

2024-2025 ISO Reliability Assessment - Preliminary Study Results

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	
				2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity	2029 SP High CEC Forecast		
Bellota - Riverbank - Melones SW STA 115 kV Line	P2-4:A11-9:_TESLA 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	165	N/A	N/A	N/A	N/A	N/A	N/A	NConv	NConv	N/A	Project: Tesla 115 kV Bus Reconfiguration Project
	BELLOTA 230/115KV TB 1 & BELLOTA 230/115KV TB 2	P6	N-1-1	<100	<100	104	<100	<100	<100	<100	127	108	<100	Continue to monitor
	RPN JNCN-RIPON #1 115KV [0] MOAS OPENED ON VLYHMTPI_VALLY HM & STANISLAUS-MELONES SW STA-MANTECA #1 115KV [3830] MOAS OPENED ON STANISLAUSPH_FRGINTWP3	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	100	100	<100	Continue to monitor
Bellota-Riverbank-Melones 115 kV Line	P5-SC:A11:12:_MANTECA 115-60KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	110	105	104	129	145	147	147	111	135	103	Add Redundant battery
	P5-SA:A11:11:_TESLA 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	63	141	NConv	36	126	81	81	NConv	NConv	115	Add Redundant relay
Belloa 230/115 kV Transformer No. 2	P2-4:A11-9:_TESLA 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	44	N/A	N/A	N/A	N/A	N/A	N/A	NConv	NConv	N/A	Continue to monitor
Brighton - Bellota 230 kV Line	P5-SC:AS:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	131	125	N/A	23	54	12	12	50	45	131	Add Redundant battery
Brighton - Davis 115 kV Line	P4-2:AS:1:_STUCK BREAKER & NO BF RELAY RIO OSO 115KV CB 402 412 422 432 442 462 OR 472	P5	Non-Redundant battery supply/Relay	105	106	138	18	52	13	13	44	42	107	Add Redundant relay
	WOODLAND-DAVIS 115KV [4210] & BRIGHTN-W.SCRMNO 115KV [0]	P6	N-1-1	148	148	177	<100	<100	<100	<100	<100	<100	151	Review Project: Vaca Dixon Area Reinforcement Project
	BRIGHTN-W.SCRMNO 115KV [0] & WOODLAND-DAVIS 115KV [4210]	P6	N-1-1	127	128	149	<100	<100	<100	<100	<100	<100	130	Review Project: Vaca Dixon Area Reinforcement Project
Brighton 230/115 kV Transformer No. 9	P1-2:A11:4:_BRIGHTON-BELLOTA 230KV [4420]	P1	N-1	69	41	N/A	96	46	89	89	105	99	N/A	Sensitivity only
	RIO OSO-LOCKEFORD 230KV [5620] & BRIGHTON-BELLOTA 230KV [4420]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	127	<100	<100	Sensitivity only
	P7-1:A11:38:_BRIGHTON-BELLOTA 230KV [4420] & RIO OSO-LOCKEFORD 230KV [5620]	P7	DCTL	69	N/A	N/A	N/A	19	N/A	N/A	103	18	N/A	Sensitivity only
Colgate-Palermo 60 kV Line	COLGTE1 230/60KV TB 3 & NARROWSPH2 13.80KV GEN UNIT 1	P3	G-1 / N-1	100	100	101.13	<100	<100	<100	<100	<100	<100	99.88	Continue to monitor
	TABLE MTN-RIO OSO 230KV [5700] & PALERMO-COLGATE 230KV [5360]	P6	N-1-1	100	101	101	<100	<100	<100	<100	<100	<100	102	Summer setup
	P7-1:AS:6:_Table Mountain-Rio Oso 230 kV Line & Palermo-Colgate 230 kV Line	P7	DCTL	120	106	110	36	37	39	39	65	52	108	Summer setup
Cortina 230/115/60 kV Transformer No. 1	P1-3:A4:6:_CORTINA 230/115KV TB 4	P1	N-1	100	N/A	104	16	N/A	11	11	65	79	79	Project: Cortina 60KV reinforcement
	CORTINA 115/60KV TB 5 & Q1455SPV 0.60KV GEN UNIT 1	P3	G-1 / N-1	<100	<100	<100	<100	<100	<100	<100	170.73	118.41	<100	Sensitivity only
	CORTINA 115/60KV TB 5 & Q1455C2-Q1455C1 #1 35KV [0]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	171	118	<100	Sensitivity only
Cortina 60 kV Line No. 3	Base Case	P0	N0	200	203	165	24	61	17	17	144	61	206	Under review
Delta Switching Yard - Tesla 230 kV Line	P2-3:A4:4:_BDLSWSTA 230KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	40	40	55	83	32	61	61	102	39	39	Sensitivity only
Dixon-Vaca #1 60 kV	P1-2:A4:58:_DIXON-VACA #2 60KV [6740]	P1	N-1	121	121	103	17	38	38	38	90	38	130	Review Project: Vaca Dixon Area Reinforcement Project
Drum - Grass Valley - Weimar 60 kV Line	P1-2:AS:60:_COLGATE-GRASS VALLEY 60KV [6490]	P1	N-1	<100	112	78	22	12	47	47	73	12	101	Existing RAS under Review
	COLGATE-GRASS VALLEY 60KV [6490] & ROLLINS 6.60KV GEN UNIT 1	P3	G-1 / N-1	<100	114.41	<100	<100	<100	<100	<100	<100	<100	117.35	Existing RAS under Review
Drum - Higgins 115 kV Line	P4-2:AS:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundant battery supply/Relay	133	135	230	47	25	92	92	35	25	140	Add Redundant relay
Drum - Rio Oso 115 kV No. 1 Line	P2-4:AS:19:_GOLDHILL 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	NConv	N/A	N/A	N/A	34	N/A	N/A	59	37	N/A	Generation redispatch
Drum 115/60 kV Transformer No. 1	P4-2:AS:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundant battery supply/Relay	25	25	51	35	31	104	104	21	32	26	Add Redundant relay
	DRUM-HIGGINS 115KV [4393] MOAS OPENED ON CHCGO PK_HIGGINS & RIO OSO-DRUMPH1-BRUNSWCK 115KV [0]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
	PLACER-GOLD HILL #1 115KV [3340] & DRUM-HIGGINS 115KV [4393] MOAS OPENED ON CHCGO PK_HIGGINS	P6	N-1-1	<100	<100	101	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
EL Dorado-Missouri Flat #1 115kV	P2-1:AS:9:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHRPING2)	P2-1	Line Section w/o Fault	179	183	262	15	50	48	48	59	50	189	Under review
EL Dorado-Missouri Flat #2 115kV	P2-1:AS:9:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHRPING2)	P2-1	Line Section w/o Fault	218	223	319	13	72	39	39	79	71	230	Under review

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)						Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen Sensitivity	2026 OP Sensitivity	2029 SP High CEC Forecast	
Gold Hill 230/115 kV Transformer No. 2	P2-4:A5:4_GOLDHILL 230KV - SECTION 2E & 2D	P2-4	Bus-Tie-Breaker	N/A	84	100	15	84	38	N/A	N/A	86	Project: Gold Hill 230/115 kV Transformer Additoin Project. Short term: Action Plan
Hammer - Country Club 60 kV	P1-2:A11:92_LOCKEFORD #1 60KV [9461]	P1	N-1	74	75	40	50	69	59	177	170	73	Sensitivity only
	LOCKFORD 230/60KV TB 3 & LOCKFORD 230/60KV TB 2	P6	N-1-1	<100	110	<100	<100	<100	<100	<100	<100	111	Existing RAS under Review
	P7-1:A11:18_STAGG-COUNTRY CLUB #1 60KV [8080] & STAGG-COUNTRY CLUB #2 60KV [8090]	P7	DCTL	118	77	91	11	52	24	60	46	79	Existing RAS under Review
Higgins - Bell 115 kV Line	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	94	96	168	25	38	25	41	38	99	Continue to monitor
Kasson - Louise 60 kV Line	P5-SA:A11:14_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	184	108	116	34	38	24	129	38	109	Add Redundant relay
Lambie - Birds Landing 230 kV Line	P2-3:A4:4_BDL5WSTA 230KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	131	132	56	51	117	73	89	117	132	Under review
Lockeford - Bellota 230 kV Line	P2-4:A11:22_STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	29	100	N/A	44	25	44	45	45	101	Sensitivity only
	P4-2:A11:1_STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundant battery supply/Relay	22	99	N/A	44	25	44	45	45	100	Sensitivity only
	STAGG-E 230/60KV TB 4 & STAGG-D 230/60KV TB 1	P6	N-1-1	<100	100	<100	<100	<100	<100	<100	<100	101	Sensitivity only
Lockeford - Industrial 60 kV Line	P1-2: LOCKEFRD-VICTOR-INDUSTRIL 60KV [0]	P1	N-1	100	98	<100	89	<100	84	<100	<100	<100	Project: Lockeford-Lodi Project
	P2-1: LOCKEFRD-LODI #2 60KV [7440] [LOCKEFRD-VICTOR_JCT]	P2-1	Line Section w/o Fault	107	106	<100	92	<100	82	<100	<100	<100	Project: Lockeford-Lodi Project
Lockeford - Lodi 60 kV Line No. 2	P1-2:A11:93_LOCKEFORD-INDUSTRIAL 60KV [7420]	P1	N-1	101	101	44	88	61	100	130	127	17	Project: Lockeford - Lodi Area 230 kV Development
Lockeford 230/60 kV Transformer No. 3	P4-2:A11:1_STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundant battery supply/Relay	47	101	70	49	40	31	42	39	101	Add Redundant relay
Lockeford No. 1 60 kV Line	P1-2:A11:88_HAMMER-COUNTRY CLUB 60KV [7010] MOAS OPENED ON MORADAJT_MSHR 60V	P1	N-1	<100	77	34	67	44	83	114	108	<100	Sensitivity only
Manteca - Louise 60 kV Line	P5-SA:A11:14_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	119	70	76	23	25	8	84	25	71	Add Redundant relay
Manteca - Tierra 115 kV Lin	P2-4:A11:9_TESLA 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	41	N/A	N/A	N/A	N/A	N/A	NConv	NConv	N/A	Project: Tesla 115 kV Bus Reconfiguration Project
Missouri Flat - Gold Hill 115 kV No. 1 Line	P2-1:A5:9_MISSOURI FLAT-GOLD HILL #2 115KV [2670] [GOLDHILL-SHRPING2]	P2-1	Line Section w/o Fault	77	78	112	6	22	20	26	22	81	Continue to monitor
New Bellota-Lockeford 230 kV Line	P5-5C:A5:1_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	N/A	N/A	119	N/A	N/A	N/A	N/A	N/A	N/A	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	N/A	N/A	169	N/A	N/A	N/A	N/A	N/A	N/A	Add Redundant battery
Nicolaus - Marysville 60 kV Line	P2-3:A5:87_E_NICOLS 115KV - RING R1 & R5	P2-3	Non-Bus-Tie Breaker	89	102	140	5	50	35	36	49	106	Disable automatics
	E.MRYSVE-MRYSVILLE #1 60KV [0] & NARROWSPHZ 13.80KV GEN UNIT 1	P3	G-1 / N-1	<100	104.14	<100	<100	<100	<100	<100	<100	106.21	Disable automatics
	RIO OSO-NICOLAUS 115KV [3440] & PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRYJ2	P6	N-1-1	108	<100	<100	<100	<100	<100	<100	<100	<100	Disable automatics
	P7-1:A5:20_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	19	3	32	30	81	29	105	91	3	Disable automatics
Placer - Bell 115 kV Line	P2-4:A5:19_GOLDHILL 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	NConv	N/A	N/A	N/A	144	N/A	134	144	N/A	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	83	85	147	8	35	25	35	34	87	Add Redundant relay
Placer - Gold Hill 115 kV Line No. 1	PLACER-GOLD HILL #2 115KV [4290] & DRUM-HIGGINS 115KV [4393] MOAS OPENED ON CHCGO PK_HIGGINS	P6	N-1-1	83	96	114	<100	<100	<100	<100	<100	99	Continue to monitor
Placer - Gold Hill 115 kV Line No. 2	PLACER-GOLD HILL #1 115KV [3340] & DRUM-HIGGINS 115KV [4393] MOAS OPENED ON CHCGO PK_HIGGINS	P6	N-1-1	94	105	124	<100	<100	<100	<100	<100	107	Operation solution
Placer 115/60 kV Transformer No. 1	Base Case	P0	N0	85	86	108	13	33	34	27	34	88	Continue to monitor
Rancho Seco - Bellota 230 kV Line No. 2	RANCHO SECO-BELLOTA #1 230KV [5550] & GOLD HILL - LAKE 230KV [1]	P6	N-1-1	<100	<100	<100	<100	<100	100	100	<100	<100	Continue to monitor
Rio Oso - Linkcon 115 kV Line	ATLANTIC-GOLD HILL 230KV [4330] & RIO OSO-ATLANTIC 230KV [5590]	P6	N-1-1	115	<100	104	<100	<100	<100	<100	<100	<100	Project: Reconductor Rio Oso-SPI Jct-Lincoln 115kV line

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				2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity	2029 SP High CEC Forecast	
Rio Oso - Brighton 230 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	92	87	106	16	47	25	65	64	88	Add Redundant relay
Rio Oso - West Sacramento 115 kV Line	P2-3:A4:2:1:_BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2-3	Non-Bus-Tie Breaker	104	106	59	26	52	9	52	46	109	Project: Rio oso-w sacramento reconductoring
	BRIGHTON-BELLOTA 230KV [4420] & RIO OSO-BRIGHTON 230KV [5600]	P6	N-1-1	113	117	<100	<100	<100	<100	<100	<100	122	Project: Rio oso-w sacramento reconductoring
Riverbank Jct - Ripon 115 kV Line	P1-2:A12:8:_MI-WUK-CURTIS 115KV [1073] MOAS OPENED ON MI-WUK_SPSONDRAJCT	P1	N-1	43	43	31	100	59	85	113	115	50	Project: Manteca-Ripon-Riverbank-Melones Area 115 kV Line Reconductoring Stanislaus-Manteca rebuild project
	P5-SA:A11:11:_TESLA 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	53	106	NConv	23	80	61	NConv	NConv	88	Add Redundant relay
Riverbank Jct SW STA - Ripon 115 kV	P2-3:A11:26:_TESLA - 1D 115KV & TESLA-SCHULTE SW STA #1 LINE	P2-3	Non-Bus-Tie Breaker	35	N/A	N/A	N/A	41	N/A	118	108	N/A	Project: Manteca-Ripon-Riverbank-Melones Area 115 kV Line Reconductoring Stanislaus-Manteca rebuild project
	P2-4:A11:9:_TESLA 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	139	N/A	N/A	N/A	N/A	N/A	NConv	NConv	N/A	Project: Tesla 115 kV Bus Reconfiguration Project
	MELONES-MANTECA 115KV [0] MOAS OPENED ON STANISLAUSPH_FRGNTNP1 & STANISLAUS-MANTECA #2 115KV [3820]	P6	N-1-1	<100	<100	<100	100	<100	90	<100	95	<100	Continue to monitor
Schulte - Kasson - Manteca 115 kV Line	SCHULTE SW STA-LAMMERS 115KV [3993] & TESLA-LEPRINO_JCT 115KV [0] MOAS OPENED ON LEPRINO_JCT_TRACY JC	P6	N-1-1	137	109	120	<100	<100	<100	<100	<100	105	Operation solution
Smartville - Nicolaus 60 kV No. 2 Line	P5-SA:A5:2:_RIO OSO 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	103	97	108	28	56	32	77	64	98	Add Redundant relay
	RIO OSO-NICOLAUS 115KV [3440] & PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON E.MRYR_I2_E.NICDLS	P6	N-1-1	<100	<100	106	<100	<100	<100	<100	<100	<100	Continue to monitor
Stagg - Hammer 60 kV Line No 1	LOCKFORD 230/60KV TB 3 & LOCKFORD 230/60KV TB 2	P6	N-1-1	<100	154	127	101	<100	<100	<100	<100	155	Existing RAS under Review
	P7-1:A11:18:_STAGG-COUNTRY CLUB #1 60KV [8080] & STAGG-COUNTRY CLUB #2 60KV [8090]	P7	DCTL	141	106	129	18	62	<100	74	56	109	Existing RAS under Review
	P7-1:A11:24:_RIO OSO-LOCKFORD 230KV [5620] & LOCKFORD-BELLOTA 230KV [4990]	P7	DCTL	60	154	64	102	26	84	33	25	155	Existing RAS under Review
Stanislaus - Melones SW STA - Riverbank JCT SW STA 115 kV Line	P1-2:A12:11:_MELONES-MANTECA 115KV [0] MOAS OPENED ON STANISLAUSPH_FRGNTNP1	P1	N-1	37	59	106	34	39	10	<100	<100	109	Continue to monitor
	P2-1:A11:35:_RIPON-MANTECA 115KV [1062] (RPN2-MANTECA)	P2-1	Line Section w/o Fault	17	91	52	107	63	137	223	210	36	Continue to monitor
	MANTECA-RIPON 115KV [0] & STANISLAUSPH 13.80KV GEN UNIT 1	P3	G-1 / N-1	<100	<100	105.76	<100	<100	<100	<100	<100	<100	Continue to monitor
	MANTECA-MELONES 115KV [0] MOAS OPENED ON STANISLAUSPH_FRGNTNP1 & STANISLAUSPH 13.80KV GEN UNIT 1	P3	G-1 / N-1	<100	<100	<100	100.34	<100	<100	101.03	96.87	<100	Continue to monitor
	P5-SC:A11:9:_TESLA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	101	NConv	NConv	139	34	50	NConv	NConv	150	Add Redundant battery
	P5-SA:A11:11:_TESLA 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	93	180	NConv	116	87	<100	NConv	NConv	148	Add Redundant relay
	BELLOTA 230/115KV TB 2 & BELLOTA 230/115KV TB 1	P6	N-1-1	<100	<100	112	<100	<100	<100	<100	<100	<100	Continue to monitor
Stanislaus-Melones-Manteca 115 kV Line No. 1	P2-4:A11:9:_TESLA 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	126	N/A	N/A	N/A	N/A	N/A	NConv	NConv	N/A	Project: Manteca-Ripon-Riverbank-Melones Area 115 kV Line Reconductoring Stanislaus-Manteca rebuild project
	P2-4:A11:1:_BELLOTA 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	18	13	116	14	17	13	88	59	26	Project: Manteca-Ripon-Riverbank-Melones Area 115 kV Line Reconductoring Stanislaus-Manteca rebuild project
	STANISLAUSPH-MELONES-RIVRBKIT 115KV [0] & Q1109BESS 34.50KV GEN UNIT 1	P3	G-1 / N-1	<100	<100	<100	90	<100	<100	100.33	100.38	<100	Continue to monitor
	P5-SC:A11:9:_TESLA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	102	NConv	NConv	120	38	40	NConv	NConv	143	Add Redundant battery
	P5-SA:A11:11:_TESLA 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	96	155	NConv	109	42	31	NConv	NConv	132	Add Redundant relay
	BELLOTA 230/115KV TB 2 & BELLOTA 230/115KV TB 1	P6	N-1-1	<100	<100	108	<100	<100	<100	<100	<100	<100	Continue to monitor
Stockton 'A' - Lockeford - Bellota 115 kV Line No. 2	STANISLAUS-MANTECA #2 115KV [3820] & STANISLAUSPH-MELONES-RIVRBKIT 115KV [0]	P6	N-1-1	<100	<100	<100	107	<100	101	99	99	<100	Continue to monitor
	P2-3:A11:39:_BELLOTA - 1D 115KV & BELLOTA-RIVERBANK LINE	P2-3	Non-Bus-Tie Breaker	83	83	113	15	38	14	27	27	85	Continue to monitor
Tesla - Salado - Manteca 115 kV Line	P5-SA:A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	137	52	72	14	43	<100	95	58	47	Add Redundant relay
	P2-3:A11:28:_TESLA - 1D 115KV & TESLA-LAWRENCE LAB LINE	P2-3	Non-Bus-Tie Breaker	48	N/A	N/A	N/A	N/A	N/A	121	92	N/A	Continue to monitor

2024-2025 ISO Reliability Assessment - Preliminary Study Results

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
				2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity	2029 SP High CEC Forecast	
Tesla - Schulte 115 kv Line No. 1	TESLA-SCHULTE SW STA #1 115KV [3980] & GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS	P3	G-1 / N-1	104.09	97	111	<100	<100	<100	<100	<100	93.41	Operation solution
	SCHULTE - GWFTRCY 115KV [1] & TESLA-SCHULTE SW STA #2 115KV [3980]	P6	N-1-1	103	96	111	<100	<100	<100	<100	<100	92	Operation solution
Tesla - Tracy 115 kv Line	P5-SC-A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	140	106	138	22	52	<100	93	66	103	Add Redundant battery
	P5-SA-A11:14:_KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	53	81	105	15	24	<100	33	24	78	Add Redundant relay
	SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	130	102	125	<100	<100	<100	94	<100	100	Operation solution
Tesla-Schulte SW STA #2 115 kv Line	TESLA-SCHULTE SW STA #1 115KV [3970] & GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS	P3	G-1 / N-1	103.64	96	111	<100	<100	<100	<100	<100	92.99	Operation solution
	TESLA-SCHULTE SW STA #1 115KV [3970] & SCHULTE - GWFTRCY 115KV [1]	P6	N-1-1	103	95	110	<100	<100	<100	<100	<100	92	Operation solution
Tiger Creek - Electra 230 kv Line	VALLEY SPRINGS-BELLOTA 230KV [5860] & WOODLANDBIOM 13.80KV GEN UNIT 1	P3	G-1 / N-1	<100	<100	101.40	<100	<100	<100	<100	<100	<100	Continue to monitor
Vaca - Bahla 230 kv Line	P2-3:A4:4:_BDLSWSTA 230KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	150	151	74	63	135	73	107	136	150	Under review
	P5-SC-A11:1:_TESLA 500KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	109	86	83	44	20	24	105	83	85	Add Redundant battery
Vaca - Parkway 230 kv Line	P5-SC-A11:9:_TESLA 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	80	NConv	NConv	61	37	38	NConv	NConv	66	Add Redundant battery
Valley Springs 230/60 kv Transformer No. 1	VLY SP5 230/60KV TB 2 & WOODLANDBIOM 13.80KV GEN UNIT 1	P3	G-1 / N-1	<100	<100	102.15	<100	<100	<100	<100	<100	<100	Continue to monitor
	VLY SP5 230/60KV TB 2 & RIO OSO-WOODLAND #2 115KV [3470]	P6	N-1-1	<100	<100	102	<100	<100	<100	<100	<100	<100	Continue to monitor
Vierra - Tracy - Kasson 115 kv Line	P1-2:A11:52:_TESLA-LEPRIND_JCT 115KV [0] MOAS OPENED ON LEPRINDO_JCT_TRACY JC	P1	N-1	<100	88	31	43	67	42	113	120	<100	Sensitivity only
	P5-SC-A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	135	80	111	8	45	15	94	67	73	Add Redundant battery
	VIERRA-TESLA 115KV [0] & TESLA-LEPRINDO_JCT 115KV [0] MOAS OPENED ON LEPRINDO_JCT_TRACY JC	P6	N-1-1	<100	91	104	<100	<100	<100	<100	<100	<100	Continue to monitor
Weber 60 kv Line No. 2 (Weber - French Camp)	P1-2:A11:78:_WEBER-FRENCH CAMP #1 60KV [8320]	P1	N-1	112	140	27	41	53	37	102	103	19	Project: French Camp Reinforcement Project
West Sacramento - Brighton 115 kv Line	P5-SC-A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDANT BATT)	P5	Non-Redundant battery supply/Relay	106	98	135	19	43	<100	44	37	102	Add Redundant battery
West Sacramento - Davis 115 kv Line	P7-1:A4:17:_Rio Oso-West Sacramento 115 kv Line & West Sacramento-Brighton 115 kv Line	P7	DCTL	89	89	106	25	40	<100	55	39	91	Review Project: Vaca Dixon Area Reinforcement Project
Woodland-Davis 115 kv Line	P2-3:A4:18:_BRIGHTN - ME 115KV & BRIGHTN-W.SCRMND LINE	P2-3	Non-Bus-Tie Breaker	108	75	87	<100	56	<100	45	41	77	Review Project: Vaca Dixon Area Reinforcement Project
	P5-SA:A4:7:_BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	120	102	124	27	60	11	56	53	104	Add Redundant relay
	RIO OSO-BRIGHTON 230KV [5600] & BRIGHTON-BELLOTA 230KV [4420]	P6	N-1-1	119	<100	<100	<100	<100	<100	<100	<100	<100	Review Project: Vaca Dixon Area Reinforcement Project
	BRIGHTON-BELLOTA 230KV [4420] & RIO OSO-BRIGHTON 230KV [5600]	P6	N-1-1	119	101	<100	<100	<100	<100	<100	<100	102	Review 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
				2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity	2029 SP High CEC Forecast	
CARBONA 60 kV	P5-5A:A11:14: KASSON 115KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	0.92	0.95	0.91	1.02	1.05	1.03	0.90	1.01	0.95	System adjustments or voltage support if needed
EL DORADO PH 115 kV	P2-1:A5:9: MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2	Line Section w/o Fault	0.89	0.89	0.89	1.05	1.07	1.07	1.01	1.05	0.86	System adjustments or voltage support if needed
MERIDIAN 60 kV	Base Case	P0	N-0	0.88	0.85	0.91	1.07	1.04	1.03	0.93	1.06	0.86	Under review
GRAND ISLAND 115 kV	P5-5A:A4:7: BRIGHTON 230KV BUS (FAILURE OF NON-REDUNDANT RELAY)	P5	Non-Redundant battery supply/Relay	0.89	0.91	0.83	1.02	1.08	1.07	1.00	1.02	0.89	System adjustments or voltage support if needed
LOCKEFORD 230 kV	P1-2:A11:5: LOCKEFORD-BELLOTA 230KV [4990] & P1-1:A5:11: COLGATE1 13.80KV GEN UNIT 1	P3	G-1 / N-1	0.89	>.95	>.95	>.95	>.95	>.95	>.95	>.95	>.95	Lockeford-Lodi Area 230 kV Development project
LOCKEFORD 230 kV	P1-2:A11:5: LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	0.90	0.91	0.96	0.96	0.98	0.97	0.94	0.96	0.90	Lockeford-Lodi Area 230 kV Development project
PLACER 115 kV	P4-2:A5:2: STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundant battery supply/Relay	0.92	0.92	0.60	1.04	1.11	1.10	1.01	1.04	0.91	System adjustments or voltage support if needed
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	0.92	0.92	0.60	1.04	1.11	1.10	1.01	1.04	0.91	System adjustments or voltage support if needed
BELL 115 kV	P4-2:A5:2: STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundant battery supply/Relay	0.92	0.92	0.61	1.05	1.10	1.10	1.01	1.04	0.92	System adjustments or voltage support if needed
BELL 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	0.92	0.93	0.61	1.05	1.11	1.10	1.01	1.04	0.92	System adjustments or voltage support if needed
WEIMAR 60 kV	P1-1:A5:28: ROLLINS 6.60KV GEN UNIT 1	P1	N-1	0.93	0.93	0.90	0.98	1.02	1.01	0.97	0.98	0.93	System adjustments or voltage support if needed
COUNTRY CLUB 60 kV	P2-4:A11:22: STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus-Tie-Breaker	0.93	0.48	0.37	<.95	1.05	1.00	<.95	<.95	0.48	Under review
EAST MARYSVILLE 115 kV	P2-1:A5:13: PALERMO-NICOLAUS 115KV [3210] (E.MRYSVE-E.MRY J2)	P2	Line Section w/o Fault	<.95	1.12	0.88	<.95	1.13	1.14	<.95	<.95	1.12	System adjustments or voltage support if needed
HAMMER 60 kV	P2-4:A11:22: STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus-Tie-Breaker	0.92	0.48	0.37	<.95	1.05	1.00	<.95	<.95	0.47	Under review
MOSHER 60 kV	P2-4:A11:22: STAGG-D SECTION 1D & STAGG-E SECTION 1E 230KV	P2	Bus-Tie-Breaker	0.91	0.56	0.51	<.95	1.05	1.01	<.95	<.95	0.55	Under review
COUNTRY CLUB 60 kV	P4-2:A11:1: STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundant battery supply/Relay	<.95	0.48	0.36	<.95	1.05	1.00	<.95	<.95	0.48	System adjustments or voltage support if needed
MOSHER 60 kV	P4-2:A11:1: STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundant battery supply/Relay	<.95	0.56	0.50	<.95	1.05	1.01	<.95	<.95	0.55	System adjustments or voltage support if needed
SUTTER HOME SWITCHING STATION 60	P4-2:A11:1: STUCK BREAKER & NO BF RELAY STAGG 230 KV CB252	P5	Non-Redundant battery supply/Relay	<.95	0.47	0.33	<.95	1.02	0.97	<.95	<.95	0.46	System adjustments or voltage support if needed
COUNTRY CLUB 60 kV	P7-1:A11:34: EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	<.95	NConv	0.28	<.95	1.05	1.10	<.95	<.95	NConv	System adjustments or voltage support if needed
HAMMER 60 kV	P7-1:A11:34: EIGHT MILE ROAD-STAGG 230KV [5002] & STAGG-TESLA 230KV [5680]	P7	DCTL	<.95	NConv	0.29	<.95	1.05	1.10	<.95	<.95	NConv	System adjustments or voltage support if needed
LODI 60 kV	P7-1:A11:24: RIO OSO-LOCKEFORD 230KV [5620] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	<.95	0.34	1.02	<.95	0.46	0.42	<.95	<.95	0.34	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
				2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity	2029 SP High CEC Forecast	
GOLD HILL 115 kV	P5-5A:A5:3: GOLD HILL 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	NConv	NConv	NConv	1.03	1.16	1.05	1.05	1.03	NConv	System adjustments or voltage support if needed
WEST SACRAMENTO 115 kV	P2-3:A4:21: BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2	Non-Bus-Tie Breaker	0.94	0.94	0.90	1.03	1.07	1.05	1.01	1.03	0.93	Continue to monitor
CORTINA 230 kV	P2-3:A4:55: CORTINA 230KV - RING R2 & R3	P2	Non-Bus-Tie Breaker	0.94	0.89	0.94	1.01	1.11	1.12	0.96	1.00	0.94	System adjustments or voltage support if needed
DAVIS 115 kV	P2-3:A4:21: BRIGHTN - ME 115KV & BRIGHTON-DAVIS LINE	P2	Non-Bus-Tie Breaker	0.94	0.94	0.90	1.03	1.07	1.05	1.01	1.03	0.94	Continue to monitor
CORTINA 115 kV	P2-3:A4:58: CORTINA 230KV - RING R1 & R4	P2	Non-Bus-Tie Breaker	0.96	0.93	0.99	1.03	1.12	1.11	0.99	1.02	0.97	System adjustments or voltage support if needed
BRIGHTON 230 kV	P2-4:A11:1: BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-Tie-Breaker	0.96	0.96	0.89	1.01	1.03	1.03	1.00	1.01	0.95	Continue to monitor
EAST NICOLAUS 115 kV	P2-3:A5:87: E.NICOLS 115KV - RING R1 & R5	P2	Non-Bus-Tie Breaker	1.01	1.00	0.79	1.13	1.09	1.06	1.05	1.13	1.00	Continue to monitor
TESLA 115 kV	P2-4:A11:8: TESLA D 230KV - SECTION 1D & 2D	P2	Bus-Tie-Breaker	1.01	1.01	0.97	1.03	1.02	1.03	0.90	1.00	1.02	System adjustments or voltage support if needed
SCHULTE SW STA 115 kV	P2-4:A11:8: TESLA D 230KV - SECTION 1D & 2D	P2	Bus-Tie-Breaker	1.01	1.02	0.97	1.03	1.02	1.03	0.88	0.99	1.02	System adjustments or voltage support if needed
RIPON 115 kV	P2-1:A11:35: RIPON-MANTECA 115KV [1062] (RPNJ2-MANTECA)	P2	Line Section w/o Fault	1.01	0.96	0.93	1.01	0.99	1.01	0.81	0.90	1.01	Continue to monitor
CLAY 60 kV	P2-3:A11:94: VLLY SPS 230KV - RING R1 & R4	P2	Non-Bus-Tie Breaker	1.01	1.02	0.85	1.03	1.05	1.05	1.06	1.04	1.01	Continue to monitor
VALLEY HOME 115 kV	P2-4:A11:1: BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-Tie-Breaker	1.01	1.03	0.84	1.04	1.03	1.05	1.00	1.03	1.02	Continue to monitor
CURTIS 115 kV	P2-4:A11:1: BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-Tie-Breaker	1.02	1.04	0.76	1.04	1.04	1.06	1.00	1.02	1.03	Continue to monitor
MI-WUK 115 kV	P2-4:A11:1: BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-Tie-Breaker	1.03	1.04	0.78	1.04	1.05	1.06	1.01	1.03	1.04	Continue to monitor
MELONES SW STA 115 kV	P2-4:A11:1: BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-Tie-Breaker	1.03	1.05	0.75	1.05	1.04	1.06	0.98	1.02	1.04	Continue to monitor
FROGTOWN 115 kV	P2-4:A11:1: BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-Tie-Breaker	1.03	1.05	0.80	1.05	1.05	1.06	1.00	1.04	1.04	Continue to monitor
STOCKTON A 115 kV	P2-4:A11:1: BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-Tie-Breaker	1.04	1.11	0.50	1.04	1.04	1.12	0.95	1.01	1.11	Continue to monitor
LOCKEFORD 115 kV	P2-4:A11:1: BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-Tie-Breaker	1.04	1.11	0.52	1.03	1.04	1.12	0.96	1.01	1.11	Continue to monitor
STANISLAUS PH 115 kV	P2-4:A11:1: BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-Tie-Breaker	1.04	1.06	0.84	1.06	1.06	1.07	1.02	1.05	1.05	Continue to monitor
BELLOTA 115 kV	P2-4:A11:1: BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-Tie-Breaker	1.04	1.12	0.54	1.03	1.03	1.12	0.95	1.01	1.11	Continue to monitor
HORSESHOE 115 kV	P2-4:A5:5: GOLDHILL 115KV - SECTION 1F & 1G	P2	Bus-Tie-Breaker	>.95	1.00	0.90	>.95	1.07	1.07	>.95	>.95	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
				2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity	2029 SP High CEC Forecast	
CLAY 60 kV	P1-2:A11:10:_VALLEY SPRINGS-BELLOTA 230KV [5860] & P1-1:A11:26:_WESTPOINTPH 11.50KV GEN UNIT 1	P3	G-1 / N-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
MERIDIAN 60 kV	P1-1:A4:22:_WADHAM 13.80KV GEN UNIT 1 & P1-1:A4:1:_Q1455SPV 0.60KV GEN UNIT 1	P3	G-1 / N-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
RIPON 115 kV	P1-2:A11:46:_MANTECA-RIPON 115KV [0] & P1-1:A12:13:_STANISLAUSPH 13.80KV GEN UNIT 1	P3	G-1 / N-1	>.95	>.95	0.88	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
VALLEY SPRINGS 230 kV	P1-2:A11:10:_VALLEY SPRINGS-BELLOTA 230KV [5860] & P1-1:A4:23:_WOODLANDBIOM 13.80KV GEN UNIT 1	P3	G-1 / N-1	>.95	>.95	0.87	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
WEIMAR 60 kV	P1-1:A5:28:_ROLLINS 6.60KV GEN UNIT 1 & P1-1:A11:36:_GWFTRCY3 18.00KV & GWFTRCY1 13.80KV & GWFTRCY2 13.80KV GEN UNITS	P3	G-1 / N-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
LAMMERS 115 kV	P5-5C:A11:19:_SCHULTE SW STA 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.94	0.96	0.88	1.02	1.04	1.05	0.96	1.02	0.97	Continue to monitor
HIGGINS 115 kV	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundant battery supply/Relay	0.94	0.94	0.67	1.05	1.10	1.09	1.02	1.05	0.94	Continue to monitor
WOODLAND 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-Redundant battery supply/Relay	0.96	0.99	0.81	1.05	1.09	1.07	1.01	1.05	0.98	Continue to monitor
ATLANTIC 230 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.96	0.97	0.87	1.03	1.02	1.05	1.00	1.02	0.97	Continue to monitor
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-Redundant battery supply/Relay	0.96	0.97	0.90	1.01	1.02	1.03	1.00	1.01	0.97	Continue to monitor
DAVIS 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-Redundant battery supply/Relay	0.97	1.00	0.84	1.05	1.08	1.07	1.02	1.05	1.00	Continue to monitor
PLEASANT GROVE 115 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.98	0.99	0.87	1.04	1.04	1.08	1.02	1.04	0.99	Continue to monitor
LINCOLN 115 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.98	1.00	0.86	1.04	1.05	1.08	1.03	1.04	0.99	Continue to monitor
ATLANTIC 115 kV	P5-5C:A5:1:_RIO OSO 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundant battery supply/Relay	0.98	1.00	0.88	1.05	1.04	1.07	1.02	1.05	0.99	Continue to monitor
LOCKEFORD 230 kV	P5-5C(DC):A4:2:_STATION DC BATTERY SUPPLY BRIGHTON 230KV BATT	P5	Non-Redundant battery supply/Relay	0.98	0.89	0.97	1.01	0.98	0.97	0.98	1.00	0.89	Lockeford-Lodi Area 230 kV Development project
HALSEY PH 60 kV	P4-2:A5:2:_STUCK BREAKER & NO BF RELAY GOLD HILL 115KV CB 172 OR 392	P5	Non-Redundant battery supply/Relay	0.99	0.99	0.58	1.03	1.04	1.03	1.02	1.03	0.99	Continue to monitor
WEST SACRAMENTO 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-Redundant battery supply/Relay	1.00	1.03	0.89	1.06	1.08	1.08	1.04	1.06	1.03	Continue to monitor
RIO OSO 230 kV	P5-5A:A5:2:_RIO OSO 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundant battery supply/Relay	1.02	1.03	0.87	1.03	1.03	1.03	1.19	1.03	1.03	Continue to monitor
ATLANTIC 115 kV	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330] & P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590]	P6	N-1-1	>.95	>.95	0.86	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
ATLANTIC 115 kV	P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590] & P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330]	P6	N-1-1	>.95	>.95	0.86	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
ATLANTIC 230 kV	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330] & P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590]	P6	N-1-1	>.95	>.95	0.83	>.95	>.95	>.95	>.95	>.95	>.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
				2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity	2029 SP High CEC Forecast	
BELL 115 kV	P1-2:A5:16:_PLACER-GOLD HILL #1 115KV [3340] & P1-2:A5:17:_PLACER-GOLD HILL #2 115KV [4290]	P6	N-1-1	>.95	>.95	0.82	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
BELLOTA 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	>.95	>.95	0.56	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
BRIGHTON 115 kV	P1-2:A11:114:_LOCKFORD-BRIGHTON 230KV [0] & P1-2:A4:6:_RIO OSO-BRIGHTON 230KV [5600]	P6	N-1-1	>.95	>.95	0.85	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
CLAY 60 kV	P1-2:A11:10:_VALLEY SPRINGS-BELLOTA 230KV [5860] & P1-3:A11:11:_VLLY SPS 230/60KV TB 2	P6	N-1-1	>.95	>.95	0.85	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
CORTINA 230 kV	P1-2:A4:10:_CORTINA-VACA 230KV [4540] & P1-2:A4:2:_DELEVAN-CORTINA 230KV [4384]	P6	N-1-1	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	>.95	System adjustments or voltage support if needed
COUNTRY CLUB 60 kV	P1-2:A11:11:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:9:_STAGG-TESLA 230KV [5680]	P6	N-1-1	>.95	>.95	0.28	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
CURTIS 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	>.95	>.95	0.78	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
DAVIS 115 kV	P1-2:A11:114:_LOCKFORD-BRIGHTON 230KV [0] & P1-2:A4:6:_RIO OSO-BRIGHTON 230KV [5600]	P6	N-1-1	>.95	>.95	0.86	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
EAST MARYSVILLE 115 kV	P1-2:A5:15:_PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & P1-2:A5:26:_RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	>.95	>.95	0.83	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
EAST NICOLAUS 115 kV	P1-2:A5:15:_PALERMO-NICOLAUS 115KV [3210] MOAS OPENED ON PALERMO_E.MRY J2 & P1-2:A5:26:_RIO OSO-NICOLAUS 115KV [3440]	P6	N-1-1	>.95	>.95	0.81	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
FROGTOWN 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	>.95	>.95	0.82	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
FROGTOWN 115 kV	P1-3:A11:9:_BELLOTA 230/115KV TB 2 & P1-3:A11:8:_BELLOTA 230/115KV TB 1	P6	N-1-1	>.95	>.95	0.82	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
GRAND ISLAND 115 kV	P1-2:A11:114:_LOCKFORD-BRIGHTON 230KV [0] & P1-2:A4:6:_RIO OSO-BRIGHTON 230KV [5600]	P6	N-1-1	>.95	>.95	0.84	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
HALSEY PH 60 kV	P1-2:A5:16:_PLACER-GOLD HILL #1 115KV [3340] & P1-2:A5:17:_PLACER-GOLD HILL #2 115KV [4290]	P6	N-1-1	>.95	>.95	0.83	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
HALSEY PH 60 kV	P1-2:A5:17:_PLACER-GOLD HILL #2 115KV [4290] & P1-2:A5:16:_PLACER-GOLD HILL #1 115KV [3340]	P6	N-1-1	>.95	>.95	0.83	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
HAMMER 60 kV	P1-2:A11:11:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:9:_STAGG-TESLA 230KV [5680]	P6	N-1-1	>.95	>.95	0.29	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
HIGGINS 115 kV	P1-2:A5:16:_PLACER-GOLD HILL #1 115KV [3340] & P1-2:A5:17:_PLACER-GOLD HILL #2 115KV [4290]	P6	N-1-1	>.95	>.95	0.86	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
LAMMERS 115 kV	P1-2:A11:43:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] & P1-2:A11:57:_SCHULTE SW STA-LAMMERS 115KV [3993]	P6	N-1-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
LEPRINO SW STA 115 kV	P1-2:A11:108:_VIERRA-TRACY-KASSON 115KV [4310] (2) & P1-2:A11:52:_TESLA-LEPRINO_JCT 115KV [0] MOAS OPENED ON LEPRINO_JCT_TRACY JC	P6	N-1-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
LEPRINO SW STA 115 kV	P1-2:A11:52:_TESLA-LEPRINO_JCT 115KV [0] MOAS OPENED ON LEPRINO_JCT_TRACY JC & P1-2:A11:108:_VIERRA-TRACY-KASSON 115KV [4310] (2)	P6	N-1-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
LOCKEFORD 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	>.95	>.95	0.55	>.95	>.95	>.95	>.95	>.95	>.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
				2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity	2029 SP High CEC Forecast	
LODI 60 kV	P1-2:A11:2:_RIO OSO-LOCKEFORD 230KV [5620] & P1-2:A11:5:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1-1	>.95	0.34	>.95	>.95	0.47	0.43	>.95	>.95	0.33	System adjustments or voltage support if needed
MELONES SW STA 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	>.95	>.95	0.77	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
MI-WUK 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	>.95	>.95	0.80	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
MOSHER 60 kV	P1-2:A11:11:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:9:_STAGG-TESLA 230KV [5680]	P6	N-1-1	>.95	>.95	0.46	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
PLACER 115 kV	P1-2:A5:16:_PLACER-GOLD HILL #1 115KV [3340] & P1-2:A5:17:_PLACER-GOLD HILL #2 115KV [4290]	P6	N-1-1	>.95	>.95	0.81	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
PLAINFIELD 60 kV	P1-4:A4:17:_PLAINFIELD SVD=V2 & P1-4:A4:18:_PLAINFIELD SVD=V1	P6	N-1-1	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	0.89	System adjustments or voltage support if needed
PLEASANT GROVE 115 kV	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330] & P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590]	P6	N-1-1	>.95	>.95	0.87	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
RIPON 115 kV	P1-2:A11:36:_Q1557-RIPON #1 115KV [0] & P1-2:A11:46:_MANTECA-RIPON 115KV [0]	P6	N-1-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
STANISLAUS PH 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	>.95	>.95	0.85	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
STOCKTON A 115 kV	P1-3:A11:8:_BELLOTA 230/115KV TB 1 & P1-3:A11:9:_BELLOTA 230/115KV TB 2	P6	N-1-1	>.95	>.95	0.52	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
SUTTER HOME SWITCHING STATION 60	P1-2:A11:11:_EIGHT MILE ROAD-STAGG 230KV [5002] & P1-2:A11:9:_STAGG-TESLA 230KV [5680]	P6	N-1-1	>.95	>.95	0.25	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
TRACY 115 kV	P1-2:A11:108:_VIERRA-TRACY-KASSON 115KV [4310] (2) & P1-2:A11:52:_TESLA-LEPRINO_JCT 115KV [0] MOAS OPENED ON LEPRINO_JCT_TRACY JC	P6	N-1-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
VALLEY HOME 115 kV	P1-2:A11:46:_MANTECA-RIPON 115KV [0] & P1-2:A11:64:_BELLOTA-RVRBANK-MELONES TULLOCH 115KV [0]	P6	N-1-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
VALLEY SPRINGS 230 kV	P1-2:A4:31:_WOODLAND-DAVIS 115KV [4210] & P1-2:A11:10:_VALLEY SPRINGS-BELLOTA 230KV [5860]	P6	N-1-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
WEIMAR 60 kV	P1-2:A11:107:_VIERRA-TESLA 115KV [0] & P1-3:A5:40:_ROLLINS 60/6.6KV TB 1	P6	N-1-1	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
WEST SACRAMENTO 115 kV	P1-2:A11:114:_LOCKFORD-BRIGHTON 230KV [0] & P1-2:A4:6:_RIO OSO-BRIGHTON 230KV [5600]	P6	N-1-1	>.95	>.95	0.85	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
WOODLAND 115 kV	P1-2:A4:30:_RIO OSO-WOODLAND #1 115KV [3460] & P1-2:A4:32:_RIO OSO-WOODLAND #2 115KV [3470]	P6	N-1-1	>.95	>.95	0.90	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
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	0.94	0.95	0.67	1.05	1.10	1.09	1.02	1.05	0.94	Continue to monitor
WEST SACRAMENTO 115 kV	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	0.95	0.97	0.89	1.05	1.08	1.06	1.02	1.02	0.96	Continue to monitor
WEIMAR 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	0.95	0.95	0.86	0.99	1.01	1.02	0.98	0.99	0.95	Continue to monitor
WOODLAND 115 kV	P7-1:A4:16_Rio Oso-Woodland #1 115 kV Line & Rio Oso-Woodland #2 115 kV Line	P7	DCTL	0.99	1.00	0.90	1.05	1.08	1.07	1.02	1.05	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
				2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity	2029 SP High CEC Forecast	
HALSEY PH 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	0.99	0.58	1.03	1.03	1.03	1.02	1.03	0.99	Continue to monitor
BRIGHTON 230 kV	P7-1:A11:12:_LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	>.95	>.95	0.89	>.95	>.95	>.95	>.95	>.95	>.95	Continue to monitor
LOCKEFORD 230 kV	P7-1:A11:12:_LOCKEFORD-BELLOTA 230KV #1 [4990] & LOCKEFORD-BELLOTA 230KV #2 [4990]	P7	DCTL	>.95	>.95	0.87	>.95	>.95	>.95	>.95	>.95	>.95	Lockeford-Lodi Area 230 kV Development project

Substation	Contingency	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)						Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity	2029 SP High CEC Forecast	
LOCKFORD 230 kV	P1-2:A11:5:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	9	<8	<8	<8	<8	<8	<8	<8	<8	Lockeford-Lodi Area 230 kV Development project
GRSS VLY 60 kV	P1-2:A5:60:_COLGATE-GRASS VALLEY 60KV [6490]	P1	N-1	<8	<8	11	<8	<8	<8	<8	<8	<8	Continue to monitor

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2026 Spring Off-Peak	2029 Summer Peak	2034 Summer Peak	2026 OP Sensitivity	2029 SP High CEC Forecast	
P1-1 - Gen HIGHWINDS 0.69 kV unit 1	P1	N-1	NA	No Issue	NA	NA	No Issue	No mitigation required
P1-2 - Line GOLDHILL to RALSTON 230 kV ckt 1	P1	N-1	NA	Potential WECC/NERC criteria violation	No Issue	No Issue	No Issue	Under review with PTO for fault clearing time and fault impedances.
P1-2 - Line WEBER to TESLA E 230 kV ckt 1	P1	N-1	No Issue	NA	NA	NA	NA	No mitigation required
P1-3 - Tran TESLA 230/115 kV bk 3	P1	N-1	No Issue	NA	NA	NA	NA	No mitigation required
P1-3 - Tran TESLA 500/230 kV bk 2	P1	N-1	NA	NA	No Issue	No Issue	No Issue	No mitigation required
P1-3 - Tran VACA-DIX 230-115 kV bk 4	P1	N-1	NA	Potential WECC/NERC criteria violation	NA	NA	NA	Under review with PTO for fault clearing time and fault impedances.
P1-4 - RIO OSO 230 kV SVC id v	P1	N-1	No Issue	Potential WECC/NERC criteria violation	No Issue	No Issue	Potential WECC/NERC criteria violation	Under review with PTO for fault clearing time and fault impedances.
P2-1 - Line GOLDHILL to RALSTON 230 kV ckt 1	P2	Bus/Breaker	NA	NA	NA	No Issue	No Issue	No mitigation required
P2-1 - Line SANDHLWJCT to TESLA D 230 kV ckt 1	P2	Bus/Breaker	No Issue	NA	NA	NA	NA	No mitigation required
P2-1 - Line SCHULTE to GWFRACY 115 kV ckt 1	P2	Bus/Breaker	NA	No Issue	Potential WECC/NERC criteria violation	NA	NA	Under review with PTO for fault clearing time and fault impedances.
P2-2 - Bus Fault at BELLOTA 230 kV Bus 1E	P2	Bus/Breaker	No Issue	NA	NA	Potential WECC/NERC criteria violation	No Issue	Under review with PTO for fault clearing time and fault impedances.
P2-2 - Bus Fault at TESLA D 230 kV Section 2D	P2	Bus/Breaker	NA	Potential WECC/NERC criteria violation	NA	NA	NA	No mitigation required
P2-2 - Bus Fault at VACA-DIX 230 kV Bus 1F	P2	Bus/Breaker	No Issue	No Issue	Potential WECC/NERC criteria violation	No Issue	Potential WECC/NERC criteria violation	Under review with PTO for fault clearing time and fault impedances.
P2-3 - Internal fault at non-Bus-tie Breaker 312 at TESLA D 230 kV	P2	Bus/Breaker	NA	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	NA	NA	Under review with PTO for fault clearing time and fault impedances.
P2-4 - Internal fault at Bus-tie Breaker 400 at BELLOTA 230 kV	P2	Bus/Breaker	No Issue	No Issue	NA	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Under review with PTO for fault clearing time and fault impedances.
P2-4 - Internal fault at Bus-tie Breaker 612 at VACA-DIX 230 kV	P2	Bus/Breaker	NA	NA	Potential WECC/NERC criteria violation	NA	NA	Under review with PTO for fault clearing time and fault impedances.
P3-1 - Gen HIGHWINDS 0.69 kV unit 1 and SHILOH 0.6 kV unit 1	P3	G-1/N-1	NA	NA	NA	No Issue	No Issue	No mitigation required
P3-1 - Gen STANISLS 13.8 kV unit 1 and RALSTON 13.8 kV unit 1	P3	G-1/N-1	No Issue	NA	NA	NA	NA	No mitigation required
P3-1 - Gens GWFRACY (3 units) and COLGATE1 13.8 kV unit 1	P3	G-1/N-1	NA	No Issue	No Issue	NA	NA	No mitigation required
P3-2 - Gen GWFRACY (3 units) and Line GOLDHILL to RALSTON 230 kV ckt 1	P3	G-1/N-1	NA	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	NA	NA	Under review with PTO for fault clearing time and fault impedances.
P3-2 - Gen HIGHWINDS 0.69 kV unit 1 and Line GOLDHILL to RALSTON 230 kV ckt 1	P3	G-1/N-1	NA	NA	NA	No Issue	Potential WECC/NERC criteria violation	Under review with PTO for fault clearing time and fault impedances.
P3-2 - Gen STANISLS 13.8 kV unit 1 and Line WEBER to TESLA E 230 kV ckt 1	P3	G-1/N-1	No Issue	NA	NA	NA	NA	No mitigation required
P3-3 - Gen GWFRACY (3 units) and Tran TESLA 500-230 kV bk 2	P3	G-1/N-1	NA	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	NA	NA	Install redundant relay
P3-3 - Gen HIGHWINDS 0.69 kV unit 1 and Tran TESLA 500/230 kV bk 2	P3	G-1/N-1	NA	NA	NA	No Issue	Potential WECC/NERC criteria violation	No mitigation required
P3-3 - Gen STANISLS 13.8 kV unit 1 and Tran TESLA 230/115 kV bk 3	P3	G-1/N-1	No Issue	NA	NA	NA	NA	Install redundant relay
P3-4 - Gen GWFRACY (3 units) and RIO OSO 230 kV SVC id v	P3	G-1/N-1	NA	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	NA	NA	Under review with PTO for fault clearing time and fault impedances.
P3-4 - Gen HIGHWINDS 0.69 kV unit 1 and RIO OSO 230 kV SVC id v	P3	G-1/N-1	NA	NA	NA	No Issue	Potential WECC/NERC criteria violation	Under review with PTO for fault clearing time and fault impedances.
P4-1 - Stuck 115 kV Breaker 162 protecting Gen STANISLS 13.8 kV unit 1	P4	Stuck Breaker	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
P4-2 - Stuck breaker Tesla CB 2512 protecting Line TESLA C to NEWARK E 230 kV ckt 2	P4	Stuck Breaker	No Issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No Issue	Potential WECC/NERC criteria violation	Under review with PTO for fault clearing time and fault impedances.
P4-3 - Stuck breaker Tesla CB 2422 protecting Tran Tesla 500-230 kV bk 6	P4	Stuck Breaker	No Issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No Issue	Potential WECC/NERC criteria violation	Under review with PTO for fault clearing time and fault impedances.

Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2026 Spring Off-Peak	2029 Summer Peak	2034 Summer Peak	2026 OP Sensitivity	2029 SP High CEC Forecast	
P4-4 - Stuck Breaker 492 protecting SVD VACA-DIX 230 kV id v	P4	Stuck Breaker	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No Issue	Potential WECC/NERC criteria violation	Under review with PTO for fault clearing time and fault impedances.
P4-5 - Stuck non-Bus-tie Breaker 312 protecting Substation Bus TESLA D 230 kV Section 1D	P4	Stuck Breaker	No Issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No Issue	Potential WECC/NERC criteria violation	Under review with PTO for fault clearing time and fault impedances.
P4-6 - Stuck Bus-tie Breaker 102 protecting Substation Bus TESLA 115 kV	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	Under review with PTO for fault clearing time and fault impedances.
P5-1 - Failure of non-redundant relay on Colgate CB 262 protecting Gen COLGATE1 13.8 kV unit 1	P5	Non-Redundant battery supply/Relay	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
P5-1d - Failure of Colgate 230 kV CB 262 control circuits due to non-redundant DC panel with fault for Gen COLGATE1 13.8 kV unit 1 (ALL 230 kV clears remotely)	P5	Non-Redundant battery supply/Relay	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
P5-2d - Failure of Stanislaus PH 115 kV CB 112 non-redundant DC CB control circuit (with no Breaker Fail relay) for Line STANISLS to FRGTNTP1 115 kV ckt 1 (ALL 115 kV clears remotely)	P5	Non-Redundant battery supply/Relay	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
P5-2d - Failure of Vaca-Dixon 230 kV non-redundant DC CB control circuit	P5	Non-Redundant battery supply/Relay	No Issue	No Issue	Potential WECC/NERC criteria violation	No Issue	No Issue	Under review with PTO for fault clearing time and fault impedances.
P5-2d - Failure of Woodland 115 kV non-redundant DC CB control circuit	P5	Non-Redundant battery supply/Relay	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
P5-3d - Failure of Rio Oso 230 kV CB 272 control circuits due to non-redundant DC panel with fault for Tran RIO OSO 230/115 kV bk 1 (ALL 230 kV clears remotely)	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	Under review with PTO for fault clearing time and fault impedances.
P5-4 - Failure of non-redundant relay protecting RIO OSO 230 kV SVC id v	P5	Non-Redundant battery supply/Relay	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
P5-4d - Failure of Gold Hill 115 kV CB 392 control circuits due to non-redundant DC panel with fault for SVD GOLDHILL 115 kV SVC id v (ALL 115 kV clears remotely)	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	Under review with PTO for fault clearing time and fault impedances.
P5-5a - Failure of non-redundant relay protecting Substation Bus TESLA D 230 kV (ALL 230 kV elements clear remotely)	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	Under review with PTO for fault clearing time and fault impedances.
P5-5c - Failure of non-redundant relay DC Supply protecting Substation Bus BELLOTA 230 kV	P5	Non-Redundant battery supply/Relay	Potential WECC/NERC criteria violation	No Issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Under review with PTO for fault clearing time and fault impedances.
P5-5c - Failure of non-redundant relay DC Supply protecting Substation Bus STAGG 230 kV	P5	Non-Redundant battery supply/Relay	No Issue	Potential WECC/NERC criteria violation	No Issue	No Issue	No Issue	No mitigation required
P6-3 - Fault on Line BRIGHTON to BELLOTA 230 kV ckt 1 with Loss of RIO OSO 230 kV SVC id v	P6	N-1-1	No Issue	Potential WECC/NERC criteria violation	No Issue	No Issue	Potential WECC/NERC criteria violation	Under review with PTO for fault clearing time and fault impedances.
P6-2 - Fault on Tran BELLOTA 230-115 kV bk 1 with Loss of Tran BELLOTA 230-115 kV bk 2 with RAS	P6	N-1-1	NA	No Issue	No Issue	NA	No Issue	No mitigation required
P6-2 - Fault on Tran BELLOTA 230-115 kV bk 1 with Loss of Tran BELLOTA 230-115 kV bk 2	P6	N-1-1	No Issue	No Issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No Issue	Under review with PTO for fault clearing time and fault impedances.
P6-1 - Fault on Line Rio Oso to Lockeford 230 kV ckt 1 with Loss of Line Lockeford - Bellota 230 kV ckt 1	P6	N-1-1	No Issue	Potential WECC/NERC criteria violation	No Issue	No Issue	No Issue	Under review with PTO for fault clearing time and fault impedances.
P7-1_RS - Fault on Line RIO OSO* to BRIGHTON 230 kV Line ckt 1 and Line RIO OSO* to LOCKFORD 230 kV ckt 1 (HSR Success)	P7	DCTL	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
P7-1_RF - Fault on Line RIO OSO* to BRIGHTON 230 kV Line ckt 1 and Line RIO OSO* to LOCKFORD 230 kV ckt 1 (HSR Failure)	P7	DCTL	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
P7-1 - Line RIO OSO to W.SCRMNO 115 kV Line ckt 1 with Line W.SCRMNO to BRIGHTON 115 kV ckt 1 RS	P7	DCTL	No Issue	No Issue	No Issue	No Issue	No Issue	No mitigation required
P7-1 - Line RIO OSO to W.SCRMNO 115 kV Line ckt 1 with Line W.SCRMNO to BRIGHTON 115 kV ckt 1 RF	P7	DCTL	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
			2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity	2029 SP High CEC Forecast	

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

Substation	Load Served (MW)									Potential Mitigation Solutions	
	2026 Summer Peak	2026 Summer Peak	2029 Summer Peak	2034 Summer Peak	2026 Spring Off-Peak	2029 Spring Off-Peak	2029 Summer-Off Peak	2026 SP Heavy Renewable & Min Gas Gen	2026 OP Sensitivity		2029 SP High CEC Forecast

No single source substation with more than 100 MW