	81	94	Continue to monitor
	P2-3:A14:54:_MC CALL 115KV - MIDDLE BREAKER BAY 4	P2-3	Non-Bus-Tie Breaker	91	85	111	7	75	35	21	73	86	Continue to monitor
	P2-4:A13:5:_PANOCHÉ 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	68	NA	NA	NA	93	NA	30	107	NA	Sensitivity only
	P2-4:A14:8:_MC CALL 230KV - SECTION 1E & 1D	P2-4	Bus-Tie-Breaker	95	90	NConv	40	89	14	54	104	95	Continue to monitor
	P5-5:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	59	65	NConv	NConv	NConv	NConv	36	NConv	63	Install Redundant battery
	P5-5:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	68	67	69	29	98	15	28	NConv	67	Install Redundant battery
	P7-1:A13:6:_PANOCHÉ-TRANQLTYSS #1 230KV [0] & PANOCHÉ-TRANQLTYSS #2 230KV [0]	P7-1	DCTL	68	NA	NA	NA	92	NA	30	106	NA	Sensitivity only
	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7-1	DCTL	99	89	151	7	83	36	20	80	91	Continue to monitor
P7-1:A14:17:_HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7-1	DCTL	86	80	NConv	26	74	10	41	102	86	Sensitivity only	
P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7-1	DCTL	79	75	NConv	39	75	29	47	95	80	Continue to monitor	
Kingsburg-Camden Lno 1 70kV line	Base Case	P0	Base Case	96	90	103	32	75	6	58	75	91	Voltage support project
	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7-1	DCTL	91	83	103	32	73	6	53	71	84	Continue to monitor
Las Aguilas-Mosslanding Reactor 230kV	P5-5:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	NA	38	NConv	NConv	NA	NConv	NA	NA	NConv	Install Redundant battery
Las Aguilas-Panoche 230kV Line No 1	P5-5:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	49	62	NConv	NConv	NConv	NConv	43	NConv	NConv	Install Redundant battery
Las Aguilas-Panoche 230kV Line No 2	P5-5:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	50	62	NConv	NConv	NConv	NConv	43	NConv	NConv	Install Redundant battery
Legrand-Chowchilla 115kV	P5-5:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	24	31	NConv	NConv	NConv	NConv	36	NConv	NConv	Install Redundant battery
Legrand-Dairyland 115kV(Legrand-chowchilla solar section)	P5-5:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	24	30	NConv	NConv	NConv	NConv	32	NConv	NConv	Install Redundant battery
Legrand-Wilson 115kV	P7-1:A13:7:_LOS BANOS-PANOCHÉ #1 230KV [5030] & PANOCHÉ-ORO LOMA 115KV [3240]	P7-1	DCTL	NA	99	41	12	NA	35	NA	NA	101	Sensitivity only
Los Banos 230/70 kV Transformer #3	P1-3:A13:7:_LOS BANOS 230/70KV TB 4	P1-3	N-1	66	66	51	22	100	22	27	94	64	Generation Re-dispatch
	P2-2:A13:2:_LOS BANOS 230KV SECTION 2D	P2-2	Bus	67	67	56	22	100	23	47	94	64	Generation Re-dispatch
Los Banos-Canal-Oro Loma 70 kV Line	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1-2	N-1	122	124	62	13	87	18	45	70	126	Project: Losbanos Area reinforcement
	P1-2:A13:99:_POLELINE-PANOCHÉ #1 230KV [0] & P1-2:A13:100:_LOS BANOS-POLELINE #1 230KV [0]	P6	N-1-1	<100	<100	113	<100	<100	<100	<100	<100	<100	Continue to monitor
Los Banos-Dos Amigos 230kV line	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant Relay	8	15	NA	15	92	30	16	107	18	Install Redundant Relay
	P5-5:A14:14:_Gates 230-70kV Batt(FAILURE OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	5	12	NA	14	89	29	16	104	17	Install Redundant battery
	P1-2:A13:75:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1-2	N-1	140	112	68	23	121	4	61	100	113	Project: Losbanos Area reinforcement
	P1-1:A13:26:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:75:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	102	<100	Sensitivity only

2023-2024 ISO Reliability Assessment - Study Results

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



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
Los Banos-Livingston Jct-Canal 70 kV Line	P5-5c:A13:23:_Hammonds 115kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NA	NA	123	NA	NA	NA	NA	NA	NA	Install Redundant battery
	P5-5c:A13:24:_Oro Loma 115-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NA	NA	123	NA	NA	NA	NA	NA	NA	Install Redundant battery
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	111	103	126	32	53	47	100	53	103	Install Redundant battery
	P1-2:A13:99:_POLELINE-PANOCHÉ #1 230KV [0] & P1-2:A13:100:_LOS BANOS-POLELINE #1 230KV [0]	P6	N-1-1	<100	<100	117	<100	<100	<100	<100	<100	<100	<100
Los Banos-Mercy Springs Sw Sta 70kV Line (Mercy Springs Sw Sta - Arburua Sub section)	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1-2	N-1	112	115	52	3	77	23	39	59	117	Project: Losbanos Area reinforcement
	P1-2:A13:99:_POLELINE-PANOCHÉ #1 230KV [0] & P1-2:A13:100:_LOS BANOS-POLELINE #1 230KV [0]	P6	N-1-1	<100	<100	103	<100	<100	<100	<100	<100	<100	Continue to monitor
Manchester - Airways - Sanger 115 kV Line	P1-2:A14:49:_BARTON-AIRWAYS-SANGER 115KV [1060]	P1-2	N-1	17	16	9	46	20	100	46	26	13	Generation Re-dispatch
	P2-3:A14:39:_AIRWAYS - 1E 115KV & BARTON-AIRWAYS-SANGER LINE	P2-3	Non-Bus-Tie Breaker	17	16	9	46	20	100	46	26	13	Generation Re-dispatch
	P2-3:A14:63:_BARTON - 1F 115KV & BARTON-AIRWAYS-SANGER LINE	P2-3	Non-Bus-Tie Breaker	19	18	10	46	19	100	45	25	14	Generation Re-dispatch
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	17	18	NConv	NConv	NConv	NConv	42	NConv	NConv	Install Redundant battery
	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	21	26	36	28	45	NConv	Install Redundant battery
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7-1	DCTL	44	40	NConv	60	49	101	67	76	47	Continue to monitor
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7-1	DCTL	49	46	NConv	61	54	99	67	82	53	Continue to monitor
	P7-1:A14:17:_HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7-1	DCTL	34	26	NConv	41	9	101	29	12	27	Continue to monitor
Manchester-Airways-Sanger 115 kV Line	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7-1	DCTL	3	4	NConv	38	14	98	44	14	5	Continue to monitor
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	14	11	NConv	NConv	NConv	NConv	40	NConv	NConv	Install Redundant battery
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7-1	DCTL	27	24	NConv	59	37	108	65	64	30	Continue to monitor
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7-1	DCTL	33	30	NConv	61	42	106	66	70	36	Continue to monitor
Mc Call 230kV-115kV Bank No 2	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	112	104	NConv	46	81	26	88	89	107	RAS or operating solution
Mc Call 230kV-115kV Bank No 3	P2-3:A14:50:_MC CALL 115KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie Breaker	119	111	163	51	94	20	93	113	116	Contingency taking out more equipment - Ignore
	P2-4:A14:8:_MC CALL 230KV - SECTION 1E & 1D	P2-4	Bus-Tie-Breaker	89	83	NConv	33	61	14	68	75	85	Continue to monitor
	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-3:A14:5:_MC CALL 230/115KV TB 1	P3	G-1/N-1	<100	<100	100	<100	<100	<100	<100	<100	<100	Continue to monitor
	P1-3:A14:5:_MC CALL 230/115KV TB 1 & P1-2:A14:81:_HENRIETTA-LEPRINO SW STA 115KV [1737]	P6	N-1-1	<100	<100	101	<100	<100	<100	<100	<100	<100	Continue to monitor
Mccall 230/115kV Bank 1	P1-3:A14:5:_MC CALL 230/115KV TB 1 & Base Case	P6	N-1-1	<100	<100	101	<100	<100	<100	<100	<100	<100	Continue to monitor
	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-3:A14:7:_MC CALL 230/115KV TB 3	P3	G-1/N-1	<100	<100	102	<100	<100	<100	<100	<100	<100	Continue to monitor
Mccall 230/115kV Bank 2	P1-3:A14:7:_MC CALL 230/115KV TB 3 & P1-3:A14:6:_MC CALL 230/115KV TB 2	P6	N-1-1	100	100	117	<100	96	<100	95	99	100	Operating solution, RAS or increase bank capacity
	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	108	99	NConv	46	79	26	85	87	102	Project:Reedley reinforcement project review

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
McCall-California Ave. 115 kV Line	P1-2:A14:67:_SANGER-CALIFORNIA AVE 115KV [9130] & P1-2:A14:69:_MCCALL-WEST FRESNO #2 115KV [2370]	P6	N-1-1	160	157	167	<100	<100	<100	124	<100	158	Operating solution, RAS or increase line capacity
Mccall-Kingsburg No 2 115kV Line	P2-2:A14:59:_KINGSBURGD 115KV SECTION 1D	P2-2	Bus	101	92	130	28	85	50	22	83	94	Bus upgrade or increase line capacity
	P2-3:A14:72:_KINGSBURGD - 1D 115KV & MCCALL-KINGSBURG #1 LINE	P2-3	Non-Bus-Tie Breaker	101	92	130	28	85	50	22	83	94	Bus upgrade or increase line capacity
	P2-3:A14:73:_KINGSBURGD - 1D 115KV & GWF-KINGSBURG LINE	P2-3	Non-Bus-Tie Breaker	101	92	130	28	85	50	22	83	94	Bus upgrade or increase line capacity
McCall-Reedley 115 kV Line (McCall-Wahtoke)	P5-5c:A14:21:_Sanger 115kv Batt(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	106	100	117	35	85	12	64	88	101	Install Redundant battery
McCall-Reedley 115 kV Line (Reedley-Wahtoke)	P2-1:A14:106:_SANGER-REEDLEY 115KV [9140] (SANGERCNJCT-PARLIER)	P2-1	Line Section w/o Fault	103	102	116	38	71	9	57	77	105	Increase Line capacity
	P2-3:A14:47:_SANGER 115KV - MIDDLE BREAKER BAY 6	P2-3	Non-Bus-Tie Breaker	90	91	104	44	69	21	68	83	94	Continue to monitor
	P5-5c:A13:8:_Borden 230-70kv Batt(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NA	NA	103	NA	NA	NA	NA	NA	NA	Install Redundant battery
	P5-5c:A14:21:_Sanger 115kv Batt(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	135	133	150	50	106	22	88	112	135	Install Redundant battery
McCall-Sanger #2 115 kV Line	P7-1:A14:8:_HELMS-GREGG #1 230KV [4870] & HELMS-GREGG #2 230KV [4880]	P7-1	DCTL	NConv	NConv	97	38	49	7	53	66	81	Helms 3 Gen RAS
	P1-2:A14:53:_MCCALL-SANGER #3 115KV [2350] & P1-2:A14:51:_MCCALL-SANGER #1 115KV [2330]	P6	N-1-1	<100	<100	105	<100	<100	<100	<100	<100	<100	Continue to monitor
McCall-Sanger #3 115 kV Line	P2-3:A14:51:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	81	76	106	62	68	43	74	91	81	Continue to monitor
	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	85	81	114	39	61	4	53	69	84	Continue to monitor
	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	88	83	114	31	54	17	51	67	86	Continue to monitor
	P5-5a:A14:2:_HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	87	83	111	32	53	18	50	66	85	Install Redundant Relay
	P5-5c:A14:5:_Herndon 230-115kv Batt(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	88	83	112	32	53	16	51	66	85	Install Redundant battery
	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7-1	DCTL	78	74	107	72	69	56	80	95	79	Continue to monitor
	P7-1:A14:8:_HELMS-GREGG #1 230KV [4870] & HELMS-GREGG #2 230KV [4880]	P7-1	DCTL	NConv	NConv	100	50	50	10	56	65	73	Helms 3 Gen RAS
McCall-West Fresno 115 kV Line	P2-4:A14:15:_CAL AVE 115KV - SECTION 1D & 1E	P2-4	Bus-Tie-Breaker	73	70	110	25	48	10	59	48	72	Continue to monitor
	P1-2:A14:67:_SANGER-CALIFORNIA AVE 115KV [9130] & P1-2:A14:63:_CALIFORNIA AVE-MCCALL 115KV [2360]	P6	N-1-1	140	137	<100	<100	<100	<100	104	<100	141	Operating Solution
Melones-Wilson 230kV line	P5-5c:A13:1:_Los Banos 500-230-70kv Batt(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	79	60	NConv	NConv	NConv	NConv	31	NConv	NConv	Install Redundant battery
	P7-1:A13:19:_COTTLE-MELONES 230KV [4530] & BELLOTA-WARNERVILLE 230KV [4380]	P7-1	DCTL	NConv	NConv	65	NConv	98	20	99	98	NConv	WASN's new melones RAS
	P7-1:A13:5:_BELLOTA-COTTLE 230KV [4360] & BELLOTA-WARNERVILLE 230KV [4380]	P7-1	DCTL	NConv	NConv	52	NConv	89	23	96	89	NConv	WASN's new melones RAS
Merced 115/70 kV Transformer #2	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Project: Wilson 115kV reinforcement
	P5-5a:A13:1:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Install Redundant Relay
	P5-5c:A13:2:_Wilson 230-115kv Batt(FAILURE OF NON-REDUNDENT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	44	NConv	52	NConv	NConv	NConv	Install Redundant battery
Merced Falls-Fxhauer 70 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Project: Wilson 115kV reinforcement
	P5-5a:A13:1:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Install Redundant Relay

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
Merced Falls-Excelsior 70kV Line	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	142	NConv	86	NConv	NConv	NConv	Install Redundant battery
	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230] & P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]	P6	N-1-1	<100	<100	<100	<100	<100	108	65	<100	<100	Generation Re-dispatch
Merced-Merced Falls 70 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Project: Wilson 115kV reinforcement
	P5-5a:A13:1:_WILSON 115 KV #1 & #2 BUS (Failure of Non-Redundant Relay)	P5-5	Non-Redundant Relay	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Install Redundant Relay
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	147	NConv	93	NConv	NConv	NConv	Install Redundant battery
MERCED-MERCED M #2 115 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Project: Wilson 115kV reinforcement
	P5-5a:A13:1:_WILSON 115 KV #1 & #2 BUS (Failure of Non-Redundant Relay)	P5-5	Non-Redundant Relay	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Install Redundant Relay
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	31	NConv	42	NConv	NConv	NConv	Install Redundant battery
Mercy Springs Sw Sta- Oro loma 70kV Line (Mercy Springs Sw Sta-Mercy springs sub section)	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1-2	N-1	169	91	94	18	111	6	88	107	93	Project: Losbanos Area reinforcement
	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2-1	Line Section w/o Fault	81	45	105	18	62	13	58	70	45	Continue to monitor
	P2-2:A13:25:_PANOCHÉ2 115KV SECTION 2D	P2-2	Bus	81	45	105	18	62	13	58	70	45	Continue to monitor
	P2-3:A13:42:_PANOCHÉ2 - 2D 115KV & PANOCHÉ-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	81	45	105	18	62	13	58	70	45	Continue to monitor
	P2-3:A13:52:_LOS BANS - MA 70KV & LOS BANOS-O'NEILL PGP LINE	P2-3	Non-Bus-Tie Breaker	0	0	102	0	0	0	0	0	0	Continue to monitor
	P2-4:A13:13:_PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	81	45	113	18	62	13	58	70	45	Continue to monitor
	P5-5c:A13:23:_Hammonds 115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	NA	NA	103	NA	NA	NA	NA	NA	NA	Install Redundant battery
	P1-2:A13:61:_PANOCHÉ-ORO LOMA 115KV [3240] & P1-2:A13:48:_WILSON-ORO LOMA 115KV [4200]	P6	N-1-1	<100	<100	106	<100	<100	<100	<100	<100	<100	<100
Mosslanding- Las Aguilas No 1 230kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	NA	76	NConv	NConv	NA	NConv	NA	NA	NConv	Install Redundant battery
MOSSLNSW-LASAGUILASS #2 230KV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	58	NA	NA	NA	NConv	NA	88	NConv	NA	Install Redundant battery
MustangSS-Gates 230KV Line No 1	P1-2:A14:28:_GATES-MUSTANG SW STA #2 230KV [2605]	P1-2	N-1	6	14	35	24	90	13	27	102	10	Generation Re-dispatch
	P2-3:A14:29:_GATES F 230KV - MIDDLE BREAKER BAY 4	P2-3	Non-Bus-Tie Breaker	5	12	34	23	91	9	27	102	9	Sensitivity only
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	22	12	NConv	NConv	NConv	NConv	13	NConv	NConv	Install Redundant battery
MustangSS-Gates 230KV Line No 2	P1-2:A14:27:_GATES-MUSTANG SW STA #1 230KV [2604]	P1-2	N-1	6	14	35	24	90	13	27	102	10	Generation Re-dispatch
	P2-3:A14:28:_GATES F 230KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie Breaker	6	13	34	23	89	10	26	100	9	Sensitivity only

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	22	12	NConv	NConv	NConv	NConv	13	NConv	NConv	Install Redundant battery
Oro Loma-Canal #1(Oro Loma-Santa Rita) 70 kV Line	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1-2	N-1	58	56	101	6	30	23	18	30	57	Continue to monitor
	P2-3:A13:52:_LOS BANS - MA 70KV & LOS BANOS-O'NEILL PGP LINE	P2-3	Non-Bus-Tie Breaker	58	56	147	6	30	23	18	30	57	Continue to monitor
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	58	56	NConv	6	NConv	NConv	18	NConv	57	Install Redundant battery
Panoche-Gates 230kV Line No 1	P2-2:A13:6:_PANOCH 230KV SECTION 2D	P2-2	Bus	20	28	4	74	85	59	8	102	17	Sensitivity only
	P2-3:A13:5:_PANOCH - 2D 230KV & PANOCH-PANOCH ENERGY CENTER LINE	P2-3	Non-Bus-Tie Breaker	20	28	4	74	85	59	8	102	17	Sensitivity only
	P2-3:A14:18:_MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	34	32	4	54	92	42	9	113	23	Sensitivity only
	P2-4:A13:3:_PANOCH 230KV - SECTION 2E & 2D	P2-4	Bus-Tie-Breaker	21	NA	4	NA	93	NA	1	113	NA	Sensitivity only
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	87	29	NConv	NConv	NConv	NConv	7	NConv	NConv	Install Redundant battery
	P5-5c:A14:12:_Mustang SW STA 230KV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	19	25	NConv	65	79	44	8	106	30	Install Redundant battery
	P5-5c:A14:1:_Gates 500kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	40	34	25	128	11	63	51	32	44	Install Redundant battery
	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7-1	DCTL	34	32	4	54	93	42	9	113	23	Sensitivity only
	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7-1	DCTL	17	27	NConv	62	72	46	12	104	18	Continue to monitor
Panoche-Gates 230kV Line No 2	P2-3:A14:18:_MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	36	34	4	57	98	45	9	120	25	Sensitivity only
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	92	31	NConv	NConv	NConv	NConv	7	NConv	NConv	Install Redundant battery
	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	20	25	NConv	65	84	44	8	113	32	Install Redundant battery
	P5-5c:A14:1:_Gates 500kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	42	36	27	136	12	67	54	34	47	Install Redundant battery
	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7-1	DCTL	36	34	4	57	98	44	10	120	25	Sensitivity only
	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7-1	DCTL	18	29	NConv	66	77	49	13	110	19	Continue to monitor
Panoche-Manning No 1 230kV line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	NA	41	NConv	NConv	NA	NConv	NA	NA	NConv	Install Redundant battery
Panoche-Manning No 2 230kV line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	NA	41	NConv	NConv	NA	NConv	NA	NA	NConv	Install Redundant battery
Panoche-Mendota 115 kV Line	P5-5a:A13:1:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant Relay	NConv	NA	NA	NA	NConv	NA	NConv	NConv	NA	Install Redundant Relay
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	46	NConv	84	NConv	NConv	NConv	Install Redundant battery
Panoche-Oro Loma 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	41	35	NConv	NConv	NConv	NConv	32	NConv	NConv	Install Redundant battery
	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	122	<100	<100	<100	<100	<100	<100	<100	<100	Project:Oroloma area reinforcement
Panoche-Schindler #1 115 kV Line	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	101	90	81	61	77	68	48	64	88	Mitigated by future generation
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant Relay	102	89	NConv	63	71	68	46	56	91	Install Redundant Relay
	P1-3:A14:13:_GATES D 230/70KV TB 5 & P1-2:A14:47:_PANOCH-EXCELSIOR SW STA #2 115KV [3260]	P6	N-1-1	149	131	162	<100	117	92	<100	<100	129	Project:Potential Gates Bank installation



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
Panoche-Tranquility No 1 230kV line	P2-3:A13:8:_TRANQUITYSS 230KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie Breaker	14	NA	NA	NA	100	NA	29	98	NA	Generation Re-dispatch
Poleline-Mercy Springs sw sta No 1 70kV Line	P2-3:A13:52:_LOS BANS - MA 70KV & LOS BANOS-O'NEILL PGP LINE	P2-3	Non-Bus-Tie Breaker	NA	NA	125	NA	NA	NA	NA	NA	NA	Continue to monitor
Reedley 115/70 kV Transformer #4	P1-3:A14:40:_REEDLEY 115/70KV TB 2	P1-3	N-1	116	117	112	38	87	14	70	85	119	Project:Reedley reinforcement project review
	P2-3:A14:139:_REEDLEY 115KV - RING R5 & R6	P2-3	Non-Bus-Tie Breaker	101	102	101	36	82	14	60	82	104	Project:Reedley reinforcement project review
	P2-3:A14:141:_REEDLEY 115KV - RING R1 & R6	P2-3	Non-Bus-Tie Breaker	104	106	106	39	84	14	64	86	108	Project:Reedley reinforcement project review
Reedley-Dinuba 70 kV Line	P1-2:A14:118:_REEDLEY-OROSI 70KV [9060]	P1-2	N-1	141	135	128	46	106	9	89	69	137	Project:Reedley reinforcement project review
	P1-2:A14:57:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:58:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	103	<100	<100	<100	<100	<100	<100	<100	<100	Project:Reedley reinforcement project review
Reedley-Orosi 70 kV Line	P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P1-2	N-1	57	133	159	43	43	8	42	44	136	Project:Reedley reinforcement project review
Sanger-Reedley 115 kV Line	P1-2:A14:58:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE & P1-2:A14:55:_KINGS RIVER-SANGER-REEDLEY 115KV [2030]	P6	N-1-1	124	115	138	<100	93	<100	<100	90	118	Operating solution, RAS or increase line capacity
Schindler 115/70 kV Transformer #1	P1-3:A14:13:_GATES D 230/70KV TB 5	P1-3	N-1	117	110	102	43	100	57	23	70	108	Project:Potential Gates Bank installation
	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	118	113	101	52	101	55	27	73	111	Project:Potential Gates Bank installation
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	125	120	100	61	110	52	33	83	117	Mitigated by future generation
	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:13:_GATES D 230/70KV TB 5	P3	G-1/N-1	<100	<100	<100	<100	104	<100	<100	<100	<100	Generation Re-dispatch
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	128	119	NConv	65	98	52	30	67	122	Install Redundant Relay
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5-5	Non-Redundant Relay	68	40	NConv	NConv	NConv	NConv	10	NConv	NConv	Install Redundant battery
Schindler-Coalinga #2 70 kV Line	P1-3:A14:13:_GATES D 230/70KV TB 5	P1-3	N-1	105	97	84	10	92	22	28	90	95	Mitigated by future generation
	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	106	100	83	15	94	21	25	92	98	Mitigated by future generation
	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	23	22	49	109	24	106	86	18	22	Generation Re-dispatch
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	114	107	82	17	104	20	21	103	104	Mitigated by future generation
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	117	106	NConv	28	91	20	23	87	108	Install Redundant Relay
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5-5	Non-Redundant Relay	49	48	49	86	26	107	86	NConv	47	Install Redundant battery
	P5-5c:A14:14:_Gates 230-70kV Batt(Failure of Non-Redundent Batt)	P5-5	Non-Redundant Relay	140	126	NConv	21	89	41	54	85	132	Install Redundant battery
Schindler-Coalinga #2 70 kV Line (Schindler-Paige section)	P7-1:A14:10:_PANOCH1-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7-1	DCTL	49	47	49	86	26	106	86	16	48	Generation Re-dispatch
	P1-3:A14:13:_GATES D 230/70KV TB 5	P1-3	N-1	103	95	83	28	92	36	15	47	93	Mitigated by future generation
	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	104	99	82	36	94	34	18	49	96	Mitigated by future generation
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	113	106	81	44	104	31	24	61	103	Mitigated by future generation
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	116	104	NConv	48	91	31	21	43	107	Install Redundant Relay
P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5-5	Non-Redundant Relay	68	43	NConv	NConv	NConv	NConv	12	NConv	NConv	Install Redundant battery	



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P5-5c:A14:14:_Gates 230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	137	123	NConv	33	89	9	14	43	129	Install Redundant battery
Schindler-Huron-Gates 70 kV Line	P1-3:A14:13:_GATES D 230/70KV TB 5	P1-3	N-1	124	115	120	51	104	68	28	86	113	Project:Potential Gates Bank installation
	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	125	118	119	59	105	66	32	88	116	Project:Potential Gates Bank installation
	P2-3:A14:135:_SCHINDLER 115KV - RING R1 & R3	P2-3	Non-Bus-Tie Breaker	126	121	119	22	89	34	24	61	121	Project:Potential Gates Bank installation
	P2-3:A14:58:_EXCELSIORSS 115KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	126	121	119	22	89	34	24	61	121	Project:Potential Gates Bank installation
	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	105	78	142	93	49	96	44	81	78	Project:Potential Gates Bank installation
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	132	124	118	66	114	64	37	97	121	Project:Potential Gates Bank installation
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	14	27	NConv	NConv	NConv	NConv	18	NConv	NConv	Install Redundant battery
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	157	140	144	62	109	96	44	NConv	141	Install Redundant battery
	P5-5c:A14:27:_Excelsior SW STA 115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	126	120	120	22	89	34	24	61	121	Install Redundant battery
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (Failure of Non-Redundant Relay)	P5-5	Non-Redundant Relay	135	123	NConv	70	103	64	34	84	125	Install Redundant Relay
Tranquility-Kearney 230kV line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	62	33	NConv	NConv	NConv	NConv	6	NConv	NConv	Install Redundant battery
	P7-1:A13:14:_EXCELSIORSS-PANOCH1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7-1	DCTL	125	114	115	58	92	87	49	76	114	Project:Potential Gates Bank installation
	P7-1:A14:10:_PANOCH1-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7-1	DCTL	157	141	143	62	109	97	44	80	141	Project:Potential Gates Bank installation
	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	14	47	35	32	54	NConv	Install Redundant battery
Warnerville - Wilson 230 kV Line	P2-2:A14:2:_HELMS PP2 230KV SECTION 1E	P2-2	Bus	89	97	88	61	44	106	8	72	82	Generation Re-dispatch
	P2-3:A14:18:_MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	38	48	61	64	100	78	13	132	35	Sensitivity only
	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie Breaker	NConv	NConv	142	14	57	67	14	64	NConv	Helms 3 Gen RAS
	P2-4:A13:5:_PANOCH1 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	45	NA	NA	NA	92	NA	9	123	NA	Sensitivity only
	P2-4:A14:34:_HELMS PP1 SECTION 1D & HELMS PP2 SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	90	98	90	61	44	106	8	72	83	Generation Re-dispatch
	P2-4:A14:35:_HELMS PP2 SECTION 1E & HELMS PP3 SECTION 1F 230KV	P2-4	Bus-Tie-Breaker	NConv	NConv	97	61	63	121	8	72	104	Generation Re-dispatch
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (Failure of Non-Redundant Relay)	P5-5	Non-Redundant Relay	36	40	NConv	59	121	77	14	159	48	Install Redundant Relay
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	114	113	NConv	NConv	NConv	NConv	20	NConv	NConv	Install Redundant battery
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	66	63	30	64	124	86	20	NConv	74	Install Redundant battery
	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	79	73	NConv	29	65	56	24	115	84	Install Redundant battery
	P5-5c:A14:14:_Gates 230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	34	39	NConv	59	119	77	14	157	48	Install Redundant battery
	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	11	69	77	17	73	NConv	Install Redundant battery
	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7-1	DCTL	NConv	NConv	142	14	57	67	14	64	NConv	Continue to monitor
Warnerville - Wilson 230 kV Line	P7-1:A13:6:_PANOCH1-TRANQLTYSS #1 230KV [0] & PANOCH1-TRANQLTYSS #2 230KV [0]	P7-1	DCTL	50	NA	NA	NA	89	NA	9	120	NA	Sensitivity only
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7-1	DCTL	83	89	NConv	30	57	30	39	108	80	Continue to monitor

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7-1	DCTL	90	97	NConv	28	62	32	39	116	88	Continue to monitor
	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7-1	DCTL	39	50	68	62	96	78	11	129	37	Sensitivity only
	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7-1	DCTL	79	83	NConv	30	65	56	22	115	72	Continue to monitor
	P7-1:A14:8:_HELMS-GREGG #1 230KV [4870] & HELMS-GREGG #2 230KV [4880]	P7-1	DCTL	NConv	NConv	97	61	63	121	8	72	104	Helms 3 Gen RAS
Wilson 230kV reactor	P2-2:A14:2:_HELMS PP2 230KV SECTION 1E	P2-2	Bus	87	95	87	61	44	105	8	72	81	Generation Re-dispatch
	P2-3:A14:18:_MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	37	47	61	64	99	77	13	131	34	Sensitivity only
	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie Breaker	NConv	NConv	141	13	56	66	14	64	NConv	Helms 3 Gen RAS
	P2-4:A13:5:_PANOCH 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	44	NA	NA	NA	91	NA	9	122	NA	Sensitivity only
	P2-4:A14:34:_HELMS PP1 SECTION 1D & HELMS PP2 SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	89	97	89	61	44	105	8	72	82	Generation Re-dispatch
	P2-4:A14:35:_HELMS PP2 SECTION 1E & HELMS PP3 SECTION 1F 230KV	P2-4	Bus-Tie-Breaker	NConv	NConv	96	61	62	120	8	72	103	Generation Re-dispatch
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5-5	Non-Redundant Relay	35	39	NConv	59	120	76	14	158	48	Install Redundant Relay
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	112	112	NConv	NConv	NConv	NConv	20	NConv	NConv	Install Redundant battery
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	65	62	30	63	123	85	19	NConv	74	Install Redundant battery
	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	78	73	NConv	28	64	55	23	114	83	Install Redundant battery
	P5-5c:A14:14:_Gates 230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	33	39	NConv	59	118	76	14	156	47	Install Redundant battery
	P5-5c:A14:2:_Gregg 230kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	NConv	NConv	NConv	11	68	76	17	72	NConv	Install Redundant battery
	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7-1	DCTL	NConv	NConv	141	13	56	66	14	64	NConv	Project: Wilson 115kV reinforcement
	P7-1:A13:6:_PANOCH 230KV [0] & PANOCH 230KV [0]	P7-1	DCTL	49	NA	NA	NA	88	NA	9	119	NA	Sensitivity only
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNON-KEARNEY 230KV [4900]	P7-1	DCTL	82	88	NConv	29	56	30	38	107	79	Continue to monitor
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7-1	DCTL	88	96	NConv	27	62	32	39	115	87	Continue to monitor
P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7-1	DCTL	38	49	68	61	95	77	11	128	36	Sensitivity only	
P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7-1	DCTL	77	82	NConv	29	64	55	22	114	71	Continue to monitor	
P7-1:A14:8:_HELMS-GREGG #1 230KV [4870] & HELMS-GREGG #2 230KV [4880]	P7-1	DCTL	NConv	NConv	96	61	62	120	8	72	103	Helms 3 Gen RAS	
Wilson- El Capitan No 1 115kV line	P1-2:A13:52:_WILSON-ATWATER #2 115KV [4160] & P1-2:A13:44:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	<100	122	160	<100	<100	<100	<100	<100	124	Operating solution, RAS or increase line capacity
Wilson-Atwater #2 115 kV Line	P1-2:A13:44:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED & P1-2:A13:54:_EL CAPITAN-WILSON 115KV [1510]	P6	N-1-1	139	136	185	<100	106	<100	<100	107	138	Operating solution, RAS or increase line capacity
Wilson-Le Grand 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5-5	Non-Redundant Relay	23	20	NConv	NConv	NConv	NConv	33	NConv	NConv	Install Redundant battery
	P2-2:A13:17:_WILSON B 115KV SECTION 2D	P2-2	Bus	119	NA	NA	NA	110	NA	81	117	NA	Project:Wilson 115kV area reinforcement

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
Wilson-Merced #1 115 kV Line	P2-3:A13:31: WILSON B - 2D 115KV & WILSON-ORO LOMA LINE	P2-3	Non-Bus-Tie Breaker	119	NA	NA	NA	110	NA	81	117	NA	Project:Wilson 115kV area reinforcement
	P7-1:A13:10: ATWATER-EL CAPITAN 115KV [1020] & WILSON-ATWATER #2 115KV [4160]	P7-1	DCTL	94	89	109	38	83	18	66	87	90	Continue to monitor
	P7-1:A13:12: EL CAPITAN-WILSON 115KV [1510] & WILSON-ATWATER #2 115KV [4160]	P7-1	DCTL	94	89	107	42	83	2	79	87	90	Continue to monitor
Wilson-Merced #2 115 kV Line	P2-2:A13:16: WILSON A 115KV SECTION 1D	P2-2	Bus	113	NA	NA	NA	104	NA	76	113	NA	Project:Wilson 115kV area reinforcement
	P2-3:A13:30: WILSON A - 1D 115KV & WILSONSTCOM-WILSON A #1 LINE	P2-3	Non-Bus-Tie Breaker	113	NA	NA	NA	104	NA	76	113	NA	Project:Wilson 115kV area reinforcement
Wilson-Merced No 2 115kV line	P7-1:A13:10: ATWATER-EL CAPITAN 115KV [1020] & WILSON-ATWATER #2 115KV [4160]	P7-1	DCTL	NA	85	103	36	NA	17	NA	NA	85	Continue to monitor
	P7-1:A13:12: EL CAPITAN-WILSON 115KV [1510] & WILSON-ATWATER #2 115KV [4160]	P7-1	DCTL	NA	85	102	40	NA	2	NA	NA	85	Continue to monitor
Wilson-Oro Loma 115 kV Line	P1-2:A13:61: PANOCHÉ-ORO LOMA 115KV [3240]	P1-2	N-1	109	99	40	12	63	35	25	63	101	Project:Wilson 115kV area reinforcement
	P2-1:A13:49: PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2-1	Line Section w/o Fault	171	164	52	34	91	28	54	92	167	Project: Oroloma Area reinforcement
	P2-1:A13:50: PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-HAMMONDS)	P2-1	Line Section w/o Fault	137	130	48	25	78	31	39	78	132	Project: Oroloma Area reinforcement
	P2-2:A13:25: PANOCHÉ2 115KV SECTION 2D	P2-2	Bus	171	164	52	34	91	28	54	92	167	Project: Wilson 115kV reinforcement
	P2-3:A13:42: PANOCHÉ2 - 2D 115KV & PANOCHÉ-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	171	163	52	34	91	27	54	92	167	Project: Wilson 115kV reinforcement
	P2-4:A13:13: PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	174	165	47	34	92	28	54	94	169	Project: Wilson 115kV reinforcement
	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	NA	49	NConv	NConv	NA	NConv	NA	NA	NConv	Install Redundant battery
	P5-5c:A13:24: Hammonds 115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	109	99	NA	12	63	35	25	63	101	Install Redundant battery
	P5-5c:A13:4: Panoche 230-115kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	110	99	51	12	66	35	25	NConv	102	Install Redundant battery
	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	40	49	NConv	NConv	NConv	NConv	29	NConv	NConv	Install Redundant battery
Wilson-Storey 230kV Line No 1	P7-1:A13:7: LOS BANOS-PANOCHÉ #1 230KV [5030] & PANOCHÉ-ORO LOMA 115KV [3240]	P7-1	DCTL	109	NA	NA	NA	63	NA	25	63	NA	Project: Wilson 115kV reinforcement
	P5-5a:A14:1: GATES SECTION D & E 230 KV BUS (Failure of Non-Redundant Relay)	P5-5	Non-Redundant Relay	3	6	NConv	43	76	28	7	104	3	Install Redundant Relay
	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	45	39	NConv	NConv	NConv	NConv	7	NConv	NConv	Install Redundant battery
Wilson-Storey 230kV Line No 2	P5-5c:A14:14: Gates 230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	3	6	NConv	43	75	28	7	103	3	Install Redundant battery
	P5-5c:A13:1: Los Banos 500-230-70kV Batt(Failure of Non-Redundant Batt)	P5-5	Non-Redundant Relay	35	30	NConv	NConv	NConv	NConv	6	NConv	NConv	Install Redundant battery

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



Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
AIRPROD 115 kV	Base Case	P0	Base case	1.01	1.01	0.94	1.07	1.02	1.07	1.02	1.02	1.01	Continue to monitor
AIRPROD 115 kV	P1-3:A14:7:_MC CALL 230/115KV TB 3&P1-3:A14:5:_MC CALL 230/115KV TB 1	P6	N-1-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
AIRWAYS 115 kV	Base Case	P0	Base case	0.98	0.98	0.90	1.07	1.00	1.06	1.01	1.00	0.98	Continue to monitor
AIRWAYS 115 kV	P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P1	N-1	0.95	0.95	0.86	1.08	0.99	1.08	0.99	0.99	0.95	Continue to monitor
AIRWAYS 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.90	0.91	0.84	1.08	0.96	1.08	0.97	0.96	0.90	System adjustment
AIRWAYS 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P3	G-1/N-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor
AIRWAYS 115 kV	P5-5a:A14:2:_HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	0.91	0.92	0.88	1.08	0.98	1.08	0.97	0.97	0.91	Install redundant relay
AIRWAYS 115 kV	P1-2:A14:49:_BARTON-AIRWAYS-SANGER 115KV [1060]&P1-2:A14:72:_HERNDON-MANCHESTER 115KV [1780]	P6	N-1-1	NA	NA	0.84	NA	NA	NA	NA	NA	NA	Continue to monitor
AIRWAYS 115 kV	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	0.94	0.95	0.84	1.08	0.98	1.08	0.98	0.98	0.94	Continue to monitor
AIRWAYS2 115 kV	Base Case	P0	Base case	0.98	0.98	0.90	1.07	1.01	1.06	1.01	1.01	0.98	Continue to monitor
AIRWAYS2 115 kV	P1-2:A14:72:_HERNDON-MANCHESTER 115KV [1780]	P1	N-1	0.96	0.96	0.87	1.07	0.99	1.06	0.99	0.99	0.96	Continue to monitor
AIRWAYS2 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.91	0.91	0.85	1.08	0.96	1.07	0.97	0.97	0.91	Continue to monitor
AIRWAYS2 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:72:_HERNDON-MANCHESTER 115KV [1780]	P3	G-1/N-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Continue to monitor
AIRWAYS2 115 kV	P5-5a:A14:2:_HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	0.91	0.92	0.88	1.08	0.98	1.08	0.97	0.98	0.92	Install redundant relay
AIRWAYS2 115 kV	P1-2:A14:49:_BARTON-AIRWAYS-SANGER 115KV [1060]&P1-2:A14:72:_HERNDON-MANCHESTER 115KV [1780]	P6	N-1-1	NA	NA	0.84	NA	NA	NA	NA	NA	NA	Continue to monitor
AIRWAYS2 115 kV	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	0.94	0.94	0.84	1.08	0.98	1.08	0.98	0.98	0.94	Continue to monitor
ANGIOLA 70 kV	Base Case	P0	Base case	0.98	0.99	0.89	1.07	0.99	1.08	1.03	0.99	0.99	Continue to monitor
ANGIOLA 70 kV	P1-2:A14:82:_WAUKENA SW STA-CORCORAN 115KV [8773]	P1	N-1	0.92	0.94	0.83	1.07	0.94	1.08	1.01	0.94	0.94	Continue to monitor
ANGIOLA 70 kV	P2-3:A14:147:_WAUKENA_SS 115KV - RING R2 & R1	P2	Bus/Breaker	0.92	0.94	0.82	1.07	0.94	1.08	1.01	0.94	0.93	Continue to monitor
ANGIOLA 70 kV	P1-1:A14:52:_JGBSWLT 12.47KV GEN UNIT ST&P1-2:A14:82:_WAUKENA SW STA-CORCORAN 115KV [8773]	P3	G-1/N-1	NA	NA	0.81	NA	NA	NA	NA	NA	NA	Continue to monitor
ANGIOLA 70 kV	P5-5c:A14:38:_Waukena SW STA 115KV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.92	0.94	0.83	1.07	0.95	1.08	1.01	0.94	0.94	Install redundant battery
ANGIOLA 70 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	0.91	0.94	0.51	1.05	0.88	1.05	0.99	0.91	0.94	Continue to monitor

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



Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
ARBURUA 70 kV	P1-1:A13:26:_VEGA 0.36KV GEN UNIT 1&P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	0.89	0.88	NA	NA	NA	NA	NA	NA	0.88	Project:Losbanos area reinforcement
ASHLAN 230 kV	Base Case	P0	Base case	0.98	0.98	0.91	1.04	1.01	1.03	1.01	1.00	0.97	Continue to monitor
ASHLAN 230 kV	P1-3:A14:45:_SANGERCGRN 115/13.8KV TB 1	P1	N-1	0.98	0.98	0.90	1.04	1.01	1.03	1.01	1.00	0.97	Continue to monitor
ASHLAN 230 kV	P1-1:A14:67:_RIOBRVFSNO 12.47KV GEN UNIT 1&P1-4:A14:30:_GREGG SVD=V	P3	G-1/N-1	NA	NA	0.90	NA	NA	NA	NA	NA	NA	Continue to monitor
ASHLAN 230 kV	P5-5c:A14:21:_Sanger 115kv Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	0.98	0.98	0.90	1.04	1.01	1.03	1.01	1.00	0.97	Install redundant battery
ASHLAN 230 kV	P1-2:A14:15:_HELMS-GREGG #1 230KV [4870]&P1-2:A14:20:_MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Continue to monitor
ATWATER 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.73	1.05	1.00	1.03	1.02	1.00	NConv	Continue to monitor
ATWATER 115 kV	P5-5c:A13:2:_Wilson 230-115kv Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.29	NConv	0.59	NConv	NConv	NConv	Install redundant battery
ATWATER 115 kV	P7-1:A13:10:_ATWATER-EL CAPITAN 115KV [1020] & WILSON-ATWATER #2 115KV [4160]	P7	DCTL	0.96	0.94	0.90	1.05	0.98	1.02	0.99	0.98	0.94	Continue to monitor
ATWATER 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.73	1.05	1.00	1.03	1.02	1.00	NConv	Continue to monitor
AUBERRY 70 kV	Base Case	P0	Base case	1.06	1.06	0.92	1.05	0.99	1.07	1.10	0.99	1.06	Continue to monitor
AUBERRY 70 kV	P1-2:A14:107:_FRIANT-COPPERMINE 70KV [8660]	P1	N-1	1.06	1.06	0.83	1.06	0.96	1.07	1.12	0.98	1.06	Continue to monitor
AUBERRY 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.50	1.05	0.98	1.07	1.09	0.99	NConv	Continue to monitor
AUBERRY 70 kV	P5-5c:A13:8:_Borden 230-70kv Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NA	NA	0.62	NA	NA	NA	NA	NA	NA	Install redundant battery
AUBERRY 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.50	1.05	0.98	1.07	1.09	0.99	NConv	Continue to monitor
AVENAL 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	0.94	0.97	0.80	1.06	0.84	1.07	1.04	0.90	0.97	Continue to monitor
AVENAL 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	0.94	0.97	0.80	1.06	0.84	1.07	1.04	0.90	0.97	Continue to monitor
AVENAL 70 kV	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1&P1-3:A14:13:_GATES D 230/70KV TB 5	P3	G-1/N-1	NA	NA	0.71	NA	0.80	NA	NA	0.86	NA	Continue to monitor
AVENAL 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (Failure OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	0.94	0.97	NConv	1.06	0.83	1.07	1.04	0.88	0.97	Install redundant relay
BARTON 115 kV	Base Case	P0	Base case	0.98	0.98	0.91	1.07	1.01	1.05	1.01	1.01	0.98	Continue to monitor
BARTON 115 kV	P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P1	N-1	0.95	0.95	0.85	1.08	0.99	1.08	0.99	0.99	0.95	Continue to monitor
BARTON 115 kV	P2-1:A14:51:_BARTON-AIRWAYS-SANGER 115KV [1060] (SANGER-AIRWAYJ2)	P2	Bus/Breaker	0.97	0.97	0.87	1.07	1.00	1.06	1.01	1.00	0.97	Continue to monitor
BARTON 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.90	0.91	0.83	1.08	0.96	1.08	0.97	0.96	0.90	System adjustment

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
BARTON 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P3	G-1/N-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor
BARTON 115 kV	P5-5a:A14:2:_HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	0.91	0.92	0.87	1.08	0.98	1.08	0.97	0.97	0.91	Install redundant relay
BARTON 115 kV	P1-3:A14:7:_MC CALL 230/115KV TB 3&P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P6	N-1-1	NA	NA	0.84	NA	NA	NA	NA	NA	NA	Continue to monitor
BARTON 115 kV	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	0.95	0.95	0.84	1.08	0.98	1.08	0.98	0.98	0.95	Continue to monitor
BER VLLY 70 kV	Base Case	P0	Base case	0.95	0.95	0.96	1.00	0.96	0.98	0.96	0.96	0.95	Add voltage support
BER VLLY 70 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1	P1	N-1	0.93	0.92	0.88	1.00	0.94	0.99	0.94	0.94	0.92	Continue to monitor
BER VLLY 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.85	0.99	0.96	0.98	0.96	0.96	NConv	Continue to monitor
BER VLLY 70 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.81	NA	NA	NA	NA	NA	NA	Continue to monitor
BER VLLY 70 kV	P5-5c:A13:2:_Wilson 230-115kv Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.73	NConv	0.93	NConv	NConv	NConv	Install redundant battery
BER VLLY 70 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.62	NA	0.81	NA	0.85	0.79	NA	Continue to monitor
BER VLLY 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.85	0.99	0.96	0.98	0.96	0.96	NConv	Continue to monitor
BIOLA 70 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	1.02	1.02	0.89	1.05	1.01	1.05	1.03	1.00	1.02	Continue to monitor
BONITA 70 kV	Base Case	P0	Base case	1.00	1.00	0.94	1.04	1.02	1.06	1.03	1.02	1.00	Continue to monitor
BONITA 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.55	1.04	1.01	1.05	1.02	1.00	NConv	Continue to monitor
BONITA 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.55	1.04	1.01	1.05	1.02	1.00	NConv	Continue to monitor
BOSWELL 70 kV	Base Case	P0	Base case	0.99	1.00	0.90	1.07	0.99	1.08	1.03	1.00	0.99	Continue to monitor
BOSWELL 70 kV	P1-2:A14:82:_WAUKENA SW STA-CORCORAN 115KV [8773]	P1	N-1	0.93	0.95	0.84	1.07	0.95	1.08	1.02	0.95	0.94	Continue to monitor
BOSWELL 70 kV	P2-3:A14:148:_WAUKENA_SS 115KV - RING R2 & R3	P2	Bus/Breaker	0.92	0.94	0.83	1.07	0.95	1.08	1.02	0.95	0.94	Continue to monitor
BOSWELL 70 kV	P1-1:A14:52:_JGBSWLT 12.47KV GEN UNIT ST&P1-2:A14:82:_WAUKENA SW STA-CORCORAN 115KV [8773]	P3	G-1/N-1	NA	NA	0.81	NA	NA	NA	NA	NA	NA	Continue to monitor
BOSWELL 70 kV	P5-5c:A14:38:_Waukena SW STA 115kv Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.92	0.94	0.83	1.07	0.95	1.08	1.02	0.95	0.94	Install redundant battery
BOSWELL 70 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	0.91	0.95	0.52	1.05	0.88	1.05	0.99	0.91	0.94	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
BOSWELL 70 kV	P7-1:A14:27:_HERNDON-WOODWARD 115KV [1790] & BORDEN-COPPERMINE 70KV [8500]	P7	DCTL	0.99	1.00	0.89	1.07	0.99	1.08	1.03	1.00	0.99	Continue to monitor
CAL AVE 115 kV	Base Case	P0	Base case	0.96	0.96	0.89	1.07	1.00	1.07	0.99	1.00	0.96	Continue to monitor
CAL AVE 115 kV	P1-2:A14:67:_SANGER-CALIFORNIA AVE 115KV [9130]	P1	N-1	0.90	0.90	0.82	1.06	0.97	1.07	0.93	0.97	0.89	Add voltage support
CAL AVE 115 kV	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.88	0.89	NConv	1.07	0.96	1.06	0.92	0.95	0.88	System adjustment
CAL AVE 115 kV	P1-1:A14:59:_MCCALL1T 13.20KV GEN UNIT 1&P1-2:A14:67:_SANGER-CALIFORNIA AVE 115KV [9130]	P3	G-1/N-1	0.89	0.89	0.81	NA	NA	NA	NA	NA	0.89	Operation solution
CAL AVE 115 kV	P5-5c:A14:21:_Sanger 115kv Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	0.91	0.92	0.87	1.06	0.98	1.07	0.95	0.98	0.91	Install redundant battery
CAL AVE 115 kV	P1-2:A14:69:_MCCALL-WEST FRESNO #2 115KV [2370]&P1-2:A14:67:_SANGER-CALIFORNIA AVE 115KV [9130]	P6	N-1-1	0.58	0.59	0.52	NA	0.87	NA	0.70	0.86	0.58	Operation solution
CAL AVE 115 kV	P7-1:A13:5:_BELLOTA-COTTLE 230KV [4360] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	NConv	NConv	0.90	NConv	1.00	1.07	NConv	1.00	NConv	Continue to monitor
CALFLAX 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	0.93	0.95	0.83	1.04	0.89	1.04	1.01	0.95	0.96	Continue to monitor
CALFLAX 70 kV	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1&P1-3:A14:13:_GATES D 230/70KV TB 5	P3	G-1/N-1	NA	0.89	0.76	NA	0.86	NA	NA	NA	0.89	Operation solution
CALFLAX 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	0.92	0.95	NConv	1.04	0.88	1.04	1.01	0.93	0.96	Install redundant relay
CAMDEN 70 kV	Base Case	P0	Base case	0.92	0.93	0.85	1.05	0.95	1.06	0.97	0.96	0.93	Add voltage support
CAMDEN 70 kV	P1-2:A14:77:_GWF-KINGSBURG 115KV [1743]	P1	N-1	0.91	0.92	0.83	1.06	0.95	1.07	0.97	0.96	0.92	Continue to monitor
CAMDEN 70 kV	P2-1:A14:99:_GWF-KINGSBURG 115KV [1743] (GWFHANFORDSS-CONTADNA)	P2	Bus/Breaker	0.91	0.92	0.89	1.06	0.95	1.07	0.97	0.95	0.91	Continue to monitor
CAMDEN 70 kV	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.85	0.86	NConv	1.05	0.91	1.06	0.91	0.91	0.86	Add voltage support
CAMDEN 70 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:86:_LEPRINO SW STA-GWF HANFORD SW STA 115KV [1740]	P3	G-1/N-1	NA	NA	0.79	NA	NA	NA	NA	NA	NA	Continue to monitor
CAMDEN 70 kV	P5-5c:A14:40:_Leprino SW STA 115kv Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	0.92	0.93	0.81	1.06	0.96	1.07	0.97	0.96	0.93	Install redundant battery
CAMDEN 70 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	0.84	0.87	0.49	1.01	0.84	1.02	0.91	0.87	0.87	Add voltage support
CANAL 70 kV	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	0.83	0.85	0.92	1.05	0.90	1.05	0.93	0.93	0.84	Project:Losbanos area reinforcement
CANAL 70 kV	P2-3:A13:52:_LOS BANS - MA 70KV & LOS BANOS-O'NEILL PGP LINE	P2	Bus/Breaker	NA	NA	0.84	NA	NA	NA	NA	NA	NA	Continue to monitor
CANAL 70 kV	P1-1:A13:26:_VEGA 0.36KV GEN UNIT 1&P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	0.78	0.80	NA	NA	NA	NA	0.90	0.90	0.80	Project:Losbanos area reinforcement
CANAL 70 kV	P5-5c:A13:4:_Panoche 230-115kv Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	1.00	1.00	0.90	1.05	0.97	1.07	1.02	NConv	1.00	Install redundant battery

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
CANANDGA 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.59	1.04	1.03	1.04	1.03	1.03	NConv	Continue to monitor
CANANDGA 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.59	1.04	1.03	1.04	1.03	1.03	NConv	Continue to monitor
CASSIDY 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.58	1.04	1.01	1.05	1.05	1.02	NConv	Continue to monitor
CASSIDY 70 kV	P5-5c:A13:8:_Borden 230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NA	NA	0.66	NA	NA	NA	NA	NA	NA	Install redundant battery
CASSIDY 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.58	1.04	1.01	1.05	1.05	1.02	NConv	Continue to monitor
CERTTEED 115 kV	P2-1:A13:16:_LE GRAND-CHOWCHILLA 115KV [2110] (CERTAN T-LE GRAND)	P2	Bus/Breaker	0.93	0.95	0.87	1.05	0.99	1.05	0.97	0.99	0.94	Continue to monitor
CERTTEED 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.84	1.04	1.00	1.03	1.00	1.00	NConv	Continue to monitor
CERTTEED 115 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Continue to monitor
CERTTEED 115 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.54	NA	0.70	NA	NA	0.69	NA	Continue to monitor
CERTTEED 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.84	1.04	1.00	1.03	1.00	1.00	NConv	Continue to monitor
CHEVPIPE 70 kV	P2-3:A13:52:_LOS BANS - MA 70KV & LOS BANOS-O'NEILL PGP LINE	P2	Bus/Breaker	NA	NA	0.82	NA	NA	NA	NA	NA	NA	Continue to monitor
CHEVPLIN 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	0.93	0.96	0.80	1.06	0.85	1.06	1.03	0.90	0.96	Continue to monitor
CHEVPLIN 70 kV	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1&P1-3:A14:13:_GATES D 230/70KV TB 5	P3	G-1/N-1	NA	0.89	0.72	NA	0.80	NA	NA	0.87	0.89	Operation solution
CHEVPLIN 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	0.93	0.96	NConv	1.05	0.83	1.06	1.03	0.89	0.96	Install redundant relay
CHLDHOSP 115 kV	Base Case	P0	Base case	0.99	0.99	0.91	1.07	1.02	1.05	1.02	1.02	0.98	Continue to monitor
CHLDHOSP 115 kV	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	0.87	0.88	0.83	1.09	1.00	1.09	0.97	0.99	0.88	System adjustment
CHLDHOSP 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-3:A14:5:_MC CALL 230/115KV TB 1	P3	G-1/N-1	NA	NA	0.90	NA	NA	NA	NA	NA	NA	Continue to monitor
CHLDHOSP 115 kV	P1-4:A14:30:_GREGG SVD=V&P1-2:A14:75:_WOODWARD-SHEPHERD 115KV [1895]	P6	N-1-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Continue to monitor
CHWCHLA2BM 115 kV	P2-1:A13:16:_LE GRAND-CHOWCHILLA 115KV [2110] (CERTAN T-LE GRAND)	P2	Bus/Breaker	0.94	0.95	0.87	1.05	0.99	1.05	0.97	0.99	0.95	Continue to monitor
CHWCHLA2BM 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.84	1.04	1.00	1.03	1.00	1.01	NConv	Continue to monitor
CHWCHLA2BM 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.84	1.04	1.00	1.03	1.00	1.01	NConv	Continue to monitor
CHWCHLA2BM 13.8 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Continue to monitor



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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
CHWCHLA2BM 13.8 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.55	NA	0.70	NA	NA	0.69	NA	Continue to monitor
CHWCHLLA 115 kV	P1-2:A13:40:_LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	0.85	0.87	NConv	1.07	0.92	1.08	0.94	0.92	0.87	Add voltage support
CHWCHLLA 115 kV	P2-1:A13:15:_LE GRAND-CHOWCHILLA 115KV [2110] (CHWCHLLA-CERTAN T)	P2	Bus/Breaker	0.85	0.87	NConv	1.07	0.92	1.08	0.94	0.92	0.87	System adjustment
CHWCHLLA 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.84	1.04	1.00	1.03	1.00	1.00	NConv	Continue to monitor
CHWCHLLA 115 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Continue to monitor
CHWCHLLA 115 kV	P5-5c:A13:12:_Le Grand 115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.85	0.88	NA	1.07	0.92	1.08	0.94	0.92	0.87	Install redundant battery
CHWCHLLA 115 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.55	NA	0.70	NA	NA	0.69	NA	Continue to monitor
CHWCHLLA 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.84	1.04	1.00	1.03	1.00	1.00	NConv	Continue to monitor
CLOVIS-1 115 kV	Base Case	P0	Base case	0.98	0.98	0.91	1.07	1.02	1.07	1.01	1.01	0.98	Continue to monitor
CLOVIS-1 115 kV	P1-2:A14:48:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890]	P1	N-1	0.96	0.96	0.89	1.07	0.99	1.07	0.99	1.00	0.96	Continue to monitor
CLOVIS-1 115 kV	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	0.91	0.92	0.87	1.09	1.00	1.08	0.98	0.99	0.91	Continue to monitor
CLOVIS-1 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P3	G-1/N-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Continue to monitor
CLOVIS-1 115 kV	P5-5c:A14:16:_Shepherd 115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.96	0.96	0.89	1.07	1.00	1.07	0.99	0.99	0.96	Install redundant battery
CLOVIS-1 115 kV	P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]&P1-2:A14:50:_KERCKHOFF-CLOVIS-SANGER #2 115KV [1900]	P6	N-1-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor
CLOVIS-1 115 kV	P7-1:A14:27:_HERNDON-WOODWARD 115KV [1790] & BORDEN-COPPERMINE 70KV [8500]	P7	DCTL	0.96	0.96	0.88	1.07	1.02	1.07	1.00	1.01	0.96	Continue to monitor
CLOVIS-2 115 kV	Base Case	P0	Base case	0.97	0.97	0.90	1.08	1.01	1.07	1.00	1.01	0.97	Continue to monitor
CLOVIS-2 115 kV	P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P1	N-1	0.96	0.96	0.88	1.08	1.01	1.07	0.99	1.01	0.96	Continue to monitor
CLOVIS-2 115 kV	P2-1:A14:50:_KERCKHOFF-CLOVIS-SANGER #2 115KV [1900] (CLOVISJ2-SANGER)	P2	Bus/Breaker	0.90	0.90	0.82	1.08	0.98	1.08	0.97	0.97	0.90	Continue to monitor
CLOVIS-2 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P3	G-1/N-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Continue to monitor
CLOVIS-2 115 kV	P5-5c:A14:16:_Shepherd 115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.96	0.96	0.89	1.08	1.00	1.07	0.99	0.99	0.96	Install redundant battery
CLOVIS-2 115 kV	P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]&P1-2:A14:50:_KERCKHOFF-CLOVIS-SANGER #2 115KV [1900]	P6	N-1-1	NA	NA	0.84	NA	NA	NA	NA	NA	NA	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
CLOVIS-2 115 kV	P7-1:A14:27:_HERNDON-WOODWARD 115KV [1790] & BORDEN-COPPERMINE 70KV [8500]	P7	DCTL	0.96	0.96	0.88	1.08	1.01	1.07	1.00	1.01	0.96	Continue to monitor
CLOVIS-2 115 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.96	0.96	0.89	1.08	1.00	1.07	0.99	1.00	0.95	Continue to monitor
COLNGA 1 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	0.92	0.94	0.81	1.03	0.87	1.03	0.99	0.92	0.94	Continue to monitor
COLNGA 1 70 kV	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1&P1-3:A14:13:_GATES D 230/70KV TB 5	P3	G-1/N-1	0.88	0.87	0.72	NA	0.82	NA	NA	0.89	0.87	Operation solution
COLNGA 1 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	0.91	0.94	NConv	1.02	0.86	1.03	0.99	0.90	0.94	Install redundant relay
COLNGA 2 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	0.93	0.95	0.83	1.03	0.88	1.03	1.00	0.93	0.95	Continue to monitor
COLNGA 2 70 kV	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1&P1-3:A14:13:_GATES D 230/70KV TB 5	P3	G-1/N-1	0.89	0.88	0.74	NA	0.84	NA	NA	0.90	0.88	Operation solution
COLNGA 2 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	0.92	0.95	NConv	1.03	0.87	1.03	1.00	0.92	0.95	Install redundant relay
CONTADNA 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:86:_LEPRINO SW STA-GWF HANFORD SW STA 115KV [1740]	P3	G-1/N-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
CONTADNA 115 kV	P5-5c:A14:40:_Leprino SW STA 115kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	1.01	1.01	0.89	1.06	1.01	1.06	1.01	1.02	1.01	Install redundant battery
CONTADNA 115 kV	P1-2:A14:85:_HRNTASLR-LPRNJCTSS #1 115KV [0]&P1-2:A14:81:_HENRIETTA-LEPRINO SW STA 115KV [1737]	P6	N-1-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor
CONTADNA 115 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	0.98	0.99	0.76	1.02	0.97	1.01	0.99	0.98	0.99	Continue to monitor
COPPRMNE 70 kV	P1-2:A14:107:_FRIANT-COPPERMINE 70KV [8660]	P1	N-1	1.05	1.06	0.89	1.05	0.98	1.06	1.10	1.01	1.06	Continue to monitor
COPPRMNE 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.57	1.04	1.00	1.05	1.07	1.01	NConv	Continue to monitor
COPPRMNE 70 kV	P5-5c:A13:8:_Borden 230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NA	NA	0.71	NA	NA	NA	NA	NA	NA	Install redundant battery
COPPRMNE 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.57	1.04	1.00	1.05	1.07	1.01	NConv	Continue to monitor
CORCORAN 115 kV	Base Case	P0	Base case	0.98	0.99	0.90	1.07	0.99	1.07	1.03	0.99	0.99	Continue to monitor
CORCORAN 115 kV	P1-2:A14:82:_WAUKENA SW STA-CORCORAN 115KV [8773]	P1	N-1	0.92	0.94	0.84	1.07	0.94	1.07	1.01	0.94	0.94	Continue to monitor
CORCORAN 115 kV	P2-3:A14:147:_WAUKENA_SS 115KV - RING R2 & R1	P2	Bus/Breaker	0.92	0.94	0.83	1.07	0.94	1.07	1.01	0.94	0.93	Continue to monitor
CORCORAN 115 kV	P1-1:A14:52:_JGBSWLT 12.47KV GEN UNIT ST&P1-2:A14:82:_WAUKENA SW STA-CORCORAN 115KV [8773]	P3	G-1/N-1	NA	NA	0.82	NA	NA	NA	NA	NA	NA	Continue to monitor
CORCORAN 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.04	0.89	1.04	0.99	0.93	NConv	Install redundant battery

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
CORCORAN 115 kV	P5-5c:A14:38:_Waukena SW STA 115KV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.92	0.94	0.83	1.07	0.95	1.07	1.01	0.94	0.93	Install redundant battery
CORCORAN 115 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	0.91	0.94	0.53	1.04	0.88	1.04	0.99	0.91	0.93	Continue to monitor
CORCORAN 70 kV	Base Case	P0	Base case	1.00	1.00	0.91	1.08	1.00	1.08	1.04	1.00	1.00	Continue to monitor
CORCORAN 70 kV	P1-2:A14:82:_WAUKENA SW STA-CORCORAN 115KV [8773]	P1	N-1	0.93	0.95	0.84	1.08	0.96	1.08	1.03	0.96	0.95	Continue to monitor
CORCORAN 70 kV	P2-3:A14:147:_WAUKENA_SS 115KV - RING R2 & R1	P2	Bus/Breaker	0.93	0.95	0.84	1.08	0.95	1.08	1.03	0.95	0.95	Continue to monitor
CORCORAN 70 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	0.92	0.95	0.53	1.05	0.89	1.05	1.00	0.92	0.95	Continue to monitor
CORSGOLD 115 kV	Base Case	P0	Base case	0.96	0.95	0.87	1.07	1.00	1.07	1.00	1.00	0.95	Continue to monitor
CORSGOLD 115 kV	P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P1	N-1	0.93	0.93	0.87	1.08	1.00	1.08	0.99	1.00	0.92	Continue to monitor
CORSGOLD 115 kV	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	0.91	0.91	0.85	1.09	0.98	1.08	0.97	0.97	0.91	Continue to monitor
CORSGOLD 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P3	G-1/N-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Continue to monitor
CORSGOLD 115 kV	P1-2:A13:40:_LE GRAND-CHOWCHILLA 115KV [2110]&P1-2:A14:48:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890]	P6	N-1-1	NA	NA	0.78	NA	NA	NA	NA	NA	NA	Continue to monitor
CORSGOLD 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.89	1.07	1.00	1.07	1.00	1.00	NConv	Continue to monitor
CORSGOLD 115 kV	P7-1:A14:27:_HERNDON-WOODWARD 115KV [1790] & BORDEN-COPPERMINE 70KV [8500]	P7	DCTL	0.93	0.93	0.88	1.08	1.00	1.08	0.99	1.00	0.93	Continue to monitor
CRESSEY 115 kV	Base Case	P0	Base case	1.01	0.98	0.95	1.06	1.01	1.03	1.02	1.01	0.98	Continue to monitor
CRESSEY 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.73	1.05	0.99	1.03	1.01	0.99	NConv	Continue to monitor
CRESSEY 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.29	NConv	0.59	NConv	NConv	NConv	Install redundant battery
CRESSEY 115 kV	P7-1:A13:10:_ATWATER-EL CAPITAN 115KV [1020] & WILSON-ATWATER #2 115KV [4160]	P7	DCTL	0.95	0.93	0.89	1.05	0.98	1.02	0.98	0.98	0.93	Continue to monitor
CRESSEY 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.73	1.05	0.99	1.03	1.01	0.99	NConv	Continue to monitor
DAIRYLND 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.85	1.04	0.99	1.03	1.01	0.99	NConv	Continue to monitor
DAIRYLND 115 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.82	NA	NA	NA	NA	NA	NA	Continue to monitor
DAIRYLND 115 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.48	NA	0.61	NA	NA	0.60	NA	Continue to monitor
DAIRYLND 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.85	1.04	0.99	1.03	1.01	0.99	NConv	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
DANISHCM 115 kV	Base Case	P0	Base case	0.96	0.96	0.89	1.07	1.00	1.07	0.99	1.00	0.96	Continue to monitor
DANISHCM 115 kV	P1-2:A14:67:_SANGER-CALIFORNIA AVE 115KV [9130]	P1	N-1	0.90	0.90	0.83	1.06	0.97	1.07	0.94	0.97	0.90	Continue to monitor
DANISHCM 115 kV	P2-4:A14:8:_MC CALL 230KV - SECTION 1E & 1D	P2	Bus/Breaker	0.88	0.89	NConv	1.06	0.96	1.06	0.93	0.95	0.88	System adjustment
DANISHCM 115 kV	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.89	0.89	NConv	1.07	0.96	1.06	0.93	0.95	0.88	System adjustment
DANISHCM 115 kV	P1-1:A14:59:_MCCALL1T 13.20KV GEN UNIT 1&P1-2:A14:67:_SANGER-CALIFORNIA AVE 115KV [9130]	P3	G-1/N-1	0.90	0.90	0.82	NA	NA	NA	NA	NA	0.89	Operation solution
DANISHCM 115 kV	P5-5c:A14:21:_Sanger 115kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	0.92	0.92	0.87	1.06	0.98	1.07	0.95	0.99	0.92	Install redundant battery
DANISHCM 115 kV	P1-2:A14:69:_MCCALL-WEST FRESNO #2 115KV [2370]&P1-2:A14:67:_SANGER-CALIFORNIA AVE 115KV [9130]	P6	N-1-1	0.60	0.61	0.54	NA	0.88	NA	0.72	0.87	0.60	Operation solution
DANISHCM 115 kV	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	0.95	0.96	0.87	1.07	1.00	1.07	0.98	1.00	0.95	Continue to monitor
DFS 115 kV	P2-4:A13:13:_PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2	Bus/Breaker	0.72	0.71	NConv	1.06	0.90	1.10	0.94	0.89	0.71	System adjustment
DINUBA 70 kV	Base Case	P0	Base case	1.00	1.01	0.95	1.04	1.02	1.04	1.01	1.02	1.00	Continue to monitor
DINUBA 70 kV	P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P1	N-1	1.01	0.88	0.79	1.04	1.02	1.05	1.02	NA	0.88	Project:Review reedley area reinforcement
DINUBA 70 kV	P2-3:A14:51:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	0.95	0.95	0.86	1.04	0.99	1.04	0.99	0.99	0.95	Continue to monitor
DINUBA 70 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	NA	0.88	0.78	NA	NA	NA	NA	NA	0.87	Operation solution
DINUBA 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.04	0.97	1.05	0.93	0.87	NConv	Install redundant battery
DINUBA 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.95	0.95	0.86	1.04	0.99	1.04	0.99	0.99	0.95	Continue to monitor
DOS PALS 70 kV	P2-4:A13:13:_PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2	Bus/Breaker	0.80	0.79	NConv	1.04	1.00	1.04	1.02	0.99	0.78	System adjustment
DOS PALS 70 kV	P1-2:A13:61:_PANOCHÉ-ORO LOMA 115KV [3240]&P1-2:A13:48:_WILSON-ORO LOMA 115KV [4200]	P6	N-1-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Continue to monitor
DUNLAP 70 kV	Base Case	P0	Base case	0.98	0.98	0.92	1.04	1.00	1.04	0.99	1.01	0.98	Continue to monitor
DUNLAP 70 kV	P1-3:A14:5:_MC CALL 230/115KV TB 1	P1	N-1	0.96	0.97	0.90	1.04	0.99	1.04	0.98	1.00	0.97	Continue to monitor
DUNLAP 70 kV	P2-3:A14:139:_REEDLEY 115KV - RING R5 & R6	P2	Bus/Breaker	0.93	0.92	0.84	1.04	0.98	1.05	0.98	0.98	0.92	Continue to monitor
DUNLAP 70 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	NA	NA	0.83	NA	NA	NA	NA	NA	NA	Continue to monitor
DUNLAP 70 kV	P5-5c:A13:8:_Borden 230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Install redundant battery
DUNLAP 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.92	0.93	0.82	1.04	0.98	1.04	0.97	0.98	0.92	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
EL CAPTN 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.74	1.05	1.00	1.04	1.02	1.00	NConv	Continue to monitor
EL CAPTN 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.29	NConv	0.60	NConv	NConv	NConv	Install redundant battery
EL CAPTN 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.74	1.05	1.00	1.04	1.02	1.00	NConv	Continue to monitor
EL NIDO 115 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	0.87	0.86	0.91	1.06	0.98	1.06	1.00	0.97	0.86	Project:Oroloma area reinforcement
EL NIDO 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.80	1.05	1.01	1.05	1.03	1.01	NConv	Continue to monitor
EL NIDO 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1&P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	0.89	NA	NA	NA	NA	NA	NA	NA	NA	Project:Wilson area reinforcement
EL NIDO 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.80	1.05	1.01	1.05	1.03	1.01	NConv	Continue to monitor
EL PECO 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.58	1.04	1.02	1.05	1.02	1.02	NConv	Continue to monitor
EL PECO 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.58	1.04	1.02	1.05	1.02	1.02	NConv	Continue to monitor
ELNIDOBM 13.8 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
ELNIDOBM 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.82	1.01	0.98	0.99	0.99	0.98	NConv	Continue to monitor
ELNIDOBM 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.82	1.01	0.98	0.99	0.99	0.98	NConv	Continue to monitor
FIGRDN 1 230 kV	Base Case	P0	Base case	0.98	0.98	0.91	1.04	1.01	1.03	1.01	1.00	0.98	Continue to monitor
FIGRDN 1 230 kV	P1-1:A14:67:_RIOBRVFSNO 12.47KV GEN UNIT 1&P1-4:A14:30:_GREGG SVD=V	P3	G-1/N-1	NA	NA	0.90	NA	NA	NA	NA	NA	NA	Continue to monitor
FIGRDN 1 230 kV	P5-5c:A14:21:_Sanger 115KV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.98	0.98	0.90	1.04	1.01	1.03	1.01	1.00	0.97	Install redundant battery
FIGRDN 1 230 kV	P1-2:A14:15:_HELMS-GREGG #1 230KV [4870]&P1-2:A14:20:_MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Continue to monitor
FIGRDN 2 230 kV	Base Case	P0	Base case	0.98	0.97	0.91	1.04	1.00	1.03	1.01	1.00	0.97	Continue to monitor
FIGRDN 2 230 kV	P1-3:A14:45:_SANGERCN 115/13.8KV TB 1	P1	N-1	0.98	0.97	0.90	1.04	1.00	1.03	1.01	1.00	0.97	Continue to monitor
FIGRDN 2 230 kV	P2-2:A14:11:_HAAS 230KV SECTION 1D	P2	Bus/Breaker	0.98	0.97	0.90	1.04	1.00	1.03	1.01	1.00	0.97	Continue to monitor
FIGRDN 2 230 kV	P1-1:A14:67:_RIOBRVFSNO 12.47KV GEN UNIT 1&P1-4:A14:30:_GREGG SVD=V	P3	G-1/N-1	NA	NA	0.90	NA	NA	NA	NA	NA	NA	Continue to monitor
FIGRDN 2 230 kV	P5-5c:A14:21:_Sanger 115KV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.98	0.97	0.90	1.04	1.01	1.03	1.01	1.00	0.97	Install redundant battery
FIGRDN 2 230 kV	P1-2:A14:15:_HELMS-GREGG #1 230KV [4870]&P1-2:A14:20:_MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Continue to monitor
FIREBAGH 70 kV	P1-2:A13:61:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	0.97	0.97	0.89	1.04	0.99	1.05	1.01	0.98	0.96	Continue to monitor
FIREBAGH 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	0.76	0.77	NConv	1.03	0.97	1.05	1.01	0.96	0.75	Project:Oroloma area reinforcement

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



Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
FIREBAGH 70 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A13:61:_PANOCHÉ-ORO LOMA 115KV [3240]	P3	G-1/N-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Continue to monitor
FIREBAGH 70 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.96	0.96	0.87	1.03	0.98	1.06	1.01	NConv	0.95	Install redundant battery
FIREBAGH 70 kV	P1-2:A13:61:_PANOCHÉ-ORO LOMA 115KV [3240]&P1-2:A13:48:_WILSON-ORO LOMA 115KV [4200]	P6	N-1-1	NA	NA	0.79	NA	NA	NA	NA	NA	NA	Continue to monitor
FIREBAGH 70 kV	P7-1:A13:7:_LOS BANOS-PANOCHÉ #1 230KV [5030] & PANOCHÉ-ORO LOMA 115KV [3240]	P7	DCTL	0.97	0.97	0.89	1.04	0.99	1.05	1.01	0.98	0.96	Continue to monitor
GALLO 115 kV	Base Case	P0	Base case	1.00	0.98	0.94	1.06	1.01	1.03	1.01	1.01	0.98	Continue to monitor
GALLO 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.72	1.04	0.99	1.03	1.00	0.99	NConv	Continue to monitor
GALLO 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.29	NConv	0.58	NConv	NConv	NConv	Install redundant battery
GALLO 115 kV	P7-1:A13:10:_ATWATER-EL CAPITAN 115KV [1020] & WILSON-ATWATER #2 115KV [4160]	P7	DCTL	0.95	0.93	0.89	1.05	0.98	1.02	0.98	0.98	0.93	Continue to monitor
GALLO 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.72	1.04	0.99	1.03	1.00	0.99	NConv	Continue to monitor
GILLRAN 115 kV	P2-1:A13:46:_DAIRYLAND-MENDOTA 115KV [1360] (MENDOTA-GILLTAP)	P2	Bus/Breaker	0.92	0.92	0.90	1.04	0.96	1.02	0.96	0.96	0.91	Continue to monitor
GILLRAN 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.89	1.03	0.99	1.02	1.00	0.99	NConv	Continue to monitor
GILLRAN 115 kV	P2-4:A13:13:_PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2	Bus/Breaker	0.99	0.99	NConv	1.02	0.89	1.00	0.98	0.89	0.98	Generation re-dispatch
GILLRAN 115 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.77	NA	NA	NA	NA	0.89	NA	Continue to monitor
GILLRAN 115 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.99	0.99	0.89	1.02	0.87	1.00	0.98	NConv	0.99	Install redundant battery
GILLRAN 115 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.43	NA	0.56	NA	NA	0.55	NA	Continue to monitor
GILLRAN 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.89	1.03	0.99	1.02	1.00	0.99	NConv	Continue to monitor
GLASS 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.59	1.04	1.03	1.04	1.03	1.03	NConv	Continue to monitor
GLASS 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.59	1.04	1.03	1.04	1.03	1.03	NConv	Continue to monitor
GRDNGLS1WB 115 kV	Base Case	P0	Base case	1.00	1.01	0.94	1.06	1.02	1.06	1.02	1.02	1.00	Continue to monitor
GRDNGLS1WB 115 kV	P2-2:A14:59:_KINGSBURGD 115KV SECTION 1D	P2	Bus/Breaker	0.99	0.99	0.89	1.06	1.00	1.06	1.02	1.01	0.99	Continue to monitor
GRDNGLS1WB 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:86:_LEPRINO SW STA-GWF HANFORD SW STA 115KV [1740]	P3	G-1/N-1	NA	NA	0.90	NA	NA	NA	NA	NA	NA	Continue to monitor

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



Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
GRDNGLS1WB 115 kV	P1-3:A14:7:_MC CALL 230/115KV TB 3&P1-3:A14:5:_MC CALL 230/115KV TB 1	P6	N-1-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
HAMMONDS 115 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	0.71	0.70	NConv	1.05	0.90	1.10	0.94	0.89	0.69	Project:Oroloma area reinforcement
HARDWICK 70 kV	Base Case	P0	Base case	0.99	0.99	0.91	1.06	1.00	1.06	1.01	1.00	0.99	Continue to monitor
HARDWICK 70 kV	P1-3:A14:5:_MC CALL 230/115KV TB 1	P1	N-1	0.98	0.98	0.89	1.06	0.99	1.06	1.00	0.99	0.98	Continue to monitor
HARDWICK 70 kV	P2-3:A14:73:_KINGSBURGD - 1D 115KV & GWF-KINGSBURG LINE	P2	Bus/Breaker	0.96	0.97	0.84	1.06	0.98	1.06	1.00	0.98	0.96	Continue to monitor
HARDWICK 70 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:86:_LEPRINO SW STA-GWF HANFORD SW STA 115KV [1740]	P3	G-1/N-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Continue to monitor
HARDWICK 70 kV	P5-5c:A14:40:_Leprino SW STA 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.99	0.99	0.88	1.07	1.00	1.07	1.01	1.00	0.99	Install redundant battery
HARDWICK 70 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	0.91	0.93	0.56	1.02	0.89	1.02	0.96	0.92	0.93	Continue to monitor
INDN FLT 70 kV	Base Case	P0	Base case	0.93	0.93	0.95	0.99	0.95	0.98	0.94	0.95	0.93	Add voltage support
INDN FLT 70 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1	P1	N-1	0.91	0.91	0.87	0.99	0.93	0.99	0.92	0.93	0.90	Continue to monitor
INDN FLT 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.83	0.98	0.95	0.98	0.94	0.95	NConv	Continue to monitor
INDN FLT 70 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCH1-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.79	NA	NA	NA	NA	NA	0.90	Continue to monitor
INDN FLT 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.72	NConv	0.93	NConv	NConv	NConv	Install redundant battery
INDN FLT 70 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCH1-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.60	NA	0.79	NA	0.83	0.78	NA	Continue to monitor
INDN FLT 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.83	0.98	0.95	0.98	0.94	0.95	NConv	Continue to monitor
KEARNEY 230 kV	Base Case	P0	Base case	0.99	0.98	0.92	1.03	1.00	1.02	1.01	1.00	0.98	Continue to monitor
KEARNEY 230 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.91	0.91	0.84	1.03	0.94	1.04	0.97	0.94	0.91	Continue to monitor
KEARNEY 70 kV	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1&P1-2:A14:11:_TRANQUILLITY SW STA-KEARNEY 230KV [5380]	P3	G-1/N-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Continue to monitor
KEARNEY 70 kV	P1-2:A14:11:_TRANQUILLITY SW STA-KEARNEY 230KV [5380]&P1-4:A14:30:_GREGG SVD=V	P6	N-1-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
KERCKHOFFPH2 115 kV	Base Case	P0	Base case	0.99	0.98	0.91	1.07	1.02	1.07	1.02	1.02	0.98	Continue to monitor
KERCKHOFFPH2 115 kV	P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P1	N-1	0.96	0.96	0.89	1.08	1.02	1.08	1.01	1.02	0.96	Continue to monitor
KERCKHOFFPH2 115 kV	P2-1:A14:50:_KERCKHOFF-CLOVIS-SANGER #2 115KV [1900] (CLOVISJ2-SANGER)	P2	Bus/Breaker	0.96	0.95	0.89	1.07	1.01	1.07	1.00	1.00	0.95	Continue to monitor
KERCKHOFFPH2 115 kV	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	0.92	0.92	0.87	1.09	1.00	1.08	0.98	1.00	0.92	Continue to monitor

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Study Area: **PG&E Greater Fresno**  
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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
KERCKHOFFPH2 115 kV	P7-1:A14:27:_HERNDON-WOODWARD 115KV [1790] & BORDEN-COPPERMINE 70KV [8500]	P7	DCTL	0.96	0.96	0.89	1.08	1.02	1.07	1.01	1.02	0.96	Continue to monitor
KERCKHOFFPH2 13.8 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P3	G-1/N-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Continue to monitor
KERCKHOFFPH2 13.8 kV	P1-2:A13:40:_LE GRAND-CHOWCHILLA 115KV [2110]&P1-2:A14:48:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890]	P6	N-1-1	NA	NA	0.81	NA	NA	NA	NA	NA	NA	Continue to monitor
KETTLEMN 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	0.93	0.96	0.80	1.06	0.85	1.06	1.03	0.90	0.96	Continue to monitor
KETTLEMN 70 kV	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1&P1-3:A14:13:_GATES D 230/70KV TB 5	P3	G-1/N-1	NA	0.89	0.72	NA	0.80	NA	NA	0.87	0.89	Operation solution
KETTLEMN 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	0.93	0.96	NConv	1.05	0.83	1.06	1.03	0.89	0.96	Install redundant relay
KINGSBURGD 115 kV	Base Case	P0	Base case	1.00	1.00	0.93	1.06	1.01	1.06	1.02	1.01	1.00	Continue to monitor
KINGSBURGD 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:86:_LEPRINO SW STA-GWF HANFORD SW STA 115KV [1740]	P3	G-1/N-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
KINGSBURGD 115 kV	P5-5c:A14:40:_Leprino SW STA 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant battery supply/Relay	1.00	1.00	0.90	1.07	1.01	1.07	1.02	1.01	1.00	Install redundant battery
KINGSBURGD 115 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	0.92	0.95	0.59	1.02	0.91	1.01	0.97	0.93	0.94	Continue to monitor
KINGSBURGE 115 kV	Base Case	P0	Base case	1.00	1.00	0.93	1.06	1.01	1.06	1.02	1.01	1.00	Continue to monitor
KINGSBURGE 115 kV	P2-2:A14:59:_KINGSBURGD 115KV SECTION 1D	P2	Bus/Breaker	0.98	0.98	0.86	1.06	0.99	1.06	1.01	1.00	0.98	Continue to monitor
KINGSBURGE 115 kV	P2-3:A14:72:_KINGSBURGD - 1D 115KV & MCCALL-KINGSBURG #1 LINE	P2	Bus/Breaker	0.98	0.98	0.86	1.06	0.99	1.06	1.01	1.00	0.98	Continue to monitor
KINGSBURGE 115 kV	P2-3:A14:73:_KINGSBURGD - 1D 115KV & GWF-KINGSBURG LINE	P2	Bus/Breaker	0.98	0.98	0.86	1.06	0.99	1.06	1.01	1.00	0.98	Continue to monitor
KINGSBURGE 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:86:_LEPRINO SW STA-GWF HANFORD SW STA 115KV [1740]	P3	G-1/N-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
KINGSBURGE 115 kV	P5-5c:A14:40:_Leprino SW STA 115kV Batt(Failure of Non-Redundant Batt)	P5	Non-Redundant battery supply/Relay	1.00	1.00	0.90	1.07	1.01	1.07	1.02	1.01	1.00	Install redundant battery
KINGSBURGE 115 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	0.92	0.95	0.59	1.02	0.91	1.01	0.97	0.93	0.94	Continue to monitor
LASPALMS 115 kV	Base Case	P0	Base case	0.98	0.98	0.90	1.07	1.01	1.06	1.01	1.01	0.98	Continue to monitor
LASPALMS 115 kV	P1-2:A14:72:_HERNDON-MANCHESTER 115KV [1780]	P1	N-1	0.96	0.96	0.87	1.07	1.00	1.06	0.99	0.99	0.96	Continue to monitor
LASPALMS 115 kV	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	0.91	0.92	0.86	1.08	0.98	1.07	0.97	0.98	0.91	Continue to monitor
LASPALMS 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:72:_HERNDON-MANCHESTER 115KV [1780]	P3	G-1/N-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Continue to monitor



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Study Area: **PG&E Greater Fresno**  
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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
LASPALMS 115 kV	P5-5a:A14:2:_HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	0.92	0.92	0.88	1.08	0.98	1.08	0.97	0.98	0.92	Install redundant relay
LASPALMS 115 kV	P1-2:A14:49:_BARTON-AIRWAYS-SANGER 115KV [1060]&P1-2:A14:72:_HERNDON-MANCHESTER 115KV [1780]	P6	N-1-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor
LASPALMS 115 kV	P7-1:A14:27:_HERNDON-WOODWARD 115KV [1790] & BORDEN-COPPERMINE 70KV [8500]	P7	DCTL	0.97	0.97	0.89	1.07	1.01	1.06	1.01	1.01	0.97	Continue to monitor
LASPALMS 115 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.97	0.97	0.89	1.07	1.00	1.06	1.00	1.00	0.96	Continue to monitor
LE GRAND 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.83	1.04	1.00	1.04	1.01	1.00	NConv	Continue to monitor
LE GRAND 115 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Continue to monitor
LE GRAND 115 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.53	NA	0.68	NA	NA	0.66	NA	Continue to monitor
LE GRAND 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.83	1.04	1.00	1.04	1.01	1.00	NConv	Continue to monitor
LEPRINOFDLMR 115 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	0.99	1.00	0.90	1.01	0.99	1.01	1.00	0.99	1.00	Continue to monitor
LEPRINOFDLMR 21 kV	P1-2:A14:85:_HRNTASLR-LPRNJCTSS #1 115KV [0]&P1-2:A14:81:_HENRIETTA-LEPRINO SW STA 115KV [1737]	P6	N-1-1	NA	NA	0.82	NA	NA	NA	NA	NA	NA	Continue to monitor
LIVNGSTN 115 kV	Base Case	P0	Base case	1.00	0.98	0.94	1.06	1.01	1.02	1.01	1.01	0.98	Continue to monitor
LIVNGSTN 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.72	1.04	0.99	1.02	1.01	0.99	NConv	Continue to monitor
LIVNGSTN 115 kV	P1-1:A13:26:_VEGA 0.36KV GEN UNIT 1&P1-2:A13:75:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P3	G-1/N-1	0.84	0.84	NA	NA	NA	NA	NA	0.85	0.84	Project:Losbanos area reinforcement
LIVNGSTN 115 kV	P5-5c:A13:2:_Wilson 230-115kv Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.29	NConv	0.57	NConv	NConv	NConv	Install redundant battery
LIVNGSTN 115 kV	P7-1:A13:10:_ATWATER-EL CAPITAN 115KV [1020] & WILSON-ATWATER #2 115KV [4160]	P7	DCTL	0.95	0.93	0.90	1.05	0.98	1.01	0.98	0.98	0.93	Continue to monitor
LIVNGSTN 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.72	1.04	0.99	1.02	1.01	0.99	NConv	Continue to monitor
LIVNGSTN 70 kV	P1-2:A13:75:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	0.88	0.87	0.93	1.03	0.85	1.09	0.94	0.90	0.87	Project:Losbanos area reinforcement
LIVNGSTN 70 kV	P2-2:A13:1:_LOS BANOS 230KV SECTION 1D	P2	Bus/Breaker	0.88	0.88	0.90	1.00	0.83	1.07	0.92	0.86	0.88	Project:Reivew Losbanos area reinforcement
LIVNGSTN 70 kV	P2-3:A13:52:_LOS BANS - MA 70KV & LOS BANOS-O'NEILL PGP LINE	P2	Bus/Breaker	NA	NA	0.78	NA	NA	NA	NA	NA	NA	Continue to monitor
LIVNGSTN 70 kV	P2-3:A14:18:_MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	0.93	0.93	NConv	1.03	0.90	1.09	0.96	0.91	0.93	Generation re-dispatch
LIVNGSTN 70 kV	P2-4:A13:18:_LOS BANOS 230KV - SECTION 2D & 1D	P2	Bus/Breaker	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
LIVNGSTN 70 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	1.03	1.04	0.72	1.03	0.90	1.09	1.06	NConv	1.04	Install redundant battery
LIVNGSTN 70 kV	P7-1:A13:11:_LOS BANOS-PANOCHÉ #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	0.88	0.87	0.93	1.03	0.85	1.10	0.95	0.90	0.87	Project:Losbanos area reinforcement
LIVNGSTN 70 kV	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	0.93	0.93	NConv	1.03	0.90	1.09	0.96	0.91	0.93	Generation re-dispatch
LUIS_#3 115 kV	P2-4:A13:13:_PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2	Bus/Breaker	0.70	0.69	NConv	1.05	0.89	1.11	0.93	0.89	0.68	Project:Oroloma area reinforcement
LUIS_#5 115 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉJ-PANOCHÉ2)	P2	Bus/Breaker	0.71	0.70	0.83	1.06	0.91	1.11	0.93	0.91	0.69	Project:Oroloma area reinforcement
MADERA 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.59	1.04	1.03	1.05	1.03	1.03	NConv	Continue to monitor
MADERA 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.59	1.04	1.03	1.05	1.03	1.03	NConv	Continue to monitor
MALAGA 115 kV	Base Case	P0	Base case	1.01	1.01	0.94	1.07	1.02	1.07	1.01	1.02	1.01	Continue to monitor
MALAGA 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.07	0.98	1.08	0.90	0.89	NConv	Install redundant battery
MANCHSTR 115 kV	Base Case	P0	Base case	0.98	0.97	0.89	1.07	1.01	1.06	1.01	1.01	0.97	Continue to monitor
MANCHSTR 115 kV	P1-2:A14:43:_LASPALMS-MANCHSTR-AIRWAYS2-SANGER 115KV [0]	P1	N-1	0.97	0.97	0.88	1.07	1.01	1.06	1.01	1.00	0.97	Continue to monitor
MANCHSTR 115 kV	P1-2:A14:72:_HERNDON-MANCHESTER 115KV [1780]	P1	N-1	0.95	0.95	0.85	1.08	0.99	1.07	0.98	0.98	0.95	Continue to monitor
MANCHSTR 115 kV	P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P1	N-1	0.98	0.97	0.88	1.07	1.01	1.06	1.01	1.01	0.97	Continue to monitor
MANCHSTR 115 kV	P1-3:A14:45:_SANGERCGRN 115/13.8KV TB 1	P1	N-1	0.98	0.97	0.88	1.07	1.01	1.06	1.01	1.01	0.97	Continue to monitor
MANCHSTR 115 kV	P2-1:A14:105:_SANGER COGEN TAP 115KV [9141] (SANGERCGRNCT-SANGERCGRN)	P2	Bus/Breaker	0.98	0.97	0.88	1.07	1.01	1.06	1.01	1.01	0.97	Continue to monitor
MANCHSTR 115 kV	P2-1:A14:40:_MANCHESTER-AIRWAYS-SANGER 115KV [2180] (AIRWAYJ1-SANGER)	P2	Bus/Breaker	0.95	0.95	0.87	1.06	0.99	1.05	1.00	0.98	0.95	Continue to monitor
MANCHSTR 115 kV	P2-3:A14:144:_MANCHSTR 115KV - RING R3 & R4	P2	Bus/Breaker	0.96	0.96	0.87	1.07	0.99	1.06	0.99	0.99	0.95	Continue to monitor
MANCHSTR 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.89	0.90	0.82	1.08	0.95	1.08	0.96	0.96	0.89	System adjustment
MANCHSTR 115 kV	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	0.90	0.90	0.84	1.09	0.97	1.08	0.96	0.97	0.90	System adjustment
MANCHSTR 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:72:_HERNDON-MANCHESTER 115KV [1780]	P3	G-1/N-1	NA	NA	0.84	NA	NA	NA	NA	NA	NA	Continue to monitor
MANCHSTR 115 kV	P5-5a:A14:2:_HERNDON #1 115KV BUS (Failure OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	0.90	0.91	0.86	1.08	0.97	1.08	0.96	0.97	0.90	Install redundant relay
MANCHSTR 115 kV	P1-2:A14:49:_BARTON-AIRWAYS-SANGER 115KV [1060]&P1-2:A14:72:_HERNDON-MANCHESTER 115KV [1780]	P6	N-1-1	NA	NA	0.83	NA	NA	NA	NA	NA	NA	Continue to monitor
MANCHSTR 115 kV	P7-1:A13:10:_ATWATER-EL CAPITAN 115KV [1020] & WILSON-ATWATER #2 115KV [4160]	P7	DCTL	0.98	0.97	0.90	1.07	1.01	1.06	1.01	1.01	0.97	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
MANCHSTR 115 kV	P7-1:A13:19:_COTTLE-MELONES 230KV [4530] & BELLOTA-WARNERVILLE 230KV [4380]	P7	DCTL	NConv	NConv	0.90	NConv	1.01	1.06	NConv	1.01	NConv	Continue to monitor
MANCHSTR 115 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.96	0.96	0.88	1.07	1.01	1.06	1.00	1.00	0.96	Continue to monitor
MARIPOS2 70 kV	Base Case	P0	Base case	0.93	0.92	0.91	1.00	0.94	1.00	0.95	0.94	0.92	Add voltage support
MARIPOS2 70 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1	P1	N-1	0.95	0.94	0.89	1.00	0.92	1.01	0.93	0.92	0.94	Continue to monitor
MARIPOS2 70 kV	P1-3:A13:31:_EXCHQUER 13.8/115KV TB 1	P1	N-1	0.95	0.94	0.89	1.00	0.92	1.01	0.94	0.92	0.94	Continue to monitor
MARIPOS2 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.86	0.99	0.94	1.00	0.95	0.94	NConv	Continue to monitor
MARIPOS2 70 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.82	NA	NA	NA	NA	NA	NA	Continue to monitor
MARIPOS2 70 kV	P5-5c:A13:2:_Wilson 230-115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.73	NConv	0.95	NConv	NConv	NConv	Install redundant battery
MARIPOS2 70 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.64	NA	0.82	NA	0.86	0.81	NA	Continue to monitor
MARIPOS2 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.86	0.99	0.94	1.00	0.95	0.94	NConv	Continue to monitor
MCMULLN1 230 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.95	0.95	0.89	1.03	0.96	1.03	0.99	0.96	0.95	Continue to monitor
MENDOTA 115 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	1.03	1.03	NConv	1.03	0.89	1.03	1.02	0.89	1.03	Generation re-dispatch
MENDOTA 115 kV	P2-3:A13:40:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	1.02	1.01	NConv	1.03	0.89	1.02	1.02	0.89	1.01	Generation re-dispatch
MENDOTA 115 kV	P2-4:A13:13:_PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2	Bus/Breaker	1.03	1.03	NConv	1.03	0.88	1.03	1.02	0.87	1.03	Generation re-dispatch
MENDOTA 115 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.76	NA	0.88	NA	NA	0.87	NA	Continue to monitor
MENDOTA 115 kV	P5-5c:A13:4:_Panoche 230-115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	1.03	1.03	0.88	1.03	0.85	1.03	1.02	NConv	1.03	Install redundant battery
MENDOTA 115 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.41	NA	0.54	NA	NA	0.53	NA	Continue to monitor
MENDOTA 70 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	1.04	1.04	NConv	1.04	0.90	1.04	1.04	0.90	1.04	Sensitivity only
MENDOTA 70 kV	P2-3:A13:40:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	1.03	1.03	NConv	1.04	0.90	1.04	1.03	0.90	1.03	Sensitivity only
MERCED 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.76	1.04	1.00	1.03	1.02	1.00	NConv	Continue to monitor
MERCED 115 kV	P5-5c:A13:2:_Wilson 230-115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.29	NConv	0.60	NConv	NConv	NConv	Install redundant battery
MERCED 115 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
MERCED 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.76	1.04	1.00	1.03	1.02	1.00	NConv	Continue to monitor
MERCED 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.81	1.01	0.97	0.99	0.99	0.98	NConv	Continue to monitor
MERCED 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.81	1.01	0.97	0.99	0.99	0.98	NConv	Continue to monitor
MRCDFLLS 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.86	1.00	0.97	0.99	0.98	0.97	NConv	Continue to monitor
MRCDFLLS 70 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Continue to monitor
MRCDFLLS 70 kV	P5-5c:A13:2:_Wilson 230-115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.65	NConv	0.89	NConv	NConv	NConv	Install redundant battery
MRCDFLLS 70 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.72	NA	0.86	NA	0.87	0.85	NA	Continue to monitor
MRCDFLLS 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.86	1.00	0.97	0.99	0.98	0.97	NConv	Continue to monitor
NEWHALL 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.89	1.03	1.00	1.03	1.01	1.00	NConv	Continue to monitor
NEWHALL 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	0.99	0.99	NConv	1.02	0.90	1.01	0.98	0.90	0.99	Generation re-dispatch
NEWHALL 115 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.78	NA	NA	NA	NA	0.89	NA	Continue to monitor
NEWHALL 115 kV	P5-5c:A13:4:_Panoche 230-115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	1.00	0.99	0.90	1.02	0.87	1.01	0.98	NConv	0.99	Install redundant battery
NEWHALL 115 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.43	NA	0.57	NA	NA	0.56	NA	Continue to monitor
NEWHALL 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.89	1.03	1.00	1.03	1.01	1.00	NConv	Continue to monitor
OAKHURST 115 kV	Base Case	P0	Base case	0.95	0.94	0.85	1.07	0.99	1.07	0.99	0.99	0.94	Add voltage support
OAKHURST 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1	P1	N-1	0.92	0.92	0.88	1.07	0.97	1.07	0.98	0.97	0.92	Continue to monitor
OAKHURST 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.90	0.91	0.86	1.08	0.95	1.08	0.96	0.95	0.91	Continue to monitor
OAKHURST 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P3	G-1/N-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Continue to monitor
OAKHURST 115 kV	Base Case	P5	Non-Redundant battery supply/Relay	0.95	0.94	0.87	1.08	1.00	1.07	0.99	0.99	0.94	Continue to monitor
OAKHURST 115 kV	P1-2:A13:40:_LE GRAND-CHOWCHILLA 115KV [2110]&P1-2:A14:48:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890]	P6	N-1-1	NA	NA	0.78	NA	NA	NA	NA	NA	NA	Continue to monitor
OAKHURST 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.88	1.07	0.99	1.07	0.99	0.99	NConv	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
OAKHURST 115 kV	P7-1:A14:27:_HERNDON-WOODWARD 115KV [1790] & BORDEN-COPPERMINE 70KV [8500]	P7	DCTL	0.92	0.92	0.87	1.08	0.99	1.08	0.98	0.99	0.91	Continue to monitor
ORO LOMA 115 kV	P1-2:A13:61:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	0.90	0.89	0.87	1.08	0.96	1.07	1.01	0.96	0.89	Project: Review oroloma area reinforcement
ORO LOMA 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	0.73	0.72	NConv	1.06	0.90	1.10	0.95	0.89	0.71	Project:review oroloma area reinforcement
ORO LOMA 115 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:61:_PANOCHE-ORO LOMA 115KV [3240]	P3	G-1/N-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Continue to monitor
ORO LOMA 115 kV	P5-5c:A13:4:_Panoche 230-115KV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.89	0.89	0.85	1.07	0.91	1.07	1.01	NConv	0.88	Install redundant battery
ORO LOMA 115 kV	P1-2:A13:61:_PANOCHE-ORO LOMA 115KV [3240]&P1-2:A13:48:_WILSON-ORO LOMA 115KV [4200]	P6	N-1-1	NA	NA	0.77	NA	NA	NA	NA	NA	NA	Continue to monitor
ORO LOMA 115 kV	P7-1:A13:7:_LOS BANOS-PANOCHE #1 230KV [5030] & PANOCHE-ORO LOMA 115KV [3240]	P7	DCTL	0.90	0.89	0.87	1.08	0.96	1.07	1.01	0.96	0.89	Project:review oroloma area reinforcement
ORO LOMA 70 kV	P2-3:A13:42:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	0.82	0.81	0.93	1.03	1.02	1.04	1.03	1.02	0.80	Project:Oroloma area reinforcement
ORO LOMA 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	0.81	0.81	NConv	1.03	1.00	1.04	1.02	1.00	0.80	Project:review oroloma area reinforcement
OROSI 70 kV	Base Case	P0	Base case	1.00	1.01	0.95	1.04	1.02	1.04	1.01	1.02	1.01	Continue to monitor
OROSI 70 kV	P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P1	N-1	1.01	0.95	0.87	1.04	1.02	1.04	1.02	1.02	0.95	Continue to monitor
OROSI 70 kV	P1-2:A14:118:_REEDLEY-OROSI 70KV [9060]	P1	N-1	0.92	0.93	0.87	1.03	0.96	1.04	0.95	-1000.00	0.92	Continue to monitor
OROSI 70 kV	P2-3:A14:139:_REEDLEY 115KV - RING R5 & R6	P2	Bus/Breaker	0.95	0.95	0.87	1.04	1.00	1.05	1.00	1.00	0.94	Continue to monitor
OROSI 70 kV	P2-3:A14:51:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	0.95	0.95	0.86	1.04	0.99	1.04	0.99	1.00	0.95	Continue to monitor
OROSI 70 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Continue to monitor
OROSI 70 kV	P5-5c:A14:10:_Mccall 230-115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.04	0.98	1.05	0.93	0.87	NConv	Install redundant battery
OROSI 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.95	0.95	0.86	1.04	0.99	1.04	0.99	1.00	0.95	Continue to monitor
ORTIGA 70 kV	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	0.86	0.87	0.96	1.05	0.92	1.05	0.95	0.95	0.87	Project:Losbanos area reinforcement
ORTIGA 70 kV	P1-1:A13:26:_VEGA 0.36KV GEN UNIT 1&P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	0.82	0.83	NA	NA	NA	NA	NA	NA	0.82	Operation solution
ORTIGA 70 kV	P7-1:A13:11:_LOS BANOS-PANOCHE #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	0.90	0.90	0.99	1.05	0.90	1.07	0.96	0.96	0.90	Project:Losbanos area reinforcement
OXFORD 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	0.70	0.69	NConv	1.05	0.89	1.11	0.93	0.89	0.68	System adjustment
PARLIER 115 kV	Base Case	P0	Base case	0.97	0.97	0.91	1.07	1.01	1.07	1.00	1.00	0.97	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
PARLIER 115 kV	P1-1:A14:73:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS	P1	N-1	0.96	0.96	0.89	1.07	1.00	1.07	1.00	1.00	0.96	Continue to monitor
PARLIER 115 kV	P2-4:A14:8:_MC CALL 230KV - SECTION 1E & 1D	P2	Bus/Breaker	0.90	0.90	NConv	1.07	0.97	1.06	0.94	0.95	0.90	System adjustment
PARLIER 115 kV	P5-5c:A14:10:_Mccall 230-115KV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.07	0.93	1.08	0.88	0.84	NConv	Install redundant battery
PARLIER 115 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.93	0.93	0.85	1.07	0.98	1.07	0.97	0.97	0.93	Continue to monitor
PLSNTVLY 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	0.94	0.96	0.85	1.03	0.90	1.02	1.00	0.95	0.96	Continue to monitor
PLSNTVLY 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	0.94	0.96	0.85	1.03	0.90	1.02	1.00	0.95	0.96	Continue to monitor
PLSNTVLY 70 kV	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1&P1-3:A14:13:_GATES D 230/70KV TB 5	P3	G-1/N-1	NA	0.90	0.78	NA	0.86	NA	NA	NA	0.90	Operation solution
PLSNTVLY 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	0.93	0.96	NConv	1.03	0.89	1.02	1.00	0.94	0.97	Install redundant relay
PMTFMPP 115 kV	P2-1:A13:46:_DAIRYLAND-MENDOTA 115KV [1360] (MENDOTA-GILLTAP)	P2	Bus/Breaker	0.93	0.92	0.90	1.04	0.96	1.02	0.96	0.96	0.92	Continue to monitor
PMTFMPP 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.89	1.03	1.00	1.03	1.01	1.00	NConv	Continue to monitor
PMTFMPP 115 kV	P2-4:A13:13:_PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2	Bus/Breaker	0.99	0.99	NConv	1.02	0.89	1.01	0.98	0.89	0.99	Generation re-dispatch
PMTFMPP 115 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.77	NA	NA	NA	NA	0.89	NA	Continue to monitor
PMTFMPP 115 kV	P5-5c:A13:4:_Panoche 230-115KV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	0.99	0.99	0.89	1.02	0.87	1.01	0.98	NConv	0.99	Install redundant battery
PMTFMPP 115 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.43	NA	0.56	NA	NA	0.55	NA	Continue to monitor
PMTFMPP 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.89	1.03	1.00	1.03	1.01	1.00	NConv	Continue to monitor
PNEDLE 115 kV	Base Case	P0	Base case	0.98	0.97	0.89	1.07	1.01	1.05	1.01	1.01	0.97	Continue to monitor
PNEDLE 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1	P1	N-1	0.98	0.97	0.89	1.07	1.01	1.05	1.01	1.01	0.97	Continue to monitor
PNEDLE 115 kV	P1-2:A14:71:_HERNDON-BULLARD #2 115KV [1770]	P1	N-1	0.94	0.95	0.85	1.07	0.99	1.05	0.99	0.99	0.94	Continue to monitor
PNEDLE 115 kV	P1-3:A14:45:_SANGERCN 115/13.8KV TB 1	P1	N-1	0.98	0.97	0.89	1.07	1.01	1.05	1.01	1.01	0.97	Continue to monitor
PNEDLE 115 kV	P2-1:A14:86:_HERNDON-BULLARD #2 115KV [1770] (HERNDON-PNDLJ2)	P2	Bus/Breaker	0.94	0.94	0.85	1.07	0.99	1.05	0.99	0.99	0.94	Continue to monitor
PNEDLE 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.86	0.87	0.77	1.08	0.93	1.08	0.95	0.94	0.86	System adjustment
PNEDLE 115 kV	P1-1:A14:62:_HERNDNIT 13.20KV GEN UNIT 1&P1-2:A14:73:_HERNDON-BULLARD #1 115KV [1760]	P3	G-1/N-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor
PNEDLE 115 kV	P5-5c:A14:32:_Pinedale 115KV Batt #1(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	0.94	0.95	0.86	1.07	1.00	1.05	0.99	0.99	0.94	Install redundant battery

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
PNEDLE 115 kV	P1-2:A14:73:_HERNDON-BULLARD #1 115KV [1760]&P1-3:A14:3:_HERNDON 230/115KV TB 1	P6	N-1-1	NA	NA	0.84	NA	NA	NA	NA	NA	NA	Continue to monitor
PNEDLE 115 kV	P7-1:A13:15:_LASAGUILASS-PANOCHÉ #1 230KV [0] & LASAGUILASS-PANOCHÉ #2 230KV [0]	P7	DCTL	0.98	0.97	0.90	1.07	1.01	1.05	1.01	1.01	0.97	Continue to monitor
PNEDLE2 115 kV	Base Case	P0	Base case	0.98	0.98	0.90	1.07	1.01	1.05	1.01	1.01	0.97	Continue to monitor
PNEDLE2 115 kV	P1-2:A14:73:_HERNDON-BULLARD #1 115KV [1760]	P1	N-1	0.94	0.95	0.85	1.07	0.99	1.05	0.99	0.99	0.94	Continue to monitor
PNEDLE2 115 kV	P1-3:A14:17:_HAAS 230/13.8KV TB 1	P1	N-1	0.98	0.98	0.89	1.07	1.01	1.05	1.01	1.01	0.97	Continue to monitor
PNEDLE2 115 kV	P1-3:A14:35:_KERCKHOFFPH2 115/13.8KV TB 1	P1	N-1	0.98	0.98	0.89	1.07	1.01	1.05	1.01	1.01	0.97	Continue to monitor
PNEDLE2 115 kV	P1-3:A14:45:_SANGERCN 115/13.8KV TB 1	P1	N-1	0.98	0.98	0.89	1.07	1.01	1.05	1.01	1.01	0.97	Continue to monitor
PNEDLE2 115 kV	P2-1:A14:12:_HAAS-MCCALL 230KV [4850] (HAAS-BALCH3TP)	P2	Bus/Breaker	0.98	0.98	0.89	1.07	1.01	1.05	1.01	1.01	0.97	Continue to monitor
PNEDLE2 115 kV	P2-1:A14:86:_HERNDON-BULLARD #2 115KV [1770] (HERNDON-PNDLJ2)	P2	Bus/Breaker	0.92	0.93	0.83	1.07	0.98	1.06	0.97	0.98	0.93	Continue to monitor
PNEDLE2 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.86	0.87	0.78	1.08	0.93	1.08	0.95	0.94	0.86	System adjustment
PNEDLE2 115 kV	P1-1:A14:62:_HERNDNIT 13.20KV GEN UNIT 1&P1-2:A14:71:_HERNDON-BULLARD #2 115KV [1770]	P3	G-1/N-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor
PNEDLE2 115 kV	P5-5c:A14:34:_Pinedale 115kv Batt #2(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.94	0.95	0.86	1.07	1.00	1.05	0.99	0.99	0.94	Install redundant battery
PNEDLE2 115 kV	P1-2:A14:71:_HERNDON-BULLARD #2 115KV [1770]&P1-3:A14:3:_HERNDON 230/115KV TB 1	P6	N-1-1	NA	NA	0.84	NA	NA	NA	NA	NA	NA	Continue to monitor
PPG 115 kV	Base Case	P0	Base case	1.01	1.01	0.94	1.07	1.02	1.07	1.01	1.02	1.01	Continue to monitor
PPG 115 kV	P5-5c:A14:10:_Mccall 230-115kv Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.07	0.98	1.08	0.90	0.89	NConv	Install redundant battery
PPG 115 kV	P1-3:A14:7:_MC CALL 230/115KV TB 3&P1-3:A14:5:_MC CALL 230/115KV TB 1	P6	N-1-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
RAINBW 115 kV	Base Case	P0	Base case	0.98	0.98	0.91	1.07	1.01	1.07	1.01	1.01	0.98	Continue to monitor
RAINBW 115 kV	P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P1	N-1	0.97	0.98	0.89	1.07	1.01	1.07	1.00	1.01	0.97	Continue to monitor
RAINBW 115 kV	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	0.93	0.94	0.89	1.08	1.00	1.08	0.98	0.99	0.93	Continue to monitor
RAINBW 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-3:A14:5:_MC CALL 230/115KV TB 1	P3	G-1/N-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
RAINBW 115 kV	P5-5c:A14:10:_Mccall 230-115kv Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.07	0.95	1.08	0.91	0.86	NConv	Install redundant battery
RAINBW 115 kV	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	0.98	0.98	0.89	1.07	1.01	1.07	1.00	1.01	0.97	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
RAINBW 115 kV	P7-1:A14:27:_HERNDON-WOODWARD 115KV [1790] & BORDEN-COPPERMINE 70KV [8500]	P7	DCTL	0.98	0.98	0.90	1.07	1.01	1.07	1.01	1.01	0.97	Continue to monitor
RAINBW 115 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.96	0.96	0.88	1.07	1.00	1.07	0.99	0.99	0.96	Continue to monitor
RANCHRS 115 kV	Base Case	P0	Base case	1.01	1.01	0.94	1.07	1.02	1.07	1.01	1.02	1.01	Continue to monitor
RANCHRS 115 kV	P1-3:A14:7:_MC CALL 230/115KV TB 3&P1-3:A14:5:_MC CALL 230/115KV TB 1	P6	N-1-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
REEDLEY 115 kV	Base Case	P0	Base case	0.97	0.97	0.90	1.07	1.00	1.07	1.00	1.00	0.97	Continue to monitor
REEDLEY 115 kV	P1-3:A14:45:_SANGERCN 115/13.8KV TB 1	P1	N-1	0.96	0.96	0.88	1.07	1.00	1.07	1.00	1.00	0.96	Continue to monitor
REEDLEY 115 kV	P1-3:A14:6:_MC CALL 230/115KV TB 2	P1	N-1	0.97	0.97	0.90	1.07	1.00	1.07	1.00	1.00	0.97	Continue to monitor
REEDLEY 115 kV	P2-1:A14:107:_SANGER-REEDLEY 115KV [9140] (PARLIER-REEDLEY)	P2	Bus/Breaker	0.96	0.96	0.89	1.07	0.99	1.07	1.00	0.99	0.95	Continue to monitor
REEDLEY 115 kV	P2-1:A14:55:_MCCALL-REEDLEY 115KV [2320] (MC CALL-WAHTOKE)	P2	Bus/Breaker	0.91	0.91	0.84	1.07	0.97	1.08	0.96	0.96	0.91	Continue to monitor
REEDLEY 115 kV	P2-3:A14:51:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	0.90	0.90	0.82	1.07	0.96	1.08	0.95	0.95	0.90	Continue to monitor
REEDLEY 115 kV	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	P2	Bus/Breaker	0.89	0.89	NConv	1.07	0.96	1.07	0.93	0.95	0.89	Project:Reedley project upgrade
REEDLEY 115 kV	P5-5c:A14:10:_Mccall 230-115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.07	0.91	1.09	0.87	0.82	NConv	Install redundant battery
REEDLEY 115 kV	P5-5c:A14:25:_Wahtoke 115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.94	0.94	0.88	1.07	0.99	1.07	0.98	0.98	0.93	Install redundant battery
REEDLEY 115 kV	P7-1:A14:27:_HERNDON-WOODWARD 115KV [1790] & BORDEN-COPPERMINE 70KV [8500]	P7	DCTL	0.96	0.96	0.89	1.07	1.00	1.07	1.00	1.00	0.96	Continue to monitor
REEDLEY 115 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.90	0.90	0.82	1.07	0.96	1.08	0.95	0.95	0.90	Continue to monitor
REEDLEY 115 kV	P7-1:A14:6:_BALCH-SANGER 115KV [1050] & KINGS RIVER-SANGER-REEDLEY 115KV [2030]	P7	DCTL	0.95	0.95	0.90	1.07	0.99	1.07	0.99	0.99	0.95	Continue to monitor
REEDLEY 70 kV	P2-3:A14:51:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	0.98	0.98	0.90	1.04	1.02	1.04	1.02	1.02	0.98	Continue to monitor
REEDLEY 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.98	0.98	0.89	1.04	1.02	1.04	1.02	1.02	0.98	Continue to monitor
RIOBRVFSNO 115 kV	Base Case	P0	Base case	1.01	1.01	0.94	1.07	1.02	1.07	1.02	1.02	1.01	Continue to monitor
RIOBRVFSNO 115 kV	P1-3:A14:7:_MC CALL 230/115KV TB 3&P1-3:A14:5:_MC CALL 230/115KV TB 1	P6	N-1-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
RIVERROC 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.57	1.04	1.01	1.05	1.06	1.01	NConv	Continue to monitor
RIVERROC 70 kV	P5-5c:A13:8:_Borden 230-70kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NA	NA	0.68	NA	NA	NA	NA	NA	NA	Install redundant battery
RIVERROC 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.57	1.04	1.01	1.05	1.06	1.01	NConv	Continue to monitor
SANDCRK 70 kV	Base Case	P0	Base case	0.99	0.99	0.93	1.04	1.01	1.04	1.00	1.01	0.99	Continue to monitor
SANDCRK 70 kV	P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P1	N-1	1.00	0.94	0.85	1.04	1.01	1.04	1.00	1.01	0.93	Continue to monitor



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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
SANDCRK 70 kV	P2-1:A14:55:_MCCALL-REEDLEY 115KV [2320] (MC CALL-WAHTOKE)	P2	Bus/Breaker	0.94	0.95	0.86	1.04	0.98	1.04	0.98	0.98	0.94	Continue to monitor
SANDCRK 70 kV	P2-3:A14:139:_REEDLEY 115KV - RING R5 & R6	P2	Bus/Breaker	0.93	0.93	0.85	1.04	0.99	1.05	0.98	0.99	0.93	Continue to monitor
SANDCRK 70 kV	P2-3:A14:51:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	0.93	0.94	0.84	1.04	0.98	1.04	0.98	0.99	0.93	Continue to monitor
SANDCRK 70 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor
SANDCRK 70 kV	P5-5c:A14:10:_Mccall 230-115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.04	0.97	1.05	0.91	0.86	NConv	Install redundant battery
SANDCRK 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.93	0.94	0.83	1.04	0.98	1.04	0.98	0.99	0.93	Continue to monitor
SANGER 115 kV	Base Case	P0	Base case	0.99	0.99	0.92	1.07	1.02	1.07	1.01	1.01	0.99	Continue to monitor
SANGER 115 kV	P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P1	N-1	0.98	0.98	0.90	1.07	1.02	1.07	1.00	1.01	0.98	Continue to monitor
SANGER 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.93	0.94	0.89	1.07	0.99	1.08	0.99	0.99	0.94	Continue to monitor
SANGER 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-3:A14:5:_MC CALL 230/115KV TB 1	P3	G-1/N-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Continue to monitor
SANGER 115 kV	P5-5c:A14:10:_Mccall 230-115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.07	0.96	1.08	0.91	0.87	NConv	Install redundant battery
SANGER 115 kV	P1-3:A14:7:_MC CALL 230/115KV TB 3&P1-3:A14:5:_MC CALL 230/115KV TB 1	P6	N-1-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Continue to monitor
SANGER 115 kV	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	0.98	0.98	0.90	1.07	1.01	1.07	1.00	1.01	0.98	Continue to monitor
SANGERCGRN 115 kV	Base Case	P0	Base case	0.99	0.99	0.92	1.07	1.01	1.07	1.01	1.01	0.99	Continue to monitor
SANGERCGRN 115 kV	P1-3:A14:45:_SANGERCGRN 115/13.8KV TB 1	P1	N-1	0.98	0.98	0.90	1.07	1.01	1.07	1.01	1.01	0.98	Continue to monitor
SANGERCGRN 115 kV	P2-3:A14:51:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	0.96	0.96	0.89	1.07	1.00	1.07	0.99	0.99	0.96	Continue to monitor
SANGERCGRN 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.94	0.94	0.90	1.07	0.99	1.08	0.98	0.98	0.94	Continue to monitor
SANGERCGRN 115 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.96	0.96	0.89	1.07	1.00	1.07	0.99	0.99	0.96	Continue to monitor
SANGERCGRN 13.8 kV	P1-3:A14:7:_MC CALL 230/115KV TB 3&P1-3:A14:5:_MC CALL 230/115KV TB 1	P6	N-1-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Continue to monitor
SAXONCRK 70 kV	Base Case	P0	Base case	0.94	0.94	0.96	1.00	0.96	0.98	0.95	0.96	0.94	Add voltage support
SAXONCRK 70 kV	P1-3:A13:31:_EXCHQUER 13.8/115KV TB 1	P1	N-1	0.92	0.92	0.88	1.00	0.93	0.99	0.94	0.93	0.92	Continue to monitor
SAXONCRK 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.84	0.99	0.95	0.98	0.95	0.96	NConv	Continue to monitor
SAXONCRK 70 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.80	NA	NA	NA	NA	NA	NA	Continue to monitor
SAXONCRK 70 kV	P5-5c:A13:2:_Wilson 230-115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.73	NConv	0.93	NConv	NConv	NConv	Install redundant battery

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Study Area: **PG&E Greater Fresno**  
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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
SAXONCRK 70 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.62	NA	0.80	NA	0.84	0.79	NA	Continue to monitor
SAXONCRK 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.84	0.99	0.95	0.98	0.95	0.96	NConv	Continue to monitor
SESWTF 115 kV	Base Case	P0	Base case	0.98	0.98	0.90	1.07	1.01	1.06	1.01	1.00	0.98	Continue to monitor
SESWTF 115 kV	P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P1	N-1	0.95	0.95	0.86	1.08	0.99	1.08	0.99	0.99	0.95	Continue to monitor
SESWTF 115 kV	P1-3:A14:45:_SANGERCN 115/13.8KV TB 1	P1	N-1	0.98	0.98	0.89	1.07	1.01	1.06	1.01	1.00	0.98	Continue to monitor
SESWTF 115 kV	P1-3:A14:5:_MC CALL 230/115KV TB 1	P1	N-1	0.97	0.97	0.89	1.07	1.00	1.06	1.00	1.00	0.97	Continue to monitor
SESWTF 115 kV	P2-1:A14:12:_HAAS-MCCALL 230KV [4850] (HAAS-BALCH3TP)	P2	Bus/Breaker	0.98	0.98	0.89	1.07	1.01	1.06	1.01	1.00	0.98	Continue to monitor
SESWTF 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.90	0.91	0.84	1.08	0.96	1.08	0.97	0.96	0.90	Continue to monitor
SESWTF 115 kV	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	0.91	0.91	0.86	1.08	0.98	1.08	0.97	0.98	0.91	Continue to monitor
SESWTF 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P3	G-1/N-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Continue to monitor
SESWTF 115 kV	P5-5a:A14:2:_HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	0.91	0.92	0.88	1.08	0.98	1.08	0.97	0.98	0.91	Install redundant relay
SESWTF 115 kV	P1-3:A14:7:_MC CALL 230/115KV TB 3&P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P6	N-1-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor
SESWTF 115 kV	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	0.95	0.95	0.84	1.08	0.98	1.08	0.98	0.98	0.95	Continue to monitor
SHARON 115 kV	Base Case	P0	Base case	0.99	0.98	0.94	1.06	1.01	1.04	1.01	1.01	0.98	Continue to monitor
SHARON 115 kV	P1-2:A13:40:_LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	0.86	0.88	NConv	1.07	0.93	1.08	0.95	0.93	0.88	Add voltage support
SHARON 115 kV	P2-1:A13:15:_LE GRAND-CHOWCHILLA 115KV [2110] (CHWCHILLA-CERTAN T)	P2	Bus/Breaker	0.86	0.88	NConv	1.07	0.93	1.08	0.95	0.93	0.88	System adjustment
SHARON 115 kV	P2-1:A13:16:_LE GRAND-CHOWCHILLA 115KV [2110] (CERTAN T-LE GRAND)	P2	Bus/Breaker	0.93	0.94	0.87	1.06	0.99	1.05	0.97	0.98	0.94	Continue to monitor
SHARON 115 kV	P2-3:A13:28:_LE GRAND - MA 115KV & LE GRAND-CHOWCHILLA LINE	P2	Bus/Breaker	0.86	0.88	NConv	1.07	0.93	1.08	0.95	0.93	0.88	System adjustment
SHARON 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.85	1.04	1.00	1.04	1.00	1.00	NConv	Continue to monitor
SHARON 115 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.87	NA	NA	NA	NA	NA	NA	Continue to monitor
SHARON 115 kV	P5-5c:A13:12:_Le Grand 115kv Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	0.86	0.89	NA	1.07	0.93	1.08	0.95	0.93	0.88	Install redundant battery
SHARON 115 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.59	NA	0.74	NA	NA	0.73	NA	Continue to monitor
SHARON 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.85	1.04	1.00	1.04	1.00	1.00	NConv	Continue to monitor

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Study Area: **PG&E Greater Fresno**  
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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
SHEPHERD 115 kV	Base Case	P0	Base case	0.98	0.98	0.91	1.07	1.03	1.06	1.02	1.02	0.98	Continue to monitor
SHEPHERD 115 kV	P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P1	N-1	0.94	0.94	0.86	1.08	1.02	1.08	1.00	1.02	0.94	Continue to monitor
SHEPHERD 115 kV	P1-4:A14:29:_SHEPHERD SVD=V	P1	N-1	0.96	0.96	0.89	1.07	1.00	1.06	0.99	1.00	0.95	Continue to monitor
SHEPHERD 115 kV	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	0.89	0.89	0.84	1.09	1.00	1.09	0.97	1.00	0.89	System adjustment
SHEPHERD 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P3	G-1/N-1	NA	NA	0.84	NA	NA	NA	NA	NA	NA	Continue to monitor
SHEPHERD 115 kV	P5-5a:A14:2:_HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	0.90	0.90	0.87	1.08	1.00	1.09	0.98	1.00	0.89	Install redundant relay
SHEPHERD 115 kV	P1-2:A13:40:_LE GRAND-CHOWCHILLA 115KV [2110]&P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P6	N-1-1	NA	NA	0.81	NA	NA	NA	NA	NA	NA	Continue to monitor
SHEPHERD 115 kV	P7-1:A14:27:_HERNDON-WOODWARD 115KV [1790] & BORDEN-COPPERMINE 70KV [8500]	P7	DCTL	0.94	0.94	0.86	1.08	1.02	1.08	1.00	1.02	0.94	Continue to monitor
SJNO2 70 kV	Base Case	P0	Base case	1.06	1.07	0.91	1.05	0.99	1.07	1.10	0.99	1.07	Continue to monitor
SJNO2 70 kV	P1-2:A14:107:_FRIANT-COPPERMINE 70KV [8660]	P1	N-1	1.06	1.07	0.82	1.06	0.96	1.08	1.12	0.98	1.07	Continue to monitor
SJNO2 70 kV	P1-3:A13:54:_BORDEN 70/230KV TB 1	P1	N-1	NA	NA	0.90	NA	NA	NA	NA	NA	NA	Continue to monitor
SJNO2 70 kV	P1-4:A14:37:_COPPRMNE SVD=V	P1	N-1	NA	1.07	0.87	1.05	NA	1.07	NA	NA	1.07	Continue to monitor
SJNO2 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.49	1.05	0.98	1.07	1.10	0.99	NConv	Continue to monitor
SJNO2 70 kV	P5-5c:A13:8:_Borden 230-70kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NA	NA	0.61	NA	NA	NA	NA	NA	NA	Install redundant battery
SJNO2 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.49	1.05	0.98	1.07	1.10	0.99	NConv	Continue to monitor
SJNO3 70 kV	Base Case	P0	Base case	1.06	1.07	0.90	1.06	0.98	1.07	1.10	0.99	1.06	Continue to monitor
SJNO3 70 kV	P1-2:A14:107:_FRIANT-COPPERMINE 70KV [8660]	P1	N-1	1.06	1.07	0.81	1.06	0.96	1.08	1.13	0.98	1.06	Continue to monitor
SJNO3 70 kV	P1-3:A13:54:_BORDEN 70/230KV TB 1	P1	N-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Continue to monitor
SJNO3 70 kV	P1-4:A14:37:_COPPRMNE SVD=V	P1	N-1	NA	1.07	0.86	1.06	NA	1.07	NA	NA	1.06	Continue to monitor
SJNO3 70 kV	P2-3:A13:17:_BORDEN 230KV - MIDDLE BREAKER BAY 4	P2	Bus/Breaker	1.06	1.07	0.89	1.06	0.97	1.07	1.10	0.99	1.06	Continue to monitor
SJNO3 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.48	1.05	0.98	1.07	1.10	0.98	NConv	Continue to monitor
SJNO3 70 kV	P5-5c:A13:8:_Borden 230-70kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	NA	NA	0.59	NA	NA	NA	NA	NA	NA	Install redundant battery
SJNO3 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.48	1.05	0.98	1.07	1.10	0.98	NConv	Continue to monitor
SNTA NLA 70 kV	P2-3:A13:52:_LOS BANS - MA 70KV & LOS BANOS-O'NEILL PGP LINE	P2	Bus/Breaker	NA	NA	0.82	NA	NA	NA	NA	NA	NA	Continue to monitor
SNTA RTA 70 kV	P2-2:A13:25:_PANOCH2 115KV SECTION 2D	p2	Bus/Breaker	0.80	0.79	0.91	1.04	1.01	1.05	1.02	1.01	0.78	Project:Losbanos area reinforcement
SNTA RTA 70 kV	P2-3:A13:42:_PANOCH2 - 2D 115KV & PANOCH-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	0.80	0.79	0.92	1.04	1.01	1.05	1.02	1.01	0.78	Project:Losbanos area reinforcement

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



Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
SNTA RTA 70 kV	P2-4:A13:13:_PANOCH1 SECTION 1D & PANOCH2 SECTION 2D 115KV	P2	Bus/Breaker	0.79	0.78	NConv	1.04	0.99	1.05	1.02	0.99	0.77	System adjustment
SNTA RTA 70 kV	P1-2:A13:61:_PANOCH1-ORO LOMA 115KV [3240]&P1-2:A13:48:_WILSON-ORO LOMA 115KV [4200]	P6	N-1-1	NA	NA	0.86	NA	NA	NA	NA	NA	NA	Continue to monitor
STONCRRL 70 kV	Base Case	P0	Base case	0.99	1.00	0.94	1.04	1.01	1.04	1.00	1.01	0.99	Continue to monitor
STONCRRL 70 kV	P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P1	N-1	1.00	0.94	0.85	1.04	1.01	1.04	1.01	1.01	0.93	Continue to monitor
STONCRRL 70 kV	P1-2:A14:118:_REEDLEY-OROSI 70KV [9060]	P1	N-1	0.91	0.92	0.86	1.03	0.95	1.04	0.94	-1000.00	0.91	Continue to monitor
STONCRRL 70 kV	P2-1:A14:55:_MCCALL-REEDLEY 115KV [2320] (MC CALL-WAHTOKE)	P2	Bus/Breaker	0.95	0.95	0.87	1.04	0.98	1.04	0.98	0.99	0.95	Continue to monitor
STONCRRL 70 kV	P2-1:A14:66:_MCCALL-REEDLEY 115KV [2320] (WAHTOKE-REEDLEY)	P2	Bus/Breaker	0.97	0.97	0.90	1.04	0.99	1.04	0.98	0.99	0.97	Continue to monitor
STONCRRL 70 kV	P2-3:A14:139:_REEDLEY 115KV - RING R5 & R6	P2	Bus/Breaker	0.94	0.94	0.86	1.04	0.99	1.05	0.99	0.99	0.93	Continue to monitor
STONCRRL 70 kV	P2-3:A14:140:_REEDLEY 115KV - RING R5 & R4	P2	Bus/Breaker	0.97	0.96	0.89	1.04	0.99	1.04	0.98	0.99	0.96	Continue to monitor
STONCRRL 70 kV	P2-3:A14:51:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	0.94	0.94	0.85	1.04	0.99	1.04	0.98	0.99	0.94	Continue to monitor
STONCRRL 70 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	NA	NA	0.85	NA	NA	NA	NA	NA	NA	Continue to monitor
STONCRRL 70 kV	P5-5c:A14:10:_Mccall 230-115kv Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.04	0.97	1.05	0.92	0.86	NConv	Install redundant battery
STONCRRL 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.94	0.94	0.84	1.04	0.99	1.04	0.98	0.99	0.94	Continue to monitor
STOREY 2 230 kV	Base Case	P0	Base case	0.97	0.97	0.91	1.03	1.00	1.02	1.00	0.99	0.97	Continue to monitor
STOREY 2 230 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.62	1.01	0.95	1.00	0.96	0.95	NConv	Continue to monitor
STOREY 2 230 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A13:6:_WARNERVILLE-WILSON 230KV [5870]	P3	G-1/N-1	NA	NA	0.90	NA	NA	NA	NA	NA	NA	Continue to monitor
STOREY 2 230 kV	P1-2:A14:15:_HELMS-GREGG #1 230KV [4870]&P1-2:A14:20:_MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Continue to monitor
STOREY 2 230 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.62	1.01	0.95	1.00	0.96	0.95	NConv	Continue to monitor
SUNMAID 115 kV	Base Case	P0	Base case	1.01	1.01	0.94	1.06	1.02	1.06	1.02	1.02	1.01	Continue to monitor
SUNMAID 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:86:_LEPRINO SW STA-GWF HANFORD SW STA 115KV [1740]	P3	G-1/N-1	NA	NA	0.90	NA	NA	NA	NA	NA	NA	Continue to monitor
SUNMAID 115 kV	P1-3:A14:7:_MC CALL 230/115KV TB 3&P1-3:A14:5:_MC CALL 230/115KV TB 1	P6	N-1-1	NA	NA	0.88	NA	NA	NA	NA	NA	NA	Continue to monitor
TOMATAK 70 kV	P1-2:A13:60:_PANOCH1-MENDOTA 115KV [3230]	P1	N-1	1.03	1.03	NConv	1.03	0.88	1.02	1.02	0.88	1.03	Generation re-dispatch
TOMATAK 70 kV	P2-1:A13:47:_PANOCH1-MENDOTA 115KV [3230] (PANOCH1-PANOCH1)	P2	Bus/Breaker	1.03	1.03	NConv	1.03	0.89	1.02	1.02	0.88	1.03	Generation re-dispatch
TOMATAK 70 kV	P2-3:A13:40:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	1.01	1.01	NConv	1.03	0.88	1.02	1.01	0.88	1.01	Generation re-dispatch

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
TOMATAK 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	1.02	1.02	NConv	1.03	0.87	1.02	1.02	0.87	1.02	Generation re-dispatch
TOMATAK 70 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.75	NA	0.88	NA	NA	0.87	NA	Continue to monitor
TOMATAK 70 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	1.03	1.03	0.88	1.03	0.84	1.02	1.02	NConv	1.02	Install redundant battery
TOMATAK 70 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	NA	NA	0.40	NA	0.52	NA	NA	0.51	NA	Continue to monitor
TORNADO 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	0.92	0.94	0.82	1.03	0.87	1.03	1.00	0.93	0.94	Continue to monitor
TORNADO 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	0.92	0.94	0.82	1.03	0.87	1.03	1.00	0.93	0.94	Continue to monitor
TORNADO 70 kV	P1-1:A14:68:_CHV.COAL 9.11KV GEN UNIT 1&P1-3:A14:13:_GATES D 230/70KV TB 5	P3	G-1/N-1	0.89	0.88	0.73	NA	0.83	NA	NA	0.89	0.88	Operation solution
TORNADO 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	0.92	0.94	NConv	1.03	0.86	1.03	1.00	0.91	0.95	Install redundant relay
TVY VLLY 70 kV	P2-3:A14:51:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	0.98	0.98	0.88	1.04	1.01	1.04	1.02	1.01	0.98	Continue to monitor
TVY VLLY 70 kV	P5-5c:A13:8:_Borden 230-70kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NA	NA	0.84	NA	NA	NA	NA	NA	NA	Install redundant battery
TVY VLLY 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.98	0.98	0.88	1.04	1.01	1.04	1.02	1.01	0.98	Continue to monitor
WAHTOKE 115 kV	Base Case	P0	Base case	0.98	0.98	0.91	1.07	1.01	1.07	1.01	1.01	0.98	Continue to monitor
WAHTOKE 115 kV	P1-2:A14:70:_HERNDON-BARTON 115KV [1750]	P1	N-1	0.97	0.98	0.89	1.07	1.01	1.07	1.00	1.01	0.97	Continue to monitor
WAHTOKE 115 kV	P2-1:A14:105:_SANGER COGEN TAP 115KV [9141] (SANGERCNGJCT-SANGERCNG)	P2	Bus/Breaker	0.98	0.98	0.90	1.07	1.01	1.07	1.01	1.01	0.98	Continue to monitor
WAHTOKE 115 kV	P2-1:A14:55:_MCCALL-REEDLEY 115KV [2320] (MC CALL-WAHTOKE)	P2	Bus/Breaker	0.90	0.91	0.83	1.07	0.96	1.08	0.96	0.95	0.90	Continue to monitor
WAHTOKE 115 kV	P2-4:A14:8:_MC CALL 230KV - SECTION 1E & 1D	P2	Bus/Breaker	0.90	0.91	NConv	1.07	0.96	1.06	0.95	0.95	0.90	System adjustment
WAHTOKE 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.07	0.91	1.09	0.87	0.81	NConv	Install redundant battery
WAHTOKE 115 kV	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	0.97	0.98	0.89	1.07	1.01	1.07	1.00	1.01	0.97	Continue to monitor
WAHTOKE 115 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.89	0.90	0.81	1.07	0.96	1.08	0.95	0.95	0.89	Project:Review reedley area reinforcement
WILSONPGAE 115 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.77	1.05	1.01	1.03	1.03	1.01	NConv	Continue to monitor
WILSONPGAE 115 kV	P1-2:A13:30:_MELONES-WILSON 230KV [5080]&P1-2:A13:6:_WARNERVILLE-WILSON 230KV [5870]	P6	N-1-1	NA	NA	0.89	NA	NA	NA	NA	NA	NA	Continue to monitor
WILSONPGAE 115 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.77	1.05	1.01	1.03	1.03	1.01	NConv	Continue to monitor
WILSONPGAE 230 kV	Base Case	P0	Base case	0.98	0.97	0.94	1.02	0.99	1.00	0.99	0.99	0.97	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2025 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
WILSONPGAE 230 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.73	1.01	0.97	1.00	0.98	0.97	NConv	Continue to monitor
WILSONPGAE 230 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.73	1.01	0.97	1.00	0.98	0.97	NConv	Continue to monitor
WISHON 70 kV	Base Case	P0	Base case	1.07	1.07	0.93	1.05	0.99	1.06	1.10	1.00	1.07	Continue to monitor
WISHON 70 kV	P1-1:A14:64:_FRIANTDAM 6.60KV GEN UNIT 2	P1	N-1	1.07	1.07	0.90	1.05	0.98	1.06	1.12	1.00	1.07	Continue to monitor
WISHON 70 kV	P1-2:A14:107:_FRIANT-COPPERMINE 70KV [8660]	P1	N-1	1.07	1.07	0.84	1.06	0.96	1.07	1.12	0.99	1.07	Continue to monitor
WISHON 70 kV	P1-4:A14:37:_COPPRMNE SVD=V	P1	N-1	NA	1.07	0.88	1.05	NA	1.06	NA	NA	1.07	Continue to monitor
WISHON 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.51	1.05	0.98	1.06	1.10	0.99	NConv	Continue to monitor
WISHON 70 kV	P5-5c:A13:8:_Borden 230-70KV Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NA	NA	0.63	NA	NA	NA	NA	NA	NA	Install redundant battery
WISHON 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.51	1.05	0.98	1.06	1.10	0.99	NConv	Continue to monitor
WOODWARD 115 kV	Base Case	P0	Base case	0.98	0.98	0.91	1.07	1.02	1.06	1.02	1.02	0.98	Continue to monitor
WOODWARD 115 kV	P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P1	N-1	0.93	0.93	0.85	1.09	1.01	1.08	1.00	1.01	0.93	Continue to monitor
WOODWARD 115 kV	P1-2:A14:75:_WOODWARD-SHEPHERD 115KV [1895]	P1	N-1	0.97	0.97	0.89	1.07	1.00	1.06	1.01	1.00	0.97	Continue to monitor
WOODWARD 115 kV	P2-1:A14:105:_SANGER COGEN TAP 115KV [9141] (SANGERCNCT-SANGERCN)	P2	Bus/Breaker	0.98	0.98	0.90	1.07	1.02	1.06	1.02	1.02	0.98	Continue to monitor
WOODWARD 115 kV	P2-1:A14:88:_HERNDON-WOODWARD 115KV [1790] (HERNDON-CHLDHOSP_JCT)	P2	Bus/Breaker	0.93	0.93	0.84	1.08	1.01	1.08	0.99	1.01	0.92	Continue to monitor
WOODWARD 115 kV	P2-1:A14:89:_HERNDON-WOODWARD 115KV [1790] (WOODWARD-CHLDHOSP_JCT)	P2	Bus/Breaker	0.93	0.93	0.85	1.09	1.01	1.08	1.00	1.01	0.93	Continue to monitor
WOODWARD 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	0.89	0.89	0.82	1.08	0.96	1.08	0.97	0.96	0.89	System adjustment
WOODWARD 115 kV	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	0.88	0.88	0.83	1.09	1.00	1.09	0.97	0.99	0.88	System adjustment
WOODWARD 115 kV	P1-1:A14:47:_KERCKHOFFPH2 13.80KV GEN UNIT 1&P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P3	G-1/N-1	NA	NA	0.83	NA	NA	NA	NA	NA	NA	Continue to monitor
WOODWARD 115 kV	P5-5a:A14:2:_HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	0.89	0.89	0.86	1.09	1.00	1.09	0.97	0.99	0.89	Install redundant relay
WOODWARD 115 kV	P1-2:A13:40:_LE GRAND-CHOWCHILLA 115KV [2110]&P1-2:A14:74:_HERNDON-WOODWARD 115KV [1790]	P6	N-1-1	NA	NA	0.80	NA	NA	NA	NA	NA	NA	Continue to monitor
WOODWARD 115 kV	P7-1:A14:27:_HERNDON-WOODWARD 115KV [1790] & BORDEN-COPPERMINE 70KV [8500]	P7	DCTL	0.93	0.93	0.85	1.09	1.02	1.08	1.00	1.01	0.93	Continue to monitor
WST FRSO 115 kV	Base Case	P0	Base case	0.95	0.95	0.88	1.07	1.00	1.07	0.98	1.00	0.95	Continue to monitor
WST FRSO 115 kV	P1-2:A14:120:_CAMDEN-KINGSBURG 70KV [8653]	P1	N-1	0.95	0.95	0.90	1.07	1.00	1.07	0.98	1.00	0.95	Continue to monitor
WST FRSO 115 kV	P1-2:A14:67:_SANGER-CALIFORNIA AVE 115KV [9130]	P1	N-1	0.90	0.90	0.82	1.06	0.97	1.07	0.93	0.97	0.90	Continue to monitor

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
WST FRSO 115 kV	P1-2:A14:68:_WEST FRESNO-CALIFORNIA AVE 115KV [2361]	P1	N-1	0.92	0.92	0.84	1.07	0.98	1.07	0.95	0.98	0.92	Continue to monitor
WST FRSO 115 kV	P1-3:A14:5:_MC CALL 230/115KV TB 1	P1	N-1	0.94	0.94	0.87	1.07	0.99	1.07	0.97	0.99	0.94	Continue to monitor
WST FRSO 115 kV	P2-1:A14:84:_HERNDON-BULLARD #1 115KV [1760] (PNDLJ1-PNEDLE)	P2	Bus/Breaker	0.95	0.95	0.90	1.07	1.00	1.07	0.98	1.00	0.95	Continue to monitor
WST FRSO 115 kV	P2-2:A14:40:_CAL AVE 115KV SECTION 1F	P2	Bus/Breaker	0.92	0.92	0.84	1.07	0.98	1.07	0.95	0.98	0.92	Continue to monitor
WST FRSO 115 kV	P2-2:A14:62:_CORCORAN 115KV SECTION 1D	p2	Bus/Breaker	0.95	0.95	0.90	1.07	1.00	1.07	0.98	1.00	0.95	Continue to monitor
WST FRSO 115 kV	P2-3:A14:126:_ASHLAN 230KV - RING R4 & R3	p2	Bus/Breaker	0.95	0.95	0.90	1.07	1.00	1.07	0.98	1.00	0.95	Continue to monitor
WST FRSO 115 kV	P2-3:A14:131:_SHEPHERD 115KV - RING R2 & R3	p2	Bus/Breaker	0.96	0.96	0.90	1.07	1.00	1.07	0.98	1.00	0.96	Continue to monitor
WST FRSO 115 kV	P2-3:A14:52:_MC CALL 115KV - MIDDLE BREAKER BAY 5	P2	Bus/Breaker	0.92	0.92	0.84	1.07	0.98	1.07	0.95	0.98	0.91	Continue to monitor
WST FRSO 115 kV	P2-4:A14:15:_CAL AVE 115KV - SECTION 1D & 1E	p2	Bus/Breaker	0.90	0.90	0.78	1.06	0.97	1.07	0.93	0.97	0.90	System adjustment
WST FRSO 115 kV	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	p2	Bus/Breaker	0.87	0.88	NConv	1.07	0.95	1.06	0.92	0.94	0.87	System adjustment
WST FRSO 115 kV	P1-1:A14:59:_MCCALL1T 13.20KV GEN UNIT 1&P1-2:A14:67:_SANGER-CALIFORNIA AVE 115KV [9130]	P3	G-1/N-1	0.89	0.89	0.81	NA	NA	NA	NA	NA	0.89	Operation solution
WST FRSO 115 kV	P5-5c:A14:28:_California Ave 115kv Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.93	0.93	0.86	1.07	0.99	1.07	0.96	0.98	0.93	Install redundant battery
WST FRSO 115 kV	P1-2:A14:69:_MCCALL-WEST FRESNO #2 115KV [2370]&P1-2:A14:67:_SANGER-CALIFORNIA AVE 115KV [9130]	P6	N-1-1	0.55	0.56	0.49	NA	0.86	NA	0.67	0.85	0.55	Operation solution
WST FRSO 115 kV	P7-1:A13:8:_DAIRYLAND-MENDOTA 115KV [1360] & TOMATAK-MENDOTA #1 70KV [0]	P7	DCTL	0.95	0.95	0.89	1.07	1.00	1.07	0.98	1.00	0.95	Continue to monitor
WST FRSO 115 kV	P7-1:A14:11:_CALIFORNIA AVE-MCCALL 115KV [2360] & MCCALL-WEST FRESNO #2 115KV [2370]	P7	DCTL	0.89	0.89	0.81	1.07	0.97	1.07	0.92	0.97	0.88	Operation solution
WST FRSO 115 kV	P7-1:A14:14:_TEMPLETON-GATES 230KV [5934] & GATES-CALFLATSSS #1 230KV [0]	P7	DCTL	0.95	0.95	0.90	1.07	1.00	1.07	0.98	1.00	0.95	Continue to monitor
WST FRSO 115 kV	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	0.95	0.95	0.86	1.07	1.00	1.07	0.97	1.00	0.94	Continue to monitor
WST FRSO 115 kV	P7-1:A14:28:_GWF-KINGSBURG 115KV [1743] & GWF-HENRIETTA 70KV [8774]	P7	DCTL	0.95	0.95	0.90	1.07	1.00	1.07	0.98	1.00	0.95	Continue to monitor
WST FRSO 115 kV	P7-1:A14:2:_Q529TP-Q529 #1 115KV [0] & KINGSBURG-WAUKENA SW STA 115KV [2050]	P7	DCTL	0.95	0.95	0.90	1.07	1.00	1.07	0.98	1.00	0.95	Continue to monitor
WST FRSO 115 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	0.95	0.95	0.88	1.07	1.00	1.07	0.98	0.99	0.94	Continue to monitor
WST FRSO 115 kV	P7-1:A14:5:_GATES-PANOCHÉ #1 230KV [4720] & GATES-PANOCHÉ #2 230KV [4730]	P7	DCTL	0.95	0.95	0.90	1.07	1.00	1.07	0.98	1.00	0.95	Continue to monitor
WSTLD1RA 115 kV	P2-1:A13:49:_PANOCHÉ-ORO LOMA 115KV [3240] (PANOCHÉ1-PANOCHÉ2)	P2	Bus/Breaker	0.71	0.70	0.83	1.06	0.91	1.11	0.93	0.91	0.69	Project:Oroloma area reinforcement
WSTLD1RA 115 kV	P2-4:A13:13:_PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2	Bus/Breaker	0.70	0.69	NConv	1.05	0.89	1.11	0.93	0.89	0.68	System adjustment
YOSEMITE 70 kV	Base Case	P0	Base case	0.93	0.93	0.95	0.99	0.95	0.98	0.94	0.95	0.93	Add voltage support

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Substation	Contingency	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
YOSEMITE 70 kV	P1-3:A13:31:_EXCHQUER 13.8/115KV TB 1	P1	N-1	0.91	0.90	0.86	0.99	0.93	0.99	0.92	0.93	0.90	Continue to monitor
YOSEMITE 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	NConv	NConv	0.83	0.98	0.94	0.98	0.94	0.94	NConv	Continue to monitor
YOSEMITE 70 kV	P1-1:A13:33:_EXCHQUER 13.80KV GEN UNIT 1&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P3	G-1/N-1	NA	NA	0.79	NA	NA	NA	NA	NA	NA	Continue to monitor
YOSEMITE 70 kV	P5-5c:A13:2:_Wilson 230-115kv Batt(Failure OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	0.72	NConv	0.93	NConv	NConv	NConv	Install redundant battery
YOSEMITE 70 kV	P1-2:A13:46:_WILSON-LE GRAND 115KV [4170]&P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	0.90	NA	0.60	NA	0.79	NA	0.83	0.78	NA	Operation solution
YOSEMITE 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	NConv	NConv	0.83	0.98	0.94	0.98	0.94	0.94	NConv	Continue to monitor



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
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
ADERASLR 115 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	8.56	<8	<8	<8	<8	<8	<8	Continue to monitor
AUBERRY 70 kV	P1-2:A13:83:_BORDEN-COPPERMINE 70KV [8500] MOAS OPENED ON BORDEN_CASSIDY	P1	N-1	<8	<8	35.45	<8	<8	<8	<8	<8	<8	Continue to monitor
AVENAL 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	18.00	<8	13.20	<8	<8	8.16	<8	Continue to monitor
AVNLPARK 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	17.96	<8	13.17	<8	<8	<8	<8	Continue to monitor
BIOMASS 70 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	20.52	<8	<8	<8	<8	13.64	<8	Continue to monitor
CALFLAX 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	15.22	<8	10.97	<8	<8	<8	<8	Continue to monitor
CALRENEW 70 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	20.52	<8	<8	<8	<8	13.64	<8	Continue to monitor
CANAL 70 kV	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	14.26	12.38	<8	<8	<8	<8	<8	<8	12.76	Project:Losbanos Area Reinforcement
CASSIDY 70 kV	P1-2:A13:83:_BORDEN-COPPERMINE 70KV [8500] MOAS OPENED ON BORDEN_CASSIDY	P1	N-1	<8	<8	37.29	<8	<8	<8	<8	<8	<8	Continue to monitor
CHEVPLIN 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	17.89	<8	13.10	<8	<8	<8	<8	Continue to monitor
CHWCHLLA 115 kV	P1-2:A13:40:_LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	14.17	11.14	22.52	<8	<8	<8	<8	<8	11.53	system adjustment
COLNGA 1 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	15.75	<8	11.28	<8	<8	<8	<8	Continue to monitor
COLNGA 2 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	15.47	<8	11.25	<8	<8	<8	<8	Continue to monitor
COPPRMNE 70 kV	P1-2:A13:83:_BORDEN-COPPERMINE 70KV [8500] MOAS OPENED ON BORDEN_CASSIDY	P1	N-1	<8	<8	32.50	<8	<8	<8	<8	<8	<8	Continue to monitor
DAIRYLAND 115 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	10.10	<8	<8	<8	<8	<8	<8	Continue to monitor
DERRICK 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	15.39	<8	11.20	<8	<8	<8	<8	Continue to monitor
EXCHEQUER 115 kV	P1-2:A13:45:_EXCHEQUER-LE GRAND 115KV [1560]	P1	N-1	<8	<8	<8	<8	<8	10.15	<8	<8	<8	Generation Re-dispatch
FIREBAGH 70 kV	P1-2:A13:61:_PANOCHÉ-ORO LOMA 115KV [3240]	P1	N-1	<8	<8	8.57	<8	<8	<8	<8	<8	<8	Continue to monitor
FIVEPOINTSSS 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	10.94	<8	<8	<8	<8	<8	<8	Continue to monitor
FRIANTDAM 70 kV	P1-2:A13:83:_BORDEN-COPPERMINE 70KV [8500] MOAS OPENED ON BORDEN_CASSIDY	P1	N-1	<8	<8	31.01	<8	<8	<8	<8	<8	<8	Continue to monitor
GATES 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	17.59	<8	12.67	<8	<8	<8	<8	Continue to monitor
GILLRAN 115 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	15.31	<8	<8	<8	<8	<8	<8	Continue to monitor
HURON 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	16.72	<8	11.83	<8	<8	<8	<8	Continue to monitor
JACALITO 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	16.76	<8	12.09	<8	<8	<8	<8	Continue to monitor
JAYNESWSTA 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	17.50	<8	12.61	<8	<8	<8	<8	Continue to monitor
KETTLEMN 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	17.88	<8	13.09	<8	<8	<8	<8	Continue to monitor
MADERAPR 115 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	15.12	<8	<8	<8	<8	<8	<8	Continue to monitor
MENDOTA 70 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	20.52	<8	<8	<8	<8	13.63	<8	Continue to monitor
MERCYSRNGSS 70 kV	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	<8	9.01	<8	<8	<8	<8	<8	<8	9.31	Project:Losbanos Area Reinforcement
MRCYSRPS 70 kV	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	9.16	9.34	<8	<8	<8	<8	<8	<8	9.65	Project:Losbanos Area Reinforcement
NEWHALL 115 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	14.84	<8	<8	<8	<8	<8	<8	Continue to monitor
NORTHSTAR 115 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	20.01	<8	12.59	<8	<8	13.27	<8	Continue to monitor
NRTHFORK 70 kV	P1-2:A13:83:_BORDEN-COPPERMINE 70KV [8500] MOAS OPENED ON BORDEN_CASSIDY	P1	N-1	<8	<8	35.77	<8	<8	<8	<8	<8	<8	Continue to monitor
OIL CITY 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	15.43	<8	11.22	<8	<8	<8	<8	Continue to monitor
ORO LOMA 115 kV	P1-2:A13:61:_PANOCHÉ-ORO LOMA 115KV [3240]	P1	N-1	<8	13.15	11.59	<8	<8	<8	<8	<8	13.46	Add voltage support
ORTIGA 70 kV	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	11.03	10.51	<8	<8	<8	<8	<8	<8	10.85	Project:Losbanos Area Reinforcement
PAIGESLR 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	10.54	<8	<8	<8	<8	<8	<8	Continue to monitor
PENNIZIER 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	15.43	<8	11.22	<8	<8	<8	<8	Continue to monitor
PLSNTVLY 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	13.14	<8	9.26	<8	<8	<8	<8	Continue to monitor
PMTFMPP 115 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	15.29	<8	<8	<8	<8	<8	<8	Continue to monitor

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
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
Q1028Q1029 115 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	20.01	<8	12.59	<8	<8	13.27	<8	Continue to monitor
Q1127 115 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	19.98	<8	12.59	<8	<8	13.27	<8	Continue to monitor
RIVERROC 70 kV	P1-2:A13:83:_BORDEN-COPPERMINE 70KV [8500] MOAS OPENED ON BORDEN_CASSIDY	P1	N-1	<8	<8	34.98	<8	<8	<8	<8	<8	<8	Continue to monitor
SCHLNDLR 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	9.97	<8	<8	<8	<8	<8	<8	Continue to monitor
SHARON 115 kV	P1-2:A13:40:_LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	12.56	9.81	20.34	<8	<8	<8	<8	<8	10.17	system adjustment
SJNO2 70 kV	P1-2:A13:83:_BORDEN-COPPERMINE 70KV [8500] MOAS OPENED ON BORDEN_CASSIDY	P1	N-1	<8	<8	35.62	<8	<8	<8	<8	<8	<8	Continue to monitor
SJNO3 70 kV	P1-2:A13:83:_BORDEN-COPPERMINE 70KV [8500] MOAS OPENED ON BORDEN_CASSIDY	P1	N-1	<8	<8	35.92	<8	<8	<8	<8	<8	<8	Continue to monitor
STONCRRL 70 kV	P1-2:A14:117:_REEDLEY-DINUBA #1 70KV [9050]	P1	N-1	<8	<8	8.09	<8	<8	<8	<8	<8	<8	Continue to monitor
SUN CITY 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	17.98	<8	13.18	<8	<8	8.15	<8	Continue to monitor
TOMATAK 70 kV	P1-2:A13:60:_PANOCHÉ-MENDOTA 115KV [3230]	P1	N-1	<8	<8	20.90	<8	13.15	<8	<8	13.87	<8	Continue to monitor
TORNADO 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	15.65	<8	11.32	<8	<8	<8	<8	Continue to monitor
TVY VLLY 70 kV	P1-2:A13:83:_BORDEN-COPPERMINE 70KV [8500] MOAS OPENED ON BORDEN_CASSIDY	P1	N-1	<8	<8	17.81	<8	<8	<8	<8	<8	<8	Continue to monitor
VEGA 70 kV	P1-2:A13:73:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	<8	9.00	<8	<8	<8	<8	<8	<8	9.30	Project:Losbanos Area Reinforcement
WESTLND3_3 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	17.50	<8	12.61	<8	<8	<8	<8	Continue to monitor
WHTNYPT 70 kV	P1-3:A14:13:_GATES D 230/70KV TB 5	P1	N-1	<8	<8	10.95	<8	<8	<8	<8	<8	<8	Continue to monitor
WISHON 70 kV	P1-2:A13:83:_BORDEN-COPPERMINE 70KV [8500] MOAS OPENED ON BORDEN_CASSIDY	P1	N-1	<8	<8	35.03	<8	<8	<8	<8	<8	<8	Continue to monitor

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2025 Spring Off-Peak	2028 Summer Peak	2035 Summer Peak	2028 SP High CEC Forecast	2025 OP Sensitivity	
P2-1 - Line HENTAP1 to MUSTANGSS 230 kV ckt 1	P2	Bus/Breaker	No Issues	Potential WECC/NERC criteria violation	No Issues	No Issues	No Issues	Under review
P2-2 - Bus Fault at GATES 230 kV Section 1D	P2	Bus/Breaker	Potential WECC/NERC criteria violation	No Issues	No Issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Future project
P2-4 - Internal fault at Bus-tie Breaker 202 at MC CALL 230 kV Bus D	P2	Bus/Breaker	No Issues	No Issues	No Issues	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Sensitivity only
P4-5 - Stuck non-Bus-tie Breaker 242 protecting Substation Bus MIDWAY 230 kV Section F	P4	Stuck Breaker	Potential WECC/NERC criteria violation	No Issues	No Issues	No Issues	No Issues	Future project
P4-6 - Stuck Bus-tie Breaker 202 protecting Substation Bus GATES 230 kV Section 1D	P4	Stuck Breaker	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Project: Gates bank upgrade
P5-1d - Failure of Exchequer 115 kV CB 112 control circuits due to non-redundant DC panel with fault for Gen EXCHQUER 13.8 kV unit 1 (ALL 115 kV clears remotely)	P5	Non-Redundant battery supply	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Add redundant DC panel
P5-4d - Failure of Gregg 230 kV CB 472 control circuits due to non-redundant DC panel with fault for SVD GREGG 230 kV id "v " (ALL 230 kV clears remotely)	P5	Non-Redundant battery supply	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Add redundant DC panel
P5-5c - Failure of non-redundant DC battery supplying Borden 230kV and 70kV Buses	P5	Non-Redundant battery supply	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Add redundant DC battery
P2-4-Internal fault at Bus-tie Breaker 302 at MC CALL 230 kV Bus E	P2	Bus/Breaker	No Issues	No Issues	Potential WECC/NERC criteria violation	No Issues	No Issues	continue to monitor

2023-2024 ISO Reliability Assessment - Study Results

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

Single Contingency Load Drop



Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions	
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast		

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

2023-2024 ISO Reliability Assessment - Study Results

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

*Single Source Substation with more than 100 MW Load*



Substation	Load Served (MW)									Potential Mitigation Solutions
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	

No single source substation with more than 100 MW

2023-2024 ISO Reliability Assessment - Study Results

Study Area: Kern

Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
Arco-Midway 230kV line	P5-5C(DC):A15:1:_MIDWAY 500KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Install Redundant Battery Supply
Kern Oil-7th Standard 115kV line	P1-2:A15:41:_7TH STANDARD-KERN 115KV [1981]	P1	Line w/o Fault	120	132	<100	<100	<100	<100	<100	<100	161	Project: NE Kern 115kV Area Reinforcement
Kern Oil-Kern PP 115kV line	P1-2:A15:49:_KERN-MAGUNDEN-WITCO 115KV [1970]P1-2:A15:41:_7TH STANDARD-KERN 115KV [1981]	P6	N-1-1	129	<100	<100	<100	<100	<100	<100	<100	<100	Project: Kern 115kV BAAH
Kern Oil-Magunden 15kV line	P7-1:A15:7_Kern PP-Westpark No. 1 & 2 115 kV Lines	P7	DCTL	<100	<100	108	<100	<100	<100	<100	<100	<100	Continue to Monitor
Kern PP bus section breaker	P2-4:A15:7:_KERN PWR 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	103	<100	<100	<100	<100	<100	<100	<100	<100	Project: Midway - Kern PP 230kV
Kern PP -Magunden 115kV line	P2-4:A15:7:_KERN PWR 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	161	<100	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	109	130	<100	<100	<100	<100	<100	129	NA	Project: NE Kern 115kV Area Reinforcement
Kern PP-7th Standard 115kV line	P2-1:A15:52:_LERDO-KERN OIL-7TH STANDARD 115KV [1950] (LRDO JCT-KERN OIL)	P2	Line w/o Fault	<100	<100	103	<100	<100	<100	<100	<100	<100	Continue to Monitor
	P2-2:A15:20:_KERN OIL 115KV SECTION 1D	P2	Bus	<100	<100	102	<100	<100	<100	<100	<100	<100	Continue to Monitor
	P2-2:A15:32:_KERN PWR 115KV SECTION 2E	P2	Bus	106	<100	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	116	108	<100	<100	<100	<100	<100	108	108	Project: NE Kern 115kV Area Reinforcement
	P2-3:A15:146:_KERN OIL - 1D 115KV & KERN OIL-LIVEOAKSWSTA-KERN OIL-POSO MT LINE	P2	Non-Bus Tie Breaker	<100	<100	102	<100	<100	<100	<100	<100	<100	Continue to Monitor
	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	116	108	<100	<100	<100	<100	<100	108	108	Project: NE Kern 115kV Area Reinforcement
	P2-4:A15:2:_KERN OIL 115KV - SECTION 1D & 1E	P2	Bus Tie Breaker	<100	<100	102	<100	<100	<100	<100	<100	<100	Continue to Monitor
	P2-4:A15:6:_KERN PWR 115KV - SECTION 1E & 2E	P2	Bus Tie Breaker	181	<100	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
Kern PP-Kern Oil 115kV line	P2-4:A15:7:_KERN PWR 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	145	<100	<100	<100	<100	<100	<100	<100	108	Project: NE Kern 115kV Area Reinforcement
	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	116	108	<100	<100	<100	<100	<100	108	<100	Project: NE Kern 115kV Area Reinforcement
	P2-3:A15:136:_TAFT 115KV - RING R2 & R1	P2	Non-Bus Tie Breaker	<100	<100	<100	101	<100	<100	<100	<100	<100	Operating Solution
	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	<100	<100	<100	104	<100	<100	<100	<100	<100	Operating Solution
Kern PP-Magnuden 115kV line	P1-2:A15:49:_KERN-MAGUNDEN-WITCO 115KV [1970]	P3	G-1/N-1	<100	<100	106	<100	<100	<100	<100	<100	<100	Continue to Monitor
	P1-2:A15:113:_KERN OIL-LIVEOAKSWSTA-KERN OIL-POSO MT 115KV [0] MOAS OPENED ON CRCKERNFRNTJ_PO SO MT	P6	N-1-1	<100	<100	127	<100	<100	<100	<100	<100	111	Continue to monitor
Kern Ridge-Temblor 115kV line	P1-2:A15:38:_WESTPARK-COLUMBUS 115KV [0]P1-2:A15:41:_7TH STANDARD-KERN 115KV [1981]	P6	N-1-1	112	<100	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
Kern Ridge-Temblor 115kV line	P5-5C(DC):A15:7:_MIDWAY 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	<100	<100	<100	<100	<100	<100	110	<100	Diverge	Sensitivity only
Kern Ridge-Temblor 115kV line	P7-1:A15:8:_MIDSUN-MIDWAY & MIDWAY-TEMBLOR 115 KV LINES	P7	DCTL	<100	<100	<100	<100	<100	<100	<100	109.6	<100	Sensitivity only
Lerdo-Kern Oil 115kV line	P1-2:A15:41:_7TH STANDARD-KERN 115KV [1981]P1-2:A15:47:_KERN OIL-WITCO 115KV [1920]	P6	N-1-1	152.36	120.28	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
Lerdo-Kern Oil-7th Standard	P2-2:A15:33:_KERN PWR 115KV SECTION 2D	P2	Bus	112	<100	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	109	130	<100	<100	<100	<100	<100	129	<100	Project: NE Kern 115kV Area Reinforcement
	P2-3:A15:148:_KERN PWR 115KV - MIDDLE BREAKER BAY 1	P2	Non-Bus Tie Breaker	<100	132	<100	<100	<100	<100	<100	133	<100	Project: NE Kern 115kV Area Reinforcement
	P2-3:A15:57:_KERN PWR - 2D 115KV & KERN-STOCKDALE-LAMONT #2 LINE	P2	Non-Bus Tie Breaker	113	<100	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
	P2-3:A15:58:_KERN PWR - 2D 115KV & KERN PWR-DOUBLE C LINE	P2	Non-Bus Tie Breaker	112	<100	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
	P2-3:A15:69:_MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus Tie Breaker	138	146	<100	<100	<100	<100	<100	148	<100	Project: NE Kern 115kV Area Reinforcement
	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	192	197	<100	<100	<100	<100	<100	197	108	Project: NE Kern 115kV Area Reinforcement
	P2-4:A15:19:_MIDWAY-DBBSB SECTION 2D & MIDWAY-E SECTION 2E 230KV	P2	Bus Tie Breaker	115	<100	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
Lerdo-Lerdo Junction 115kV line	P2-4:A15:6:_KERN PWR 115KV - SECTION 1E & 2E	P2	Bus Tie Breaker	175	<100	<100	<100	<100	<100	<100	<100	NA	Project: NE Kern 115kV Area Reinforcement
Midway Bus Section Breaker	P1-2:A15:31:_WSCOPRSN-SEMITROPIC_D-CHARKA 115KV [0]	P3	G-1/N-1	126	130	100	<100	<100	<100	<100	131	132	Review Project: NE Kern 115kV Area Reinforcement
	P2-3:A15:22:_MIDWAY-DBBSB - 2D 230KV & MIDWAY-DBBSB-MIDWAY-R12 #1 LINE	P2	Non-Bus Tie Breaker	<100	<100	<100	<100	105	<100	<100	<100	NA	Operating Solution
	P2-1:A15:110:_MIDWAY-TEMBLOR 115KV [2630] (TEMBLOR-PSE MCKJ)	P2	Line w/o Fault	<100	<100	<100	<100	<100	<100	<100	128	<100	Sensitivity only
	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line w/o Fault	<100	<100	<100	102	<100	<100	<100	<100	<100	Operating Solution
	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line w/o Fault	<100	<100	<100	<100	<100	<100	<100	128	<100	Sensitivity only

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
Midway-Carrizzo 115kV line	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	<100	<100	<100	102	<100	<100	<100	<100	<100	Operating Solution
	P2-3:A15:70:_MIDWAY - 2D 115KV & MIDWAY-TEMBLOR LINE	P2	Non-Bus Tie Breaker	<100	<100	<100	<100	<100	<100	128	<100	<100	Sensitivity only
	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-Bus Tie Breaker	<100	<100	<100	102	<100	<100	<100	<100	<100	Operating Solution
	P2-3:A15:81:_PUMPJACK - 1D 115KV & LINE	P2	Non-Bus Tie Breaker	<100	<100	<100	7	<100	<100	128	<100	<100	Sensitivity only
	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2 P2	Bus Tie Breaker Bus Tie Breaker	<100 <100	<100 <100	<100 <100	101 102	<100 <100	<100 <100	<100 <100	<100 <100	<100 <100	Operating Solution Operating Solution
Midway-Kern PP 230kV line	P2-4:A15:19:_MIDWAY-DBSB SECTION 2D & MIDWAY-E SECTION 2E 230KV	P2	Bus Tie Breaker	117	<100	<100	<100	103	<100	<100	<100	NA	Project: Kern 115kV BAAH
Midway-Rio Bravo 115kV line	P1-2:A15:54:_MIDWAY-RENFRO-TUPMAN 115KV [2590]	P1	N-1	101	110	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
	P1-2:A15:56:_MIDWAY-TUPMAN-RIO BRAVO-RENFRO 115KV [2600]	P1	N-1	134	158	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
	P1-2:A15:63:_MIDWAY-SHAFTER 115KV [2610]	P1	N-1	134	157	<100	<100	<100	<100	<100	<100	<100	Project: NE Kern 115kV Area Reinforcement
Midway-Semitropic 115kV line	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant battery	126	113	<100	<100	<100	<100	<100	114	121	Project: NE Kern 115kV Area Reinforcement
	P1-2:A15:53:_SEMITROPIC-MIDWAY #1 115KV [3630]P1-2:A15:34:_SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] MOAS OPENED ON GANSO_MIDWAY	P6	N-1-1	<100	<100	<100	<100	<100	101	<100	<100	<100	Generation Re-dispatch
Midway-Shafter 115kV line	P5-5A(NRDR):A15:15:_TUPMAN 115KV BUS 1D (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-redundant relay	134	158	51	28	54	4	94	159	159	Project: NE Kern 115kV Area Reinforcement
	P5-5A(NRDR):A15:7:_RENFRO 115KV (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-redundant relay	134	158	51	28	54	4	94	159	159	Project: NE Kern 115kV Area Reinforcement
	P7-1:A15:7:_MIDWAY-TUPMAN-RENFRO & MIDWAY-TUPMAN-RIO BRAVO-RE	P7	DCTL	134	158	51	<100	54	<100	94	<100	159	Operating Solution
Midway-Taft 115kV line	P5-5C(DC):A15:4:_KERN 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	Diverge	Diverge	Diverge	56	19	30	29	Diverge	Diverge	Install Redundant Battery Supply
Midway-Temblor 115kV line	P7-1:A15:14:_CALIENTE SW STA - MIDWAY #1 & #2 230 KV LINES	P7	DCTL	11.44	10.66	10.3	<100	68.9	<100	102.47	<100	9.96	Sensitivity only
Midway-Tupman 115kV line	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	183	199	<100	29	92	13	107	201	201.18	Project: NE Kern 115kV Area Reinforcement
Midway-Tupman-Rio Bravo 115kV line	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	134	156	51	28	54	7	94	158	<100	Project: NE Kern 115kV Area Reinforcement
	P2-3:A15:133:_SHAFTER 115KV - RING R1 & R4	P2	Non-Bus Tie Breaker	82	107	33	20	36	6	53	109	<100	Project: NE Kern 115kV Area Reinforcement
	P2-3:A15:69:_MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus Tie Breaker	134	157	51	27	54	7	93	158	<100	Project: NE Kern 115kV Area Reinforcement
	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	145	172	51	28	56	7	98	174	201	Project: NE Kern 115kV Area Reinforcement
	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	140	163	50	27	55	7	95	165	<100	Project: NE Kern 115kV Area Reinforcement
Midway-Wheeler Ridge 230kV line	P1-2:A15:109:_BITTERWATRSS-MIDWAY-D 230KV [0]	P1	N-1	<100	108	<100	<100	<100	<100	<100	<100	109	Project: Wheeler Ridge Junction
	P2-1:A15:238:_MIDWAY-WHEELER RIDGE #1 230KV [5190] (BUENAVJ1-MIDWAY-D)	P2	Line w/o Fault	Diverge	119	50	7	Diverge	105	Diverge	114	114	Project: Wheeler Ridge Junction
	P2-1:A15:239:_MIDWAY-WHEELER RIDGE #2 230KV [5200] (BUENAVJ2-MIDWAY-D)	P2	Line w/o Fault	<100	119	50	12	Diverge	104	Diverge	114	114	Project: Wheeler Ridge Junction
	P2-3:A15:13:_MIDWAY-E - 1E 230KV & LINE	P2	Non-Bus Tie Breaker	<100	100	100	101	Diverge	1	Diverge	100	<100	Project: Wheeler Ridge Junction
	P2-3:A15:140:_MIDWAY-D 230KV - MIDDLE BREAKER BAY 4	P2	Non-Bus Tie Breaker	<100	108	46	17	Diverge	93	Diverge	103	<100	Project: Wheeler Ridge Junction
Semitropic-Lerdo 115kV line	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	111	111	<100	100	<100	<100	93	109	196	Project: NE Kern 115kV Area Reinforcement
	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	111	111	<100	100	<100	<100	93	110	196	Project: NE Kern 115kV Area Reinforcement
	P2-4:A15:7:_KERN PWR 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	143	<100	<100	<100	27	<100	47	<100	196	Project: NE Kern 115kV Area Reinforcement
	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	111	111	<100	100	<100	<100	93	109	196	Project: NE Kern 115kV Area Reinforcement
	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant battery	280	242	35	63	27	10	70	246	246	Project: NE Kern 115kV Area Reinforcement
P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	279	242	35	63	27	10	70	246	246	Project: NE Kern 115kV Area Reinforcement	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
Shafter-Rio Bravo 115kV line	P5-5C(DC):A15:4:_KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant relay	Diverge	Diverge	Diverge	96	31	10	54	Diverge	Diverge	Install Redundant Battery Supply
	P1-2:A15:45:_Lerdo-KERN OIL-7TH STANDARD 115KV [1950]P1-1:A15:32:_MT POSO 13.80KV GEN UNIT 1	P6	N-1-1	104	113	<100	<100	<100	<100	<100	<100	154	Project: NE Kern 115kV Area Reinforcement
	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	86	99	41	18	33	5	62	100	100	Sensitivity only
	P2-3:A15:69:_MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-Bus Tie Breaker	86	100	41	18	33	5	62	100	100	Operating Solution
	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	93	110	43	18	35	5	65	110	110	Project: NE Kern 115kV Area Reinforcement
Temblor-Carrizo 115kV line	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	90	104	42	18	34	5	63	105	104	Project: NE Kern 115kV Area Reinforcement
	P7-1:A15:14:_CALIENTE SW STA - MIDWAY #1 & #2 230 KV LINES	P7	DCTL	59	48	26	<100	117	<100	72	<100	52	Operating Solution
	P7-1:A15:8:_MIDSUN-MIDWAY & MIDWAY-TEMBLOR 115 KV LINES	P7	DCTL	21.02	20.92	13.64	<100	11.03	<100	128.03	<100	20.87	Sensitivity only
	P5-5C(DC):A15:1:_MIDWAY 500KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Install Redundant Battery Supply
	P5-5C(DC):A15:4:_KERN 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant relay	Diverge	Diverge	Diverge	42	10	18	25	Diverge	Diverge	Install Redundant Battery Supply
Temblor-Kern Ridge 115kV line	P5-5C(DC):A15:7:_MIDWAY 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-redundant relay	21	21	12	12	9	20	128	21	Diverge	Operating Solution
	P1-2:A15:28:_MIDWAY-WHEELER RIDGE #1 230KV [5190]	P1	N-1	<100	<100	<100	<100	105	<100	<100	<100	<100	Generation Re-dispatch
	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	<100	<100	<100	<100	<100	<100	128	<100	<100	Sensitivity only
	P2-1:A15:110:_MIDWAY-TEMBLOR 115KV [2630] (TEMBLOR-PSE MCKJ)	P2	Line w/o Fault	21	21	16	10	11	20	110	21	<100	Sensitivity only
	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line w/o Fault	22	22	10	12	10	19	110	22	<100	Sensitivity only
Tremblor-Carrizo 115kV line	P2-3:A15:70:_MIDWAY - 2D 115KV & MIDWAY-TEMBLOR LINE	P2	Non-Bus Tie Breaker	21	21	16	11	11	20	110	21	<100	Sensitivity only
	P2-3:A15:81:_PUMPJACK - 1D 115KV & LINE	P2	Non-Bus Tie Breaker	21	21	16	10	11	20	110	21	<100	Sensitivity only
Wheeler Ridge-Tejon 70kV line	P1-2:A15:10:_CALIENTE SW STA-MIDWAY #2 230KV [5226]	P6	N-1-1	<100	<100	<100	117	<100	<100	<100	<100	<100	Tejon Area Reinforcement Project
Wheeler Ridge-San Bernard 70kV line	P1-2:A15:93:_WHEELER RIDGE-SAN BERNARD 70KV [9300] + P1-3:A15:94:_KR	P3	G-1/N-1	111	110	113							Tejon Area Reinforcement Project
Wheeler Ridge-Taft 70kV line	P1-2:A15:92:_WHEELER RIDGE-TEJON 70KV [9310] + P1-3:A15:94:_KRN CNYN	P3	G-1/N-1	102	101	106							Tejon Area Reinforcement Project
	P7-1:A15:1:_KERN-OLD RIVER NO. 1 & 2 70 KV LINES	P7	DCTL	64	59	57	<100	21	<100	111	<100	61	Operating Solution



2023-2024 ISO Reliability Assessment - Study Results

Study Area: Kern

Low Voltages



Substation	Contingency (All and Worst )	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
KERNRDGE_L19	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	0.87	0.88	0.97	0.97	0.97	0.92	0.50	0.97	TBD	Generation Redispatch
KERNRDGE_L04	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	0.87	0.88	0.97	0.97	0.97	0.92	0.49	0.97	TBD	Generation Redispatch
KERNRDGE_L19	P1-3:A15:109:_KERNRDGELH 69/4.16KV TB 1	P1	N-1	0.94	0.93	0.96	0.96	0.96	0.95	0.88	0.96	TBD	Sensitivity Only
KERNRDGE_L18	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	0.94	0.95	1.03	1.03	1.03	0.99	0.53	1.03	TBD	Sensitivity Only
KERNRDGE_L04	P1-3:A15:109:_KERNRDGELH 69/4.16KV TB 1	P1	N-1	0.94	0.94	0.96	0.96	0.96	0.95	0.89	0.96	TBD	Sensitivity Only
KERNRDGE_L34	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	0.94	0.95	1.03	1.03	1.03	0.99	0.53	1.03	TBD	Sensitivity Only
KERNRDGE_L32	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	0.94	0.95	1.03	1.03	1.03	1.00	0.53	1.03	TBD	Sensitivity Only
KERNRDGE_L11	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	0.94	0.95	1.03	1.03	1.03	1.00	0.53	1.03	TBD	Sensitivity Only
KERNRDGE	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	0.94	0.95	1.04	1.04	1.04	1.00	0.54	1.04	TBD	Sensitivity Only
TEMBLOR	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	0.95	0.96	1.03	1.04	1.04	1.00	0.56	1.04	TBD	Sensitivity Only
CARNATIO	P2-4:A15:27:_KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus Tie Breaker	0.55	0.56	0.42	1.03	NA	NA	1.07	0.56	TBD	Load forecast under review
PANAMA	P2-4:A15:27:_KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus Tie Breaker	0.56	0.57	0.43	1.04	NA	NA	1.08	0.57	TBD	Load forecast under review
OLD RIVR	P2-4:A15:27:_KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus Tie Breaker	0.57	0.58	0.50	1.04	NA	NA	1.07	0.58	TBD	Load forecast under review
OLD_RVR1	P2-4:A15:27:_KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus Tie Breaker	0.57	0.58	0.50	1.04	NA	NA	1.07	0.58	TBD	Load forecast under review
SAN EMDO	P2-4:A15:27:_KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus Tie Breaker	0.67	0.68	0.62	1.04	NA	NA	1.06	0.67	TBD	Load forecast under review
S_KERN	P2-4:A15:27:_KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus Tie Breaker	0.77	0.78	0.74	1.04	NA	NA	1.05	0.78	TBD	Load forecast under review
COPUS_E	P2-4:A15:27:_KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus Tie Breaker	0.82	0.83	0.80	1.03	1.02	1.03	1.04	0.83	TBD	Load forecast under review
BSCL_PLD	P2-4:A15:27:_KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus Tie Breaker	0.82	0.83	0.80	1.03	1.02	1.03	1.04	0.83	TBD	Load forecast under review
MC FRLND	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.83	0.82	1.00	1.01	1.00	1.05	0.96	0.82	TBD	Project: Kern 115kV Reinforcement
MC FRLND	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.83	0.83	1.00	1.01	1.00	1.05	0.96	0.83	TBD	Project: Kern 115kV Reinforcement
MC FRLND	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.83	0.83	1.00	1.01	1.00	1.05	0.96	0.83	TBD	Project: Kern 115kV Reinforcement
WASCO	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.84	0.84	NA	1.01	NA	NA	0.98	0.84	TBD	Project: Kern 115kV Reinforcement
WASCO	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.84	0.84	NA	1.01	NA	NA	0.98	0.84	TBD	Project: Kern 115kV Reinforcement
WASCO	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.85	0.84	NA	1.01	NA	NA	0.98	0.84	TBD	Project: Kern 115kV Reinforcement
GOSE LKE	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.86	0.85	NA	1.05	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
GOSE LKE	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.86	0.85	NA	1.05	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
GOSE LKE	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.86	0.85	NA	1.05	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
WILDWOOD1	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.86	0.85	NA	1.05	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
WILDWOOD2	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.86	0.85	NA	1.05	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
WILDWOOD1	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.86	0.85	NA	1.05	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement

Substation	Contingency (All and Worst)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
WILDWOOD1	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.86	0.85	NA	1.05	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
WILDWOOD2	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.86	0.85	NA	1.05	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
WILDWOOD2	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.86	0.85	NA	1.05	NA	NA	1.03	0.85	TBD	Project: Kern 115kV Reinforcement
SMTRPCWS	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.87	0.85	NA	1.05	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
SEMITROPIC_E	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.87	0.85	NA	1.05	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
SEMIREAC	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.87	0.85	NA	1.04	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
KERNRDGE_L19	P2-1:A15:110:_MIDWAY-TEMBLOR 115KV [2630] (TEMBLOR-PSE MCKJ)	P2	Line section w/o fault	0.87	0.88	0.97	0.97	0.97	0.92	0.50	0.87	TBD	Project: Kern 115kV Reinforcement
KERNRDGE_L19	P2-3:A15:70:_MIDWAY - 2D 115KV & MIDWAY-TEMBLOR LINE	P2	Non-bus tie breaker	0.87	0.88	0.97	0.97	0.97	0.92	0.50	0.87	TBD	Project: Kern 115kV Reinforcement
KERNRDGE_L19	P2-3:A15:81:_PUMPJACK - 1D 115KV & LINE	P2	Non-bus tie breaker	0.87	0.88	0.97	0.97	0.97	0.92	0.50	0.87	TBD	Project: Kern 115kV Reinforcement
MCKIBBEN	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.87	0.85	NA	1.03	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
PONDROAD	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.87	0.85	NA	1.03	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
SMYRNA	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.87	0.85	NA	1.03	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
SMTRPCWS	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.87	0.85	NA	1.05	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
SMTRPCWS	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.87	0.85	NA	1.05	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
KERNRDGE_L04	P2-1:A15:110:_MIDWAY-TEMBLOR 115KV [2630] (TEMBLOR-PSE MCKJ)	P2	Line section w/o fault	0.87	0.88	0.97	0.97	0.97	0.92	0.49	0.88	TBD	Project: Kern 115kV Reinforcement
SEMITROPIC_E	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.87	0.85	NA	1.05	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
SEMITROPIC_E	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.87	0.85	NA	1.05	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
SEMIREAC	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.87	0.85	NA	1.04	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
KERNRDGE_L04	P2-3:A15:70:_MIDWAY - 2D 115KV & MIDWAY-TEMBLOR LINE	P2	Non-bus tie breaker	0.87	0.88	0.97	0.97	0.97	0.92	0.49	0.88	TBD	Project: Kern 115kV Reinforcement
KERNRDGE_L04	P2-3:A15:81:_PUMPJACK - 1D 115KV & LINE	P2	Non-bus tie breaker	0.87	0.88	0.97	0.97	0.97	0.92	0.49	0.88	TBD	Project: Kern 115kV Reinforcement
SEMIREAC	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.87	0.85	NA	1.04	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
MCKIBBEN	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.87	0.85	NA	1.03	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
GANSO	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.87	0.85	NA	1.04	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement

Substation	Contingency (All and Worst )	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
MCKIBBEN	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.87	0.85	NA	1.03	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
PONDROAD	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.87	0.85	NA	1.03	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
SMYRNA	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.87	0.85	NA	1.03	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
PONDROAD	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.87	0.85	NA	1.03	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
SMYRNA	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.87	0.85	NA	1.03	NA	NA	1.02	0.85	TBD	Project: Kern 115kV Reinforcement
GANSO	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.87	0.85	NA	1.04	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
GANSO	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.87	0.85	NA	1.04	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
WSCOPRSN	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.87	0.86	NA	1.04	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
MRCPAWST	P2-4:A15:27:_KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus Tie Breaker	0.87	0.88	0.85	1.03	1.02	1.03	1.04	0.88	TBD	Load forecast under review
WSCOPRSN	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.87	0.86	NA	1.04	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
WSCOPRSN	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.87	0.86	NA	1.04	NA	NA	1.02	0.86	TBD	Project: Kern 115kV Reinforcement
ATWELL_ISL	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.87	0.86	NA	1.03	NA	NA	1.03	0.86	TBD	Project: Kern 115kV Reinforcement
ATWELLW	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.87	0.86	NA	1.03	NA	NA	1.03	0.86	TBD	Project: Kern 115kV Reinforcement
MC FRLND	P2-3:A15:69:_MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-bus tie breaker	0.87	0.87	1.00	1.02	1.00	1.05	0.95	0.87	TBD	Project: Kern 115kV Reinforcement
ATWELL_ISL	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.88	0.86	NA	1.03	NA	NA	1.03	0.86	TBD	Project: Kern 115kV Reinforcement
ATWELLW	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.88	0.86	NA	1.03	NA	NA	1.03	0.86	TBD	Project: Kern 115kV Reinforcement
ATWELL_ISL	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.88	0.86	NA	1.03	NA	NA	1.03	0.86	TBD	Project: Kern 115kV Reinforcement
ATWELLW	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.88	0.86	NA	1.03	NA	NA	1.03	0.86	TBD	Project: Kern 115kV Reinforcement
CHARKA	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.88	0.87	NA	1.04	NA	NA	1.01	0.87	TBD	Project: Kern 115kV Reinforcement
SHAFTER	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.88	0.86	0.94	1.04	0.97	1.07	0.94	0.86	TBD	Project: Kern 115kV Reinforcement
CHARKA	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.88	0.87	NA	1.04	NA	NA	1.01	0.87	TBD	Project: Kern 115kV Reinforcement
CHARKA	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.88	0.87	NA	1.04	NA	NA	1.01	0.87	TBD	Project: Kern 115kV Reinforcement
GARDNER	P2-4:A15:27:_KERN PW2 SECTION 2D & KERN PW1 SECTION 1D 70KV	P2	Bus Tie Breaker	0.88	0.89	0.87	1.03	1.02	1.03	1.03	0.89	TBD	Load forecast under review
FAMOSO	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.89	0.88	1.02	1.02	1.01	1.05	0.99	0.88	TBD	Project: Kern 115kV Reinforcement
FAMOSO	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.89	0.88	1.02	1.02	1.01	1.05	0.99	0.88	TBD	Project: Kern 115kV Reinforcement
7STNDRD	P2-4:A15:7:_KERN PWR 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.89	NA	NA	NA	NA	NA	0.98	NA	TBD	Project: Kern 115kV Reinforcement
FAMOSO	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.89	0.88	1.02	1.02	1.01	1.05	0.99	0.88	TBD	Project: Kern 115kV Reinforcement

Substation	Contingency (All and Worst )	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
WASCO	P2-3:A15:69:_MIDWAY - 2E 115KV & SMYRNA-SEMITROPIC-MIDWAY LINE	P2	Non-bus tie breaker	0.89	0.88	NA	1.02	NA	NA	0.96	0.88	TBD	Project: Kern 115kV Reinforcement
FAMOSO	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.90	0.89	NA	1.04	NA	NA	1.01	0.89	TBD	Project: Kern 115kV Reinforcement
KERNWTR_LD	P2-4:A15:7:_KERN PWR 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.90	NA	NA	NA	NA	NA	0.98	NA	TBD	Project: Kern 115kV Reinforcement
FAMOSO	P2-2:A15:41:_MIDWAY 115KV SECTION 2E	P2	Bus	0.90	0.89	NA	1.04	NA	NA	1.01	0.89	TBD	Project: Kern 115kV Reinforcement
FAMOSO	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.90	0.89	NA	1.04	NA	NA	1.01	0.89	TBD	Project: Kern 115kV Reinforcement
RIO BRVO	P2-4:A15:10:_MIDWAY 115KV - SECTION 2E & 1E	P2	Bus Tie Breaker	0.91	0.89	0.95	1.04	0.98	1.07	0.96	0.89	TBD	Project: Kern 115kV Reinforcement
KERNRDGE_L19	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.93	0.93	0.97	0.97	0.97	0.95	0.77	0.93	TBD	Sensitivity Only
KERNRDGE_L19	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	0.93	0.93	0.97	0.97	0.97	0.95	0.77	0.93	TBD	Sensitivity Only
KERNRDGE_L19	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	0.93	0.93	0.97	0.97	0.97	0.95	0.77	0.93	TBD	Sensitivity Only
KERNRDGE_L19	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	0.93	0.93	0.97	0.97	0.97	0.95	0.77	0.93	TBD	Sensitivity Only
KERNRDGE_L19	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	0.93	0.93	0.97	0.97	0.97	0.95	0.77	0.93	TBD	Sensitivity Only
KERNRDGE_L04	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	0.93	0.94	0.97	0.97	0.97	0.95	0.77	0.94	TBD	Sensitivity Only
KERNRDGE_L04	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	0.93	0.94	0.97	0.97	0.97	0.95	0.77	0.94	TBD	Sensitivity Only
KERNRDGE_L04	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	0.93	0.94	0.97	0.97	0.97	0.95	0.77	0.94	TBD	Sensitivity Only
KERNRDGE_L04	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	0.93	0.94	0.97	0.97	0.97	0.95	0.77	0.94	TBD	Sensitivity Only
KERNRDGE_L04	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	0.93	0.94	0.97	0.97	0.97	0.95	0.77	0.94	TBD	Sensitivity Only
KERNRDGE_L19	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line section w/o fault	0.94	0.94	0.97	0.97	0.97	0.95	0.50	0.94	TBD	Sensitivity Only
KERNRDGE_L04	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line section w/o fault	0.94	0.94	0.97	0.97	0.97	0.95	0.49	0.94	TBD	Sensitivity Only
KERNRDGE_L18	P2-1:A15:110:_MIDWAY-TEMBLOR 115KV [2630] (TEMBLOR-PSE MCKJ)	P2	Line section w/o fault	0.94	0.95	1.03	1.03	1.03	0.99	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L18	P2-3:A15:70:_MIDWAY - 2D 115KV & MIDWAY-TEMBLOR LINE	P2	Non-bus tie breaker	0.94	0.95	1.03	1.03	1.03	0.99	0.53	0.95	TBD	Sensitivity Only

Substation	Contingency (All and Worst )	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
KERNRDGE_L18	P2-3:A15:81:_PUMPJACK - 1D 115KV & LINE	P2	Non-bus tie breaker	0.94	0.95	1.03	1.03	1.03	0.99	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L34	P2-1:A15:110:_MIDWAY-TEMBLOR 115KV [2630] (TEMBLOR-PSE MCKJ)	P2	Line section w/o fault	0.94	0.95	1.03	1.03	1.03	0.99	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L34	P2-3:A15:70:_MIDWAY - 2D 115KV & MIDWAY-TEMBLOR LINE	P2	Non-bus tie breaker	0.94	0.95	1.03	1.03	1.03	0.99	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L34	P2-3:A15:81:_PUMPJACK - 1D 115KV & LINE	P2	Non-bus tie breaker	0.94	0.95	1.03	1.03	1.03	0.99	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L32	P2-1:A15:110:_MIDWAY-TEMBLOR 115KV [2630] (TEMBLOR-PSE MCKJ)	P2	Line section w/o fault	0.94	0.95	1.03	1.03	1.03	0.99	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L32	P2-3:A15:70:_MIDWAY - 2D 115KV & MIDWAY-TEMBLOR LINE	P2	Non-bus tie breaker	0.94	0.95	1.03	1.03	1.03	1.00	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L32	P2-3:A15:81:_PUMPJACK - 1D 115KV & LINE	P2	Non-bus tie breaker	0.94	0.95	1.03	1.03	1.03	1.00	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L11	P2-1:A15:110:_MIDWAY-TEMBLOR 115KV [2630] (TEMBLOR-PSE MCKJ)	P2	Line section w/o fault	0.94	0.95	1.03	1.03	1.03	1.00	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L11	P2-3:A15:70:_MIDWAY - 2D 115KV & MIDWAY-TEMBLOR LINE	P2	Non-bus tie breaker	0.94	0.95	1.03	1.03	1.03	1.00	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L11	P2-3:A15:81:_PUMPJACK - 1D 115KV & LINE	P2	Non-bus tie breaker	0.94	0.95	1.03	1.03	1.03	1.00	0.53	0.95	TBD	Sensitivity Only
KERNRDGE	P2-1:A15:110:_MIDWAY-TEMBLOR 115KV [2630] (TEMBLOR-PSE MCKJ)	P2	Line section w/o fault	0.94	0.95	1.04	1.04	1.04	1.00	0.54	0.95	TBD	Sensitivity Only
KERNRDGE	P2-3:A15:70:_MIDWAY - 2D 115KV & MIDWAY-TEMBLOR LINE	P2	Non-bus tie breaker	0.94	0.95	1.04	1.04	1.04	1.00	0.54	0.95	TBD	Sensitivity Only
KERNRDGE	P2-3:A15:81:_PUMPJACK - 1D 115KV & LINE	P2	Non-bus tie breaker	0.94	0.95	1.04	1.04	1.04	1.00	0.54	0.95	TBD	Sensitivity Only
TEMBLOR	P2-1:A15:110:_MIDWAY-TEMBLOR 115KV [2630] (TEMBLOR-PSE MCKJ)	P2	Line section w/o fault	0.95	0.96	1.03	1.04	1.04	1.00	0.56	0.95	TBD	Sensitivity Only
TEMBLOR	P2-3:A15:70:_MIDWAY - 2D 115KV & MIDWAY-TEMBLOR LINE	P2	Non-bus tie breaker	0.95	0.96	1.03	1.04	1.04	1.00	0.56	0.95	TBD	Sensitivity Only
TEMBLOR	P2-3:A15:81:_PUMPJACK - 1D 115KV & LINE	P2	Non-bus tie breaker	0.95	0.96	1.03	1.04	1.04	1.00	0.56	0.95	TBD	Sensitivity Only

Substation	Contingency (All and Worst )	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
KERNRDGE_L19	Base Case	P2	Base Case	0.95	0.95	0.97	0.97	0.97	0.96	0.92	0.95	TBD	Sensitivity Only
KERNRDGE_L04	Base Case	P2		0.95	0.95	0.97	0.97	0.97	0.96	0.92	0.95	TBD	Sensitivity Only
CARRIZO	P2-1:A15:110:_MIDWAY-TEMBLOR 115KV [2630] (TEMBLOR-PSE MCKJ)	P2	Line section w/o fault	0.97	0.98	1.02	1.03	1.02	1.02	0.71	0.98	TBD	Sensitivity Only
CARRIZO	P2-3:A15:70:_MIDWAY - 2D 115KV & MIDWAY-TEMBLOR LINE	P2	Non-bus tie breaker	0.97	0.98	1.02	1.03	1.02	1.02	0.71	0.98	TBD	Sensitivity Only
CARRIZO	P2-3:A15:81:_PUMPJACK - 1D 115KV & LINE	P2	Non-bus tie breaker	0.97	0.98	1.02	1.03	1.02	1.02	0.71	0.98	TBD	Sensitivity Only
SHAFTER	Base Case		Base Case	1.00	0.99	1.02	1.04	1.03	1.06	1.02	1.00	TBD	Sensitivity Only
KERNRDGE_L18	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.00	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L18	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.00	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L18	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.00	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L18	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.00	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L18	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	1.00	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L34	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L34	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L34	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L34	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L34	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L32	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L32	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L32	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L32	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L32	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only

Substation	Contingency (All and Worst )	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
KERNRDGE_L11	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L11	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L11	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L11	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
RIO BRVO	Base Case	Base Case	Base Case	1.01	1.00	1.01	1.04	1.03	1.06	1.02	1.00	TBD	Sensitivity Only
KERNRDGE_L11	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	1.01	1.01	1.03	1.03	1.03	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.01	1.01	1.04	1.04	1.04	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.01	1.01	1.04	1.04	1.04	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.01	1.01	1.04	1.04	1.04	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.02	0.82	1.01	TBD	Sensitivity Only
KERNRDGE_L18	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line section w/o fault	1.01	1.01	1.03	1.03	1.03	1.02	0.53	1.01	TBD	Sensitivity Only
KERNRDGE_L34	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line section w/o fault	1.01	1.01	1.03	1.03	1.03	1.02	0.53	1.01	TBD	Sensitivity Only
BELRIDGE	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
BELRIDGE	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
BELRIDGE	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
BELRIDGE	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
BELRIDGE	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
KERNRDGE_L32	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line section w/o fault	1.01	1.01	1.03	1.03	1.03	1.02	0.53	1.01	TBD	Sensitivity Only
CARRIZO	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line section w/o fault	1.01	1.01	1.02	1.03	1.02	1.03	0.71	1.01	TBD	Sensitivity Only

Substation	Contingency (All and Worst)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
RIOBRAVO1	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
RIOBRVSLR2	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
PUMPJACK	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
KERNRDGE_L11	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line section w/o fault	1.01	1.01	1.03	1.03	1.03	1.02	0.53	1.01	TBD	Sensitivity Only
RIOBRAVO1	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
RIOBRAVO1	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
RIOBRAVO1	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
RIOBRVSLR2	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
RIOBRVSLR2	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
RIOBRVSLR2	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
RIOBRVSLR2	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
PUMPJACK	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
PUMPJACK	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
PUMPJACK	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
RIOBRAVO1	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
PUMPJACK	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.86	1.01	TBD	Sensitivity Only
PSE MCKJ	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.84	1.01	TBD	Sensitivity Only
TEMBLOR	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.84	1.01	TBD	Sensitivity Only
PSE MCKJ	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.01	1.01	1.04	1.04	1.04	1.03	0.84	1.01	TBD	Sensitivity Only
PSE MCKJ	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.84	1.01	TBD	Sensitivity Only
TEMBLOR	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.01	1.01	1.04	1.04	1.04	1.03	0.84	1.01	TBD	Sensitivity Only
TEMBLOR	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.01	1.01	1.04	1.04	1.04	1.03	0.84	1.01	TBD	Sensitivity Only



Substation	Contingency (All and Worst)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
TEMBLOR	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.84	1.01	TBD	Sensitivity Only
PSE MCKJ	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.01	1.01	1.04	1.04	1.04	1.03	0.84	1.01	TBD	Sensitivity Only
PSE MCKJ	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.85	1.01	TBD	Sensitivity Only
KERNRDGE	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line section w/o fault	1.01	1.01	1.04	1.04	1.04	1.03	0.54	1.01	TBD	Sensitivity Only
TEMBLOR	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Bus Tie Breaker	1.01	1.01	1.04	1.04	1.04	1.03	0.85	1.01	TBD	Sensitivity Only
PSE MCKJ	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line section w/o fault	1.02	1.02	1.04	1.04	1.04	1.03	0.56	1.02	TBD	Sensitivity Only
TEMBLOR	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line section w/o fault	1.02	1.02	1.04	1.04	1.04	1.03	0.56	1.02	TBD	Sensitivity Only
PSE MCKT	P2-4:A15:9:_MIDWAY 115KV - SECTION 2E & 2D	P2	Bus Tie Breaker	1.02	1.02	1.04	1.04	1.04	1.03	0.84	1.02	TBD	Sensitivity Only
PSE MCKT	P2-1:A15:30:_MIDWAY-TEMBLOR 115KV [2630] (BELRDG J-MIDWAY)	P2	Line section w/o fault	1.02	1.02	1.04	1.04	1.04	1.03	0.84	1.02	TBD	Sensitivity Only
PSE MCKT	P2-2:A15:42:_MIDWAY 115KV SECTION 2D	P2	Bus	1.02	1.02	1.04	1.04	1.04	1.03	0.84	1.02	TBD	Sensitivity Only
PSE MCKT	P2-3:A15:71:_MIDWAY - 2D 115KV & MIDWAY-RENFRO-TUPMAN LINE	P2	Non-bus tie breaker	1.02	1.02	1.04	1.04	1.04	1.03	0.84	1.02	TBD	Sensitivity Only
PSE MCKT	P2-4:A15:11:_MIDWAY 115KV - SECTION 2D & 1D	P2	Non-bus tie breaker	1.02	1.02	1.04	1.04	1.04	1.03	0.85	1.02	TBD	Sensitivity Only
PSE MCKT	P2-1:A15:35:_MIDWAY-TEMBLOR 115KV [2630] (PSE MCKJ-BELRDG J)	P2	Line section w/o fault	1.02	1.02	1.04	1.04	1.04	1.03	0.56	1.02	TBD	Sensitivity Only
7STNDRD	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.55	0.61	NA	1.04	NA	NA	0.98	0.60	TBD	Install Redundant Battery
7STNDRD	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.56	0.61	NA	1.04	NA	NA	0.98	0.60	TBD	Install Redundant Relay
CRCKERNFRNT	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.58	0.63	NA	1.03	NA	NA	0.99	0.62	TBD	Install Redundant Battery
VEDDER	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.58	0.63	NA	1.03	NA	NA	0.99	0.63	TBD	Install Redundant Battery

Substation	Contingency (All and Worst )	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
CRCKERNFRNT	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.58	0.63	NA	1.03	NA	NA	0.99	0.62	TBD	Install Redundant Relay
POSO MT	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.58	0.64	NA	1.03	NA	NA	0.99	0.63	TBD	Install Redundant Battery
VEDDER	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.58	0.63	NA	1.03	NA	NA	0.99	0.63	TBD	Install Redundant Relay
POSO MT	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.58	0.64	NA	1.03	NA	NA	0.99	0.63	TBD	Install Redundant Relay
KERN OIL	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.59	0.64	NA	1.04	NA	NA	1.00	0.63	TBD	Install Redundant Battery
DEXZEL	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.59	0.64	NA	1.04	NA	NA	1.00	0.64	TBD	Install Redundant Battery
GODN_BER	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.59	0.64	NA	1.04	NA	NA	1.00	0.64	TBD	Install Redundant Battery
KERN OIL	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.59	0.64	NA	1.04	NA	NA	1.00	0.63	TBD	Install Redundant Relay
DEXZEL	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.59	0.64	NA	1.04	NA	NA	1.00	0.64	TBD	Install Redundant Relay
GODN_BER	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.59	0.64	NA	1.04	NA	NA	1.00	0.64	TBD	Install Redundant Relay
RASMUSEN	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.59	0.65	NA	1.04	NA	NA	1.00	0.64	TBD	Install Redundant Battery
DISCOVER	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.59	0.65	NA	1.04	NA	NA	1.00	0.64	TBD	Install Redundant Battery
RASMUSEN	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.60	0.65	NA	1.04	NA	NA	1.00	0.64	TBD	Install Redundant Relay
DISCOVER	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.60	0.65	NA	1.04	NA	NA	1.00	0.64	TBD	Install Redundant Relay
LIVEOAKSWSTA	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.60	0.64	NA	1.04	NA	NA	1.00	0.64	TBD	Install Redundant Battery
LIVEOAKSWSTA	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.60	0.64	NA	1.04	NA	NA	1.00	0.64	TBD	Install Redundant Relay

Substation	Contingency (All and Worst )	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
LERDO	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.60	0.66	NA	1.04	NA	NA	0.98	0.65	TBD	Install Redundant Battery
LIVE OAK	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.61	0.65	NA	1.04	NA	NA	1.01	0.64	TBD	Install Redundant Battery
LERDO	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.61	0.66	NA	1.04	NA	NA	0.98	0.65	TBD	Install Redundant Relay
LIVE OAK	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.61	0.65	NA	1.04	NA	NA	1.01	0.64	TBD	Install Redundant Relay
EISEN	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.61	0.69	0.30	1.01	NA	NA	0.99	0.67	TBD	Install Redundant Battery, long term load forecast under review
EISEN	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.61	0.69	0.30	1.01	NA	NA	0.99	0.67	TBD	Install Redundant Battery, long term load forecast under review
BAKRSFLD	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.62	0.70	0.31	1.02	NA	NA	1.00	0.68	TBD	Install Redundant Battery, long term load forecast under review
BAKRSFLD	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.62	0.70	0.31	1.02	NA	NA	1.00	0.68	TBD	Install Redundant Battery, long term load forecast under review
MAGUNDEN	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.62	0.70	0.31	1.03	NA	NA	1.00	0.68	TBD	Install Redundant Battery, long term load forecast under review
MAGUNDEN	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.62	0.70	0.31	1.03	NA	NA	1.00	0.68	TBD	Install Redundant Battery, long term load forecast under review
CARNATIO	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.63	0.71	0.31	1.02	NA	NA	1.01	0.69	TBD	Install Redundant Battery, long term load forecast under review
CARNATIO	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.63	0.71	0.31	1.02	NA	NA	1.01	0.69	TBD	Install Redundant Battery, long term load forecast under review
FRUITVLE	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.63	0.71	0.31	1.02	NA	NA	1.01	0.69	TBD	Install Redundant Battery, long term load forecast under review
FRUITVLE	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.64	0.71	0.31	1.02	NA	NA	1.01	0.69	TBD	Install Redundant Battery, long term load forecast under review
KERN PW1	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.64	0.71	0.32	1.02	NA	NA	1.01	0.69	TBD	Install Redundant Battery, long term load forecast under review
KERN PW1	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.64	0.71	0.32	1.02	NA	NA	1.01	0.69	TBD	Install Redundant Battery, long term load forecast under review

Substation	Contingency (All and Worst )	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
OLD_RVR1	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.64	0.72	0.36	1.03	NA	NA	1.02	0.70	TBD	Install Redundant Battery, long term load forecast under review
OLD_RVR1	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.64	0.72	0.36	1.03	NA	NA	1.02	0.70	TBD	Install Redundant Battery, long term load forecast under review
OLD RIVR	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.64	0.72	0.36	1.03	NA	NA	1.02	0.70	TBD	Install Redundant Battery, long term load forecast under review
OLD RIVR	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.64	0.72	0.36	1.03	NA	NA	1.02	0.70	TBD	Install Redundant Battery, long term load forecast under review
PANAMA	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.64	0.72	0.32	1.02	NA	NA	1.02	0.70	TBD	Install Redundant Battery, long term load forecast under review
PANAMA	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.64	0.72	0.32	1.02	NA	NA	1.02	0.70	TBD	Install Redundant Battery, long term load forecast under review
CAWELO B	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.67	0.73	0.30	1.01	NA	NA	0.99	0.72	TBD	Install Redundant Battery, long term load forecast under review
CAWELO B	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.67	0.73	0.30	1.01	NA	NA	0.99	0.72	TBD	Install Redundant Battery, long term load forecast under review
SAN EMDO	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.73	0.79	0.52	1.03	NA	NA	1.03	0.78	TBD	Install Redundant Battery, long term load forecast under review
SAN EMDO	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.73	0.79	0.52	1.03	NA	NA	1.03	0.77	TBD	Install Redundant Battery, long term load forecast under review
MC FRLND	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.73	0.77	0.28	1.00	NA	NA	0.96	0.76	TBD	Install Redundant Battery, long term load forecast under review
MC FRLND	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.73	0.77	0.28	1.00	NA	NA	0.96	0.76	TBD	Install Redundant Battery, long term load forecast under review
FAMOSO	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.73	0.78	0.29	1.01	NA	NA	0.98	0.77	TBD	Install Redundant Battery, long term load forecast under review
FAMOSO	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.73	0.78	0.29	1.01	NA	NA	0.98	0.77	TBD	Install Redundant Battery, long term load forecast under review
FAMOSO	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.75	0.79	1.02	1.03	1.03	1.05	1.00	0.78	TBD	Install Redundant Battery
FAMOSO	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.75	0.79	1.02	1.03	1.03	1.05	1.00	0.78	TBD	Install Redundant Relay

Substation	Contingency (All and Worst )	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
WASCO	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.79	0.82	0.97	1.00	0.98	1.01	0.97	0.82	TBD	Install Redundant Battery
WASCO	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.79	0.82	0.97	1.00	0.98	1.01	0.97	0.82	TBD	Install Redundant Relay
S_KERN	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.81	0.87	0.67	1.04	NA	NA	1.03	0.85	TBD	Install Redundant Battery, long term load forecast under review
S_KERN	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.82	0.87	0.67	1.04	NA	NA	1.03	0.85	TBD	Install Redundant Battery, long term load forecast under review
CHARKA	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.83	0.86	1.02	1.03	1.03	1.05	1.02	0.86	TBD	Install Redundant Battery
CHARKA	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.84	0.86	1.02	1.03	1.03	1.05	1.02	0.86	TBD	Install Redundant Relay
COPUS_E	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.86	0.90	0.74	1.04	1.02	1.03	1.03	0.89	TBD	Install Redundant Battery, long term load forecast under review
COPUS_E	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.86	0.90	0.74	1.04	1.02	1.03	1.03	0.89	TBD	Install Redundant Battery, long term load forecast under review
BSCL_PLD	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.86	0.90	0.74	1.04	1.02	1.03	1.03	0.89	TBD	Install Redundant Battery, long term load forecast under review
BSCL_PLD	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.86	0.90	0.74	1.04	1.02	1.03	1.03	0.89	TBD	Install Redundant Battery, long term load forecast under review
KERNRDGE_L19	P5-5C(DC):A15:7:_MIDWAY 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.87	0.88	0.97	0.97	0.97	0.93	0.50	0.87	TBD	Install Redundant Relay
KERNRDGE_L04	P5-5C(DC):A15:7:_MIDWAY 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.87	0.88	0.97	0.97	0.97	0.93	0.49	0.88	TBD	Install Redundant Relay
WSCOPRSN	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.90	0.92	1.02	1.03	1.03	1.05	1.03	0.91	TBD	Install Redundant Battery
WSCOPRSN	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.90	0.92	1.02	1.03	1.03	1.05	1.03	0.91	TBD	Install Redundant Relay
MRCPAWST	P4-2:A15:2:_KERN PP 115KV CB 102 112 132 142 152 212 222 232 262 272 OR 312	P4	Non-redundant relay	0.90	0.94	0.80	1.04	1.02	1.03	1.03	0.93	TBD	Install Redundant Battery, long term load forecast under review
MRCPAWST	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.90	0.94	0.80	1.04	1.02	1.03	1.03	0.93	TBD	Install Redundant Battery, long term load forecast under review

Substation	Contingency (All and Worst )	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
GARDNER	P5-5C(DC):A15:26:_KERN 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.91	0.94	0.82	1.03	1.02	1.03	1.03	0.94	TBD	Continue to Monitor
KERNRDGE_L18	P5-5C(DC):A15:7:_MIDWAY 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.94	0.95	1.03	1.03	1.03	1.00	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L34	P5-5C(DC):A15:7:_MIDWAY 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.94	0.95	1.03	1.03	1.03	1.00	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L32	P5-5C(DC):A15:7:_MIDWAY 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.94	0.95	1.03	1.03	1.03	1.00	0.53	0.95	TBD	Sensitivity Only
KERNRDGE_L11	P5-5C(DC):A15:7:_MIDWAY 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.95	0.95	1.03	1.03	1.03	1.00	0.53	0.95	TBD	Sensitivity Only
KERNRDGE	P5-5C(DC):A15:7:_MIDWAY 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-redundant relay	0.95	0.95	1.04	1.04	1.04	1.01	0.54	0.95	TBD	Sensitivity Only
EISEN	P1-3:A15:52:_KERN PW2 70/115KV TB 1	P1	N-1	0.72	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
LERDO	P1-2:A15:45:_LERDO-KERN OIL-7TH STANDARD 115KV [1950]	P1	N-1	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
ELK HLLS	P1-3:A15:49:_TAFT 115/70KV TB 1	P1	N-1	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
LERDO	P1-1:A15:32:_MT POSO 13.80KV GEN UNIT 1	P1	N-1	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
MC FRLND	P1-2:A15:34:_SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] MOAS OPENED ON GANSO_MIDWAY	P1	N-1	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TX_BV_HL	P1-3:A15:49:_TAFT 115/70KV TB 1	P1	N-1	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
LERDO	P1-3:A15:58:_OGLE TAP 115/13.8KV TB 1	P1	N-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
NORTHMWY	P1-3:A15:49:_TAFT 115/70KV TB 1	P1	N-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
MDWY_P_S	P1-3:A15:49:_TAFT 115/70KV TB 1	P1	N-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
CUYAMA	P1-3:A15:42:_TAFT 115/70KV TB 2	P1	N-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
CUYAMASLR	P1-3:A15:42:_TAFT 115/70KV TB 2	P1	N-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TEMBLOR	P1-3:A15:42:_TAFT 115/70KV TB 2	P1	N-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
MCKTTRCK	P1-3:A15:42:_TAFT 115/70KV TB 2	P1	N-1	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
NORTHMWY	P1-3:A15:42:_TAFT 115/70KV TB 2	P1	N-1	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
MDWY_P_S	P1-3:A15:42:_TAFT 115/70KV TB 2	P1	N-1	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TAFT_SW_TAFC	P1-3:A15:49:_TAFT 115/70KV TB 1	P1	N-1	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TAFT A	P1-3:A15:49:_TAFT 115/70KV TB 1	P1	N-1	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TAFT_SW_TAFM	P1-3:A15:49:_TAFT 115/70KV TB 1	P1	N-1	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
LERDO	P1-2:A15:53:_SEMITROPIC-MIDWAY #1 115KV [3630]	P1	N-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
GOSE LKE	P1-2:A15:34:_SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] MOAS OPENED ON GANSO_MIDWAY	P1	N-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
GOSE LKE	P1-2:A15:53:_SEMITROPIC-MIDWAY #1 115KV [3630]	P1	N-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TAFT_SW_TAFC	P1-3:A15:42:_TAFT 115/70KV TB 2	P1	N-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TAFT A	P1-3:A15:42:_TAFT 115/70KV TB 2	P1	N-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TAFT_SW_TAFM	P1-3:A15:42:_TAFT 115/70KV TB 2	P1	N-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
WILDWOOD2	P1-2:A15:34:_SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] MOAS OPENED ON GANSO_MIDWAY	P1	N-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
EISEN	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.72	0.74	0.30	>0.9	>0.9	>0.9	>0.9	0.73	TBD	Long term load forecast under review
BAKRSFLD	::P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.73	0.75	0.30	>0.9	>0.9	>0.9	>0.9	0.74	TBD	Long term load forecast under review
CARNATIO	::P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.74	0.76	0.31	>0.9	>0.9	>0.9	>0.9	0.75	TBD	Long term load forecast under review

Substation	Contingency (All and Worst)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
CAWELO B	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.77	0.79	0.30	>0.9	>0.9	>0.9	>0.9	0.78	TBD	Long term load forecast under review
CELERON	:P1-3:A15:49:_TAFT 115/70KV TB 1	P6	N-1-1	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.78	TBD	Project: Kern 115kV Reinforcement
CUYAMA	:P1-3:A15:49:_TAFT 115/70KV TB 1	P6	N-1-1	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
CUYAMASLR	:P1-3:A15:49:_TAFT 115/70KV TB 1	P6	N-1-1	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
EISEN	:P1-3:A15:51:_KERN PW1 70/115KV TB 1	P6	N-1-1	0.72	0.74	0.30	>0.9	>0.9	>0.9	>0.9	0.73	TBD	Long term load forecast under review
ELK HLLS	:P1-3:A15:49:_TAFT 115/70KV TB 1	P6	N-1-1	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
FAMOSO	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.82	>0.9	0.29	>0.9	>0.9	>0.9	>0.9	0.90	TBD	Long term load forecast under review
FRUITVLE	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.74	0.76	0.31	>0.9	>0.9	>0.9	>0.9	0.75	TBD	Long term load forecast under review
KERN PW1	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.74	>0.9	0.31	>0.9	>0.9	>0.9	>0.9	0.75	TBD	Long term load forecast under review
KNG_ELIS	:P1-3:A15:49:_TAFT 115/70KV TB 1	P6	N-1-1	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
LERDO	:P1-2:A15:45:_LERDO-KERN OIL-7TH STANDARD 115KV [1950]	P6	N-1-1	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.84	TBD	Project: Kern 115kV Reinforcement
MAGUNDEN	:P1-3:A15:51:_KERN PW1 70/115KV TB 1	P6	N-1-1	0.73	0.75	0.30	>0.9	>0.9	>0.9	>0.9	0.87	TBD	Long term load forecast under review
MC FRLND	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.82	0.83	0.27	>0.9	>0.9	>0.9	>0.9	0.74	TBD	Long term load forecast under review
MC FRLND	:P1-3:A15:51:_KERN PW1 70/115KV TB 1	P6	N-1-1	0.82	0.83	0.27	>0.9	>0.9	>0.9	>0.9	0.74	TBD	Long term load forecast under review
MCKTTRCK	:P1-3:A15:49:_TAFT 115/70KV TB 1	P6	N-1-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
MDWY_P_S	:P1-3:A15:49:_TAFT 115/70KV TB 1	P6	N-1-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
NORTHMWW	:P1-3:A15:49:_TAFT 115/70KV TB 1	P6	N-1-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
OLD RIVR	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.74	0.77	0.36	>0.9	>0.9	>0.9	>0.9	0.76	TBD	Long term load forecast under review
OLD_RVR1	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.74	0.77	0.35	>0.9	>0.9	>0.9	>0.9	0.76	TBD	Long term load forecast under review
PANAMA	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.75	0.77	0.31	>0.9	>0.9	>0.9	>0.9	0.76	TBD	Long term load forecast under review
S_KERN	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.87	0.89	0.66	>0.9	>0.9	>0.9	>0.9	0.88	TBD	Long term load forecast under review
SAN EMDO	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.81	0.83	0.51	>0.9	>0.9	>0.9	>0.9	0.82	TBD	Long term load forecast under review
TEMBLOR	:P1-3:A15:49:_TAFT 115/70KV TB 1	P6	N-1-1	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TX_BV_HL	:P1-3:A15:49:_TAFT 115/70KV TB 1	P6	N-1-1	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
WASCO	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	TBD	Project: Kern 115kV Reinforcement
GOSE LKE	:P1-2:A15:34:_SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] MOAS OPENED ON GANSO_MIDWAY	P6	N-1-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TAFT_SW_TAFC	:P1-3:A15:42:_TAFT 115/70KV TB 2	P6	N-1-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TAFT A	:P1-3:A15:42:_TAFT 115/70KV TB 2	P6	N-1-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
TAFT_SW_TAFM	:P1-3:A15:42:_TAFT 115/70KV TB 2	P6	N-1-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Project: Kern 115kV Reinforcement
WILDWOOD2	:P1-2:A15:34:_SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] MOAS OPENED ON GANSO_MIDWAY	P6	N-1-1	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	TBD	Project: Kern 115kV Reinforcement
BSC_LPLD	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.73	>0.9	>0.9	>0.9	TBD	System adjustments or voltage support if necessary
CADET	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	TBD	System adjustments or voltage support if necessary
MOCO	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	TBD	System adjustments or voltage support if necessary
MRCPAWST	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.79	>0.9	>0.9	>0.9	TBD	System adjustments or voltage support if necessary
COPUS_E	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.73	>0.9	>0.9	>0.9	TBD	System adjustments or voltage support if necessary
MARICOPA	:P1-3:A15:52:_KERN PW2 70/115KV TB 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	TBD	System adjustments or voltage support if necessary
GOSE LKE	:P1-2:A15:34:_SMYRNA-SEMITROPIC-MIDWAY 115KV [3710] MOAS OPENED ON GANSO_MIDWAY	P6	N-1-1	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	TBD	Continue to Monitor
CAWELO C	P1-2:A15:45:_LERDO-KERN OIL-7TH STANDARD 115KV [1950]	P3	G-1/N-1	0.88	0.86	>0.9	>0.9	0.86	>0.9	>0.9	0.86	TBD	Project: Kern 115kV Reinforcement
LERDO	P1-2:A15:45:_LERDO-KERN OIL-7TH STANDARD 115KV [1950]	P3	G-1/N-1	0.85	0.83	>0.9	>0.9	0.83	>0.9	>0.9	0.83	TBD	Project: Kern 115kV Reinforcement
FAMOSO	P1-2:A15:45:_LERDO-KERN OIL-7TH STANDARD 115KV [1950]	P3	G-1/N-1	>0.9	0.89	>0.9	>0.9	0.89	>0.9	>0.9	0.90	TBD	Project: Kern 115kV Reinforcement

Substation	Contingency	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)						Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	
CARRIZO 115 kV	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	<8	<8	<8	<8	<8	<8	<8	30	<8	Sensitivity only
KERNRDGE 115 kV	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1		<8	<8	<8	<8	<8	<8	44	<8	Sensitivity only
KERNRDGE_L04 69 kV	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	8	<8	<8	<8	<8	<8	<8	43	<8	Project: Kern 115kV Reinforcement
KERNRDGE_L04 69 kV	P1-3:A15:109:_KERNRDGELH 69/4.16KV TB 1	P1	N-1	<8	<8	<8	<8	<8	<8	<8	3	<8	Sensitivity only
KERNRDGELH 69 kV	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	8	<8	<8	<8	<8	<8	<8	43	<8	Project: Kern 115kV Reinforcement
KERNRDGELH 69 kV	P1-3:A15:109:_KERNRDGELH 69/4.16KV TB 1	P1	N-1	<8	<8	<8	<8	<8	<8	<8	4	<8	Sensitivity only
TEMBLOR 115 kV	P1-2:A15:36:_MIDWAY-TEMBLOR 115KV [2630]	P1	N-1	<8	<8	<8	<8	<8	<8	<8	43	<8	Sensitivity only



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2025 Spring Off-Peak	2028 Summer Peak	2035 Summer Peak	2028 SP High CEC Forecast	2025 OP Sensitivity	
In accordance with TPL-001-5- Requirement R2.6, this area relies on the past studies from the 2022-23 Transmission Planning Process.								
<a href="http://www.caiso.com/Documents/BoardApproved2022-2023TransmissionPlan.pdf">http://www.caiso.com/Documents/BoardApproved2022-2023TransmissionPlan.pdf</a>								

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	

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



Substation	Load Served (MW)									Potential Mitigation Solutions
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	2028 SP High CEC Forecast	

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Atascadero-Cayucos 70 kV Line	MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant relay installation recommended in 2020-2021 TPP
	MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP
Atascadero-San Luis Obispo 70 kV Line	MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant relay installation recommended in 2020-2021 TPP
	MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP
	MORRO BAY-TEMPLETON 230KV [5933] & TEMPLETON-GATES 230KV [5934]	P6	N-1-1	111	26	36	56	15	21	55	1	27	50	54	Project: Estrella Substation Project
Baywood-San Luis Obispo 70 kV Line	MORRO BAY-TEMPLETON 230KV [5933] & TEMPLETON-GATES 230KV [5934]	P6	N-1-1	109	48	64	56	34	45	65	20	48	50	65	Project: Estrella Substation Project
Callender Sw. Sta-Mesa 115 kV Line	MORROBAY 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	144	132	Diverge	Diverge	Existing UVLS
	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent Relay	NA	NA	NA	NA	NA	223	106	84	NA	47	116	Redundant relay installation recommended in 2022-2023 TPP
	MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant relay installation recommended in 2020-2021 TPP
	MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP
	MORRO BAY-DIABLO 230KV [5260] & MORRO BAY-MESA 230KV [5290]	P6	N-1-1	NA	NA	Diverge	Diverge	Diverge	Diverge	Diverge	143	124	134	Diverge	Existing UVLS
	MORRO BAY-MESA AND MORRO BAY-DIABLO 230 KV LINES	P7	DCTL	NA	NA	Diverge	Diverge	Diverge	Diverge	Diverge	143	124	134	Diverge	Existing UVLS
	MORRO BAY-MESA AND DIABLO-MESA 230 KV LINES	P7	DCTL	NA	NA	NA	81	Diverge	Diverge	Diverge	136	110	124	Diverge	Existing UVLS
Coalinga #1-San Miguel 70 kV Line	PASO ROBLES-TEMPLETON 70KV [9400]	P1	N-1	Diverge	30	41	55	13	25	57	24	29	71	57	Project: Estrella Substation Project
	SAN MIGUEL-PASO ROBLES 70KV [9390]	P1	N-1	118	NA	NA	58	NA	NA	60	NA	NA	73	59	Project: Estrella Substation Project
	SAN MIGL-UNIONPGAE #1 70KV [0]	P1	N-1	NA	123	143	NA	59	65	NA	37	124	NA	NA	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation
	MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent Relay	Diverge	27	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant relay installation recommended in 2020-2021 TPP
	TEMPLETON 230-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	35	48	55	15	29	57	23	34	71	57	Project: Estrella Substation Project
	MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	26	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	24	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP
	MORRO BAY-CALFLATS SS AND TEMPLETON-GATES 230 KV LINES	P7	DCTL	110	29	37	30	11	24	51	24	28	44	55	Project: Estrella Substation Project
	TEMPLETON-ATASCADERO & TEMPLETON-PASO ROBLES 70 KV LINES	P7	DCTL	Diverge	31	42	55	13	25	57	24	30	71	57	Project: Estrella Substation Project
Coburn 230/60 kV Bank #1	DIABLOCN1 25.00KV GEN UNIT 1 & COBURN 230/60KV TB 2	P3	G-1/ N-1	84	86	NA	94	93	NA	93	104	85	16	69	Continue to monitor / Generation Redispatch
	DIABLOCN2 25.00KV GEN UNIT 1 & COBURN 230/60KV TB 2	P3	G-1/ N-1	84	86	NA	94	93	NA	93	104	85	16	69	Continue to monitor / Generation Redispatch
Crazy Horse-Moss Landing #1 115 kV Line	SALINAS-MOSSLSNW-DOLAN RD 115KV [0] & MOSS LANDING-SALINAS #2 115KV [2890]	P6	N-1-1	85	97	126	58	64	85	33	23	97	57	54	Continue to monitor

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
MOSS LANDING - SALINAS #1 AND #2 115 KV LINES		P7	DCTL	85	97	126	58	64	85	54	23	97	57	54	Continue to monitor
Crazy Horse-Moss Landing #2 115 kV Line	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLNSW-DOLAN RD 115KV [0]	P6	N-1-1	89	102	132	62	69	90	36	23	102	59	57	ISO recommends a RAS
	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	89	102	132	62	69	90	57	23	102	59	57	ISO recommends a RAS
Crazy Horse-Natividad #1 115 kV Line	MOSS LANDING-SALINAS #1 115KV [2880] (MOSSLNSW-DOLAN J1)	P2-1	Line Section w/o Fault	80	93	111	49	55	71	52	22	94	47	52	Continue to monitor
	MOSSLNSW 115KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie-Breaker Fault	72	84	100	44	50	64	47	20	85	40	47	Continue to monitor
	MOSSLNSW 115KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie-Breaker Fault	72	84	100	44	50	64	47	20	85	41	47	Continue to monitor
	MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	NA	Redundant battery supply installation recommended in 2022-2023 TPP
	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLNSW-DOLAN RD 115KV [0]	P6	N-1-1	167	197	253	99	112	147	47	43	197	101	107	ISO previously recommended a RAS in 2018-2019 TPP.
	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	167	197	253	99	112	147	107	43	197	101	107	ISO previously recommended a RAS in 2018-2019 TPP.
Crazy Horse-Soledad 115 kV Line	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	134	140	168	69	74	99	87	33	139	93	87	ISO previously recommended a RAS in 2018-2019 TPP.
	MOSS LANDING-SALINAS #1 115KV [2880] (MOSSLNSW-DOLAN J1)	P2-1	Line Section w/o Fault	80	93	111	49	55	71	52	22	94	47	52	Continue to monitor
	MOSSLNSW 115KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie-Breaker Fault	72	84	100	44	50	64	47	20	85	40	47	Continue to monitor
	MOSSLNSW 115KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie-Breaker Fault	72	84	100	44	50	64	47	20	85	41	47	Continue to monitor
	MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	NA	Redundant battery supply installation recommended in 2022-2023 TPP
	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLNSW-DOLAN RD 115KV [0]	P6	N-1-1	167	197	253	99	112	147	47	43	197	101	107	ISO previously recommended a RAS in 2018-2019 TPP.
	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	167	197	253	99	112	147	107	43	197	101	107	ISO previously recommended a RAS in 2018-2019 TPP.
Divide-Cabrillo 115 kV Line No. 1	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	134	140	168	69	74	99	87	33	139	93	87	ISO previously recommended a RAS in 2018-2019 TPP.
	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	158	156	166	37	38	46	137	17	158	39	50	Existing UVLS
Estrella-Paso Robles 70 kV Line	MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	NA	Redundant relay installation recommended in 2020-2021 TPP
	MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	NA	Redundant battery supply installation recommended in 2022-2023 TPP
	TEMPLETON-GATES 230KV [5934] & MORROBAY-ESTRELLA #1 230KV [0]	P6	N-1-1	NA	85	107	NA	38	54	NA	17	81	NA	NA	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation
	MORRO BAY-CALFLATS SS AND TEMPLETON-GATES 230 KV LINES	P7	DCTL	NA	85	107	NA	38	54	NA	17	81	NA	NA	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation
SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)		P5	Non-Redundant Relay	Diverge	Diverge	Diverge	218	229	Diverge	210	203	Diverge	213	210	Redundant relay installation recommended in 2018-2019 TPP
	MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	NA	Redundant battery supply installation recommended in 2022-2023 TPP

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Green Valley 115/60 Transformer #1	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLNSW-DOLAN RD 115KV [0]	P6	N-1-1	69	83	115	59	59	79	42	14	82	52	51	Continue to monitor
	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	40	49	Diverge	69	70	54	57	42	59	54	Project: Morgan Hill Area Reinforcement
	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	69	83	115	59	59	79	51	14	82	52	51	Continue to monitor
Green Valley-Morgan Hill 115 kV Line	MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	NA	Redundant battery supply installation recommended in 2022-2023 TPP
Green Valley-Watsonville 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	130	136	Diverge	160	150	Diverge	160	160	Redundant relay installation recommended in 2018-2019 TPP
	MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	NA	Redundant battery supply installation recommended in 2022-2023 TPP
	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLNSW-DOLAN RD 115KV [0]	P6	N-1-1	69	83	115	59	59	79	42	14	82	52	51	Continue to monitor
	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	32	41	Diverge	42	46	133	40	33	92	133	Project: Morgan Hill Area Reinforcement
Lagunitas 60 kV Tap	Base Case	P0	Base Case	66	90	158	51	69	114	38	20	91	32	38	Continue to monitor
	MLPB2CTG3 18.00KV & MLPB2CTG4 18.00KV & MLPB2STG2 18.00KV GEN UNITS	P1	N-1	58	80	139	48	64	114	34	18	80	29	34	Continue to monitor
	MOSSLNSW SVD=V	P1	N-1	58	80	138	48	64	114	34	18	80	29	34	Continue to monitor
	MOSSLNSW 115KV - MIDDLE BREAKER BAY 7	P2-3	Non-Bus-Tie-Breaker Fault	58	80	138	48	64	114	34	18	80	29	34	Continue to monitor
	MOSSLNSW 115KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie-Breaker Fault	58	80	137	48	64	114	34	18	80	29	34	Continue to monitor
	MOSSLNSW 230KV - MIDDLE BREAKER BAY 7	P2-3	Non-Bus-Tie-Breaker Fault	58	80	138	48	64	114	34	18	80	29	34	Continue to monitor
	HOLLISTR SECTION 1E & HOLST D SECTION 1D 115KV	P2-4	Bus-Tie-Breaker Fault	58	80	138	48	64	114	34	18	80	29	34	Continue to monitor
	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	170	177	Diverge	201	205	Diverge	218	201	Redundant relay installation recommended in 2018-2019 TPP
	HOLLISTR 115KV BUS D (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	58	80	138	48	64	114	34	18	80	29	34	Install redundant relay
	MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	NA	Redundant battery supply installation recommended in 2022-2023 TPP
	HOLLISTER 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	58	80	138	48	64	114	34	18	80	29	34	Install redundant battery supply
	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	81	88	Diverge	92	92	14	65	87	185	258	Project: Morgan Hill Area Reinforcement
	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	81	88	Diverge	92	92	258	65	87	184	258	Project: Morgan Hill Area Reinforcement
	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	66	85	164	51	69	110	38	20	85	32	38	Continue to monitor
	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	58	80	147	48	64	114	34	18	80	29	34	Continue to monitor
CRAZY HORSE - SAN BENITO & CRAZY HORSE - HOLLISTER 115 KV LINES	P7	DCTL	58	80	138	48	64	114	34	18	80	29	34	Continue to monitor	
SAN BENITO - HOLLISTER & CRAZY HORSE - HOLLISTER 115 KV LINES	P7	DCTL	58	80	138	48	64	114	34	18	80	29	34	Continue to monitor	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Mesa-Divide 115 kV Line No. 1	MESA-SISQUOC 115KV [2460] & MESA_PGE-SNTA MRA 115KV [0]	P6	N-1-1	77	76	105	34	35	37	67	30	78	21	35	Continue to monitor
Mesa-Divide 115 kV Line No. 2	MESA-SISQUOC 115KV [2460] & MESA_PGE-SNTA MRA 115KV [0]	P6	N-1-1	77	76	105	34	35	37	67	30	78	21	35	Continue to monitor
Mesa-Santa Maria 115 kV Line	MORROBAY 230/115KV TB 6 & CALLENDER SW STA-MESA 115KV [1210]	P6	N-1-1	102	96	128	91	93	118	89	30	99	59	89	Operations Solution / Generation Redispatch
	MESA-SISQUOC AND CALLENDER SW STA-MESA 115 KV LINES	P7	DCTL	83	78	103	69	70	84	70	27	82	49	69	Continue to monitor
Morro Bay 230/115 Transformer No. 6	MORROBAY 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	90	116	Diverge	Diverge	Existing UVLS
	MESA_PGE 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	78	Diverge	Diverge	Diverge	Diverge	39	Diverge	Diverge	Diverge	Existing UVLS
	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	60	57	78	47	48	124	116	67	57	69	126	Redundant relay installation recommended in 2022-2023 TPP
	MESA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	Diverge	Diverge	78	Diverge	Diverge	Diverge	Diverge	41	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP
	MESA PGE 230/115KV TB 2 & MESA PGE 230/115KV TB 3	P6	N-1-1	60	Diverge	78	122	124	154	114	65	135	67	123	Existing UVLS
	MORRO BAY-MESA AND MORRO BAY-DIABLO 230 KV LINES	P7	DCTL	59	55	Diverge	Diverge	Diverge	Diverge	Diverge	102	126	113	Diverge	Existing UVLS
	MORRO BAY-MESA AND DIABLO-MESA 230 KV LINES	P7	DCTL	60	56	78	105	Diverge	Diverge	Diverge	97	124	112	Diverge	Existing UVLS
Morro Bay-Mesa 230 kV Line	DIABLO-MESA 230KV [4620] & MORROBAY 230/115KV TB 6	P6	N-1-1	70	65	102	58	59	72	80	47	58	53	82	Continue to monitor
Morro Bay-San Louis Obispo 115 kV Line No. 1	MORROBAY 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	57	76	Diverge	Diverge	Existing UVLS
	MORRO BAY-MESA 230KV [5290] & MORRO BAY-DIABLO 230KV [5260]	P6	N-1-1	30	28	Diverge	107	31	Diverge	27	62	76	73	28	Existing UVLS
	MORRO BAY-MESA AND MORRO BAY-DIABLO 230 KV LINES	P7	DCTL	35	32	Diverge	Diverge	Diverge	Diverge	Diverge	64	79	73	Diverge	Existing UVLS
	MORRO BAY-MESA AND DIABLO-MESA 230 KV LINES	P7	DCTL	31	28	40	77	Diverge	Diverge	Diverge	61	74	72	Diverge	Existing UVLS
Morro Bay-San Louis Obispo 115 kV Line No. 2	MORROBAY 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	58	78	Diverge	Diverge	Existing UVLS
	MESA_PGE 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	48	Diverge	Diverge	Diverge	Diverge	25	Diverge	Diverge	Diverge	Existing UVLS
	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	37	35	47	35	36	102	74	43	35	45	81	Redundant relay installation recommended in 2022-2023 TPP
	MESA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	Diverge	Diverge	47	Diverge	Diverge	Diverge	Diverge	26	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP
	MORRO BAY-MESA 230KV [5290] & MORRO BAY-DIABLO 230KV [5260]	P6	N-1-1	37	33	Diverge	114	Diverge	Diverge	Diverge	63	Diverge	73	Diverge	Existing UVLS
	MORRO BAY-MESA AND MORRO BAY-DIABLO 230 KV LINES	P7	DCTL	37	34	Diverge	Diverge	Diverge	Diverge	Diverge	64	81	73	Diverge	Existing UVLS
	MORRO BAY-MESA AND DIABLO-MESA 230 KV LINES	P7	DCTL	37	34	47	84	Diverge	Diverge	Diverge	62	79	72	Diverge	Existing UVLS
Moss Landing 230/115 kV Bank #1	MOSSLNSW 230/115KV TB 4 & MOSSLNSW 230/115KV TB 2	P6	N-1-1	87	89	113	46	83	101	49	45	79	70	77	Continue to monitor
Moss Landing 230/115 kV Bank #2	MOSSLNSW 230/115KV TB 4 & MOSSLNSW 230/115KV TB 1	P6	N-1-1	87	89	113	76	83	101	49	45	79	70	77	Continue to monitor
Moss Landing 230/115 kV Bank #3	MOSSLNSW 230/115KV TB 4 & MOSSLNSW 230/115KV TB 1	P6	N-1-1	87	89	113	76	83	101	49	45	79	70	77	Continue to monitor
Moss Landing 230/115 kV Bank #4	MOSSLNSW 230/115KV TB 2 & MOSSLNSW 230/115KV TB 1	P6	N-1-1	98	100	125	84	92	112	66	60	88	79	88	Operations Solution / Generation Redispatch

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Moss Landing-Green Valley #2 115 kV Line	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & METCALF-MOSS LANDING #1 230KV [5100]	P6	N-1-1	78	68	85	79	93	102	31	55	72	26	54	Continue to monitor
Moss Landing-Salinas #1 115 kV Line	MOSS LANDING-SALINAS #2 115KV [2890]	P1	N-1	74	82	103	55	61	78	47	21	83	50	47	Continue to monitor
	MOSS LANDING-SALINAS #2 115KV [2890] (SALINAS-DOLAN J2)	P2-1	Line Section w/o Fault	74	82	103	55	61	78	47	21	83	50	47	Continue to monitor
	MOSS LANDING-SALINAS #2 115KV [2890] (MOSSLNSW-DOLAN J2)	P2-1	Line Section w/o Fault	74	82	103	55	60	78	47	21	83	50	47	Continue to monitor
	SALINAS 115KV - MIDDLE BREAKER BAY 4	P2-3	Non-Bus-Tie-Breaker Fault	74	82	103	55	61	78	47	21	83	50	47	Continue to monitor
	MOSSLNSW 115KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie-Breaker Fault	74	82	103	56	61	78	47	21	83	50	47	Continue to monitor
	MOSS LANDING-CRAZY HORSE CANYON #2 115KV [2983] & MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE	P6	N-1-1	97	109	89	70	76	100	41	26	109	67	61	Operations Solution / Generation Redispatch
	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	97	109	138	70	76	100	61	26	109	67	61	ISO recommends a RAS
Moss Landing-Salinas #2 115 kV Line	SALINAS-MOSSLNSW-DOLAN RD 115KV [0]	P1	N-1	74	82	103	55	61	78	47	21	83	50	47	Continue to monitor
	MOSSLNSW 115KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie-Breaker Fault	74	82	103	55	61	78	47	21	83	50	47	Continue to monitor
	DOLAN RD - 1D 115KV & SALINAS-MOSSLNSW-DOLAN RD LINE	P2-3	Non-Bus-Tie-Breaker Fault	74	82	103	55	61	78	47	21	83	50	47	Continue to monitor
	DOLAN ROAD 115KV BATT (FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	74	82	103	55	61	78	47	21	83	50	47	Continue to monitor
	MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE & SALINAS-MOSSLNSW-DOLAN RD 115KV [0]	P6	N-1-1	97	108	103	71	78	101	47	26	109	65	61	Operations Solution / Generation Redispatch
	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	87	99	126	62	68	90	56	23	99	58	56	Continue to monitor
Oceano-Callender Sw. Sta 115 kV Line	MORROBAY 230/115KV TB 6	P1	N-1	69	63	101	55	56	80	62	3	66	31	61	Continue to monitor
	MORROBAY 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	145	132	Diverge	Diverge	Existing UVLS
	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	8	8	3	5	5	228	109	89	8	51	120	Redundant relay installation recommended in 2022-2023 TPP
	MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant relay installation recommended in 2020-2021 TPP
	MORRO BAY SW 230-115KV BATT (FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP
	MORRO BAY-DIABLO 230KV [5260] & MORRO BAY-MESA 230KV [5290]	P6	N-1-1	8	8	67	Diverge	Diverge	Diverge	Diverge	144	124	135	Diverge	Existing UVLS
	MORRO BAY-MESA AND MORRO BAY-DIABLO 230 KV LINES	P7	DCTL	8	8	Diverge	Diverge	Diverge	Diverge	Diverge	144	124	135	Diverge	Existing UVLS
	MORRO BAY-MESA AND DIABLO-MESA 230 KV LINES	P7	DCTL	8	8	3	83	Diverge	Diverge	Diverge	138	111	127	Diverge	Existing UVLS
Paso Robles-Templeton 70 kV Line	ESTRELLA 230/70KV TB 1	P1	N-1	NA	85	103	NA	47	56	NA	11	86	NA	NA	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation
	ESTRELLA 230KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie-Breaker Fault	NA	84	102	NA	47	55	NA	11	85	NA	NA	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation
	ESTRELLA 230KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie-Breaker Fault	NA	85	103	NA	47	56	NA	11	86	NA	NA	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
Salinas 115/60 kV Bank #2	SALINAS 115/60KV TB 3	P1	N-1	76	97	125	59	69	92	45	29	98	55	45	Continue to monitor
	SALINAS 115KV SECTION 2D	P2-2	Bus Fault	76	97	125	59	69	92	45	29	98	55	45	Continue to monitor
Salinas 115/60 kV Bank #3	SALINAS 115/60KV TB 2	P1	N-1	71	91	118	56	65	86	43	27	92	52	43	Continue to monitor
	SALINAS 115KV SECTION 1D	P2-2	Bus Fault	71	91	118	56	65	86	43	27	92	52	43	Continue to monitor
Salinas-Firestone #1 60 kV Line	Base Case	P0	Base Case	104	132	147	47	53	62	60	48	132	94	60	Review Project: Salinas-Firestone #1 and #2 reconductor
	SALINAS-FIRESTONE #2 60KV [7910]	P1	N-1	133	180	197	65	75	86	74	64	181	121	74	Review Project: Salinas-Firestone #1 and #2 reconductor
	SALINAS 115/60KV TB 3	P1	N-1	103	138	159	53	61	74	59	49	139	94	59	Review Project: Salinas-Firestone #1 and #2 reconductor
	MOSSLNSW SVD=V	P1	N-1	104	132	127	44	49	58	53	42	132	83	53	Review Project: Salinas-Firestone #1 and #2 reconductor
	SALINAS 115KV SECTION 2D	P2-2	Bus Fault	103	138	159	53	61	74	59	49	139	94	59	Review Project: Salinas-Firestone #1 and #2 reconductor
	MOSSLNSW 115KV - MIDDLE BREAKER BAY 7	P2-3	Non-Bus-Tie-Breaker Fault	104	132	127	44	49	58	53	42	132	83	53	Review Project: Salinas-Firestone #1 and #2 reconductor
	MOSSLNSW 115KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie-Breaker Fault	104	132	126	44	49	58	53	42	132	83	53	Review Project: Salinas-Firestone #1 and #2 reconductor
	MOSSLNSW 230KV - MIDDLE BREAKER BAY 7	P2-3	Non-Bus-Tie-Breaker Fault	104	132	127	44	49	58	53	42	132	83	53	Review Project: Salinas-Firestone #1 and #2 reconductor
	HOLLISTR SECTION 1E & HOLST D SECTION 1D 115KV	P2-4	Bus-Tie-Breaker Fault	104	132	126	44	49	58	53	42	132	83	53	Review Project: Salinas-Firestone #1 and #2 reconductor
	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	35	36	Diverge	47	66	Diverge	63	47	Redundant relay installation recommended in 2018-2019 TPP
	HOLLISTR 115KV BUS D (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	104	132	126	44	49	58	53	42	132	83	53	Install redundant relay
	MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	NA	Redundant battery supply installation recommended in 2022-2023 TPP
	HOLLISTER 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant Battery Supply	104	132	126	44	49	58	53	42	132	83	53	Install redundant battery supply
	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	104	123	150	44	49	58	53	42	123	83	53	Review Project: Salinas-Firestone #1 and #2 reconductor
	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	104	132	135	44	49	58	53	42	132	83	53	Review Project: Salinas-Firestone #1 and #2 reconductor
	CRAZY HORSE - SAN BENITO & CRAZY HORSE - HOLLISTER 115 KV LINES	P7	DCTL	104	132	126	44	49	58	53	42	132	83	53	Review Project: Salinas-Firestone #1 and #2 reconductor
	SAN BENITO - HOLLISTER & CRAZY HORSE - HOLLISTER 115 KV LINES	P7	DCTL	104	132	126	44	49	58	53	42	132	83	53	Review Project: Salinas-Firestone #1 and #2 reconductor
Salinas-Firestone #2 60 kV Line	SALINAS1-FIRESTONE 60KV [0]	P1	N-1	130	179	207	63	73	91	68	57	181	117	68	Review Project: Salinas-Firestone #1 and #2 reconductor
	SALINAS-FIRESTONE #2 60KV [7910]	P1	N-1	160	116	120	91	48	51	82	40	116	150	82	Review Project: Salinas-Firestone #1 and #2 reconductor
	SALINAS-FIRESTONE #2 60KV [7910] (2)	P1	N-1	161	117	121	92	48	51	82	40	118	151	82	Review Project: Salinas-Firestone #1 and #2 reconductor
Salinas-Laureles 60 kV Line	Base Case	P0	Base Case	71	72	101	61	64	81	45	9	73	23	45	Continue to monitor
	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	71	68	104	61	64	78	45	9	68	23	45	Continue to monitor
MORROBAY 230KV - SECTION 1E & 2E	MORROBAY 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	118	129	Diverge	Diverge	Existing UVLS
	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	44	40	52	46	47	250	113	76	41	50	124	Redundant relay installation recommended in 2022-2023 TPP
	MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant relay installation recommended in 2020-2021 TPP

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		
San Luis Obispo-Oceano 115 kV Line	MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP	
	MESA PGE 230/115KV TB 3 & MESA PGE 230/115KV TB 2	P6	N-1-1	44	Diverge	53	131	133	151	113	76	124	50	123	Existing UVLS	
	MORRO BAY-MESA AND MORRO BAY-DIABLO 230 KV LINES	P7	DCTL	45	40	Diverge	Diverge	Diverge	Diverge	Diverge	117	121	112	Diverge	Existing UVLS	
	MORRO BAY-MESA AND DIABLO-MESA 230 KV LINES	P7	DCTL	44	40	52	106	Diverge	Diverge	Diverge	113	115	107	Diverge	Existing UVLS	
San Luis Obispo-Santa Maria 115 kV Line	MORROBAY 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	163	168	Diverge	Diverge	Existing UVLS
	MESA_PGE 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	NA	Diverge	Diverge	Diverge	Diverge	Diverge	89	Diverge	Diverge	Diverge	Existing UVLS
	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent Relay	NA	NA	NA	NA	NA	NA	146	104	NA	69	160	Redundant relay installation recommended in 2022-2023 TPP	
	MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant relay installation recommended in 2020-2021 TPP	
	MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP	
	MESA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	Diverge	NA	Diverge	Diverge	Diverge	Diverge	Diverge	88	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP
	MORRO BAY-MESA 230KV [5290] & MORRO BAY-DIABLO 230KV [5260]	P6	N-1-1	NA	NA	Diverge	186	Diverge	Diverge	Diverge	Diverge	159	158	151	Diverge	Existing UVLS
	MORRO BAY-MESA AND MORRO BAY-DIABLO 230 KV LINES	P7	DCTL	NA	NA	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	161	158	152	Diverge	Existing UVLS
MORRO BAY-MESA AND DIABLO-MESA 230 KV LINES	P7	DCTL	NA	NA	NA	125	Diverge	Diverge	Diverge	Diverge	155	149	145	Diverge	Existing UVLS	
San Miguel-Paso Robles 70 kV Line	PASO ROBLES-TEMPLETON 70KV [9400]	P1	N-1	Diverge	NA	NA	1	NA	NA	2	NA	NA	1	2	Project: Estrella Substation Project	
	TEMPLETON 230-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	NA	NA	1	NA	NA	2	NA	NA	1	2	Project: Estrella Substation Project	
	TEMPLETON-ATASCADERO & TEMPLETON-PASO ROBLES 70 KV LINES	P7	DCTL	Diverge	NA	NA	1	NA	NA	2	NA	NA	1	2	Project: Estrella Substation Project	
Santa Maria-Sisquoc 115 kV Line	MESA_PGE 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	NA	Diverge	Diverge	Diverge	Diverge	Diverge	32	Diverge	Diverge	Diverge	Existing UVLS
	MESA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	Diverge	NA	Diverge	Diverge	Diverge	Diverge	Diverge	53	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP
Santa Ynez Sw. Sta. - Cabrillo 115 kV Line	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	149	154	161	32	33	40	129	13	155	34	42	Operations Solution / Generation Redispatch	
Sisquoc-Santa Ynez Sw.Sta. 115 kV Line	MESA_PGE 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	NA	Diverge	Diverge	Diverge	Diverge	Diverge	28	Diverge	Diverge	Diverge	Existing UVLS
	MESA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	Diverge	NA	Diverge	Diverge	Diverge	Diverge	Diverge	28	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP
	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	172	175	174	24	25	28	178	10	176	19	35	Review Project: South of Mesa	
	MESA-DIVIDE #1 AND #2 115 KV LINES	P7	DCTL	101	98	91	114	112	116	83	104	99	37	103	Review Project: South of Mesa	
	MORROBAY 230KV - SECTION 2D & 2E	P2-4	Bus-Tie-Breaker Fault	85	NA	NA	81	NA	NA	102	NA	NA	28	103	Existing UVLS	
	MORROBAY 230KV - SECTION 1D & 1E	P2-4	Bus-Tie-Breaker Fault	91	87	122	92	87	64	109	71	83	32	110	Existing UVLS	
	MORROBAY 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	106	112	Diverge	Diverge	Existing UVLS
	MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant relay installation recommended in 2020-2021 TPP	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		
Temblor-San Luis Obispo 115 kV Line	MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP	
	SOLAR SW STA 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	84	81	110	100	88	35	116	76	76	29	118	Redundant battery supply installation recommended in 2022-2023 TPP	
	CALIENTE 230KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	82	79	103	100	88	34	117	77	75	24	117	Continue to monitor / Generation Redispatch	
	MORROBAY 230/115KV TB 6 & MORRO BAY-MESA 230KV [5290]	P6	N-1-1	100	94	134	95	89	75	117	73	87	36	118	Operations Solution / Generation Redispatch	
	SOLARSS-CALNTESS 230 KV LINE NO. 1 & 2	P7	DCTL	82	79	104	100	88	35	117	77	75	29	117	Continue to monitor / Generation Redispatch	
	MORRO BAY-CALFLATS SS AND TEMPLETON-GATES 230 KV LINES	P7	DCTL	100	79	102	72	67	45	94	56	74	18	96	Continue to monitor	
	MORROBAY-SOLARSS 230 KV LINE NO. 1 & 2	P7	DCTL	84	81	110	100	89	35	117	76	76	39	118	Continue to monitor / Generation Redispatch	
	MIDWAY-CALNTESS 230 KV LINE NO. 1 & 2	P7	DCTL	82	79	94	100	88	32	117	77	75	24	117	Continue to monitor / Generation Redispatch	
	MORRO BAY-MESA AND MORRO BAY-DIABLO 230 KV LINES	P7	DCTL	48	46	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	82	84	39	Diverge	Existing UVLS
MORRO BAY-MESA AND DIABLO-MESA 230 KV LINES	P7	DCTL	46	45	57	82	Diverge	Diverge	Diverge	Diverge	80	83	38	Diverge	Existing UVLS	
Templeton 230/70 kV Transformer	MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant relay installation recommended in 2020-2021 TPP	
	MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery Supply	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP	
Templeton-Atascadero 70 kV Line	MORRO BAY 230KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant relay installation recommended in 2020-2021 TPP	
	MORRO BAY SW 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery Supply	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP	
Watsonville-Salinas 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	176	183	Diverge	Diverge	216	203	Diverge	216	216	Redundant relay installation recommended in 2018-2019 TPP
	MOSS LANDING 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery Supply	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	Diverge	Diverge	NA	NA	Redundant battery supply installation recommended in 2022-2023 TPP	
	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	81	88	Diverge	92	92	27	64	87	187	260	Project: Morgan Hill Area Reinforcement	
	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	81	88	Diverge	92	92	261	64	87	187	261	Project: Morgan Hill Area Reinforcement	

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off Peak	2028 Spring Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
FIRESTONE 60 kV	Base Case	P0	Base Case	0.95	0.94	0.94	0.96	0.97	0.96	0.99	1.01	0.94	0.95	0.99	Potential new voltage support in the area
GABILAN 60 kV	Base Case	P0	Base Case	0.97	0.96	0.95	0.97	0.97	0.95	1.00	1.02	0.96	0.98	1.00	Continue to monitor
GONZALES 60 kV	Base Case	P0	Base Case	0.94	0.94	0.93	0.99	0.99	0.97	0.98	1.05	0.94	0.97	0.98	Potential new voltage support in the area
HOLLISTR 115 kV	Base Case	P0	Base Case	0.97	0.97	0.94	1.00	0.99	0.97	1.00	1.04	0.97	0.99	1.00	Continue to monitor
HOLSTD 115 kV	Base Case	P0	Base Case	0.97	0.97	0.94	1.00	0.99	0.98	1.00	1.04	0.97	0.99	1.00	Continue to monitor
LAURELES 60 kV	Base Case	P0	Base Case	0.95	0.95	0.92	0.95	0.95	0.93	0.98	1.03	0.95	0.98	0.98	Potential new voltage support in the area
LGNTS J1 60 kV	Base Case	P0	Base Case	0.97	0.96	0.95	0.97	0.97	0.95	1.00	1.02	0.96	0.98	1.00	Continue to monitor
OTTER 60 kV	Base Case	P0	Base Case	0.95	0.95	0.90	0.95	0.94	0.92	0.97	1.02	0.95	0.98	0.97	Potential new voltage support in the area
RSVTN RD 60 kV	Base Case	P0	Base Case	0.96	0.96	0.95	0.96	0.96	0.96	0.99	1.02	0.96	0.98	0.99	Continue to monitor
SAN MIGL 70 kV	Base Case	P0	Base Case	0.93	0.97	0.97	0.95	0.98	0.98	0.97	1.01	0.97	0.95	0.98	Project: Estrella Substation Project
SPENCE 60 kV	Base Case	P0	Base Case	0.94	0.94	0.93	0.96	0.96	0.96	0.98	1.01	0.94	0.94	0.98	Potential new voltage support in the area
HOLLISTR 115 kV	CRAZY HORSE CANYON-HOLLISTER 115KV [2153]	P1	N-1	0.94	0.94	0.89	0.98	0.97	0.94	0.99	1.04	0.94	0.96	0.99	Continue to monitor
HOLSTD 115 kV	CRAZY HORSE CANYON-HOLLISTER 115KV [2153]	P1	N-1	0.94	0.94	0.89	0.98	0.97	0.94	0.99	1.04	0.94	0.96	0.99	Continue to monitor
HOLLISTR 115 kV	CRAZY HORSE CANYON-SAN BENITO 115KV [2152]	P1	N-1	0.93	0.93	0.88	0.97	0.97	0.94	0.98	1.04	0.93	0.96	0.98	Continue to monitor
HOLSTD 115 kV	CRAZY HORSE CANYON-SAN BENITO 115KV [2152]	P1	N-1	0.93	0.93	0.88	0.97	0.97	0.94	0.98	1.04	0.93	0.96	0.98	Continue to monitor
SNBENITO 115 kV	CRAZY HORSE CANYON-SAN BENITO 115KV [2152]	P1	N-1	0.93	0.92	0.88	0.97	0.97	0.94	0.98	1.04	0.93	0.95	0.98	Continue to monitor
SAN MIGL 70 kV	ESTRELLA 230/70KV TB 1	P1	N-1	N/A	0.90	0.89	N/A	0.94	0.92	N/A	1.03	0.90	N/A	N/A	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation
MESA PGE 230 kV	MORRO BAY-MESA 230KV [5290]	P1	N-1	0.97	1.00	0.89	1.01	1.01	1.04	0.99	1.03	1.03	1.02	1.00	Continue to monitor
PSA RBL 70 kV	PASO ROBLES-TEMPLETON 70KV [9400]	P1	N-1	Diverge	0.96	0.94	0.83	0.97	0.97	0.90	1.02	0.96	0.81	0.90	Project: Estrella Substation Project
SAN MIGL 70 kV	PASO ROBLES-TEMPLETON 70KV [9400]	P1	N-1	Diverge	0.97	0.97	0.83	0.98	0.98	0.90	1.01	0.97	0.81	0.90	Project: Estrella Substation Project
FIRESTONE 60 kV	SALINAS1-FIRESTONE 60KV [0]	P1	N-1	0.88	0.87	0.86	0.92	0.93	0.93	0.96	1.01	0.87	0.89	0.96	Potential new voltage support in the area
SPENCE 60 kV	SALINAS1-FIRESTONE 60KV [0]	P1	N-1	0.88	0.87	0.86	0.92	0.93	0.93	0.96	1.01	0.87	0.89	0.96	Potential new voltage support in the area
SPENCE 60 kV	SALINAS-FIRESTONE #2 60KV [7910]	P1	N-1	0.90	0.89	0.89	0.93	0.94	0.94	0.96	1.01	0.89	0.91	0.96	Potential new voltage support in the area
SPENCE 60 kV	SALINAS-FIRESTONE #2 60KV [7910] (2)	P1	N-1	0.89	0.88	0.88	0.92	0.94	0.93	0.96	1.01	0.88	0.90	0.96	Potential new voltage support in the area
HOLLISTR 115 kV	SAN BENITO-HOLLISTER 115KV [2901]	P1	N-1	0.94	0.94	0.90	0.98	0.97	0.94	0.99	1.04	0.94	0.96	0.99	Continue to monitor
HOLSTD 115 kV	SAN BENITO-HOLLISTER 115KV [2901]	P1	N-1	0.94	0.94	0.90	0.98	0.97	0.94	0.99	1.04	0.94	0.96	0.99	Continue to monitor
SAN MIGL 70 kV	SAN MIGL-UNIONPGE #1 70KV [0]	P1	N-1	N/A	0.65	0.59	N/A	0.80	0.78	N/A	0.98	0.65	N/A	N/A	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation
SAN MIGL 70 kV	SAN MIGUEL-PASO ROBLES 70KV [9390]	P1	N-1	0.66	N/A	N/A	0.80	N/A	N/A	0.87	N/A	N/A	0.79	0.89	Project: Estrella Substation Project
PERRY 70 kV	SN LS OB 115/70KV TB 3	P1	N-1	0.94	0.93	0.89	0.96	0.97	0.94	0.95	1.03	0.93	0.96	0.95	Continue to monitor
HOLLISTR 115 kV	SAN BENITO-HOLLISTER 115KV [2901] (HLST_TP-HOLLISTR)	P2-1	Line Section w/o Fault	0.94	0.94	0.90	0.98	0.97	0.94	0.99	1.04	0.94	0.96	0.99	Continue to monitor
HOLSTD 115 kV	SAN BENITO-HOLLISTER 115KV [2901] (HLST_TP-HOLLISTR)	P2-1	Line Section w/o Fault	0.94	0.94	0.90	0.98	0.97	0.94	0.99	1.04	0.94	0.96	0.99	Continue to monitor
HOLLISTR 115 kV	SAN BENITO-HOLLISTER 115KV [2901] (SNBENITO-HLST_TP)	P2-1	Line Section w/o Fault	0.94	0.94	0.90	0.98	0.97	0.94	0.99	1.04	0.94	0.96	0.99	Continue to monitor
HOLSTD 115 kV	SAN BENITO-HOLLISTER 115KV [2901] (SNBENITO-HLST_TP)	P2-1	Line Section w/o Fault	0.94	0.94	0.90	0.98	0.97	0.94	0.99	1.04	0.94	0.96	0.99	Continue to monitor
CALLENDERS 115 kV	MESAPGE 115KV SECTION 1D	P2-2	Bus Fault	0.92	0.93	0.86	0.97	0.97	0.96	0.91	1.03	0.94	0.98	0.91	continue to monitor
OCEANO 115 kV	MESAPGE 115KV SECTION 1D	P2-2	Bus Fault	0.92	0.93	0.86	0.97	0.97	0.97	0.91	1.03	0.94	0.98	0.91	Continue to monitor
UNIONOIL 115 kV	MESAPGE 115KV SECTION 1D	P2-2	Bus Fault	0.92	0.93	0.86	0.97	0.97	0.96	0.91	1.03	0.94	0.98	0.91	Continue to monitor
MESA PGE 230 kV	MORROBAY 230KV SECTION 2E	P2-2	Bus Fault	0.95	0.98	0.88	1.02	1.01	1.03	0.97	1.02	1.03	1.01	0.98	Continue to monitor
PERRY 70 kV	SN LS OB 115KV SECTION MA	P2-2	Bus Fault	0.93	0.93	0.89	0.96	0.97	0.94	0.94	1.03	0.93	0.96	0.95	Continue to monitor
GONZALES 60 kV	CRZYHRS 115KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie-Breaker Fault	0.89	0.89	0.88	0.97	0.97	0.93	0.95	1.05	0.89	0.94	0.95	Potential new voltage support in the area
HOLLISTR 115 kV	CRZYHRS 115KV - MIDDLE BREAKER BAY 4	P2-3	Non-Bus-Tie-Breaker Fault	0.94	0.94	0.89	0.98	0.97	0.94	0.99	1.04	0.94	0.96	0.99	Continue to monitor
HOLSTD 115 kV	CRZYHRS 115KV - MIDDLE BREAKER BAY 4	P2-3	Non-Bus-Tie-Breaker Fault	0.94	0.94	0.89	0.98	0.97	0.94	0.99	1.04	0.94	0.96	0.99	Continue to monitor
HOLLISTR 115 kV	CRZYHRS 115KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie-Breaker Fault	0.91	0.90	0.85	0.96	0.95	0.92	0.97	1.04	0.91	0.94	0.97	Continue to monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off Peak	2028 Spring Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
HOLSTD 115 kV	CRZYHRS 115KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie-Breaker Fault	0.91	0.90	0.85	0.96	0.96	0.92	0.97	1.04	0.91	0.94	0.97	Continue to monitor
SNBENITO 115 kV	CRZYHRS 115KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie-Breaker Fault	0.91	0.90	0.84	0.96	0.95	0.92	0.97	1.04	0.90	0.94	0.97	Continue to monitor
SAN MIGL 70 kV	ESTRELLA 230KV - MIDDLE BREAKER BAY 1	P2-3	Non-Bus-Tie-Breaker Fault	N/A	0.90	0.88	N/A	0.93	0.92	N/A	1.03	0.90	N/A	N/A	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation
SAN MIGL 70 kV	ESTRELLA 230KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie-Breaker Fault	N/A	0.90	0.89	N/A	0.94	0.92	N/A	1.03	0.90	N/A	N/A	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation
MESA PGE 230 kV	MESA PGE 230KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie-Breaker Fault	0.97	1.00	0.89	1.00	1.01	1.03	0.98	1.03	1.03	1.02	1.00	Continue to monitor
CALLENDERSS 115 kV	MESA_PGE - 1D 115KV & MESA_PGE-SNTA MRA LINE	P2-3	Non-Bus-Tie-Breaker Fault	0.92	0.93	0.86	0.97	0.97	0.97	0.91	1.03	0.94	0.98	0.91	continue to monitor
OCEANO 115 kV	MESA_PGE - 1D 115KV & MESA_PGE-SNTA MRA LINE	P2-3	Non-Bus-Tie-Breaker Fault	0.92	0.93	0.86	0.97	0.97	0.97	0.91	1.03	0.94	0.98	0.92	Continue to monitor
UNIONOIL 115 kV	MESA_PGE - 1D 115KV & MESA_PGE-SNTA MRA LINE	P2-3	Non-Bus-Tie-Breaker Fault	0.92	0.93	0.86	0.97	0.97	0.97	0.91	1.03	0.94	0.98	0.91	Continue to monitor
PERRY 70 kV	SN LS OB - MA 115KV & MORRO BAY-SAN LUIS OBISPO #1 LINE	P2-3	Non-Bus-Tie-Breaker Fault	0.93	0.93	0.89	0.96	0.97	0.94	0.95	1.03	0.93	0.96	0.95	Continue to monitor
PERRY 70 kV	SN LS OB - MA 115KV & MORRO BAY-SAN LUIS OBISPO #2 LINE	P2-3	Non-Bus-Tie-Breaker Fault	0.94	0.93	0.89	0.96	0.97	0.94	0.94	1.03	0.93	0.96	0.95	Continue to monitor
PERRY 70 kV	SN LS OB - MA 115KV & TEMBLOR-SAN LUIS OBISPO LINE	P2-3	Non-Bus-Tie-Breaker Fault	0.93	0.93	0.89	0.96	0.97	0.94	0.94	1.03	0.93	0.96	0.95	Continue to monitor
CALLENDERSS 115 kV	MESA_PGE 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	0.89	Diverge	Diverge	Diverge	Diverge	1.03	Diverge	Diverge	Diverge	Existing UVLS
OCEANO 115 kV	MESA_PGE 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	0.89	Diverge	Diverge	Diverge	Diverge	1.03	Diverge	Diverge	Diverge	Existing UVLS
UNIONOIL 115 kV	MESA_PGE 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	0.89	Diverge	Diverge	Diverge	Diverge	1.03	Diverge	Diverge	Diverge	Existing UVLS
MESA PGE 230 kV	MORROBAY 230KV - SECTION 1D & 1E	P2-4	Bus-Tie-Breaker Fault	1.00	1.00	0.90	1.01	1.01	1.01	1.00	1.03	1.03	1.02	1.00	Continue to monitor
MESA PGE 230 kV	MORROBAY 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker Fault	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	1.03	0.87	Diverge	Diverge	Existing UVLS
MESA PGE 230 kV	MORROBAY 230KV - SECTION 2D & 2E	P2-4	Bus-Tie-Breaker Fault	0.89	N/A	N/A	1.03	N/A	N/A	0.92	N/A	N/A	1.01	0.92	Existing UVLS
PSA RBL5 70 kV	DIABLOCNYN1 25.00KV GEN UNIT 1 & PASO ROBLES-TEMPLETON 70KV [9400]	P3	G-1/ N-1	Diverge	0.96	N/A	0.83	0.97	N/A	0.89	1.02	0.96	0.81	0.90	Project: Estrella Substation Project
SAN MIGL 70 kV	DIABLOCNYN1 25.00KV GEN UNIT 1 & PASO ROBLES-TEMPLETON 70KV [9400]	P3	G-1/ N-1	Diverge	0.97	N/A	0.83	0.98	N/A	0.89	1.01	0.96	0.81	0.90	Project: Estrella Substation Project
OTTER 60 kV	KNGCTYCGNCTG 13.80KV GEN UNITS & CRAZY HORSE CANYON-SALINAS-SOLEIDAD #1 115KV [2900]	P3	G-1/ N-1	0.95	0.95	0.89	0.95	0.94	0.91	0.97	1.02	0.94	0.98	0.97	Potential new voltage support in the area
SAN MIGL 70 kV	KNGCTYCGNCTG 13.80KV GEN UNITS & SAN MIGL-UNIONPGE #1 70KV [0]	P3	G-1/ N-1	N/A	0.65	0.59	N/A	0.80	0.78	N/A	0.98	0.64	N/A	N/A	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation
FIRESTNE 60 kV	MLPB2CTG3 18.00KV & MLPB2CTG4 18.00KV & MLPB2STG2 18.00KV GEN UNITS & SALINAS1-FIRESTNE 60KV [0]	P3	G-1/ N-1	0.88	0.87	0.86	0.92	0.93	0.93	0.96	1.01	0.87	0.89	0.96	Potential new voltage support in the area
SPENCE 60 kV	MLPB2CTG3 18.00KV & MLPB2CTG4 18.00KV & MLPB2STG2 18.00KV GEN UNITS & SALINAS1-FIRESTNE 60KV [0]	P3	G-1/ N-1	0.88	0.87	0.86	0.92	0.93	0.93	0.96	1.01	0.87	0.89	0.96	Potential new voltage support in the area
MESA PGE 230 kV	MORROBAY1-25 25.00KV GEN UNIT VP & MORRO BAY-MESA 230KV [5290]	P3	G-1/ N-1	N/A	N/A	0.89	N/A	N/A	1.04	N/A	N/A	N/A	N/A	N/A	Existing UVLS
CHVSANARDO 60 kV	SALNR GN 13.80KV GEN UNIT 1 & COBURN-OIL FIELDS #1 60KV [6410]	P3	G-1/ N-1	0.86	0.86	0.88	0.85	0.85	0.96	0.81	0.87	0.86	0.93	0.81	Operations Solution / Generation Redispatch
OILFLDS 60 kV	SALNR GN 13.80KV GEN UNIT 1 & COBURN-OIL FIELDS #1 60KV [6410]	P3	G-1/ N-1	0.87	0.87	0.89	0.87	0.86	1.03	0.82	0.88	0.86	0.93	0.82	Operations Solution / Generation Redispatch
SALN RVR 60 kV	SALNR GN 13.80KV GEN UNIT 1 & COBURN-OIL FIELDS #1 60KV [6410]	P3	G-1/ N-1	0.86	0.86	0.88	0.86	0.85	0.96	0.81	0.87	0.86	0.93	0.82	Operations Solution / Generation Redispatch

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off Peak	2028 Spring Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
SAN ARDO 60 KV	SALNR GN 13.80KV GEN UNIT 1 & COBURN-OIL FIELDS #1 60KV [6410]	P3	G-1/ N-1	0.96	0.96	1.02	0.97	0.97	1.03	0.88	0.98	0.96	0.97	0.88	Operations Solution / Generation Redispatch
SARG CYN 60 KV	SALNR GN 13.80KV GEN UNIT 1 & COBURN-OIL FIELDS #1 60KV [6410]	P3	G-1/ N-1	0.87	0.87	0.89	0.87	0.86	1.03	0.82	0.88	0.86	0.93	0.82	Operations Solution / Generation Redispatch
BUELLTON 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	N/A	N/A	N/A	N/A	N/A	0.38	0.92	0.99	N/A	0.93	0.89	Redundant relay installation recommended in 2022-2023 TPP
CABRILLO 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	N/A	N/A	N/A	N/A	N/A	0.39	0.94	1.00	N/A	0.95	0.91	Redundant relay installation recommended in 2022-2023 TPP
CALLENDERS 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.95	0.95	0.90	0.98	0.98	0.52	0.94	0.99	0.95	0.97	0.91	Redundant relay installation recommended in 2022-2023 TPP
FAIRWAY 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	N/A	N/A	N/A	N/A	N/A	0.41	0.93	0.98	N/A	0.96	0.90	Redundant relay installation recommended in 2022-2023 TPP
FOOTHILL 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.98	0.98	0.95	1.01	1.01	0.85	0.96	1.02	0.98	0.99	0.95	Redundant relay installation recommended in 2022-2023 TPP
GAREY 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	N/A	N/A	N/A	N/A	N/A	0.41	0.94	0.99	N/A	0.96	0.91	Redundant relay installation recommended in 2022-2023 TPP
GOLDTREE 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.98	0.98	0.95	1.01	1.01	0.86	0.96	1.02	0.98	0.99	0.95	Redundant relay installation recommended in 2022-2023 TPP
MESA_PGE 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	N/A	N/A	N/A	N/A	N/A	0.43	0.95	0.98	N/A	0.97	0.92	Redundant relay installation recommended in 2022-2023 TPP
OCEANO 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.95	0.95	0.90	0.98	0.98	0.56	0.93	1.00	0.96	0.98	0.91	Redundant relay installation recommended in 2022-2023 TPP
PALMR 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	N/A	N/A	N/A	N/A	N/A	0.41	0.93	0.99	N/A	0.95	0.90	Redundant relay installation recommended in 2022-2023 TPP
S.M.ASSO 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	N/A	N/A	N/A	N/A	N/A	0.42	0.94	0.99	N/A	0.96	0.91	Redundant relay installation recommended in 2022-2023 TPP
SISQUOC 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	N/A	N/A	N/A	N/A	N/A	0.41	0.94	0.99	N/A	0.96	0.91	Redundant relay installation recommended in 2022-2023 TPP
SN LS OB 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.98	0.98	0.94	1.00	1.00	0.83	0.95	1.02	0.98	0.99	0.94	Redundant relay installation recommended in 2022-2023 TPP
SNTA MRA 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	N/A	N/A	N/A	N/A	N/A	0.41	0.93	0.98	N/A	0.96	0.90	Redundant relay installation recommended in 2022-2023 TPP
SNTA YNZ 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	N/A	N/A	N/A	N/A	N/A	0.38	0.92	0.99	N/A	0.93	0.89	Redundant relay installation recommended in 2022-2023 TPP
UNIONOIL 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	0.95	0.95	0.90	0.98	0.98	0.52	0.94	0.99	0.95	0.97	0.91	Redundant relay installation recommended in 2022-2023 TPP
ZACA 115 KV	MESA 230 KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant Relay	N/A	N/A	N/A	N/A	N/A	0.38	0.93	0.99	N/A	0.94	0.90	Redundant relay installation recommended in 2022-2023 TPP
OCEANO 115 KV	MESA 230-115KV BATT(Failure of Non-Redundant BATT)	P5	Non-Redundant Battery Supply	Diverge	Diverge	0.90	Diverge	Diverge	Diverge	Diverge	1.03	Diverge	Diverge	Diverge	Redundant battery supply installation recommended in 2022-2023 TPP
PERRY 70 KV	NO BF RELAY SAN LUIS OBISPO 115KV CB 112 132 142 152 OR 162	P5	No Bus Fault Relay	0.94	0.93	0.89	0.96	0.97	0.94	0.94	1.03	0.93	0.96	0.95	Continue to monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off Peak	2028 Spring Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
AGRILINK 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.81	0.81	Diverge	0.83	0.90	Diverge	0.83	0.83	Redundant relay installation recommended in 2018-2019 TPP
BNA VSTA 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.25	0.22	Diverge	0.30	0.47	Diverge	0.26	0.30	Redundant relay installation recommended in 2018-2019 TPP
BORONDA 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.26	0.23	Diverge	0.31	0.48	Diverge	0.27	0.31	Redundant relay installation recommended in 2018-2019 TPP
BRIGTANO 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.57	0.55	Diverge	0.59	0.70	Diverge	0.59	0.59	Redundant relay installation recommended in 2018-2019 TPP
ERTA 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.86	0.86	Diverge	0.87	0.94	Diverge	0.88	0.87	Redundant relay installation recommended in 2018-2019 TPP
FIRESTNE 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.24	0.21	Diverge	0.29	0.47	Diverge	0.25	0.29	Redundant relay installation recommended in 2018-2019 TPP
FRSHXPRS 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.25	0.22	Diverge	0.30	0.47	Diverge	0.26	0.30	Redundant relay installation recommended in 2018-2019 TPP
GABILAN 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.25	0.22	Diverge	0.30	0.48	Diverge	0.26	0.30	Redundant relay installation recommended in 2018-2019 TPP
GRANITEROCK 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.56	0.55	Diverge	0.59	0.70	Diverge	0.59	0.59	Redundant relay installation recommended in 2018-2019 TPP
GREENVALLEY 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.89	0.89	Diverge	0.90	0.96	Diverge	0.91	0.90	Redundant relay installation recommended in 2018-2019 TPP
IND.ACRE 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.26	0.23	Diverge	0.31	0.48	Diverge	0.27	0.31	Redundant relay installation recommended in 2018-2019 TPP
LAURELES 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.24	0.20	Diverge	0.29	0.49	Diverge	0.27	0.29	Redundant relay installation recommended in 2018-2019 TPP
LGNTS J1 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.25	0.22	Diverge	0.30	0.48	Diverge	0.26	0.30	Redundant relay installation recommended in 2018-2019 TPP
OTTER 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.23	0.20	Diverge	0.28	0.49	Diverge	0.27	0.28	Redundant relay installation recommended in 2018-2019 TPP
RSVTN RD 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.24	0.21	Diverge	0.30	0.49	Diverge	0.26	0.30	Redundant relay installation recommended in 2018-2019 TPP
SALINAS1 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.26	0.23	Diverge	0.31	0.48	Diverge	0.27	0.31	Redundant relay installation recommended in 2018-2019 TPP
SALINAS2 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.26	0.23	Diverge	0.31	0.48	Diverge	0.27	0.31	Redundant relay installation recommended in 2018-2019 TPP
SPENCE 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.24	0.21	Diverge	0.29	0.47	Diverge	0.24	0.29	Redundant relay installation recommended in 2018-2019 TPP
WTSNVILLE 60 kV	SALINAS 115KV BAAH BUS #1 OR #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Diverge	Diverge	Diverge	0.80	0.80	Diverge	0.82	0.89	Diverge	0.82	0.82	Redundant relay installation recommended in 2018-2019 TPP
PERRY 70 kV	SAN LUIS OBISPO 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	0.94	0.93	0.89	0.96	0.97	0.94	0.94	1.03	0.93	0.96	0.95	Continue to monitor



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off Peak	2028 Spring Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
PSA RBL5 70 kV	TEMPLETON 230-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	0.96	0.94	0.83	0.97	0.97	0.90	1.02	0.96	0.81	0.90	Project: Estrella Substation Project
SAN MIGL 70 kV	TEMPLETON 230-70KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundent Battery Supply	Diverge	0.97	0.96	0.83	0.98	0.98	0.89	1.00	0.97	0.81	0.90	Project: Estrella Substation Project
CALLENDERS 115 kV	CALLENDER SW STA-MESA 115KV [1210] & MORROBAY 230/115KV TB 6	P6	N-1-1	0.88	0.88	0.80	0.98	1.00	0.90	0.86	1.03	0.89	1.01	0.87	Operations Solution / Generation Redispatch
OCEANO 115 kV	CALLENDER SW STA-MESA 115KV [1210] & MORROBAY 230/115KV TB 6	P6	N-1-1	0.88	0.89	0.80	1.01	0.99	0.90	0.86	1.04	0.89	1.00	0.87	Operations Solution / Generation Redispatch
CHVSANARDO 60 kV	COBURN-LASAGUILASS #1 230KV [0] & MOSSLAND 500/230KV TB 9	P6	N-1-1	1.01	1.01	1.01	1.01	1.01	1.02	1.01	1.01	1.01	0.89	1.00	Sensitivity Only
ESTRELLA 230 kV	ESTRELLA-CALFLATSSS #1 230KV [0] & MORROBAY-ESTRELLA #1 230KV [0]	P6	N-1-1	NA	0.89	0.85	NA	1.01	1.00	NA	1.04	1.00	NA	NA	Reverse Power Flow Relay at Estrella Substation
MORROBAY 230 kV	ESTRELLA-CALFLATSSS #1 230KV [0] & TEMPLETON-GATES 230KV [5934]	P6	N-1-1	NA	1.00	0.90	NA	1.01	1.02	NA	1.04	1.01	NA	NA	Operations Solution / Generation Redispatch
MESA PGE 230 kV	MESA_PGE_SVD=v & MORRO BAY-MESA 230KV [5290]	P6	N-1-1	0.87	0.88	0.83	Diverge	Diverge	Diverge	0.87	1.02	0.99	1.01	0.88	Operations Solution / Generation Redispatch
BUELLTON 115 kV	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	0.64	0.64	0.58	1.00	1.02	1.02	0.71	1.04	0.64	0.99	1.00	Operations Solution / Generation Redispatch
CABRILLO 115 kV	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	0.78	0.79	0.73	1.01	1.03	1.03	0.82	1.03	0.79	1.00	1.01	Operations Solution / Generation Redispatch
FAIRWAY 115 kV	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	0.46	0.49	0.41	1.01	1.02	1.02	0.51	1.04	0.49	1.01	0.89	Operations Solution / Generation Redispatch
GAREY 115 kV	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	0.47	0.51	0.43	1.02	1.02	1.03	0.53	1.04	0.50	1.01	1.02	Operations Solution / Generation Redispatch
PALMR 115 kV	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	0.50	0.52	0.45	1.02	1.03	1.03	0.56	1.04	0.52	1.00	1.01	Operations Solution / Generation Redispatch
PURSMAR 115 kV	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	0.83	0.85	0.79	1.01	1.03	1.03	0.87	1.03	0.84	1.00	1.02	Operations Solution / Generation Redispatch
SISQUOC 115 kV	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	0.47	0.51	0.43	1.02	1.02	1.03	0.53	1.04	0.50	1.01	1.02	Operations Solution / Generation Redispatch
SNTA MRA 115 kV	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	0.46	0.49	0.40	1.02	1.02	1.03	0.50	1.04	0.48	1.02	0.90	Operations Solution / Generation Redispatch
SNTA YNZ 115 kV	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	0.63	0.64	0.58	1.00	1.02	1.02	0.71	1.04	0.63	0.98	1.00	Operations Solution / Generation Redispatch
SURF 115 kV	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	0.79	0.81	0.75	1.01	1.02	1.03	0.84	1.03	0.80	1.00	1.01	Operations Solution / Generation Redispatch
ZACA 115 kV	MESA_PGE-SNTA MRA 115KV [0] & MESA-SISQUOC 115KV [2460]	P6	N-1-1	0.60	0.62	0.56	1.01	1.02	1.02	0.66	1.04	0.62	0.99	1.01	Operations Solution / Generation Redispatch
MOSSLNSW 230 kV	METCALF-MOSS LANDING #2 230KV [5110] & MOSSLAND 500/230KV TB 9	P6	N-1-1	1.01	1.01	0.99	1.01	1.01	1.01	1.01	1.01	1.01	0.87	1.01	Sensitivity Only
DIABLOCN 230 kV	MORRO BAY-MESA 230KV [5290] & MORRO BAY-DIABLO 230KV [5260]	P6	N-1-1	1.04	1.03	Diverge	0.85	Diverge	Diverge	Diverge	1.03	1.05	1.04	Diverge	Existing UVLS
ATASCDRO 70 kV	MORRO BAY-TEMPLETON 230KV [5933] & TEMPLETON-GATES 230KV [5934]	P6	N-1-1	0.79	1.00	0.99	1.02	1.01	1.01	0.99	1.03	1.00	1.00	0.99	Project: Estrella Substation Project
BAYWOOD 70 kV	MORRO BAY-TEMPLETON 230KV [5933] & TEMPLETON-GATES 230KV [5934]	P6	N-1-1	0.88	0.99	0.98	1.01	1.00	0.99	0.99	1.02	0.99	1.00	0.99	Project: Estrella Substation Project
CAYUCOS 70 kV	MORRO BAY-TEMPLETON 230KV [5933] & TEMPLETON-GATES 230KV [5934]	P6	N-1-1	0.84	0.99	0.97	1.01	1.00	0.99	0.99	1.02	0.98	0.99	0.99	Project: Estrella Substation Project
PERRY 70 kV	MORRO BAY-TEMPLETON 230KV [5933] & TEMPLETON-GATES 230KV [5934]	P6	N-1-1	0.84	0.98	0.96	1.01	0.99	0.98	0.98	1.03	0.98	0.99	0.98	Project: Estrella Substation Project
PSA RBL5 70 kV	MORRO BAY-TEMPLETON 230KV [5933] & TEMPLETON-GATES 230KV [5934]	P6	N-1-1	0.65	0.98	0.98	0.89	1.00	1.00	0.98	1.03	0.98	0.88	0.98	Project: Estrella Substation Project



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off Peak	2028 Spring Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
GOLDTREE 115 kV	MORROBAY 230/115KV TB 6 & CALLENDER SW STA-MESA 115KV [1210]	P6	N-1-1	0.99	0.90	0.84	1.00	1.01	1.02	0.90	1.04	0.99	1.00	0.90	Operations Solution / Generation Redispatch
UNIONOIL 115 kV	MORROBAY 230/115KV TB 6 & CALLENDER SW STA-MESA 115KV [1210]	P6	N-1-1	0.88	0.88	0.81	0.98	0.99	0.89	0.86	1.03	0.89	0.99	0.86	Operations Solution / Generation Redispatch
FOOTHILL 115 kV	MORROBAY 230/115KV TB 6 & MORRO BAY-MESA 230KV [5290]	P6	N-1-1	0.99	1.00	0.89	Diverge	Diverge	Diverge	Diverge	1.05	1.01	1.02	Diverge	Operations Solution / Generation Redispatch
MORRO BY 115 kV	MORROBAY 230/115KV TB 6 & MORRO BAY-MESA 230KV [5290]	P6	N-1-1	1.00	1.00	0.88	Diverge	Diverge	Diverge	Diverge	1.05	1.01	1.02	Diverge	Operations Solution / Generation Redispatch
SN LS OB 115 kV	MORROBAY 230/115KV TB 6 & MORRO BAY-MESA 230KV [5290]	P6	N-1-1	0.99	1.00	0.89	Diverge	Diverge	Diverge	Diverge	1.05	0.97	1.02	Diverge	Operations Solution / Generation Redispatch
HOLLISTR 115 kV	MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE & MOSS LANDING-CRAZY HORSE CANYON #2 115KV [2983]	P6	N-1-1	0.90	0.87	0.82	0.99	0.98	0.90	0.99	1.04	0.88	0.98	0.99	Operations Solution / Generation Redispatch
HOLST D 115 kV	MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE & MOSS LANDING-CRAZY HORSE CANYON #2 115KV [2983]	P6	N-1-1	0.90	0.87	0.82	0.99	0.98	0.90	0.99	1.05	0.88	0.98	0.99	Operations Solution / Generation Redispatch
SNBENITO 115 kV	MOSS LANDING-CRAZY HORSE CANYON #2 115KV [2983] & MOSS LANDING-CRAZY HORSE CANYON #1 115KV [2930] MOAS OPENED ON PRNDL J1_PRUNEDLE	P6	N-1-1	0.96	0.89	0.84	0.99	0.99	0.97	1.00	1.04	0.90	0.99	1.00	Operations Solution / Generation Redispatch
AGRILINK 60 kV	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	1.00	0.99	Diverge	1.00	0.98	1.01	1.05	1.00	0.55	0.37	Project: Morgan Hill Area Reinforcement
BRIGTANO 60 kV	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	0.97	0.97	Diverge	0.97	0.96	0.99	1.03	0.97	0.69	0.57	Project: Morgan Hill Area Reinforcement
CMP EVRS 115 kV	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	1.00	1.01	Diverge	1.01	0.99	0.98	1.04	1.00	0.43	0.24	Project: Morgan Hill Area Reinforcement
ERTA 60 kV	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	1.01	1.00	Diverge	1.01	0.99	1.01	1.06	1.01	0.52	0.34	Project: Morgan Hill Area Reinforcement
GRANITROCK 60 kV	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	0.97	0.96	Diverge	0.97	0.96	0.98	1.02	0.96	0.68	0.56	Project: Morgan Hill Area Reinforcement
GREENVALLEY 115 kV	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	1.00	0.99	Diverge	1.00	0.98	0.99	1.04	0.99	0.43	0.25	Project: Morgan Hill Area Reinforcement
GREENVALLEY 60 kV	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	1.02	1.01	Diverge	1.02	1.00	1.02	1.07	1.01	0.51	0.32	Project: Morgan Hill Area Reinforcement
PAUL SWT 115 kV	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	1.00	1.01	Diverge	1.00	0.99	0.98	1.04	1.00	0.43	0.24	Project: Morgan Hill Area Reinforcement
ROB ROY 115 kV	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	1.00	1.00	Diverge	1.00	0.99	0.98	1.04	1.00	0.43	0.24	Project: Morgan Hill Area Reinforcement
WTSNVILLE 60 kV	MOSS LANDING-GREEN VALLEY #1 115KV [2850] & MOSS LANDING-GREEN VALLEY #2 115KV [2860]	P6	N-1-1	Diverge	1.00	0.99	Diverge	1.00	0.98	1.00	1.05	1.00	0.55	0.38	Project: Morgan Hill Area Reinforcement
BNA VSTA 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNW-DOLAN RD 115KV [0]	P6	N-1-1	0.96	0.90	0.82	0.97	0.97	0.96	0.98	1.01	0.95	0.96	0.98	Potential new voltage support in the area
BORONDA 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNW-DOLAN RD 115KV [0]	P6	N-1-1	0.98	0.98	0.86	0.98	0.98	0.98	1.00	1.01	0.98	0.98	1.00	Continue to monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off Peak	2028 Spring Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
CAMPHORA 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.89	0.86	0.83	0.99	0.99	0.96	0.98	1.05	0.87	0.97	0.98	Potential new voltage support in the area
FIRESTNE 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.94	0.89	0.81	0.95	0.96	0.95	0.97	1.01	0.89	0.95	0.97	Potential new voltage support in the area
FRSHXPRS 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.96	0.96	0.82	0.97	0.97	0.96	0.98	1.01	0.96	0.96	0.98	Continue to monitor
GABILAN 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.97	0.96	0.81	0.96	0.96	0.94	0.99	1.01	0.96	0.97	0.99	Continue to monitor
GONZALES 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.88	0.85	0.81	0.98	0.98	0.90	0.97	1.05	0.85	0.96	0.97	Potential new voltage support in the area
IND.ACRE 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.98	0.97	0.84	0.98	0.98	0.97	0.99	1.01	0.97	0.98	0.99	Continue to monitor
LAURELES 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.95	0.90	0.78	0.94	0.94	0.90	0.97	1.02	0.95	0.98	0.97	Potential new voltage support in the area
LGNTS J1 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.97	0.96	0.81	0.96	0.96	0.94	0.99	1.01	0.96	0.97	0.99	Continue to monitor
OTTER 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.95	0.89	0.75	0.94	0.93	0.88	0.96	1.02	0.90	0.98	0.96	Potential new voltage support in the area
RSVTN RD 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.96	0.96	0.82	0.96	0.96	0.95	0.98	1.02	0.96	0.97	0.98	Continue to monitor
SALINAS 115 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.97	0.88	0.82	1.00	0.99	0.97	1.00	1.04	0.89	0.99	1.00	Operations Solution / Generation Redispatch
SALINAS1 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.98	0.98	0.86	0.98	0.98	0.98	1.00	1.01	0.98	0.98	1.00	Continue to monitor
SALINAS2 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.98	0.98	0.86	0.98	0.98	0.98	1.00	1.01	0.98	0.98	1.00	Continue to monitor
SNBRN JT 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.98	0.97	0.84	0.98	0.98	0.97	0.99	1.01	0.97	0.98	0.99	Continue to monitor
SOLEDAD 115 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.95	0.88	0.84	0.99	0.99	0.97	0.99	1.04	0.89	0.98	0.99	Operations Solution / Generation Redispatch
SOLEDAD 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.90	0.87	0.84	0.99	0.99	0.97	0.98	1.05	0.88	0.98	0.98	Operations Solution / Generation Redispatch
SPENCE 60 kV	MOSS LANDING-SALINAS #2 115KV [2890] & SALINAS-MOSSLSNSW-DOLAN RD 115KV [0]	P6	N-1-1	0.94	0.88	0.80	0.95	0.96	0.95	0.97	1.01	0.89	0.94	0.97	Potential new voltage support in the area
SALN RVR 60 kV	MOSSLAND 500/230KV TB 9 & COBURN-LASAGUILASS #1 230KV [0]	P6	N-1-1	1.01	1.01	1.01	1.01	1.02	1.02	1.01	1.02	1.01	0.90	1.01	Sensitivity Only
TEMPLETN 230 kV	TEMPLETON-GATES 230KV [5934] & ESTRELLA-CALFLATSS #1 230KV [0]	P6	N-1-1	NA	0.89	0.88	NA	1.01	1.01	NA	1.03	1.00	NA	NA	Operations Solution / Generation Redispatch
SAN MIGL 70 kV	TEMPLETON-GATES 230KV [5934] & MORRO BAY-TEMPLETON 230KV [5933]	P6	N-1-1	0.64	0.96	0.97	0.88	0.98	0.97	0.90	1.01	0.96	0.86	0.90	Project: Estrella Substation Project
CALLENDERSS 115 kV	CALLENDER SW STA-MESA & SAN LUIS OBISPO-SANTA MARIA 115 KV LINES	P7	DCTL	0.95	0.95	0.88	0.97	0.98	0.98	0.93	1.03	0.95	0.98	0.93	continue to monitor
OCEANO 115 kV	CALLENDER SW STA-MESA & SAN LUIS OBISPO-SANTA MARIA 115 KV LINES	P7	DCTL	0.95	0.96	0.88	0.97	0.98	0.98	0.93	1.03	0.96	0.99	0.94	Continue to monitor

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off Peak	2028 Spring Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
UNIONOIL 115 kV	CALLENDER SW STA-MESA & SAN LUIS OBISPO-SANTA MARIA 115 KV LINES	P7	DCTL	0.94	0.95	0.88	0.97	0.98	0.98	0.93	1.03	0.95	0.98	0.93	Continue to monitor
MESA PGE 230 kV	MORRO BAY-CALFLATS SS AND TEMPLETON-GATES 230 KV LINES	P7	DCTL	0.88	0.98	0.91	1.02	1.01	1.04	0.96	1.03	1.03	1.02	0.96	Project: Estrella Substation Project
SAN MIGL 70 kV	MORRO BAY-CALFLATS SS AND TEMPLETON-GATES 230 KV LINES	P7	DCTL	0.89	0.97	0.96	0.96	0.98	0.98	0.96	1.01	0.97	0.95	0.96	Project: Estrella Substation Project
TEMPLETN 230 kV	MORRO BAY-CALFLATS SS AND TEMPLETON-GATES 230 KV LINES	P7	DCTL	0.88	0.97	0.92	1.01	1.00	1.02	0.95	1.03	1.00	1.00	0.95	Project: Estrella Substation Project
MESA PGE 230 kV	MORRO BAY-MESA AND DIABLO-MESA 230 KV LINES	P7	DCTL	N/A	N/A	N/A	0.87	Diverge	Diverge	Diverge	1.03	0.86	0.85	Diverge	Existing UVLS
DIABLOCN 230 kV	MORRO BAY-MESA AND MORRO BAY-DIABLO 230 KV LINES	P7	DCTL	N/A	N/A	Diverge	Diverge	Diverge	Diverge	Diverge	1.16	1.02	1.03	Diverge	Existing UVLS
MESA PGE 230 kV	MORRO BAY-MESA AND MORRO BAY-DIABLO 230 KV LINES	P7	DCTL	N/A	N/A	Diverge	Diverge	Diverge	Diverge	Diverge	1.16	0.99	1.00	Diverge	Existing UVLS
CAMPORA 60 kV	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	0.90	0.88	0.86	0.97	0.96	0.92	0.96	1.05	0.88	0.94	0.96	Potential new voltage support in the area
GONZALES 60 kV	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	0.88	0.86	0.83	0.96	0.95	0.90	0.95	1.05	0.87	0.93	0.95	Potential new voltage support in the area
HOLLISTR 115 kV	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	0.90	0.87	0.82	0.95	0.94	0.90	0.96	1.04	0.88	0.93	0.96	ISO recommends a RAS
HOLSTD 115 kV	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	0.90	0.87	0.82	0.95	0.94	0.90	0.96	1.04	0.88	0.93	0.96	ISO recommends a RAS
LAURELES 60 kV	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	0.95	0.95	0.88	0.95	0.94	0.92	0.96	1.03	0.95	0.98	0.96	Potential new voltage support in the area
OTTER 60 kV	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	0.95	0.95	0.86	0.95	0.93	0.91	0.95	1.02	0.95	0.98	0.95	Potential new voltage support in the area
SNBENITO 115 kV	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	0.91	0.89	0.84	0.96	0.95	0.91	0.97	1.04	0.90	0.94	0.97	ISO recommends a RAS
SOLEDAD 115 kV	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	0.91	0.89	0.86	0.97	0.96	0.92	0.96	1.04	0.90	0.95	0.96	ISO recommends a RAS
SOLEDAD 60 kV	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	0.91	0.88	0.86	0.97	0.96	0.92	0.96	1.05	0.89	0.94	0.96	ISO recommends a RAS
SPENCE 60 kV	MOSS LANDING - CRAZY HORSE #1 AND #2 115 KV LINES	P7	DCTL	0.94	0.94	0.89	0.96	0.95	0.95	0.96	1.01	0.94	0.94	0.96	Potential new voltage support in the area
AGRILINK 60 kV	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	0.94	0.94	Diverge	0.94	0.92	0.37	1.06	0.93	0.55	0.37	Project: Morgan Hill Area Reinforcement
BRIGTANO 60 kV	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	0.92	0.93	Diverge	0.92	0.91	0.57	1.02	0.92	0.69	0.57	Project: Morgan Hill Area Reinforcement
CMP EVRS 115 kV	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	0.94	0.94	Diverge	0.97	0.93	0.24	1.06	0.94	0.44	0.24	Project: Morgan Hill Area Reinforcement
ERTA 60 kV	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	0.94	0.94	Diverge	0.95	0.93	0.34	1.06	0.94	0.52	0.34	Project: Morgan Hill Area Reinforcement
GRANITROCK 60 kV	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	0.92	0.92	Diverge	0.92	0.90	0.56	1.02	0.91	0.68	0.56	Project: Morgan Hill Area Reinforcement
GREENVALLEY 115 kV	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	0.94	0.93	Diverge	0.96	0.93	0.25	1.05	0.93	0.43	0.25	Project: Morgan Hill Area Reinforcement
GREENVALLEY 60 kV	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	0.95	0.95	Diverge	0.96	0.93	0.32	1.07	0.94	0.51	0.32	Project: Morgan Hill Area Reinforcement
PAUL SWT 115 kV	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	0.94	0.95	Diverge	0.97	0.93	0.24	1.06	0.94	0.43	0.24	Project: Morgan Hill Area Reinforcement
ROB ROY 115 kV	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	0.94	0.94	Diverge	0.96	0.93	0.24	1.06	0.93	0.43	0.24	Project: Morgan Hill Area Reinforcement
WTSNVILLE 60 kV	MOSS LANDING - GREEN VALLEY #1 AND #2 115 KV LINES	P7	DCTL	Diverge	0.93	0.94	Diverge	0.94	0.92	0.38	1.06	0.93	0.55	0.38	Project: Morgan Hill Area Reinforcement
BNA VSTA 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.94	0.90	0.82	0.97	0.97	0.94	0.97	1.01	0.91	0.97	0.97	Potential new voltage support in the area
BORONDA 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.97	0.93	0.86	0.98	0.99	0.96	0.98	1.02	0.94	0.99	0.98	continue to monitor
CAMPORA 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.89	0.86	0.83	0.96	0.95	0.91	0.95	1.05	0.87	0.94	0.95	Potential new voltage support in the area
FIRESTNE 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.93	0.89	0.81	0.95	0.96	0.94	0.96	1.01	0.89	0.95	0.96	Potential new voltage support in the area

Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off Peak	2028 Spring Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
FRSHXPRS 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.95	0.90	0.82	0.97	0.97	0.94	0.97	1.01	0.91	0.97	0.97	Continue to monitor
GABILAN 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.95	0.91	0.81	0.96	0.96	0.92	0.97	1.02	0.91	0.98	0.97	Continue to monitor
GONZALES 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.88	0.85	0.81	0.95	0.94	0.90	0.94	1.05	0.85	0.93	0.94	Potential new voltage support in the area
HOLLISTR 115 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.93	0.91	0.86	0.97	0.96	0.93	0.98	1.04	0.91	0.96	0.98	Continue to monitor
HOLSTD 115 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.93	0.91	0.86	0.97	0.96	0.93	0.98	1.04	0.91	0.96	0.98	Continue to monitor
IND.ACRE 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.96	0.92	0.84	0.98	0.98	0.95	0.98	1.01	0.93	0.98	0.98	Continue to monitor
LAURELES 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.94	0.90	0.78	0.94	0.94	0.90	0.95	1.03	0.90	0.98	0.95	Potential new voltage support in the area
LGNTS J1 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.95	0.91	0.81	0.96	0.96	0.92	0.97	1.02	0.91	0.98	0.97	Continue to monitor
OTTER 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.93	0.89	0.76	0.94	0.93	0.88	0.94	1.02	0.90	0.98	0.94	Potential new voltage support in the area
RSVTN RD 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.95	0.91	0.82	0.96	0.96	0.93	0.97	1.02	0.91	0.98	0.97	Continue to monitor
SALINAS 115 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.91	0.88	0.82	0.95	0.94	0.91	0.96	1.04	0.89	0.95	0.96	ISO recommends a RAS
SALINAS1 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.97	0.93	0.86	0.98	0.99	0.96	0.98	1.02	0.94	0.99	0.98	Continue to monitor
SALINAS2 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.97	0.93	0.86	0.98	0.99	0.96	0.98	1.02	0.94	0.99	0.98	Continue to monitor
SNBENITO 115 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.94	0.92	0.88	0.97	0.97	0.94	0.98	1.04	0.93	0.97	0.98	Continue to monitor
SOLEDAD 115 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.91	0.88	0.84	0.96	0.95	0.92	0.96	1.04	0.89	0.95	0.96	ISO recommends a RAS
SOLEDAD 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.90	0.87	0.84	0.96	0.95	0.91	0.95	1.05	0.88	0.94	0.95	ISO recommends a RAS
SPENCE 60 kV	MOSS LANDING - SALINAS #1 AND #2 115 KV LINES	P7	DCTL	0.92	0.88	0.80	0.95	0.96	0.93	0.96	1.01	0.89	0.94	0.96	Potential new voltage support in the area
PSA RBLS 70 kV	TEMPLETON-ATASCADERO & TEMPLETON-PASO ROBLES 70 KV LINES	P7	DCTL	Diverge	0.96	0.94	0.83	0.98	0.97	0.90	1.02	0.96	0.81	0.90	Project: Estrella Substation Project
SAN MIGL 70 kV	TEMPLETON-ATASCADERO & TEMPLETON-PASO ROBLES 70 KV LINES	P7	DCTL	Diverge	0.97	0.97	0.83	0.98	0.98	0.90	1.01	0.97	0.81	0.90	Project: Estrella Substation Project

Substation	Contingency	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)								Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		
CRZY_H&I 115 kV	CRAZY HORSE CANYON-SAN BENITO 115KV [2152]	P1	N-1	<8	<8	9	<8	<8	<8	<8	<8	<8	<8	<8	<8	Continue to monitor
SNBENITO 115 kV	CRAZY HORSE CANYON-SAN BENITO 115KV [2152]	P1	N-1	<8	<8	9	<8	<8	<8	<8	<8	<8	<8	<8	<8	Continue to monitor
PSA RBLS 70 kV	PASO ROBLES-TEMPLETON 70KV [9400]	P1	N-1	<8	<8	<8	15	<8	<8	<8	9	<8	<8	16	9	Project: Estrella Substation Project
SAN MIGL 70 kV	PASO ROBLES-TEMPLETON 70KV [9400]	P1	N-1	<8	<8	<8	13	<8	<8	<8	<8	<8	<8	13	<8	Project: Estrella Substation Project
	SAN MIGUEL-PASO ROBLES 70KV [9390]	P1	N-1	27	<8	<8	16	<8	<8	<8	10	<8	<8	15	9	Project: Estrella Substation Project
	SAN MIGL-UNIONPGAE #1 70KV [0]	P1	N-1	NA	32	38	NA	18	20	NA	<8	32	NA	NA	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation	
	ESTRELLA 230/70KV TB 1	P1	N-1	NA	<8	8	NA	<8	<8	<8	NA	<8	<8	NA	NA	Continue to monitor load materialization; Consider load transfer to New Union 70 kV Substation

2023-2024 ISO Reliability Assessment - Preliminary Study Results

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

*Transient Stability*

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2025 Spring Off-Peak	2028 Summer Peak	2035 Summer Peak	2028 SP High CEC Forecast	2025 OP Sensitivity	

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

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

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP Sensitivity

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

2023-2024 ISO Reliability Assessment - Preliminary Study Results

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

Single Source Substation with more than 100 MW Load



Substation	Load Served (MW)											Potential Mitigation Solutions
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Winter Peak	2028 Winter Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	

No single source substation with more than 100 MW



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew		
24042 ELDORDO 500 26048 MCCULLGH 500 1 1	L-P6_207692_Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 Line LUGO 500.0 to MOHAVE 500.0 Circuit 1	P6*	overlapping singles			145.65					105.8				The P3 and P6 overloads could be eliminated by operational mitigation actions, such as generation curtailment and import reduction, as system adjustment after the first contingency. Stay informed on the future transmission projects to interconnect the out-of-state wind resources and modify the Lugo-Victorville RAS as needed
	L-P6_207699_Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 Line MOHAVE 500.0 to ELDORDO 500.0 Circuit 1	P6*	overlapping singles			129.07									
	L-P6_207752_Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 Line ELDORDO2 230.0 to SLOAN CANYON 230.0 Circuit 1	P6*	overlapping singles			109.94									
	L-P6_207765_Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 Line ALBERHIL 500.0 to VALLEYS 500.0 Circuit 1	P6*	overlapping singles			108.97									
	L-P6_207799_Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 Line MOENKOPI 500.0 to ELDORDO 500.0 Circuit 1	P6*	overlapping singles			112.09				99.5					
24086 LUGO 500 24156 VINCENT 500 #1 or #2	L-P6_211431_Line LUGO 500.0 to VINCENT 500.0 Circuit 2/1 Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1	P6*	overlapping singles	98.67							98.58	117.7		The P6 overloads in the sensitivity case could be eliminated by operational mitigation, such as curtailing generation in the Tehachapi area and reducing import via Path 26 after the first contingency of the P6 events	
24156 VINCENT 500 24386 MESA CAL 500 #1 and #2	L-P6_211254_Line LUGO 500.0 to VINCENT 500.0 Circuit 1 Line LUGO 500.0 to VINCENT 500.0 Circuit 2	P6*	overlapping singles	95.63							94.94	108.95			
24156 VINCENT 500 29402 WIRLWIND 500 3 1	L-P6_220041_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1 Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1	P6*	overlapping singles								92.13	118			
	L-P6_219966_Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 1 Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2	P6*	overlapping singles									100.49			
24591 MW_VINCNT_11 500 24590 MW_VINCNT_12 500 1 1	L-P6_201792_Line MIDWAY 500.0 to Vincent 500.0 Circuit 2 Line MIDWAY 500.0 to Whirlwind 500.0 Circuit 3	P6*	overlapping singles	127.8							93.1			The P6 overloads with heavy Path 26 flow from north to south could be eliminated by operational mitigation actions including curtailing generation in the Tehachapi area, reducing import via Path 26, and bypassing series cap banks as needed after the first contingency of the P6 events.	
	L-P6_201891_Line MIDWAY 500.0 to Vincent 500.0 Circuit 2 Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3	P6*	overlapping singles	102.91											
	L-P6_201950_Line MIDWAY 500.0 to Vincent 500.0 Circuit 2 Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1	P6*	overlapping singles	102.45											
24593 MW_VINCNT_21 500 24592 MW_VINCNT_22 500 2 1	L-P6_201598_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line MIDWAY 500.0 to Whirlwind 500.0 Circuit 3	P6*	overlapping singles	130.3							95.05				
	L-P6_216300_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1	P6*	overlapping singles			96.66	107.25				100.66	108.66		The P6 overloads could be eliminated by operational mitigation actions including curtailing	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew			
24594 MW_WRLWIND_32 500 29402 WIRLWIND 500 3 1	L-P6_220041_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1 Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1	P6*	overlapping singles			103.6	104.06					95.51		107.87		operational mitigation actions including curtailing generation in the Tehachapi area, reducing import or export via Path 26, and bypassing series cap banks as needed after the first contingency of the P6 events. The existing Path 26 RAS could eliminate the power flow divergence for the simultaneous outage of Midway-Vincent #1 and #2 500 kV lines (a credible common corridor N-2 event) under operating scenarios with heavy Path 26 flow from north to south (B1 and S2). However, the overload for the credible common corridor N-2 outage under operating scenario with heavy Path 26 flow from south to north (B8) requires collaboration with potential policy-driven need and grid operation.
	L-P6_219966_Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 1 Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2	P6*	overlapping singles									103.61				
	L-P6_201597_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line MIDWAY 500.0 to Vincent 500.0 Circuit 2	P6*	overlapping singles			172.5							132.3	93.43		
	L_M_P7_P26_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line MIDWAY 500.0 to Vincent 500.0 Circuit 2	N-2	Credible Common Corridor			172.5							132.3	93.43		
29400 ANTELOPE 500 24156 VINCENT 500 #1 and #2	L-P2_88102_Line MIDWAY 500.0 to WIRLWIND 500.0 Circuit 3 Line WIRLWIND 500.0 to VINCENT 500.0 Circuit 3 (CB8012)	P2	internal CB fault											102.57		Eliminate the P2/P4 and P5 contingencies by modifying Whirlwind 500 kV bus configuration and upgrading Whirlwind CB# 8012 with redundant trip coil, or upgrade the Antelope - Vincent 500 kV lines. The overload was attributed the renewable generation development in the Tehachapi area and its mitigation needs to collaborate with the policy study
	L_T_P4_008_Whirlwind - Vincent 500 kV line and Whirlwind - Midway 500 kV line (CB8012)	P4	stuck CB											102.57		
	L_P5_d_TC_005_Vincent - Whirlwind 500 kv Line (Non Redundant Trip Coil Whirlwind CB# 8012)	P5	non-redundant component												102.57	
29400 ANTELOPE 500 24156 VINCENT 500 #1 or #2	L-P6_216298_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2 or 1	P6*	overlapping singles	108.56	115		114.6						121.39	148.87		The P6 overloads could be eliminated by operational mitigation actions including curtailing generation in the Tehachapi area and reducing import via Path 26 after the first contingency of the P6 events
	L-P6_220006_Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2 or 1 Line WIRLWIND 500.0 to WINDHUB 500.0 Circuit 1	P6*	overlapping singles		91.59		90.43						94.97	116.03		
	L-P6_217588_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2 or 1	P6*	overlapping singles											116.85		
29400 ANTELOPE 500 29401 WINDHUB 500 1 1	L-P6_216300_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1	P6*	overlapping singles											109.51		
	L-P2_88102_Line MIDWAY 500.0 to WIRLWIND 500.0 Circuit 3 Line WIRLWIND 500.0 to VINCENT 500.0 Circuit 3	P2	internal CB fault											121.66		The P2/P3/P4/P5/P6 overloads will be
	L-P3_103178_Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1 Gen Alamitos Repower	P3	G1 followed by P1											109.88		

Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew		
29400 ANTELOPE 500 29402 WIRLWIND 500 1 1	L_T_P4_008_Whirlwind - Vincent 500 kV line and Whirlwind-Midway 500 kV line	P2/P4	stuck CB/ CB fault										121.66		eliminated by the Antelope-Whirlwind 500 kV line upgrade project approved in the ISO 2022-23 TP
	L_P5_d_TC_005_Vincent - Whirlwind 500 kv Line (Non Redundant Trip Coil Whirlwind CB# 8012)	P5	non-redundant component										121.66		
	L-P6_216299_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1	P6*	overlapping singles	122.28	93.99		98.73					101.13	162.71		
24801 DEVERS 500 29252 DVRS_RB_11 500 #1 or #2	L-P6_216172_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Line DEVERS 500.0 to REDBLUFF 500.0 Circuit 2 or 1	P6*	overlapping singles										104.8		The P6 overloads could be eliminated by operational mitigation actions including curtailing generation in the Eastern area and reducing import via Path 46 after the first contingency of the P6 events
	L-P6_200134_Line PALOVRDE 500.0 to Colorado 500.0 Circuit 1 Line DEVERS 500.0 to REDBLUFF 500.0 Circuit 2 or 1	P6*	overlapping singles										119.87		
	L-P6_218349_Line DEVERS 500.0 to REDBLUFF 500.0 Circuit 2 Line N.GILA 500.0 to IMPRLVLY 500.0 Circuit 1	P6*	overlapping singles	92.86									114.05		
24138 SERRANO 500 24184 serran1i 13.8 1 1	T-P6_245220_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 2SERRAN2T 13.80 Tran SERRANO 500.00 to SERRANO	P6*	overlapping singles	147.36								96.71	126.21		Previously approved 4th Serrano bank project mitigates the P6 overloads
24138 SERRANO 500 24186 serran2i 13.8 2 1	T-P6_245161_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 1SERRAN1T 13.80 Tran SERRANO 500.00 to SERRANO	P6*	overlapping singles	150.13	92.24							99.15	128.62		
24156 VINCENT 500 29518 vincen1i 13.8 1 1	L-P6_228287_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Tran VINCENT 500.00 to VINCNT2 230.00 Circuit 4VINC	P6*	overlapping singles	118.04								97.36	119.2		The P6 overloads could be eliminated by dispatching available resources including energy storage and demand response in the West LA Basin after the 1st event of P6 contingency or pre-contingency for the P7 contingencies; The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed in the West LA basin.
24156 VINCENT 500 24190 vincen2i 13.8 2 1	L-P6_228285_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Tran VINCENT 500.00 to VINCENT 230.00 Circuit 3	P6*	overlapping singles	114.51								97.34	121.68		
24156 VINCENT 500 24155 VINCENT 230 3 1	L-P6_228284_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Tran VINCENT 500.00 to VINCENT 230.00 Circuit 2VINC	P6*	overlapping singles	114.51								97.34	121.69		
24156 VINCENT 500 29520 vincen4i 13.8 4 1	L-P6_228286_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Tran VINCENT 500.00 to VINCNT2 230.00 Circuit 1VINC	P6*	overlapping singles	118.04								97.36	119.2		
24386 MESA CAL 500 24390 mesa4i 13.8 4 1	L-P6_224863_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 Tran MESA CAL 500.00 to MESACALS 230.00 Circuit 3MESA	P6*	overlapping singles	115.33	108.52		104.64					114	116.88		
	T-P6_246000_Tran MESA CAL 500.00 to MESA CAL 230.00 Circuit 2MESAZT 13.80 Tran MESA CAL 500.00 to MESACALS	P6*	overlapping singles	115.59	105.66		104.67					110.8	116.66		



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew			
24016 BARRE 230 24154 VILLA PK 230 1 1	L-P6_203912_Line BARRE 230.0 to LEWIS 230.0 Circuit 1 Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1	P6*	overlapping singles	111.09												
	L-P6_203878_Line BARRE 230.0 to LEWIS 230.0 Circuit 1 Line DELAMO 230.0 to BARRE 230.0 Circuit 1	P6*	overlapping singles	110.9												
24021 CENTER 230 24393 MESACALS 230 1 1	L_P5_ab_BD_001_Serrano 500 kv East Bus	P5	non-redundant component	123.87	110.98		100.72					130.42	109.06			
	L_P5_ab_BD_017_Laguna Bell 220 kv North Bus	P5	non-redundant component	107.88	92.95							102.99				
	L-P6_210327_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2	P6*	overlapping singles	121.72	106.5		101.31					117.47	109.16			
	L-P6_217223_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2 Line MESACALS 230.0 to WALNUT 230.0 Circuit 1	P6*	overlapping singles	111.54	99.53		91.12					110.47	108.39			
	L-P6_229132_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2 Tran MESA CAL 500.00 to MESA CAL 230.00 Circuit 2 2MESA	P6*	overlapping singles	117.47	100.41		97.64					110.49	104.01			
	L-P6_206030_Line DELAMO 230.0 to LAGUBELL 230.0 Circuit 1 Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1	P6*	overlapping singles	110.11												
	L_M_P7_0012_Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1 Line DELAMO 230.0 to LAGUBELL 230.0 Circuit 1	P7	common structure	110.11												
24025 CHINO 230 25656 MIRALOME 230 #3	L-P6_204597_Line CHINO 230.0 to MIRALOMW 230.0 Circuit 1 Line CHINO 230.0 to MIRALOMW 230.0 Circuit 2	P6*	overlapping singles	110.91								93.72				
	L_M_P7_0047_Line CHINO 230.0 to MIRALOMW 230.0 Circuit 1 Line CHINO 230.0 to MIRALOMW 230.0 Circuit 2	P7	common structure	110.91								93.72				
24030 BARRE-W 230 24044 ELLIS 230 1 1	L_P5_ab_BD_007_Barre 220 kv North Bus	P5	non-redundant component		93.76							108.41				
	L-P6_204028_Line BARRE 230.0 to LEWIS 230.0 Circuit 1 Line BARRE-W 230.0 to ELLIS 230.0 Circuit 2	P6*	overlapping singles		125.08		116.59					139.76				
24030 BARRE-W 230 24044 ELLIS 230 2 1	L_P5_ab_BD_007_Barre 220 kv North Bus	P5	non-redundant component		93.76							108.41				
	L-P6_204027_Line BARRE 230.0 to LEWIS 230.0 Circuit 1 Line BARRE-W 230.0 to ELLIS 230.0 Circuit 1	P6*	overlapping singles		125.08		116.59					139.76				

The existing El Nido RAS can eliminate the LA CIENEGA - LA FRESA 230 kV line overload for the P7 contingency. The P6 and other P7 overloads could be eliminated by dispatching available resources including energy storage and demand response in the West LA Basin after the 1st event of P6 contingency and pre-contingency for the P7 contingencies; The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed in the West LA basin. Further coordination with SCE protection engineer is required to address the P5



2023-2024 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Southern Bulk**



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew		
22357 IV PFC1 230 22358 IV PFC 230 1 1	L-P6_220692_Line ECO 500.0 to MIGUEL 500.0 Circuit 1 Line OCOTILLO 500.0 to SUNCREST 500.0 Circuit 1	P6*	overlapping singles	165.29	159.34	113.44	146.01	90.74			93.25	NConv	141.6	113.31	Operational mitigation including SDG&E 500 kV RAS along with previously approved transmission projects can mitigate the P6 overload concerns in the near-term and long-term.
22357 IV PFC1 230 22358 IV PFC 230 2 1	L-P6_220692_Line ECO 500.0 to MIGUEL 500.0 Circuit 1 Line OCOTILLO 500.0 to SUNCREST 500.0 Circuit 1	P6*	overlapping singles	165.29	159.34	113.44	146.01	90.74			93.25	NConv	141.6	113.31	
22464 MIGUEL 230 22468 MIGUEL 500 #2 or #1	L-P6_234698_Line OCOTILLO 500.0 to SUNCREST 500.0 Circuit 1 Tran MIGUEL 500.00 to MIGUELMP 500.00 Circuit 1 or 2	P6*	overlapping singles	144.85	146.96		133.51					151.75	141.64	113.23	
22885 SUNCREST 500 22888 SNCRSMP1 500 1 1	L-P6_234630_Line ECO 500.0 to MIGUEL 500.0 Circuit 1 Tran SUNCREST 500.00 to SNCRSMP2 500.00 Circuit 1	P6*	overlapping singles	122.91	128.04		116.24					132.01	120.55	99.42	
22885 SUNCREST 500 22889 SNCRSMP2 500 1 1	L-P6_234629_Line ECO 500.0 to MIGUEL 500.0 Circuit 1 Tran SUNCREST 500.00 to SNCRSMP1 500.00 Circuit 1	P6*	overlapping singles	122.97	128.1		116.31					132.05	120.6	99.48	

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
					B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLo ad	S2: 2025 SP Sensitivity_HiR enew		S3: 2025 OP Sensitivity_HiR enew
			No P1 or P3 contingency resulted in low or high voltage violation												



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)								Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew		

No P1 or P3 contingency resulted in load deviation more than 8%

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
01_Lugo500kV--P1.3: 3PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Victorville 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
02_IV500kV--P1.3: 3PH 4 cycle fault at Imperial Valley 500kV w/ loss of Imperial Valley-North Gila 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
03_PV500kV--P1.1: 3PH 4 cycle fault at Palo Verde w/ loss of Palo Verde Unit No.1	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
04_Sant230kV--P1.1: 3PH 4 cycle fault at Santiago 230 kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
05_Eldorado230kV--P1.3: 3PH 4 cycle fault at Eldorado 230 kV w/ loss of Cima-Eldorado-Pisgah No.1 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
06_Pisgah230kV--P1.3: 3PH 4 cycle fault at Pisgah 230 kV w/ loss of Cima-Eldorado-Pisgah No.1 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
07_Lugo230kV--P1.3: 3PH 4 cycle fault at Lugo 230 kV w/ loss of Lugo-Pisgah No.2 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
08_Pisgah230kV--P1.3: 3PH 4 cycle fault at Pisgah 230 kV w/ loss of Lugo-Pisgah No.2 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
09_Vincent500kV--P1.2: 3PH 4 cycle fault at Vincent 500kV w/ loss of Vincent-Whirlwind 500kV & series cap bypass of MW_Vincent_12-Vincent 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
10_Whirlwind500kV--P1.2: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Windhub-Whirlwind 500kV & series cap bypass of MW_Wrlwind_32-Wirlwind 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
11_Whirlwind500kV--P1.2: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Antelope-Whirlwind 500kV & series cap bypass of MW_Wrlwind_32-Wirlwind 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
12_Eldorado500kV--P1.2: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Mohave 500kV & series cap bypass of Eldorado-Eld_Lugo_11 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
13_Eldorado500kV--P1.2: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Mohave 500kV & Lugo-Mohave 500kV line shunt	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
14_Miraloma500kV--P1.2: 3PH 4 cycle fault at Miraloma 500kV w/ loss of Miraloma-Serrano No.2 500kV & EastTS-MiraLoma 500kV line shunt	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
15_Valley500kV--P1.2: 3PH 4 cycle fault at Valley 500kV w/ loss of Alberhill-Valley 500kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
16_RanchoVista500kV--P1.2: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Rancho Vista-Serrano 500kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
17_Serrano500kV--P1.2: 3PH 4 cycle fault at Serrano 500kV w/ loss of Mira Loma-Serrano 500kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
18_Santiago230kV--P1.2: 3PH 4 cycle fault at Santiago 230kV w/ loss of San Onofre-Santiago No.1 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
19_SanOnofre230kV--P1.2: 3PH 4 cycle fault at San Onofre 230kV w/ loss of San Onofre-Santiago No.2 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
20_Johanna230kV--P1.2: 3PH 4 cycle fault at Johanna 230kV w/ loss of Johanna-Santiago 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
21_Ellis230kV--P1.2: 3PH 4 cycle fault at Ellis 230kV w/ loss of Ellis-Santiago 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
22_SanOnofre230kV--P1.2: 3PH 4 cycle fault at San Onofre 230kV w/ loss of San Onofre-Viejo 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
23_Viejo230kV--P1.2: 3PH 4 cycle fault at Viejo 230kV w/ loss of Chino-Viejo 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
24_N.Gila500kV--P1.2: 3PH 4 cycle fault at N.Gila 500kV w/ loss of Hoodoo Wash-N.Gila 500kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
25A_Valley500kV--P1.2: 3PH 4 cycle fault at Valley 500kV w/ loss of Serrano-Valley 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
25B_Valley500kV--P1.2: 3PH 4 cycle fault at Valley 500kV w/ loss of Alberhill-Valley 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
26_RanchoVista500kV--P1.2: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Rancho Vista-Serrano 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
27_Serrano500kV--P1.2: 3PH 4 cycle fault at Serrano 500kV w/ loss of Mira Loma-Serrano 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
28_Devers500kV--P1.2: 3PH 4 cycle fault at Devers 230kV w/ loss of Devers-Valley No.2 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
29_Devers500kV--P1.2: 3PH 4 cycle fault at Devers 500kV w/ loss of Devers-Red Bluff No.2 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
30_N.Gila500kV--P1.2: 3PH 4 cycle fault at N.Gila 500kV w/ loss of Hoodoo Wash-N.Gila 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
31_Vincent500kV--P2.3: 1PH 4 cycle fault at Vincent 500kV w/ loss of Mesa-Vincent 500kV & Midway-Vincent No.2 500kV w/ series cap bypass of MW_Vincent_12-Vincent500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
32_Vincent500kV--P2.3: 1PH 4 cycle fault at Vincent 500kV w/ loss of Antelope-Vincent No.1 500kV & Lugo-Vincent No.2 500kV w/ series cap bypass of MW_Vincent_22-Vincent500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
33_Whirlwind500kV--P2.3: 1PH 4 cycle fault at Vincent 500kV w/ loss of Midway Whirlwind 500kV & Vincent-Whirlwind 500kV w/ series cap bypass of MW_Vincent_12-Vincent500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
34_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Rancho Vista 500kV & Lugo-Vincent No.1 500kV w/ series cap bypass of Eld_Lugo_14-Lugo500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
35_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Vincent No.2 500kV & Lugo-Victorville 500kV w/ series cap bypass of Lugo-Lgo_Mohve_11_500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
36_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Mira Loma No.2 500kV & Eldorado-Lugo 500kV w/ series cap bypass of Lugo-Lgo_Mohve_11_500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
37_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Mira Loma No.3 500kV & Lugo-Mohave 500kV w/ series cap bypass of Eld_Lugo_14-Lugo500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
38_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Rancho Vista 500kV & Lugo-Vincent No.1 500kV w/ loss of Eld_Lugo_14-Lugo500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
39_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Vincent No.2 500kV & Lugo-Victorville 500kV w/ loss of Lugo-Lgo_Mohve_11_500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
40_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Miraloma No.2 500kV & Eldorado-Lugo 500kV w/ loss of Lugo-Lgo_Mohve_11_500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
41_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Miraloma No.3 500kV & Lugo-Mohave 500kV w/ loss of Eld_Lugo_14-Lugo500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
42_Miraloma500kV--P2.3: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mira Loma-Rancho Vista 500kV & Mira Loma-Serrano No.1 500kV w/ loss of EastTS-Miraloma 500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
43_Santiago230kV--P2.3: 1PH 4 cycle fault at Santiago 230kV w/ loss of Ellis-Santiago 230kV & San Onofre-Santiago No.2 230kV & loss of Santiago Synchronous Condensers	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
44_Devers500kV--P2.3: 1PH 4 cycle fault at Devers 500kV w/ loss of Devers-Red Bluff No.1 500kV & Devers-Valley No.1 500kV including loss of Devers SVCs & Cap Bank	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
45_MiraLoma500kV--P2.3: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mira Loma-Rancho Vista 500kV & Mira Loma-Serrano No.1 500kV including loss of Devers SVCs & Cap Bank	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
46_Sylmar230kV--P4: 3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Gould-Sylmar 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
47_Sylmar230kV--P4: 3Ph line fault on Pardee-Sylmar No.2 230 kV with stuck breaker at Sylmar followed by loss of Eagle Rock-Sylmar 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
48_Sylmar230kV--P4: 3Ph line fault on Gould-Sylmar 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
49_Sylmar230kV--P4: 3Ph line fault on Eagle Rock-Sylmar 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
50_Sylmar230kV--P4: 3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
51_Sylmar230kV--P4: 3Ph line fault on Pardee-Sylmar No.2 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
52_Sylmar230kV--P4: 1-Ph fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
53_Sylmar230kV--P4: 1-Ph line fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
54_Devers500kV--P4: 3Ph line fault on Devers-Red Bluff No.1 500 kV with stuck breaker at Devers followed by loss of Devers-Valley No.1 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
55_Lugo500kV--P4: 3Ph line fault on Lugo-Rancho Vista 500 kV with stuck breaker at Lugo followed by loss of Lugo-Vincent No.1 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
56_Lugo500kV--P4: 3Ph line fault on Lugo-Vincent No.2 500 kV with stuck breaker at Lugo followed by loss of Lugo-Victorville 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
57_MiraLoma500kV--P4: 3Ph line fault on Mira Loma-Rancho Vista 500 kV with stuck breaker at Mira Loma followed by loss of Mira Loma-Serrano No.1 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
58_MiraLoma230kV--P4: 3Ph line fault on Mira Loma-Walnut 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
59_MiraLoma230kV--P4: 3Ph line fault on Mira Loma-Olinda 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma No.3 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
60_MiraLoma230kV--P4: 3Ph line fault on Mira Loma-Rancho Vista No.1 230 kV with stuck breaker at Mira Loma followed by loss of Mira Loma-Vista No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
61_RanchoVista230kV--P4: 3Ph line fault on Etiwanda-Rancho Vista No.1 230 kV with stuck breaker at Rancho Vista followed by loss of Mira Loma-Rancho Vista No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
62_RanchoVista230kV--P4: 3Ph line fault on Padua-Rancho Vista No.1 230 kV with stuck breaker at Rancho Vista followed by loss of Etiwanda-Rancho Vista No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
63_Serrano230kV--P4: 3Ph line fault on Chino-Serrano 230 kV with stuck breaker at Serrano followed by loss of Lewis-Serrano No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
64_Serrano230kV--P4: 3Ph line fault on Lewis-Serrano No.2 230 kV with stuck breaker at Serrano followed by loss of SONGS-Serrano 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
65_Vincent500kV--P4: 3Ph line fault on Mesa-Vincent 500 kV with stuck breaker at Vincent followed by loss of Midway-Vincent No.2 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
66_Vincent500kV--P4: 3Ph line fault on Antelope-Vincent No.1 500 kV with stuck breaker at Vincent followed by loss of Lugo-Vincent No.2 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
67_Vincent230kV--P4: 3Ph line fault on Mesa-Vincent No.2 230 kV with stuck breaker at Vincent followed by loss of Santa Clara-Vincent 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
68_Vincent230kV--P4: 3Ph line fault on Pardee-Vincent No.1 230 kV with stuck breaker at Vincent followed by loss of Mesa-Vincent No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
69_Whirlwind500kV--P4: 3Ph line fault on Midway-Whirlwind 500 kV with stuck breaker at Whirlwind followed by loss of Vincent-Whirlwind 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
70_Chino230kV--P4: 3Ph line fault on Chino-Viejo 230 kV with stuck breaker at Chino followed by loss of Chino-Serrano 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
71_Ellis230kV--P4: 3Ph line fault on Barre-Ellis No.2 230 kV with stuck breaker at Ellis followed by loss of Ellis-Santiago 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
72_Ellis230kV--P4: 3Ph line fault on Ellis-Johanna 230 kV with stuck breaker at Ellis followed by loss of Barre-Ellis No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
73_Goodrich230kV--P4: 3Ph line fault on Goodrich-Gould 230 kV with stuck breaker at Goodrich followed by loss of Goodrich-Mesa 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
74_Hinson230kV--P4: 3Ph line fault on Hinson-Lighthipe 230 kV with stuck breaker at Hinson followed by loss of Hinson-Harborgren 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
75_Olinda230kV--P4: 3Ph line fault on Olinda-Walnut 230 kV with stuck breaker at Olinda followed by loss of Mira Loma-Olinda 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
76_RioHondo230kV--P4: 3Ph line fault on Mesa-Rio Hondo No.2 230 kV with stuck breaker at Rio Hondo followed by loss of Rio Hondo-Vincent No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
77_SantaClara230kV--P4: 3Ph line fault on Moorpark-Santa Clara No.1 230 kV with stuck breaker at Santa Clara followed by loss of Goleta-Santa Clara No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
78_SantaClara230kV--P4: 3Ph line fault on Goleta-Santa Clara No.2 230 kV with stuck breaker at Santa Clara followed by loss of Moorpark-Santa Clara No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
79_Santiago230kV--3Ph line fault on SONGS-Santiago No.2 230 kV with stuck breaker at Santiago followed by loss of Ellis-Santiago 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
80_Pardee230kV--P4: 3Ph line fault on Bailey-Pardee 230 kV with stuck breaker at Pardee followed by loss of Pardee-Vincent No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
81_Pardee230kV--P4: 3Ph line fault on Pardee-Vincent No.2 230 kV with stuck breaker at Pardee followed by loss of Pardee-Pastoria 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
82_Pardee230kV--P4: 3Ph line fault on Pardee-Santa Clara 230 kV with stuck breaker at Pardee followed by loss of Pardee-Pastoria-Warne 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
83_Pardee230kV--P4: 3Ph line fault on Moor Park-Pardee No.2 230 kV with stuck breaker at Pardee followed by loss of Pardee-Sylmar No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
84_Pardee230kV--P4: 3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Pardee followed by loss of Moor Park-Pardee No.3 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
85_VillaPark230kV--P4: 3Ph line fault on Barre-Villa Park 230 kV with stuck breaker at Villa Park followed by loss of Serrano-Villa Park No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
86_Lewis230kV--P4: 3Ph line fault on Barre-Lewis 230 kV with stuck breaker at Lewis followed by loss of Lewis-Serrano No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
87_Lewis230kV--P4: 3Ph line fault on Lewis-Serrano No.1 230 kV with stuck breaker at Lewis followed by loss of Lewis-Villa Park 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met

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

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

2023-2024 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Southern Bulk**

Single Source Substation with more than 100 MW Load



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

No single source substation with more than 100 MW



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring-Off Peak	2028 Spring-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
24087 MAGUNDEN 230 24115 PASTORIA 230 1 1	line_P6_200188_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 2 Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3	P6	N-1-1	< 100	< 100	< 100	99.3	< 100	112.0	< 100	106.4	< 100	Existing Big Creek/San Joaquin Valley RAS
24087 MAGUNDEN 230 24115 PASTORIA 230 2 1	line_P6_200096_Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 1 Line MAGUNDEN 230.0 to PASTORIA 230.0 Circuit 3	P6	N-1-1	< 100	< 100	< 100	99.7	< 100	112.4	< 100	106.8	< 100	Existing Big Creek/San Joaquin Valley RAS
24087 MAGUNDEN 230 24401 ANTELOPE 230 1 1	line_P6_202053_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to BAILEY 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	105.1	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202056_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	107.6	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202057_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	107.0	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202058_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	108.7	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202059_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PASTORIA 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	105.7	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202068_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line Pardee - Pastoria - Wame 230 kV line	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	105.0	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
24114 PARDEE 230 24115 PASTORIA 230 1 1	line_P6_201987_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	101.1	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201989_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	104.1	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201990_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PASTORIA 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	100.1	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201999_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line Pardee - Pastoria - Wame 230 kV line	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	100.3	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202053_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to BAILEY 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	100.4	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202056_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	102.0	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202058_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	105.0	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202059_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PASTORIA 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	100.9	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202068_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line Pardee - Pastoria - Wame 230 kV line	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	101.1	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202324_Line PASTORIA 230.0 to EDMONSTN PARDEE 230.0 to WARNETAP 230.0 Circuit 1 Line	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	102.6	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
line_P3_103309_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Gen TOT896_G2ST 0.6 Unit ID 1	line_P3_103309_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Gen TOT896_G2ST 0.6 Unit ID 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	111.3	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201984_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PARDEE 230.0 to BAILEY 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	118.4	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201987_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	120.0	< 100	100.9	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201988_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	120.7	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202053_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to BAILEY 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	119.3	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202056_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	121.0	< 100	101.4	< 100	Existing Pastoria Energy Facility RAS



24114 PARDEE	230	24217 WARNETAP	230	1	line_P6_202057_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	121.7	< 100	100.3	< 100	Existing Pastoria Energy Facility RAS	
					line_P6_202121_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line PARDEE 230.0 to BAILEY 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.1	< 100	Existing Pastoria Energy Facility RAS
					line_P6_202124_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.9	< 100	Existing Pastoria Energy Facility RAS
					line_P6_202125_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.1	< 100	Existing Pastoria Energy Facility RAS
					line_P6_202255_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	117.4	< 100	105.4	< 100	Existing Pastoria Energy Facility RAS	
					line_P6_202322_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	118.5	< 100	108.8	< 100	Existing Pastoria Energy Facility RAS	
					line_P6_202323_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	119.4	< 100	107.9	< 100	Existing Pastoria Energy Facility RAS	
24114 PARDEE	230	24403 BAILEY	230	1	line_P6_201989_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	100.8	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS	
					line_P6_202058_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.6	< 100	Existing Pastoria Energy Facility RAS
24115 PASTORIA	230	24217 WARNETAP	230	1	line_P3_103309_Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1 Gen TOT896_G2ST 0.6 Unit ID 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	100.1	< 100	< 100	Existing Pastoria Energy Facility RAS	
					line_P6_201984_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PARDEE 230.0 to BAILEY 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.1	< 100	Existing Pastoria Energy Facility RAS
					line_P6_201987_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.7	< 100	Existing Pastoria Energy Facility RAS
					line_P6_201988_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.4	< 100	Existing Pastoria Energy Facility RAS
					line_P6_202053_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to BAILEY 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.0	< 100	Existing Pastoria Energy Facility RAS
					line_P6_202056_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.7	< 100	Existing Pastoria Energy Facility RAS
					line_P6_202057_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.4	< 100	Existing Pastoria Energy Facility RAS
					line_P6_202255_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	106.1	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
					line_P6_202322_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	107.2	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
line_P6_202323_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	108.1	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS					
24301 BIG CRK1	230	24235 RECTOR	230	1	line_P6_201306_Line BIG CRK2 230.0 to BIG CRK3 230.0 Circuit 1 Line BIG CRK2 230.0 to BIG CRK8 230.0 Circuit 1	P6	N-1-1	< 100	107.0	< 100	< 100	107.8	107.6	107.0	< 100	107.9	Existing Big Creek/San Joaquin Valley RAS	
					line_P6_201309_Line BIG CRK2 230.0 to BIG CRK3 230.0 Circuit 1 Line BIG CRK8 230.0 to BIG CRK3 230.0 Circuit 1	P6	N-1-1	< 100	124.1	< 100	< 100	124.7	124.3	124.2	< 100	125.1	Existing Big Creek/San Joaquin Valley RAS	
					line_P6_201463_Line BIG CRK3 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK4 230.0 to BIG CRK3 230.0 Circuit 1	P6	N-1-1	< 100	102.4	< 100	< 100	103.1	101.7	102.5	< 100	104.4	Existing Big Creek/San Joaquin Valley RAS	
24302 BIG CRK2	230	24303 BIG CRK3	230	1	line_P6_201066_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK2 230.0 to BIG CRK8 230.0 Circuit 1	P6	N-1-1	< 100	110.3	< 100	< 100	111.6	111.6	110.3	< 100	112.3	Reduce Big Creek generation after initial contingency	
					line_P6_201069_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK8 230.0 to BIG CRK3 230.0 Circuit 1	P6	N-1-1	< 100	126.3	< 100	< 100	127.8	127.5	126.3	< 100	128.8	Reduce Big Creek generation after initial contingency	
24302 BIG CRK2	230	24305 BIG CRK8	230	1	line_P6_201065_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK2 230.0 to BIG CRK3 230.0 Circuit 1	P6	N-1-1	< 100	111.0	< 100	< 100	112.4	112.4	111.0	< 100	113.0	Existing Big Creek/San Joaquin Valley RAS	
24303 BIG CRK3	230	24235 RECTOR	230	1	line_P6_200728_Line SPRINGVL 230.0 to BIG CRK4 230.0 Circuit 1 Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1	P6	N-1-1	101.7	122.9	< 100	< 100	124.2	120.2	123.1	102.4	Diverge	Existing Big Creek/San Joaquin Valley RAS	
					line_P6_201068_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line BIG CRK4 230.0 to BIG CRK3 230.0 Circuit 1	P6	N-1-1	< 100	108.1	< 100	< 100	109.2	107.4	108.3	< 100	110.6	Existing Big Creek/San Joaquin Valley RAS	
					line_P6_201073_Line BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 2	P6	N-1-1	116.8	143.5	111.6	114.7	140.6	126.0	144.3	113.7	141.5	Existing Big Creek/San Joaquin Valley RAS	

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



				line_P6_201154_Line BIG CRK1 RECTOR	230.0 to BIG CRK2 230.0 to BIG CRK3	230.0 Circuit 1 Line 230.0 Circuit 2	P6	N-1-1	< 100	< 100	104.2	99.1	< 100	< 100	95.7	< 100	< 100	Existing Big Creek/San Joaquin Valley RAS					
				line_P6_201544_Line BIG CRK4 RECTOR	230.0 to BIG CRK3 230.0 to BIG CRK3	230.0 Circuit 1 Line 230.0 Circuit 2	P6	N-1-1	< 100	106.3	< 100	< 100	107.0	105.6	106.4	< 100	108.2	Existing Big Creek/San Joaquin Valley RAS					
24305	BIG CRK8	230	24303	BIG CRK3	230	1	1	line_P6_201065_Line BIG CRK1 RECTOR	230.0 to RECTOR 230.0 to BIG CRK3	230.0 Circuit 1 Line 230.0 Circuit 1	P6	N-1-1	< 100	127.8	< 100	< 100	129.3	129.2	127.8	< 100	130.2	Existing Big Creek/San Joaquin Valley RAS	
24402	ANTELOPE	66.0	24401	ANTELOPE	230	1	1	line_P6_205195_Line ANTELOPE	230.0 to PARDEE 66.00 to ANTELOPE	230.0 Circuit 1 Tran 230.00 Circuit 2	P6	N-1-1	< 100	< 100	102.7	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency		
								line_P6_205197_Line ANTELOPE	230.0 to PARDEE 66.00 to ANTELOPE	230.0 Circuit 1 Tran 230.00 Circuit 4	P6	N-1-1	< 100	< 100	102.3	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205335_Line ANTELOPE	230.0 to PASTORIA 66.00 to ANTELOPE	230.0 Circuit 1 Tran 230.00 Circuit 2	P6	N-1-1	< 100	< 100	102.3	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205699_Line ANTELOPE	66.0 to NEENACH 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 2	P6	N-1-1	< 100	< 100	102.8	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205701_Line ANTELOPE	66.0 to NEENACH 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 4	P6	N-1-1	< 100	< 100	102.4	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205895_Line ANTELOPE	66.0 to TAP 85 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 2	P6	N-1-1	< 100	< 100	105.2	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205897_Line ANTELOPE	66.0 to TAP 85 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 4	P6	N-1-1	< 100	< 100	104.8	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205923_Line ANTELOPE	66.0 to TAP 85 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 2	P6	N-1-1	< 100	< 100	103.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency
								line_P6_205925_Line ANTELOPE	66.0 to TAP 85 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 4	P6	N-1-1	< 100	< 100	102.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency
				tran_P6_207154_Tran ANTELOPE	66.00 to ANTELOPE 66.00 to ANTELOPE	230.00 Circuit 2 0.00 Tran ANTELOPE	P6	N-1-1	106.0	125.3	195.1	< 100	106.7	< 100	129.1	< 100	107.6	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency					
24402	ANTELOPE	66.0	24401	ANTELOPE	230	2	1	line_P6_205197_Line ANTELOPE	230.0 to PARDEE 66.00 to ANTELOPE	230.0 Circuit 1 Tran 230.00 Circuit 4	P6	N-1-1	< 100	< 100	106.0	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency		
								line_P6_205337_Line ANTELOPE	230.0 to PASTORIA 66.00 to ANTELOPE	230.0 Circuit 1 Tran 230.00 Circuit 4	P6	N-1-1	< 100	< 100	105.6	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205701_Line ANTELOPE	66.0 to NEENACH 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 4	P6	N-1-1	< 100	< 100	106.1	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205894_Line ANTELOPE	66.0 to TAP 85 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 1	P6	N-1-1	< 100	< 100	107.1	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205897_Line ANTELOPE	66.0 to TAP 85 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 4	P6	N-1-1	< 100	< 100	108.6	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205925_Line ANTELOPE	66.0 to TAP 85 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 4	P6	N-1-1	< 100	< 100	106.7	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								tran_P3_109582_Tran ANTELOPE	66.00 to ANTELOPE 18.0 Unit ID G2	230.00 Circuit 4 0.00 Gen PSTRIAG2	P3	G-1/N-1	< 100	< 100	105.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency
								tran_P6_207128_Tran ANTELOPE	66.00 to ANTELOPE 66.00 to ANTELOPE	230.00 Circuit 1 0.00 Tran ANTELOPE	P6	N-1-1	106.3	125.6	195.9	< 100	107.1	< 100	129.5	< 100	107.9	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								tran_P6_207204_Tran ANTELOPE	66.00 to ANTELOPE 66.00 to BAILEY	230.00 Circuit 4 0.00 Tran BAILEY	P6	N-1-1	< 100	< 100	105.5	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
				tran_P6_207205_Tran ANTELOPE	66.00 to ANTELOPE 66.00 to BAILEY	230.00 Circuit 4 0.00 Tran BAILEY	P6	N-1-1	< 100	< 100	105.6	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency					
24402	ANTELOPE	66.0	24401	ANTELOPE	230	4	1	line_P6_205195_Line ANTELOPE	230.0 to PARDEE 66.00 to ANTELOPE	230.0 Circuit 1 Tran 230.00 Circuit 2	P6	N-1-1	< 100	< 100	105.6	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency		
								line_P6_205335_Line ANTELOPE	230.0 to PASTORIA 66.00 to ANTELOPE	230.0 Circuit 1 Tran 230.00 Circuit 2	P6	N-1-1	< 100	< 100	105.2	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205699_Line ANTELOPE	66.0 to NEENACH 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 2	P6	N-1-1	< 100	< 100	105.7	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205894_Line ANTELOPE	66.0 to TAP 85 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 1	P6	N-1-1	< 100	< 100	106.3	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	
								line_P6_205895_Line ANTELOPE	66.0 to TAP 85 66.00 to ANTELOPE	66.0 Circuit 1 Tran 230.00 Circuit 2	P6	N-1-1	< 100	< 100	108.2	< 100	< 100	< 100	< 100	< 100	< 100	Engizering existing hot spare transformer after intial contingency with an option to shed load after second contingency	



	line_P6_205923_Line NEENACH 66.0 to TAP 85 66.0 Circuit 1 Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 2	P6	N-1-1	< 100	< 100	106.3	< 100	< 100	< 100	< 100	< 100	< 100	Energizing existing hot spare transformer after intial contingency with an option to shed load after second contingency
	tran_P3_109392_Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 2 0.00 Gen PSTRIAG2 18.0 Unit ID G2	P3	G-1/N-1	< 100	< 100	105.0	< 100	< 100	< 100	< 100	< 100	< 100	Energizing existing hot spare transformer after intial contingency with an option to shed load after second contingency
	tran_P6_207126_Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 1 0.00 Tran ANTELOPE 66.00 to ANTELOPE	P6	N-1-1	106.3	125.6	195.7	< 100	107.0	< 100	129.4	< 100	107.8	Energizing existing hot spare transformer after intial contingency with an option to shed load after second contingency
	tran_P6_207155_Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 100	< 100	105.1	< 100	< 100	< 100	< 100	< 100	< 100	Energizing existing hot spare transformer after intial contingency with an option to shed load after second contingency
	tran_P6_207156_Tran ANTELOPE 66.00 to ANTELOPE 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 100	< 100	105.2	< 100	< 100	< 100	< 100	< 100	< 100	Energizing existing hot spare transformer after intial contingency with an option to shed load after second contingency
24402 ANTELOPE 66.0 24420 NEENACH 66.0 1 1	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	122.4	< 100	< 100	< 100	< 100	< 100	< 100	Split Antelope-Bailey 66 kV System per existing SCE operating procedure after initial contingency
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 100	< 100	122.4	< 100	< 100	< 100	< 100	< 100	< 100	Split Antelope-Bailey 66 kV System per existing SCE operating procedure after initial contingency
24403 BAILEY 230 24115 PASTORIA 230 1 1	line_P6_201988_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	100.4	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_201989_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	102.7	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202057_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	101.2	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202058_Line MAGUNDEN 230.0 to ANTELOPE 230.0 Circuit 2 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	103.6	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
	line_P6_202324_Line PASTORIA 230.0 to EDMONSTN 230.0 Circuit 1 Line PARDEE 230.0 to WARNETAP 230.0 Circuit 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	100.9	< 100	< 100	< 100	Existing Pastoria Energy Facility RAS
24420 NEENACH 66.0 24452 TAP 85 66.0 1 1	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 100	< 100	112.0	< 100	< 100	< 100	< 100	< 100	< 100	Split Antelope-Bailey 66 kV System per existing SCE operating procedure after initial contingency
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 100	< 100	111.9	< 100	< 100	< 100	< 100	< 100	< 100	Split Antelope-Bailey 66 kV System per existing SCE operating procedure after initial contingency

2023-24 ISO Reliability Assessment - Preliminary Study Results

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

High/Low Voltages



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)						Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring-Off Peak	2028 Spring-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	
ALAMO SC 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.77	0.9 < V < 1.1	1.12	1.14	0.9 < V < 1.1	0.9 < V < 1.1	1.10	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.77	0.9 < V < 1.1	1.12	1.14	0.9 < V < 1.1	0.9 < V < 1.1	1.11	system adjustments after first contingency mitigates the issue
ALPINE 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.84	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.84	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
BAILEY 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.76	0.9 < V < 1.1	1.12	1.15	0.9 < V < 1.1	0.9 < V < 1.1	1.11	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.76	0.9 < V < 1.1	1.13	1.15	0.9 < V < 1.1	0.9 < V < 1.1	1.11	system adjustments after first contingency mitigates the issue
NEENACH 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.84	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.84	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
OSO 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.77	0.9 < V < 1.1	1.12	1.14	0.9 < V < 1.1	0.9 < V < 1.1	1.11	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.77	0.9 < V < 1.1	1.12	1.14	0.9 < V < 1.1	0.9 < V < 1.1	1.11	system adjustments after first contingency mitigates the issue
TAP 85 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.77	0.9 < V < 1.1	1.11	1.13	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.76	0.9 < V < 1.1	1.11	1.13	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
TAP 86 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.77	0.9 < V < 1.1	1.12	1.14	0.9 < V < 1.1	0.9 < V < 1.1	1.11	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.77	0.9 < V < 1.1	1.12	1.14	0.9 < V < 1.1	0.9 < V < 1.1	1.11	system adjustments after first contingency mitigates the issue
WESTPAC 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.76	0.9 < V < 1.1	1.10	1.13	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.76	0.9 < V < 1.1	1.11	1.13	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue
BAILEY 230 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.75	0.9 < V < 1.1	0.9 < V < 1.1	1.11	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	system adjustments after first contingency mitigates the issue



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)						Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring Off Peak	2028 Spring-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		
ALAMO SC 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	< 8	27.81	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	< 8	27.88	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
ALPINE 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	< 8	20.53	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	< 8	20.55	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
BAILEY 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	< 8	28.63	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	< 8	28.70	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
NEENACH 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	< 8	20.53	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	< 8	20.55	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
OSO 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	< 8	28.15	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	< 8	28.22	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
TAP 85 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	< 8	28.12	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	< 8	28.18	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
TAP 86 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	< 8	28.15	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	< 8	28.22	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
WESTPAC 66 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	< 8	28.28	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
	tran_P6_207228_Tran BAILEY 66.00 to BAILEY 230.00 Circuit 2 0.00 Tran BAILEY 66.00 to BAILEY	P6	N-1-1	< 8	< 8	28.34	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue
BAILEY 230 kV	line_P6_202257_Line PARDEE 230.0 to BAILEY 230.0 Circuit 1 Line BAILEY 230.0 to PASTORIA 230.0 Circuit 1	P6	N-1-1	< 8	< 8	27.09	< 8	< 8	< 8	< 8	< 8	< 8	< 8	system adjustments after first contingency mitigates the issue











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



**Single Contingency Load Drop**

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions	
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring-Off Peak	2028 Spring-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity		

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

2023-24 ISO Reliability Assessment - Preliminary Study Results

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



*Single Source Substation with more than 100 MW Load*

Substation	Load Served (MW)									Potential Mitigation Solutions
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2025 Spring-Off Peak	2028 Spring-Off Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP Sensitivity	

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP BESS Charging		
Lugo 500/230kV Transformer No.1	Lugo 500/230kV Transformer No.2	P1	N-1	113.19	<100	<100	<100	<100	<100	<100	<100	<100	<100	124.5	<100	Short term: HDPP RAS and Mojave Desert RAS Long term: Previously approved Lugo 500/230kV Transformer No.3
Lugo 500/230kV Transformer No.2	Lugo 500/230kV Transformer No.1	P1	N-1	113.26	<100	<100	<100	<100	<100	<100	<100	<100	<100	124.57	<100	Short term: HDPP RAS and Mojave Desert RAS Long term: Previously approved Lugo 500/230kV Transformer No.3
Lugo 500/230kV Transformer No.3	Lugo 500/230kV transformers Nos. 1&2	P6	N-1-1	N/A	113.94	<100	<100	<100	N/A	<100	<100	<100	N/A	N/A	Generation redispatch after the first contingency	
Lugo-Plisgah 230kV Line	Lugo 500/230kV transformers Nos. 1&2	P6	N-1-1	Diverge	<100	<100	<100	<100	<100	<100	<100	<100	Diverge	<100	Short term: HDPP RAS and Mojave Desert RAS Long term: Previously approved Lugo 500/230kV Transformer No.3	
Kramer-Victor 230kV No.1 or 2 Line	Kramer-Victor 230kV No.2 or 1 line	P1	N-1	121.69	120.82	<100	<100	<100	<100	111.15	<100	<100	108.73	<100	Short term: Mojave Desert RAS Long term: Previously approved Victor-Kramer 115kV conversion	
	Victor-Roadway 115kV and Kramer-Victor 230kV No.2 or 1 lines	P6	N-1-1	146.89	146.94	<100	<100	<100	<100	139.36	<100	114.29	131.41	<100	Short term: Mojave Desert RAS Long term: Previously approved Victor-Kramer 115kV conversion	
	Kramer-Roadway 115kV and Kramer-Victor 230kV No.2 or 1 lines	P6	N-1-1	137.85	138.03	<100	<100	<100	<100	125.57	<100	110.16	122.95	<100	Short term: Mojave Desert RAS Long term: Previously approved Victor-Kramer 115kV conversion	
Lugo-Victor 230kV No.1 and No.2 lines	Lugo-Victor 230kV Nos. 3&4 lines	P7	DCTL	120.04	<100	<100	<100	<100	<100	<100	<100	<100	132.72	<100	Short term: HDPP RAS Long term: Previously approved Lugo-Victor 230kV lines upgrade	
Lugo-Victor 230kV No.3 and No.4 lines	Lugo-Victor 230kV Nos. 1&2 lines	P7	DCTL	120.04	<100	<100	<100	<100	<100	<100	<100	<100	132.72	<100	Short term: HDPP RAS Long term: Previously approved Lugo-Victor 230kV lines upgrade	
Victor-Kramer 115kV Line	Victor-Roadway 115kV and Kramer-Victor 230kV No.2 lines	P6	N-1-1	102.52	106.48	<100	<100	<100	<100	102.81	<100	<100	<100	<100	Short term: Mojave Desert RAS Long term: Previously approved Victor-Kramer 115kV conversion	
Victor-Roadway 115kV Line	Kramer-Victor 230kV Nos. 1&2 lines	P7	DCTL	Diverge	Diverge	<100	<100	<100	<100	Diverge	<100	Diverge	Diverge	Diverge	Short term: Mojave Desert RAS Long term: Previously approved Victor-Kramer 115kV conversion	
	Victor-Kramer 115kV and Victor-Kramer 230kV No.1 or 2 lines	P6	N-1-1	104.44	110.07	<100	<100	<100	<100	117.53	<100	<100	<100	<100	Short term: Generation redispatch after the first contingency Long term: Previously approved Victor-Kramer 115kV conversion	
Kramer-Coolwater 230kV Line	Sandlot-Kramer 230kV line and Coolwater 230/115kV transformer	P6	N-1-1	N/A	<100	<100	<100	<100	N/A	109.05	<100	<100	N/A	<100	Generation redispatch after the first contingency	
Coolwater 230/115kV Transformer	Sandlot-Kramer 230kV and Kramer-Coolwater 230kV lines	P7	DCTL	N/A	144.69	<100	<100	<100	N/A	Diverge	<100	146.18	N/A	N/A	Future Kramer CRAS will include this contingency	
Remaining Victor 230/115kV Transformer	Loss of the other two Victor 230/115kV transformers	P6	N-1-1	<100	<100	187.43	<100	115.44	<100	<100	<100	166.36	<100	<100	Utilize existing spare transformer	
Control-Inyokern 115kV Line	Control-Coso-Inyokern 115kV line	P1	N-1	<100	<100	<100	117.3	<100	<100	<100	<100	<100	<100	<100	Operating Procedure 7690 reduce preselected generation output	
	Control 115kV East Bus	P2	Bus Fault	104.17	<100	<100	Diverge	<100	<100	<100	<100	<100	110.11	<100	Operating Procedure 7690 reduce preselected generation output	
Control-Inyo 115kV Line	Kramer-Inyokern 115kV and Inyokern-Kramer-Randsburg 115kV lines	P6	N-1-1	125.77	<100	<100	Diverge	<100	<100	<100	<100	<100	163.67	<100	Operating Procedure 7690 reduce preselected generation output	
	Kramer 115kV East Bus	P5	Non-Redundant Relay	125.85	<100	<100	Diverge	<100	<100	<100	<100	<100	161.16	<100	Install redundant bus differential relay	
Inyo 115kV PST	Control-Inyokern 115kV and Control-Coso-Inyokern 115kV lines	P7	DCTL	<100	<100	<100	Diverge	<100	<100	<100	<100	<100	Diverge	<100	Bishop RAS	
Control 115/55kV Transformer	Loss of the other Control 115/55kV transformer	P1	N-1	<100	<100	109.2	<100	<100	<100	<100	<100	<100	<100	<100	New Control 115/55kV transformer	

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP BESS Charging	
Randsburg, Inyokern, Downs, Searles 115kV	Inyokern-Kramer 115kV line	P1	N-1	Low Voltage	0.9<P.U.<1.06	0.9<P.U.<1.06	0.9<P.U.<1.06	0.80	0.9<P.U.<1.06	0.9<P.U.<1.06	0.9<P.U.<1.06	0.9<P.U.<1.06	0.9<P.U.<1.06	0.9<P.U.<1.06	0.9<P.U.<1.06	Install shunt capacitor at load bus
Inyo 115kV	Control 115kV E/W bus section fault	P5	Non-Redundant Relay	High/Low Voltage	1.14	1.10	1.0<P.U.<1.05	1.06	0.97	1.11	1.10	1.0<P.U.<1.05	1.0<P.U.<1.05	1.0<P.U.<1.05	1.11	Install shunt reactor at Inyo
Control, Inyo, 115kV	Control-Inyokern and Control-Coso-Inyokern 115kV lines	P7	DCTL	Low Voltage	0.93	0.95	1.0<P.U.<1.05	1.0<P.U.<1.05	0.87	1.0<P.U.<1.05	0.94	0.90	0.98	0.93	1.0<P.U.<1.05	Bishop RAS
	Kramer 115kV East Bus	P5	Non-Redundant Relay	Low Voltage	0.91	0.92	1.0<P.U.<1.05	1.0<P.U.<1.05	0.89	1.0<P.U.<1.05	0.92	1.0<P.U.<1.05	1.0<P.U.<1.05	0.94	1.0<P.U.<1.05	Install non-redundant relay
Control 115kV	Inyokern-Kramer and Inyokern-Kramer-Randsburg 115kV lines	P6	N-1-1	Low Voltage	0.91	0.93	0.94	1.0<P.U.<1.05	0.90	1.0<P.U.<1.05	0.93	1.0<P.U.<1.05	1.0<P.U.<1.05	0.94	1.0<P.U.<1.05	Operating procedure 7690
Coolwater, Baker, Dunn Siding, Tortilla, Tiefort 115kV	Kramer 115kV East Bus	P5	Non-Redundant Relay	Low Voltage	0.79	0.9<P.U.<1.05	0.9<P.U.<1.05	0.9<P.U.<1.05	0.9<P.U.<1.05	0.70	0.9<P.U.<1.05	0.9<P.U.<1.05	0.9<P.U.<1.05	0.9<P.U.<1.05	0.68	Previously approved new Coolwater 230/115kV transformer
Coolwater 115kV	Kramer-Coolwater and Coolwater-Tortilla 115kV lines	P6	N-1-1	Low Voltage	0.77	0.9<P.U.<1.05	0.9<P.U.<1.05	0.9<P.U.<1.05	0.9<P.U.<1.05	0.9<P.U.<1.05	0.9<P.U.<1.05	0.9<P.U.<1.05	0.9<P.U.<1.05	0.78	0.89	Previously approved new Coolwater 230/115kV transformer

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		
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP BESS Charging	

No P1 or P3 contingencies resulted in voltage deviation greater than 8%

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 SP High CEC Forecast	2025 OP BESS Charging	
Control-Casa Diablo 1150kV (1PH fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Control-Casa Diablo 1150kV (1PH fault at Casa Diablo)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Control-Coso-Inyokern 115kV (1PH fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	WECC criteria not met	Stable/WECC criteria met	WECC criteria not met	WECC criteria not met	Install shunt capacitor at Inyokern
Control-Coso-Inyokern 115kV (1PH fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Control-Inyokern (Fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Control-Inyokern (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	WECC criteria not met	Install shunt capacitor at Inyokern
Control-Inyo 115kV (Fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Inyokern-Downs 115kV (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Inyokern-Searles 15kV (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Kramer-Roadway 115kV (Fault at Kramer)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Kramer-Roadway 115kV (Fault at Roadway)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Kramer-Victor 115kV (Fault at Kramer)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Kramer-Victor 115kV (Fault at Victor)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Control 115/55kV Transformereformer Banks	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Kramer 230/115kV Transformer Banks	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Lugo 500/230kV Transformer Banks no RAS	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Unstable	Stable/WECC criteria met	Unstable	HDPP RAS and Mojave Desert RAS Long term: Previously approved Lugo 500/230kV No.3 transformer
Lugo 500/230kV Transformer Banks RAS	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	WECC criteria not met	Previously approved Lugo 500/230kV No.3 transformer
Kramer-Inyokern-Randsburg Nos.1 & 3 115kV	P6	Normal clearing	Unstable	Stable/WECC criteria met	Stable/WECC criteria met	Unstable	Diverge	Operating procedure 7690
Coolwater-Kramer & Coolwater-SEGS-Tortilla 115kV (Fault at Coolwater)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Coolwater-Kramer & Coolwater-SEGS-Tortilla 115kV_OP (Fault at Coolwater)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Coolwater-Kramer & Kramer-Tortilla 115kV (Fault at Kramer)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Coolwater-Kramer & Kramer-Tortilla 115kV_OP (Fault at Kramer)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Kramer-Victor 230kV Nos.1 & 2 no RAS	P7	Normal clearing	Unstable	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Mojave Desert RAS
Kramer-Victor 230kV Nos.1 & 2 RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Lugo-Victor 230kV Nos.1 & 2 no RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Lugo-Victor 230kV Nos.1 & 2 RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Control-Coso-Inyokern & Control-Inyokern 115kV no RAS	P7	Normal clearing	Unstable	Unstable	Unstable	Unstable	Stable/WECC criteria met	Bishop RAS
Control-Coso-Inyokern & Control-Inyokern 115kV RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Kramer-Victor & Roadway-Victor 115kV	P7	Normal clearing	Stable/WECC criteria met	N/A	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Kramer-Victor & Kramer-Roadway 115kV	P7	Normal clearing	Stable/WECC criteria met	N/A	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Control 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Cool Water 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Kramer 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Tortilla 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues





Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 SP High CEC Forecast	2025 OP BESS Charging	
TC_Kramer_Kramer-Tortilla 115kV	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
TC_Kramer_Kramer-Victor 115kV No.1	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
TC_Tortilla_Tortilla-SEGS-Coolwater 115kV	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
TC_Tortilla_Tortilla-Kramer 115kV	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
TC_Victor_Victor-Kramer 115kV No.1	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
TC_Victor_Victor-Roadway 115kV	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
DC_Kramer 230	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Install Redundant DC
DC_Sandlot 230	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Install Redundant DC
DC_Victor 230	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Install Redundant DC
DC_Control 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Install Redundant DC
DC_Coolwater 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Install Redundant DC
DC_Inyokern 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Install Redundant DC
DC_Kramer 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Install Redundant DC
DC_Tortilla 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Install Redundant DC
DC_Victor 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge	Install Redundant DC

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP BESS Charging

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

Substation	Load Served (MW)										Potential Mitigation Solutions	
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP BESS Charging

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 OP BESS Charging		
Ivanpah 230/115kV Transformer No. 2	Ivanpah 230/115kV Transformer No.1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.69	< 100	Diverge	< 100	Ivanpah RAS
	Ivanpah 230/115kV Transformer No.1 and Ivanpah-Baker-Coolwtare-Dunn siding-Mountain Pass 115kV line	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.2	< 100	114.2	< 100	Ivanpah RAS
Ivanpah 230/115kV Transformer No.1	Ivanpah 230/115kV Transformer No.2	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.69	< 100	Diverge	< 100	Ivanpah RAS
	Ivanpah 230/115kV Transformer No.2 and Ivanpah-Baker-Coolwater-Dunn siding-Mountain Pass 115kV line	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.2	< 100	114.2	< 100	Ivanpah RAS
Ivanpah-Mountain Pass-Baker-Dunn siding-Coolwater 115kV Line	Ivanpah 230/115kV transformers Nos.1&2	P6	N-1-1	Diverge	Diverge	<100	Diverge	112.14	< 100	Diverge	Diverge	Diverge	Diverge	Diverge	< 100	Ivanpah RAS
	Eldorado-Ivanpah & Eldorado-Primm 230kV	P7	DCTL	Diverge	Diverge	<100	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Ivanpah RAS
	Eldorado-Ivanpah & Ivanpah-Primm 230kV	P7	DCTL	Diverge	Diverge	<100	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Ivanpah RAS
Lugo-Calcite 230kV No.1 Line	Eldorado 500/230kV Transformer No.5 and Eldorado-Sloan Canyon 230kV	P6	N-1-1	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Diverge	Ivanpah RAS
	Cima-Eld-Pisgah #2 Stuck CB followed by N1 of Lugo-Pisgah No.2 230kV	P4	Stuck Breaker	< 100	< 100	101.19	< 100	<100	< 100	< 100	< 100	104.32	< 100	< 100	< 100	Future Calcite CRAS
	Lugo-Pisgah 230kV No.2 and Eldorado-Lugo 500kV lines	P6	N-1-1	< 100	< 100	106.33	< 100	100.14	< 100	< 100	< 100	104.23	< 100	< 100	< 100	Congestion management Future Calcite CRAS
	Lugo-Pisgah 230kV No.2 and Eldorado-Cima-Pisgah 230kV No1 or 2 lines	P6	N-1-1	< 100	< 100	101.25	< 100	<100	< 100	< 100	< 100	104.32	< 100	< 100	< 100	Congestion management Future Calcite CRAS
Eldorado - McCullough 500kV Line	Lugo-Pisgah 230kV No.2 and Lugo-Victorville 500kV lines	P6	N-1-1	< 100	< 100	109.04	< 100	104.71	< 100	< 100	<100	< 100	< 100	< 100	< 100	Congestion management Future Calcite CRAS
	Eldorado-Lugo & Lugo-Mohave 500kV lines	P6	N-1-1	< 100	< 100	113.49	< 100	101.33	< 100	< 100	< 100	113.59	< 100	< 100	< 100	Lugo-Victorville RAS and congestion management
	Eldorado-Lugo and Eldorado-Moenkopi 500kV lines	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.06	< 100	< 100	< 100	Lugo-Victorville RAS
	Eldorado-Lugo and Eldorado-Mohave 500kV lines	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.43	< 100	< 100	< 100	Planned Lugo-Victorville RAS expansion will include this contingency



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	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP BESS Charging

No P1 or P3 contingencies resulted in voltage deviation greater than 8%

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2026 Summer Peak	2025 Summer Peak	2025 Spring Off-Peak	2028 SP High CEC Forecast	2025 OP BESS Charging	
Lugo-Victorville 500kV Line (fault at Lugo)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Merchant #1 230kV Line (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Merchant #2 230kV Line (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Lugo-Mohave 500kV Line (fault at Lugo)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Mohave 500kV Line (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-McCullough 500kV Line (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Moenkopi 500kV Line (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Ivanpah 230kV Line (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Primm 230kV Line (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Ivanpah-Primm 230kV Line (fault at Ivanpah)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Sloan Canyon-Eldorado 230kV Line	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Harry Allen 500kV Line (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	N/A	N/A	N/A		
Sloan Canyon-Harry Allen 500kV Line (fault at Sloan Canyon)	P1	Normal clearing	N/A	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	N/A	
Ivanpah 230/115kV A Bank	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado 500/230kV 5AA Bank (fault at Eldorado 500kV)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado 500/230kV 3AA Bank (fault at Eldorado 230kV)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado 500/230kV 4AA Bank (fault at Eldorado 230kV)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Lugo 500kV Line (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Sloan Canyon-Mead 230kV Line (fault at Mead)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Cima-Pisgah 230kV Line (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Cima-Pisgah 230kV Line (fault at Pisgah)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Pisgah 230kV Line (fault at Eldorado)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Pisgah 230kV Line (fault at Pisgah)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Ivanpah-Baker-Coolwater-Dunnsiding-Mountain Pass 115kV (fault at Ivanpah)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Ivanpah 230kV line stuck CB followed by Ivanpah A Bank	P4	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-NSO 230kV line stuck CB followed by Eldorado-Magnolia 230kV line	P4	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Mead 230kV No.1 stuck CB followed by Eldorado-Cima-Pisgah 230kV line	P4	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Mead 230kV No.2 stuck CB followed by Eldorado-Pisgah 230kV line	P4	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Cima-Pisgah 230kV line stuck CB followed by Calcite-Pisgah 230kV line	P4	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Pisgah 230kV line stuck CB followed by Lugo-Pisgah 230kV line	P4	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Lugo and Eldorado-Moenkopi 500kV lines	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
McCullough-Victorville 500kV Nos. 1&2 lines (fault at Victorville)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Cima-Pisgah 230kV Nos. 1&2 lines (fault at Eldorado)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Mohave and Eldorado-Moenkopi 500kV lines	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Ivanpah and Eldorado-Primm 230kV lines (fault at Eldorado)	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Ivanpah and Eldorado-Primm 230kV lines (fault at Ivanpah)	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Eldorado-Merchant 230kV Nos.1&2 lines (fault at Eldorado)	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	
Harry Allen-Mead and Harry Allen-Eldorado 500kV lines (fault at Harry Allen)	P7	Normal clearing	N/A	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	
Harry Allen-Mead and Harry Allen-Sloan Canyon 500kV lines (fault at Harry Allen)	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 SP High CEC Forecast	2025 OP BESS Charging	



Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP BESS Charging

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

2023-2024 ISO Reliability Assessment - Study Results

Study Area: **SCE East of Lugo**

Single Source Substation with more than 100 MW Load



Substation	Load Served (MW)										Potential Mitigation Solutions	
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer-Off Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen		2025 OP BESS Charging

No single source substation with more than 100 MW

Study Area: **SCE Eastern area**  
 Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 Spr Shoulder/Peak Heavy Renewable	
21076 RAMON230 230 24806 MIRAGE 230 1 1	CVSUB230 230.0 to MIRAGE 230.0 Circuit 1 Line RAMON230 230.0 to MIRAGE 230.0 Circuit 2	P6	N-1-1	<100	<100	117.2	<100	112.3	<100	<100	<100	Path 42 RAS
25401 EAGLEMTN 230 25405 IRON MTN 230 1 1	J.HINDS - MIRAGE 230 kv Line BLYTHESC - EAGLEMTN 161 kv	P6	N-1-1	129.5	<100	123.0	<100	<100	<100	129.6	<100	Blythe RAS (arming point update needed)*
25401 EAGLEMTN 230 25405 IRON MTN 230 1 1	DEVERS 230.0 to MIRAGE 230.0 Ckt 1 Line DEVERS 230.0 to MIRAGE 230.0 Ckt 2	P7	DCTL	<100	<100	<100	<100	105.6	<100	<100	<100	Path 42 RAS
25401 EAGLEMTN 230 25405 IRON MTN 230 1 1	J.HINDS - MIRAGE 230 kv	P1	N-1	<100	<100	<100	123.4	<100	<100	<100	<100	Blythe RAS (arming point update needed)*
25405 IRON MTN 230 24019 CAMINO 230 1 1	J.HINDS - MIRAGE 230 kv Line BLYTHESC - EAGLEMTN 161 kv	P6	N-1-1	119.4	<100	113.2	<100	<100	<100	119.5	<100	Blythe RAS (arming point update needed)*
25405 IRON MTN 230 24019 CAMINO 230 1 1	DEVERS 230.0 to MIRAGE 230.0 Ckt 1 Line DEVERS 230.0 to MIRAGE 230.0 Ckt 2	P7	DCTL	<100	<100	<100	<100	105.0	<100	<100	<100	Path 42 RAS
25405 IRON MTN 230 24019 CAMINO 230 1 1	J.HINDS - MIRAGE 230 kv	P1	N-1	<100	<100	<100	122.9	<100	<100	<100	<100	Blythe RAS (arming point update needed)*
25406 J.HINDS 230 24806 MIRAGE 230 1 1	CAMINO - GENE - IRON MTN - MEAD 230 kv OUTAGE	P1	N-1	<100	Diverge	<100	<100	113.7	<100	<100	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	DEVERS 230.0 to MIRAGE 230.0 Ckt 1 Line DEVERS 230.0 to MIRAGE 230.0 Ckt 2	P7	DCTL	<100	<100	<100	<100	115.0	<100	<100	<100	Path 42 RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	COLRIVER - REDBLUFF 500.0 #1 Line COLRIVER - REDBLUFF 500.0 #2	P6	N-1-1	<100	<100	<100	<100	115.1	<100	<100	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	DEVERS - REDBLUFF 500.0 # 1 Line DEVERS - REDBLUFF 500.0 #2	P6	N-1-1	108.0	<100	107.9	<100	119.3	<100	120.8	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	EAGLEMTN-IRON MTN 230 kv	P1	N-1	<100	<100	<100	<100	115.0	<100	<100	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	J.HindsMWD, J.HindMWD portion & EagleMTN-J.Hinds Jh & Eagle Shunt Reactor	P2/P4	CB & LLTRE	140.9	<100	138.0	<100	<100	<100	141.0	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	EagleMTN loss EagleMTN sub, Jh & Eagle Shunt Reactor	P2/P4	CB & LLTRE	119.3	<100	<100	<100	<100	<100	119.7	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	CB405-EagleMTN loss EagleMTN sub and J.Hind MWD portion, Jh & Eagle Shunt Reactor	P2/P4	CB & LLTRE	140.9	<100	138.0	<100	<100	<100	141.0	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	CB407-EagleMTN loss EagleMTN sub and EagleMTN-IRON MTN Jh & Eagle Shunt Reactor	P2/P4	CB & LLTRE	119.3	<100	<100	<100	<100	<100	119.7	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	CB307, Eagle-Iron-Camino-Gene-Mead 230kv-loss Iron Jh Shunt Reactor	P2/P4	CB & LLTRE	<100	<100	<100	<100	114.5	<100	<100	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	CB307, Eagle-Iron-Camino-Gene-Mead 230kv-loss Iron Eagle Shunt Reactor	P2/P4	CB & LLTRE	<100	<100	<100	<100	111.4	<100	<100	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	CB208, Iron-Camino-Gene-Mead-Parker 230kv-loss Gene Jh Shunt Reactor	P2/P4	CB & LLTRE	<100	<100	<100	<100	113.7	<100	<100	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	CB208, Iron-Camino-Gene-Mead-Parker 230kv-loss Gene Eagle Shunt Reactor	P2/P4	CB & LLTRE	<100	<100	<100	<100	110.9	<100	<100	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	Open CB405-EagleMT, Line JHINDMWD - EAGLEMTN 230 kv Jh Shunt Reactor	P2/P4	CB & LLTRE	119.3	<100	<100	<100	<100	<100	119.7	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	Open CB405-EagleMT, Line JHINDMWD - EAGLEMTN 230 kv Eagle Shunt Reactor	P2/P4	CB & LLTRE	119.3	<100	<100	<100	<100	<100	119.7	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	Open CB407-EagleMT, Line EAGLEMTN - IRON MTN 230 kv Jh Shunt Reactor	P2/P4	CB & LLTRE	<100	<100	<100	<100	115.0	<100	<100	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	Open CB407-EagleMT, Line EAGLEMTN - IRON MTN 230 kv Eagle Shunt Reactor	P2/P4	CB & LLTRE	141.0	<100	<100	<100	<100	<100	112.1	<100	Blythe RAS
25406 J.HINDS 230 24806 MIRAGE 230 1 1	JHINDMWD - EAGLEMTN 230 kv	P1	N-1	140.9	<100	138.0	<100	<100	<100	<100	<100	Blythe RAS
25512 JHINDMWD 230 25401 EAGLEMTN 230 1 1	J.HINDS - MIRAGE 230 kv Line BLYTHESC - EAGLEMTN 161 kv	P6	N-1-1	159.8	<100	151.9	Diverge	<100	<100	160.0	<100	Blythe RAS (arming point update needed)*
25512 JHINDMWD 230 25401 EAGLEMTN 230 1 1	DEVERS 230.0 to MIRAGE 230.0 Ckt 1 Line DEVERS 230.0 to MIRAGE 230.0 Ckt 2	P7	DCTL	141.6	<100	<100	112.5	141.04*	<100	146.5	<100	Blythe RAS (arming point update needed)*
25512 JHINDMWD 230 25401 EAGLEMTN 230 1 1	J.HINDS - MIRAGE 230 kv	P1	N-1	148.9	<100	143.6	185.23*	<100	<100	149.1	<100	Blythe RAS (arming point update needed)*
25512 JHINDMWD 230 25401 EAGLEMTN 230 1 1	J.HINDS - MIRAGE 230 kv Line EAGLEMTN-IRON MTN 230 kv	P6	N-1-1	Diverge	Diverge	Diverge	Diverge	<100	Diverge	Diverge	<100	Blythe RAS (arming point update needed)*
25512 JHINDMWD 230 25401 EAGLEMTN 230 1 1	CAMINO - GENE - IRON MTN - MEAD 230 kv Line Julian Hinds - Mirage	P6	N-1-1	Diverge	Diverge	Diverge	Diverge	<100	Diverge	Diverge	<100	Blythe RAS (arming point update needed)*
25512 JHINDMWD 230 25406 J.HINDS 230 r1 1	J.HINDS - MIRAGE 230 kv Line BLYTHESC - EAGLEMTN 161 kv	P6	N-1-1	153.8	<100	146.1	Diverge	<100	<100	153.9	<100	Blythe RAS
25512 JHINDMWD 230 25406 J.HINDS 230 r1 1	DEVERS 230.0 to MIRAGE 230.0 Ckt 1 Line DEVERS 230.0 to MIRAGE 230.0 Ckt 2	P7	DCTL	136.2	<100	<100	<100	114.3	<100	140.3	<100	Blythe RAS
25512 JHINDMWD 230 25406 J.HINDS 230 r1 1	J.HINDS - MIRAGE 230 kv	P1	N-1	142.7	<100	137.6	150.2	<100	<100	142.8	<100	Blythe RAS
24900 COLRIVER 500 24959 colrvr2i 13.8 2 1	Tran COLRIVER 500/230/13.8 #1	P1	N-1	128.1	<100	<100	<100	<100	<100	165.8	<100	WOCR CRAS
24900 COLRIVER 500 24993 colrvr1i 13.8 1 1	Tran COLRIVER 500/230/13.8 #2	P1	N-1	128.1	<100	<100	<100	<100	<100	165.8	<100	WOCR CRAS
24374 REDBLUFF 500 24379 redblf1i 13.8 1 1	Tran REDBLUFF 500/230/13.8 #2	P1	N-1	117.5	<100	<100	<100	<100	<100	132.6	<100	WOCR CRAS
24374 REDBLUFF 500 24377 redblf2i 13.8 2 1	Tran REDBLUFF 500/230/13.8 #1	P1	N-1	117.5	<100	<100	<100	<100	<100	132.6	<100	WOCR CRAS





Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 SP High CEC Forecast	2025 Spr Shoulder-Peak Heavy Renewable		
EagleMTN-BlytheSCE 161 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-BlytheSCE 161 kV & Blythe 1CT	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV & Blythe 1CT trip (RAS)	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV & Blythe 1CT trip (RAS)	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Palo Verde 500 kV, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River - Red Bluff 500 kV #1, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #1, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Valley 500 kV #1, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Valley-Serrano/Alberhill 500 kV, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers 500/230 AA #2, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Imperial Valley - N. Gila 500 kV	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Imperial Valley - N. Gila 500 kV, no Devers SVC	P1	N-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds Bus tie CB fault, loss Julian Hinds	P2.4	Bus-Tie-Breaker	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers Middle CB fault, loss of Devers - Red Bluff 500 kV #1 and Devers-Valley 500 kV #1, no Devers SVC	P2.3	Non-Bus-Tie Breaker	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers Middle CB fault, loss of Devers - Red Bluff 500 kV #2 and Devers 1AA Bank, no Devers SVC	P2.3	Non-Bus-Tie Breaker	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 872 stuck at BlytheSCE	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 872 stuck at BlytheSCE & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 70 stuck at EagleMTN	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, CB 70 stuck at EagleMTN & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, CB 407 stuck at EagleMTN	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, CB 407 stuck at EagleMTN & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, CB 307 stuck (close to Iron)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV, CB 405 stuck at EagleMTN	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV, CB 405 stuck at EagleMTN & Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV, Stuck CB 509 at J.Hinds	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN 230/161 kV Transformer #5, Stuck CB432 at EagleMTN	P4.3	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN 230/161 kV Transformer #5, Stuck CB432 at EagleMTN & Blythe 1CT trip (RAS)	P4.3	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Valley-Serrano/Alberhill 500 kV with stuck breaker followed by Valley 4AA Bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #1 with stuck breaker followed by Devers-Valley 500 kV #1	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #2 with stuck breaker followed by Devers 1AA bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Mirage 230 kV with stuck breaker followed by Coachell Valley-Mirage 230 kV	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Vista 230 kV #1 with stuck breaker followed by Devers 3A bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Vista 230 kV #2 with stuck breaker followed by Devers 1AA bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - El Casco 230 kV with stuck breaker followed by El Casco 2A bank	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Mirage-J.Hinds 230 kV with stuck breaker followed by Mirage-Ramon 230 kV	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Mirage-J.Hinds 230 kV with stuck breaker followed by Mirage-Ramon 230 kV Blythe 1CT trip (RAS)	P4.2	Breaker Failure	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant Relay	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply
Julian Hinds 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant Relay	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply
BlytheSCE 161 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant Relay	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply
Mirage 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant Relay	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply
Devers 500 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant Relay	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply
El Casco 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant Relay	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply
San Bernardino 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant Relay	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply
Vista 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant Relay	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply
Etiwanda 230 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant Relay	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply
Valley 500 kV Bus, non-Redundant DC Supply fail	P5.3.13c	Non-Redundant Relay	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	WECC criteria not met	Add redundant DC supply
Colorado River-Palo Verde 500 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Red Bluff 500 kV #1, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River 1AA Bank, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Genesis 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Black Creek 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Dracker 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Suncatcher 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Crimson 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Centipede 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Filippi 230 kV, non-Redundant Trip Coil fail at Colorado River	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River-Red Bluff 500 kV #1, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Red Bluff 1AA Bank, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Red Bluff 500 kV No. 2, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Desert Sunlight-Red Bluff 230 kV, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Black Ranch-Red Bluff 230 kV, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Almasol-Red Bluff 230 kV, non-Redundant Trip Coil fail at Red Bluff	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios			
			2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 SP High CEC Forecast	2025 Spr Shoulder-Peak Heavy Renewable		
Devers-Red Bluff 500 kV No. 2, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Valley 500 kV No. 1, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers 1AA Bank, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-El Casco 230 kV, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Mirage 230 kV No. 1, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-San Bernardino 230 kV, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Sentinel 230 kV, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Vista 230 kV No. 2, non-Redundant Trip Coil fail at Devers	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-El Casco 230 kV, non-Redundant Trip Coil fail at El Casco	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
El Casco-San Bernardino 230 kV, non-Redundant Trip Coil fail at El Casco	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
El Casco-San Bernardino 230 kV, non-Redundant Trip Coil fail at San Bernardino	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-San Bernardino 230 kV, non-Redundant Trip Coil fail at San Bernardino	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda-San Bernardino 230 kV, non-Redundant Trip Coil fail at San Bernardino	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Mountainview-San Bernardino 230 kV No. 3, non-Redundant Trip Coil fail at San Bernardino	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
San Bernardino-Vista 230 kV, non-Redundant Trip Coil fail at San Bernardino	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
San Bernardino-Vista 230 kV, non-Redundant Trip Coil fail at Vista	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Vista 230 kV No. 1, non-Redundant Trip Coil fail at Vista	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda-Vista 230 kV, non-Redundant Trip Coil fail at Vista	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Mira Loma-Vista 230 kV No. 1, non-Redundant Trip Coil fail at Vista	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Mira Loma-Vista 230 kV No. 2, non-Redundant Trip Coil fail at Vista	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda-San Bernardino 230 kV, non-Redundant Trip Coil fail at Etiwanda	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda-Vista 230 kV, non-Redundant Trip Coil fail at Etiwanda	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Valley 500 kV No. 1, non-Redundant Trip Coil fail at Valley	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Serrano-Valley 500 kV, non-Redundant Trip Coil fail at Valley	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Valley 1AA Bank, non-Redundant Trip Coil fail at Valley	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Valley 4AA Bank, non-Redundant Trip Coil fail at Valley	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-Mirage 230 kV No. 1, non-Redundant Trip Coil fail at Mirage	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV, non-Redundant Trip Coil fail at Mirage	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Mirage-Ramon 230 kV, non-Redundant Trip Coil fail at Mirage	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Coachella Valley-Mirage 230 kV, non-Redundant Trip Coil fail at Mirage	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV, non-Redundant Trip Coil fail at Julian Hinds	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Buck Blvd-Julian Hinds 230 kV, non-Redundant Trip Coil fail at Julian Hinds	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Eagle Mtn-Julian Hinds (MWD), non-Redundant Trip Coil fail at Julian Hinds	P5.4.13d	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, non-redundant pilot relay fail, SLG near BlytheSC	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
BlytheSCE-EagleMTN 161 kV, non-redundant pilot relay fail, SLG near EagleMtn	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, non-redundant pilot relay fail, SLG near EagleMTN	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
EagleMTN-IronMTN 230 kV, non-redundant pilot relay fail, SLG near IronMtn	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV, non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV & Blythe 1CT trip (RAS), non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV, non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-EagleMTN 230 kV & Blythe 1CT trip (RAS), non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV, non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV & Blythe 1CT trip (RAS),non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV, non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage 230 kV & Blythe 1CT trip (RAS), non-redundant pilot relay fail	P5.2	Non-Redundant Relay	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Julian Hinds-Mirage & EagleMTN-IronMTN 230 kV	P6.1	N-1-1	Diverge	Diverge	No Issues	Diverge	No Issues	No Issues	ISO7720 (OP) with system adjustments after the first contingency
Julian Hinds-Mirage & EagleMTN-IronMTN 230 kV & ISO7720 (OP)	P6.1	N-1-1	Diverge	No Issues	No Issues	Diverge	No Issues	No Issues	ISO7720 (OP) with system adjustments after the first contingency
Colorado River - Red Bluff 500 kV #1 & #2	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Red Bluff 500 kV #1 & #2	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Valley 500 kV #1 & #2	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda - San Bernardino & El Casco-San Bernardino 230kV	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
San Bernardino - Vista & Devers - San Bernardino 230kV	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Colorado River - Palo Verde & Colorado River - Delaney 500 kV	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Mirage-Ramon & Coachella Valley-Mirage 230 kV	P6.1	N-1-1	No Issues	Diverge	No Issues	No Issues	No Issues	No Issues	Path 42 RAS, Blythe RAS
Mirage-Ramon & Coachella Valley-Mirage 230 kV with RAS	P6.1	N-1-1	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Mirage 230 kV #1 & #2	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Mirage 230 kV #1 & #2 with RAS	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-San Bernardino & Devers-El Casco 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers-San Bernardino & San Bernardino-El Casco 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Devers - Vista 230 kV #1 & #2	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Etiwanda-San Bernardino & San Bernardino-Vista 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Mira Loma-Vista #2 & Mira Loma-Vista #1/Vista-Wildlife 230 kV	P7.1	DCTL	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	
Coachella Valley-Ramon & Coachella Valley-Mirage 230 kV	P7.1	DCTL	Oscillations	Oscillations	No Issues	Oscillations	No Issues	No Issues	Path 42 RAS with system adjustments
Coachella Valley-Ramon & Coachella Valley-Mirage 230 kV with RAS	P7.1	DCTL	Oscillations	Oscillations	No Issues	Oscillations	No Issues	No Issues	Path 42 RAS with system adjustments
Devers Substation 500 kV Bus & AA Banks	Extreme	NA	No Issues	No Issues	No Issues	No Issues	No Issues	No Issues	

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 SP High CEC Forecast	2025 Spr Shoulder-Peak Heavy Renewable	
Valley Substation 500 kV Bus & AA Banks	Extreme	NA	No Issues	No Issues	No Issues	No Issues	No Issues	
Loss of Mountainview Generation Station	Extreme	NA	No Issues	No Issues	No Issues	No Issues	No Issues	



2023-2024 ISO Reliability Assessment - Preliminary Study Results

Study Area: **SCE Eastern area**

Single Contingency Load Drop



Worst Contingency	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2028 SP High CEC Forecast	2025 SP Heavy Renewable & Min Gas Gen	2025 Spr Shoulder-Peak Heavy Renewable	

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

Substation	Load Served (MW)												Potential Mitigation Solutions	

No single source substation with more than 100 MW

**Thermal Overloads**

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew	
24042 ELDORDO 500 26048 MCCULLGH 500 1 1	L-P6_207692_Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 Line LUGO 500.0 to MOHAVE 500.0 Circuit 1	P6*	overlapping singles			112.78		123.15				113.18			The P6 overloads could be eliminated by operational mitigation actions, such as generation curtailment and import reduction, as system adjustment after the first contingency. Stay informed on the future transmission projects to interconnect the out-of-state wind resources and modify the Lugo-Victorville RAS as needed
	L-P6_207699_Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 Line MOHAVE 500.0 to ELDORDO 500.0 Circuit 1	P6*	overlapping singles			96.1		113.46				102.02			
	L-P6_207799_Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 Line MOENKOPI 500.0 to ELDORDO 500.0 Circuit 1	P6*	overlapping singles									103.94			
24086 LUGO 500 24156 VINCENT 500 #1 or #2	L-P6_211431_Line LUGO 500.0 to VINCENT 500.0 Circuit 2/1 Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1	P6*	overlapping singles	97.78									123.18		The P6 overloads in the sensitivity case could be eliminated by operational mitigation, such as curtailing generation in the Tehachapi area and reducing import via Path 26 after the first contingency of the P6 events
24156 VINCENT 500 24386 MESA CAL 500 #1 and #2	L-P6_211254_Line LUGO 500.0 to VINCENT 500.0 Circuit 1 Line LUGO 500.0 to VINCENT 500.0 Circuit 2	P6*	overlapping singles	94.34									111.07		
24591 MW_VINCNT_11 500 24590 MW_VINCNT_12 500 1 1	L-P6_201792_Line MIDWAY 500.0 to Vincent 500.0 Circuit 2 Line MIDWAY 500.0 to Whirlwind 500.0 Circuit 3	P6*	overlapping singles	127.3								92.56	128.1		The P6 overloads with heavy Path 26 flow from north to south could be eliminated by operational mitigation actions including curtailing generation in the Tehachapi area, reducing import via Path 26, and bypassing series cap banks as needed after the first contingency of the P3/P6 events.
	L-P6_201891_Line MIDWAY 500.0 to Vincent 500.0 Circuit 2 Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3	P6*	overlapping singles	102.22074									107.08		
	L-P6_201950_Line MIDWAY 500.0 to Vincent 500.0 Circuit 2 Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1	P6*	overlapping singles	101.84577										105.3	
24593 MW_VINCNT_21 500 24592 MW_VINCNT_22 500 2 1	L-P6_201598_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line MIDWAY 500.0 to Whirlwind 500.0 Circuit 3	P6*	overlapping singles	129.7								94.46	130.5		The P6 overloads could be eliminated by operational mitigation actions including curtailing generation in the Tehachapi area, reducing import or export via Path 26, and bypassing series cap banks as needed after the first contingency of the P6 events. The existing Path 26 RAS could eliminate the power flow divergence for the simultaneous outage of Midway-Vincent #1 and #2 500 kV lines (a credible common corridor N-2 event) under operating scenarios with heavy Path 26 flow from north to south (B1 and S2). However, the
	L-P6_201697_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3	P6*	overlapping singles	105.16234									110.15		
	L-P6_201756_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line ANTELOPE 500.0 to WIRLWIND 500.0 Circuit 1	P6*	overlapping singles	104.76994										108.32	
24594 MW_WRLWND_32 500 29402 WIRLWIND 500 3 1	L-P6_219966_Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 1 Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2	P6*	overlapping singles									101.91			The P6 overloads could be eliminated by operational mitigation actions including curtailing generation in the Tehachapi area, reducing import or export via Path 26, and bypassing series cap banks as needed after the first contingency of the P6 events. The existing Path 26 RAS could eliminate the power flow divergence for the simultaneous outage of Midway-Vincent #1 and #2 500 kV lines (a credible common corridor N-2 event) under operating scenarios with heavy Path 26 flow from north to south (B1 and S2). However, the
	L-P6_201597_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line MIDWAY 500.0 to Vincent 500.0 Circuit 2	P6*	overlapping singles	171.7								131.78	173.7		

**Thermal Overloads**

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew		
	L_M_P7_P26_Line MIDWAY 500.0 to Vincent 500.0 Circuit 1 Line MIDWAY 500.0 to Vincent 500.0 Circuit 2	N-2	Always Credible Common Corridor	171.7								131.78		173.7		overload for the credible common corridor N-2 outage under operating scenario with heavy Path 26 flow from south to north (B8) requires collaboration with potential policy-driven need and grid operation.
29400 ANTELOPE 500 24156 VINCENT 500 #1 or #2	L-P6_216298_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2 or 1	P6*	overlapping singles	107.17	113.28	93.1	113.39						107.41	129.78		The P6 overloads could be eliminated by operational mitigation actions including curtailing generation in the Tehachapi area and reducing import via Path 26 after the first contingency of the P6 events
	L-P6_220006_Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2 or 1 Line WIRLWIND 500.0 to WINDHUB 500.0 Circuit 1	P6*	overlapping singles		90.1									102.29		
	L-P6_217588_Line ANTELOPE 230.0 to PARDEE 230.0 Circuit 1 Line ANTELOPE 500.0 to VINCENT 500.0 Circuit 2 or 1	P6*	overlapping singles											104.48		
29400 ANTELOPE 500 29402 WIRLWIND 500 1 1	L-P6_216299_Line VINCENT 500.0 to WIRLWIND 500.0 Circuit 3 Line ANTELOPE 500.0 to WINDHUB 500.0 Circuit 1	P6*	overlapping singles	121.98	94.05	93.18	99.97							136.8		The P6 overloads will be eliminated by the Antelope-Whirlwind 500 kV line upgrade project approved in the ISO 2022-23 TP
24801 DEVERS 500 29252 DVRS_RB_11 500 #1 or #2	L-P6_216172_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Line DEVERS 500.0 to REDBLUFF 500.0 Circuit 2 or 1	P6*	overlapping singles											105.6		The P6 overloads could be eliminated by operational mitigation actions including curtailing generation in the Eastern area and reducing import via Path 46 after the first contingency of the P6 events
	L-P6_200134_Line PALOVRDE 500.0 to Colorado 500.0 Circuit 1 Line DEVERS 500.0 to REDBLUFF 500.0 Circuit 2 or 1	P6*	overlapping singles											113.09		
	L-P6_218349_Line DEVERS 500.0 to REDBLUFF 500.0 Circuit 2 Line N.GILA 500.0 to IMPRLVLY 500.0 Circuit 1	P6*	overlapping singles	91.22										116.36		
24138 SERRANO 500 24184 serran1i 13.8 1 1	T-P6_245220_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 2SERRAN2T 13.80 Tran SERRANO 500.00 to SERRANO	P6*	overlapping singles	140.06			91.12							128.29		Previously approved 4th Serrano bank project mitigates the P6 overloads
24138 SERRANO 500 24186 serran2i 13.8 2 1	T-P6_245161_Tran SERRANO 500.00 to SERRANO 230.00 Circuit 1SERRAN1T 13.80 Tran SERRANO 500.00 to SERRANO	P6*	overlapping singles	142.7			93.42							130.74		
24156 VINCENT 500 29518 vincen1i 13.8 1 1	L-P6_228287_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Tran VINCENT 500.00 to VINCNT2 230.00 Circuit 4VINC	P6*	overlapping singles	116.04		90.9	94.52							117.5		The P6 overloads could be eliminated by dispatching available resources including energy storage and demand response in the West LA Basin after the 1st event of P6 contingency or
24156 VINCENT 500 24190 vincen2i 13.8 2 1	L-P6_228285_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Tran VINCENT 500.00 to VINCENT 230.00 Circuit 3	P6*	overlapping singles	112.9			91.71							120.75		
24156 VINCENT 500 24155 VINCENT 230 3 1	L-P6_228284_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Tran VINCENT 500.00 to VINCENT 230.00 Circuit 2VINC	P6*	overlapping singles	112.9			91.71							120.75		

Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew	
24156 VINCENT 500 29520 vincen4i 13.8 4 1	L-P6_228286_Line VINCENT 500.0 to MESA CAL 500.0 Circuit 1 Tran VINCENT 500.00 to VINCNT2 230.00 Circuit 1VINC	P6*	overlapping singles	116.04		90.9	94.52						117.5		pre-contingency for the P7 contingencies; The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed in the West LA basin.
24386 MESA CAL 500 24390 mesa4i 13.8 4 1	L-P6_224863_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 Tran MESA CAL 500.00 to MESACALS 230.00 Circuit 3MESA	P6*	overlapping singles	110.98	103.27		110.5					104.14	113.98		
	T-P6_246000_Tran MESA CAL 500.00 to MESA CAL 230.00 Circuit 2MESA2T 13.80 Tran MESA CAL 500.00 to MESACALS	P6*	overlapping singles	110.6	101.31		110.65					102.57	113.09		
24386 MESA CAL 500 24392 mesa3i 13.8 3 1	L-P6_224864_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 Tran MESA CAL 500.00 to MESACALS 230.00 Circuit 4MESA	P6*	overlapping singles	110.98	103.27		110.5					104.14	113.98		
	T-P6_246001_Tran MESA CAL 500.00 to MESA CAL 230.00 Circuit 2MESA2T 13.80 Tran MESA CAL 500.00 to MESACALS	P6*	overlapping singles	110.6	101.31		110.65					102.57	113.09		
24393 MESACALS 230 24076 LAGUBELL 230 2 1	L-P6_210269_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1	P6*	overlapping singles	109.99	102.19		114.01					102.41	107.84		
	L-P6_204452_Line CENTER 230.0 to MESACALS 230.0 Circuit 1 Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1	P6*	overlapping singles	109.93	98.36		113.26					98.23	105.96		
	L-P6_210277_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 Line MESA CAL 230.0 to REDONDO 230.0 Circuit 1	P6*	overlapping singles	102.88	97.26		108.76					97.64	101.24		
	L_M_P7_0013_Line REDONDO 230.0 to MESA CAL 230.0 Circuit 1 Line LAGUBELL 230.0 to MESACAL 230.0 Circuit 1	P7	common structure	102.88	97.26		108.76					97.64	101.24		
24016 BARRE 230 24044 ELLIS 230 1 1	L-P6_203502_Line BARRE 230.0 to ELLIS 230.0 Circuit 3 Line BARRE 230.0 to ELLIS 230.0 Circuit 4	P6*	overlapping singles	116.53											
	L_M_P7_0049_Line BARRE 230.0 to ELLIS 230.0 Circuit 3 Line BARRE 230.0 to ELLIS 230.0 Circuit 4	P7	common structure	116.53											
24016 BARRE 230 24044 ELLIS 230 2 1	L-P6_203502_Line BARRE 230.0 to ELLIS 230.0 Circuit 3 Line BARRE 230.0 to ELLIS 230.0 Circuit 4	P6*	overlapping singles	116.53											
	L_M_P7_0049_Line BARRE 230.0 to ELLIS 230.0 Circuit 3 Line BARRE 230.0 to ELLIS 230.0 Circuit 4	P7	common structure	116.53											
24016 BARRE 230 24044 ELLIS 230 3 1	L-P6_203846_Line BARRE 230.0 to ELLIS 230.0 Circuit 4 Line BARRE-W 230.0 to VILLA PK 230.0 Circuit 1	P6*	overlapping singles				105.11								
	L_M_P7_0048_Line BARRE 230.0 to ELLIS 230.0 Circuit 1 Line BARRE 230.0 to ELLIS 230.0 Circuit 2	P7	common structure	116.53											
24016 BARRE 230 24044 ELLIS 230 4 1	L-P6_203662_Line BARRE 230.0 to ELLIS 230.0 Circuit 3 Line BARRE-W 230.0 to VILLA PK 230.0 Circuit 1	P6*	overlapping singles				105.11								
	L_M_P7_0048_Line BARRE 230.0 to ELLIS 230.0 Circuit 1 Line BARRE 230.0 to ELLIS 230.0 Circuit 2	P7	common structure	116.53											
24016 BARRE 230 24154 VILLA PK 230 1 1	L-P6_203949_Line BARRE 230.0 to LEWIS 230.0 Circuit 1 Line S.ONOFRE 230.0 to SERRANO 230.0 Circuit 1	P6*	overlapping singles	105.19											
	L_P5_ab_BD_001_Serrano 500 kv East Bus	P5	non-redundant component	111.95			111.13						103.53		

Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew	
24021 CENTER 230 24393 MESACALS 230 1 1	L-P6_210327_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2	P6*	overlapping singles	110.46			109.67						103.05		The existing El Nido RAS can eliminate the LA CIENEGA - LA FRESA 230 kV line overload for the P7 contingency. The P6 and other P7 overloads could be eliminated by dispatching available resources including energy storage and demand response in the West LA Basin after the 1st event of P6 contingency and pre-contingency for the P7 contingencies; The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed in the West LA basin. Further coordination with SCE protection engineer is required to address the P5 overloads. Previously approved transmission projects can mitigate all of these concerns in the long-term.
	L-P6_217223_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2 Line MESACALS 230.0 to WALNUT 230.0 Circuit 1	P6*	overlapping singles	102.7			99.48						104.56		
	L-P6_229132_Line MESACALS 230.0 to LAGUBELL 230.0 Circuit 2 Tran MESA CAL 500.00 to MESA CAL 230.00 Circuit 2MESA	P6*	overlapping singles	106.27			105.76						98.43		
	L-P6_206030_Line DELAMO 230.0 to LAGUBELL 230.0 Circuit 1 Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1	P6*	overlapping singles	101.06											
	L_M_P7_0012_Line LITEHIPE 230.0 to MESA CAL 230.0 Circuit 1 Line DELAMO 230.0 to LAGUBELL 230.0 Circuit 1	P7	common structure	101.06											
24025 CHINO 230 25656 MIRALOME 230 #3	L-P6_204597_Line CHINO 230.0 to MIRALOMW 230.0 Circuit 1 Line CHINO 230.0 to MIRALOMW 230.0 Circuit 2	P6*	overlapping singles	108.36									92.33		
	L_M_P7_0047_Line CHINO 230.0 to MIRALOMW 230.0 Circuit 1 Line CHINO 230.0 to MIRALOMW 230.0 Circuit 2	P7	common structure	108.36									92.33		
24030 BARRE-W 230 24044 ELLIS 230 #1 or #2	L-P6_204028_Line BARRE 230.0 to LEWIS 230.0 Circuit 1 Line BARRE-W 230.0 to ELLIS 230.0 Circuit 2 or 1	P6*	overlapping singles		108.15		124.54						103.49		
24029 DELAMO 230 24016 BARRE 230 1 1	L_P5_ab_BD_001_Serrano 500 kv East Bus	P5	non-redundant component	107.29									91.04		
24044 ELLIS 230 24134 SANTIAGO 230 1 1	L-P6_207975_Line ELLIS 230.0 to JOHANNA 230.0 Circuit 1 Line N.GILA 500.0 to IMPRLVLY 500.0 Circuit 1	P6*	overlapping singles	111.99	94.76								109.57		
	L-P6_207941_Line ELLIS 230.0 to JOHANNA 230.0 Circuit 1 Line VIEJO 230.0 to CHINO 230.0 Circuit 1	P6*	overlapping singles	111.21									97.46		
	L-P6_207882_Line ELLIS 230.0 to JOHANNA 230.0 Circuit 1 Line S.ONOFRE 230.0 to SERRANO 230.0 Circuit 1	P6*	overlapping singles	111.04									97.25		
24082 LCIENEGA 230 24074 LA FRESA 230 1 1	L-P6_206679_Line EL NIDO 230.0 to LA FRESA 230.0 Circuit 3 Line EL NIDO 230.0 to LA FRESA 230.0 Circuit 4	P6*	overlapping singles		92.31		124.12	101.34					95.03		
	L_M_P7_0041_Line LA FRESA 230.0 to EL NIDO 230.0 Circuit 3 Line LA FRESA 230.0 to EL NIDO 230.0 Circuit 4	P7	common structure		92.31		124.12	101.34					95.03		
24084 LITEHIPE 230 24091 MESA CAL 230	L-P6_210277_Line LAGUBELL 230.0 to MESA CAL 230.0 Circuit 1 Line MESA CAL 230.0 to REDONDO 230.0 Circuit 1	P6*	overlapping singles	107.03	97.45		105.75						97.11	107.67	
	L-P6_209842_Line LA FRESA 230.0 to LAGUBELL 230.0 Circuit 1 Line MESA CAL 230.0 to REDONDO 230.0 Circuit 1	P6*	overlapping singles	96.86	90.13		101.6						90.21	97.72	



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLo ad	S2: 2025 SP Sensitivity_HIRe new	S3: 2025 OP Sensitivity_HIRe new	
No P1 or P3 contingency resulted in low or high voltage violation																



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)								Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				B1: 2025 Summer Peak	B2: 2028 Summer Peak	B3: 2035 Summer Peak	B4: 2028 Summer-Off Peak	B5: 2035 Winter Peak	B6: 2025 Spring Off-Peak	B7: 2028 Spring Off-Peak	B8: 2035 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S2: 2025 SP Sensitivity_HiRenew	S3: 2025 OP Sensitivity_HiRenew	
No P1 or P3 contingency resulted in load deviation more than 8%															

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
01_Lugo500kV--P1.3: 3PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Victorville 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
02_IV500kV--P1.3: 3PH 4 cycle fault at Imperial Valley 500kV w/ loss of Imperial Valley-North Gila 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
03_PV500kV--P1.1: 3PH 4 cycle fault at Palo Verde w/ loss of Palo Verde Unit No.1	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
04_Sant230kV--P1.1: 3PH 4 cycle fault at Santiago 230 kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
05_Eldorado230kV--P1.3: 3PH 4 cycle fault at Eldorado 230 kV w/ loss of Cima-Eldorado-Pisgah No.1 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
06_Pisgah230kV--P1.3: 3PH 4 cycle fault at Pisgah 230 kV w/ loss of Cima-Eldorado-Pisgah No.1 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
07_Lugo230kV--P1.3: 3PH 4 cycle fault at Lugo 230 kV w/ loss of Lugo-Pisgah No.2 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
08_Pisgah230kV--P1.3: 3PH 4 cycle fault at Pisgah 230 kV w/ loss of Lugo-Pisgah No.2 230 kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
09_Vincent500kV--P1.2: 3PH 4 cycle fault at Vincent 500kV w/ loss of Vincent-Whirlwind 500kV & series cap bypass of MW_Vincent_12-Vincent 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
10_Whirlwind500kV--P1.2: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Windhub-Whirlwind 500kV & series cap bypass of MW_Wrlwind_32-Wirlwind 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
11_Whirlwind500kV--P1.2: 3PH 4 cycle fault at Whirlwind 500kV w/ loss of Antelope-Whirlwind 500kV & series cap bypass of MW_Wrlwind_32-Wirlwind 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
12_Eldorado500kV--P1.2: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Mohave 500kV & series cap bypass of Eldordo-Eld_Lugo_11 500kV	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
13_Eldorado500kV--P1.2: 3PH 4 cycle fault at Eldorado 500kV w/ loss of Eldorado-Mohave 500kV & Lugo-Mohave 500kV line shunt	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
14_Miraloma500kV--P1.2: 3PH 4 cycle fault at Miraloma 500kV w/ loss of Miraloma-Serrano No.2 500kV & EastTS-MiraLoma 500kV line shunt	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
15_Valley500kV--P1.2: 3PH 4 cycle fault at Valley 500kV w/ loss of Alberhill-Valley 500kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
16_RanchoVista500kV--P1.2: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Rancho Vista-Serrano 500kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
17_Serrano500kV--P1.2: 3PH 4 cycle fault at Serrano 500kV w/ loss of Mira Loma-Serrano 500kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
18_Santiago230kV--P1.2: 3PH 4 cycle fault at Santiago 230kV w/ loss of San Onofre-Santiago No.1 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
19_SanOnofre230kV--P1.2: 3PH 4 cycle fault at San Onofre 230kV w/ loss of San Onofre-Santiago No.2 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
20_Johanna230kV--P1.2: 3PH 4 cycle fault at Johanna 230kV w/ loss of Johanna-Santiago 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
21_Ellis230kV--P1.2: 3PH 4 cycle fault at Ellis 230kV w/ loss of Ellis-Santiago 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
22_SanOnofre230kV--P1.2: 3PH 4 cycle fault at San Onofre 230kV w/ loss of San Onofre-Viejo 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
23_Viejo230kV--P1.2: 3PH 4 cycle fault at Viejo 230kV w/ loss of Chino-Viejo 230kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
24_N.Gila500kV--P1.2: 3PH 4 cycle fault at N.Gila 500kV w/ loss of Hoodoo Wash-N.Gila 500kV w/ loss of Santiago Synchronous Condensers	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
25A_Valley500kV--P1.2: 3PH 4 cycle fault at Valley 500kV w/ loss of Serrano-Valley 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
25B_Valley500kV--P1.2: 3PH 4 cycle fault at Valley 500kV w/ loss of Alberhill-Valley 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
26_RanchoVista500kV--P1.2: 3PH 4 cycle fault at Rancho Vista 500kV w/ loss of Rancho Vista-Serrano 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
27_Serrano500kV--P1.2: 3PH 4 cycle fault at Serrano 500kV w/ loss of Mira Loma-Serrano 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
28_Devers500kV--P1.2: 3PH 4 cycle fault at Devers 230kV w/ loss of Devers-Valley No.2 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
29_Devers500kV--P1.2: 3PH 4 cycle fault at Devers 500kV w/ loss of Devers-Red Bluff No.2 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
30_N.Gila500kV--P1.2: 3PH 4 cycle fault at N.Gila 500kV w/ loss of Hoodoo Wash-N.Gila 500kV including loss of Devers SVCs & Cap Bank	P1	Single Contingency	stable	stable	stable	stable	stable	criteria met
31_Vincent500kV--P2.3: 1PH 4 cycle fault at Vincent 500kV w/ loss of Mesa-Vincent 500kV & Midway-Vincent No.2 500kV w/ series cap bypass of MW_Vincent_12-Vincent500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
32_Vincent500kV--P2.3: 1PH 4 cycle fault at Vincent 500kV w/ loss of Antelope-Vincent No.1 500kV & Lugo-Vincent No.2 500kV w/ series cap bypass of MW_Vincent_22-Vincent500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
33_Whirlwind500kV--P2.3: 1PH 4 cycle fault at Vincent 500kV w/ loss of Midway-Whirlwind 500kV & Vincent-Whirlwind 500kV w/ series cap bypass of MW_Vincent_12-Vincent500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
34_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Rancho Vista 500kV & Lugo-Vincent No.1 500kV w/ series cap bypass of Eld_Lugo_14-Lugo500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
35_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Vincent No.2 500kV & Lugo-Victorville 500kV w/ series cap bypass of Lugo-Lgo_Mohve_11_500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
36_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Mira Loma No.2 500kV & Eldorado-Lugo 500kV w/ series cap bypass of Lugo-Lgo_Mohve_11_500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
37_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Mira Loma No.3 500kV & Lugo-Mohave 500kV w/ series cap bypass of Eld_Lugo_14-Lugo500kV	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
38_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Rancho Vista 500kV & Lugo-Vincent No.1 500kV w/ loss of Eld_Lugo_14-Lugo500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
39_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Vincent No.2 500kV & Lugo-Victorville 500kV w/ loss of Lugo-Lgo_Mohve_11_500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
40_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Miraloma No.2 500kV & Eldorado-Lugo 500kV w/ loss of Lugo-Lgo_Mohve_11 500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
41_Lugo500kV--P2.3: 1PH 4 cycle fault at Lugo 500kV w/ loss of Lugo-Miraloma No.3 500kV & Lugo-Mohave 500kV w/ loss of Eld_Lugo_14-Lugo500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
42_Miraloma500kV--P2.3: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mira Loma-Rancho Vista 500kV & Mira Loma-Serrano No.1 500kV w/ loss of EastTS-MiraLoma 500kV line shunt	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
43_Santiago230kV--P2.3: 1PH 4 cycle fault at Santiago 230kV w/ loss of Ellis-Santiago 230kV & San Onofre-Santiago No.2 230kV & loss of Santiago Synchronous Condensers	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
44_Devers500kV--P2.3: 1PH 4 cycle fault at Devers 500kV w/ loss of Devers-Red Bluff No.1 500kV & Devers-Valley No.1 500kV including loss of Devers SVCs & Cap Bank	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
45_Miraloma500kV--P2.3: 1PH 4 cycle fault at Mira Loma 500kV w/ loss of Mira Loma-Rancho Vista 500kV & Mira Loma-Serrano No.1 500kV including loss of Devers SVCs & Cap Bank	P2	Internal Breaker Fault	stable	stable	stable	stable	stable	criteria met
46_Sylmar230kV--P4: 3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Gould-Sylmar 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
47_Sylmar230kV--P4: 3Ph line fault on Pardee-Sylmar No.2 230 kV with stuck breaker at Sylmar followed by loss of Eagle Rock-Sylmar 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
48_Sylmar230kV--P4: 3Ph line fault on Gould-Sylmar 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
49_Sylmar230kV--P4: 3Ph line fault on Eagle Rock-Sylmar 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
50_Sylmar230kV--P4: 3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
51_Sylmar230kV--P4: 3Ph line fault on Pardee-Sylmar No.2 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
52_Sylmar230kV--P4: 1-Ph fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'E'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
53_Sylmar230kV--P4: 1-Ph line fault on Sylmar Bank 'G' 230 kV with stuck breaker at Sylmar followed by loss of Sylmar Bank 'F'	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
54_Devers500kV--P4: 3Ph line fault on Devers-Red Bluff No.1 500 kV with stuck breaker at Devers followed by loss of Devers-Valley No.1 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
55_Lugo500kV--P4: 3Ph line fault on Lugo-Rancho Vista 500 kV with stuck breaker at Lugo followed by loss of Lugo-Vincent No.1 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
56_Lugo500kV--P4: 3Ph line fault on Lugo-Vincent No.2 500 kV with stuck breaker at Lugo followed by loss of Lugo-Victorville 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
57_MiraLoma500kV--P4: 3Ph line fault on Mira Loma-Rancho Vista 500 kV with stuck breaker at Mira Loma followed by loss of Mira Loma-Serrano No.1 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
58_MiraLoma230kV--P4: 3Ph line fault on Mira Loma-Walnut 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
59_MiraLoma230kV--P4: 3Ph line fault on Mira Loma-Olinda 230 kV with stuck breaker at Mira Loma followed by loss of Chino-Mira Loma No.3 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
60_MiraLoma230kV--P4: 3Ph line fault on Mira Loma-Rancho Vista No.1 230 kV with stuck breaker at Mira Loma followed by loss of Mira Loma-Vista No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
61_RanchoVista230kV--P4: 3Ph line fault on Etiwanda-Rancho Vista No.1 230 kV with stuck breaker at Rancho Vista followed by loss of Mira Loma-Rancho Vista No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
62_RanchoVista230kV--P4: 3Ph line fault on Padua-Rancho Vista No.1 230 kV with stuck breaker at Rancho Vista followed by loss of Etiwanda-Rancho Vista No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
63_Serrano230kV--P4: 3Ph line fault on Chino-Serrano 230 kV with stuck breaker at Serrano followed by loss of Lewis-Serrano No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
64_Serrano230kV--P4: 3Ph line fault on Lewis-Serrano No.2 230 kV with stuck breaker at Serrano followed by loss of SONGS-Serrano 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
65_Vincent500kV--P4: 3Ph line fault on Mesa-Vincent 500 kV with stuck breaker at Vincent followed by loss of Midway-Vincent No.2 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
66_Vincent500kV--P4: 3Ph line fault on Antelope-Vincent No.1 500 kV with stuck breaker at Vincent followed by loss of Lugo-Vincent No.2 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
67_Vincent230kV--P4: 3Ph line fault on Mesa-Vincent No.2 230 kV with stuck breaker at Vincent followed by loss of Santa Clara-Vincent 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
68_Vincent230kV--P4: 3Ph line fault on Pardee-Vincent No.1 230 kV with stuck breaker at Vincent followed by loss of Mesa-Vincent No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
69_Whirlwind500kV--P4: 3Ph line fault on Midway-Whirlwind 500 kV with stuck breaker at Whirlwind followed by loss of Vincent-Whirlwind 500 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
70_Chino230kV--P4: 3Ph line fault on Chino-Viejo 230 kV with stuck breaker at Chino followed by loss of Chino-Serrano 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
71_Ellis230kV--P4: 3Ph line fault on Barre-Ellis No.2 230 kV with stuck breaker at Ellis followed by loss of Ellis-Santiago 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
72_Ellis230kV--P4: 3Ph line fault on Ellis-Johanna 230 kV with stuck breaker at Ellis followed by loss of Barre-Ellis No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
73_Goodrich230kV--P4: 3Ph line fault on Goodrich-Gould 230 kV with stuck breaker at Goodrich followed by loss of Goodrich-Mesa 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
74_Hinson230kV--P4: 3Ph line fault on Hinson-Lighthipe 230 kV with stuck breaker at Hinson followed by loss of Hinson-Harborgren 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
75_Olinda230kV--P4: 3Ph line fault on Olinda-Walnut 230 kV with stuck breaker at Olinda followed by loss of Mira Loma-Olinda 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
76_RioHondo230kV--P4: 3Ph line fault on Mesa-Rio Hondo No.2 230 kV with stuck breaker at Rio Hondo followed by loss of Rio Hondo-Vincent No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			B2: 2028 Summer Peak	B3: 2035 Summer Peak	B6: 2025 Spring Off-Peak	S1: 2028 SP Sensitivity_HiLoad	S3: 2025 OP Sensitivity_HiRenew	
77_SantaClara230kV--P4: 3Ph line fault on Moorpark-Santa Clara No.1 230 kV with stuck breaker at Santa Clara followed by loss of Goleta-Santa Clara No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
78_SantaClara230kV--P4: 3Ph line fault on Goleta-Santa Clara No.2 230 kV with stuck breaker at Santa Clara followed by loss of Moorpark-Santa Clara No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
79_Santiago230kV--3Ph line fault on SONGS-Santiago No.2 230 kV with stuck breaker at Santiago followed by loss of Ellis-Santiago 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
80_Pardee230kV--P4: 3Ph line fault on Bailey-Pardee 230 kV with stuck breaker at Pardee followed by loss of Pardee-Vincent No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
81_Pardee230kV--P4: 3Ph line fault on Pardee-Vincent No.2 230 kV with stuck breaker at Pardee followed by loss of Pardee-Pastoria 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
82_Pardee230kV--P4: 3Ph line fault on Pardee-Santa Clara 230 kV with stuck breaker at Pardee followed by loss of Pardee-Pastoria-Warne 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
83_Pardee230kV--P4: 3Ph line fault on Moor Park-Pardee No.2 230 kV with stuck breaker at Pardee followed by loss of Pardee-Sylmar No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
84_Pardee230kV--P4: 3Ph line fault on Pardee-Sylmar No.1 230 kV with stuck breaker at Pardee followed by loss of Moor Park-Pardee No.3 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
85_VillaPark230kV--P4: 3Ph line fault on Barre-Villa Park 230 kV with stuck breaker at Villa Park followed by loss of Serrano-Villa Park No.1 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
86_Lewis230kV--P4: 3Ph line fault on Barre-Lewis 230 kV with stuck breaker at Lewis followed by loss of Lewis-Serrano No.2 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met
87_Lewis230kV--P4: 3Ph line fault on Lewis-Serrano No.1 230 kV with stuck breaker at Lewis followed by loss of Lewis-Villa Park 230 kV	P4	stuck breaker	stable	stable	stable	stable	stable	criteria met

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

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

2023-2024 ISO Reliability Assessment - Preliminary Study Results

Study Area: **SCE Main**

Single Source Substation with more than 100 MW Load



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

No single source substation with more than 100 MW



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)							Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 SP with Forecasted Load Addition	2028 SP with Forecasted Load Addition	2025 OP BESS Charging	
Amargosa 230/138kV Transformer	Innovation-Desert View 230kV and Trout Canyon-Sloan Canyon 230kV lines	P6	N-1-1	110.86	<100	<100	<100	<100	<100	<100	102.33	<100	Diverge	Short term: Generation redispatch after the first contingency Long term: Previously approved GLW Core Upgrade
Amargosa-Sandy 138kV Line	Trout Canyon-Sloan Canyon 500kV Nos.1&2 lines	P7	DCTL	N/A	<100	101.07	<100	N/A	<100	Divergence	N/A	<100	N/A	Future Trout Canyon RAS, trip 1,450MW installed capacity generation at Trout Canyon 230kV
IS Tap-Northwest 138kV Line	Northwest-Desert View 230kV Nos.1&2 lines	P7	DCTL	N/A	<100	<100	<100	N/A	<100	112.2	N/A	<100	N/A	Future Desert View RAS trip 300MW installed capacity generation at Desert View and Innovation
	Innovation-Desert View 230kV Nos.1&2 lines	P7	DCTL	N/A	<100	<100	<100	N/A	<100	100.3	N/A	<100	N/A	Future Desert View RAS trip 300MW installed capacity generation at Innovation
	Trout Canyon-Sloan Canyon 500kV Nos.1&2 lines	P7	DCTL	N/A	<100	100.2	<100	N/A	<100	Divergence	N/A	<100	N/A	Future Trout Canyon RAS, trip 1,450MW installed capacity generation at Trout Canyon 230kV
	Innovation-Desert View 230kV and Trout Canyon-Sloan Canyon 230kV lines	P6	N-1-1	175.61	<100	<100	<100	<100	<100	<100	163.33	<100	Diverge	Short term: Generation redispatch after the first contingency Long term: Previously approved GLW Core Upgrade
	Pahrump-Vista 138kV line and Innovation 230/138kV transformer	P6	N-1-1	<100	<100	<100	<100	<100	<100	114.77	<100	<100	<100	Generation redispatch after the first contingency
VEA PST-IS Tap 138kV Line	Northwest-Desert View 230kV Nos.1&2 lines	P7	DCTL	N/A	<100	<100	<100	N/A	<100	118.71	N/A	<100	N/A	Future Desert View RAS trip 300MW installed capacity generation at Desert View and Innovation
	Innovation-Desert View 230kV Nos.1&2 lines	P7	DCTL	N/A	<100	<100	<100	N/A	<100	106.84	N/A	<100	N/A	Future Desert View RAS trip 300MW installed capacity generation at Innovation
	Trout Canyon-Sloan Canyon 500kV Nos.1&2 lines	P7	DCTL	N/A	<100	108.48	<100	N/A	<100	Divergence	N/A	<100	N/A	Future Trout Canyon RAS, trip 1,450MW installed capacity generation at Trout Canyon 230kV
	Pahrump-Vista 138kV line and Innovation 230/138kV transformer	P6	N-1-1	N/A	<100	<100	<100	N/A	<100	120.9	N/A	<100	N/A	Short term: Generation redispatch after the first contingency Long term: Previously approved GLW Core Upgrade
Remaining Pahrump 230/138kV Transformer	One Pahrump 230/138kV transformer and Gamebird 230/138kV transformer	P6	N-1-1	<100	<100	120.53	<100	<100	<100	<100	<100	<100	<100	Existing UVLS scheme
Gamebird 230/138kV Transformer	Pahrump-Gamebird 230kV and Trout Canyon-Sloan Canyon 230kV lines	P6	N-1-1	132.01	<100	<100	<100	<100	<100	<100	131.98	<100	<100	Short term: Generation redispatch after the first contingency Long term: Previously approved GLW Core Upgrade
Gamebird-Pahrump 138kV Line	Pahrump-Gamebird 230kV and Trout Canyon-Sloan Canyon 230kV lines	P6	N-1-1	109.4	<100	<100	<100	<100	<100	<100	106.32	<100	<100	Short term: Generation redispatch after the first contingency Long term: Previously approved GLW Core Upgrade
Sloan Canyon 500/230kV Transformer	Sloan Canyon-Eldorado 500kV and Sloan Canyon-Harry Allen 500kV lines	P6	N-1-1	N/A	<100	<100	<100	N/A	<100	104.22	N/A	<100	N/A	Generation redispatch after the first contingency
Remaining Trout Canyon 500/230kV Transformer	Loss of the other two Trout Canyon 500/230kV transformers	P6	N-1-1	N/A	<100	<100	<100	N/A	<100	106.35	N/A	<100	N/A	Generation redispatch after the first contingency



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	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 SP with Forecasted Load Addition	2028 SP with Forecasted Load Addition		2025 OP BESS Charging

No P1 or P3 contingencies resulted in voltage deviation greater than 8%

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2028 SP with Forecasted Load Addition	2025 OP BESS Charging	
Amargosa-Sandy 138kV (fault at Amargosa)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Pahrump-Vista 138kV (fault at Pahrump)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Pahrump-Gamebird 138kV (fault at Pahrump)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Vista-Johnnie-Valley 138kV (fault at Vista)	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Vista-Johnnie 230kV (fault at Vista)	P1	Normal clearing	Stable/WECC criteria met	Unstable	N/A	Stable/WECC criteria met	N/A	Under review with PTO
Vista-Pahrump 230kV (fault at Vista)	P1	Normal clearing	Stable/WECC criteria met	Unstable	N/A	Stable/WECC criteria met	N/A	Under review with PTO
Lathrop Wells-Valley TP 230kV (fault at Lathrop Wells)	P1	Normal clearing	Stable/WECC criteria met	Unstable	N/A	Stable/WECC criteria met	N/A	Under review with PTO
Lathrop Wells 138kV bus fault	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Sandy 138kV bus fault	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Valley 138kV bus fault	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Valley Switch 138kV bus fault	P1	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Gamebird-Sandy & Thousandaire-Gamebird 138kV	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Gamebird-Pahrump 138kV & Gamebird 230/138kV transformer	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Pahrump-Innovation & Pahrump-Gamebird 230kV	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Nwest-Desert View & Pahrump-Gamebird 230kV	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Sloan Canyon-Eldorado & Sloan Canyon-Mead 230kV	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	No Issues
Pahrump-Vista 138kV & Pahrump-Gamebird 138kV	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 Issues
Pahrump 230/138kV No.2 & Pahrump-Vista 138kV	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 Issues
Pahrump 230/138kV No.1 & Pahrump-Gamebird 138kV	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 Issues
Pahrump 230/138kV No.1 & Pahrump-Gamebird 230kV	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 Issues
Pahrump 230/138kV No.2 & Pahrump-Vista 230kV	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 Issues
Pahrump-Gamebird 230kV No.2 & Trout Canyon-Gamebird 230kV No.2	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 Issues
Sloan Canyon 500/230kV transformer & Sloan Canyon-Eldorado 230kV	P4.2	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Innovation-Desert View 230kV No.1 & Innovation 230/138kV transformer	P4.2	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Innovation-Johnnie 230kV No.1 & Innovation 230/138kV transformer	P4.2	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Sloan Canyon-Eldorado 500kV & Trout Canyon-Sloan Canyon 500kV No.1	P4.2	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Sloan Canyon-Harry Allen 500kV & Trout Canyon-Sloan Canyon 500kV No.2	P4.2	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Trout Canyon 500/230kV No.1&Trout Canyon-Sloan Canyon 500kV No.1	P4.2	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Trout Canyon 500/230kV No.2 & Trout Canyon-Gamebird 230kV No.2	P4.2	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Johnnie-Pahrump 230kV & Johnnie-Innovation 230kV	P4.2	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Johnnie-Vista 230kV & Johnnie-Valley TP 230kV	P4.2	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Valley TP-Lathrop Wells 230kV & Valley TP-Johnnie 230kV	P4.2	Stuck breaker	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Pahrump-Gamebird 230kV Nos.1&2	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Innovation-Desert View 230kV Nos.1&2	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Trout Canyon-Sloan Canyon 500kV Nos.1&2	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Trout Canyon-Gamebird 230kV Nos.1&2	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Desert View-Northwest 230kV Nos.1&2	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Innovation-Johnnie 230kV Nos.1&2	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Valley TP-Johnnie 230kV Nos.1&2	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Valley TP-Lathrop Wells 230kV Nos.1&2	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	N/A	Stable/WECC criteria met	N/A	No Issues
Pahrump-Gamebird 230kV & Pahrump-Gamebird 138kV	P7	Normal clearing	N/A	N/A	Stable/WECC criteria met	N/A	Stable/WECC criteria met	No Issues
Pahrump-Gamebird 230kV & Gamebird-Sandy 138kV	P7	Normal clearing	N/A	N/A	Stable/WECC criteria met	N/A	Stable/WECC criteria met	No Issues
Pahrump-Innovation 230kV & Pahrump-Vista 138kV	P7	Normal clearing	N/A	N/A	Stable/WECC criteria met	N/A	Stable/WECC criteria met	No Issues
Pahrump-Innovation 230kV & Vista-ValleySS 138kV	P7	Normal clearing	N/A	N/A	Stable/WECC criteria met	N/A	Stable/WECC criteria met	No Issues
Desert View 230kV	P5	Non-redundant Relay	N/A	N/A	Stable/WECC criteria met	N/A	Stable/WECC criteria met	No Issues

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions	
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 SP with Forecasted Load Addition	2028 SP with Forecasted Load Addition	2025 OP BESS Charging		

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

2023-2024 ISO Reliability Assessment - Study Results

Study Area: **Valley Electric Association**

Single Source Substation with more than 100 MW Load



Substation	Load Served (MW)										Potential Mitigation Solutions
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 SP with Forecasted Load Addition	2028 SP with Forecasted Load Addition	2025 OP BESS Charging	

No single source substation with more than 100 MW

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast	
22886 SUNCREST 230 22832 SYCAMORE 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL23055_Line SCR-SX 230kV ck 2	P6	N-1-1	118.3	125.9	< 100	145.8	< 100	< 100	< 100	< 100	130.2	115.0	127.1	On the short and medium terms, rely on the existing TL23054/ TL23055 RAS, along with the 30-minute short-term emergency ratings of the 230 kV lines (30% higher than their continuous ratings), to allow the market and operators to bring down the overloads that do not exceed 130% for the P6 contingencies within the continuous ratings in 30 minutes as operational mitigation measures. These could involve system adjustments, such as reducing generation output in the greater Imperial Valley area, dispatching conventional gas generation, preferred resources, and battery energy storage in the San Diego area, adjusting the Imperial Valley phase shifting transformers, and bypassing the series capacitor banks in the 500 kV transmission lines between Hassayampa and North Gila as needed. The use of energy storage is marginally adequate to mitigate the reliability concern in the ten-year horizon, as there would be sufficient energy capability (MWh) and could be fully charged to serve the peak load which lasts around four hours.
	TL50001_Line ECO-ML 500kV ck 1 AND TL23055+RAS_Line SCR-SX 230kV ck 2 + RAS	P6	N-1-1	< 100	106.3	< 100	118.4	< 100	< 100	< 100	< 100	< 100	< 100	107.4	
22886 SUNCREST 230 22832 SYCAMORE 230 2 1	TL50001_Line ECO-ML 500kV ck 1 AND TL23054_Line SCR-SX 230kV ck 1	P6	N-1-1	118.3	126.0	< 100	145.8	< 100	< 100	< 100	< 100	130.2	115.0	127.1	The ISO approved "Miguel-Sycamore Canyon 230 kV line Loop-in to Suncrest" project (ISD 2032) solves this reliability issue in the long term.
	TL50001_Line ECO-ML 500kV ck 1 AND TL23054+RAS_Line SCR-SX 230kV ck 1 + RAS	P6	N-1-1	< 100	106.3	< 100	118.4	< 100	< 100	< 100	< 100	< 100	< 100	107.4	
22886 SUNCREST 230 22888 SNCRSMP1 500 1 1	SCR_BK81_Trans SCR 500/230kV ck 2 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	109.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	On the short and medium terms, rely on the 24-hr emergency ratings of the Suncrest banks (if necessary, the 30-min emergency rating may also be utilized). If this is not enough to mitigate the overloads, congestion management and additional system adjustments can be used after the first contingency for the P6 events. The system adjustments and mitigation solutions would be similar to the ones described above for the TL23054/TL23055 Suncrest – Sycamore Canyon overload issues.
22886 SUNCREST 230 22889 SNCRSMP2 500 1 1	SCR_BK80_Trans SCR 500/230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	109.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	The ISO approved "Miguel-Sycamore Canyon 230 kV line Loop-in to Suncrest" project (ISD 2032) solves this reliability issue in the long term since it includes a third Suncrest 500/230 kV bank.
22464 MIGUEL 230 22468 MIGUEL 500 2 1	ML_BK80_Trans ML 500/230kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	101.0	107.4	< 100	127.1	< 100	< 100	< 100	< 100	114.9	< 100	108.4	On the short and medium terms, rely on the existing Miguel BK 80/81 RAS, along with the use of the 24-hr emergency ratings of the Miguel banks (if necessary, the 30-min emergency rating may also be utilized). If this is not enough to mitigate the overloads, congestion management and additional system adjustments can be used after the first contingency for the P6 events. The system adjustments and mitigation solutions would be similar to the ones described above for the TL23054/TL23055 overload issues.
	ML_BK80+RAS_Trans ML 500/230kV ck 1 + RAS AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	103.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22464 MIGUEL 230 22472 MIGUELMP 500 1 1	ML_BK81_Trans ML 500/230kV ck 2 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	101.8	108.9	< 100	128.6	< 100	< 100	< 100	< 100	116.0	< 100	109.9	The ISO approved "Miguel-Sycamore Canyon 230 kV line Loop-in to Suncrest" project (ISD 2032) solves this reliability issue in the long term since it includes a third Miguel 500/230 kV bank.
	ML_BK81+RAS_Trans ML 500/230kV ck 2 + RAS AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	105.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22356 IMPRLVLY 230 22357 IV PFC1 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	100.2	106.1	< 100	118.0	< 100	< 100	< 100	< 100	110.1	< 100	107.2	On the short and medium terms, rely on existing TL50001 Gen Drop RAS or TL50003 Gen Drop RAS. If this is not enough to mitigate the overloads, congestion management and additional system adjustments can be used after the first contingency for the P6 events. The system adjustments and mitigation
22357 IV PFC1 230 22358 IV PFC 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	115.1	122.5	< 100	135.7	< 100	< 100	< 100	< 100	124.0	112.2	123.7	
	TL50001_Line ECO-ML 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	< 100	< 100	< 100	103.7	< 100	< 100	< 100	< 100	< 100	< 100	100.4	
	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	115.1	122.5	< 100	135.7	< 100	< 100	< 100	< 100	124.0	112.2	123.7	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)									Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast		
22357 IV PFC1 230 22358 IV PFC 230 2 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	< 100	< 100	< 100	103.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.4	solutions would be similar to the ones described above for the TL23054/TL23055 overload issues.  The ISO approved "Imperial Valley-North of SONGS 500 kV Line and Substation" project (ISD 2034) solves this reliability issue in the long term.
22358 IV PFC 230 20118 ROA-230 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	100.2	106.1	< 100	118.0	< 100	< 100	< 100	< 100	< 100	110.1	< 100	107.2	
22609 OTAYMESA 230 20149 TJI-230 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	128.2	134.9	< 100	149.0	< 100	< 100	< 100	< 100	< 100	138.2	125.6	136.2	Rely on existing 230 kV Otay Mesa Gen Drop RAS or congestion management after the first contingency for the P6 events.
	TL50001_Line ECO-ML 500kV ck 1 AND TL50003+GEN_DROP_RAS_Line OCO-SCR 500kV ck 1 + GEN DROP RAS	P6	N-1-1	103.2	110.5	< 100	115.6	< 100	< 100	< 100	< 100	< 100	100.1	< 100	111.8	
	TL23042_Line BB-OM-ML 230kV ck 1 AND TL23041_Line SX-OM-ML 230kV ck 1	P6	N-1-1	104.4	103.8	103.9	< 100	103.5	104.0	< 100	< 100	< 100	< 100	< 100	103.8	
	TL23041+23042_Lines SX-OM-ML 230kV ck 1 + BB-OM-ML 230kV ck 1	P7	DCTL	104.4	103.8	103.9	< 100	103.6	104.0	< 100	< 100	< 100	< 100	< 100	103.8	
22464 MIGUEL 230 22467 MLSXTAP 230 1 1	TL23042_Line BB-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	118.2	121.1	101.7	< 100	< 100	104.8	< 100	< 100	< 100	< 100	< 100	121.8	Rely on existing TL23041/TL23042 RAS. The 30-min emergency rating (6.8% higher than their normal rating) may also be utilized when RAS is not sufficient to mitigate the overloads, giving the market and operators enough time to eliminate the identified thermal overloads. The system adjustment that can be implemented is to reduce remaining generation output in Otay Mesa.
22609 OTAYMESA 230 22467 MLSXTAP 230 1 1	TL23042_Line BB-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	119.8	121.9	100.7	< 100	< 100	108.4	< 100	< 100	< 100	< 100	< 100	122.5	
	TL23042+RAS_Line BB-OM-ML 230kV ck 1 + RAS AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	101.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.4	
22609 OTAYMESA 230 22466 MLMS3TAP 230 1 1	TL23041_Line SX-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	120.7	122.9	101.9	< 100	< 100	109.1	< 100	< 100	< 100	< 100	< 100	123.5	
	TL23041+RAS_Line SX-OM-ML 230kV ck 1 + RAS AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	101.0	103.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.6	
22430 SILVERGT 230 22596 OLD TOWN 230 1 1	TL23028_Line SG-MS-OT 230kV ck 1 AND TL23071_Line SX-PQ 230kV ck 1	P6	N-1-1	101.9	102.5	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.1	< 100	102.6	Rely on 2-hr short-term emergency ratings for TL23028A and TL23029 (29% higher than their normal ratings), giving the market and operators enough time to eliminate the identified thermal overloads. The system adjustments that can be implemented are to reduce generation output in Otay Mesa, Otay, and/or Border substations.
22430 SILVERGT 230 22597 OLDTWNT 230 1 1	TL23029_Line SG-OT 230kV ck 1 AND TL23071_Line SX-PQ 230kV ck 1	P6	N-1-1	100.3	100.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.8	< 100	100.8	
22227 ENCINATP 230 22716 SANLUSRY 230 1 1	TL23003_Line SA-EA 230kV ck 1 AND TL23030_Line ES-TA-CP 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.2	< 100	< 100	Rely on system adjustments after the first contingency for the P6 event, such as reducing generation output at Palomar Energy Center.
22592 OLD TOWN 69.0 22596 OLD TOWN 230 1 1	OT_BK71_Tran OT 230/69kV ck 2	P1	N-1	< 100	< 100	108.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Discuss with the PTO the potential for cost effective upgrade solutions in following planning cycles, such as adding a third 230/69 kV transformer in Old Town substation or installing battery energy storage in the 69 kV load pocket area if there is space available.
	OT-230-1S_CB OLD TOWN 230KV 1S	P4	Fault + Stuck Breaker	< 100	< 100	107.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	OT-230-2S_CB OLD TOWN 230KV 2S	P4	Fault + Stuck Breaker	< 100	< 100	108.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22592 OLD TOWN 69.0 22596 OLD TOWN 230 2 1	OT_BK70_Tran OT 230/69kV ck 1	P1	N-1	< 100	< 100	108.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	OT-230-1N_CB OLD TOWN 230KV 1N	P4	Fault + Stuck Breaker	< 100	< 100	107.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	OT-230-2N_CB OLD TOWN 230KV 2N	P4	Fault + Stuck Breaker	< 100	< 100	107.5	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22112 CAPSTRNO 138 22860 TRABUCO 138 1 1	TL13830_Line MAR-TB 138kV ck 1 AND TL13833_Loop-in1_Line CP-Q1806 138kV ck 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.7	< 100	< 100	< 100	Rely on system adjustments after the first contingency for the P6 event, such as reducing generation output at Palomar Energy Center.
22112 CAPSTRNO 138 22860 TRABUCO 138 2 1	TB-138-S_Bus TRABUCO 138kV S	P2	Bus Section Fault	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.2	< 100	< 100	< 100	



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions		
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast			
22122 CAR STRANO 138 22633 Q1806 138kV ck 1	TL13830_Line MAR-TB 138kV ck 1 AND TL13834_Line CP-TB 138kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.2	< 100	< 100	< 100	Continue to monitor the 138 kV thermal overload concerns identified in the 2035 Spring Off-Peak case and discuss with the PTO the potential for cost effective upgrade solutions in future planning cycles.	
22432 MARGARTA 138 22860 TRABUCO 138 1 1	Bus-CP138-ALL_CAPISTRANO 138 kV ALL BUS	P5	Non-Redundant Relay	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.7	< 100	< 100	< 100		
	TL13833_Loop-in1_Line CP-Q1806 138kV ck 2 AND TL13834_Line CP-TB 138kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.4	< 100	< 100	< 100		
	TL13833_Loop-in1+13834_Lines CP-Q1806 138kV ck 2 + CP-TB 138kV ck 1	P7	DCTL	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.4	< 100	< 100	< 100		
22678 R.MSNVJO 138 22432 MARGARTA 138 1 1	Bus-CP138-ALL_CAPISTRANO 138 kV ALL BUS	P5	Non-Redundant Relay	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.7	< 100	< 100	< 100		
	TL13833_Loop-in1_Line CP-Q1806 138kV ck 2 AND TL13834_Line CP-TB 138kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.4	< 100	< 100	< 100		
	TL13833_Loop-in1+13834_Lines CP-Q1806 138kV ck 2 + CP-TB 138kV ck 1	P7	DCTL	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.4	< 100	< 100	< 100		
22840 TALEGA 138 22678 R.MSNVJO 138 1 1	Bus-CP138-ALL_CAPISTRANO 138 kV ALL BUS	P5	Non-Redundant Relay	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.2	< 100	< 100	< 100		
	TL13833_Loop-in1_Line CP-Q1806 138kV ck 2 AND TL13834_Line CP-TB 138kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.9	< 100	< 100	< 100		
	TL13833_Loop-in1+13834_Lines CP-Q1806 138kV ck 2 + CP-TB 138kV ck 1	P7	DCTL	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.9	< 100	< 100	< 100		
22124 CHCARITA 138 22578 NRTHCTYMTRTP 138 1 1	TL13822_Line MS-CH 138kV ck 1 AND SX_BK60_Tran SX 230/138kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.8	< 100		Rely on battery energy storage charging curtailment, at Sycamore Canyon connected to the 138 kV bus, after the first contingency for the P6 events.
22500 MISSION 138 22120 CARLTNHS 138 1 1	TL13811_Line SH-NCM-CC 138kV ck 1 AND SX_BK60_Tran SX 230/138kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.8	< 100		
22024 B 69.0 22420 SILVERGT 69.0 1 1	Bus-OT230-NS_OLD TOWN 230 kV N+S BUS	P5	Non-Redundant Relay	102.3	107.4	127.6	107.9	107.5	< 100	< 100	< 100	< 100	< 100	< 100	108.4	Addition of the Old Town 230 kV Redundant Bus Differential Relay proposed by SDG&E (ISD Q3 2024).	
22024 B 69.0 22420 SILVERGT 69.0 2 1	Bus-OT230-NS_OLD TOWN 230 kV N+S BUS	P5	Non-Redundant Relay	< 100	< 100	105.8	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100		
22380 KETTNER 69.0 22024 B 69.0 1 1	Bus-OT230-NS_OLD TOWN 230 kV N+S BUS	P5	Non-Redundant Relay	104.4	114.6	136.5	107.1	118.1	< 100	< 100	< 100	< 100	< 100	< 100	115.6		
22420 SILVERGT 69.0 22144 CORONADO 69.0 1 1	Bus-OT230-NS_OLD TOWN 230 kV N+S BUS	P5	Non-Redundant Relay	< 100	< 100	102.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100		
22420 SILVERGT 69.0 22868 URBAN 69.0 1 1	Bus-OT230-NS_OLD TOWN 230 kV N+S BUS	P5	Non-Redundant Relay	103.1	108.7	129.9	112.0	108.4	< 100	< 100	< 100	< 100	< 100	< 100	109.7		
22592 OLD TOWN 69.0 22871 VINE SUB 69.0 1 1	Bus-SG230-EW_SILVERGATE 230 kV E+W BUS	P5	Non-Redundant Relay	< 100	< 100	106.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100		
22556 NAVSTMTR 69.0 22820 SWEETWTR 69.0 1 1	Bus-SG230-EW_SILVERGATE 230 kV E+W BUS	P5	Non-Redundant Relay	< 100	105.6	115.1	107.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.2	Addition of the Silvergate 230 kV Redundant Bus Differential Relay proposed by SDG&E (ISD Q3 2024).	
22556 NAVSTMTR 69.0 22824 SWTWTRTP 69.0 1 1	Bus-SG230-EW_SILVERGATE 230 kV E+W BUS	P5	Non-Redundant Relay	103.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100		
22820 SWEETWTR 69.0 22824 SWTWTRTP 69.0 1 1	Bus-SG230-EW_SILVERGATE 230 kV E+W BUS	P5	Non-Redundant Relay	109.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100		
22440 MELROSE 69.0 22708 SANLUSRY 69.0 1 1	PA_GEN1_Gen PA GEN1 ID 1 AND TL6966_Line OR-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.9	< 100		
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6966_Line OR-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.7	< 100		
	TL680_Line SA-ME-SM 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.3	< 100		

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast		
22708 SANLUSRY 69.0 22582 OCEAN RANCH 69.0 1 1	TL6912_Line PN-SA 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.7	< 100	<p>For the 2035 Summer Peak and Winter Peak cases, rely on pre-contingency congestion management to protect against the P1 outage by dispatching Melrose battery energy storage. Furthermore, for P3 events, rely on additional Melrose battery energy storage after the first contingency. The use of Melrose energy storage marginally solves the P3 concerns in the 2035 cases, thus there is a need to discuss potential upgrade alternatives with the PTO in future planning cycles.</p> <p>For the 2025 Spring Off-Peak sensitivity case, rely on pre-contingency congestion management to protect against the P1 outages by limiting the charging of Melrose battery energy storage. Furthermore, for P3 events, rely on additional Melrose battery energy storage charging curtailment after the first contingency.</p> <p>Continue to monitor the P5 concern in the sensitivity case.</p>
	TL693_Line ME-SA 69kV ck 1	P1	N-1	< 100	< 100	110.7	< 100	108.6	< 100	< 100	< 100	< 100	< 100	115.7	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL680_Line SA-ME-SM 69kV ck 1	P3	G-1/N-1	< 100	< 100	105.8	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.3	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL691_Line MN-PN-AV 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.0	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	104.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.9	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	118.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	123.3	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL680_Line SA-ME-SM 69kV ck 1	P3	G-1/N-1	< 100	< 100	105.8	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	104.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	118.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL680_Line SA-ME-SM 69kV ck 1	P3	G-1/N-1	< 100	< 100	100.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.4	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL691_Line MN-PN-AV 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	101.1	< 100	< 100	< 100	< 100	103.7	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	101.4	< 100	< 100	105.3	< 100	< 100	< 100	< 100	108.0	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	118.1	< 100	< 100	116.4	< 100	< 100	< 100	< 100	123.1	< 100	
	PEC_CT1_Gen PEN_CT1 ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	112.8	< 100	< 100	110.8	< 100	< 100	< 100	< 100	117.8	< 100	
	PEC_CT2_Gen PEN_CT2 ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	112.8	< 100	< 100	110.8	< 100	< 100	< 100	< 100	117.8	< 100	
PEC_ST_Gen PEN_ST ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	101.3	< 100	< 100	< 100	< 100	104.1	< 100		
PEC_ST_Gen PEN_ST ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	113.7	< 100	< 100	111.7	< 100	< 100	< 100	< 100	118.6	< 100		
Bus-PEN230-EW_PALOMAR ENERGY 230 kV E+W BUS	P5	Non-Redundant Relay		< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.3	< 100	
22046 BASILONE 69.0 22368 JAP MESA 69.0 1 1	TL23007_Line CP-SO 230kV ck 1 AND TL23052_Line TA-SO 230kV ck 1	P6	N-1-1	131.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL23007+23052_Lines CP-SO 230kV ck 1 + TA-SO 230kV ck 1	P7	DCTL	131.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22046 BASILONE 69.0 22848 TALEGATP 69.0 1 1	EA_ALL_Gen EA GEN1 U6/U7/U8/U9/U10 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.6	< 100	<p>Rely on existing TL695 at TA overload scheme in the short-term.</p> <p>TL695B Japanese Mesa-Talega Tap Reconductor project (ISD August 2026) mitigates the overload in the long-term.</p>
	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.3	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL50002_Line NG-IV 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.5	< 100	
	SA-230-1T_CB SAN LUIS REY 230KV 1T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.4	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast		
	TL23002_Line SA-SO 230kV ck 2 AND TL23006_Line SA-SO 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.4	< 100	< 100	
	TL23007_Line CP-SO 230kV ck 1 AND TL23052_Line TA-SO 230kV ck 1	P6	N-1-1	164.9	< 100	< 100	< 100	< 100	< 100	117.0	< 100	< 100	< 100	116.9	< 100	
	TL23007+23052_Lines CP-SO 230kV ck 1 + TA-SO 230kV ck 1	P7	DCTL	164.9	< 100	< 100	< 100	< 100	< 100	117.0	< 100	< 100	< 100	116.9	< 100	
22808 STUARTTP 69.0 22400 LASPULGS 69.0 1 1	TL23007_Line CP-SO 230kV ck 1 AND TL23052_Line TA-SO 230kV ck 1	P6	N-1-1	148.3	< 100	< 100	< 100	< 100	< 100	108.0	< 100	< 100	< 100	107.5	< 100	Rely on existing TL695 at TA overload scheme in the short-term.
	TL23007+23052_Lines CP-SO 230kV ck 1 + TA-SO 230kV ck 1	P7	DCTL	148.3	< 100	< 100	< 100	< 100	< 100	108.0	< 100	< 100	< 100	107.5	< 100	TL690E Stuart Tap-Las Pulgas 69 kV Reconductor project (ISD March 2028) mitigates the overload in the long-term.
22136 CLAIRMNT 69.0 22140 CLARMTTP 69.0 1 1	TL670_Line MS-CM 69kV ck 1	P1	N-1	< 100	< 100	106.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Discuss potential upgrade alternatives with the PTO or install additional battery energy storage at Clairemont substation.
22208 EL CAJON 69.0 22408 LOSCOCHS 69.0 1 1	TL632_Line GR-LC-ML 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.8	< 100	< 100	Rely on pre-contingency congestion management by dispatching an El Cajon gas fired unit.
	KU_GEN_Gen KUMEYAA ID 1 AND TL632_Line GR-LC-ML 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.9	< 100	< 100	
	EC GEN1_Gen EC GEN1 ID 1 AND TL632_Line GR-LC-ML 69kV ck 1	P3	G-1/N-1	103.6	< 100	< 100	< 100	< 100	< 100	100.2	< 100	< 100	< 100	< 100	< 100	Rely on system adjustments after the first contingency for the P3 events by dispatching El Cajon, Paradise, Kearny, and/or Clairemont battery energy storage.
	EC GEN2_Gen EC GEN2 ID 1 AND TL632_Line GR-LC-ML 69kV ck 1	P3	G-1/N-1	104.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	TL632 Granite Loop-In and TL6914 Reconfiguration project (ISD October 2026) mitigates the overload in the long-term.
22604 OTAY 69.0 22616 OTAYLKTP 69.0 1 1	TL6964_Line ML-SLT 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	116.0	< 100	< 100	Rely on pre-contingency congestion management by dispatching a Border gas fired unit.
	BD_GEN3_Gen CALPK_BD ID 1 AND TL6964_Line ML-SLT 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	172.5	< 100	< 100	< 100	< 100	< 100	< 100	Rely on system adjustments after the first contingency for the P3 events by dispatching additional Border gas fired generation.
	BD_GEN3_Gen CALPK_BD ID 1 AND TL6910_Line BD-SLT 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	131.7	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL623_Line OY-IB-SYO 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	129.2	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL6964_Line ML-SLT 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	133.5	< 100	< 100	< 100	132.6	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL623_Line OY-IB-SYO 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.5	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL6910_Line BD-SLT 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	102.2	< 100	< 100	< 100	101.8	< 100	
22768 BAY BLVD 69.0 22352 IMPRLBCH 69.0 1 1	BD_GEN3_Gen CALPK_BD ID 1 AND TL646_Line BB-OY 69kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	104.1	< 100	< 100	< 100	< 100	< 100	< 100	
22740 SANYSYRO 69.0 22608 OTAY TP 69.0 1 1	TL649_Line OY-OL-SYO-BD 69kV ck 1	P1	N-1	103.7	102.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.3	TL623C Reconductor (San Ysidro - Otay Tap) project (ISD December 2029) mitigates the overload in the long-term.
22664 POMERADO 69.0 22828 SYCAMORE 69.0 1 1	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6924_Line POM-SX 69kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.5	< 100	Rely on battery energy storage charging curtailment, at Pomerado connected to the 69 kV bus, after the first contingency for the P3 events.
22664 POMERADO 69.0 22828 SYCAMORE 69.0 2 1	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6915_Line POM-SX 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.5	< 100	
	TL637_Line ST-CRE 69kV ck 1	P1	N-1	< 100	< 100	101.8	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Change Current Transformer at Warners substation.

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast		
22884 WARNERS 69.0 22688 RINCON 69.0 1 1	TL681_Line AS-VC-FE 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	135.3	138.4	< 100	< 100	< 100	Limiting the charging of Valley Center battery energy storage, to protect against the overloading of TL682 Warners - Rincon which currently is not monitored by the existing Valley Center RAS as a short-term solution.  Valley Center System Improvement project proposed my the PTO as a long-term solution.
	VC_U1_Gen VALLEY CENTER ID 28 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	141.0	143.7	< 100	< 100	< 100	
	VC_U2_Gen VALLEY CENTER ID 59 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	137.1	140.0	< 100	< 100	< 100	
	Q1673_Gen Q1673 GEN1 ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	138.0	140.9	< 100	< 100	< 100	
	GR1192_Gen GR1192 ID VP AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	140.6	< 100	< 100	< 100	
22688 RINCON 69.0 22404 LILAC 69.0 1 1	TL681_Line AS-VC-FE 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.8	109.9	< 100	118.8	< 100	Limiting the charging of Valley Center battery energy storage, to protect against the overloading of TL683 Rincon - Lilac which currently is not monitored by the existing Valley Center RAS as a short-term solution.  Valley Center System Improvement project proposed my the PTO as a long-term solution.
	VC_U1_Gen VALLEY CENTER ID 28 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	115.7	116.5	< 100	< 100	< 100	
	VC_U2_Gen VALLEY CENTER ID 59 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	110.9	112.0	< 100	< 100	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	115.6	< 100	< 100	
22688 RINCON 69.0 22870 VALCNTR 69.0 1 1	TL681_Line AS-VC-FE 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	129.2	131.7	< 100	104.2	< 100	
	VC_U1_Gen VALLEY CENTER ID 28 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	136.6	138.8	< 100	< 100	< 100	
	VC_U2_Gen VALLEY CENTER ID 59 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	131.4	133.9	< 100	< 100	< 100	
22870 VALCNTR 69.0 22012 ASH TP 69.0 1 1	TL637_Line ST-CRE 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.4	< 100	For the 2025 Spring Off-Peak sensitivity case, limiting the charging of Valley Center battery energy storage was required to mitigate the P0 overload of TL681B Valley Center - Ash Tap.  Additionally, rely on the existing Valley Center RAS to trip the battery energy storage (under charging mode) at Valley Center for P1 and P3 outages as a short-term solution.  Valley Center System Improvement project proposed my the PTO as a long-term solution.
	TL683_Line RIN-LI 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.4	108.0	< 100	118.3	< 100	
	TL685_Line WR-ST 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.7	< 100	
	TL688_Line ES-LI 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	114.8	< 100	
	TL6926_Line RIN-VC 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	139.7	141.3	< 100	111.9	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL635_Line CRE-LC 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.5	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL637_Line ST-CRE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.4	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL685_Line WR-ST 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.7	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL688_Line ES-LI 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	127.6	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL691_Line MN-PN-AV 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.9	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast		
	PA_GEN1_Gen PA GEN1 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.0	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL6917_Line CRE-SX 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.7	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL694_Line MN-MH-ME 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.3	< 100	
	VC_U1_Gen VALLEY CENTER ID 28 AND TL6926_Line RIN-VC 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	147.0	148.3	< 100	< 100	< 100	
	VC_U2_Gen VALLEY CENTER ID 59 AND TL6926_Line RIN-VC 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	141.9	143.5	< 100	< 100	< 100	
	VC_U1_Gen VALLEY CENTER ID 28 AND TL683_Line RIN-LI 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	113.6	113.9	< 100	< 100	< 100	
	VC_U2_Gen VALLEY CENTER ID 59 AND TL683_Line RIN-LI 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.3	109.8	< 100	< 100	< 100	
	TL688_Line ES-LI 69kV ck 1 AND TL6932_Line LI-PA 69kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	132.5	< 100	
22008 ASH 69.0 22012 ASH TP 69.0 1 1	TL6926_Line RIN-VC 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.1	104.7	< 100	< 100	< 100	Limiting the charging of Valley Center battery energy storage, to protect against the overloading of TL681A Ash - Ash Tap which currently is not monitored by the existing Valley Center RAS as a short-term solution.  Valley Center System Improvement project proposed by the PTO as a long-term solution.
	VC_U1_Gen VALLEY CENTER ID 28 AND TL6926_Line RIN-VC 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.5	109.8	< 100	< 100	< 100	
	VC_U2_Gen VALLEY CENTER ID 59 AND TL6926_Line RIN-VC 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.7	106.2	< 100	< 100	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL688_Line ES-LI 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.9	< 100	
	TL688_Line ES-LI 69kV ck 1 AND TL6932_Line LI-PA 69kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.6	< 100	
19020 BLYTHE 161 21731 VEGA_3_SS 161 1 1	S-LINE1_IV-WIXOM_SS 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.5	128.4	< 100	< 100	< 100	Since there is a high export from IID area to SDG&E and SCE Eastern areas, IID would need to rely on pre-contingency congestion management to protect against the P1 outage of the S-Line. Additional system adjustments in IID area would be needed for some of the P3 and P6 events.  Furthermore, the existing Blythe RAS would operate for the contingencies that include the outage of J. Hinds - Mirage 230 kV transmission line.
	S-LINE2_WIXOM_SS-ELCENTSW 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.1	119.5	< 100	< 100	< 100	
	S-LINE1_IV-WIXOM_SS 230kV ck 1 AND CVSUB-MRG_CVSUB230-MIRAGE 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	122.4	135.1	< 100	< 100	< 100	
	S-LINE1_IV-WIXOM_SS 230kV ck 1 AND JHND-MRG_J.HINDS-MIRAGE 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Diverge	137.1	< 100	< 100	< 100	
21731 VEGA_3_SS 161 21047 NILAND161 161 1 1	S-LINE1_IV-WIXOM_SS 230kV ck 1 AND JHND-MRG_J.HINDS-MIRAGE 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Diverge	106.0	< 100	< 100	< 100	
21007 CVSUB230 230 21076 RAMON230 230 1 1	S-LINE1_IV-WIXOM_SS 230kV ck 1 AND CVSUB-MRG_CVSUB230-MIRAGE 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.7	100.3	< 100	< 100	< 100	
	S-LINE1_IV-WIXOM_SS 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	111.4	< 100	138.9	153.3	< 100	< 100	< 100	
	S-LINE2_WIXOM_SS-ELCENTSW 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	124.5	139.1	< 100	< 100	< 100	
	PV_UNIT1_Gen PALOVRD1 ID 1 AND S-LINE1_IV-WIXOM_SS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	113.7	< 100	141.9	153.4	< 100	< 100	< 100	



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions	
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast		
21331 EC161_SS 161 21059 PILOT_KNB161 161 1 1	PV_UNIT1_Gen PALOVRD1 ID 1 AND S-LINE2_WIXOM_SS-ELCENTSW 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	127.5	139.2	< 100	< 100	< 100	Since there is a high export from IID area to SDG&E and SCE Eastern areas, IID would need to rely on pre-contingency congestion management to protect against the P1 outage of the S-Line. Additional system adjustments in IID area would be needed for some of the P3 and P6 events.
	GR1187_Gen GR1187 ID VE AND S-LINE1_IV-WIXOM_SS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	150.5	< 100	< 100	< 100	
	GR1187_Gen GR1187 ID VE AND S-LINE2_WIXOM_SS-ELCENTSW 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	136.3	< 100	< 100	< 100	
	GR1188_Gen GR1188 ID VS AND S-LINE1_IV-WIXOM_SS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	158.3	< 100	< 100	< 100	
	GR1188_Gen GR1188 ID VS AND S-LINE2_WIXOM_SS-ELCENTSW 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	144.1	< 100	< 100	< 100	
	S-LINE1_IV-WIXOM_SS 230kV ck 1 AND PLV-CLRVR_PALOVRDE-COLRIVER 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	106.1	< 100	140.7	160.0	< 100	< 100	< 100	
	S-LINE1_IV-WIXOM_SS 230kV ck 1 AND CVSUB-MRG_CVSUB230-MIRAGE 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	102.8	116.5	< 100	147.8	159.4	< 100	< 100	< 100	
	S-LINE1_IV-WIXOM_SS 230kV ck 1 AND HAA-NG_Line HAA-NG 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	116.8	< 100	137.3	152.1	< 100	< 100	< 100	
21072 YUCCA161 161 21059 PILOT_KNB161 161 1 1	GR1188_Gen GR1188 ID VS AND S-LINE1_IV-WIXOM_SS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.9	< 100	< 100	< 100	
	GR1190_Gen GR1190 ID VS AND S-LINE1_IV-WIXOM_SS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.6	< 100	< 100	< 100	
	GR1188_Gen GR1188 ID VS AND S-LINE2_WIXOM_SS-ELCENTSW 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.8	< 100	< 100	< 100	
	HDW-NG_Line HDW-NG 500kV ck 1 AND S-LINE1_IV-WIXOM_SS 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.2	< 100	< 100	< 100	
21072 YUCCA161 161 84846 YUCCA W 69.0 1 1	S-LINE1_IV-WIXOM_SS 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.1	< 100	< 100	< 100	
	PV_UNIT1_Gen PALOVRD1 ID 1 AND S-LINE1_IV-WIXOM_SS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.5	101.6	< 100	< 100	< 100	
	GR1188_Gen GR1188 ID VS AND S-LINE1_IV-WIXOM_SS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	114.9	< 100	< 100	< 100	
	GR1188_Gen GR1188 ID VS AND S-LINE2_WIXOM_SS-ELCENTSW 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.0	< 100	< 100	< 100	
	GR1187_Gen GR1187 ID VE AND S-LINE1_IV-WIXOM_SS 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.5	< 100	< 100	< 100	
	S-LINE1_IV-WIXOM_SS 230kV ck 1 AND TL23066_Line IV-DW 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.5	112.2	< 100	< 100	< 100	
	S-LINE1_IV-WIXOM_SS 230kV ck 1 AND CVSUB-MRG_CVSUB230-MIRAGE 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.2	111.7	< 100	< 100	< 100	
	HDW-NG_Line HDW-NG 500kV ck 1 AND S-LINE1_IV-WIXOM_SS 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.8	114.5	< 100	< 100	< 100	
21378 SALTON_CITY 92.0 21379 DSERT_SHORES 92.0 1 1	S-LINE1_IV-WIXOM_SS 230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.8	< 100	< 100	< 100	< 100	

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)									Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast		

No substation with voltages below 0.9 pu or above 1.05 pu

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
				2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast	
SALT CREEK 69 kV	TL6964_Line ML-SLT 69kV ck 1	P1	N-1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	8.33	< 8	< 8	Rely on pre-contingency congestion management by dispatching a Border gas fired unit.



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast	
SLO 3PH Fault at DEVERS 500, trip DEVERS - VALLEYSC 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at PALO VERDE 500kV, trip PALO VERDE - COLRIVER 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 500kV, trip IMPRLVLY - ECO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 500kV, trip IMPRLVLY - N.GILA 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at HAA 500kV, trip HAA - HDWSH 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at NG 500kV, trip NG - HAA 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at HDWSH 500kV, trip HDWSH - NG 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at ML 500kV, trip MIGUEL - ECO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 500kV, trip IMPRLVLY - OCOTILLO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at PEN 230kV, trip PEN - ESCNDIDO 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at PQ 230kV, trip PENSQTOS - OLD TOWN 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at SA 230kV, trip SANLUSRY - ENCINA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at TA 230kV, trip S.ONOFRE - TALEGA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at PQ 230kV, trip PENSQTOS - SYCAMORE 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at SG 230kV, trip SILVERGT - BAY BLVD 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 230kV, trip IMPRLVLY PFC - ROA-230 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at TA 230kV, trip TALEGA - ESCNDIDO - CAPSTRNO 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at ML 230kV, trip MIGUEL - BAY BLVD - OTAY MESA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at OT 230kV, trip OLD TOWN - MISSION - SILVERGT 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at SCR 500kV, trip SUNCREST - OCOTILLO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at OM 230kV, trip OTAYMESA - TJI-230 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 230kV, trip IMPRLVLY - WIXOM_SS 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 500kV, trip IMPRLVLY - NSONGS 500kV ck 1	P1	N-1	-	No issues	-	-	-	No violation
SLO 3PH Fault at NSONGS 500kV, trip NSONGS - SERRANO 500kV ck 1	P1	N-1	-	No issues	-	-	-	No violation
SLO 3PH Fault at NSONGS 230kV, trip NSONGS - VIEJO 230kV ck 1	P1	N-1	-	No issues	-	-	-	No violation
BQ-138 Bus BATIQUITOS 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
BUE-138 BUS BOULEVARD EAST 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
CAN-138 BUS CANNON 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
CP-138 Bus CAPISTRANO 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
ECO-138 BUS EAST COUNTY 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
FR-138 BUS FRIARS 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
GHL-138 BUS GRANT HILL 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
MS-230 Bus MISSION 230kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
MS-138 Bus MISSION 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
PAR-138 BUS PALOMAR AIRPORT 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
PEN-230 BUS PALOMAR ENERGY 230kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
PI-138 BUS PICO 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2028 Summer Peak	2035 Summer Peak	2025 Spring Off-Peak	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast	
PV-138 BUS PROCTOR VALLEY 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
RMV-138 BUS RANCHO MISSION VIEJO 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
SA-230 BUS SAN LUIS REY 230kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
SN-138 BUS SANTEE 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
SH-138 BUS SHADOWRIDGE 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
SG-230 BUS SILVERGATE 230kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
SX-138 BUS SYCAMORE CANYON 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
TA-138 BUS TALEGA 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
TC-138 BUS TELEGRAPH CANYON 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at ML 230kV, trip both lines MIGUEL - MISSION 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at SA 230kV, trip TL23002 and TL23010 SANLUSRY - S.ONOFRE 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at SO 230kV, trip both lines S.ONOFRE - SANTIAGO 230kV	P7	DCTL	No issues	-	No issues	No issues	No issues	No violation
DLO 3PH Fault at NSONGS 230kV, trip both lines NSONGS - SANTIAGO 230kV	P7	DCTL	-	No issues	-	-	-	No violation
DLO 3PH Fault at SA 230kV, trip both lines SANLUSRY SC - MISSION 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at OM 230kV, trip MIGUEL - BAY BLVD - OTAYMESA and MIGUEL - SYCAMORE - OTAYMESA 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at ML 230kV, trip MIGUEL - SYCAMORE 230kV and MIGUEL - SYCAMORE - OTAYMESA 230kV	P7	DCTL	No issues	-	No issues	No issues	No issues	No violation
DLO 3PH Fault at ML 230kV, trip MIGUEL - SUNCREST 230kV and MIGUEL - SYCAMORE - OTAYMESA 230kV	P7	DCTL	-	No issues	-	-	-	No violation
DLO 3PH Fault at SA 230kV, trip SANLUSRY - ENCINA 230kV and SANLUSRY - ENCINATP 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at PEN 230kV, trip PEN - ARTESN 230kV and PEN - ENCINATP 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at SCR 230kV, trip both lines SUNCREST - SYCAMORE 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at NSONGS 230kV, trip two lines S.ONOFRE - NSONGS 230kV	P7	DCTL	-	No issues	-	-	-	No violation
DLO 3PH Fault at SO 230kV, trip S.ONOFRE - NSONGS ck 3 230kV and S.ONOFRE - SERRANO 230kV ck 1	P7	DCTL	-	No issues	-	-	-	No violation

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)									Potential Mitigation Solutions		
			2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation		2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast

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

**Single Source Substation with more than 100 MW Load**

Substation	Load Served (MW)											Potential Mitigation Solutions
	2025 Summer Peak	2028 Summer Peak	2035 Summer Peak	2028 Summer Off-Peak	2035 Winter Peak	2025 Spring Off-Peak	2028 Spring Off-Peak	2035 Spring Off-Peak	2025 Summer Peak Heavy Renewable & Minimum Gas Generation	2025 Spring Off-Peak Storage charging in load pockets	2028 Summer Peak 1-in-20 load forecast	

No single source substation with more than 100 MW

Bus/Substation	Area	Zone	Voltage PU (Base Scenarios)				Voltage PU (Sensitivity Scenarios) 2025 OP Heavy Renewable & Min Gas Gen	Project & Potential Mitigation Solutions
			2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer Off-Peak	2035 Winter Off-Peak		
AGRLINK 60 kV	Central Coast/Los Padres	Central Coast	1.03	1.06	NA	NA	1.03	System adjustments or voltage support if needed
BIG BASIN 60 kV	Central Coast/Los Padres	Central Coast	1.04	1.05	NA	NA	1.04	System adjustments or voltage support if needed
BURNS 60 kV	Central Coast/Los Padres	Central Coast	1.04	1.05	NA	NA	1.04	System adjustments or voltage support if needed
CRUISER 60 kV	Central Coast/Los Padres	Central Coast	1.04	1.05	NA	NA	1.04	System adjustments or voltage support if needed
DIABLOOYNSS 500 kV	Central Coast/Los Padres	Central Coast	NA	NA	NA	1.68	NA	System adjustments or voltage support if needed
ERTA 60 kV	Central Coast/Los Padres	Central Coast	1.04	1.06	NA	NA	1.04	System adjustments or voltage support if needed
GREENVALLEY 60 kV	Central Coast/Los Padres	Central Coast	1.04	1.07	NA	NA	1.04	System adjustments or voltage support if needed
PT MRTT 60 kV	Central Coast/Los Padres	Central Coast	1.04	1.05	NA	NA	1.04	System adjustments or voltage support if needed
WTSNVILLE 60 kV	Central Coast/Los Padres	Central Coast	1.03	1.06	NA	NA	1.03	System adjustments or voltage support if needed
AEC 300 115 kV	Central Valley	Stockton	1.03	1.05	1.06	NA	1.03	System adjustments or voltage support if needed
ALLEGHNY 60 kV	Central Valley	Sierra	1.02	1.06	1.07	1.05	1.02	System adjustments or voltage support if needed
ALTA-CGE 60 kV	Central Valley	Stockton	1.05	1.06	1.06	1.05	1.05	System adjustments or voltage support if needed
AM FORST 60 kV	Central Valley	Stockton	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
AMFOR_SW 60 kV	Central Valley	Stockton	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
APLHTAP1 115 kV	Central Valley	Sierra	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
APPLE HL 115 kV	Central Valley	Sierra	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
ATLANTIC 115 kV	Central Valley	Sierra	1.01	1.05	1.05	NA	1.01	System adjustments or voltage support if needed
AVERNA 115 kV	Central Valley	Stockton	1.00	1.04	1.05	NA	1.00	System adjustments or voltage support if needed
B/BTHNY- 60 kV	Central Valley	Stockton	1.05	1.06	1.06	1.05	1.05	System adjustments or voltage support if needed
BANGOR 60 kV	Central Valley	Sierra	1.02	1.07	1.08	1.07	1.02	System adjustments or voltage support if needed
BANTA 115 kV	Central Valley	Stockton	1.00	1.04	1.05	NA	1.01	System adjustments or voltage support if needed
BEALE 1.60 kV	Central Valley	Sierra	1.02	1.04	1.07	1.06	1.02	System adjustments or voltage support if needed
BEALE 2.60 kV	Central Valley	Sierra	1.01	1.03	1.06	1.06	1.01	System adjustments or voltage support if needed
BEARDSLY 115 kV	Central Valley	Stanislaus	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
BELL PGE 115 kV	Central Valley	Sierra	1.03	1.06	1.06	NA	1.03	System adjustments or voltage support if needed
BRIGHTN 115 kV	Central Valley	Sacramento	1.07	1.07	1.07	1.07	1.07	System adjustments or voltage support if needed
BRKR SLG 115 kV	Central Valley	Sacramento	1.04	1.08	1.07	1.06	1.04	System adjustments or voltage support if needed
BRNSWALT 115 kV	Central Valley	Sierra	1.04	1.06	1.06	1.04	1.04	System adjustments or voltage support if needed
BRNSWCKP 115 kV	Central Valley	Sierra	1.04	1.06	1.06	NA	1.04	System adjustments or voltage support if needed
BRUNSWCK 115 kV	Central Valley	Sierra	1.03	1.07	1.06	NA	1.03	System adjustments or voltage support if needed
BRWNS VY 60 kV	Central Valley	Sierra	1.02	1.05	1.07	1.07	1.02	System adjustments or voltage support if needed
BUENAVISTA 60 kV	Central Valley	Stockton	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
CAL CMTT 60 kV	Central Valley	Stockton	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
CAMPUS 115 kV	Central Valley	Sacramento	1.03	1.09	1.06	1.05	1.03	System adjustments or voltage support if needed
CATARACT 115 kV	Central Valley	Stockton	1.03	1.05	1.06	NA	1.03	System adjustments or voltage support if needed
CHCAGO FK 115 kV	Central Valley	Sierra	1.04	1.07	1.06	1.05	1.04	System adjustments or voltage support if needed
CHINESESTA 115 kV	Central Valley	Stanislaus	1.02	1.04	1.05	NA	1.02	System adjustments or voltage support if needed
CLAY 60 kV	Central Valley	Stockton	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
CLMBA HL 60 kV	Central Valley	Sierra	1.03	1.07	1.08	1.07	1.03	System adjustments or voltage support if needed
CMP FRWT 60 kV	Central Valley	Sierra	1.03	1.04	1.06	1.07	1.03	System adjustments or voltage support if needed
CNTRY CB 60 kV	Central Valley	Stockton	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
COLGATE 60 kV	Central Valley	Sierra	1.04	1.07	1.08	1.07	1.04	System adjustments or voltage support if needed
CORDELL 115 kV	Central Valley	Sacramento	1.00	1.07	1.06	NA	1.00	System adjustments or voltage support if needed
CORRAL 60 kV	Central Valley	Stockton	1.02	1.06	1.05	NA	1.02	System adjustments or voltage support if needed
CORRAL2 60 kV	Central Valley	Stockton	1.02	1.06	1.05	NA	1.02	System adjustments or voltage support if needed
CORTINA 60 kV	Central Valley	Sacramento	1.06	1.02	1.02	NA	1.06	System adjustments or voltage support if needed
CROWCREEK SS 60 kV	Central Valley	Stanislaus	1.03	1.02	1.06	1.03	1.03	System adjustments or voltage support if needed
CRWCRKSLR1 60 kV	Central Valley	Stanislaus	1.03	1.02	1.06	1.03	1.03	System adjustments or voltage support if needed
CRWS LDG 60 kV	Central Valley	Stanislaus	1.02	1.03	1.06	NA	1.02	System adjustments or voltage support if needed
DAVIS 115 kV	Central Valley	Sacramento	1.03	1.08	1.06	1.05	1.03	System adjustments or voltage support if needed
DEEPWATER 115 kV	Central Valley	Sacramento	1.04	1.07	1.07	1.06	1.04	System adjustments or voltage support if needed
DIMOND 1.115 kV	Central Valley	Sierra	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
DIMOND 2.115 kV	Central Valley	Sierra	1.03	1.04	1.05	NA	1.03	System adjustments or voltage support if needed
DIND SPR 115 kV	Central Valley	Sierra	1.03	1.04	1.05	NA	1.03	System adjustments or voltage support if needed
DOBBSIN 60 kV	Central Valley	Sierra	1.04	1.07	1.08	1.07	1.04	System adjustments or voltage support if needed
DONNELLS 115 kV	Central Valley	Stanislaus	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
DRUMPH1 115 kV	Central Valley	Sierra	1.05	1.06	1.06	1.04	1.05	System adjustments or voltage support if needed
DRUMPH2 115 kV	Central Valley	Sierra	1.05	1.06	1.06	1.04	1.05	System adjustments or voltage support if needed
DITCH FL2 115 kV	Central Valley	Sierra	1.05	1.06	1.06	1.04	1.05	System adjustments or voltage support if needed
DUTCHFLAT1P 115 kV	Central Valley	Sierra	1.04	1.06	1.06	1.04	1.04	System adjustments or voltage support if needed
E.MRYSVE 115 kV	Central Valley	Sierra	1.04	1.06	1.07	1.06	1.04	System adjustments or voltage support if needed
E.NICOLS 115 kV	Central Valley	Sierra	1.03	1.05	1.05	1.05	1.03	System adjustments or voltage support if needed
ELDORAD 115 kV	Central Valley	Sierra	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
ELLS GTY 115 kV	Central Valley	Stockton	1.03	1.05	1.06	NA	1.03	System adjustments or voltage support if needed
FLINT 115 kV	Central Valley	Sierra	1.03	1.06	1.06	1.05	1.03	System adjustments or voltage support if needed
FLINTZ 115 kV	Central Valley	Sierra	1.03	1.06	1.06	1.05	1.03	System adjustments or voltage support if needed
FROGTOWN 115 kV	Central Valley	Stockton	1.02	1.05	1.06	NA	1.02	System adjustments or voltage support if needed
GOLDHILL 115 kV	Central Valley	Sierra	1.05	1.05	1.05	1.05	1.05	System adjustments or voltage support if needed
GRAND IS 115 kV	Central Valley	Sacramento	1.07	1.08	1.08	1.07	1.07	System adjustments or voltage support if needed
GRSS VLY 60 kV	Central Valley	Sierra	1.02	1.07	1.08	1.07	1.02	System adjustments or voltage support if needed
GUSTINE 60 kV	Central Valley	Stanislaus	0.99	1.04	1.06	NA	0.99	System adjustments or voltage support if needed
GWFTACY 115 kV	Central Valley	Stockton	1.03	1.05	1.06	NA	1.03	System adjustments or voltage support if needed
HAMMER 60 kV	Central Valley	Stockton	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
HERDLYN 60 kV	Central Valley	Stockton	1.05	1.06	1.06	1.05	1.05	System adjustments or voltage support if needed
HIGGINS 115 kV	Central Valley	Sierra	1.03	1.07	1.06	NA	1.03	System adjustments or voltage support if needed
HORSESHE 115 kV	Central Valley	Sierra	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
HORSHE1 115 kV	Central Valley	Sierra	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
HORSHE2 115 kV	Central Valley	Sierra	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
HOWLANDRD 115 kV	Central Valley	Stockton	1.00	1.04	1.05	NA	1.00	System adjustments or voltage support if needed
INE PRSN 60 kV	Central Valley	Stockton	1.02	1.05	1.04	NA	1.02	System adjustments or voltage support if needed
KASSON 115 kV	Central Valley	Stockton	1.01	1.04	1.05	NA	1.01	System adjustments or voltage support if needed
KNIGHT1 115 kV	Central Valley	Sacramento	1.02	1.06	1.06	1.05	1.02	System adjustments or voltage support if needed
KNIGHT2 115 kV	Central Valley	Sacramento	1.02	1.06	1.05	1.05	1.02	System adjustments or voltage support if needed
KWIGHTLD 115 kV	Central Valley	Sacramento	1.02	1.06	1.06	1.05	1.02	System adjustments or voltage support if needed
LAMMERS 115 kV	Central Valley	Stockton	1.02	1.05	1.06	NA	1.02	System adjustments or voltage support if needed
LEPRIND 115 kV	Central Valley	Stockton	1.01	1.04	1.05	NA	1.01	System adjustments or voltage support if needed
LID 115 kV	Central Valley	Stockton	1.00	1.04	1.05	NA	1.00	System adjustments or voltage support if needed
LIMESTNE 60 kV	Central Valley	Sierra	1.04	1.05	1.04	NA	1.04	System adjustments or voltage support if needed
LINCOLN 115 kV	Central Valley	Sierra	1.01	1.05	1.05	NA	1.01	System adjustments or voltage support if needed
MARTELL 60 kV	Central Valley	Stockton	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
MCSP 60 kV	Central Valley	Stockton	1.02	1.05	1.04	NA	1.02	System adjustments or voltage support if needed
MDWYND 115 kV	Central Valley	Stockton	1.04	1.05	1.06	NA	1.04	System adjustments or voltage support if needed
MELONES 115 kV	Central Valley	Stanislaus	1.02	1.05	1.05	NA	1.02	System adjustments or voltage support if needed
MI-WUK 115 kV	Central Valley	Stanislaus	1.02	1.05	1.05	NA	1.02	System adjustments or voltage support if needed
MIZOU T1 115 kV	Central Valley	Sierra	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
MIZOU T2 115 kV	Central Valley	Sierra	1.03	1.04	1.05	NA	1.03	System adjustments or voltage support if needed
MOBICHE 115 kV	Central Valley	Sacramento	1.02	1.07	1.06	1.04	1.02	System adjustments or voltage support if needed
MSHR 60V 60 kV	Central Valley	Stockton	1.01	1.05	1.05	NA	1.02	System adjustments or voltage support if needed
N.HOGAN 60 kV	Central Valley	Stockton	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
NARRWS 160 kV	Central Valley	Sierra	1.02	1.06	1.08	1.07	1.02	System adjustments or voltage support if needed
NARRWS 260 kV	Central Valley	Sierra	1.02	1.06	1.07	1.07	1.02	System adjustments or voltage support if needed
NEWSTL1 115 kV	Central Valley	Sierra	1.03	1.05	1.06	1.05	1.03	System adjustments or voltage support if needed
NEWSTL2 115 kV	Central Valley	Sierra	1.03	1.05	1.06	1.05	1.03	System adjustments or voltage support if needed
NEWSTLE 115 kV	Central Valley	Sierra	1.03	1.05	1.06	1.05	1.03	System adjustments or voltage support if needed
NEWMAN 60 kV	Central Valley	Stanislaus	1.00	1.04	1.06	NA	1.00	System adjustments or voltage support if needed
QI GLASS 115 kV	Central Valley	Stockton	1.02	1.05	1.06	NA	1.02	System adjustments or voltage support if needed
OLETA 60 kV	Central Valley	Stockton	1.02	1.06	1.04	NA	1.02	System adjustments or voltage support if needed
PARDEE A 60 kV	Central Valley	Stockton	1.05	1.06	1.06	NA	1.05	System adjustments or voltage support if needed
PATTERSN 60 kV	Central Valley	Stanislaus	1.03	1.03	1.06	1.03	1.03	System adjustments or voltage support if needed
PEORIA 115 kV	Central Valley	Stanislaus	1.02	1.04	1.05	NA	1.02	System adjustments or voltage support if needed
PIKE CTY 60 kV	Central Valley	Sierra	1.03	1.06	1.07	1.06	1.03	System adjustments or voltage support if needed
PLACER 115 kV	Central Valley	Sierra	1.03	1.06	1.06	1.05	1.03	System adjustments or voltage support if needed
PLCRVLB2 115 kV	Central Valley	Sierra	1.03	1.04	1.05	NA	1.03	System adjustments or voltage support if needed

Bus/Substation	Area	Zone	Voltage PU (Base Scenarios)				Voltage PU (Sensitivity Scenarios)	Project & Potential Mitigation Solutions
			2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer Off-Peak	2035 Winter Off-Peak		
RLORL83 115 kV	Central Valley	Sierra	1.03	1.04	1.05	NA	1.03	System adjustments or voltage support if needed
RLORL71 115 kV	Central Valley	Sierra	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
RLORL72 115 kV	Central Valley	Sierra	1.03	1.04	1.05	NA	1.03	System adjustments or voltage support if needed
PLSMT GR 115 kV	Central Valley	Sierra	1.01	1.05	1.05	NA	1.01	System adjustments or voltage support if needed
POST 115 kV	Central Valley	Sacramento	1.04	1.07	1.07	1.06	1.04	System adjustments or voltage support if needed
PRDESWS 60 kV	Central Valley	Stockton	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
Q1350 60 kV	Central Valley	Stanislaus	1.03	1.02	1.06	1.03	1.03	System adjustments or voltage support if needed
Q653F 115 kV	Central Valley	Sacramento	1.02	1.08	1.06	1.05	1.02	System adjustments or voltage support if needed
RTRACK 115 kV	Central Valley	Stanislaus	1.02	1.05	1.05	NA	1.02	System adjustments or voltage support if needed
RBROCKLIN 115 kV	Central Valley	Sierra	1.01	1.05	1.05	NA	1.01	System adjustments or voltage support if needed
RICE 60 kV	Central Valley	Sacramento	1.00	1.06	1.05	NA	1.00	System adjustments or voltage support if needed
RIPONCOGEN 115 kV	Central Valley	Stockton	1.04	1.04	1.05	NA	1.04	System adjustments or voltage support if needed
RVRBANK 115 kV	Central Valley	Stanislaus	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
SAFEWAY 115 kV	Central Valley	Stockton	1.03	1.05	1.06	NA	1.03	System adjustments or voltage support if needed
SALADO 60 kV	Central Valley	Stanislaus	1.04	1.03	1.05	1.04	1.04	System adjustments or voltage support if needed
SANDBAR 115 kV	Central Valley	Stanislaus	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
SCHULTE 115 kV	Central Valley	Stockton	1.03	1.05	1.06	NA	1.03	System adjustments or voltage support if needed
SHIPPINS 115 kV	Central Valley	Sierra	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
SHIPPINS2 115 kV	Central Valley	Sierra	1.04	1.04	1.05	NA	1.04	System adjustments or voltage support if needed
SMARTVLE 60 kV	Central Valley	Sierra	1.02	1.05	1.07	1.07	1.02	System adjustments or voltage support if needed
SMARTVLE1 60 kV	Central Valley	Sierra	1.02	1.05	1.07	1.07	1.02	System adjustments or voltage support if needed
SOUTH BY 60 kV	Central Valley	Stockton	1.05	1.06	1.06	1.05	1.05	System adjustments or voltage support if needed
SPICAMIN 115 kV	Central Valley	Sierra	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
SPLINC 115 kV	Central Valley	Sierra	1.02	1.05	1.05	NA	1.02	System adjustments or voltage support if needed
SPRNG GP 115 kV	Central Valley	Stanislaus	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
STAGG 60 kV	Central Valley	Stockton	1.05	1.05	1.05	NA	1.05	System adjustments or voltage support if needed
STANISL 115 kV	Central Valley	Stockton	1.03	1.06	1.06	NA	1.03	System adjustments or voltage support if needed
STNSLSRP 60 kV	Central Valley	Stanislaus	1.03	1.03	1.06	1.03	1.03	System adjustments or voltage support if needed
SUMMIT 60 kV	Central Valley	Sierra	1.03	1.05	1.04	NA	1.03	System adjustments or voltage support if needed
TCHRT 2 115 kV	Central Valley	Stockton	1.02	1.04	1.05	NA	1.02	System adjustments or voltage support if needed
TESLA 115 kV	Central Valley	Stockton	1.04	1.05	1.06	NA	1.04	System adjustments or voltage support if needed
TESLAMTR 115 kV	Central Valley	Stockton	1.03	1.04	1.05	NA	1.03	System adjustments or voltage support if needed
TOSCO-PP 60 kV	Central Valley	Stockton	1.05	1.06	1.06	1.05	1.05	System adjustments or voltage support if needed
TRACQ 115 kV	Central Valley	Stockton	1.01	1.04	1.05	NA	1.01	System adjustments or voltage support if needed
TULLOCH 115 kV	Central Valley	Stanislaus	1.03	1.04	1.05	NA	1.03	System adjustments or voltage support if needed
UOP 60 kV	Central Valley	Stockton	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
VACA-DXN 60 kV	Central Valley	Sacramento	1.06	1.05	1.05	NA	1.06	System adjustments or voltage support if needed
VALLY HM 115 kV	Central Valley	Stanislaus	1.00	1.05	1.05	NA	1.00	System adjustments or voltage support if needed
VIERRA 115 kV	Central Valley	Stockton	1.00	1.04	1.05	NA	1.00	System adjustments or voltage support if needed
VLLY SPS 60 kV	Central Valley	Stockton	1.05	1.05	1.05	NA	1.05	System adjustments or voltage support if needed
VS1A000-001D 60 kV	Central Valley	Stockton	1.05	1.05	1.05	NA	1.05	System adjustments or voltage support if needed
VSC000-002 60 kV	Central Valley	Stockton	1.05	1.05	1.05	NA	1.05	System adjustments or voltage support if needed
VSLDSW87 60 kV	Central Valley	Stockton	1.05	1.05	1.06	NA	1.05	System adjustments or voltage support if needed
W.SCRMNO 115 kV	Central Valley	Sacramento	1.04	1.07	1.07	1.06	1.04	System adjustments or voltage support if needed
WEST SDE 60 kV	Central Valley	Stockton	1.05	1.05	1.06	NA	1.05	System adjustments or voltage support if needed
WOODLANDBIOM 115 kV	Central Valley	Sacramento	1.02	1.07	1.06	1.05	1.02	System adjustments or voltage support if needed
WOODL 115 kV	Central Valley	Sacramento	1.02	1.07	1.06	1.05	1.02	System adjustments or voltage support if needed
WPVS-021-098 60 kV	Central Valley	Stockton	1.05	1.05	1.05	NA	1.05	System adjustments or voltage support if needed
WSTLNEW 60 kV	Central Valley	Stockton	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
YUBAGOLD 60 kV	Central Valley	Sierra	1.02	1.05	1.07	1.07	1.02	System adjustments or voltage support if needed
ZAMORA 115 kV	Central Valley	Sacramento	1.02	1.06	1.06	1.05	1.02	System adjustments or voltage support if needed
ZAMORAI 115 kV	Central Valley	Sacramento	1.02	1.06	1.06	1.05	1.02	System adjustments or voltage support if needed
ZAMORAZ 115 kV	Central Valley	Sacramento	1.02	1.06	1.06	1.05	1.02	System adjustments or voltage support if needed
AI00US 115 kV	Greater Bay Area	Mission	1.05	1.05	NA	NA	1.05	System adjustments or voltage support if needed
CLMBIAHS 115 kV	Greater Bay Area	Diablo	1.03	1.05	NA	NA	1.03	System adjustments or voltage support if needed
CYTE PMP 115 kV	Greater Bay Area	San Jose	1.05	1.06	NA	NA	1.05	System adjustments or voltage support if needed
DOW TAP2 115 kV	Greater Bay Area	Diablo	1.03	1.05	NA	NA	1.03	System adjustments or voltage support if needed
DYERWIND 60 kV	Greater Bay Area	Mission	1.05	1.06	NA	1.05	1.05	System adjustments or voltage support if needed
E DUBLIN 60 kV	Greater Bay Area	Mission	1.00	1.05	NA	NA	1.00	System adjustments or voltage support if needed
EASTSHRE 115 kV	Greater Bay Area	Mission	1.05	1.05	NA	NA	1.05	System adjustments or voltage support if needed
EDENVALE 115 kV	Greater Bay Area	San Jose	1.05	1.06	NA	NA	1.05	System adjustments or voltage support if needed
IBM-BALY 115 kV	Greater Bay Area	San Jose	1.05	1.06	NA	NA	1.05	System adjustments or voltage support if needed
IBM-HRRS 115 kV	Greater Bay Area	San Jose	1.05	1.06	NA	NA	1.05	System adjustments or voltage support if needed
KIRKTAP2 115 kV	Greater Bay Area	Diablo	1.03	1.05	NA	NA	1.03	System adjustments or voltage support if needed
LOS ALTS 60 kV	Greater Bay Area	De Anza	1.03	1.05	NA	NA	1.03	System adjustments or voltage support if needed
LOS GATS 60 kV	Greater Bay Area	De Anza	1.03	1.05	NA	NA	1.03	System adjustments or voltage support if needed
LOYOLA 60 kV	Greater Bay Area	De Anza	1.04	1.05	NA	NA	1.04	System adjustments or voltage support if needed
MARKIE 115 kV	Greater Bay Area	San Jose	1.03	1.05	NA	NA	1.02	System adjustments or voltage support if needed
MINTA V3A 60 kV	Greater Bay Area	De Anza	1.06	1.05	NA	NA	1.06	System adjustments or voltage support if needed
MITCALF D 115 kV	Greater Bay Area	San Jose	1.05	1.06	NA	NA	1.05	System adjustments or voltage support if needed
MITCALF E 115 kV	Greater Bay Area	San Jose	1.05	1.06	NA	NA	1.05	System adjustments or voltage support if needed
PARKS 60 kV	Greater Bay Area	Mission	1.00	1.05	NA	NA	1.00	System adjustments or voltage support if needed
PERMNITE 60 kV	Greater Bay Area	De Anza	1.05	1.04	NA	NA	1.05	System adjustments or voltage support if needed
PERCY 115 kV	Greater Bay Area	San Jose	1.03	1.05	NA	NA	1.03	System adjustments or voltage support if needed
Q1454 115 kV	Greater Bay Area	San Jose	1.05	1.05	NA	NA	1.05	System adjustments or voltage support if needed
SAN RAMN 60 kV	Greater Bay Area	Mission	1.00	1.06	NA	NA	1.00	System adjustments or voltage support if needed
ST TRESA 115 kV	Greater Bay Area	San Jose	1.05	1.06	NA	NA	1.05	System adjustments or voltage support if needed
UNITEDSP 115 kV	Greater Bay Area	Diablo	1.03	1.05	NA	NA	1.03	System adjustments or voltage support if needed
ADERSLR 115 kV	Greater Fresno	Yosemite	1.01	1.03	1.05	NA	1.01	System adjustments or voltage support if needed
AIRPROD 115 kV	Greater Fresno	Fresno	1.03	1.07	1.07	1.05	1.02	System adjustments or voltage support if needed
AIRWAYS 115 kV	Greater Fresno	Fresno	1.01	1.06	1.07	1.05	1.00	System adjustments or voltage support if needed
AIRWAYS2 115 kV	Greater Fresno	Fresno	1.01	1.06	1.07	1.05	1.01	System adjustments or voltage support if needed
AMISTS SW 70 kV	Greater Fresno	Fresno	0.98	1.05	1.04	NA	0.99	System adjustments or voltage support if needed
ANGOLA 70 kV	Greater Fresno	Fresno	0.99	1.08	1.07	NA	0.99	System adjustments or voltage support if needed
ARBURU 170 kV	Greater Fresno	Yosemite	0.99	1.05	1.05	NA	1.00	System adjustments or voltage support if needed
ARMSTRNG 70 kV	Greater Fresno	Fresno	0.98	1.05	1.04	NA	0.99	System adjustments or voltage support if needed
ATWATER 115 kV	Greater Fresno	Yosemite	1.02	1.03	1.06	NA	1.02	System adjustments or voltage support if needed
AUBERRY 70 kV	Greater Fresno	Fresno	0.99	1.07	1.05	NA	0.99	System adjustments or voltage support if needed
BALCH 115 kV	Greater Fresno	Fresno	1.04	1.06	1.07	1.05	1.03	System adjustments or voltage support if needed
BARTON 115 kV	Greater Fresno	Fresno	1.01	1.05	1.07	1.05	1.01	System adjustments or voltage support if needed
BIOLA 70 kV	Greater Fresno	Fresno	1.02	1.05	1.04	NA	1.02	System adjustments or voltage support if needed
BONITA 70 kV	Greater Fresno	Yosemite	1.02	1.06	1.04	NA	1.02	System adjustments or voltage support if needed
BOSWELL 70 kV	Greater Fresno	Fresno	0.99	1.08	1.07	NA	1.00	System adjustments or voltage support if needed
BOWLES 70 kV	Greater Fresno	Fresno	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
BULLARD 115 kV	Greater Fresno	Fresno	1.01	1.05	1.07	1.04	1.00	System adjustments or voltage support if needed
CAL AVE 115 kV	Greater Fresno	Fresno	1.00	1.07	1.07	1.05	1.00	System adjustments or voltage support if needed
CALPEAKPNOCHE 115 kV	Greater Fresno	Yosemite	1.05	1.06	1.05	NA	1.05	System adjustments or voltage support if needed
CAMDEN 70 kV	Greater Fresno	Fresno	0.96	1.06	1.05	NA	0.96	System adjustments or voltage support if needed
CANAL 70 kV	Greater Fresno	Yosemite	0.97	1.06	1.05	NA	0.98	System adjustments or voltage support if needed
CANANDGA 70 kV	Greater Fresno	Yosemite	1.04	1.05	1.04	NA	1.04	System adjustments or voltage support if needed
CARUTHS 70 kV	Greater Fresno	Fresno	1.04	1.06	1.05	NA	1.04	System adjustments or voltage support if needed
CERTAN 115 kV	Greater Fresno	Yosemite	1.01	1.03	1.05	NA	1.01	System adjustments or voltage support if needed
CERTTEED 115 kV	Greater Fresno	Yosemite	1.01	1.03	1.05	NA	1.01	System adjustments or voltage support if needed
CHENY 115 kV	Greater Fresno	Yosemite	1.05	1.06	1.05	NA	1.05	System adjustments or voltage support if needed
CHENY2 115 kV	Greater Fresno	Yosemite	1.05	1.06	1.05	NA	1.05	System adjustments or voltage support if needed
CHLDHOSP 115 kV	Greater Fresno	Fresno	1.03	1.05	1.07	NA	1.02	System adjustments or voltage support if needed
CHWCGN 115 kV	Greater Fresno	Yosemite	1.01	1.03	1.05	NA	1.01	System adjustments or voltage support if needed
CHWCHLA2BM 115 kV	Greater Fresno	Yosemite	1.01	1.03	1.05	NA	1.01	System adjustments or voltage support if needed
CHWCHLLA 115 kV	Greater Fresno	Yosemite	1.01	1.03	1.05	NA	1.01	System adjustments or voltage support if needed
CLOVIS-1 115 kV	Greater Fresno	Fresno	1.02	1.07	1.07	1.05	1.01	System adjustments or voltage support if needed
CLOVIS-2 115 kV	Greater Fresno	Fresno	1.01	1.07	1.08	1.05	1.01	System adjustments or voltage support if needed
COPPRMNE 70 kV	Greater Fresno	Fresno	1.02	1.05	1.05	NA	1.02	System adjustments or voltage support if needed
CORCORAN 115 kV	Greater Fresno	Fresno	0.99	1.07	1.07	NA	0.99	System adjustments or voltage support if needed



Bus/Substation	Area	Zone	Voltage PU (Base Scenarios)				Voltage PU (Sensitivity Scenarios) 2025 OP Heavy Renewable & Min Gas Gen	Project & Potential Mitigation Solutions
			2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer Off-Peak	2035 Winter Off-Peak		
CORCORAN 70 kV	Greater Fresno	Fresno	1.00	1.08	1.08	1.05	1.00	System adjustments or voltage support if needed
CORCORAN2 115 kV	Greater Fresno	Fresno	0.99	1.07	1.07	NA	0.99	System adjustments or voltage support if needed
CORCORANV_P 115 kV	Greater Fresno	Fresno	0.99	1.07	1.07	NA	0.99	System adjustments or voltage support if needed
CORSOLD 115 kV	Greater Fresno	Yosemite	1.00	1.07	1.07	NA	1.00	System adjustments or voltage support if needed
CRESCENTS 70 kV	Greater Fresno	Fresno	1.04	1.04	1.04	NA	1.05	System adjustments or voltage support if needed
CRESEY 115 kV	Greater Fresno	Yosemite	1.01	1.03	1.06	NA	1.01	System adjustments or voltage support if needed
DANISHCM 115 kV	Greater Fresno	Fresno	1.01	1.07	1.07	1.05	1.00	System adjustments or voltage support if needed
DFS 115 kV	Greater Fresno	Yosemite	1.03	1.06	1.06	NA	1.04	System adjustments or voltage support if needed
EL CAPTN 115 kV	Greater Fresno	Yosemite	1.02	1.04	1.06	NA	1.02	System adjustments or voltage support if needed
EL NIDO 115 kV	Greater Fresno	Yosemite	1.03	1.05	1.06	NA	1.03	System adjustments or voltage support if needed
EL PECO 70 kV	Greater Fresno	Yosemite	1.03	1.05	1.04	NA	1.03	System adjustments or voltage support if needed
ELPECO T 70 kV	Greater Fresno	Yosemite	1.03	1.05	1.04	NA	1.04	System adjustments or voltage support if needed
EXCHEQR 115 kV	Greater Fresno	Yosemite	1.04	1.05	1.07	NA	1.04	System adjustments or voltage support if needed
FRESNOWW 70 kV	Greater Fresno	Fresno	1.05	1.05	1.04	NA	1.05	System adjustments or voltage support if needed
FRIANTDAM 70 kV	Greater Fresno	Fresno	1.02	1.05	1.04	NA	1.02	System adjustments or voltage support if needed
FRSHWTR 115 kV	Greater Fresno	Fresno	0.99	1.07	1.07	NA	0.99	System adjustments or voltage support if needed
GALLO 115 kV	Greater Fresno	Yosemite	1.01	1.03	1.06	NA	1.01	System adjustments or voltage support if needed
GLASS 70 kV	Greater Fresno	Yosemite	1.04	1.05	1.04	NA	1.04	System adjustments or voltage support if needed
GRNCLB 115 kV	Greater Fresno	Fresno	1.02	1.06	1.06	1.05	1.02	System adjustments or voltage support if needed
GRNCLSZEB 115 kV	Greater Fresno	Fresno	1.02	1.06	1.06	1.05	1.02	System adjustments or voltage support if needed
GUERNSEY 70 kV	Greater Fresno	Fresno	0.98	1.05	1.04	NA	0.99	System adjustments or voltage support if needed
HAMMONDS 115 kV	Greater Fresno	Yosemite	1.04	1.06	1.05	NA	1.04	System adjustments or voltage support if needed
HARDWICK 70 kV	Greater Fresno	Fresno	1.00	1.06	1.06	NA	1.00	System adjustments or voltage support if needed
HERNDON 115 kV	Greater Fresno	Fresno	1.03	1.05	1.06	NA	1.02	System adjustments or voltage support if needed
HNFRD SW 70 kV	Greater Fresno	Fresno	1.00	1.06	1.06	NA	1.00	System adjustments or voltage support if needed
KAMM 115 kV	Greater Fresno	Fresno	1.04	1.05	1.05	NA	1.05	System adjustments or voltage support if needed
KEARNEY 70 kV	Greater Fresno	Fresno	1.05	1.05	1.05	NA	1.05	System adjustments or voltage support if needed
KERCKHFI 115 kV	Greater Fresno	Fresno	1.03	1.07	1.07	1.05	1.02	System adjustments or voltage support if needed
KERCKHOFFPHZ 115 kV	Greater Fresno	Fresno	1.03	1.07	1.07	1.05	1.02	System adjustments or voltage support if needed
KINGSBURGD 115 kV	Greater Fresno	Fresno	1.01	1.06	1.06	NA	1.01	System adjustments or voltage support if needed
KINGSBURGE 115 kV	Greater Fresno	Fresno	1.01	1.06	1.06	NA	1.01	System adjustments or voltage support if needed
KINGLOBUS 70 kV	Greater Fresno	Fresno	1.01	1.06	1.06	1.05	1.01	System adjustments or voltage support if needed
KINGSOGN 115 kV	Greater Fresno	Fresno	1.02	1.06	1.06	1.05	1.02	System adjustments or voltage support if needed
KINGSRVIR 115 kV	Greater Fresno	Fresno	NA	1.07	1.07	1.05	1.03	System adjustments or voltage support if needed
KIRCP 115 kV	Greater Fresno	Fresno	1.03	1.07	1.07	1.05	1.02	System adjustments or voltage support if needed
LASPALMS 115 kV	Greater Fresno	Fresno	1.01	1.06	1.07	NA	1.01	System adjustments or voltage support if needed
LE GRAND 115 kV	Greater Fresno	Yosemite	1.01	1.04	1.06	NA	1.01	System adjustments or voltage support if needed
LIVINGSTN 115 kV	Greater Fresno	Yosemite	1.01	1.02	1.06	NA	1.01	System adjustments or voltage support if needed
LIVINGSTN 70 kV	Greater Fresno	Yosemite	0.90	1.09	1.03	NA	0.91	System adjustments or voltage support if needed
LUIS_#3 115 kV	Greater Fresno	Yosemite	1.04	1.06	1.05	NA	1.04	System adjustments or voltage support if needed
LUIS_#5 115 kV	Greater Fresno	Yosemite	1.04	1.06	1.05	NA	1.04	System adjustments or voltage support if needed
LIVINGSTN 70 kV	Greater Fresno	Yosemite	0.98	1.07	1.05	NA	0.98	System adjustments or voltage support if needed
MADERA 70 kV	Greater Fresno	Yosemite	1.04	1.05	1.04	NA	1.04	System adjustments or voltage support if needed
MALAGA 115 kV	Greater Fresno	Fresno	1.03	1.07	1.07	1.05	1.02	System adjustments or voltage support if needed
MANCHSTR 115 kV	Greater Fresno	Fresno	1.01	1.06	1.07	NA	1.01	System adjustments or voltage support if needed
MC CALL 115 kV	Greater Fresno	Fresno	1.03	1.07	1.07	1.06	1.03	System adjustments or voltage support if needed
MERCED 115 kV	Greater Fresno	Yosemite	1.02	1.03	1.06	NA	1.02	System adjustments or voltage support if needed
MERCYSRINGSS 70 kV	Greater Fresno	Yosemite	0.99	1.05	1.05	NA	1.00	System adjustments or voltage support if needed
MRCYSFRS 70 kV	Greater Fresno	Yosemite	0.98	1.06	1.05	NA	1.00	System adjustments or voltage support if needed
NRTYFRK 70 kV	Greater Fresno	Yosemite	0.99	1.07	1.06	NA	0.99	System adjustments or voltage support if needed
OAKHURST 115 kV	Greater Fresno	Yosemite	1.00	1.07	1.07	1.05	1.00	System adjustments or voltage support if needed
OROLOMA 115 kV	Greater Fresno	Yosemite	1.03	1.06	1.06	NA	1.03	System adjustments or voltage support if needed
ORTIGA 70 kV	Greater Fresno	Yosemite	0.98	1.06	1.05	NA	0.99	System adjustments or voltage support if needed
OXFORD 115 kV	Greater Fresno	Yosemite	1.04	1.06	1.05	NA	1.05	System adjustments or voltage support if needed
PANZ_TAP 115 kV	Greater Fresno	Yosemite	1.05	1.06	1.05	NA	1.05	System adjustments or voltage support if needed
PANOCHIE 115 kV	Greater Fresno	Yosemite	1.05	1.06	1.05	NA	1.05	System adjustments or voltage support if needed
PANOCHIE2 115 kV	Greater Fresno	Yosemite	1.05	1.06	1.05	NA	1.05	System adjustments or voltage support if needed
PANOCHIE 115 kV	Greater Fresno	Yosemite	1.05	1.06	1.05	NA	1.05	System adjustments or voltage support if needed
PARLIER 115 kV	Greater Fresno	Fresno	1.01	1.07	1.07	1.05	1.00	System adjustments or voltage support if needed
PIEDRA 1 115 kV	Greater Fresno	Fresno	1.01	1.07	1.07	1.05	1.01	System adjustments or voltage support if needed
PIEDRA 2 115 kV	Greater Fresno	Fresno	1.02	1.07	1.07	1.05	1.02	System adjustments or voltage support if needed
PNEDELE 115 kV	Greater Fresno	Fresno	1.01	1.05	1.07	NA	1.01	System adjustments or voltage support if needed
PNEDELE2 115 kV	Greater Fresno	Fresno	1.02	1.05	1.07	NA	1.01	System adjustments or voltage support if needed
PPG 115 kV	Greater Fresno	Fresno	1.03	1.07	1.07	1.05	1.02	System adjustments or voltage support if needed
RAINBW 115 kV	Greater Fresno	Fresno	1.01	1.07	1.07	1.05	1.01	System adjustments or voltage support if needed
RANCHRS 115 kV	Greater Fresno	Fresno	1.03	1.07	1.07	1.05	1.02	System adjustments or voltage support if needed
REEDLEY 115 kV	Greater Fresno	Fresno	1.00	1.07	1.07	1.05	1.00	System adjustments or voltage support if needed
RESERVE 70 kV	Greater Fresno	Fresno	0.98	1.07	1.04	NA	0.99	System adjustments or voltage support if needed
ROBYRVSNO 115 kV	Greater Fresno	Fresno	1.03	1.07	1.07	1.05	1.02	System adjustments or voltage support if needed
RIVERROC 70 kV	Greater Fresno	Fresno	1.02	1.05	1.04	NA	1.02	System adjustments or voltage support if needed
RVBREC T 70 kV	Greater Fresno	Fresno	1.02	1.05	1.04	NA	1.02	System adjustments or voltage support if needed
SANGER 115 kV	Greater Fresno	Fresno	1.02	1.07	1.07	1.05	1.01	System adjustments or voltage support if needed
SANGERCQN 115 kV	Greater Fresno	Fresno	1.02	1.07	1.07	1.05	1.01	System adjustments or voltage support if needed
SCHINDLR 115 kV	Greater Fresno	Fresno	1.03	1.05	1.05	NA	1.05	System adjustments or voltage support if needed
SEWTF 115 kV	Greater Fresno	Fresno	1.01	1.06	1.07	1.05	1.00	System adjustments or voltage support if needed
SHARON 115 kV	Greater Fresno	Yosemite	1.01	1.04	1.06	NA	1.01	System adjustments or voltage support if needed
SHEPHERD 115 kV	Greater Fresno	Fresno	1.03	1.06	1.07	1.05	1.02	System adjustments or voltage support if needed
STARWDPNCH 115 kV	Greater Fresno	Yosemite	1.05	1.06	1.05	NA	1.05	System adjustments or voltage support if needed
STROUD 70 kV	Greater Fresno	Fresno	1.03	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
SUNMAID 115 kV	Greater Fresno	Fresno	1.02	1.06	1.06	1.05	1.02	System adjustments or voltage support if needed
TRIGO 70 kV	Greater Fresno	Yosemite	1.04	1.05	1.04	NA	1.04	System adjustments or voltage support if needed
VEGA 70 kV	Greater Fresno	Yosemite	0.99	1.05	1.05	NA	1.00	System adjustments or voltage support if needed
WAHFOKE 115 kV	Greater Fresno	Fresno	1.01	1.07	1.07	1.05	1.01	System adjustments or voltage support if needed
WAIKENA_35 115 kV	Greater Fresno	Fresno	0.99	1.07	1.07	NA	0.99	System adjustments or voltage support if needed
WESTLINDS 115 kV	Greater Fresno	Fresno	1.04	1.05	1.05	NA	1.05	System adjustments or voltage support if needed
WILSONGAE 115 kV	Greater Fresno	Yosemite	1.03	1.03	1.06	NA	1.03	System adjustments or voltage support if needed
WILSONSTCOM 115 kV	Greater Fresno	Yosemite	1.04	1.03	1.06	NA	1.04	System adjustments or voltage support if needed
WISHON 70 kV	Greater Fresno	Fresno	1.00	1.06	1.05	NA	1.00	System adjustments or voltage support if needed
WOODWARD 115 kV	Greater Fresno	Fresno	1.03	1.06	1.07	NA	1.02	System adjustments or voltage support if needed
WST FRSD 115 kV	Greater Fresno	Fresno	1.00	1.07	1.07	1.05	1.00	System adjustments or voltage support if needed
WSTLDIRA 115 kV	Greater Fresno	Yosemite	1.04	1.06	1.05	NA	1.05	System adjustments or voltage support if needed
BIG LAGN 60 kV	Humboldt	Humboldt	1.06	1.04	NA	1.06	1.06	System adjustments or voltage support if needed
ORICK 60 kV	Humboldt	Humboldt	1.06	1.03	NA	1.06	1.06	System adjustments or voltage support if needed
TRINDAD 60 kV	Humboldt	Humboldt	1.05	1.04	NA	1.05	1.05	System adjustments or voltage support if needed
AIDLNGYSR 115 kV	North CoastNorth Bay	North Coast	1.03	1.05	NA	NA	1.03	System adjustments or voltage support if needed
ANNAPOLS 60 kV	North CoastNorth Bay	North Coast	1.00	1.06	NA	0.99	1.00	System adjustments or voltage support if needed
CALPELLA 115 kV	North CoastNorth Bay	North Coast	1.05	1.06	NA	NA	1.05	System adjustments or voltage support if needed
CARQUINZ 115 kV	North CoastNorth Bay	North Bay	1.02	1.07	NA	1.06	1.02	System adjustments or voltage support if needed
CLOWRDLE 115 kV	North CoastNorth Bay	North Coast	1.03	1.05	NA	NA	1.03	System adjustments or voltage support if needed
COTATI 60 kV	North CoastNorth Bay	North Coast	0.99	1.05	NA	NA	0.99	System adjustments or voltage support if needed
FORT RSS 60 kV	North CoastNorth Bay	North Coast	1.00	1.06	NA	NA	1.00	System adjustments or voltage support if needed
FULTON 115 kV	North CoastNorth Bay	North Coast	1.01	1.06	NA	NA	1.01	System adjustments or voltage support if needed
GUALALA 60 kV	North CoastNorth Bay	North Coast	0.98	1.06	NA	0.98	0.98	System adjustments or voltage support if needed
HIGHWAY 115 kV	North CoastNorth Bay	North Bay	1.00	1.07	NA	NA	1.00	System adjustments or voltage support if needed
IGNACIO 115 kV	North CoastNorth Bay	North Bay	1.02	1.07	NA	1.06	1.02	System adjustments or voltage support if needed
LS LLNS 115 kV	North CoastNorth Bay	North Bay	1.02	1.07	NA	1.06	1.02	System adjustments or voltage support if needed
LUCERNE 115 kV	North CoastNorth Bay	North Coast	1.04	1.05	NA	NA	1.04	System adjustments or voltage support if needed
MENDOONO 115 kV	North CoastNorth Bay	North Coast	1.06	1.06	NA	NA	1.06	System adjustments or voltage support if needed
MIRABEL 60 kV	North CoastNorth Bay	North Coast	1.03	1.05	NA	NA	1.03	System adjustments or voltage support if needed
MNTCLOPH 115 kV	North CoastNorth Bay	North Bay	1.00	1.07	NA	NA	1.00	System adjustments or voltage support if needed
MONROE1 115 kV	North CoastNorth Bay	North Coast	0.99	1.05	NA	NA	0.99	System adjustments or voltage support if needed
MONROE2 115 kV	North CoastNorth Bay	North Coast	0.99	1.05	NA	NA	0.99	System adjustments or voltage support if needed
MONTCLLO 115 kV	North CoastNorth Bay	North Bay	1.00	1.07	NA	NA	1.00	System adjustments or voltage support if needed

Bus/Substation	Area	Zone	Voltage PU (Base Scenarios)				Voltage PU (Sensitivity Scenarios)	Project & Potential Mitigation Solutions
			2025 Spring Off-Peak	2028 Spring Off-Peak	2028 Summer Off-Peak	2035 Winter Off-Peak	2025 OP Heavy Renewable & Min Gas Gen	
MONTE RO 60 kV	North Coast/North Bay	North Coast	1.01	1.05	NA	NA	1.01	System adjustments or voltage support if needed
NTHR ALT 115 kV	North Coast/North Bay	North Bay	1.00	1.07	NA	NA	1.00	System adjustments or voltage support if needed
REDBUD 115 kV	North Coast/North Bay	North Coast	1.04	1.06	NA	NA	1.04	System adjustments or voltage support if needed
RINCON 115 kV	North Coast/North Bay	North Coast	1.01	1.06	NA	NA	1.01	System adjustments or voltage support if needed
SAN RAEL 115 kV	North Coast/North Bay	North Bay	1.01	1.07	NA	1.06	1.01	System adjustments or voltage support if needed
SILVERDO 115 kV	North Coast/North Bay	North Bay	1.00	1.06	NA	NA	1.00	System adjustments or voltage support if needed
SKAGGS 115 kV	North Coast/North Bay	North Bay	1.02	1.07	NA	1.06	1.02	System adjustments or voltage support if needed
SLMN CRK 60 kV	North Coast/North Bay	North Coast	1.00	1.06	NA	NA	1.00	System adjustments or voltage support if needed
SNMA TAP 60 kV	North Coast/North Bay	North Coast	0.99	1.05	NA	NA	0.99	System adjustments or voltage support if needed
SNMALDFL 60 kV	North Coast/North Bay	North Coast	0.99	1.05	NA	NA	0.99	System adjustments or voltage support if needed
SNTA RSA 115 kV	North Coast/North Bay	North Coast	0.99	1.05	NA	NA	0.99	System adjustments or voltage support if needed
UKIAH 115 kV	North Coast/North Bay	North Coast	1.04	1.06	NA	NA	1.04	System adjustments or voltage support if needed
ANITA 60 kV	North Valley	North Valley	1.01	1.03	1.05	NA	1.01	System adjustments or voltage support if needed
BUTTE 115 kV	North Valley	North Valley	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
CASCADE 115 kV	North Valley	North Valley	1.04	1.06	1.04	NA	1.04	System adjustments or voltage support if needed
CEDR CRK 60 kV	North Valley	North Valley	1.04	1.06	1.06	NA	1.04	System adjustments or voltage support if needed
CHALLENGE 60 kV	North Valley	North Valley	1.03	1.07	1.08	1.07	1.03	System adjustments or voltage support if needed
CLOV TAP 60 kV	North Valley	North Valley	1.04	1.06	1.06	1.05	1.04	System adjustments or voltage support if needed
CORNING 60 kV	North Valley	North Valley	1.02	1.06	1.04	NA	1.02	System adjustments or voltage support if needed
DIRVILLE 60 kV	North Valley	North Valley	0.99	1.05	1.04	NA	0.99	System adjustments or voltage support if needed
ELKCREEK 60 kV	North Valley	North Valley	1.04	1.07	1.07	NA	1.04	System adjustments or voltage support if needed
FORBSTWN 115 kV	North Valley	North Valley	1.05	1.05	1.06	1.06	1.05	System adjustments or voltage support if needed
HAMLTON 60 kV	North Valley	North Valley	1.03	1.06	1.05	NA	1.03	System adjustments or voltage support if needed
HONCUT 115 kV	North Valley	North Valley	1.05	1.05	1.06	1.06	1.05	System adjustments or voltage support if needed
KILARC 60 kV	North Valley	North Valley	1.04	1.06	1.06	1.05	1.04	System adjustments or voltage support if needed
NORD 115 kV	North Valley	North Valley	1.02	1.06	1.05	NA	1.02	System adjustments or voltage support if needed
NOTRDAME 115 kV	North Valley	North Valley	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
OLSENHYDRO 60 kV	North Valley	North Valley	1.04	1.06	1.06	1.05	1.04	System adjustments or voltage support if needed
OREGNTRL 115 kV	North Valley	North Valley	1.04	1.05	1.04	NA	1.04	System adjustments or voltage support if needed
ORLAND B 60 kV	North Valley	North Valley	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
OWID 115 kV	North Valley	North Valley	1.05	1.05	1.06	1.06	1.05	System adjustments or voltage support if needed
PALERMO 115 kV	North Valley	North Valley	1.06	1.06	1.06	1.06	1.06	System adjustments or voltage support if needed
PARADISE 115 kV	North Valley	North Valley	1.03	1.05	1.05	NA	1.03	System adjustments or voltage support if needed
RED BLFF 60 kV	North Valley	North Valley	1.01	1.05	1.04	NA	1.01	System adjustments or voltage support if needed
SLYCREEK 115 kV	North Valley	North Valley	1.06	1.05	1.06	1.06	1.06	System adjustments or voltage support if needed
SYCAMORE 115 kV	North Valley	North Valley	1.02	1.06	1.05	NA	1.02	System adjustments or voltage support if needed
TKO TAP 60 kV	North Valley	North Valley	1.04	1.05	1.05	NA	1.04	System adjustments or voltage support if needed
VINA 60 kV	North Valley	North Valley	0.97	1.05	1.04	NA	0.97	System adjustments or voltage support if needed
WHITMORE 60 kV	North Valley	North Valley	1.04	1.06	1.06	NA	1.04	System adjustments or voltage support if needed
WILLOWS 60 kV	North Valley	North Valley	1.02	1.05	1.05	NA	1.02	System adjustments or voltage support if needed
WYANDTTE 115 kV	North Valley	North Valley	1.05	1.06	1.06	1.06	1.05	System adjustments or voltage support if needed