

Study Area: PG&E Central Valley



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading (%)										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewabl e & Min Gas Gen	2027 Retireme nt of QF Generatio ns	
30280 POE 230 30330 RIO OSO 230 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	88.4	NConv	94.4	9.1	89.3	88.4	NConv	NConv	75.9	95.6	No thermal overload issue - NConvs are due to voltage issue
30330 RIO OSO 230 30348 BRIGHTON 230 1 1	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	87.5	93.0	96.3	9.7	26.7	87.5	101.6	96.2	66.8	101.5	The issue is in the long term and only under sensitivity scenario - Continue to monitor
30525 C.COSTA 230 30479 BDLSWSTA 230 1 1	P2-3:A4:4:_BDLSWSTA 230KV - MIDDLE BREAKER BAY 2	P2	Non-bus-tie breaker	41.5	43.0	43.7	22.9	89.6	41.5	44.4	42.5	106.1	46.4	Action plan or SPS
30993 SUMMIT 60.0 64109 SUMMIT 3 60.0 1 1	P2-3:A5:80:_DRUM 115KV - RING R7 & R6	P2	Non-bus-tie breaker	86.5	86.7	86.7	116.2	48.7	85.8	85.5	83.8	100.5	84.4	Under review: Existing operating procedure
	P2-3:A5:84:_BRNSWALT 115KV - RING R5 & R6	P2	Non-bus-tie breaker	86.6	86.8	86.8	116.2	48.7	86.0	85.6	83.9	100.6	84.5	Under review: Existing operating procedure
31962 WOODLANDTP 115 31970 WOODLD 115 1 1	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	98.9	105.3	110.3	17.7	13.6	101.5	122.4	117.4	70.2	112.5	Action plan or SPS
	P7-1:A4:16_Rio Oso-Woodland #1 115 kV Line & Rio Oso-Woodland #2 115 kV Line	P7	DCTL	81.0	87.1	91.3	12.7	10.1	82.9	100.4	97.7	59.1	93.0	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P7-1:A5:15_Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	P7	DCTL	81.0	87.1	91.3	12.7	10.1	82.9	100.4	97.7	59.1	93.0	The issue is in the long term and only under sensitivity scenario - Continue to monitor
31962 WOODLANDTP 115 365506 Q653FJCT 115 1 1	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	110.3	84.6	84.1	39.4	22.0	86.9	92.1	92.8	69.9	83.2	Review existing RAS
	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	110.7	113.0	84.6	39.5	22.0	87.3	92.6	93.3	70.2	83.7	Review existing RAS
	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	109.3	111.7	83.3	38.8	21.2	85.8	91.3	91.8	68.9	82.4	Review existing RAS
	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	110.3	84.6	84.1	39.4	22.0	86.9	92.1	92.8	69.9	83.2	Review existing RAS
	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	79.7	85.1	89.9	4.0	6.4	82.2	101.6	96.9	51.1	113.8	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	95.5	102.7	103.5	44.4	26.1	96.6	87.5	86.1	70.2	77.3	SPS
31963 WOODLANDTP 115 31970 WOODLD 115 1 1	P1-2:A11:6:_BRIGHTON-BELLOTA 230KV P1-2:A4:9:_RIO OSO-BRIGHTON 230KV	P6	N-1-1	82.9	81.7	81.8	<90	<90	85.1	91.6	90.6	<90	100.8	The issue is in the long term and only under sensitivity scenario - Continue to monitor
31963 WOODLANDTP 115 365506 Q653FJCT 115 1 1	P1-2:A4:34:_WEST SACRAMENTO-DAVIS 115KV P1-2:A4:35:_BRIGHTN-DAVIS-BRKR SLG 115KV	P6	N-1-1	102.0	106.1	106.6	<90	<90	104.4	117.0	119.7	<90	110.8	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
31984 BRIGHTN 115 31993 BRKPCT 115 1 1	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	104.0	107.4	110.2	23.9	10.2	106.8	122.6	119.6	65.3	123.2	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope

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31984 BRKRJCT 115 31993 BRKRJCT 115 1 1	P1-2:A4:34: _WEST SACRAMENTO-DAVIS 115KV P1-2:A4:25: _WOODLAND-DAVIS 115KV	P6	N-1-1	108.0	110.2	110.9	<90	<90	110.5	120.5	124.8	73.6	114.1	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
31993 BRKRJCT 115 32001 UCD_TP2 115 1 1	P2-4:A5:6: _RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	102.4	106.0	108.9	22.1	9.4	105.3	121.2	118.1	63.8	121.9	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
31994 BRKRJCT 115 32001 UCD_TP2 115 1 1	P1-2:A4:34: _WEST SACRAMENTO-DAVIS 115KV P1-2:A4:25: _WOODLAND-DAVIS 115KV	P6	N-1-1	106.7	109.1	109.9	<90	<90	109.2	119.5	123.5	72.6	113.2	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
32056 CORTINA 60.0 30451 CRTNA M 230 1 1	P1-3:A4:5: _CORTINA 230/115KV TB 4	P1	N-1	102.5	106.4	106.7	57.3	68.0	103.0	104.9	102.7	62.7	101.7	Under review: Existing operating procedure
	P1-1:A4:9: _WADHAM 9.11KV GEN UNIT 1 P1-3:A4:5: _CORTINA 230/115KV TB 4	P3	G-1/N-1	100.1	100.1	98.4	<90	58.3	105.9	108.2	117.4	81.6	99.4	Under review: Existing operating procedure
32057 CORTINA 60.0 30451 CRTNA M 230 1 1	P1-1:A4:9: _WADHAM 9.11KV GEN UNIT 1 P1-3:A4:5: _CORTINA 230/115KV TB 4	P6	N-1-1	100.1	100.1	98.4	<90	58.3	105.9	108.2	117.4	81.6	99.4	Under review: Existing operating procedure
32082 PLFLDJCT 60.0 32090 WINTERS 60.0 1 1	Base Case	P0	Normal	80.9	87.5	91.8	14.4	2.7	82.5	101.6	93.4	66.2	92.0	Very low voltage at the end of a long radial line with 29 MW load therefore 2 MW PV makes a difference Vaca-Davis Voltage conversion project
32082 PLFLDJCT 60.0 32092 PLAINFLD 60.0 1 1	Base Case	P0	Normal	81.3	88.6	92.9	13.5	3.0	83.0	102.9	94.5	67.1	93.2	Very low voltage at the end of a long radial line with 29 MW load therefore 2 MW PV makes a difference Vaca-Davis Voltage conversion project
32088 VACA-DXN 60.0 31998 VACA-DIX 115 5 1	P1-3:A4:19: _VACA-DIX 115/60KV TB 9	P1	N-1	96.4	106.8	110.6	44.5	49.8	97.8	117.8	115.7	85.4	110.7	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
	P2-3:A4:33: _VACA-DIX 115KV - MIDDLE BREAKER BAY 4	P2	Non-bus-tie breaker	96.4	106.9	110.7	44.5	49.8	97.9	118.0	115.8	85.5	110.8	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
	P1-1:A4:9: _WADHAM 9.11KV GEN UNIT 1 P1-3:A4:19: _VACA-DIX 115/60KV TB 9	P3	G-1/N-1	<90	106.9	110.6	<90	<90	<90	118.0	115.2	<90	110.7	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
	P1-3:A4:19: _VACA-DIX 115/60KV TB 9 P1-2:A4:49: _DIXON-VACA #2 60KV	P6	N-1-1	<90	108.3	112.3	<90	<90	<90	119.2	116.9	86.1	112.4	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
32088 VACA-DXN 60.0 32090 WINTERS 60.0 1 1	Base Case	P0	Normal	80.1	87.9	92.2	13.7	5.9	81.6	100.9	93.1	67.2	92.4	Very low voltage at the end of a long radial line with 29 MW load therefore 2 MW PV makes a difference Vaca-Davis Voltage conversion project

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32100 DIXONPGE 60.0 32101 DIXON-J2 60.0 2 1	P2-1:A4:58:_DIXON-VACA #1 60KV (VACA-DXN-VACA-JT1)	P2-1	Line Section w/o fault	92.5	105.8	108.5	54.4	65.1	93.6	114.5	116.6	87.3	108.8	Under review: Transfer trip to open the other end
32200 PEASE 115 32288 E.MRY J1 115 1 1	P2-4:A5:2:_RIO OSO 230KV - SECTION 2D & 1D	P2	Bus-tie breaker	102.6	<90	<90	20.1	<90	102.9	<90	<90	<90	<90	Near term: Action plan Long term: South of Palermo project (ISD: 4/22)
32208 GLEAF TP 115 32214 RIO OSO 115 1 1	P2-4:A5:2:_RIO OSO 230KV - SECTION 2D & 1D	P2	Bus-tie breaker	109.1	<90	<90	20.6	<90	109.4	<90	<90	<90	<90	Near term: Action plan Long term: South of Palermo project (ISD: 4/22)
32214 RIO OSO 115 31986 W.SCRMNO 115 1 1	P1-2:A4:25:_WOODLAND-DAVIS 115KV P1-2:A4:9:_RIO OSO-BRIGHTON 230KV	P6	N-1-1	86.1	97.1	98.8	<90	<90	85.2	101.7	96.6	88.1	98.5	The issue is in the long term and only under sensitivity scenario - Continue to monitor
32214 RIO OSO 115 32225 BRNSWKTP 115 1 1	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	70.3	78.4	76.6	161.3	16.9	71.6	70.1	73.3	61.8	65.1	Under review: Existing operating procedure
	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	25.4	24.3	22.4	88.7	33.0	27.2	25.2	NConv	24.3	19.9	Under review: Existing operating procedure
	P1-2:A5:35:_RIO OSO-DRUM-BRUNSWCK 115KV P1-2:A5:37:_BELL-PLACER 115KV	P6	N-1-1	124.3	160.4	158.5	204.0	<90	122.6	97.9	149.8	143.4	122.7	Under review: Existing operating procedure
32214 RIO OSO 115 32244 BRNSWKCP 115 2 1	P1-2:A5:34:_RIO OSO-BRNSWALT-DRUM 115KV P1-2:A5:37:_BELL-PLACER 115KV	P6	N-1-1	58.6	93.8	95.0	206.7	<90	58.2	93.3	91.5	133.6	60.8	Under review: Existing operating procedure
32214 RIO OSO 115 32404 SPI JCT 115 1 1	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-redundant	108.0	120.3	111.6	11.0	10.7	110.5	116.5	130.9	71.9	136.3	Protection upgrade
32214 RIO OSO 115 32404 SPI JCT 115 1 1	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV P1-2:A5:6:_RIO OSO-ATLANTIC 230KV	P6	N-1-1	108.0	119.8	111.1	<90	<90	110.5	116.0	130.7	71.8	106.3	Action plan or SPS Project: Rio Oso - Atlantic 230 kV
32218 DRUM 115 32220 DTCH FL1 115 1 1	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	78.8	95.7	96.0	65.5	8.7	81.1	90.5	101.2	90.6	82.1	Existing operating procedure
	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	133.9	147.8	144.1	49.5	52.2	142.3	169.0	NConv	90.0	144.0	Under review: Existing operating procedure
	P1-2:A5:21:_PLACER-GOLD HILL #2 115KV P1-2:A5:20:_PLACER-GOLD HILL #1 115KV	P6	N-1-1	83.2	88.6	85.7	<90	<90	87.8	101.0	98.1	<90	85.7	Under review: Existing operating procedure
	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	78.8	95.7	96.0	65.5	8.7	81.1	90.5	101.2	90.6	82.1	Under review: Existing operating procedure
	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	83.1	88.7	85.8	51.4	43.1	87.7	96.4	103.8	57.2	85.7	Under review: Existing operating procedure
32218 DRUM 115 32222 DTCH FL2 115 1 1	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	90.2	139.3	134.6	159.4	21.8	92.6	97.4	139.9	94.6	89.7	Under review: Existing operating procedure
	P1-2:A5:35:_RIO OSO-DRUM-BRUNSWCK 115KV P1-2:A5:37:_BELL-PLACER 115KV	P6	N-1-1	178.0	220.5	215.8	220.6	<90	177.3	156.0	216.0	174.2	179.5	Under review: Existing operating procedure
	P1-2:A5:37:_BELL-PLACER 115KV	P1	N-1	103.5	102.1	102.9	102.7	41.5	105.1	106.9	105.6	98.2	101.7	Under review: Existing operating procedure
	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	101.7	100.1	100.9	102.7	41.6	103.2	104.4	103.4	96.5	99.7	Under review: Existing operating procedure

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32218 DRUM 115 32244 BRNSWCKP 115 2 1	P2-1:A5:31:_DRUM-HIGGINS 115KV (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	105.1	103.9	104.8	103.1	41.8	106.7	108.7	107.6	99.4	103.6	Under review: Existing operating procedure
	P1-2:A5:34:_RIO OSO-BRNSWALT-DRUM 115KV P1-2:A5:37:_BELL-PLACER 115KV	P6	N-1-1	99.5	134.0	133.8	219.9	<90	99.6	134.0	134.8	159.6	99.8	Under review: Existing operating procedure
32220 DTCH FL1 115 32224 CHCGO PK 115 1 1	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	85.7	94.7	92.6	13.8	21.5	90.4	106.7	NConv	60.0	92.5	Under review: Existing operating procedure
32224 CHCGO PK 115 32232 HIGGINS 115 1 1	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	107.6	118.2	116.1	10.7	2.8	112.6	130.3	NConv	83.0	116.0	Under review: Existing operating procedure
32225 BRNSWKTP 115 32222 DTCH FL2 115 1 1	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	123.5	139.2	134.5	177.8	41.1	126.0	130.9	139.9	100.5	123.1	Under review: Existing operating procedure
	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	10.3	14.3	15.9	92.8	42.6	8.2	16.1	NConv	33.5	16.2	Under review: Existing operating procedure
	P2-1:A5:31:_DRUM-HIGGINS 115KV (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	91.9	90.6	91.6	100.2	42.0	93.4	98.8	93.5	91.3	94.3	Under review: Existing operating procedure
	P1-2:A5:35:_RIO OSO-DRUM-BRUNSWCK 115KV P1-2:A5:37:_BELL-PLACER 115KV	P6	N-1-1	177.9	220.4	215.7	220.5	<90	177.3	157.9	215.9	180.9	179.5	Under review: Existing operating procedure
32228 PLACER 115 32238 BELL PGE 115 1 1	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	81.9	90.3	88.9	4.6	9.1	86.1	100.9	NConv	68.7	88.8	Under review: Existing operating procedure
32232 HIGGINS 115 32238 BELL PGE 115 1 1	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	87.8	96.7	94.8	6.5	4.7	92.1	106.9	NConv	69.4	94.7	Under review: Existing operating procedure
32250 ELDORAD 115 32481 APLHTAP2 115 2 1	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	148.5	169.7	162.2	46.2	28.3	152.3	177.5	201.3	110.6	164.0	Under review: Transfer trip to open the other end
32250 ELDORAD 115 32482 APLHTAP1 115 1 1	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	114.2	127.5	121.0	25.1	13.9	117.5	134.0	153.7	101.5	122.3	Under review: Transfer trip to open the other end
32255 PLCRVLT1 115 32261 MIZOU_T1 115 1 1	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	84.3	92.6	88.2	20.5	12.0	86.5	97.1	110.1	71.8	89.1	Under review: Transfer trip to open the other end
32290 OLIVH J1 115 32288 E.MRY J1 115 1 1	P2-4:A5:2:_RIO OSO 230KV - SECTION 2D & 1D	P2	Bus-tie breaker	102.5	<90	<90	20.2	<90	102.8	<90	<90	<90	<90	Near term: Action plan Long term: South of Palermo project (ISD: 4/22)
32314 SMRTSVLE 60.0 32341 BEALE1J1 60.0 2 1	P2-2:A5:29:_COLGATE 60KV SECTION 1D	P2	Bus	<90	<90	<90	53.4	108.8	<90	<90	<90	<90	<90	Apply summer peak configuration if needed
	P2-3:A5:35:_COLGATE - 1D 60KV & COLGATE-PALERMO LINE	P2	Non-bus-tie breaker	<90	<90	<90	53.4	108.8	<90	<90	<90	<90	<90	Apply summer peak configuration if needed
	P2-3:A5:36:_COLGATE - 1D 60KV & COLGATE-CHALLENGE LINE	P2	Non-bus-tie breaker	<90	<90	<90	53.4	108.8	<90	<90	<90	<90	<90	Apply summer peak configuration if needed



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	P2-3:A5:37: _COLGATE - 1D 60KV & COLGATE-SMARTVILLE #1 LINE	P2	Non-bus-tie breaker	<90	<90	<90	44.0	113.0	<90	<90	<90	<90	<90	Apply summer peak configuration if needed
	P2-3:A5:39: _COLGATE - 1D 60KV & COLGATE-ALLEGHANY LINE	P2	Non-bus-tie breaker	<90	<90	<90	53.4	108.8	<90	<90	<90	<90	<90	Apply summer peak configuration if needed
32326 ENCL TAP 60.0 32332 PEASE 60.0 1 1	P1-1:A5:24: _GRNLEAF2 13.80KV GEN UNIT 1 P1-3:A5:31: PEAS RG 60/60KV TB 1	P3	G-1/N-1	<90	<90	<90	<90	<90	<90	<90	<90	103.9	<90	Severe voltage issue (Pease Transformer...)
	P1-2:A5:57: _MRYSVLLE-PEASE 60KV P1-3:A5:31: PEAS RG 60/60KV TB 1	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	114.3	Voltage collapse issue
32326 ENCL TAP 60.0 32334 LIVE OAK 60.0 1 1	P1-1:A5:24: _GRNLEAF2 13.80KV GEN UNIT 1 P1-3:A5:31: PEAS RG 60/60KV TB 1	P3	G-1/N-1	<90	<90	<90	<90	<90	<90	<90	<90	105.2	<90	Severe voltage issue
	P1-2:A5:57: _MRYSVLLE-PEASE 60KV P1-3:A5:31: PEAS RG 60/60KV TB 1	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	116.7	Voltage collapse issue
32328 YBA CTYJ 60.0 32332 PEASE 60.0 1 1	P1-3:A5:31: _PEAS RG 60/60KV TB 1 P1-2:A5:57: MRYSVLLE-PEASE 60KV	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	113.4	Voltage collapse issue
32356 LINCLN 115 32398 ULTRA JT 115 1 1	P5-5:A5:1: _Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-redundant	85.4	97.7	88.1	9.3	8.7	87.6	92.5	107.3	56.9	105.8	Protection upgrade
	P1-2:A5:10: _ATLANTIC-GOLD HILL 230KV P1-2:A5:6: _RIO OSO-ATLANTIC 230KV	P6	N-1-1	85.5	97.1	87.6	<90	<90	87.6	92.0	107.0	56.8	86.9	Action plan or SPS Project: Rio Oso - Atlantic 230 kV
32356 LINCLN 115 32404 SPI JCT 115 1 1	P5-5:A5:1: _Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-redundant	111.0	125.0	116.3	14.7	14.2	113.5	121.1	135.6	75.7	134.4	Protection upgrade
	P7-1:A5:2 _Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	82.9	98.6	94.5	10.6	32.5	83.3	96.2	101.1	94.9	95.2	Action plan or SPS Project: Rio Oso - Atlantic 230 kV
	P1-2:A5:10: _ATLANTIC-GOLD HILL 230KV P1-2:A5:6: _RIO OSO-ATLANTIC 230KV	P6	N-1-1	111.0	124.4	115.7	<90	<90	113.5	120.6	135.3	75.6	115.0	Action plan or SPS Project: Rio Oso - Atlantic 230 kV
32365 TAMARACK 60.0 30993 SUMMIT 60.0 1 1	P2-3:A5:80: _DRUM 115KV - RING R7 & R6	P2	Non-bus-tie breaker	83.5	84.8	85.0	110.3	48.3	83.0	83.8	82.1	97.0	82.8	Under review: Existing operating procedure
	P2-3:A5:84: _BRNSWALT 115KV - RING R5 & R6	P2	Non-bus-tie breaker	83.6	84.9	85.0	110.3	48.3	83.0	83.8	82.1	97.1	82.8	Under review: Existing operating procedure
32366 CISCO GR 60.0 32365 TAMARACK 60.0 1 1	P2-3:A5:80: _DRUM 115KV - RING R7 & R6	P2	Non-bus-tie breaker	89.9	91.3	91.5	118.7	52.2	89.3	90.2	88.4	104.0	89.2	Under review: Existing operating procedure
	P2-3:A5:84: _BRNSWALT 115KV - RING R5 & R6	P2	Non-bus-tie breaker	89.9	91.3	91.6	118.7	52.3	89.3	90.3	88.5	104.1	89.2	Under review: Existing operating procedure
32366 CISCO GR 60.0 32372 SPAULDNG 60.0 1 1	P2-3:A5:80: _DRUM 115KV - RING R7 & R6	P2	Non-bus-tie breaker	91.9	93.2	93.5	120.4	54.1	91.3	92.2	90.4	106.0	91.1	Under review: Existing operating procedure
	P2-3:A5:84: _BRNSWALT 115KV - RING R5 & R6	P2	Non-bus-tie breaker	92.0	93.3	93.5	120.4	54.1	91.4	92.2	90.5	106.1	91.2	Under review: Existing operating procedure
32374 DRUM 60.0 32376 BONNIE N 60.0 1 1	P1-1:A5:17: _ROLLINSF 6.60KV GEN UNIT 1 P1-2:A5:50: COLGATE-GRASS VALLEY 60KV	P3	G-1/N-1	92.6	93.8	93.4	<90	<90	94.1	97.0	101.9	<90	93.5	Under review: Existing operating procedure
32398 ULTRA JT 115 32408 DISNT GR 115 1 1	P5-5:A5:1: _Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-redundant	96.4	110.8	101.2	20.5	18.0	98.5	105.6	120.5	69.3	104.9	Protection upgrade

Study Area: PG&E Central Valley

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading (%)										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewabl e & Min Gas Gen	2027 Retireme nt of QF Generatio ns	
32398 ATLANTA 115 32400 ATLANTA 115 1 1	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV P1-2:A5:6:_RIO OSO-ATLANTIC 230KV	P6	N-1-1	96.4	110.1	100.5	<90	<90	98.5	104.9	120.1	69.2	100.5	Action plan or SPS Project: Rio Oso - Atlantic 230 kV
32481 APLHTAP2 115 32257 PLCRVLT2 115 2 1	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	148.5	169.8	162.3	46.1	28.5	152.3	177.5	201.4	110.6	164.1	Under review: Transfer trip to open the other end
32482 APLHTAP1 115 32255 PLCRVLT1 115 1 1	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	140.0	153.8	146.5	34.1	20.3	143.6	161.3	183.0	119.3	148.1	Under review: Transfer trip to open the other end
33500 MELNS JA 115 33509 AVENATP1 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	41.4	NConv	112.7	29.8	57.1	43.4	NConv	NConv	14.0	119.7	Short term: Action plan Long term: Substation upgrade or SPS
	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	66.3	76.8	86.3	36.3	43.1	69.5	121.3	106.4	NConv	104.6	Short term: Action plan Long term: Substation upgrade or SPS
	P7-1:A11:3:_STANISLAUS-MANTECA #2 115KV & STANISLAUS-MELONES SW STA-RIVERBANK JCT SW STA 115KV	P7	DCTL	44.3	45.4	45.0	104.5	97.5	44.6	42.6	42.1	77.7	34.4	Short term: Action plan Long term: Vierra looping project or SPS
	P7-1:A12:4:_STANISLAUS-MANTECA #2 115KV & STANISLAUS-MELONES SW STA-RIVERBANK JCT SW STA 115KV	P7	DCTL	44.3	45.4	45.0	104.5	97.5	44.6	42.6	42.1	77.7	34.4	Short term: Action plan Long term: Vierra looping project or SPS
33506 STANISLS 115 33501 FRGTNTP1 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	71.3	NConv	84.7	19.1	14.2	72.2	NConv	NConv	51.3	90.2	Short term: Action plan Long term: Substation upgrade or SPS
33509 AVENATP1 115 33514 MANTECA 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	56.5	NConv	120.4	19.5	50.2	58.9	NConv	NConv	22.4	128.9	Short term: Action plan Long term: Substation upgrade or SPS
	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	51.5	61.9	71.1	26.0	50.0	54.4	104.4	90.5	NConv	89.1	Short term: Action plan Long term: Substation upgrade or SPS
33516 RPN JNCN 115 33514 MANTECA 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	115.6	NConv	166.6	18.6	35.3	118.9	NConv	NConv	57.5	178.4	Short term: Action plan Long term: Substation upgrade or SPS
	P1-2:A11:36:_SCHULTE SW STA-KASSON-MANTECA 115KV P1-2:A11:39:_STANISLS-MELONES-RIVRBKJT 115KV	P6	N-1-1	<90	83.4	94.9	<90	<90	<90	102.8	88.0	<90	95.7	The issue is in the long term and only under sensitivity scenario - Continue to monitor
33516 RPN JNCN 115 33520 RIPON 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	38.0	NConv	105.6	19.2	22.6	38.5	NConv	NConv	36.5	113.2	Short term: Action plan Long term: Substation upgrade or SPS
33526 KSSN-JC1 115 33528 KASSON 115 1 1	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV P1-2:A11:48:_TESLA-TRACY 115KV MOAS OPENED ON LEPRINO TRACY JC	P6	N-1-1	109.8	119.0	125.2	<90	<90	110.8	140.5	135.6	85.6	125.5	Short term: Action plan Long term: Kasson SPS
33530 KSSN-JC2 115 33550 HJ HEINZ 115 1 1	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV P1-2:A11:36:_SCHULTE SW STA-KASSON-MANTECA 115KV	P6	N-1-1	92.4	101.6	113.7	<90	<90	93.1	130.4	118.4	73.4	113.2	Short term: Action plan Long term: Kasson SPS
33533 OWENSTP2 115 33526 KSSN-JC1 115 1 1	P1-2:A11:48:_TESLA-TRACY 115KV MOAS OPENED ON LEPRINO_TRACY JC P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV	P6	N-1-1	96.7	103.2	105.5	<90	<90	98.0	114.8	109.0	<90	105.8	Short term: Action plan Long term: Kasson SPS
33540 TESLA 115 33541 AEC_TP1 115 1 1	P1-2:A11:37:_TESLA-SCHULTE SW STA #1 115KV P1-2:A11:55:_GWFTRACY-SCHULTE #1 115KV	P6	N-1-1	81.9	87.0	92.3	<90	<90	83.0	100.5	98.4	<90	97.0	The issue is in the long term and only under sensitivity scenario - Continue to monitor

Study Area: PG&E Central Valley



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading (%)										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
33540 TESLA 115 33543 AEC_TP2 115 1 1	P1-2:A11:47:_TESLA-SCHULTE SW STA #2 115KV P1-2:A11:55:_GWFTTRACY-SCHULTE #1 115KV	P6	N-1-1	82.5	87.4	92.6	<90	<90	83.6	100.7	98.9	<90	97.3	The issue is in the long term and only under sensitivity scenario - Continue to monitor
33540 TESLA 115 33544 ELLS GTY 115 1 1	P2-3:A11:15:_KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA LINE	P2	Non-bus-tie breaker	86.8	91.7	97.4	15.4	15.5	88.0	109.7	103.5	61.3	103.1	Short term: Action plan Long term: Substation upgrade or SPS
	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV P1-2:A11:36:_SCHULTE SW STA-KASSON-MANTECA 115KV	P6	N-1-1	100.6	107.7	114.7	<90	<90	101.4	130.0	123.3	78.7	114.7	Short term: Action plan Long term: Vierra looping project or SPS
33540 TESLA 115 33574 LLNL TAP 115 1 1	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus-tie breaker	3.6	6.2	8.8	42.4	137.3	3.5	28.1	21.3	36.0	24.7	Short term: Action plan Long term: Substation upgrade or SPS
33542 LEPRINO 115 33546 TRACY JC 115 1 1	P2-3:A11:15:_KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA LINE	P2	Non-bus-tie breaker	84.9	90.0	95.7	14.5	14.7	86.1	108.1	101.8	59.6	101.4	Short term: Action plan Long term: Substation upgrade or SPS
	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV P1-2:A11:36:_SCHULTE SW STA-KASSON-MANTECA 115KV	P6	N-1-1	98.7	106.0	113.0	<90	<90	99.5	128.3	121.6	77.0	113.1	Short term: Action plan Long term: Vierra looping project or SPS
33542 LEPRINO 115 33548 TRACY 115 1 1	P2-3:A11:15:_KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA LINE	P2	Non-bus-tie breaker	109.2	116.2	124.4	17.1	18.4	110.7	140.6	131.0	76.2	131.8	Short term: Action plan Long term: Substation upgrade or SPS
	P5-5:A11:1:_SCHULTE 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P55	Non-redundant	86.5	92.4	98.2	15.4	16.6	87.7	110.3	104.0	64.6	103.1	Protection upgrade
	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV P1-2:A11:36:_SCHULTE SW STA-KASSON-MANTECA 115KV	P6	N-1-1	127.1	137.2	147.1	<90	<90	128.2	167.2	157.0	99.1	147.2	Short term: Action plan Long term: Vierra looping project or SPS
33544 ELLS GTY 115 33546 TRACY JC 115 1 1	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV P1-2:A11:36:_SCHULTE SW STA-KASSON-MANTECA 115KV	P6	N-1-1	85.4	91.8	97.8	<90	<90	86.2	111.1	105.3	<90	97.9	Short term: Action plan Long term: Vierra looping project or SPS
33548 TRACY 115 33550 HJ HEINZ 115 1 1	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV P1-2:A11:36:_SCHULTE SW STA-KASSON-MANTECA 115KV	P6	N-1-1	90.8	99.8	111.7	<90	<90	91.6	128.2	116.4	72.1	111.3	Short term: Action plan Long term: Vierra looping project or SPS
33549 SCHULTE 115 33533 OWENSTP2 115 2 1	P1-2:A11:48:_TESLA-TRACY 115KV MOAS OPENED ON LEPRINO_TRACY JC P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV	P6	N-1-1	96.6	103.1	105.4	<90	<90	97.9	114.7	108.9	<90	105.8	Short term: Action plan Long term: Vierra looping project or SPS
33560 LCKFRDJA 115 33562 BELLOTA 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	73.0	NConv	103.8	24.9	22.1	74.2	NConv	NConv	58.6	98.7	Short term: Action plan Long term: Substation upgrade or SPS
33562 BELLOTA 115 33950 RVRBK TP 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	90.6	NConv	124.5	28.9	21.7	93.0	NConv	NConv	64.6	118.3	Short term: Action plan Long term: Substation upgrade or SPS
	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	45.0	53.9	66.9	19.2	131.3	49.4	114.6	94.7	NConv	100.6	Short term: Action plan Long term: Substation upgrade or SPS
33510 VALLEY SPRINGS 60KV 33510 AMEOP SW 60KV 1 1	P1-2:A11:74:_VALLEY SPRINGS-CLAY 60KV	P1	N-1	109.6	108.2	107.3	68.2	44.4	111.2	116.7	117.7	82.7	107.5	Disable automatics
	P2-3:A11:43:_VLLY SPS 60KV - MIDDLE BREAKER BAY 2	P2	Non-bus-tie breaker	109.5	108.0	107.2	68.2	44.1	111.2	116.5	117.6	83.0	107.4	Disable automatics
	P2-1:A11:95:_VALLEY SPRINGS-CLAY 60KV (CLAY-BUENA_TP)	P2-1	Line Section w/o fault	109.9	108.5	107.7	68.1	45.3	111.6	117.1	118.1	83.0	107.9	Disable automatics

Study Area: PG&E Central Valley

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading (%)										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewabl e & Min Gas Gen	2027 Retireme nt of QF Generatio ns	
33610 VLLY SPS 60.0 33619 AMFOR_SW 60.0 1 1	P1-1:A11:21:_ WEST PNT 11.50KV GEN UNIT 1 P1-2:A11:74:_ VALLEY SPRINGS-CLAY 60KV	P3	G-1/N-1	109.5	<90	<90	<90	<90	111.8	117.3	118.3	82.9	<90	Disable automatics
	P7-1:A11:14:_ VALLEY SPRINGS-CLAY 60KV & VALLEY SPRINGS #2 60KV	P7	DCTL	109.6	108.2	107.3	68.2	44.4	111.2	116.7	117.7	82.7	107.5	Disable automatics
	P7-1:A11:4:_ ELECTRA-BELLOTA 230KV & VALLEY SPRINGS-BELLOTA 230KV	P7	DCTL	0.0	0.0	0.0	0.0	78.8	0.0	0.0	0.0	0.0	0.0	Disable automatics
	P1-2:A11:9:_ TIGER CREEK-VALLEY SPRINGS 230KV P1-2:A11:74:_ VALLEY SPRINGS-CLAY 60KV	P6	N-1-1	109.6	<90	<90	<90	<90	111.3	117.0	118.7	83.8	<90	Disable automatics
	P1-2:A11:74:_ VALLEY SPRINGS-CLAY 60KV	P1	N-1	98.6	98.1	97.3	60.6	38.5	100.1	106.1	107.1	74.1	97.5	Disable automatics
33619 AMFOR_SW 60.0 33616 MARTELL 60.0 1 1	P2-3:A11:43:_ VLLY SPS 60KV - MIDDLE BREAKER BAY 2	P2	Non-bus-tie breaker	98.5	98.0	97.2	60.6	38.3	100.1	106.0	106.9	74.4	97.3	Disable automatics
	P2-1:A11:95:_ VALLEY SPRINGS-CLAY 60KV (CLAY-BUENA_TP)	P2-1	Line Section w/o fault	98.8	98.4	97.6	60.5	39.2	100.4	106.4	107.4	74.4	97.8	Disable automatics
	P1-1:A11:35:_ PARDE 2 7.20KV GEN UNIT 1 P1-2:A11:74:_ VALLEY SPRINGS-CLAY 60KV	P3	G-1/N-1	98.5	98.0	97.0	90.0	39.0	100.7	106.0	107.0	74.0	97.0	Disable automatics
	P7-1:A11:14:_ VALLEY SPRINGS-CLAY 60KV & VALLEY SPRINGS #2 60KV	P7	DCTL	98.5	98.1	97.3	60.6	38.5	100.1	106.1	107.1	74.1	97.5	Disable automatics
	P1-2:A11:9:_ TIGER CREEK-VALLEY SPRINGS 230KV P1-2:A11:74:_ VALLEY SPRINGS-CLAY 60KV	P6	N-1-1	98.6	98.0	97.0	90.0	39.0	100.1	106.0	108.0	75.2	97.0	Disable automatics
	P2-1:A11:112:_ STOCKTON A-WEBER #3 60KV (WEBER E-HAZLTN J)	P2-1	Line Section w/o fault	106.5	105.5	109.8	42.8	45.9	106.8	117.6	117.4	80.8	109.7	Under review: Transfer trip to open the other end
33704 STAGG 60.0 33706 CNTRY CB 60.0 1 1	P2-2:A11:44:_ STAGG 60KV SECTION MD	P2	Bus	134.4	137.5	137.3	34.0	37.7	135.2	147.5	148.7	102.7	136.6	Substation upgrade or SPS Stagg - Hammer 60 kV line project
	P1-2:A11:85:_ STAGG-HAMMER 60KV P1-2:A11:84:_ STAGG-COUNTRY CLUB #2 60KV	P6	N-1-1	134.0	137.2	136.9	<90	<90	135.7	146.8	147.9	102.2	137.2	Action plan or SPS Stagg - Hammer 60 kV line project
	P1-2:A11:85:_ STAGG-HAMMER 60KV P1-2:A11:83:_ STAGG-COUNTRY CLUB #1 60KV	P6	N-1-1	134.0	137.2	136.9	<90	<90	135.7	146.8	147.9	102.2	137.2	Action plan or SPS Stagg - Hammer 60 kV line project
33704 STAGG 60.0 33714 HAMMER 60.0 1 1	P2-2:A11:47:_ CNTRY CB 60KV SECTION 1E	P2	Bus	108.0	107.4	107.7	26.7	30.1	108.7	114.9	116.2	80.3	107.2	Substation upgrade or SPS
	P2-4:A11:16:_ CNTRY CB 60KV - SECTION 1D & 1E	P2	Bus-tie breaker	108.0	107.3	107.6	26.7	30.1	108.6	114.6	116.0	80.2	107.1	Substation upgrade or SPS
	P2-4:A11:17:_ CNTRY CB 60KV - SECTION 1F & 1E	P2	Bus-tie breaker	107.4	107.3	107.6	26.7	30.1	108.8	114.7	116.1	80.2	107.1	Substation upgrade or SPS
	P2-1:A11:131:_ HAMMER-COUNTRY CLUB 60KV (CNTRY CB-UOP)	P2-1	Line Section w/o fault	108.0	107.5	107.9	26.7	30.1	108.6	115.0	116.3	80.5	107.4	Under review: Transfer trip to open the other end
	P2-1:A11:133:_ HAMMER-COUNTRY CLUB 60KV (WSTLNESW-HMMR JCT)	P2-1	Line Section w/o fault	101.2	102.1	103.0	22.5	24.8	101.8	110.1	109.8	75.0	102.5	Under review: Transfer trip to open the other end



Study Area: PG&E Central Valley

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading (%)										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewabl e & Min Gas Gen	2027 Retireme nt of QF Generatio ns	
	P7-1:A11:19:_STAGG-COUNTRY CLUB #1 60KV & STAGG-COUNTRY CLUB #2 60KV	P7	DCTL	135.0	138.2	137.8	34.0	37.7	136.8	148.0	149.2	102.8	138.2	SPS Stagg - Hammer 60 kV line project
33714 HAMMER 60.0 33716 HMMR JCT 60.0 1 1	P7-1:A11:19:_STAGG-COUNTRY CLUB #1 60KV & STAGG-COUNTRY CLUB #2 60KV	P7	DCTL	93.3	95.7	95.6	24.5	25.1	94.7	103.3	103.8	70.8	95.8	SPS Stagg - Hammer 60 kV line project
33724 LOCKEFRD 60.0 33725 LOCKFRD1 60.0 1 1	P1-2:A11:89:_LOCKEFORD-LODI #2 60KV P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P6	N-1-1	94.1	83.7	83.5	82.3	<90	94.3	85.9	85.6	78.9	100.2	The issue is in the long term and only under sensitivity scenario - Continue to monitor
33724 LOCKEFRD 60.0 33726 VICTOR 60.0 1 1	P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P1	N-1	107.9	92.8	96.3	89.8	61.0	108.0	98.6	95.2	88.2	96.6	Significant leading power factor in 2019 (0.7)
	P1-2:A11:101:_LODI-INDUSTRIAL 60KV P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P6	N-1-1	164.9	134.2	140.1	151.8	119.2	164.9	141.6	135.5	132.4	169.0	Project: Lockefird-Lodi area 230 kV development Scope is under review
33724 LOCKEFRD 60.0 33736 LODI JCT 60.0 1 1	P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P1	N-1	101.3	86.3	87.2	86.4	58.2	101.5	89.1	88.6	82.7	87.5	Significant leading power factor in 2019 (0.7)
	P1-2:A11:89:_LOCKEFORD-LODI #2 60KV P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P6	N-1-1	169.9	147.2	146.9	153.2	120.5	170.2	150.4	150.4	140.6	178.1	Project: Lockefird-Lodi area 230 kV development Scope is under review
33724 LOCKEFRD 60.0 38060 INDUSTR L 60.0 1 1	P1-2:A11:101:_LODI-INDUSTRIAL 60KV	P1	N-1	103.0	81.3	83.2	91.0	61.3	103.0	83.6	81.8	80.7	83.4	Significant leading power factor in 2019 (0.7)
	P1-2:A11:89:_LOCKEFORD-LODI #2 60KV	P1	N-1	108.6	90.0	90.6	93.6	63.2	108.7	92.1	92.0	87.2	90.9	Significant leading power factor in 2019 (0.7)
	P2-2:A11:52:_LODI 60KV SECTION MA	P2	Bus	102.8	81.1	82.9	90.9	61.3	103.3	83.3	81.5	80.5	83.2	Significant leading power factor in 2019 (0.7)
	P2-3:A11:66:_LODI - MA 60KV & LOCKEFORD-LODI #3 LINE	P2	Non-bus-tie breaker	102.8	81.1	82.9	90.9	61.3	103.3	83.3	81.5	80.5	83.2	Significant leading power factor in 2019 (0.7)
	P2-3:A11:67:_LODI - MA 60KV & LOCKEFORD-LODI #2 LINE	P2	Non-bus-tie breaker	102.8	81.1	82.9	90.9	61.3	103.3	83.3	81.5	80.5	83.2	Significant leading power factor in 2019 (0.7)
	P2-1:A11:142:_LOCKEFORD-LODI #2 60KV (LOCKEFRD-VICTOR)	P2-1	Line Section w/o fault	113.1	96.5	99.2	95.7	64.9	113.3	101.4	98.9	92.2	99.6	Significant leading power factor in 2019 (0.7) - continue to monitor the issue for the long term
	P2-1:A11:145:_LOCKEFORD-LODI #2 60KV (VICTOR-WODBRG J)	P2-1	Line Section w/o fault	108.7	90.2	90.8	93.6	63.2	108.8	92.3	92.2	87.3	91.2	Significant leading power factor in 2019 (0.7)
	P2-1:A11:150:_LOCKEFORD-LODI #2 60KV (INDSTR J-INDUSTR L)	P2-1	Line Section w/o fault	108.7	90.2	90.8	93.5	63.2	108.8	92.3	92.2	87.3	91.2	Significant leading power factor in 2019 (0.7)
	P1-2:A11:101:_LODI-INDUSTRIAL 60KV P1-2:A11:89:_LOCKEFORD-LODI #2 60KV	P6	N-1-1	159.9	122.1	124.2	150.6	114.6	159.8	124.4	122.4	122.3	152.4	Project: Lockefird-Lodi area 230 kV development Scope is under review
33725 LOCKFRD1 60.0 33732 COLONY 60.0 1 1	P1-2:A11:89:_LOCKEFORD-LODI #2 60KV P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P6	N-1-1	138.1	122.9	122.6	120.9	95.3	138.4	126.1	125.7	115.8	147.2	Project: Lockefird-Lodi area 230 kV development Scope is under review
33726 VICTOR 60.0 33731 WODBRG J 60.0 1 1	P1-2:A11:101:_LODI-INDUSTRIAL 60KV P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P6	N-1-1	157.3	123.7	126.3	147.8	116.2	157.2	126.8	124.4	124.1	155.1	Project: Lockefird-Lodi area 230 kV development Scope is under review
33728 LODI 60.0 33734 CLNY JCT 60.0 1 1	P1-2:A11:89:_LOCKEFORD-LODI #2 60KV P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P6	N-1-1	133.0	111.5	111.1	124.1	97.2	133.2	113.0	113.5	108.5	136.7	Project: Lockefird-Lodi area 230 kV development Scope is under review

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Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading (%)										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewabl e & Min Gas Gen	2027 Retireme nt of QF Generatio ns	
33728 LODI 60.0 33736 LODI JCT 60.0 1 1	P1-2:A11:89:_LOCKEFORD-LODI #2 60KV P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P6	N-1-1	137.1	119.0	118.7	122.0	97.4	137.4	121.5	121.5	113.6	144.0	Project: Lockefird-Lodi area 230 kV development Scope is under review
33731 WODBRG J 60.0 33735 INDSTR J 60.0 1 1	P1-2:A11:101:_LODI-INDUSTRIAL 60KV P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P6	N-1-1	157.2	123.7	126.3	147.7	116.2	157.1	126.8	124.4	124.1	155.1	Project: Lockefird-Lodi area 230 kV development Scope is under review
33732 COLONY 60.0 33734 CLNY JCT 60.0 1 1	P1-2:A11:89:_LOCKEFORD-LODI #2 60KV P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P6	N-1-1	130.8	112.3	112.2	117.5	93.4	131.0	114.6	114.7	107.4	136.2	Project: Lockefird-Lodi area 230 kV development Scope is under review
33735 INDSTR J 60.0 38060 INDUSTRL 60.0 1 1	P1-2:A11:101:_LODI-INDUSTRIAL 60KV P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P6	N-1-1	157.2	123.7	126.3	147.7	116.2	157.1	126.8	124.4	124.2	155.1	Project: Lockefird-Lodi area 230 kV development Scope is under review
33902 BRDSLY J 115 33912 SPRNG GJ 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	67.9	NConv	90.0	60.8	62.4	68.2	NConv	NConv	59.9	94.7	No thermal overload issue - NConvs are due to voltage issue
33912 SPRNG GJ 115 33914 MI-WUK 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	78.5	NConv	105.0	68.1	70.2	79.0	NConv	NConv	69.0	110.2	The issue is in the long term - continue to monitor the issue
33916 CURTISS 115 33917 SPISONORAJCT 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	75.2	NConv	99.0	67.8	70.4	75.7	NConv	NConv	67.3	103.7	The issue is in the long term and only under sensitivity scenario - Continue to monitor
33932 MELONES 115 33500 MELNS JA 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	87.0	NConv	154.4	20.1	51.3	89.5	NConv	NConv	44.3	165.4	Short term: Action plan Long term: Substation upgrade or SPS
	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	55.2	68.7	81.6	29.3	77.2	59.7	128.9	109.2	NConv	105.5	Short term: Action plan Long term: Substation upgrade or SPS
33932 MELONES 115 33934 TULLOCH 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	148.2	NConv	227.9	34.2	11.4	152.2	NConv	NConv	99.1	214.0	Short term: Action plan Long term: Substation upgrade or SPS
	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	51.8	64.3	81.0	20.1	171.9	57.8	146.8	120.9	NConv	129.7	Short term: Action plan Long term: Substation upgrade or SPS
	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1-1	104.3	138.8	129.2	<90	<90	106.6	NConv	NConv	80.6	128.1	Short term: Action plan Long term: Vierra looping project or SPS
33932 MELONES 115 33936 MELNS JB 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	96.6	NConv	152.9	23.2	53.0	99.5	NConv	NConv	43.1	163.9	Short term: Action plan Long term: Substation upgrade or SPS
	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	61.5	70.9	85.5	33.7	76.2	66.4	132.9	111.2	NConv	109.4	Short term: Action plan Long term: Substation upgrade or SPS
	P1-2:A11:104:_MANTECA-RIPON 115KV	P1	N-1	<90	83.9	96.8	<90	37.2	<90	104.6	88.3	61.3	98.0	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P2-3:A11:92:_MANTECA 115KV - RING R4 & R5	P2	Non-bus-tie breaker	1.9	83.9	96.7	1.9	37.2	1.9	104.4	88.2	61.1	97.8	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P2-3:A11:98:_MANTECA 115KV - RING R6 & R5	P2	Non-bus-tie breaker	1.9	83.9	96.8	1.9	37.2	1.9	104.5	88.2	61.1	97.9	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	40.5	NConv	108.0	38.9	63.7	42.8	NConv	NConv	12.0	113.2	Severe voltage issue

Study Area: PG&E Central Valley



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading (%)										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewabl e & Min Gas Gen	2027 Retireme nt of QF Generatio ns	
33936 MELNS JB 115 33947 RIVRBKJT 115 1 1	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	89.2	94.0	105.7	47.3	37.2	93.3	142.8	124.8	NConv	124.8	Short term: Action plan Long term: Substation upgrade or SPS
	P2-1:A11:174:_RPN JNCN-RIPON 115KV NO FAULT	P2-1	Line Section w/o fault	<90	83.9	96.8	<90	37.2	<90	104.6	88.3	61.3	98.0	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P2-1:A11:25:_RIVERBANK JCT SW STA-MANTECA 115KV (RPN JNCN-MANTECA)	P2-1	Line Section w/o fault	77.5	83.8	96.6	39.4	37.1	78.5	104.4	88.1	61.1	97.8	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P1-1:A12:8:_STANISLS 13.80KV GEN UNIT 1 P1-2:A11:104:_MANTECA-RIPON 115KV	P3	G-1/N-1	<90	86.1	99.9	<90	<90	<90	108.3	90.9	<90	100.7	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P7-1:A11:37:_STANISLAUS-MANTECA #2 115KV & MANTECA-RIPON 115KV	P7	DCTL	<90	84.0	96.9	<90	37.3	<90	104.6	88.3	61.3	98.1	The issue is in the long term and only under sensitivity scenario - Continue to monitor
33936 MELNS JB 115 33947 RIVRBKJT 115 1 1	P1-2:A11:104:_MANTECA-RIPON 115KV P1-2:A11:61:_BELLOTA-RIVERBANK-MELONES SW STA 115KV	P6	N-1-1	<90	<90	99.2	<90	<90	<90	108.6	90.4	<90	102.8	The issue is in the long term and only under sensitivity scenario - Continue to monitor
33947 RIVRBKJT 115 33951 VLYHMTP1 115 1 1	P1-2:A11:104:_MANTECA-RIPON 115KV	P1	N-1	<90	83.8	96.7	<90	37.2	<90	104.4	88.2	61.2	97.9	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P2-3:A11:92:_MANTECA 115KV - RING R4 & R5	P2	Non-bus-tie breaker	0.0	83.8	96.6	0.0	37.2	0.0	104.2	88.1	61.0	97.7	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P2-3:A11:98:_MANTECA 115KV - RING R6 & R5	P2	Non-bus-tie breaker	0.0	83.8	96.7	0.0	37.2	0.0	104.4	88.1	61.0	97.8	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	40.0	NConv	106.5	38.0	63.0	42.3	NConv	NConv	10.4	111.8	Severe voltage issue
	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	88.7	93.6	105.4	46.6	37.2	92.8	142.3	124.4	NConv	124.4	Short term: Action plan Long term: Substation upgrade or SPS
	P2-1:A11:174:_RPN JNCN-RIPON 115KV NO FAULT	P2-1	Line Section w/o fault	<90	83.8	96.7	<90	37.2	<90	104.4	88.2	61.2	97.8	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P2-1:A11:25:_RIVERBANK JCT SW STA-MANTECA 115KV (RPN JNCN-MANTECA)	P2-1	Line Section w/o fault	77.4	83.7	96.5	39.3	37.0	78.5	104.2	88.0	61.1	97.7	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P1-1:A12:8:_STANISLS 13.80KV GEN UNIT 1 P1-2:A11:104:_MANTECA-RIPON 115KV	P3	G-1/N-1	<90	86.0	99.8	<90	<90	<90	108.2	90.8	<90	100.5	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P7-1:A11:37:_STANISLAUS-MANTECA #2 115KV & MANTECA-RIPON 115KV	P7	DCTL	<90	83.9	96.8	<90	37.3	<90	104.5	88.2	61.3	98.0	The issue is in the long term and only under sensitivity scenario - Continue to monitor
	P1-2:A11:104:_MANTECA-RIPON 115KV P1-2:A11:61:_BELLOTA-RIVERBANK-MELONES SW STA 115KV	P6	N-1-1	<90	<90	99.1	<90	<90	<90	108.5	90.3	<90	102.6	The issue is in the long term and only under sensitivity scenario - Continue to monitor

Study Area: PG&E Central Valley



Thermal Overloads

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading (%)										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
33950 RVRBK TP 115 33934 TULLOCH 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	168.3	NConv	252.6	50.0	35.9	172.5	NConv	NConv	118.6	240.1	Short term: Action plan Long term: Substation upgrade or SPS
	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus-tie breaker	25.5	24.8	20.4	23.1	104.6	25.0	10.8	15.7	15.1	8.8	Short term: Action plan Long term: Substation upgrade or SPS
	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	37.6	48.5	65.6	35.9	195.5	43.5	131.7	105.9	NConv	114.1	Short term: Action plan Long term: Substation upgrade or SPS
	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1-1	130.8	168.3	158.4	<90	<90	133.3	NConv	NConv	99.7	157.1	Short term: Action plan Long term: Vierra looping project or SPS
33950 RVRBK TP 115 33944 RVRBANK 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	77.8	NConv	129.8	21.2	14.6	79.7	NConv	NConv	54.5	123.3	Short term: Action plan Long term: Substation upgrade or SPS
33951 VLYHMTP1 115 33517 RPNJN2 115 1 1	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	<90	NConv	108.4	<90	56.7	<90	NConv	NConv	12.3	115.2	Short term: Action plan Long term: Substation upgrade or SPS
	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	<90	75.4	85.9	<90	39.8	<90	119.9	104.1	NConv	103.7	Short term: Action plan Long term: Substation upgrade or SPS
37649 LLNLAB 115 33574 LLNL TAP 115 1 1	P2-4:A11:8:_TESLA D 230KV - SECTION 1D & 2D	P2	Bus-tie breaker	5.5	10.2	14.3	68.4	222.1	5.1	45.5	34.5	58.3	40.0	Short term: Action plan Long term: Substation upgrade or SPS
38054 GRIDLEY 60.0 32334 LIVE OAK 60.0 1 1	P1-1:A5:24:_GRNLEAF2 13.80KV GEN UNIT 1	P3	G-1/N-1	<90	<90	<90	<90	<90	<90	<90	<90	124.2	<90	Severe voltage issue (Pease Transformer...)
	P1-3:A5:31:_PEAS RG 60/60KV TB 1	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	166.5	Voltage collapse issue
	P1-2:A5:57:_MRYSVLLE-PEASE 60KV P1-3:A5:31:_PEAS RG 60/60KV TB 1													
38060 INDUSTR L 60.0 33728 LODI 60.0 1 1	P1-2:A11:89:_LOCKEFORD-LODI #2 60KV	P1	N-1	100.6	70.8	72.9	91.2	59.9	100.4	71.8	69.6	73.5	73.1	Significant leading power factor in 2019 (0.7)
	P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P1	N-1	110.9	81.1	83.9	99.5	65.9	110.7	83.1	80.2	82.8	84.3	Significant leading power factor in 2019 (0.7)
	P2-1:A11:142:_LOCKEFORD-LODI #2 60KV (LOCKEFRD-VICTOR)	P2-1	Line Section w/o fault	104.6	77.4	81.5	93.3	61.6	104.4	81.1	76.5	78.4	81.8	Significant leading power factor in 2019 (0.7)
	P2-1:A11:145:_LOCKEFORD-LODI #2 60KV (VICTOR-WODBRG J)	P2-1	Line Section w/o fault	100.7	71.0	73.1	91.1	59.9	100.5	71.9	69.7	73.6	73.3	Significant leading power factor in 2019 (0.7)
	P2-1:A11:150:_LOCKEFORD-LODI #2 60KV (INDSTR J-INDUSTR L)	P2-1	Line Section w/o fault	100.7	71.0	73.1	91.1	59.9	100.5	72.0	69.7	73.5	73.3	Significant leading power factor in 2019 (0.7)
	P1-2:A11:89:_LOCKEFORD-LODI #2 60KV P1-2:A11:91:_LOCKEFORD-INDUSTRIAL 60KV	P6	N-1-1	194.1	154.7	156.3	181.3	142.1	194.1	157.3	154.8	153.4	193.8	Project: Lockefird-Lodi area 230 kV development Scope is under review



Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
AEC_300 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.02	1.03	Fix power factor issues
AEC_JCT 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.03	Fix power factor issues
AEC_TP1 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.03	Fix power factor issues
AEC_TP2 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.03	Fix power factor issues
ALLEGHNY 60	Base Case	P0	N-0	1.04	1.01	1.01	1.08	1.05	1.04	1.01	1.01	1.02	1.01	Fix power factor issues
ALMENDRA 60	P1-3:A5:31: _PEAS RG 60/60KV TB 1 P1-2:A5:57: _MRYSVLE-PEASE 60KV [0]	P6	N-1/N-1										0.29	Pease 115/60 kV Transformer project
ALMENDRA 60	P7-1:A5:20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	P7	DCTL	1.04	1.01	1.01	1.01	1.01	1.04	1.01	1.01	0.78	0.00	Sensitivity only
ALTA-CGE 60	Base Case	P0	N-0	1.06	1.04	1.04	1.09	1.06	1.06	1.04	1.04	1.03	1.04	Fix power factor issues and Transfoermer tap
AMEGTAP 115	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.08	1.07	1.04	1.04	1.03	1.04	- Fix power factor issues - Vaca Dixon project
AMEGTAP 115	P1-3:A4:1: _VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.05	1.05	1.10	1.08	1.07	1.04	1.04	1.04	1.04	- Fix power factor issues - Vaca Dixon project
AMEGTAP 115	P1-4:A4:6: _VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.08	1.07	1.04	1.04	1.03	1.04	- Fix power factor issues - Vaca Dixon project
AMEGTAP 115	P2-2:A4:7: _VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	1.05	1.10	1.08	1.08	1.05	1.04	1.05	1.05	- Fix power factor issues - Vaca Dixon project
AMEGTAP 115	P1-3:A4:2: _VACA-DIX 500/230KV TB 12 4:A4:6: _VC DX11T SVD=V	P6	N-1/N-1				1.10							- Fix power factor issues - Vaca Dixon project
AMERIGAS 115	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.04	1.03	1.04	- Fix power factor issues - Vaca Dixon project
AMERIGAS 115	P1-3:A4:1: _VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	1.05	1.10	1.08	1.07	1.04	1.04	1.04	1.04	- Fix power factor issues - Vaca Dixon project
AMERIGAS 115	P1-4:A4:6: _VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.07	1.07	1.04	1.04	1.03	1.04	- Fix power factor issues - Vaca Dixon project
AMERIGAS 115	P2-2:A4:7: _VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	1.05	1.10	1.08	1.08	1.05	1.04	1.05	1.05	- Fix power factor issues - Vaca Dixon project
AMERIGAS 115	P1-3:A4:2: _VACA-DIX 500/230KV TB 12 4:A4:6: _VC DX11T SVD=V	P6	N-1/N-1				1.10							- Fix power factor issues - Vaca Dixon project
APLHTAP1 115	Base Case	P0	N-0	1.06	1.02	1.02	1.10	1.06	1.06	1.02	1.02	1.01	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P1-2:A5:36: _DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project

Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
APLHTAP1 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.03	1.03	1.10	1.07	1.06	1.02	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.07	1.02	1.02	1.11	1.07	1.07	1.02	1.01	1.02	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.02	1.03	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.08	1.02	1.02	1.11	1.07	1.08	1.02	1.02	1.03	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.10	1.07	1.06	1.01	1.01	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.00	1.00	1.11	1.06	1.06	0.99	0.99	0.99	0.99	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.03	1.03	1.10	1.07	1.08	1.03	1.02	1.02	1.03	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	1.03	0.93	0.93	1.09	1.05	1.03	0.91	0.88	0.94	0.92	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project

Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
APLHTAP1 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.10	1.07	1.06	1.01	1.01	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.10	1.07	1.06	1.02	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.10	1.07	1.06	1.02	1.01	1.01	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P2-1:A5:39:_EL DORADO-MISSOURI FLAT #1 115KV [1530] (ELDORAD-APLHTAP1)	P2-1	Line Section w/o fault	1.07	1.03	1.02	1.11	1.07	1.07	1.02	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.00	1.00	1.11	1.06	1.06	0.99	0.99	0.99	0.99	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP1 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	Base Case	P0	N-0	1.06	1.02	1.02	1.10	1.06	1.06	1.01	1.01	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	1.02	1.10	1.07	1.06	1.02	1.01	1.01	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project

Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
APLHTAP2 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.00	1.00	1.11	1.06	1.05	1.00	0.99	1.01	0.99	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.06	0.99	0.98	1.11	1.06	1.05	0.98	0.97	0.99	0.98	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.10	1.07	1.06	1.01	1.00	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.00	0.99	1.11	1.06	1.05	0.99	0.99	0.99	0.99	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.03	1.03	1.10	1.07	1.07	1.02	1.01	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	1.00	0.88	0.88	1.08	1.04	1.00	0.86	0.82	0.90	0.87	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.02	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.10	1.07	1.06	1.02	1.01	1.01	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project



Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
APLHTAP2 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.00	0.99	1.11	1.06	1.05	0.99	0.99	0.99	0.99	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APLHTAP2 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	Base Case	P0	N-0	1.06	1.02	1.02	1.10	1.06	1.06	1.02	1.02	1.01	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.03	1.02	1.10	1.07	1.06	1.02	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.07	1.02	1.02	1.11	1.07	1.07	1.02	1.01	1.02	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD- MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.08	1.02	1.02	1.11	1.07	1.08	1.02	1.02	1.03	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project

Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
APPLE HL 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.06	0.99	0.98	1.11	1.06	1.05	0.98	0.97	0.99	0.98	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.10	1.07	1.06	1.01	1.01	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.00	1.00	1.11	1.06	1.06	0.99	0.99	0.99	0.99	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.03	1.03	1.10	1.07	1.08	1.03	1.01	1.02	1.03	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	1.03	0.92	0.93	1.09	1.05	1.03	0.91	0.88	0.94	0.92	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.10	1.07	1.06	1.01	1.01	1.01	1.01	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.10	1.07	1.07	1.02	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.10	1.07	1.06	1.02	1.01	1.01	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P2-1:A5:39:_EL DORADO-MISSOURI FLAT #1 115KV [1530] (ELDORAD-APLHTAP1)	P2-1	Line Section w/o fault	1.07	1.02	1.02	1.11	1.07	1.07	1.02	1.02	1.02	1.02	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project

Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
APPLE HL 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.00	1.00	1.11	1.06	1.06	0.99	0.99	0.99	0.99	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
APPLE HL 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	- Fix power factor issues - Operating procedure - Atlantic-Placer 115 kV line project
ARBALT 60	P1-2:A4:44:_CORTINA #1 60KV [6580]	P1	N-1	1.00	0.96	0.95	1.03	1.02	0.99	0.94	0.93	0.96	0.95	Sensitivity only
ARBALT 60	P2-3:A4:41:_CORTINA - MA 60KV & CORTINA #1 LINE	P2	Non-bus-tie breaker	1.00	0.96	0.96	1.03	1.02	0.99	0.95	0.94	0.96	0.96	Sensitivity only
ARBJCT 60	P1-2:A4:44:_CORTINA #1 60KV [6580]	P1	N-1	1.00	0.96	0.96	1.03	1.02	1.00	0.95	0.94	0.96	0.96	Sensitivity only
ATLANTC 230	Base Case	P0	N-0	1.01	0.97	0.97	1.05	1.02	1.01	0.97	0.97	0.97	0.97	Fix power factor issues
ATLANTC 230	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.00	0.90	0.91	1.08	1.00	1.00	0.91	0.89	0.96	0.88	Protection upgrade
ATLANTC 230	P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590] P1-2:A5:10:_ ATLANTIC-GOLD HILL 230KV [4330]	P6	N-1/N-1		0.91	0.92				0.91	0.90		0.92	Sensitivity only
ATLANTI 60	Base Case	P0	N-0	1.08	0.99	0.99	1.11	1.06	1.08	0.98	0.98	1.00	0.98	Fix power factor issues and transformer tap
ATLANTI 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.08	0.97	0.97	1.12	1.06	1.08	0.96	0.96	0.99	0.96	Fix power factor issues and transformer tap
ATLANTI 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.08	0.97	0.96	1.12	1.06	1.08	0.96	0.96	0.98	0.95	Fix power factor issues and transformer tap
ATLANTI 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.08	0.97	0.96	1.12	1.06	1.08	0.96	0.96	0.98	0.95	Fix power factor issues and transformer tap
ATLANTI 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.08	0.96	0.95	1.12	1.06	1.08	0.94	0.94	0.97	0.94	Fix power factor issues and transformer tap
ATLANTI 60	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P3	G-1/N-1				1.12							Fix power factor issues and transformer tap
ATLANTI 60	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.08	0.91	0.92	1.14	1.04	1.08	0.91	0.90	0.99	0.88	Fix power factor issues and transformer tap
ATLANTI 60	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330] P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590]	P6	N-1/N-1		0.92		1.14				0.90			Fix power factor issues and transformer tap
ATLANTI 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.08	0.96	0.95	1.12	1.06	1.08	0.94	0.94	0.97	0.94	Fix power factor issues and transformer tap
ATLANTI 60	P7-1:A5:7 _Atlantic-Gold Hill 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	1.08	0.97	0.96	1.12	1.06	1.08	0.96	0.96	0.99	0.95	Fix power factor issues and transformer tap
ATLANTIC 115	Base Case	P0	N-0	1.03	1.00	1.00	1.08	1.04	1.03	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
ATLANTIC 115	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.93	0.94	1.10	1.02	1.02	0.94	0.92	0.99	0.91	Load power factor correction or voltage support if needed
ATLANTIC 115	P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590] P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330]	P6	N-1/N-1		0.93	0.94	1.10			0.94	0.92		0.94	Load power factor correction or voltage support if needed
AUBURN 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.87	0.87	1.02	1.02	0.98	0.83	0.27	0.94	0.88	Mitigation under review
AVENA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.99	0.85	0.85	1.05	1.03	0.98	0.83	0.84	0.98	0.83	Mitigation under review
AVENATP1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.99	0.85	0.85	1.05	1.03	0.98	0.83	0.84	0.98	0.83	Mitigation under review
AVENATP2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.89	0.88	1.05	1.03	1.00	0.87	0.88	0.99	0.87	Substation upgrade
B.BTHNY- 60	Base Case	P0	N-0	1.06	1.04	1.04	1.09	1.06	1.06	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
BANGOR 60	Base Case	P0	N-0	1.04	1.01	1.01	1.07	1.05	1.04	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
BANTA 60	Base Case	P0	N-0	1.04	1.04	1.03	1.04	1.05	1.04	1.03	1.03	1.03	1.03	Mitigation under review
BEALE2J2 60	Base Case	P0	N-0	1.03	1.03	1.03	1.06	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
BEARDSLY 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.78	0.78	1.04	1.04	1.00	0.75	0.76	1.01	0.74	Mitigation under review
BELL PGE 115	Base Case	P0	N-0	1.04	1.01	1.01	1.10	1.06	1.04	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
BELL PGE 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	0.99	0.99	1.10	1.07	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
BELL PGE 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	0.99	0.99	1.10	1.07	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
BELL PGE 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.04	0.99	0.99	1.10	1.07	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
BELL PGE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.99	0.99	1.10	1.06	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
BELL PGE 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.92	0.83	0.83	1.07	1.05	0.91	0.80	0.32	0.90	0.84	Substation upgrade
BELL PGE 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.04	0.99	0.99	1.10	1.07	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
BELL PGE 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.04	0.99	0.99	1.10	1.07	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
BELL PGE 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.04	1.01	1.01	1.10	1.07	1.04	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
BELL PGE 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393] P1-2:A5:20:_PLACER-GOLD HILL #1 115KV [3340]	P6	N-1/N-1		0.93	0.93				0.91	0.90		0.92	Mitigation under review



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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
BELL PGE 115	P7-1:A11:12:_ BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	0.99	0.99	1.10	1.06	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
BELL PGE 115	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	0.93	0.93	1.06	1.05	0.99	0.92	0.91	0.95	0.93	Mitigation under review
BELLOTA 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.32	0.33	1.04	1.02	0.82	0.30	0.30	0.87	0.31	Mitigation under review
BELLOTA 115	P1-3:A11:10:_ BELLOTA 230/115KV TB 1 P1-3:A11:11:_ BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.92	0.73	0.75			0.92			0.90	0.75	Mitigation under review
BELLOTA 230	Base Case	P0	N-0	1.03	1.00	1.00	1.05	1.03	1.03	0.99	1.00	0.99	0.99	Load power factor correction or voltage support if needed
BLLTAJCT 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.31	0.32	1.04	1.02	0.82	0.30	0.30	0.87	0.31	Mitigation under review
BLLTAJCT 115	P1-3:A11:10:_ BELLOTA 230/115KV TB 1 P1-3:A11:11:_ BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.92	0.72	0.75			0.92			0.90	0.75	Mitigation under review
BNTA JCT 60	Base Case	P0	N-0	1.04	1.04	1.03	1.04	1.05	1.04	1.03	1.03	1.03	1.03	Mitigation under review
BOGUE 115	Base Case	P0	N-0	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
BOGUE 115	P1-2:A4:25:_ WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
BOGUE 115	P2-2:A4:20:_ BRIGHTN 115KV SECTION ME	P2	Bus	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.03	Load power factor correction or voltage support if needed
BOGUE 115	P2-3:A4:19:_ BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.05	1.03	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.03	Load power factor correction or voltage support if needed
BOGUE 115	P2-3:A4:20:_ BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.05	1.03	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.03	Load power factor correction or voltage support if needed
BOGUE 115	P2-3:A4:24:_ DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
BOGUE 115	P2-3:A5:17:_ RIO OSO - 2D 115KV & BOGUE-RIO OSO LINE	P2	Non-bus-tie breaker	1.06	1.02	1.01	1.10	1.04	1.06	1.01	1.02	0.98	1.01	Mitigation under review
BOGUE 115	P2-3:A5:83:_ DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.11	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
BOGUE 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.03	1.03	1.11	1.04	1.05	1.03	1.03	1.02	1.02	Load power factor correction or voltage support if needed
BOGUE 115	P2-4:A4:10:_ BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.03	Load power factor correction or voltage support if needed
BOGUE 115	P2-4:A4:12:_ DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
BOGUE 115	P2-4:A5:6:_ RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.03	1.00	1.02	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
BOGUE 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
BOGUE 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
BOGUE 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
BOGUE 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.03	1.03	1.11	1.04	1.05	1.03	1.03	1.02	1.02	Load power factor correction or voltage support if needed
BOGUE 115	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	1.05	1.03	1.03	1.11	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
BOGUE 115	P7-1:A5:12_Rio Oso-Nicolaus 115 kV Line & Bogue-Rio Oso 115 kV Line	P7	DCTL	1.06	1.02	1.01	1.10	1.04	1.06	1.01	1.02	0.98	1.01	Mitigation under review
BOWMN TP 60	Base Case	P0	N-0	1.03	1.04	1.03	1.05	1.04	1.03	1.04	1.04	1.04	1.03	Load power factor correction or voltage support if needed
BRDSLY J 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.77	0.78	1.04	1.04	1.00	0.75	0.76	1.01	0.73	Mitigation under review
BRIGHTN 115	P1-2:A4:9:_RIO OSO-BRIGHTON 230KV [5600] P1-2:A11:6:_BRIGHTON-BELLOTA 230KV [4420]	P6	N-1/N-1		0.99	0.99	1.10			0.98	0.98		0.98	Load power factor correction or voltage support if needed
BRIGHTON 230	Base Case	P0	N-0	1.01	0.97	0.97	1.06	1.02	1.01	0.96	0.96	0.97	0.96	Load power factor correction or voltage support if needed
BRIGHTON 230	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.99	0.91	0.90	1.08	1.01	0.99	0.89	0.89	0.93	0.89	Substation upgrade
BRIGHTON 230	P1-2:A4:9:_RIO OSO-BRIGHTON 230KV [5600] P1-2:A11:6:_BRIGHTON-BELLOTA 230KV [4420]	P6	N-1/N-1	0.89	0.86	0.86	1.14	0.89	0.89	0.85	0.85	0.87	0.85	Load power factor correction or voltage support if needed
BRIGHTON 230	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	0.99	0.91	0.90	1.08	1.01	0.99	0.89	0.89	0.93	0.89	Mitigation under review
BRKR SLG 115	Base Case	P0	N-0	1.02	1.02	1.02	1.05	1.04	1.02	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
BRKR SLG 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	0.99	0.95	1.00	1.09	1.02	1.02	0.99	0.99	1.01	0.99	Mitigation under review
BRKR SLG 115	P1-3:A4:3:_BRIGHTON 230/115KV TB 10 P1-3:A4:4:_BRIGHTON 230/115KV TB 9	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
BRKR TP 115	Base Case	P0	N-0	1.02	1.02	1.02	1.05	1.04	1.02	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
BRKR TP 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	0.99	0.95	1.00	1.09	1.02	1.02	0.99	0.99	1.01	0.99	Mitigation under review
BRKR TP 115	P1-3:A4:3:_BRIGHTON 230/115KV TB 10 P1-3:A4:4:_BRIGHTON 230/115KV TB 9	P6	N-1/N-1				1.10							Mitigation under review

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
BRKRJCT 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	0.99	0.95	1.00	1.09	1.02	1.02	0.99	0.99	1.01	0.99	Mitigation under review
BRKRJCT 115	P1-3:A4:3:_BRIGHTON 230/115KV TB 10 P1-3:A4:4:_BRIGHTON 230/115KV TB 9	P6	N-1/N-1				1.10							Mitigation under review
BRNSWALT 115	Base Case	P0	N-0	1.02	1.04	1.03	1.09	1.05	1.02	1.03	1.04	1.04	1.03	Mitigation under review
BRNSWALT 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393] P1-3:A5:14:_DRUM 5 13.8/115KV TB 1	P6	N-1/N-1				1.10							Mitigation under review
BRNSWCKP 115	Base Case	P0	N-0	1.03	1.03	1.03	1.10	1.05	1.03	1.03	1.03	1.04	1.03	Mitigation under review
BRNSWCKP 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1	P1	N-1	1.04	1.03	1.03	1.10	1.05	1.04	1.03	1.04	1.04	1.03	Mitigation under review
BRNSWCKP 115	P1-3:A5:14:_DRUM 5 13.8/115KV TB 1	P1	N-1	1.04	1.03	1.03	1.10	1.05	1.04	1.03	1.04	1.04	1.03	Mitigation under review
BRNSWCKP 115	P2-3:A5:82:_DRUM 115KV - RING R2 & R1	P2	Non-bus-tie breaker	1.04	1.03	1.03	1.10	1.05	1.04	1.03	1.03	1.04	1.03	Mitigation under review
BRNSWCKP 115	P2-3:A5:86:_BRNSWALT 115KV - RING R1 & R7	P2	Non-bus-tie breaker	1.04	1.03	1.03	1.10	1.05	1.04	1.03	1.03	1.04	1.03	Mitigation under review
BRNSWCKP 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.03	1.03	1.03	1.10	1.05	1.03	1.02	1.02	1.03	1.02	Mitigation under review
BRNSWCKP 115	P2-1:A5:33:_BRUNSWICK #2 TAP 115KV [1431] (BRUNSWCK-BRNSWCKP)	P2-1	Line Section w/o fault	1.05	1.05	1.05	1.10	1.05	1.05	1.04	1.05	1.05	1.04	Mitigation under review
BRNSWCKP 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393] P1-3:A5:14:_DRUM 5 13.8/115KV TB 1	P6	N-1/N-1				1.10							Mitigation under review
BRNSWCKP 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.03	1.03	1.03	1.10	1.05	1.03	1.02	1.02	1.03	1.02	Mitigation under review
BRNSWKTP 115	Base Case	P0	N-0	1.03	1.04	1.04	1.10	1.05	1.03	1.04	1.04	1.05	1.04	Mitigation under review
BRNSWKTP 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1	P1	N-1	1.03	1.04	1.04	1.10	1.05	1.03	1.04	1.04	1.05	1.04	Mitigation under review
BRNSWKTP 115	P1-3:A5:14:_DRUM 5 13.8/115KV TB 1	P1	N-1	1.03	1.04	1.04	1.10	1.05	1.03	1.04	1.04	1.05	1.04	Load power factor correction or voltage support if needed
BRNSWKTP 115	P2-2:A5:18:_BRNSWALT 115KV SECTION 1D	P2	Bus	1.05	1.05	1.04	1.10	1.05	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
BRNSWKTP 115	P2-3:A5:82:_DRUM 115KV - RING R2 & R1	P2	Non-bus-tie breaker	1.03	1.04	1.04	1.10	1.05	1.03	1.04	1.04	1.05	1.04	Load power factor correction or voltage support if needed
BRNSWKTP 115	P2-3:A5:86:_BRNSWALT 115KV - RING R1 & R7	P2	Non-bus-tie breaker	1.03	1.04	1.04	1.10	1.05	1.03	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
BRNSWKTP 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.03	1.03	1.03	1.10	1.05	1.03	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
BRNSWKTP 115	P2-1:A5:32:_BRUNSWICK #1 TAP 115KV [1422] (BRNSWKTP-BRNSWALT)	P2-1	Line Section w/o fault	1.05	1.05	1.04	1.10	1.05	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
BRNSWKTP 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393] P1-3:A5:14:_DRUM 5 13.8/115KV TB 1	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
BRNSWKTP 115	P7-1:A11:12:_ BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.03	1.03	1.03	1.10	1.05	1.03	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
BRUNSWCK 115	Base Case	P0	N-0	1.03	1.03	1.02	1.09	1.05	1.03	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
BRUNSWCK 115	P1-2:A5:36:_ DRUM-HIGGINS 115KV [4393] P1-3:A5:14:_ DRUM 5 13.8/115KV TB 1	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
BTAV-JCT 60	Base Case	P0	N-0	1.07	1.03	1.03	1.09	1.07	1.07	1.02	1.02	1.02	1.03	Load power factor correction or voltage support if needed
BTAV-JCT 60	P1-3:A4:1:_ VACA-DIX 500/230KV TB 11	P1	N-1	1.08	1.03	1.03	1.10	1.07	1.08	1.03	1.02	1.03	1.03	Load power factor correction or voltage support if needed
BTAV-JCT 60	P1-4:A4:6:_ VC DX11T SVD=V	P1	N-1	1.07	1.03	1.03	1.10	1.07	1.07	1.02	1.02	1.02	1.03	Load power factor correction or voltage support if needed
BTAV-JCT 60	P2-2:A4:7:_ VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.04	1.04	1.10	1.07	1.08	1.03	1.02	1.04	1.04	Load power factor correction or voltage support if needed
BTAV-JCT 60	P1-2:A4:50:_ VACA-DXN-TRVS_HPT 60KV [0] P1-3:A4:1:_ VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
CACHSLJ1 60	Base Case	P0	N-0	1.07	1.02	1.03	1.09	1.07	1.07	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CACHSLJ1 60	P2-1:A4:58:_ DIXON-VACA #1 60KV [6730] (VACA-DXN-VACA-JT1)	P2-1	Line Section w/o fault	1.04	0.97	0.97	1.06	1.03	1.04	0.97	0.96	0.98	0.97	Mitigation under review
CACHSLJ1 60	P1-3:A4:19:_ VACA-DIX 115/60KV TB 9 P1-3:A4:1:_ VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
CACHSLJ2 60	Base Case	P0	N-0	1.07	1.03	1.03	1.09	1.07	1.07	1.02	1.02	1.02	1.03	Load power factor correction or voltage support if needed
CACHSLJ2 60	P1-3:A4:1:_ VACA-DIX 500/230KV TB 11	P1	N-1	1.08	1.03	1.03	1.10	1.07	1.08	1.03	1.02	1.03	1.03	Load power factor correction or voltage support if needed
CACHSLJ2 60	P1-4:A4:6:_ VC DX11T SVD=V	P1	N-1	1.07	1.03	1.03	1.10	1.07	1.07	1.02	1.02	1.02	1.03	Load power factor correction or voltage support if needed
CACHSLJ2 60	P2-2:A4:7:_ VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.04	1.04	1.10	1.07	1.08	1.03	1.02	1.04	1.04	Load power factor correction or voltage support if needed
CACHSLJ2 60	P1-2:A4:50:_ VACA-DXN-TRVS_HPT 60KV [0] P1-3:A4:1:_ VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
CACHSTAP 60	Base Case	P0	N-0	1.07	1.03	1.03	1.09	1.07	1.07	1.02	1.02	1.02	1.03	Load power factor correction or voltage support if needed
CACHSTAP 60	P1-3:A4:1:_ VACA-DIX 500/230KV TB 11	P1	N-1	1.08	1.03	1.03	1.10	1.07	1.08	1.03	1.02	1.03	1.03	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CACHSTAP 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.03	1.03	1.10	1.07	1.07	1.02	1.02	1.02	1.03	Load power factor correction or voltage support if needed
CACHSTAP 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.04	1.04	1.10	1.07	1.08	1.03	1.02	1.04	1.04	Load power factor correction or voltage support if needed
CACHSTAP 60	P1-2:A4:50:_VACA-DXN-TRVS_HPT 60KV [0] P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
CALVO 60	Base Case	P0	N-0	1.04	1.03	1.03	1.04	1.05	1.04	1.03	1.03	1.03	1.03	Mitigation under review
CAMANCH 230	Base Case	P0	N-0	1.03	1.00	1.00	1.05	1.03	1.03	1.00	1.00	0.99	1.00	Load power factor correction or voltage support if needed
CAMANCHE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.32	0.33	1.04	1.03	0.82	0.30	0.30	0.87	0.31	Mitigation under review
CAMANCHE 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.93	0.73	0.75			0.92			0.91	0.76	Mitigation under review
CAMANCPP 230	Base Case	P0	N-0	1.03	1.00	1.00	1.05	1.03	1.03	1.00	1.00	0.99	1.00	Load power factor correction or voltage support if needed
CAMPUS 115	Base Case	P0	N-0	1.02	1.02	1.01	1.06	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
CAMPUS 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	0.99	0.95	1.00	1.09	1.02	1.02	0.99	0.98	1.01	0.98	Mitigation under review
CAMPUS 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	0.99	0.95	0.99	1.09	1.02	1.02	0.99	0.98	1.01	0.98	Mitigation under review
CARBONA 60	P2-3:A11:15:_KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA LINE	P2	Non-bus-tie breaker	0.92	0.91	0.89	1.00	1.00	0.92	0.88	0.89	0.95	0.88	Mitigation under review
CARBONA 60	P1-2:A11:36:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] P1-3:A11:32:_KASSON 115/60KV TB 1	P6	N-1/N-1	0.93	0.92	0.91			0.93	0.89	0.91		0.90	Mitigation under review
CATARACT 115	Base Case	P0	N-0	1.04	1.03	1.03	1.05	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
CATARACT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.97	0.75	0.75	1.05	1.04	0.97	0.73	0.74	0.99	0.73	Mitigation under review
CDCRSTN 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.82	0.27	0.28	1.03	1.01	0.81	0.25	0.25	0.85	0.26	Mitigation under review
CDCRSTN 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.91	0.69	0.72			0.91			0.88	0.72	Mitigation under review
CDCRSTNJT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.82	0.27	0.28	1.03	1.01	0.81	0.25	0.26	0.85	0.27	Mitigation under review
CDCRSTNJT 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.91	0.70	0.72			0.91			0.88	0.72	Mitigation under review
CH.STN 115	Base Case	P0	N-0	1.04	1.02	1.02	1.05	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
CH.STN 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.67	0.67	1.05	1.04	0.94	0.65	0.66	0.96	0.63	Mitigation under review

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CH.STN 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1		0.89	0.90							0.90	Mitigation under review
CH.STNJT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.67	0.67	1.04	1.04	0.94	0.64	0.65	0.96	0.63	Mitigation under review
CH.STNJT 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1		0.89	0.90							0.90	Mitigation under review
CHCGO PK 115	Base Case	P0	N-0	1.04	1.03	1.03	1.10	1.06	1.04	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
CHCGO PK 115	P1-3:A5:23:_DTCH FL1 115/11KV TB 1	P1	N-1	1.05	1.04	1.04	1.11	1.06	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
CHCGO PK 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.03	1.02	1.11	1.06	1.04	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
CHCGO PK 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.99	0.95	0.95	1.09	1.05	0.98	0.93	0.62	0.99	0.95	Substation upgrade
CHCGO PK 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.04	0.99	0.99	1.10	1.07	1.04	0.98	0.97	0.99	0.98	Load power factor correction or voltage support if needed
CHCGO PK 115	P1-1:A5:18:_HALSEY F 6.60KV GEN UNIT 1 P1-1:A5:10:_DTCHFLT1 11.00KV GEN UNIT 1	P3	G-1/N-1				1.10							Load power factor correction or voltage support if needed
CHCGO PK 115	P1-2:A5:37:_BELL-PLACER 115KV [4395] P1-3:A5:23:_DTCH FL1 115/11KV TB 1	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
CHCGO PK 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.03	1.02	1.11	1.06	1.04	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
CHLLNGEA 60	Base Case	P0	N-0	1.05	1.02	1.02	1.08	1.06	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CISCO GR 60	Base Case	P0	N-0	1.03	1.04	1.04	1.07	1.05	1.03	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CISCO GR 60	P2-2:A5:39:_SPAULDNG 60KV SECTION MA	P2	Bus	1.02	1.05	1.05	1.11	1.07	1.02	1.05	1.05	1.06	1.05	Load power factor correction or voltage support if needed
CISCO GR 60	P2-3:A5:63:_DRUM - MA 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.03	1.05	1.05	1.10	1.06	1.03	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
CISCO GR 60	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.03	1.05	1.05	1.10	1.05	1.03	1.05	1.06	1.06	1.04	Load power factor correction or voltage support if needed
CISCO GR 60	P2-1:A5:95:_SPAULDING-SUMMIT 60KV [8060] (CISCO GR-SPAULDNG)	P2-1	Line Section w/o fault	1.02	1.05	1.05	1.11	1.07	1.02	1.05	1.06	1.06	1.05	Load power factor correction or voltage support if needed
CISCO GR 60	P1-1:A5:13:_SPAULDG 9.11KV GEN UNIT 1 P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
CISCO GR 60	P1-1:A5:13:_SPAULDG 9.11KV GEN UNIT 1 P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CISCOTAP 60	Base Case	P0	N-0	1.03	1.04	1.04	1.07	1.05	1.03	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CISCOTAP 60	P2-2:A5:39:_SPAULDNG 60KV SECTION MA	P2	Bus	1.02	1.05	1.05	1.11	1.07	1.02	1.05	1.05	1.06	1.05	Load power factor correction or voltage support if needed
CISCOTAP 60	P2-3:A5:63:_DRUM - MA 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.03	1.05	1.05	1.10	1.06	1.03	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
CISCOTAP 60	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.03	1.05	1.05	1.10	1.05	1.03	1.05	1.06	1.06	1.04	Load power factor correction or voltage support if needed
CISCOTAP 60	P2-1:A5:95:_SPAULDING-SUMMIT 60KV [8060] (CISCO GR-SPAULDNG)	P2-1	Line Section w/o fault	1.02	1.05	1.05	1.11	1.07	1.02	1.05	1.06	1.06	1.05	Load power factor correction or voltage support if needed
CISCOTAP 60	P1-1:A5:13:_SPAULDG 9.11KV GEN UNIT 1 P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
CISCOTAP 60	P1-1:A5:13:_SPAULDG 9.11KV GEN UNIT 1 P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
CL AMMNA 115	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1			0.92				0.90	0.91		0.92	Mitigation under review
CLAY 60	P1-2:A11:74:_VALLEY SPRINGS-CLAY 60KV [8252] P1-2:A11:73:_VALLEY SPRINGS-MARTELL #1 60KV [8241]	P6	N-1/N-1					0.84						Mitigation under review
CLMBA HL 60	Base Case	P0	N-0	1.05	1.02	1.02	1.08	1.05	1.05	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
CLMBA HL 60	P1-2:A5:47:_COLGATE-SMARTVILLE #1 60KV [6510] P1-2:A5:48:_COLGATE-SMARTVILLE #2 60KV [6520]	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
CLNY JCT 60	Base Case	P0	N-0	1.05	1.02	1.02	1.05	1.02	1.05	1.01	1.02	1.03	1.02	Load power factor correction or voltage support if needed
CLNY JCT 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.06	0.92	0.91	1.10	1.02	1.06	0.90	0.90	0.94	0.89	Load power factor correction or voltage support if needed
CLNY JCT 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.06	0.92	0.91	1.10	1.02	1.06	0.89	0.90	0.94	0.89	Load power factor correction or voltage support if needed
CLNY JCT 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.06	0.85	0.82	1.12	1.02	1.06	0.80	0.81	0.88	0.79	Load power factor correction or voltage support if needed
CLNY JCT 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.06	0.85	0.82	1.12	1.02	1.06	0.78	0.81	0.88	0.78	Load power factor correction or voltage support if needed
CLNY JCT 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.06	0.92	0.90	1.10	1.02	1.06	0.89	0.90	0.93	0.88	Substation upgrade
CLNY JCT 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	0.89	0.87	1.11	1.02	1.06	0.85	0.86	0.92	0.85	Load power factor correction or voltage support if needed

Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CLNY JCT 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.85	0.87	1.12			0.86	0.87	0.88	0.81	Load power factor correction or voltage support if needed
CLNY JCT 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	0.89	0.87	1.11	1.02	1.06	0.85	0.86	0.92	0.85	Load power factor correction or voltage support if needed
CLRKSVLE 115	Base Case	P0	N-0	1.05	1.02	1.02	1.11	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CLRKSVLE 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.02	1.02	1.11	1.07	1.05	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
CLRKSVLE 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.03	1.02	1.11	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CLRKSVLE 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.05	1.03	1.03	1.12	1.08	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CLRKSVLE 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.12	1.08	1.05	1.03	1.02	1.03	1.02	Load power factor correction or voltage support if needed
CLRKSVLE 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.12	1.08	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CLRKSVLE 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.12	1.08	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CLRKSVLE 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.02	1.02	1.11	1.07	1.05	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
CLRKSVLE 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.02	1.01	1.11	1.07	1.05	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
CLRKSVLE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.00	0.99	1.11	1.07	1.05	0.99	0.99	1.00	0.98	Load power factor correction or voltage support if needed
CLRKSVLE 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.02	1.02	1.11	1.08	1.05	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
CLRKSVLE 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.05	1.02	1.01	1.11	1.07	1.05	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
CLRKSVLE 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.03	1.03	1.11	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CLRKSVLE 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	1.02	1.11	1.07	1.05	1.02	1.01	1.02	1.01	Load power factor correction or voltage support if needed
CLRKSVLE 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.12							Load power factor correction or voltage support if needed
CLRKSVLE 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.00	0.99	1.12	1.07	1.05	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CLRKSVLE 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.06	1.04	1.03	1.11	1.08	1.06	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
CLRKSVLT 115	Base Case	P0	N-0	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CLRKSVLT 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CLRKSVLT 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.07	1.04	1.04	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.04	1.04	1.11	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.12	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.04	1.04	1.11	1.08	1.08	1.04	1.03	1.04	1.04	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.08	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.04	1.04	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CLRKSVLT 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CLRKSVLT 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.12							Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CLRKSVLT 115	P7-1:A11:12:_ BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
CLRKSVLT 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.05	1.05	1.11	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CLSA CRS 60	Base Case	P0	N-0	0.99	0.96	0.96	1.02	1.02	0.99	0.95	0.93	0.96	0.96	Mitigation under review
CMNCHETP 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.31	0.32	1.04	1.02	0.82	0.30	0.30	0.87	0.31	Mitigation under review
CMNCHETP 115	P1-3:A11:10:_ BELLOTA 230/115KV TB 1 P1-3:A11:11:_ BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.92	0.72	0.75			0.92			0.90	0.75	Mitigation under review
CNTRY CB 60	Base Case	P0	N-0	1.04	1.04	1.03	1.04	1.05	1.04	1.04	1.04	1.05	1.04	Mitigation under review
COLGATE 60	Base Case	P0	N-0	1.05	1.03	1.03	1.08	1.06	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
COLGATE 60	P1-2:A5:47:_ COLGATE-SMARTVILLE #1 60KV [6510] P1-2:A5:48:_ COLGATE-SMARTVILLE #2 60KV [6520]	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
COLGATEA 60	Base Case	P0	N-0	1.05	1.02	1.02	1.08	1.06	1.05	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
COLONY 60	P1-2:A11:7:_ LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.05	0.93	0.92	1.09	1.02	1.05	0.91	0.91	0.95	0.90	Mitigation under review
COLONY 60	P2-2:A11:9:_ BELLOTA 230KV SECTION 2E	P2	Bus	1.05	0.93	0.92	1.09	1.02	1.05	0.90	0.91	0.95	0.90	Mitigation under review
COLONY 60	P2-3:A11:81:_ LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.05	0.86	0.83	1.11	1.02	1.05	0.81	0.82	0.89	0.80	Load power factor correction or voltage support if needed
COLONY 60	P2-3:A11:82:_ LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.05	0.86	0.83	1.11	1.02	1.05	0.79	0.82	0.89	0.79	Load power factor correction or voltage support if needed
COLONY 60	P2-4:A11:1:_ BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.05	0.93	0.91	1.09	1.02	1.05	0.90	0.91	0.94	0.90	Substation upgrade
COLONY 60	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.90	0.88	1.10	1.02	1.05	0.86	0.87	0.93	0.86	Substation upgrade
COLONY 60	P1-3:A11:5:_ LOCKFORD 230/60KV TB 3 P1-2:A11:7:_ LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.86	0.88	1.11			0.87	0.88	0.89	0.82	Load power factor correction or voltage support if needed
COLONY 60	P7-1:A11:12:_ BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.90	0.88	1.10	1.02	1.06	0.86	0.87	0.93	0.86	Mitigation under review
COLUSA 60	Base Case	P0	N-0	0.99	0.96	0.96	1.04	1.02	0.99	0.94	0.93	0.96	0.95	Mitigation under review
CORDELIA 115	Base Case	P0	N-0	1.05	1.02	1.02	1.08	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CORDELLT 115	Base Case	P0	N-0	1.02	0.99	0.99	1.05	1.03	1.02	0.99	0.99	0.99	0.99	Load power factor correction or voltage support if needed
CORRAL 60	Base Case	P0	N-0	1.04	1.01	1.01	1.05	1.04	1.04	1.00	1.01	1.02	1.01	Load power factor correction or voltage support if needed
CORRAL2 60	Base Case	P0	N-0	1.04	1.01	1.01	1.05	1.04	1.04	1.00	1.01	1.02	1.01	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CORT_D 115	Base Case	P0	N-0	1.08	1.07	1.07	1.09	1.08	1.08	1.07	1.05	1.05	1.07	Load power factor correction or voltage support if needed
CORT_D 115	P2-3:A4:10:_CORTINA 115KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker	1.09	1.08	1.08	1.11	1.10	1.09	1.07	1.05	1.05	1.07	Load power factor correction or voltage support if needed
CORT_D 115	P2-3:A4:50:_CORTINA 230KV - RING R2 & R3	P2	Non-bus-tie breaker	1.03	0.98	0.98	1.06	1.04	1.02	0.97	0.97	1.01	0.97	Mitigation under review
CORT_D 115	P2-3:A4:53:_CORTINA 230KV - RING R1 & R4	P2	Non-bus-tie breaker	1.03	0.98	0.98	1.06	1.05	1.02	0.97	0.97	1.01	0.97	Mitigation under review
CORT_D 115	P1-2:A4:28:_EAGLE ROCK-CORTINA 115KV [1470] P1-3:A4:5:_CORTINA 230/115KV TB 4	P6	N-1/N-1	1.11	1.10	1.10			1.11				1.10	Mitigation under review
CORT_D 115	P7-1:A4:25:_EAGLE ROCK-CORTINA & CORTINA-MENDOCINO #1 Lines	P7	DCTL	1.09	1.08	1.08	1.11	1.10	1.09	1.07	1.05	1.05	1.07	Load power factor correction or voltage support if needed
CORTINA 115	Base Case	P0	N-0	1.08	1.07	1.07	1.09	1.08	1.08	1.07	1.05	1.05	1.07	Load power factor correction or voltage support if needed
CORTINA 115	P2-3:A4:10:_CORTINA 115KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker	1.09	1.08	1.08	1.11	1.10	1.09	1.07	1.05	1.05	1.07	Load power factor correction or voltage support if needed
CORTINA 115	P2-3:A4:50:_CORTINA 230KV - RING R2 & R3	P2	Non-bus-tie breaker	1.03	0.98	0.98	1.06	1.04	1.02	0.97	0.97	1.01	0.97	Mitigation under review
CORTINA 115	P2-3:A4:53:_CORTINA 230KV - RING R1 & R4	P2	Non-bus-tie breaker	1.03	0.98	0.98	1.06	1.05	1.02	0.97	0.97	1.01	0.97	Mitigation under review
CORTINA 115	P5-5:A4:5:_Cortina 115kv BAAH Bus #2 (failure of non-redundent relay)	P55	Non-Redundant	1.08	1.07	1.07	1.11	1.09	1.08	1.06	1.05	1.05	1.07	Load power factor correction or voltage support if needed
CORTINA 115	P1-2:A4:28:_EAGLE ROCK-CORTINA 115KV [1470] P1-3:A4:5:_CORTINA 230/115KV TB 4	P6	N-1/N-1	1.11	1.10	1.10			1.11				1.10	Mitigation under review
CORTINA 115	P7-1:A4:25:_EAGLE ROCK-CORTINA & CORTINA-MENDOCINO #1 Lines	P7	DCTL	1.09	1.08	1.08	1.11	1.10	1.09	1.07	1.05	1.05	1.07	Load power factor correction or voltage support if needed
CPM 115	Base Case	P0	N-0	1.06	1.04	1.03	1.11	1.07	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CPM 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.03	1.03	1.11	1.08	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CPM 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.07	1.04	1.04	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CPM 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.04	1.04	1.12	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CPM 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.12	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CPM 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CPM 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CPM 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CPM 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CPM 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CPM 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
CPM 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.04	1.04	1.11	1.08	1.08	1.04	1.03	1.04	1.04	Load power factor correction or voltage support if needed
CPM 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.08	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
CPM 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CPM 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.04	1.04	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CPM 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CPM 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.12							Load power factor correction or voltage support if needed
CPM 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
CPM 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.05	1.05	1.11	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CPM TAP 115	Base Case	P0	N-0	1.06	1.04	1.03	1.11	1.07	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CPM TAP 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.03	1.03	1.11	1.08	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CPM TAP 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.07	1.04	1.04	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CPM TAP 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.04	1.04	1.12	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CPM TAP 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.12	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CPM TAP 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CPM TAP 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CPM TAP 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CPM TAP 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CPM TAP 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CPM TAP 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
CPM TAP 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.04	1.04	1.11	1.08	1.08	1.04	1.03	1.04	1.04	Load power factor correction or voltage support if needed
CPM TAP 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.08	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
CPM TAP 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
CPM TAP 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.04	1.04	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CPM TAP 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
CPM TAP 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.12							Load power factor correction or voltage support if needed
CPM TAP 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
CPM TAP 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.05	1.05	1.11	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
CRBNA JC 60	Base Case	P0	N-0	1.04	1.04	1.03	1.04	1.05	1.04	1.03	1.03	1.03	1.03	Mitigation under review
CRBNA JC 60	P1-3:A11:32:_KASSON 115/60KV TB 1	P1	N-1	0.97	0.98	0.97	1.01	1.02	0.97	0.96	0.97	0.99	0.97	Mitigation under review
CROSRDJT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.01	0.93	0.93	1.05	1.03	1.01	0.92	0.93	1.00	0.92	Substation upgrade
CROSRDJT 115	P5-5:A11:1:_SCHULTE 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P55	Non-Redundant	1.00	0.97	0.96	1.04	1.02	1.00	0.95	0.96	0.98	0.95	Protection upgrade

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CROSRDJT 115	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1			0.92				0.90	0.91		0.92	Mitigation under review
CURTISS 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.69	0.69	1.04	1.03	0.94	0.66	0.67	0.97	0.64	Mitigation under review
DAVIS 115	Base Case	P0	N-0	1.02	1.02	1.01	1.06	1.03	1.02	1.01	1.02	1.04	1.01	Load power factor correction or voltage support if needed
DAVIS 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	0.99	0.95	1.00	1.09	1.02	1.02	0.99	0.99	1.01	0.99	Mitigation under review
DAVIS 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	0.99	0.95	1.00	1.09	1.02	1.02	0.99	0.98	1.01	0.98	Mitigation under review
DAVIS 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.00	1.00	1.11	1.03	1.03	1.00	1.00	1.02	0.99	Load power factor correction or voltage support if needed
DEEPWATR 115	Base Case	P0	N-0	1.03	1.04	1.03	1.05	1.03	1.03	1.03	1.04	1.05	1.03	Load power factor correction or voltage support if needed
DEEPWATR 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.01	0.96	1.01	1.09	1.02	1.04	1.00	1.00	1.02	1.00	Mitigation under review
DEEPWATR 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.01	0.96	1.01	1.09	1.02	1.04	1.00	1.00	1.02	1.00	Mitigation under review
DEEPWATR 115	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	1.02	0.97	0.97	1.05	1.02	1.02	1.01	1.01	1.03	1.01	Mitigation under review
DEL MAR 60	Base Case	P0	N-0	1.10	0.97	0.97	1.12	1.06	1.10	0.97	0.96	0.99	0.96	Load power factor correction or voltage support if needed
DEL MAR 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.10	0.95	0.95	1.12	1.05	1.10	0.94	0.94	0.97	0.94	Load power factor correction or voltage support if needed
DEL MAR 60	P2-2:A5:10:_GOLDHILL 115KV SECTION 1F	P2	Bus	1.10	0.98	0.98	1.11	1.06	1.10	0.97	0.97	0.99	0.97	Load power factor correction or voltage support if needed
DEL MAR 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.10	0.95	0.94	1.12	1.05	1.10	0.94	0.94	0.97	0.93	Load power factor correction or voltage support if needed
DEL MAR 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.10	0.95	0.94	1.12	1.05	1.10	0.94	0.94	0.97	0.93	Load power factor correction or voltage support if needed
DEL MAR 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.10	0.94	0.93	1.12	1.05	1.09	0.92	0.92	0.96	0.92	Load power factor correction or voltage support if needed
DEL MAR 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.10	0.98	0.97	1.12	1.06	1.10	0.97	0.95	0.99	0.97	Load power factor correction or voltage support if needed
DEL MAR 60	P2-4:A5:5:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.10	0.98	0.98	1.12	1.06	1.10	0.97	0.97	0.99	0.97	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
DEL MAR 60	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P3	G-1/N-1				1.12							Load power factor correction or voltage support if needed
DEL MAR 60	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.09	0.89	0.90	1.14	1.04	1.09	0.89	0.87	0.97	0.86	Load power factor correction or voltage support if needed
DEL MAR 60	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330] P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590]	P6	N-1/N-1		0.90	0.91	1.14			0.90	0.88			Load power factor correction or voltage support if needed
DEL MAR 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.10	0.94	0.93	1.13	1.05	1.09	0.92	0.92	0.96	0.92	Load power factor correction or voltage support if needed
DEL MAR 60	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.10	0.98	0.98	1.12	1.06	1.10	0.97	0.97	0.99	0.97	Load power factor correction or voltage support if needed
DEL MAR 60	P7-1:A5:7_Atlantic-Gold Hill 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	1.10	0.95	0.94	1.12	1.06	1.09	0.94	0.94	0.98	0.93	Load power factor correction or voltage support if needed
DELEVAN 60	Base Case	P0	N-0	1.00	0.97	0.97	1.02	1.03	1.00	0.96	0.95	0.97	0.97	Mitigation under review
DIMOND_1 115	Base Case	P0	N-0	1.06	1.03	1.03	1.10	1.07	1.06	1.03	1.02	1.02	1.03	Load power factor correction or voltage support if needed
DIMOND_1 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DIMOND_1 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.03	1.04	1.03	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.04	1.04	1.03	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.03	1.03	1.03	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.02	1.03	1.02	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.02	1.03	1.02	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
DIMOND_1 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.01	1.00	1.11	1.06	1.06	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.04	1.04	1.11	1.07	1.08	1.04	1.02	1.03	1.04	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	1.05	0.97	0.98	1.10	1.06	1.04	0.96	0.94	0.98	0.97	Mitigation under review
DIMOND_1 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.06	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
DIMOND_1 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DIMOND_1 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
DIMOND_1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
DIMOND_1 115	P7-1:A5:18_El Dorado-Missouri Flat No. 2 115 kV Line & El Dorado-Missouri Flat No. 1 115 kV Line	P7	DCTL	1.06	1.04	1.04	1.11	1.08	1.06	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
DIMOND_1 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
DIMOND_2 115	Base Case	P0	N-0	1.05	1.02	1.01	1.10	1.06	1.05	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
DIMOND_2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
DIMOND_2 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
DIMOND_2 115	P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P1	N-1	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.02	1.01	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.00	1.00	1.11	1.06	1.05	1.00	0.99	1.01	1.00	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
DIMOND_2 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.01	1.01	1.11	1.07	1.07	1.01	1.00	1.02	1.00	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	1.00	0.98	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.10	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.02	1.02	1.11	1.07	1.07	1.02	1.00	1.02	1.02	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	0.99	0.85	0.86	1.08	1.04	0.99	0.83	0.79	0.88	0.85	Mitigation under review
DIMOND_2 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.11	1.06	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.06	1.06	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
DIMOND_2 115	P2-1:A5:40:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (PLCRVLT2-MIZOU_T2)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.00	Load power factor correction or voltage support if needed
DIMOND_2 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
DIMOND_2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393] P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
DIMOND_2 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
DIMOND_2 115	P7-1:A5:18_El Dorado-Missouri Flat No. 2 115 kV Line & El Dorado-Missouri Flat No. 1 115 kV Line	P7	DCTL	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
DIMOND_2 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DIST2047 60	P1-2:A4:44:_CORTINA #1 60KV [6580] P1-3:A4:6:_CORTINA 230/230KV TB 1	P6	N-1/N-1							0.89				Mitigation under review
DIXONCAN 60	Base Case	P0	N-0	1.07	1.02	1.02	1.09	1.06	1.07	1.01	1.01	1.02	1.02	Load power factor correction or voltage support if needed
DIXONCAN 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.03	1.03	1.10	1.06	1.08	1.02	1.01	1.03	1.03	Load power factor correction or voltage support if needed
DIXONCAN 60	P1-3:A4:19:_VACA-DIX 115/60KV TB 9 P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
DIXON-J1 60	Base Case	P0	N-0	1.07	1.02	1.02	1.09	1.06	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
DIXON-J1 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.08	1.02	1.02	1.10	1.06	1.08	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
DIXON-J1 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.02	1.02	1.10	1.06	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
DIXON-J1 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.03	1.03	1.10	1.06	1.09	1.02	1.02	1.03	1.03	Load power factor correction or voltage support if needed
DIXON-J1 60	P1-3:A4:19:_VACA-DIX 115/60KV TB 9 P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
DIXON-J2 60	Base Case	P0	N-0	1.07	1.02	1.02	1.09	1.06	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
DIXON-J2 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.08	1.02	1.02	1.10	1.06	1.08	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
DIXON-J2 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.02	1.02	1.10	1.06	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
DIXON-J2 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.03	1.03	1.10	1.06	1.09	1.02	1.02	1.03	1.03	Load power factor correction or voltage support if needed
DIXON-J2 60	P1-2:A4:50:_VACA-DXN-TRVS_HPT 60KV [0] P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
DIXONPGE 60	Base Case	P0	N-0	1.07	1.02	1.02	1.09	1.06	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
DIXONPGE 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.08	1.02	1.02	1.10	1.06	1.08	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
DIXONPGE 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.02	1.02	1.10	1.06	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
DIXONPGE 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.03	1.03	1.10	1.06	1.09	1.02	1.02	1.03	1.03	Load power factor correction or voltage support if needed
DIXONPGE 60	P1-3:A4:19:_VACA-DIX 115/60KV TB 9 P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
DMND SPR 115	Base Case	P0	N-0	1.05	1.02	1.01	1.10	1.06	1.05	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
DMND SPR 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
DMND SPR 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
DMND SPR 115	P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P1	N-1	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.02	1.01	Load power factor correction or voltage support if needed
DMND SPR 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DMND SPR 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.00	1.00	1.11	1.06	1.05	1.00	0.99	1.01	1.00	Load power factor correction or voltage support if needed
DMND SPR 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
DMND SPR 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DMND SPR 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DMND SPR 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.01	1.01	1.11	1.07	1.07	1.01	1.00	1.02	1.00	Load power factor correction or voltage support if needed
DMND SPR 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	1.00	0.98	Load power factor correction or voltage support if needed
DMND SPR 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
DMND SPR 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.10	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
DMND SPR 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
DMND SPR 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.02	1.02	1.11	1.07	1.07	1.02	1.00	1.02	1.02	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
DMND SPR 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	0.99	0.85	0.86	1.08	1.04	0.99	0.83	0.79	0.88	0.85	Mitigation under review
DMND SPR 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
DMND SPR 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.11	1.06	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
DMND SPR 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
DMND SPR 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.06	1.06	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
DMND SPR 115	P2-1:A5:40:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (PLCRVLT2-MIZOU_T2)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.00	Load power factor correction or voltage support if needed
DMND SPR 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
DMND SPR 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393] P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
DMND SPR 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
DMND SPR 115	P7-1:A5:18_El Dorado-Missouri Flat No. 2 115 kV Line & El Dorado-Missouri Flat No. 1 115 kV Line	P7	DCTL	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.02	1.01	Load power factor correction or voltage support if needed
DMND SPR 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DOBBINS 60	Base Case	P0	N-0	1.05	1.02	1.02	1.08	1.06	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
DONNELLS 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.01	0.79	0.79	1.04	1.04	1.01	0.77	0.78	1.02	0.75	Mitigation under review
DPWT_TP2 115	Base Case	P0	N-0	1.04	1.04	1.03	1.05	1.03	1.04	1.03	1.04	1.05	1.03	Load power factor correction or voltage support if needed
DPWT_TP2 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.01	0.96	1.01	1.09	1.02	1.04	1.00	1.00	1.02	1.00	Mitigation under review
DPWTR_TP 115	Base Case	P0	N-0	1.03	1.04	1.03	1.05	1.03	1.03	1.03	1.04	1.05	1.03	Load power factor correction or voltage support if needed
DPWTR_TP 115	P2-2:A4:23:_W.SCRMNO 115KV SECTION 1F	P2	Bus	1.00	0.98	0.98	1.06	1.03	1.00	0.98	0.98	1.01	0.98	Mitigation under review
DPWTR_TP 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.01	0.96	1.01	1.09	1.02	1.04	1.00	1.00	1.02	1.00	Mitigation under review
DPWTR_TP 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.01	0.96	1.01	1.09	1.02	1.04	1.00	1.00	1.02	1.00	Mitigation under review

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
DPWTR_TP 115	P7-1:A4:17_Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	1.02	0.97	0.97	1.05	1.02	1.02	1.01	1.01	1.03	1.01	Mitigation under review
DRUM 115	Base Case	P0	N-0	1.04	1.05	1.04	1.10	1.06	1.04	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
DRUM 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.06	1.06	1.11	1.06	1.05	1.06	1.06	1.07	1.06	Load power factor correction or voltage support if needed
DRUM 115	P1-3:A5:14:_DRUM 5 13.8/115KV TB 1	P1	N-1	1.05	1.05	1.05	1.11	1.06	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
DRUM 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.06	1.06	1.11	1.06	1.05	1.06	1.06	1.07	1.06	Load power factor correction or voltage support if needed
DRUM 115	P2-3:A5:82:_DRUM 115KV - RING R2 & R1	P2	Non-bus-tie breaker	1.05	1.05	1.05	1.11	1.06	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
DRUM 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.04	1.04	1.11	1.06	1.04	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
DRUM 115	P2-1:A5:27:_DRUM-HIGGINS 115KV [4393] (DRUM-DTCH FL1)	P2-1	Line Section w/o fault	1.05	1.06	1.06	1.11	1.06	1.05	1.06	1.06	1.07	1.06	Load power factor correction or voltage support if needed
DRUM 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.06	1.06	1.11	1.06	1.05	1.06	1.06	1.07	1.06	Load power factor correction or voltage support if needed
DRUM 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
DRUM 115	P1-3:A5:14:_DRUM 5 13.8/115KV TB 1 P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
DRUM 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.04	1.04	1.11	1.06	1.04	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
DTCH FL1 115	Base Case	P0	N-0	1.04	1.04	1.04	1.10	1.06	1.04	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
DTCH FL1 115	P1-1:A5:10:_DTCHFLT1 11.00KV GEN UNIT 1	P1	N-1	1.04	1.04	1.04	1.11	1.06	1.04	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
DTCH FL1 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1	P1	N-1	1.04	1.04	1.04	1.11	1.06	1.04	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
DTCH FL1 115	P1-3:A5:14:_DRUM 5 13.8/115KV TB 1	P1	N-1	1.05	1.04	1.04	1.11	1.06	1.04	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
DTCH FL1 115	P1-3:A5:23:_DTCH FL1 115/11KV TB 1	P1	N-1	1.04	1.04	1.04	1.11	1.06	1.05	1.04	1.04	1.05	1.04	Load power factor correction or voltage support if needed
DTCH FL1 115	P2-3:A5:82:_DRUM 115KV - RING R2 & R1	P2	Non-bus-tie breaker	1.05	1.04	1.04	1.11	1.06	1.05	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
DTCH FL1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.03	1.03	1.11	1.06	1.04	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
DTCH FL1 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.97	0.97	1.09	1.05	1.00	0.96	0.71	1.01	0.98	Substation upgrade
DTCH FL1 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.06	1.06	1.11	1.06	1.05	1.06	1.06	1.07	1.06	Load power factor correction or voltage support if needed
DTCH FL1 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-3:A5:23:_DTCH FL1 115/11KV TB 1	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
DTCH FL1 115	P1-3:A5:14:_DRUM 5 13.8/115KV TB 1 P1-3:A5:23:_DTCH FL1 115/11KV TB 1	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
DTCH FL1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.03	1.03	1.11	1.06	1.04	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
DTCH FL2 115	Base Case	P0	N-0	1.04	1.04	1.04	1.10	1.06	1.04	1.04	1.04	1.05	1.04	Load power factor correction or voltage support if needed
DTCH FL2 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1	P1	N-1	1.04	1.05	1.04	1.11	1.06	1.04	1.05	1.05	1.05	1.04	Load power factor correction or voltage support if needed
DTCH FL2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	1.06	1.05	1.11	1.06	1.04	1.05	1.06	1.06	1.05	Load power factor correction or voltage support if needed
DTCH FL2 115	P1-3:A5:14:_DRUM 5 13.8/115KV TB 1	P1	N-1	1.04	1.05	1.04	1.11	1.06	1.04	1.05	1.05	1.05	1.04	Load power factor correction or voltage support if needed
DTCH FL2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	1.06	1.05	1.11	1.06	1.04	1.05	1.06	1.06	1.05	Load power factor correction or voltage support if needed
DTCH FL2 115	P2-3:A5:82:_DRUM 115KV - RING R2 & R1	P2	Non-bus-tie breaker	1.05	1.05	1.04	1.11	1.06	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
DTCH FL2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.04	1.04	1.11	1.05	1.04	1.04	1.03	1.04	1.03	Load power factor correction or voltage support if needed
DTCH FL2 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.04	1.06	1.05	1.11	1.06	1.04	1.05	1.06	1.06	1.05	Load power factor correction or voltage support if needed
DTCH FL2 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
DTCH FL2 115	P1-3:A5:14:_DRUM 5 13.8/115KV TB 1 P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
DTCH FL2 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.04	1.04	1.11	1.05	1.04	1.04	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.MRY J1 115	Base Case	P0	N-0	1.04	1.01	1.01	1.09	1.04	1.04	1.01	1.02	1.02	1.01	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
E.MRY J1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.01	1.01	1.10	1.03	1.04	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
E.MRY J1 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.10							Load power factor correction or voltage support if needed
E.MRY J1 115	P1-3:A5:31:_PEAS RG 60/60KV TB 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
E.MRY J1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.01	1.01	1.10	1.03	1.04	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
E.MRY J2 115	Base Case	P0	N-0	1.05	1.03	1.03	1.10	1.05	1.05	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
E.MRY J2 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.04	1.03	1.03	1.10	1.05	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
E.MRY J2 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.04	1.02	1.03	1.10	1.05	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
E.MRY J2 115	P2-3:A5:17:_RIO OSO - 2D 115KV & BOGUE-RIO OSO LINE	P2	Non-bus-tie breaker	1.04	0.98	0.98	1.10	1.05	1.04	0.98	0.98	0.99	0.97	Load power factor correction or voltage support if needed
E.MRY J2 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.11	1.05	1.05	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
E.MRY J2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.02	1.02	1.11	1.04	1.05	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
E.MRY J2 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.04	1.03	1.03	1.10	1.05	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
E.MRY J2 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.04	0.98	0.98	1.11	1.05	1.04	0.97	0.98	0.99	0.97	Load power factor correction or voltage support if needed
E.MRY J2 115	P2-1:A5:8:_PALERMO-NICOLAUS 115KV [3210] (PALERMO-E.MRY J2)	P2-1	Line Section w/o fault	1.04	1.03	1.03	1.10	1.04	1.04	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.MRY J2 115	P1-1:A5:11:_NARROWS2 13.80KV GEN UNIT 1 P1-2:A5:30:_RIO OSO-NICOLAUS 115KV [3440]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
E.MRY J2 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
E.MRY J2 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.02	1.02	1.11	1.04	1.05	1.01	1.02	1.02	1.01	Load power factor correction or voltage support if needed
E.MRY J2 115	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	1.05	1.03	1.03	1.11	1.05	1.05	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
E.MRYSVE 115	Base Case	P0	N-0	1.05	1.03	1.02	1.10	1.05	1.05	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
E.MRYSVE 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.04	1.03	1.03	1.10	1.05	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
E.MRYSVE 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.04	1.02	1.03	1.10	1.05	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
E.MRYSVE 115	P2-3:A5:17:_RIO OSO - 2D 115KV & BOGUE-RIO OSO LINE	P2	Non-bus-tie breaker	1.04	0.98	0.98	1.10	1.05	1.04	0.98	0.98	0.99	0.97	Load power factor correction or voltage support if needed
E.MRYSVE 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.11	1.05	1.05	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
E.MRYSVE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.02	1.02	1.11	1.04	1.05	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
E.MRYSVE 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.04	1.03	1.03	1.10	1.05	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
E.MRYSVE 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.04	0.98	0.98	1.11	1.05	1.04	0.97	0.98	0.99	0.97	Load power factor correction or voltage support if needed
E.MRYSVE 115	P2-1:A5:8:_PALERMO-NICOLAUS 115KV [3210] (PALERMO-E.MRY J2)	P2-1	Line Section w/o fault	1.04	1.03	1.03	1.10	1.04	1.04	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.MRYSVE 115	P1-1:A5:11:_NARROWS2 13.80KV GEN UNIT 1 2:A5:30:_RIO OSO-NICOLAUS 115KV [3440]	P1-P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
E.MRYSVE 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] 2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1-P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
E.MRYSVE 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.02	1.02	1.11	1.04	1.05	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
E.MRYSVE 115	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	1.05	1.03	1.03	1.11	1.05	1.05	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
E.NICOLS 115	Base Case	P0	N-0	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P1-2:A5:30:_RIO OSO-NICOLAUS 115KV [3440]	P1	N-1	1.04	0.97	0.96	1.11	1.05	1.03	0.96	0.96	0.98	0.96	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.05	1.04	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.04	1.04	1.04	1.11	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
E.NICOLS 115	P2-2:A5:15:_RIO OSO 115KV SECTION 2D	P2	Bus	1.03	0.96	0.96	1.10	1.05	1.03	0.96	0.96	0.98	0.96	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.04	1.03	1.04	1.11	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.04	1.03	1.04	1.10	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-3:A5:17:_RIO OSO - 2D 115KV & BOGUE-RIO OSO LINE	P2	Non-bus-tie breaker	1.04	0.96	0.96	1.10	1.05	1.04	0.95	0.96	0.98	0.95	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-3:A5:18:_RIO OSO - 2D 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.03	0.97	0.96	1.10	1.05	1.03	0.96	0.96	0.98	0.96	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-3:A5:19:_RIO OSO - 2D 115KV & RIO OSO-DRUM-BRUNSWCK LINE	P2	Non-bus-tie breaker	1.03	0.96	0.96	1.10	1.05	1.03	0.96	0.96	0.98	0.95	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-3:A5:78:_E.NICOLS 115KV - RING R1 & R2	P2	Non-bus-tie breaker	1.03	0.97	0.96	1.11	1.05	1.03	0.96	0.96	0.98	0.96	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-3:A5:79:_E.NICOLS 115KV - RING R1 & R5	P2	Non-bus-tie breaker	N/A	N/A	N/A	1.11	1.03	N/A	N/A	N/A	N/A	N/A	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.04	1.03	1.11	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.03	1.03	1.11	1.04	1.04	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.04	1.04	1.04	1.11	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.05	1.04	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.05	1.04	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.03	0.96	0.95	1.11	1.05	1.03	0.95	0.96	0.97	0.95	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
E.NICOLS 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P1-1:A5:11:_NARROWS2 13.80KV GEN UNIT 1 P1-2:A5:30:_RIO OSO-NICOLAUS 115KV [3440]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
E.NICOLS 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.03	1.03	1.11	1.04	1.04	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
E.NICOLS 115	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	1.05	1.04	1.03	1.11	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
E.NICOLS 115	P7-1:A5:12_Rio Oso-Nicolaus 115 kV Line & Bogue-Rio Oso 115 kV Line	P7	DCTL	1.04	0.96	0.96	1.10	1.05	1.04	0.96	0.96	0.97	0.95	Load power factor correction or voltage support if needed
ELDORAD 115	Base Case	P0	N-0	1.06	1.02	1.02	1.10	1.06	1.06	1.02	1.02	1.01	1.02	Load power factor correction or voltage support if needed
ELDORAD 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
ELDORAD 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.03	1.02	1.10	1.07	1.06	1.02	1.02	1.01	1.02	Load power factor correction or voltage support if needed
ELDORAD 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
ELDORAD 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.02	1.02	1.02	Load power factor correction or voltage support if needed
ELDORAD 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
ELDORAD 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.02	1.02	1.03	Load power factor correction or voltage support if needed
ELDORAD 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
ELDORAD 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.10	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
ELDORAD 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.00	1.00	1.11	1.06	1.06	0.99	0.99	0.99	0.99	Load power factor correction or voltage support if needed
ELDORAD 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.03	1.03	1.10	1.07	1.07	1.03	1.01	1.02	1.03	Load power factor correction or voltage support if needed
ELDORAD 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	1.02	0.91	0.91	1.08	1.05	1.02	0.89	0.86	0.92	0.90	Mitigation under review

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
ELDORAD 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
ELDORAD 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.10	1.07	1.06	1.02	1.02	1.01	1.02	Load power factor correction or voltage support if needed
ELDORAD 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
ELDORAD 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.00	1.00	1.11	1.06	1.06	0.99	0.99	0.99	0.99	Load power factor correction or voltage support if needed
ELDORAD 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
ELECTRA 230	Base Case	P0	N-0	1.04	1.01	1.01	1.05	1.03	1.04	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
ELECTRAJ 60	Base Case	P0	N-0	1.03	1.04	1.04	1.05	1.04	1.03	1.04	1.04	1.05	1.04	Mitigation under review
ELECTRAJ 60	P1-2:A11:12:_VALLEY SPRINGS-BELLOTA 230KV [5860] P1-2:A11:9:_TIGER CREEK-VALLEY SPRINGS 230KV [5790]	P6	N-1/N-1					0.90						Mitigation under review
ELLS GTY 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
ENCINAL 60	P1-3:A5:31:_PEAS RG 60/60KV TB 1 P1-2:A5:57:_MRYSVLLE-PEASE 60KV [0]	P6	N-1/N-1										0.35	Mitigation under review
ENCINAL 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.02	0.99	0.99	1.01	1.00	1.02	0.99	0.99	0.77	0.00	Mitigation under review
ENCL TAP 60	P1-3:A5:31:_PEAS RG 60/60KV TB 1 P1-2:A5:57:_MRYSVLLE-PEASE 60KV [0]	P6	N-1/N-1										0.35	Mitigation under review
ENCL TAP 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.02	0.99	0.99	1.01	1.00	1.02	0.99	0.99	0.77	0.00	Mitigation under review
ENVRO_HY 60	P1-2:A4:33:_WEST SACRAMENTO-BRIGHTON 115KV [4110] P1-2:A5:50:_COLGATE-GRASS VALLEY 60KV [6490]	P6	N-1/N-1		0.89	0.86								Mitigation under review
FLINT 115	Base Case	P0	N-0	1.04	1.01	1.01	1.10	1.06	1.04	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
FLINT 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	1.00	1.00	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
FLINT 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.02	1.02	1.10	1.07	1.05	1.02	1.01	1.01	1.02	Load power factor correction or voltage support if needed
FLINT 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
FLINT 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.12	1.08	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
FLINT 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
FLINT 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	1.00	1.00	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
FLINT 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.04	1.00	0.99	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
FLINT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.99	0.99	1.10	1.06	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
FLINT 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.92	0.82	0.83	1.07	1.05	0.90	0.79	0.30	0.89	0.83	Substation upgrade
FLINT 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.04	1.00	1.00	1.11	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
FLINT 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.04	1.00	0.99	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
FLINT 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	1.02	1.10	1.07	1.05	1.02	1.01	1.01	1.02	Load power factor correction or voltage support if needed
FLINT 115	P2-1:A5:35:_PLACER-GOLD HILL #2 115KV [4290] (PLACER-FLINT2)	P2-1	Line Section w/o fault	1.05	1.04	1.03	1.11	1.07	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
FLINT 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.10	1.07	1.04	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
FLINT 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	0.99	0.99	1.10	1.06	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
FLINT1 115	Base Case	P0	N-0	1.04	1.01	1.01	1.10	1.06	1.04	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
FLINT1 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	1.00	1.00	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
FLINT1 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.02	1.02	1.10	1.07	1.05	1.02	1.01	1.01	1.02	Load power factor correction or voltage support if needed
FLINT1 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
FLINT1 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
FLINT1 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
FLINT1 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	1.00	1.00	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
FLINT1 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.04	1.00	0.99	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
FLINT1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.99	0.99	1.10	1.06	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
FLINT1 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.92	0.82	0.83	1.07	1.05	0.90	0.79	0.29	0.89	0.83	Substation upgrade
FLINT1 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.04	1.00	1.00	1.11	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
FLINT1 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.04	1.00	0.99	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
FLINT1 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	1.02	1.10	1.07	1.05	1.02	1.01	1.01	1.02	Load power factor correction or voltage support if needed
FLINT1 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.10	1.07	1.04	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
FLINT1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	0.99	0.99	1.10	1.06	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
FLINT2 115	Base Case	P0	N-0	1.04	1.01	1.01	1.10	1.06	1.04	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
FLINT2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	1.00	1.00	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
FLINT2 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.02	1.02	1.10	1.07	1.05	1.02	1.01	1.01	1.02	Load power factor correction or voltage support if needed
FLINT2 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
FLINT2 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.12	1.08	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
FLINT2 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
FLINT2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	1.00	1.00	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
FLINT2 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.04	1.00	0.99	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
FLINT2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.99	0.99	1.10	1.06	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
FLINT2 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.92	0.82	0.83	1.07	1.05	0.90	0.79	0.30	0.89	0.83	Substation upgrade
FLINT2 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.04	1.00	1.00	1.11	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
FLINT2 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.04	1.00	0.99	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
FLINT2 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	1.02	1.10	1.07	1.05	1.02	1.01	1.01	1.02	Load power factor correction or voltage support if needed
FLINT2 115	P2-1:A5:35:_PLACER-GOLD HILL #2 115KV [4290] (PLACER-FLINT2)	P2-1	Line Section w/o fault	1.05	1.04	1.03	1.11	1.07	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
FLINT2 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.10	1.07	1.04	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
FLINT2 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	0.99	0.99	1.10	1.06	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
FLTN JCT 115	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
FLTN JCT 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	1.04	1.10	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
FLTN JCT 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
FLTN JCT 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	1.05	1.10	1.08	1.08	1.05	1.04	1.05	1.05	Load power factor correction or voltage support if needed
FLTN JCT 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
FLTN JT2 115	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
FLTN JT2 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	1.04	1.10	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
FLTN JT2 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
FLTN JT2 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	1.05	1.10	1.08	1.08	1.05	1.04	1.05	1.05	Load power factor correction or voltage support if needed
FLTN JT2 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
FORST HL 60	P1-2:A4:33:_WEST SACRAMENTO-BRIGHTON 115KV [4110] P1-2:A5:50:_COLGATE-GRASS VALLEY 60KV [6490]	P6	N-1/N-1		0.89	0.86								Mitigation under review
FREC TAP 115	Base Case	P0	N-0	1.05	1.04	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
FREC TAP 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
FREC TAP 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
FREC TAP 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.05	1.03	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
FREC TAP 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.05	1.03	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
FREC TAP 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.04	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
FREC TAP 115	P2-3:A5:17:_RIO OSO - 2D 115KV & BOGUE-RIO OSO LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.10	1.04	1.06	1.02	1.02	0.98	1.02	Mitigation under review
FREC TAP 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.04	1.03	1.11	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
FREC TAP 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.03	1.03	1.11	1.04	1.05	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
FREC TAP 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
FREC TAP 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.05	1.04	1.03	1.10	1.04	1.05	1.04	1.04	1.03	1.03	Load power factor correction or voltage support if needed
FREC TAP 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.03	1.00	1.03	Load power factor correction or voltage support if needed
FREC TAP 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.05	1.04	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
FREC TAP 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
FREC TAP 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
FREC TAP 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.03	1.03	1.11	1.04	1.05	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
FREC TAP 115	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	1.05	1.04	1.03	1.11	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
FREC TAP 115	P7-1:A5:12_Rio Oso-Nicolaus 115 kV Line & Bogue-Rio Oso 115 kV Line	P7	DCTL	1.06	1.02	1.02	1.10	1.04	1.06	1.02	1.02	0.98	1.02	Mitigation under review
FRGTNTP1 115	Base Case	P0	N-0	1.04	1.02	1.02	1.05	1.04	1.04	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
FRGTNTP1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.96	0.73	0.73	1.05	1.04	0.96	0.71	0.71	0.98	0.70	Mitigation under review

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
FRGTNTP2 115	Base Case	P0	N-0	1.04	1.03	1.02	1.05	1.04	1.04	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
FRGTNTP2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.96	0.73	0.73	1.05	1.04	0.96	0.71	0.72	0.98	0.70	Mitigation under review
FRNCH MS 60	Base Case	P0	N-0	1.03	1.02	1.02	1.04	1.03	1.03	1.01	1.01	0.94	1.01	Mitigation under review
FROGTOWN 115	Base Case	P0	N-0	1.04	1.02	1.02	1.05	1.04	1.04	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
FROGTOWN 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.96	0.73	0.73	1.05	1.04	0.96	0.71	0.71	0.98	0.70	Mitigation under review
GLEAF 1 115	Base Case	P0	N-0	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.03	Load power factor correction or voltage support if needed
GLEAF 1 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.05	1.04	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
GLEAF 1 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF 1 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.05	1.03	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF 1 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.05	1.03	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF 1 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF 1 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.04	1.04	1.11	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF 1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.03	1.03	1.11	1.04	1.05	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
GLEAF 1 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF 1 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF 1 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF 1 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.03	Load power factor correction or voltage support if needed
GLEAF 1 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
GLEAF 1 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
GLEAF 1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.03	1.03	1.11	1.04	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
GLEAF 1 115	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	1.05	1.04	1.04	1.11	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF TP 115	Base Case	P0	N-0	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
GLEAF TP 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
GLEAF TP 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF TP 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.05	1.03	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF TP 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.05	1.03	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF TP 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
GLEAF TP 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.04	1.03	1.11	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
GLEAF TP 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.03	1.03	1.11	1.04	1.05	1.03	1.03	1.02	1.02	Load power factor correction or voltage support if needed
GLEAF TP 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF TP 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.05	1.04	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
GLEAF TP 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
GLEAF TP 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
GLEAF TP 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
GLEAF TP 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
GLEAF TP 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.03	1.03	1.11	1.04	1.05	1.03	1.03	1.02	1.02	Load power factor correction or voltage support if needed
GLEAF TP 115	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	1.05	1.04	1.03	1.11	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
GLEAF2 60	P1-3:A5:31:_PEAS RG 60/60KV TB 1 P1-2:A5:57:_MRYSVLE-PEASE 60KV [0]	P6	N-1/N-1										0.28	Mitigation under review
GLEAF2 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.04	1.02	1.01	1.01	1.01	1.04	1.01	1.01	0.78	0.00	Mitigation under review
GLEAF2TP 60	P1-3:A5:31:_PEAS RG 60/60KV TB 1 P1-2:A5:57:_MRYSVLE-PEASE 60KV [0]	P6	N-1/N-1										0.28	Mitigation under review
GLEAF2TP 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.04	1.01	1.01	1.01	1.01	1.04	1.01	1.01	0.78	0.00	Mitigation under review
GOLDHILL 115	Base Case	P0	N-0	1.06	1.04	1.03	1.11	1.07	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
GOLDHILL 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.03	1.03	1.11	1.08	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
GOLDHILL 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.04	1.04	1.11	1.08	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.05	1.04	1.12	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.12	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.05	1.04	1.12	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.05	1.04	1.12	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.08	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.08	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.05	1.05	1.11	1.08	1.08	1.04	1.03	1.04	1.04	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.08	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.08	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.04	1.04	1.11	1.08	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
GOLDHILL 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.04	1.03	1.11	1.08	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
GOLDHILL 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.12							Load power factor correction or voltage support if needed
GOLDHILL 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
GOLDHILL 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.05	1.05	1.11	1.08	1.07	1.05	1.04	1.05	1.04	Load power factor correction or voltage support if needed
GOLDHILL 230	Base Case	P0	N-0	1.01	0.98	0.98	1.05	1.02	1.01	0.98	0.98	0.98	0.97	Load power factor correction or voltage support if needed
GRAND IS 115	P1-2:A4:9:_RIO OSO-BRIGHTON 230KV [5600] P1-2:A11:6:_BRIGHTON-BELLOTA 230KV [4420]	P6	N-1/N-1		0.98	0.98	1.10			0.96	0.97		0.97	Load power factor correction or voltage support if needed
GRANITE 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
GRANITE 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	0.98	1.05	1.06	1.02	0.95	0.97	0.00	0.91	Mitigation under review
GRSS VLY 60	Base Case	P0	N-0	1.03	1.01	1.01	1.08	1.05	1.03	1.01	1.00	1.02	1.00	Load power factor correction or voltage support if needed
GRSS VLY 60	P1-2:A4:33:_WEST SACRAMENTO-BRIGHTON 115KV [4110] P1-2:A5:50:_COLGATE-GRASS VALLEY 60KV [6490]	P6	N-1/N-1		0.92	0.90								Mitigation under review
GUSTN JT 60	P2-1:A12:39:_SALADO-NEWMAN #2 60KV [7870] (SALADO-PATTERSN)	P2-1	Line Section w/o fault	1.00	0.97	0.97	1.03	1.05	1.00	0.96	0.97	1.02	0.94	Mitigation under review
GUSTN JT 60	P2-1:A12:41:_SALADO-NEWMAN #2 60KV [7870] (PATTERSN-CRWS LDJ)	P2-1	Line Section w/o fault	1.00	0.97	0.96	1.03	1.05	1.00	0.96	0.97	1.02	0.94	Mitigation under review
GWFTACY 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
HALE 115	Base Case	P0	N-0	1.06	1.02	1.02	1.09	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
HALE 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
HALE J1 115	Base Case	P0	N-0	1.06	1.02	1.02	1.09	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
HALE J1 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
HALE J2 115	Base Case	P0	N-0	1.05	1.03	1.03	1.08	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
HALE2 115	Base Case	P0	N-0	1.06	1.02	1.02	1.09	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
HALE2 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
HALSEY 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.87	0.87	1.02	1.03	0.99	0.83	0.27	0.94	0.88	Mitigation under review
HARTER 60	P1-3:A5:31:_PEAS RG 60/60KV TB 1 P1-2:A5:57:_MRYSVLLE-PEASE 60KV [0]	P6	N-1/N-1										0.28	Mitigation under review
HARTER 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.04	1.02	1.01	1.01	1.00	1.04	1.01	1.01	0.75	0.00	Mitigation under review
HERDLYN 60	Base Case	P0	N-0	1.06	1.04	1.04	1.09	1.05	1.06	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
HERDLYN 60	P2-2:A11:56:_HERDLYN 60KV SECTION 1D	P2	Bus	1.07	1.04	1.04	1.10	1.06	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
HERDLYN 60	P2-3:A11:77:_HERDLYN - 1D 60KV & VASCO-HERDLYN LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.10	1.06	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
HERDLYN 60	P2-3:A11:78:_HERDLYN - 1D 60KV & HERDLYN-BALFOUR LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.10	1.06	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
HIGGINS 115	Base Case	P0	N-0	1.04	1.02	1.01	1.10	1.06	1.04	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
HIGGINS 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	0.99	0.98	1.10	1.07	1.04	0.98	0.97	0.98	0.98	Load power factor correction or voltage support if needed
HIGGINS 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	0.99	0.98	1.10	1.07	1.04	0.98	0.97	0.99	0.98	Load power factor correction or voltage support if needed
HIGGINS 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.04	0.98	0.98	1.10	1.07	1.04	0.98	0.97	0.98	0.98	Mitigation under review
HIGGINS 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.00	1.00	1.10	1.06	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
HIGGINS 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.94	0.86	0.87	1.08	1.05	0.93	0.83	0.40	0.93	0.87	Substation upgrade
HIGGINS 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.04	0.99	0.99	1.10	1.07	1.04	0.98	0.97	0.99	0.98	Load power factor correction or voltage support if needed
HIGGINS 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.04	0.98	0.98	1.10	1.07	1.04	0.97	0.97	0.98	0.97	Mitigation under review
HIGGINS 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393] P1-2:A5:20:_PLACER-GOLD HILL #1 115KV [3340]	P6	N-1/N-1		0.92	0.92				0.91	0.89		0.91	Mitigation under review
HIGGINS 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.00	1.00	1.10	1.06	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
HIGGINS 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.00	0.95	0.95	1.07	1.05	1.00	0.94	0.93	0.97	0.95	Mitigation under review
HJ HEINZ 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.02	0.96	0.96	1.05	1.03	1.02	0.95	0.95	1.00	0.95	Substation upgrade

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
HJ HEINZ 115	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1		0.92	0.92				0.89	0.90		0.91	Mitigation under review
HNYLNJCT 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.05	0.95	0.94	1.09	1.03	1.05	0.92	0.93	0.96	0.92	Mitigation under review
HNYLNJCT 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.05	0.95	0.94	1.09	1.03	1.05	0.92	0.93	0.96	0.92	Mitigation under review
HNYLNJCT 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.05	0.88	0.85	1.10	1.03	1.05	0.83	0.84	0.91	0.82	Load power factor correction or voltage support if needed
HNYLNJCT 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.05	0.87	0.85	1.10	1.03	1.05	0.81	0.84	0.91	0.81	Load power factor correction or voltage support if needed
HNYLNJCT 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.04	0.95	0.93	1.08	1.03	1.04	0.92	0.92	0.95	0.91	Substation upgrade
HNYLNJCT 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.91	0.90	1.09	1.03	1.04	0.88	0.89	0.94	0.88	Substation upgrade
HNYLNJCT 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.87	0.90	1.10			0.88	0.89	0.90	0.84	Load power factor correction or voltage support if needed
HNYLNJCT 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	0.91	0.90	1.09	1.03	1.05	0.88	0.89	0.94	0.88	Mitigation under review
HORSESHE 115	Base Case	P0	N-0	1.05	1.02	1.02	1.10	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
HORSESHE 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
HORSESHE 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.03	1.03	1.11	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
HORSESHE 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.03	1.04	1.03	Load power factor correction or voltage support if needed
HORSESHE 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.05	1.04	1.03	1.12	1.08	1.05	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
HORSESHE 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.03	Load power factor correction or voltage support if needed
HORSESHE 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.03	1.04	1.03	Load power factor correction or voltage support if needed
HORSESHE 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
HORSESHE 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
HORSESHE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.00	1.00	1.11	1.06	1.05	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
HORSESHE 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.90	0.81	0.81	1.08	1.05	0.89	0.77	0.26	0.88	0.81	Substation upgrade

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
HORSESHE 115	P2-1:A5:10:_PLACER-GOLD HILL #1 115KV [3340] (GOLDHILL-HORSHE1)	P2-1	Line Section w/o fault	1.01	0.98	0.97	1.10	1.06	1.01	0.97	0.96	0.98	0.97	Mitigation under review
HORSESHE 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
HORSESHE 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
HORSESHE 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
HORSESHE 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	1.02	1.11	1.07	1.05	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
HORSESHE 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
HORSESHE 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.00	1.00	1.11	1.07	1.05	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
HORSHE1 115	Base Case	P0	N-0	1.05	1.02	1.02	1.10	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
HORSHE1 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
HORSHE1 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.03	1.03	1.11	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
HORSHE1 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.03	1.04	1.03	Load power factor correction or voltage support if needed
HORSHE1 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.03	Load power factor correction or voltage support if needed
HORSHE1 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.03	1.04	1.03	Load power factor correction or voltage support if needed
HORSHE1 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
HORSHE1 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
HORSHE1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.00	1.00	1.11	1.07	1.05	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
HORSHE1 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.90	0.81	0.81	1.08	1.05	0.89	0.77	0.26	0.88	0.81	Substation upgrade
HORSHE1 115	P2-1:A5:10:_PLACER-GOLD HILL #1 115KV [3340] (GOLDHILL-HORSHE1)	P2-1	Line Section w/o fault	1.01	0.98	0.97	1.10	1.06	1.01	0.97	0.96	0.98	0.97	Mitigation under review

Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
HORSHE1 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
HORSHE1 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
HORSHE1 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
HORSHE1 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	1.02	1.11	1.07	1.05	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
HORSHE1 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
HORSHE1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.00	1.00	1.11	1.07	1.05	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
HORSHE2 115	Base Case	P0	N-0	1.05	1.03	1.03	1.10	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
HORSHE2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.02	1.01	1.11	1.07	1.05	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
HORSHE2 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.02	1.02	1.02	Load power factor correction or voltage support if needed
HORSHE2 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.05	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
HORSHE2 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.05	1.04	1.03	1.12	1.08	1.05	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
HORSHE2 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.05	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
HORSHE2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.02	1.01	1.11	1.07	1.05	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
HORSHE2 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.02	1.01	1.11	1.07	1.05	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
HORSHE2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.00	1.00	1.11	1.07	1.05	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
HORSHE2 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.92	0.82	0.83	1.07	1.05	0.90	0.79	0.30	0.89	0.83	Substation upgrade
HORSHE2 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.02	1.02	1.11	1.07	1.05	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
HORSHE2 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.11	1.07	1.05	1.01	1.00	1.01	1.00	Load power factor correction or voltage support if needed



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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
HORSHE2 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.02	1.02	1.03	Load power factor correction or voltage support if needed
HORSHE2 115	P2-1:A5:35:_PLACER-GOLD HILL #2 115KV [4290] (PLACER-FLINT2)	P2-1	Line Section w/o fault	1.06	1.04	1.04	1.11	1.07	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
HORSHE2 115	P2-1:A5:36:_PLACER-GOLD HILL #2 115KV [4290] (HORSHE2-NEWCSTL2)	P2-1	Line Section w/o fault	1.06	1.04	1.04	1.11	1.07	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
HORSHE2 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.03	1.02	1.11	1.07	1.05	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
HORSHE2 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
HORSHE2 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.00	1.00	1.11	1.07	1.05	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
HRDLNJCT 60	Base Case	P0	N-0	1.06	1.04	1.04	1.09	1.05	1.06	1.04	1.04	1.03	1.03	Load power factor correction or voltage support if needed
INDSTR J 60	Base Case	P0	N-0	1.07	1.02	1.02	1.06	1.02	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
INDSTR J 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.07	0.92	0.91	1.11	1.01	1.07	0.89	0.90	0.94	0.89	Load power factor correction or voltage support if needed
INDSTR J 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.07	0.92	0.91	1.11	1.01	1.07	0.89	0.90	0.94	0.89	Load power factor correction or voltage support if needed
INDSTR J 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.07	0.84	0.82	1.13	1.01	1.07	0.79	0.81	0.88	0.78	Load power factor correction or voltage support if needed
INDSTR J 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.07	0.84	0.81	1.13	1.01	1.07	0.77	0.80	0.88	0.77	Load power factor correction or voltage support if needed
INDSTR J 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.07	0.92	0.90	1.11	1.01	1.07	0.89	0.89	0.93	0.88	Load power factor correction or voltage support if needed
INDSTR J 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.07	0.88	0.87	1.12	1.01	1.07	0.84	0.85	0.91	0.84	Load power factor correction or voltage support if needed
INDSTR J 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.84	0.87	1.13			0.86	0.86	0.87	0.81	Load power factor correction or voltage support if needed
INDSTR J 60	P1-2:A11:101:_LODI-INDUSTRIAL 60KV [6755] P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1				1.13							Load power factor correction or voltage support if needed
INDSTR J 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.07	0.88	0.87	1.12	1.01	1.08	0.85	0.86	0.92	0.84	Load power factor correction or voltage support if needed
INE PRSN 60	P1-2:A11:74:_VALLEY SPRINGS-CLAY 60KV [8252] P1-2:A11:73:_VALLEY SPRINGS-MARTELL #1 60KV [8241]	P6	N-1/N-1					0.83						Mitigation under review

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
INE_TP 60	P1-2:A11:74:_ VALLEY SPRINGS-CLAY 60KV [8252] P1-2:A11:73:_ VALLEY SPRINGS-MARTELL #1 60KV [8241]	P6	N-1/N-1					0.84						Mitigation under review
INGREDIONJCT 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.82	0.27	0.27	1.03	1.01	0.81	0.25	0.25	0.84	0.26	Mitigation under review
INGREDIONJCT 115	P1-3:A11:10:_ BELLOTA 230/115KV TB 1 P1-3:A11:11:_ BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.91	0.69	0.71			0.91			0.88	0.72	Mitigation under review
INGRM C. 115	Base Case	P0	N-0	1.04	1.02	1.02	1.05	1.04	1.04	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
INGRM C. 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.02	0.97	0.97	1.06	1.04	1.03	0.96	0.97	1.01	0.96	Substation upgrade
JAMESN-A 115	Base Case	P0	N-0	1.05	1.03	1.03	1.08	1.06	1.05	1.02	1.02	1.01	1.03	Load power factor correction or voltage support if needed
JAMESN-A 115	P1-2:A4:41:_ VACA-SUISUN 115KV [4070]	P1	N-1	1.02	0.98	0.98	1.07	1.04	1.02	0.98	0.97	0.99	0.98	Mitigation under review
JAMESN-A 115	P2-3:A4:33:_ VACA-DIX 115KV - MIDDLE BREAKER BAY 4	P2	Non-bus-tie breaker	1.02	0.98	0.98	1.07	1.04	1.02	0.97	0.97	0.99	0.98	Mitigation under review
JAMESN-A 115	P2-1:A4:31:_ VACA-SUISUN 115KV [4070] (WEC-SUISUN)	P2-1	Line Section w/o fault	1.02	0.98	0.98	1.07	1.04	1.02	0.98	0.97	0.99	0.98	Mitigation under review
JAMESN-A 115	P7-1:A4:26:_ VACA-SUISUN & VACA-SUISUN-JAMESON	P7	DCTL	1.02	0.98	0.98	1.07	1.04	1.02	0.98	0.97	0.99	0.98	Mitigation under review
JAMESON 115	Base Case	P0	N-0	1.06	1.02	1.01	1.09	1.06	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
JAMESON 115	P1-3:A4:2:_ VACA-DIX 500/230KV TB 12 P1-4:A4:6:_ VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
JMSN JCT 115	Base Case	P0	N-0	1.06	1.02	1.02	1.09	1.07	1.06	1.01	1.01	1.02	1.02	Load power factor correction or voltage support if needed
JMSN JCT 115	P1-3:A4:2:_ VACA-DIX 500/230KV TB 12 P1-4:A4:6:_ VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
KASSON 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.02	0.95	0.95	1.05	1.03	1.02	0.94	0.94	1.00	0.94	Substation upgrade
KASSON 115	P5-5:A11:1:_ SCHULTE 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P55	Non-Redundant	1.00	0.97	0.97	1.04	1.02	1.00	0.96	0.96	0.98	0.96	Protection upgrade
KASSON 115	P1-2:A11:54:_ SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_ TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1			0.92				0.90	0.91		0.92	Mitigation under review
KASSON 60	Base Case	P0	N-0	1.04	1.04	1.03	1.04	1.05	1.04	1.03	1.03	1.03	1.03	Mitigation under review
KNIGHT1 115	Base Case	P0	N-0	1.03	1.02	1.02	1.09	1.04	1.03	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHT1 115	P1-2:A4:25:_ WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.04	1.02	1.02	1.11	1.04	1.04	1.01	1.03	1.03	1.02	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-2:A4:17:_ WOODLD 115KV SECTION 1F	P2	Bus	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
KNIGHT1 115	P2-2:A4:18:_WOODLD 115KV SECTION 1D	P2	Bus	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.01	1.02	1.02	1.10	1.03	1.03	1.02	1.01	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.04	1.03	1.03	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-3:A4:17:_WOODLD - 1F 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.01	1.00	1.02	1.10	1.03	1.03	1.02	1.01	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.01	1.02	1.02	1.10	1.03	1.03	1.02	1.01	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.03	1.03	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.04	1.04	1.03	1.11	1.04	1.04	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-4:A4:9:_WOODLD 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.05	1.05	1.05	1.10	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.04	1.03	1.02	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHT1 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.04	1.03	1.02	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHT1 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
KNIGHT1 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
KNIGHT2 115	Base Case	P0	N-0	1.03	1.02	1.02	1.09	1.04	1.03	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
KNIGHT2 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.03	1.02	1.02	1.11	1.04	1.03	1.01	1.02	1.03	1.02	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.04	1.04	1.04	1.11	1.04	1.04	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.01	1.02	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.04	1.03	1.03	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.04	1.04	1.04	1.11	1.04	1.04	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.01	1.00	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.02	1.02	1.11	1.04	1.03	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.01	1.02	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.03	1.02	1.11	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.04	1.04	1.04	1.11	1.04	1.04	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.03	1.02	1.02	1.11	1.04	1.03	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-1:A4:16:_RIO OSO-WOODLAND #2 115KV [3470] (WODLNDJ2-WOODLD)	P2-1	Line Section w/o fault	1.04	1.04	1.04	1.10	1.04	1.04	1.03	1.05	1.05	1.03	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHT2 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	1.02	1.10	1.04	1.03	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHT2 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
KNIGHT2 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
KNIGHTLD 115	Base Case	P0	N-0	1.03	1.02	1.02	1.09	1.04	1.03	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
KNIGHTLD 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.04	1.02	1.02	1.11	1.04	1.04	1.01	1.03	1.03	1.02	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-2:A4:18:_WOODLD 115KV SECTION 1D	P2	Bus	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.01	1.02	1.02	1.10	1.03	1.03	1.02	1.01	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.04	1.03	1.03	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-3:A4:17:_WOODLD - 1F 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.01	1.00	1.02	1.10	1.03	1.03	1.02	1.01	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.01	1.02	1.02	1.10	1.03	1.03	1.02	1.01	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.03	1.03	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.04	1.04	1.03	1.11	1.04	1.04	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-4:A4:9:_WOODLD 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.05	1.05	1.05	1.10	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.04	1.03	1.02	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHTLD 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.04	1.03	1.02	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
KNIGHTLD 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
KNIGHTLD 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
KSSN-JC1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.02	0.95	0.95	1.05	1.03	1.02	0.94	0.94	1.00	0.94	Substation upgrade
KSSN-JC1 115	P5-5:A11:1:_SCHULTE 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P55	Non-Redundant	1.00	0.97	0.97	1.04	1.02	1.00	0.96	0.96	0.98	0.96	Protection upgrade
KSSN-JC2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.01	0.95	0.94	1.05	1.03	1.01	0.93	0.94	1.00	0.93	Substation upgrade
KSSN-JC2 115	P5-5:A11:1:_SCHULTE 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P55	Non-Redundant	1.00	0.97	0.97	1.04	1.02	1.00	0.96	0.96	0.98	0.96	Protection upgrade
KSSN-JC2 115	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1			0.92				0.90	0.91		0.92	Mitigation under review
KYOHOTAP 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.30	0.31	1.04	1.02	0.82	0.29	0.29	0.87	0.30	Mitigation under review
KYOHOTAP 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.92	0.72	0.74			0.92			0.90	0.75	Mitigation under review
LAMMERS 115	Base Case	P0	N-0	1.04	1.03	1.03	1.05	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
LAMMERS 115	P5-5:A11:1:_SCHULTE 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P55	Non-Redundant	0.99	0.96	0.96	1.05	1.02	0.99	0.95	0.95	0.98	0.95	Protection upgrade
LAMMERS 115	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1			0.92				0.89	0.90		0.91	Mitigation under review
LCKFRDJA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.82	0.28	0.29	1.03	1.01	0.81	0.26	0.27	0.85	0.28	Mitigation under review
LCKFRDJA 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.91	0.70	0.73			0.91			0.89	0.73	Mitigation under review
LCKFRDJB 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.31	0.32	1.04	1.02	0.82	0.29	0.29	0.87	0.30	Mitigation under review
LCKFRDJB 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.92	0.72	0.74			0.92			0.90	0.75	Mitigation under review
LEE_JCT 60	P2-3:A11:15:_KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA LINE	P2	Non-bus-tie breaker	0.97	0.96	0.95	1.01	1.02	0.97	0.95	0.95	0.99	0.94	Mitigation under review
LEE_JCT 60	P2-3:A11:16:_KASSON - 1D 115KV & VIERRA-TRACY-KASSON LINE	P2	Non-bus-tie breaker	0.98	0.98	0.98	1.02	1.03	0.98	0.97	0.97	1.00	0.97	Mitigation under review
LEE_JCT 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.95	0.95	1.03	1.04	1.00	0.95	0.95	1.01	0.95	Mitigation under review
LEE_JCT 60	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.00	1.00	0.99	1.02	1.04	1.00	0.97	0.98	0.00	0.97	Mitigation under review
LEPRINO 115	Base Case	P0	N-0	1.03	1.01	1.01	1.05	1.03	1.03	1.01	1.01	1.01	1.01	Mitigation under review
LEPRINO 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.02	0.96	0.96	1.05	1.03	1.02	0.95	0.95	1.00	0.95	Substation upgrade
LEPRINO 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.00	0.98	0.97	1.03	1.03	1.00	0.94	0.96	0.00	0.94	Mitigation under review
LEPRINO 115	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1		0.92	0.91				0.89	0.90		0.91	Mitigation under review
LINCLN 115	Base Case	P0	N-0	1.04	1.02	1.01	1.09	1.04	1.04	1.01	1.02	1.02	1.01	Load power factor correction or voltage support if needed

Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
LINCLN 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320]	P1	N-1	1.02	0.97	0.97	1.07	1.03	1.02	0.97	0.96	0.98	0.96	Mitigation under review
LINCLN 115	P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P1	N-1	1.05	1.04	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
LINCLN 115	P2-3:A5:13:_RIO OSO - 1D 115KV & RIO OSO-LINCOLN LINE	P2	Non-bus-tie breaker	1.02	0.97	0.97	1.08	1.04	1.02	0.97	0.97	0.98	0.96	Mitigation under review
LINCLN 115	P2-3:A5:30:_SPI-LINC - 1D 115KV & RIO OSO-LINCOLN LINE	P2	Non-bus-tie breaker	1.02	0.97	0.97	1.07	1.03	1.02	0.97	0.96	0.98	0.96	Mitigation under review
LINCLN 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.98	0.98	1.07	1.04	1.02	0.98	0.98	0.99	0.96	Substation upgrade
LINCLN 115	P2-1:A5:5:_RIO OSO-LINCOLN 115KV [1320] (LINCLN-SPI JCT)	P2-1	Line Section w/o fault	1.02	0.97	0.97	1.07	1.04	1.02	0.97	0.96	0.98	0.96	Mitigation under review
LINCLN 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P3	G-1/N-1				1.10							Load power factor correction or voltage support if needed
LINCLN 115	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.97	0.98	1.10	1.03	1.02	0.98	0.97	1.01	0.96	Load power factor correction or voltage support if needed
LINCLN 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210] P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
LIVE OAK 60	P1-3:A5:31:_PEAS RG 60/60KV TB 1 P1-2:A5:57:_MRYSVLLE-PEASE 60KV [0]	P6	N-1/N-1										0.37	Mitigation under review
LIVE OAK 60	P7-1:A5:20:_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.02	0.99	0.99	1.01	1.00	1.02	0.98	0.98	0.78	0.00	Mitigation under review
LLNL TAP 115	Base Case	P0	N-0	1.04	1.03	1.02	1.06	1.04	1.04	1.03	1.03	1.02	1.02	Load power factor correction or voltage support if needed
LOCKEFRD 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.05	0.95	0.94	1.09	1.03	1.05	0.92	0.93	0.96	0.92	Mitigation under review
LOCKEFRD 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.05	0.95	0.94	1.09	1.03	1.05	0.92	0.93	0.96	0.92	Mitigation under review
LOCKEFRD 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.05	0.88	0.85	1.10	1.03	1.05	0.83	0.84	0.91	0.82	Load power factor correction or voltage support if needed
LOCKEFRD 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.05	0.87	0.85	1.10	1.03	1.05	0.81	0.84	0.91	0.81	Load power factor correction or voltage support if needed
LOCKEFRD 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.04	0.95	0.93	1.08	1.03	1.04	0.92	0.92	0.95	0.91	Substation upgrade
LOCKEFRD 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.91	0.90	1.09	1.03	1.04	0.88	0.89	0.94	0.88	Substation upgrade
LOCKEFRD 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.87	0.90	1.10			0.88	0.89	0.90	0.84	Load power factor correction or voltage support if needed
LOCKEFRD 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	0.91	0.90	1.09	1.03	1.05	0.88	0.89	0.94	0.88	Mitigation under review
LOCKFORD 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.31	0.32	1.04	1.02	0.82	0.29	0.29	0.87	0.31	Mitigation under review
LOCKFORD 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.92	0.72	0.75			0.92			0.90	0.75	Mitigation under review

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
LOCKFORD 230	Base Case	P0	N-0	1.04	0.98	0.98	1.07	1.02	1.04	0.98	0.98	0.97	0.98	Load power factor correction or voltage support if needed
LOCKFORD 230	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.07	0.84	0.83	1.13	0.97	1.07	0.82	0.83	0.86	0.82	Load power factor correction or voltage support if needed
LOCKFORD 230	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.07	0.84	0.83	1.13	0.97	1.07	0.82	0.83	0.86	0.82	Load power factor correction or voltage support if needed
LOCKFORD 230	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.06	0.81	0.79	1.12	0.97	1.06	0.78	0.78	0.83	0.77	Load power factor correction or voltage support if needed
LOCKFORD 230	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.06	0.81	0.79	1.12	0.97	1.06	0.76	0.78	0.83	0.76	Load power factor correction or voltage support if needed
LOCKFORD 230	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.07	0.84	0.83	1.13	0.97	1.07	0.82	0.82	0.85	0.81	Load power factor correction or voltage support if needed
LOCKFORD 230	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	0.81	0.80	1.13	0.97	1.06	0.78	0.79	0.84	0.78	Load power factor correction or voltage support if needed
LOCKFORD 230	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P3	G-1/N-1				1.13							Load power factor correction or voltage support if needed
LOCKFORD 230	P1-2:A11:88:_LOCKEFORD-LODI #1 60KV [7430] P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1				1.13							Load power factor correction or voltage support if needed
LOCKFORD 230	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	0.81	0.80	1.13	0.97	1.06	0.79	0.79	0.84	0.78	Load power factor correction or voltage support if needed
LOCKFRD1 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.05	0.95	0.94	1.09	1.03	1.05	0.92	0.93	0.96	0.92	Mitigation under review
LOCKFRD1 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.05	0.95	0.94	1.09	1.03	1.05	0.92	0.93	0.96	0.92	Mitigation under review
LOCKFRD1 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.05	0.88	0.85	1.10	1.03	1.05	0.83	0.84	0.91	0.82	Load power factor correction or voltage support if needed
LOCKFRD1 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.05	0.87	0.85	1.10	1.03	1.05	0.81	0.84	0.91	0.81	Load power factor correction or voltage support if needed
LOCKFRD1 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.04	0.95	0.93	1.08	1.03	1.04	0.92	0.92	0.95	0.91	Substation upgrade
LOCKFRD1 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.91	0.90	1.09	1.03	1.04	0.88	0.89	0.94	0.87	Substation upgrade
LOCKFRD1 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.87	0.90	1.10			0.88	0.89	0.90	0.84	Load power factor correction or voltage support if needed
LOCKFRD1 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	0.91	0.90	1.09	1.03	1.05	0.88	0.89	0.94	0.88	Mitigation under review
LODI 60	Base Case	P0	N-0	1.06	1.02	1.01	1.06	1.02	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
LODI 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.07	0.92	0.90	1.11	1.01	1.07	0.89	0.90	0.94	0.89	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
LODI 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.07	0.92	0.90	1.11	1.01	1.07	0.89	0.90	0.93	0.88	Load power factor correction or voltage support if needed
LODI 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.07	0.84	0.81	1.13	1.01	1.07	0.79	0.80	0.88	0.78	Load power factor correction or voltage support if needed
LODI 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.07	0.84	0.81	1.13	1.01	1.07	0.77	0.80	0.87	0.77	Load power factor correction or voltage support if needed
LODI 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.07	0.91	0.90	1.11	1.01	1.07	0.88	0.89	0.92	0.88	Load power factor correction or voltage support if needed
LODI 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.07	0.88	0.86	1.11	1.01	1.07	0.84	0.85	0.91	0.84	Load power factor correction or voltage support if needed
LODI 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.84	0.87	1.13			0.85	0.86	0.87	0.81	Load power factor correction or voltage support if needed
LODI 60	P1-2:A11:88:_LOCKEFORD-LODI #1 60KV [7430] P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1				1.12							Load power factor correction or voltage support if needed
LODI 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.07	0.88	0.86	1.11	1.01	1.07	0.84	0.85	0.91	0.84	Load power factor correction or voltage support if needed
LODI JCT 60	Base Case	P0	N-0	1.05	1.02	1.02	1.05	1.02	1.05	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
LODI JCT 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.06	0.92	0.91	1.10	1.02	1.06	0.90	0.91	0.94	0.89	Load power factor correction or voltage support if needed
LODI JCT 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.06	0.92	0.91	1.10	1.02	1.06	0.89	0.90	0.94	0.89	Load power factor correction or voltage support if needed
LODI JCT 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.06	0.85	0.82	1.12	1.02	1.06	0.80	0.81	0.88	0.79	Load power factor correction or voltage support if needed
LODI JCT 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.06	0.85	0.82	1.12	1.02	1.06	0.78	0.81	0.88	0.78	Load power factor correction or voltage support if needed
LODI JCT 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.06	0.92	0.91	1.10	1.02	1.06	0.89	0.90	0.93	0.89	Load power factor correction or voltage support if needed
LODI JCT 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	0.89	0.87	1.11	1.02	1.06	0.85	0.86	0.92	0.85	Load power factor correction or voltage support if needed
LODI JCT 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.85	0.87	1.12			0.86	0.87	0.88	0.81	Load power factor correction or voltage support if needed
LODI JCT 60	P1-2:A11:88:_LOCKEFORD-LODI #1 60KV [7430] P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
LODI JCT 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	0.89	0.87	1.11	1.02	1.06	0.85	0.86	0.92	0.85	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
LYOTH-SP 60	Base Case	P0	N-0	1.04	1.04	1.03	1.04	1.05	1.04	1.03	1.03	1.03	1.03	Mitigation under review
MADISON 115	Base Case	P0	N-0	1.06	1.03	1.03	1.09	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
MADISON 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.03	1.03	1.10	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
MADISON 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.06	1.03	1.03	1.10	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
MADISON 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.04	1.04	1.10	1.07	1.08	1.04	1.03	1.04	1.04	Load power factor correction or voltage support if needed
MADISON 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
MAINE-PR 60	Base Case	P0	N-0	1.07	1.03	1.03	1.09	1.07	1.07	1.02	1.02	1.02	1.03	Load power factor correction or voltage support if needed
MAINE-PR 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.08	1.03	1.03	1.10	1.07	1.08	1.03	1.02	1.03	1.03	Load power factor correction or voltage support if needed
MAINE-PR 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.03	1.03	1.10	1.07	1.07	1.02	1.02	1.02	1.03	Load power factor correction or voltage support if needed
MAINE-PR 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.04	1.04	1.10	1.07	1.08	1.03	1.02	1.04	1.04	Load power factor correction or voltage support if needed
MAINE-PR 60	P1-2:A4:50:_VACA-DXN-TRVS_HPT 60KV [0] P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
MANTECA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.01	0.91	0.91	1.05	1.02	1.01	0.90	0.90	0.99	0.90	Mitigation under review
MANTECA 115	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1							0.90	0.91			Mitigation under review
MARTELL 60	P1-2:A11:74:_VALLEY SPRINGS-CLAY 60KV [8252] P1-2:A11:73:_VALLEY SPRINGS-MARTELL #1 60KV [8241]	P6	N-1/N-1					0.87						Mitigation under review
MARTELTP 60	P1-2:A11:74:_VALLEY SPRINGS-CLAY 60KV [8252] P1-2:A11:73:_VALLEY SPRINGS-MARTELL #1 60KV [8241]	P6	N-1/N-1					0.87						Mitigation under review
MCD_ISLE 60	Base Case	P0	N-0	1.00	0.99	0.99	1.05	1.01	1.00	0.99	0.99	0.98	0.99	Load power factor correction or voltage support if needed
MCSP 60	P1-2:A11:74:_VALLEY SPRINGS-CLAY 60KV [8252] P1-2:A11:73:_VALLEY SPRINGS-MARTELL #1 60KV [8241]	P6	N-1/N-1					0.83						Mitigation under review
MCSPJT 60	P1-2:A11:74:_VALLEY SPRINGS-CLAY 60KV [8252] P1-2:A11:73:_VALLEY SPRINGS-MARTELL #1 60KV [8241]	P6	N-1/N-1					0.83						Mitigation under review



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
MDL_RIVR 60	Base Case	P0	N-0	1.01	1.00	1.00	1.06	1.02	1.02	1.00	1.00	0.99	1.00	Load power factor correction or voltage support if needed
MDSNVDSW159 115	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
MDSNVDSW159 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	1.04	1.10	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
MDSNVDSW159 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
MDSNVDSW159 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	1.05	1.10	1.08	1.08	1.05	1.04	1.05	1.05	Load power factor correction or voltage support if needed
MDSNVDSW159 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
MDSTO CN 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
MDSTO CN 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	0.98	1.05	1.06	1.02	0.95	0.97	0.00	0.91	Substation upgrade
MDWYWND 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
MELNS JA 115	Base Case	P0	N-0	1.04	1.02	1.02	1.05	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
MELNS JA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.95	0.71	0.71	1.05	1.04	0.95	0.69	0.70	0.97	0.68	Mitigation under review
MELNS JB 115	Base Case	P0	N-0	1.03	1.02	1.02	1.05	1.04	1.03	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
MELNS JB 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.95	0.71	0.71	1.05	1.04	0.95	0.69	0.70	0.97	0.68	Mitigation under review
MELONES 115	Base Case	P0	N-0	1.04	1.02	1.02	1.05	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
MELONES 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.93	0.66	0.66	1.05	1.04	0.93	0.63	0.64	0.95	0.62	Mitigation under review
MELONES 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.98	0.88	0.89			0.98			0.97	0.89	Mitigation under review
METTLER 60	Base Case	P0	N-0	1.02	1.02	1.01	1.05	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
METTLER 60	P1-2:A11:7:_LOCKFORD-BELLOTA 230KV [4990]	P1	N-1	1.02	1.02	1.02	1.10	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
METTLER 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.02	1.02	1.02	1.10	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
METTLER 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.02	1.02	1.02	1.12	1.04	1.02	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
METTLER 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.02	1.02	1.02	1.12	1.04	1.02	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
METTLER 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.02	1.02	1.01	1.11	1.04	1.02	1.02	1.01	1.03	1.01	Load power factor correction or voltage support if needed
METTLER 60	P1-3:A11:4:_LOCKFORD 230/60KV TB 2 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1				1.12							Load power factor correction or voltage support if needed
METTLER 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.02	1.02	1.01	1.11	1.04	1.02	1.01	1.02	1.03	1.02	Load power factor correction or voltage support if needed
MIDLFORK 230	Base Case	P0	N-0	1.03	1.01	1.01	1.05	1.04	1.03	1.00	1.00	0.98	1.00	Load power factor correction or voltage support if needed
MILER TP 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.05	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
MILER TP 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	0.98	1.05	1.06	1.02	0.95	0.97	0.00	0.91	Substation upgrade
MILLER 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.05	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
MILLER 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	0.98	1.05	1.06	1.02	0.95	0.97	0.00	0.91	Substation upgrade
MI-WUK 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.97	0.72	0.72	1.04	1.03	0.96	0.69	0.70	0.99	0.68	Mitigation under review
MIZOU_T1 115	Base Case	P0	N-0	1.06	1.03	1.03	1.10	1.07	1.06	1.03	1.02	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T1 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.07	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T1 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.03	1.03	1.03	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.03	1.03	1.03	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.03	1.03	1.03	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
MIZOU_T1 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.02	1.03	1.02	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.07	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.01	1.00	1.11	1.06	1.06	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.04	1.04	1.11	1.07	1.08	1.04	1.02	1.03	1.03	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	1.04	0.97	0.97	1.10	1.06	1.04	0.95	0.93	0.97	0.96	Mitigation under review
MIZOU_T1 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
MIZOU_T1 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T1 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
MIZOU_T1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.01	1.00	1.11	1.06	1.06	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
MIZOU_T1 115	P7-1:A5:18_El Dorado-Missouri Flat No. 2 115 kV Line & El Dorado-Missouri Flat No. 1 115 kV Line	P7	DCTL	1.06	1.04	1.04	1.11	1.08	1.06	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
MIZOU_T1 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
MIZOU_T2 115	Base Case	P0	N-0	1.05	1.02	1.01	1.10	1.06	1.05	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
MIZOU_T2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
MIZOU_T2 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	1.02	1.10	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
MIZOU_T2 115	P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P1	N-1	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.02	1.01	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
MIZOU_T2 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.00	1.00	1.11	1.06	1.05	1.00	0.99	1.01	1.00	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.01	1.01	1.11	1.07	1.07	1.01	1.00	1.02	1.00	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	1.00	0.98	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.10	1.07	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.02	1.02	1.10	1.07	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	0.99	0.85	0.86	1.08	1.04	0.99	0.84	0.79	0.89	0.85	Mitigation under review
MIZOU_T2 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.10	1.06	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.06	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.10	1.06	1.05	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
MIZOU_T2 115	P2-1:A5:40:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (PLCRVLT2-MIZOU_T2)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.00	Load power factor correction or voltage support if needed
MIZOU_T2 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
MIZOU_T2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393] P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
MIZOU_T2 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
MIZOU_T2 115	P7-1:A5:18_El Dorado-Missouri Flat No. 2 115 kV Line & El Dorado-Missouri Flat No. 1 115 kV Line	P7	DCTL	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
MIZOU_T2 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
MOBILCHE 115	Base Case	P0	N-0	1.03	1.02	1.01	1.08	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
MOBILCHE 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.03	1.01	1.00	1.11	1.04	1.03	1.00	1.01	1.03	1.01	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.02	1.00	1.00	1.10	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-2:A4:18:_WOODLD 115KV SECTION 1D	P2	Bus	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	1.02	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.02	1.00	1.00	1.10	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-3:A4:17:_WOODLD - 1F 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.02	1.00	1.00	1.10	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.01	1.01	1.11	1.04	1.03	1.01	1.02	1.02	1.01	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.02	1.02	1.10	1.04	1.04	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.01	1.01	1.11	1.04	1.03	1.00	1.01	1.03	1.00	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.03	1.03	1.03	1.11	1.04	1.03	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-4:A4:9:_WOODLD 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.05	1.05	1.05	1.10	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.03	1.01	1.01	1.11	1.04	1.03	1.00	1.02	1.03	1.01	Load power factor correction or voltage support if needed
MOBILCHE 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
MOBILCHE 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
MOBILCHE 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
MOBILCHE 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
MONDAVI 60	Base Case	P0	N-0	1.06	1.02	1.01	1.06	1.02	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
MONDAVI 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.07	0.92	0.90	1.11	1.01	1.07	0.89	0.90	0.93	0.89	Load power factor correction or voltage support if needed
MONDAVI 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.07	0.92	0.90	1.11	1.01	1.07	0.89	0.90	0.93	0.88	Load power factor correction or voltage support if needed
MONDAVI 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.07	0.84	0.81	1.13	1.01	1.07	0.79	0.80	0.88	0.78	Load power factor correction or voltage support if needed
MONDAVI 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.07	0.84	0.81	1.13	1.01	1.07	0.77	0.80	0.87	0.77	Load power factor correction or voltage support if needed
MONDAVI 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.07	0.91	0.90	1.11	1.01	1.07	0.88	0.89	0.92	0.88	Load power factor correction or voltage support if needed
MONDAVI 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.07	0.88	0.86	1.11	1.01	1.06	0.84	0.85	0.91	0.84	Load power factor correction or voltage support if needed
MONDAVI 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.84	0.87	1.13			0.85	0.86	0.87	0.81	Load power factor correction or voltage support if needed
MONDAVI 60	P1-2:A11:88:_LOCKEFORD-LODI #1 60KV [7430] P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1				1.12							Load power factor correction or voltage support if needed
MONDAVI 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.07	0.88	0.86	1.11	1.01	1.07	0.84	0.85	0.91	0.84	Load power factor correction or voltage support if needed
MRYSVLE 60	P1-2:A5:26:_PEASE-RIO OSO 115KV [3270] P1-2:A5:25:_PALERMO-PEASE 115KV [3220]	P6	N-1/N-1									0.72		Mitigation under review
MRYSVLE 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.03	0.99	0.98	1.02	0.99	1.03	0.98	0.98	0.74	0.00	Mitigation under review
MRYSVLLE 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.03	0.99	0.98	1.02	0.99	1.03	0.98	0.98	0.74	0.00	Mitigation under review
MTN_QJCT 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.87	0.87	1.02	1.02	0.98	0.83	0.27	0.94	0.88	Mitigation under review
MTN_QJCT 60	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	0.98	0.98	1.02	1.02	1.02	0.97	0.96	1.00	0.98	Mitigation under review
MTN_QUAR 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.87	0.87	1.02	1.02	0.98	0.83	0.26	0.94	0.87	Mitigation under review
MTN_QUAR 60	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	0.98	0.98	1.02	1.02	1.02	0.97	0.96	1.00	0.98	Mitigation under review

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
NARRWS 1 60	Base Case	P0	N-0	1.02	1.02	1.02	1.06	1.04	1.02	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
NARRWS 2 60	Base Case	P0	N-0	1.02	1.03	1.03	1.06	1.05	1.02	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
NARRWS 2 60	P2-2:A5:30:_SMRTSVLE 60KV SECTION MA	P2	Bus	1.03	1.03	1.03	1.10	1.06	1.03	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
NARRWS 2 60	P2-3:A5:40:_SMRTSVLE - MA 60KV & COLGATE-SMARTVILLE #1 LINE	P2	Non-bus-tie breaker	1.03	1.04	1.04	1.10	1.06	1.03	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
NARRWS 2 60	P2-3:A5:42:_SMRTSVLE - MA 60KV & SMARTVILLE-MARYSVILLE LINE	P2	Non-bus-tie breaker	1.03	1.03	1.03	1.10	1.06	1.03	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
NARRWS 2 60	P2-3:A5:43:_SMRTSVLE - MA 60KV & SMRTSVLE-BEALE_1-E.NICOLS LINE	P2	Non-bus-tie breaker	1.03	1.03	1.03	1.10	1.06	1.03	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
NARRWS 2 60	P2-3:A5:44:_SMRTSVLE - MA 60KV & SMARTVILLE-NICOLAUS #1 LINE	P2	Non-bus-tie breaker	1.03	1.03	1.03	1.10	1.06	1.03	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
NEW HOPE 60	P1-2:A11:7:_LOCKFORD-BELLOTA 230KV [4990]	P1	N-1	1.05	0.91	0.90	1.10	1.01	1.05	0.88	0.89	0.93	0.88	Mitigation under review
NEW HOPE 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.05	0.91	0.89	1.10	1.01	1.05	0.88	0.89	0.93	0.87	Mitigation under review
NEW HOPE 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.05	0.83	0.80	1.11	1.01	1.05	0.78	0.79	0.87	0.77	Load power factor correction or voltage support if needed
NEW HOPE 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.05	0.83	0.80	1.11	1.01	1.05	0.76	0.79	0.87	0.76	Load power factor correction or voltage support if needed
NEW HOPE 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.05	0.90	0.89	1.09	1.01	1.05	0.87	0.88	0.92	0.87	Substation upgrade
NEW HOPE 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.87	0.85	1.10	1.01	1.05	0.83	0.84	0.91	0.83	Load power factor correction or voltage support if needed
NEW HOPE 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.83	0.86	1.11			0.84	0.85	0.87	0.79	Load power factor correction or voltage support if needed
NEW HOPE 60	P1-2:A11:89:_LOCKFORD-LODI #2 60KV [7440] P1-2:A11:7:_LOCKFORD-BELLOTA 230KV [4990]	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
NEW HOPE 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.87	0.85	1.10	1.01	1.05	0.83	0.84	0.91	0.83	Load power factor correction or voltage support if needed
NEWCSTL1 115	Base Case	P0	N-0	1.04	1.02	1.02	1.10	1.07	1.04	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
NEWCSTL1 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.00	1.00	1.11	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTL1 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.02	1.02	1.11	1.07	1.05	1.02	1.02	1.01	1.02	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
NEWCSTL1 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
NEWCSTL1 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
NEWCSTL1 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
NEWCSTL1 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.00	1.00	1.11	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTL1 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.00	1.00	1.10	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTL1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.00	0.99	1.10	1.06	1.04	0.99	0.99	0.99	0.98	Load power factor correction or voltage support if needed
NEWCSTL1 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.91	0.82	0.82	1.07	1.05	0.90	0.78	0.28	0.89	0.82	Substation upgrade
NEWCSTL1 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.01	1.00	1.11	1.07	1.05	1.00	0.99	1.00	1.00	Load power factor correction or voltage support if needed
NEWCSTL1 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.05	1.00	1.00	1.10	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTL1 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.03	1.02	1.11	1.07	1.05	1.02	1.02	1.01	1.02	Load power factor correction or voltage support if needed
NEWCSTL1 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	1.01	1.10	1.07	1.05	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
NEWCSTL1 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:37:_BELL-PLACER 115KV [4395]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
NEWCSTL1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.00	0.99	1.11	1.06	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTL2 115	Base Case	P0	N-0	1.04	1.02	1.02	1.10	1.07	1.04	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
NEWCSTL2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.00	1.00	1.11	1.07	1.05	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTL2 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.03	1.02	1.11	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
NEWCSTL2 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
NEWCSTL2 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.12	1.08	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
NEWCSTL2 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
NEWCSTL2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.00	1.00	1.11	1.07	1.05	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTL2 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.00	1.00	1.10	1.07	1.05	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTL2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.00	0.99	1.10	1.06	1.04	0.99	0.99	1.00	0.98	Load power factor correction or voltage support if needed
NEWCSTL2 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.92	0.82	0.83	1.07	1.05	0.90	0.79	0.30	0.89	0.83	Substation upgrade
NEWCSTL2 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.01	1.00	1.11	1.07	1.05	1.00	0.99	1.00	1.00	Load power factor correction or voltage support if needed
NEWCSTL2 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.05	1.00	1.00	1.10	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTL2 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.03	1.02	1.11	1.07	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
NEWCSTL2 115	P2-1:A5:35:_PLACER-GOLD HILL #2 115KV [4290] (PLACER-FLINT2)	P2-1	Line Section w/o fault	1.06	1.04	1.03	1.11	1.07	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
NEWCSTL2 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	1.01	1.10	1.07	1.05	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
NEWCSTL2 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.00	0.99	1.11	1.06	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTLE 115	Base Case	P0	N-0	1.04	1.02	1.02	1.10	1.07	1.04	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
NEWCSTLE 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.00	1.00	1.11	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTLE 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.03	1.02	1.11	1.07	1.05	1.02	1.02	1.01	1.02	Load power factor correction or voltage support if needed
NEWCSTLE 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
NEWCSTLE 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
NEWCSTLE 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.08	1.06	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
NEWCSTLE 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.00	1.00	1.11	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
NEWCSTLE 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.00	1.00	1.10	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTLE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.00	0.99	1.10	1.06	1.04	0.99	0.99	0.99	0.98	Load power factor correction or voltage support if needed
NEWCSTLE 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.91	0.82	0.82	1.07	1.05	0.90	0.78	0.28	0.89	0.82	Substation upgrade
NEWCSTLE 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.01	1.00	1.11	1.07	1.05	1.00	0.99	1.00	1.00	Load power factor correction or voltage support if needed
NEWCSTLE 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.05	1.00	1.00	1.10	1.07	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWCSTLE 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.03	1.02	1.11	1.07	1.05	1.02	1.02	1.01	1.02	Load power factor correction or voltage support if needed
NEWCSTLE 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	1.01	1.10	1.07	1.05	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
NEWCSTLE 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:37:_BELL-PLACER 115KV [4395]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
NEWCSTLE 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.00	0.99	1.11	1.06	1.04	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
NEWMAN 60	P2-1:A12:39:_SALADO-NEWMAN #2 60KV [7870] (SALADO-PATTERSN)	P2-1	Line Section w/o fault	1.00	0.97	0.97	1.03	1.05	1.00	0.96	0.97	1.02	0.94	Mitigation under review
NEWMAN 60	P2-1:A12:41:_SALADO-NEWMAN #2 60KV [7870] (PATTERSN-CRWS LDJ)	P2-1	Line Section w/o fault	1.00	0.97	0.97	1.03	1.05	1.00	0.96	0.97	1.02	0.94	Mitigation under review
NRRWS1TP 60	Base Case	P0	N-0	1.02	1.02	1.02	1.06	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
NRRWS2TP 60	Base Case	P0	N-0	1.02	1.02	1.02	1.06	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
NRRWS2TP 60	P2-2:A5:30:_SMRTSVLE 60KV SECTION MA	P2	Bus	1.04	1.03	1.03	1.10	1.06	1.04	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
NRRWS2TP 60	P2-3:A5:40:_SMRTSVLE - MA 60KV & COLGATE-SMARTVILLE #1 LINE	P2	Non-bus-tie breaker	1.04	1.03	1.03	1.10	1.06	1.04	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
NRRWS2TP 60	P2-3:A5:42:_SMRTSVLE - MA 60KV & SMARTVILLE-MARYSVILLE LINE	P2	Non-bus-tie breaker	1.04	1.03	1.03	1.10	1.06	1.04	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
NRRWS2TP 60	P2-3:A5:43:_SMRTSVLE - MA 60KV & SMRTSVLE-BEALE_1-E.NICOLS LINE	P2	Non-bus-tie breaker	1.04	1.03	1.03	1.10	1.06	1.04	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
NRRWS2TP 60	P2-3:A5:44:_SMRTSVLE - MA 60KV & SMARTVILLE-NICOLAUS #1 LINE	P2	Non-bus-tie breaker	1.04	1.03	1.03	1.10	1.06	1.04	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
NW HPE J 60	Base Case	P0	N-0	1.05	1.02	1.01	1.05	1.02	1.05	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
NW HPE J 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.06	0.92	0.91	1.10	1.02	1.06	0.89	0.90	0.94	0.89	Load power factor correction or voltage support if needed
NW HPE J 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.06	0.92	0.91	1.10	1.02	1.06	0.89	0.90	0.94	0.89	Mitigation under review
NW HPE J 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.06	0.84	0.82	1.12	1.02	1.06	0.79	0.80	0.88	0.78	Load power factor correction or voltage support if needed
NW HPE J 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.06	0.84	0.81	1.12	1.02	1.06	0.77	0.80	0.88	0.77	Load power factor correction or voltage support if needed
NW HPE J 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.06	0.92	0.90	1.10	1.02	1.06	0.88	0.89	0.93	0.88	Substation upgrade
NW HPE J 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.88	0.87	1.10	1.02	1.05	0.84	0.85	0.91	0.84	Load power factor correction or voltage support if needed
NW HPE J 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.84	0.87	1.12			0.85	0.86	0.87	0.81	Load power factor correction or voltage support if needed
NW HPE J 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	0.88	0.87	1.11	1.02	1.06	0.84	0.85	0.92	0.84	Load power factor correction or voltage support if needed
OI GLASS 115	Base Case	P0	N-0	1.04	1.03	1.03	1.05	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
OI GLASS 115	P5-5:A11:1:_SCHULTE 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P55	Non-Redundant	0.99	0.96	0.96	1.05	1.02	0.99	0.95	0.95	0.98	0.95	Protection upgrade
OI GLASS 115	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1			0.92				0.89	0.90		0.91	Mitigation under review
OLIVH J1 115	Base Case	P0	N-0	1.04	1.02	1.02	1.09	1.04	1.04	1.02	1.02	1.02	1.01	Load power factor correction or voltage support if needed
OLIVH J1 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.02	1.02	1.10	1.04	1.05	1.02	1.03	1.02	1.02	Load power factor correction or voltage support if needed
OLIVH J1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.01	1.01	1.10	1.03	1.04	1.01	1.01	1.01	1.00	Load power factor correction or voltage support if needed
OLIVH J1 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.03	0.97	0.97	1.09	1.03	1.03	0.97	0.97	0.97	0.96	Substation upgrade
OLIVH J1 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.10							Load power factor correction or voltage support if needed
OLIVH J1 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
OLIVH J1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.01	1.01	1.10	1.03	1.04	1.01	1.01	1.01	1.00	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
OLIVH J1 115	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	1.05	1.02	1.02	1.10	1.04	1.05	1.02	1.03	1.02	1.02	Load power factor correction or voltage support if needed
OLIVH J3 115	Base Case	P0	N-0	1.05	1.03	1.03	1.10	1.04	1.05	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
OLIVH J3 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.05	1.03	1.03	1.10	1.04	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
OLIVH J3 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.10	1.04	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
OLIVH J3 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.10	1.04	1.06	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
OLIVH J3 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.03	1.03	1.11	1.04	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
OLIVH J3 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.05	1.03	1.03	1.10	1.04	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
OLIVH J3 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.05	1.02	1.02	1.10	1.04	1.05	1.02	1.02	1.00	1.02	Load power factor correction or voltage support if needed
OLIVH J3 115	P1-1:A5:5:_MIDLFORK 13.80KV GEN UNIT 1 P1-3:A5:22:_FREC TAP 115/13.8KV TB 1	P3	G-1/N-1				1.10							Load power factor correction or voltage support if needed
OLIVH J3 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
OLIVH J3 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	1.03	1.03	1.11	1.04	1.05	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
OLIVH J3 115	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	1.06	1.03	1.03	1.10	1.04	1.06	1.03	1.04	1.03	1.03	Load power factor correction or voltage support if needed
OLIVHRST 115	Base Case	P0	N-0	1.04	1.02	1.02	1.09	1.04	1.04	1.02	1.02	1.02	1.01	Load power factor correction or voltage support if needed
OLIVHRST 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.02	1.02	1.10	1.04	1.05	1.02	1.03	1.02	1.02	Load power factor correction or voltage support if needed
OLIVHRST 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.01	1.01	1.10	1.03	1.04	1.01	1.01	1.01	1.00	Load power factor correction or voltage support if needed
OLIVHRST 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.03	0.97	0.97	1.09	1.03	1.03	0.97	0.97	0.97	0.96	Substation upgrade
OLIVHRST 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.10							Load power factor correction or voltage support if needed
OLIVHRST 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
OLIVHRST 115	P7-1:A11:12:_ BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.01	1.01	1.10	1.03	1.04	1.01	1.01	1.01	1.00	Load power factor correction or voltage support if needed
OLIVHRST 115	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	1.05	1.02	1.02	1.10	1.04	1.05	1.02	1.03	1.02	1.02	Load power factor correction or voltage support if needed
OWENSTP1 115	Base Case	P0	N-0	1.04	1.03	1.03	1.05	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
OWENSTP1 115	P5-5:A11:1:_ SCHULTE 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P55	Non-Redundant	0.99	0.96	0.96	1.05	1.02	0.99	0.95	0.96	0.98	0.95	Protection upgrade
OWENSTP1 115	P1-2:A11:54:_ SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_ TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1			0.92				0.89	0.90		0.91	Mitigation under review
OWENSTP2 115	Base Case	P0	N-0	1.04	1.03	1.03	1.05	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
OXBOW 60	P1-2:A4:33:_ WEST SACRAMENTO-BRIGHTON 115KV [4110] P1-2:A5:50:_ COLGATE-GRASS VALLEY 60KV [6490]	P6	N-1/N-1		0.89	0.86								Mitigation under review
P.GRVEJ. 60	P1-2:A11:12:_ VALLEY SPRINGS-BELLOTA 230KV [5860] P1-2:A11:9:_ TIGER CREEK-VALLEY SPRINGS 230KV [5790]	P6	N-1/N-1					0.89						Mitigation under review
PARDEE A 60	Base Case	P0	N-0	1.05	1.05	1.05	1.04	1.04	1.05	1.05	1.05	1.06	1.05	Mitigation under review
PEAS RG 60	Base Case	P0	N-0	1.01	0.96	0.96	1.06	1.00	1.01	0.96	0.96	0.95	0.96	Load power factor correction or voltage support if needed
PEAS RG 60	P1-3:A5:31:_ PEAS RG 60/60KV TB 1	P1	N-1	1.02	1.00	1.00	1.07	1.02	1.02	1.00	1.01	1.01	1.00	Mitigation under review
PEAS RG 60	P2-2:A5:13:_ PEASE 115KV SECTION MA	P2	Bus	0.96	0.94	0.94	0.94	0.93	0.96	0.94	0.94	0.89	0.91	Mitigation under review
PEAS RG 60	P2-2:A5:34:_ PEASE 60KV SECTION MA	P2	Bus	1.02	1.00	1.00	1.07	1.02	1.02	1.00	1.01	1.01	1.00	Mitigation under review
PEAS RG 60	P2-3:A5:11:_ PEASE - MA 115KV & PALERMO-PEASE LINE	P2	Non-bus-tie breaker	0.96	0.94	0.94	0.94	0.93	0.96	0.94	0.94	0.89	0.91	Mitigation under review
PEAS RG 60	P2-3:A5:12:_ PEASE - MA 115KV & PEASE-RIO OSO LINE	P2	Non-bus-tie breaker	0.96	0.94	0.94	0.94	0.93	0.96	0.94	0.94	0.89	0.91	Mitigation under review
PEAS RG 60	P2-3:A5:48:_ PEASE - MA 60KV & MRYSVLLE-PEASE LINE	P2	Non-bus-tie breaker	1.02	1.00	1.00	1.07	1.02	1.02	1.00	1.01	1.01	1.00	Mitigation under review
PEAS RG 60	P2-3:A5:49:_ PEASE - MA 60KV & PEACHTON-PEASE LINE	P2	Non-bus-tie breaker	1.02	1.00	1.00	1.07	1.02	1.02	1.00	1.01	1.01	1.00	Mitigation under review
PEAS RG 60	P2-3:A5:50:_ PEASE - MA 60KV & PEASE-HARTER LINE	P2	Non-bus-tie breaker	1.02	1.00	1.00	1.07	1.02	1.02	1.00	1.01	1.01	1.00	Mitigation under review
PEAS RG 60	P1-2:A5:26:_ PEASE-RIO OSO 115KV [3270] P1-2:A5:25:_ PALERMO-PEASE 115KV [3220]	P6	N-1/N-1				0.94	0.93				0.69		Mitigation under review
PEAS RG 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	0.93	0.93	0.94	0.93	1.01	0.93	0.93	0.71	0.00	Mitigation under review

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PEASE 115	Base Case	P0	N-0	1.04	1.01	1.01	1.09	1.03	1.04	1.01	1.01	1.01	1.00	Load power factor correction or voltage support if needed
PEASE 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-3:A5:31:_PEAS RG 60/60KV TB 1	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
PEASE 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.00	1.00	1.10	1.03	1.04	1.00	1.00	1.00	0.99	Load power factor correction or voltage support if needed
PEASE 115	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.04	0.95	0.94	0.97	0.95	1.04	0.94	0.94	0.71	0.00	Mitigation under review
PEASE 60	P1-3:A5:31:_PEAS RG 60/60KV TB 1 P1-2:A5:57:_MRYSVLLE-PEASE 60KV [0]	P6	N-1/N-1										0.31	Mitigation under review
PEASE 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.03	1.00	1.00	1.01	1.00	1.03	1.00	1.00	0.76	0.00	Mitigation under review
PEASETP 60	P1-2:A5:26:_PEASE-RIO OSO 115KV [3270] P1-2:A5:25:_PALERMO-PEASE 115KV [3220]	P6	N-1/N-1									0.74		Mitigation under review
PEASETP 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.03	1.00	1.00	1.01	1.00	1.03	1.00	1.00	0.76	0.00	Mitigation under review
PENRYN 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.86	0.86	1.01	1.02	0.99	0.82	0.24	0.94	0.86	Mitigation under review
PENRYN 60	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	0.97	1.02	1.02	1.02	0.96	0.95	1.00	0.97	Mitigation under review
PEORIA 115	Base Case	P0	N-0	1.03	1.02	1.02	1.05	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
PEORIA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.66	0.67	1.05	1.04	0.93	0.64	0.65	0.96	0.63	Mitigation under review
PEORIA 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1		0.88	0.89			0.98				0.89	Mitigation under review
PIKE CTY 60	Base Case	P0	N-0	1.04	1.02	1.02	1.08	1.05	1.04	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
PLACER 115	Base Case	P0	N-0	1.04	1.01	1.01	1.10	1.06	1.04	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
PLACER 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	1.00	0.99	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
PLACER 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.02	1.02	1.10	1.07	1.05	1.02	1.01	1.01	1.01	Load power factor correction or voltage support if needed
PLACER 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	1.00	0.99	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
PLACER 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.04	0.99	0.99	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
PLACER 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.99	0.99	1.10	1.06	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
PLACER 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.92	0.83	0.83	1.07	1.05	0.90	0.79	0.30	0.89	0.83	Substation upgrade



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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLACER 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.04	1.00	1.00	1.10	1.07	1.04	0.99	0.98	0.99	0.99	Load power factor correction or voltage support if needed
PLACER 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.04	0.99	0.99	1.10	1.07	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
PLACER 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	1.02	1.10	1.07	1.05	1.02	1.01	1.01	1.01	Load power factor correction or voltage support if needed
PLACER 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.10	1.07	1.04	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLACER 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	0.99	0.99	1.10	1.06	1.04	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
PLACER 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.88	0.88	1.02	1.02	0.98	0.84	0.27	0.95	0.88	Mitigation under review
PLAINFLD 60	Base Case	P0	N-0	1.02	0.91	0.90	1.09	1.07	1.02	0.89	0.90	0.93	0.90	Load power factor correction or voltage support if needed
PLAINFLD 60	P1-2:A11:55:_GWFTRACY-SCHULTE #1 115KV [0]	P1	N-1	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.89	Mitigation under review
PLAINFLD 60	P1-2:A4:17:_VACA-LAMBIE SW STA 230KV [5845]	P1	N-1	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P1-2:A4:41:_VACA-SUISUN 115KV [4070]	P1	N-1	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P1-2:A4:50:_VACA-DXN-TRVS_HPT 60KV [0]	P1	N-1	1.02	0.92	0.92	1.09	1.07	1.02	0.90	0.91	0.94	0.91	Mitigation under review
PLAINFLD 60	P1-2:A5:11:_MIDDLE FORK-GOLD HILL 230KV [5140]	P1	N-1	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P1-2:A5:2:_POE-RIO OSO 230KV [5540]	P1	N-1	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.03	0.91	0.91	1.10	1.07	1.02	0.89	0.90	0.94	0.90	Load power factor correction or voltage support if needed
PLAINFLD 60	P1-3:A4:18:_VACA-DIX 115/60KV TB 5	P1	N-1	1.02	0.90	0.90	1.09	1.06	1.02	0.88	0.89	0.93	0.89	Mitigation under review
PLAINFLD 60	P1-3:A4:19:_VACA-DIX 115/60KV TB 9	P1	N-1	1.03	0.89	0.88	1.10	1.07	1.03	0.86	0.87	0.92	0.88	Mitigation under review
PLAINFLD 60	P1-3:A4:7:_VACA-DIX 230/115KV TB 3	P1	N-1	1.02	0.90	0.89	1.09	1.06	1.02	0.87	0.88	0.92	0.89	Mitigation under review
PLAINFLD 60	P1-3:A4:8:_VACA-DIX 230/115KV TB 4	P1	N-1	1.02	0.90	0.89	1.09	1.06	1.02	0.87	0.88	0.92	0.89	Mitigation under review
PLAINFLD 60	P1-4:A4:4:_VACA-DIX SVD=V	P1	N-1	1.02	0.90	0.90	1.09	1.06	1.01	0.88	0.89	0.92	0.89	Mitigation under review
PLAINFLD 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.02	0.91	0.90	1.10	1.07	1.02	0.89	0.90	0.93	0.90	Load power factor correction or voltage support if needed
PLAINFLD 60	P2-2:A11:15:_TESLA E 230KV SECTION 2E	P2	Bus	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P2-2:A4:1:_VACA-DIX 230KV SECTION 1E	P2	Bus	1.01	0.89	0.88	1.09	1.06	1.01	0.86	0.87	0.92	0.88	Mitigation under review
PLAINFLD 60	P2-2:A4:4:_VACA-DIX 230KV SECTION 1F	P2	Bus	1.01	0.90	0.89	1.09	1.06	1.01	0.87	0.88	0.92	0.89	Mitigation under review
PLAINFLD 60	P2-2:A4:45:_VACA-DXN 60KV SECTION ME	P2	Bus	1.03	0.92	0.91	1.10	1.08	1.03	0.90	0.91	0.95	0.91	Load power factor correction or voltage support if needed
PLAINFLD 60	P2-2:A4:47:_PLAINFLD 60KV SECTION 1D	P2	Bus	1.04	0.96	0.95	1.09	1.07	1.04	0.94	0.95	0.97	0.95	Mitigation under review
PLAINFLD 60	P2-2:A4:48:_DIXONPGE 60KV SECTION 2D	P2	Bus	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLAINFLD 60	P2-2:A4:49:_DIXONPGE 60KV SECTION 1D	P2	Bus	1.02	0.92	0.92	1.09	1.07	1.02	0.90	0.91	0.94	0.91	Mitigation under review
PLAINFLD 60	P2-2:A4:5:_VACA-DIX 230KV SECTION 2F	P2	Bus	1.02	0.89	0.89	1.09	1.07	1.01	0.87	0.88	0.92	0.88	Mitigation under review
PLAINFLD 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.04	0.92	0.92	1.11	1.07	1.03	0.90	0.90	0.95	0.91	Load power factor correction or voltage support if needed
PLAINFLD 60	P2-2:A5:7:_GOLDHILL 230KV SECTION 2D	P2	Bus	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P2-3:A11:30:_SCHULTE 115KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.89	Mitigation under review
PLAINFLD 60	P2-3:A11:6:_TESLA E - 2E 230KV & STAGG-TESLA LINE	P2	Non-bus-tie breaker	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P2-3:A4:1:_LAMBIE 230KV - MIDDLE BREAKER BAY 1	P2	Non-bus-tie breaker	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.89	Mitigation under review
PLAINFLD 60	P2-3:A4:2:_LAMBIE 230KV - MIDDLE BREAKER BAY 0	P2	Non-bus-tie breaker	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P2-3:A4:28:_VACA-DIX 115KV - MIDDLE BREAKER BAY 7	P2	Non-bus-tie breaker	1.02	0.90	0.89	1.09	1.06	1.01	0.87	0.88	0.92	0.89	Mitigation under review
PLAINFLD 60	P2-3:A4:29:_VACA-DIX 115KV - MIDDLE BREAKER BAY 8	P2	Non-bus-tie breaker	1.02	0.90	0.90	1.09	1.06	1.02	0.88	0.89	0.93	0.89	Mitigation under review
PLAINFLD 60	P2-3:A4:3:_BDLSWSTA 230KV - MIDDLE BREAKER BAY 4	P2	Non-bus-tie breaker	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.92	0.90	Mitigation under review
PLAINFLD 60	P2-3:A4:32:_VACA-DIX 115KV - MIDDLE BREAKER BAY 6	P2	Non-bus-tie breaker	1.02	0.90	0.89	1.09	1.06	1.02	0.87	0.88	0.92	0.89	Mitigation under review
PLAINFLD 60	P2-3:A4:33:_VACA-DIX 115KV - MIDDLE BREAKER BAY 4	P2	Non-bus-tie breaker	1.03	0.88	0.88	1.10	1.07	1.03	0.85	0.86	0.92	0.87	Mitigation under review
PLAINFLD 60	P2-3:A4:46:_VACA-DXN - ME 60KV & DIXON-VACA #2 LINE	P2	Non-bus-tie breaker	1.03	0.92	0.91	1.10	1.08	1.03	0.90	0.91	0.95	0.91	Load power factor correction or voltage support if needed
PLAINFLD 60	P2-3:A4:47:_VACA-DXN - ME 60KV & VACA-DXN-TRVS_HPT LINE	P2	Non-bus-tie breaker	1.03	0.92	0.91	1.10	1.08	1.03	0.90	0.91	0.95	0.91	Load power factor correction or voltage support if needed
PLAINFLD 60	P2-3:A4:49:_DIXONPGE - 2D 60KV & DIXON-VACA #2 LINE	P2	Non-bus-tie breaker	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLAINFLD 60	P2-3:A4:6:_BDLSWSTA 230KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.91	0.90	Mitigation under review
PLAINFLD 60	P2-3:A5:5:_GOLDHILL - 2D 230KV & MIDDLE FORK-GOLD HILL LINE	P2	Non-bus-tie breaker	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P2-3:A5:6:_MIDLFORK - 1D 230KV & MIDDLE FORK-GOLD HILL LINE	P2	Non-bus-tie breaker	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLAINFLD 60	P2-3:A5:89:_RIO OSO 230KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker		0.90	0.90		1.07		0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P2-4:A11:2:_BELLOTA 230KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.91	0.89	Substation upgrade
PLAINFLD 60	P2-4:A4:1:_VACA-DIX 230KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.00	0.88	0.87	1.09	1.05	1.00	0.85	0.86	0.90	0.87	Substation upgrade
PLAINFLD 60	P2-4:A4:2:_VACA-DIX 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.01	0.89	0.88	1.09	1.06	1.01	0.86	0.87	0.91	0.88	Substation upgrade
PLAINFLD 60	P2-4:A4:22:_DIXONPGE 60KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.02	0.92	0.92	1.09	1.07	1.02	0.90	0.91	0.94	0.91	Substation upgrade
PLAINFLD 60	P2-4:A4:3:_VACA-DIX 230KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.88	0.88	1.09	1.06	1.00	0.86	0.87	0.90	0.87	Substation upgrade
PLAINFLD 60	P2-4:A4:4:_VACA-DIX 230KV - SECTION 2F & 2E	P2	Bus-tie breaker	1.01	0.89	0.88	1.09	1.07	1.01	0.87	0.88	0.91	0.88	Substation upgrade
PLAINFLD 60	P2-1:A11:49:_GWFFTRACY-SCHULTE 115KV [0] NO FAULT	P2-1	Line Section w/o fault	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.89	Mitigation under review
PLAINFLD 60	P2-1:A4:24:_VACA-VACAVILLE-CORDELIA 115KV [4090] (VACA-DIX-VCVLE2J)	P2-1	Line Section w/o fault	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLAINFLD 60	P2-1:A5:3:_MIDDLE FORK-GOLD HILL 230KV [5140] (GOLDHILL-RALSTON)	P2-1	Line Section w/o fault	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P1-1:A11:24:_COG.CAPT 9.11KV GEN UNIT 1 P1-2:A11:55:_GWFFTRACY-SCHULTE #1 115KV [0]	P3	G-1/N-1			0.90								Mitigation under review
PLAINFLD 60	P5-5:A11:1:_SCHULTE 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P55	Non-Redundant	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.89	Protection upgrade
PLAINFLD 60	P5-5:A4:2:_Lambie 230 kV BAAH Bus #2 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Protection upgrade
PLAINFLD 60	P5-5:A4:3:_Bird's Landing Sw. Sta. 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.92	0.90	Protection upgrade
PLAINFLD 60	P5-5:A4:4:_Bird's Landing Sw. Sta. 230 kV BAAH Bus #2 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.91	0.89	Protection upgrade
PLAINFLD 60	P1-3:A4:19:_VACA-DIX 115/60KV TB 9 P1-3:A4:7:_VACA-DIX 230/115KV TB 3	P6	N-1/N-1		0.87	0.86				0.84	0.85		0.86	Mitigation under review
PLAINFLD 60	P1-3:A4:19:_VACA-DIX 115/60KV TB 9 P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
PLAINFLD 60	P7-1:A11:28:_TESLA-NEWARK #1 230KV [5720] & TESLA-RAVENSWOOD 230KV [5730]	P7	DCTL	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P7-1:A12:2:_MELONES-WILSON 230KV [5080] & COTTLE-MELONES 230KV [4530]	P7	DCTL	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P7-1:A4:12_Lambie Sw Sta-Birds Landing Sw Sta 230 kV Line & Peabody-Birds Landing Sw Sta 230 kV Line	P7	DCTL	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.89	Mitigation under review
PLAINFLD 60	P7-1:A4:15_Vaca-Vacaville-Jameson-North Tower 115 kV Line & Vaca-Vacaville-Coredelia 115 kV Line	P7	DCTL	1.03	0.92	0.91	1.09	1.07	1.03	0.89	0.90	0.94	0.91	Mitigation under review
PLAINFLD 60	P7-1:A4:23_CORTINA-VACA1 and DELEVAN-CORTINA	P7	DCTL	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P7-1:A4:26:_VACA-SUISUN & VACA-SUISUN-JAMESON	P7	DCTL	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLAINFLD 60	P7-1:A5:4_Poe-Rio Oso 230 kV Line & Cresta-Rio Oso 230 kV Line	P7	DCTL	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.89	Mitigation under review
PLAINFLD 60	P7-1:A5:6_Table Mountain-Rio Oso 230 kV Line & Palermo-Colgate 230 kV Line	P7	DCTL	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLAINFLD 60	P7-1:A5:8_Middle Fork-Gold Hill 230 kV Line & Placer-Gold Hill No. 1 115 kV Line	P7	DCTL	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLCRVLB2 115	Base Case	P0	N-0	1.05	1.02	1.01	1.10	1.06	1.05	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
PLCRVLB2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLB2 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	1.02	1.10	1.06	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
PLCRVLB2 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLB2 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.00	1.00	1.11	1.06	1.05	1.00	0.99	1.01	0.99	Load power factor correction or voltage support if needed
PLCRVLB2 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLB2 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLB2 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLB2 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	1.00	0.98	Load power factor correction or voltage support if needed
PLCRVLB2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.11	1.06	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLB2 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.10	1.06	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLB2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
PLCRVLB2 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.02	1.02	1.10	1.07	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLB2 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	0.99	0.86	0.86	1.08	1.04	0.99	0.84	0.80	0.89	0.86	Mitigation under review
PLCRVLB2 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLCRVLB2 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.10	1.06	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
PLCRVLB2 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
PLCRVLB2 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
PLCRVLB2 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLB3 115	Base Case	P0	N-0	1.05	1.02	1.01	1.10	1.06	1.05	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
PLCRVLB3 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLB3 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	1.02	1.10	1.06	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.00	1.00	1.11	1.06	1.05	1.00	0.99	1.01	0.99	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.08	1.03	1.03	1.11	1.07	1.08	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	1.00	0.98	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.11	1.06	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.10	1.06	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.02	1.02	1.10	1.07	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLCRVLB3 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	0.99	0.86	0.86	1.08	1.04	0.99	0.84	0.80	0.89	0.86	Mitigation under review
PLCRVLB3 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLB3 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.10	1.06	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
PLCRVLB3 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
PLCRVLB3 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
PLCRVLB3 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT1 115	Base Case	P0	N-0	1.06	1.03	1.03	1.10	1.07	1.06	1.03	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT1 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.07	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT1 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.04	1.04	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.03	1.03	1.03	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.08	1.03	1.03	1.11	1.07	1.08	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.07	1.03	1.02	1.11	1.07	1.07	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.07	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.01	1.00	1.11	1.06	1.06	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLCRVLT1 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.04	1.04	1.11	1.07	1.08	1.04	1.02	1.03	1.03	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	1.04	0.96	0.96	1.09	1.06	1.04	0.95	0.92	0.97	0.95	Mitigation under review
PLCRVLT1 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.07	1.03	1.02	1.11	1.07	1.07	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-1:A5:39:_EL DORADO-MISSOURI FLAT #1 115KV [1530] (ELDORAD-APLHTAP1)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
PLCRVLT1 115	P2-1:A5:47:_EL DORADO-MISSOURI FLAT #1 115KV [1530] (APLHTAP1-PLCRVLT1)	P2-1	Line Section w/o fault	1.06	1.04	1.04	1.11	1.07	1.06	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
PLCRVLT1 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
PLCRVLT1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.01	1.00	1.11	1.06	1.06	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLT1 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
PLCRVLT2 115	Base Case	P0	N-0	1.05	1.02	1.01	1.10	1.06	1.05	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
PLCRVLT2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLT2 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	1.02	1.10	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.00	1.00	1.11	1.06	1.05	1.00	0.99	1.01	0.99	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLCRVLT2 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	1.00	0.98	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.11	1.06	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.10	1.06	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.02	1.02	1.10	1.07	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	0.99	0.86	0.86	1.08	1.04	0.99	0.84	0.80	0.89	0.86	Mitigation under review
PLCRVLT2 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.11	1.07	1.05	1.01	1.00	1.01	1.00	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.05	1.01	1.01	1.10	1.06	1.05	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
PLCRVLT2 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.10	1.06	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
PLCRVLT2 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
PLCRVLT2 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
PLCRVLT2 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
PLFLDJCT 60	Base Case	P0	N-0	1.03	0.92	0.91	1.09	1.07	1.02	0.90	0.91	0.94	0.91	Load power factor correction or voltage support if needed
PLFLDJCT 60	P1-2:A11:55:_GWFTRACY-SCHULTE #1 115KV [0]	P1	N-1	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P1-2:A4:41:_VACA-SUISUN 115KV [4070]	P1	N-1	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P1-2:A5:11:_MIDDLE FORK-GOLD HILL 230KV [5140]	P1	N-1	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P1-2:A5:2:_POE-RIO OSO 230KV [5540]	P1	N-1	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.03	0.92	0.92	1.10	1.07	1.03	0.90	0.91	0.95	0.91	Load power factor correction or voltage support if needed
PLFLDJCT 60	P1-3:A4:18:_VACA-DIX 115/60KV TB 5	P1	N-1	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.90	Mitigation under review

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLFLDJCT 60	P1-3:A4:19:_VACA-DIX 115/60KV TB 9	P1	N-1	1.03	0.90	0.89	1.10	1.07	1.03	0.87	0.88	0.93	0.89	Mitigation under review
PLFLDJCT 60	P1-3:A4:7:_VACA-DIX 230/115KV TB 3	P1	N-1	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLFLDJCT 60	P1-3:A4:8:_VACA-DIX 230/115KV TB 4	P1	N-1	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLFLDJCT 60	P1-4:A4:4:_VACA-DIX SVD=V	P1	N-1	1.02	0.91	0.91	1.09	1.06	1.02	0.89	0.90	0.93	0.90	Mitigation under review
PLFLDJCT 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.03	0.92	0.91	1.10	1.07	1.02	0.90	0.91	0.94	0.91	Load power factor correction or voltage support if needed
PLFLDJCT 60	P2-2:A11:15:_TESLA E 230KV SECTION 2E	P2	Bus	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P2-2:A4:1:_VACA-DIX 230KV SECTION 1E	P2	Bus	1.02	0.90	0.89	1.09	1.06	1.02	0.88	0.89	0.92	0.89	Mitigation under review
PLFLDJCT 60	P2-2:A4:4:_VACA-DIX 230KV SECTION 1F	P2	Bus	1.01	0.91	0.90	1.09	1.06	1.01	0.89	0.90	0.93	0.90	Mitigation under review
PLFLDJCT 60	P2-2:A4:45:_VACA-DXN 60KV SECTION ME	P2	Bus	1.03	0.93	0.93	1.10	1.08	1.03	0.91	0.92	0.95	0.92	Load power factor correction or voltage support if needed
PLFLDJCT 60	P2-2:A4:46:_PLAINFLD 60KV SECTION 1E	P2	Bus	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.03	1.03	1.04	Mitigation under review
PLFLDJCT 60	P2-2:A4:47:_PLAINFLD 60KV SECTION 1D	P2	Bus	1.04	0.96	0.96	1.09	1.07	1.04	0.95	0.95	0.97	0.96	Mitigation under review
PLFLDJCT 60	P2-2:A4:5:_VACA-DIX 230KV SECTION 2F	P2	Bus	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.92	0.90	Mitigation under review
PLFLDJCT 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.04	0.93	0.93	1.11	1.07	1.04	0.91	0.91	0.96	0.92	Load power factor correction or voltage support if needed
PLFLDJCT 60	P2-2:A5:7:_GOLDHILL 230KV SECTION 2D	P2	Bus	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P2-3:A11:30:_SCHULTE 115KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P2-3:A11:6:_TESLA E - 2E 230KV & STAGG-TESLA LINE	P2	Non-bus-tie breaker	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P2-3:A4:1:_LAMBIE 230KV - MIDDLE BREAKER BAY 1	P2	Non-bus-tie breaker	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.90	Mitigation under review
PLFLDJCT 60	P2-3:A4:28:_VACA-DIX 115KV - MIDDLE BREAKER BAY 7	P2	Non-bus-tie breaker	1.02	0.91	0.90	1.09	1.07	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLFLDJCT 60	P2-3:A4:29:_VACA-DIX 115KV - MIDDLE BREAKER BAY 8	P2	Non-bus-tie breaker	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.90	Mitigation under review
PLFLDJCT 60	P2-3:A4:3:_BDLSWSTA 230KV - MIDDLE BREAKER BAY 4	P2	Non-bus-tie breaker	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.93	0.91	Mitigation under review
PLFLDJCT 60	P2-3:A4:32:_VACA-DIX 115KV - MIDDLE BREAKER BAY 6	P2	Non-bus-tie breaker	1.02	0.91	0.90	1.09	1.06	1.02	0.88	0.89	0.93	0.90	Mitigation under review
PLFLDJCT 60	P2-3:A4:33:_VACA-DIX 115KV - MIDDLE BREAKER BAY 4	P2	Non-bus-tie breaker	1.03	0.89	0.89	1.09	1.07	1.03	0.87	0.88	0.93	0.88	Mitigation under review
PLFLDJCT 60	P2-3:A4:46:_VACA-DXN - ME 60KV & DIXON-VACA #2 LINE	P2	Non-bus-tie breaker	1.03	0.93	0.93	1.10	1.08	1.03	0.91	0.92	0.95	0.92	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLFLDJCT 60	P2-3:A4:47:_VACA-DXN - ME 60KV & VACA-DXN-TRVS_HPT LINE	P2	Non-bus-tie breaker	1.03	0.93	0.93	1.10	1.08	1.03	0.91	0.92	0.95	0.92	Load power factor correction or voltage support if needed
PLFLDJCT 60	P2-3:A4:6:_BDLSWSTA 230KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.92	0.91	Mitigation under review
PLFLDJCT 60	P2-3:A5:5:_GOLDHILL - 2D 230KV & MIDDLE FORK-GOLD HILL LINE	P2	Non-bus-tie breaker	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P2-3:A5:6:_MIDLFORK - 1D 230KV & MIDDLE FORK-GOLD HILL LINE	P2	Non-bus-tie breaker	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P2-3:A5:89:_RIO OSO 230KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker		0.91	0.91		1.07		0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P2-4:A11:2:_BELLOTA 230KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.92	0.90	Substation upgrade
PLFLDJCT 60	P2-4:A4:1:_VACA-DIX 230KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.00	0.89	0.88	1.09	1.05	1.00	0.86	0.87	0.91	0.88	Substation upgrade
PLFLDJCT 60	P2-4:A4:2:_VACA-DIX 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.02	0.90	0.89	1.09	1.06	1.02	0.87	0.88	0.92	0.89	Substation upgrade
PLFLDJCT 60	P2-4:A4:21:_PLAINFLD 60KV - SECTION 1E & 1D	P2	Bus-tie breaker	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.03	1.03	1.04	Substation upgrade
PLFLDJCT 60	P2-4:A4:3:_VACA-DIX 230KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.01	0.89	0.89	1.09	1.06	1.01	0.87	0.88	0.91	0.88	Substation upgrade
PLFLDJCT 60	P2-4:A4:4:_VACA-DIX 230KV - SECTION 2F & 2E	P2	Bus-tie breaker	1.02	0.90	0.90	1.09	1.07	1.02	0.88	0.89	0.92	0.89	Substation upgrade
PLFLDJCT 60	P2-1:A11:49:_GWFTRACY-SCHULTE 115KV [0] NO FAULT	P2-1	Line Section w/o fault	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P2-1:A4:54:_VACA-PLAINFIELD 60KV [8200] (PLFLDJCT-PLAINFLD)	P2-1	Line Section w/o fault	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.03	1.03	1.04	Mitigation under review
PLFLDJCT 60	P2-1:A5:3:_MIDDLE FORK-GOLD HILL 230KV [5140] (GOLDHILL-RALSTON)	P2-1	Line Section w/o fault	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P1-1:A4:7:_SOLANO 34.50KV GEN UNIT 1 P1-2:A11:55:_GWFTRACY-SCHULTE #1 115KV [0]	P3	G-1/N-1								0.90			Mitigation under review
PLFLDJCT 60	P5-5:A11:1:_SCHULTE 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P55	Non-Redundant	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Protection upgrade
PLFLDJCT 60	P5-5:A4:2:_Lambie 230 kV BAAH Bus #2 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Protection upgrade
PLFLDJCT 60	P5-5:A4:3:_Bird's Landing Sw. Sta. 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.93	0.91	Protection upgrade
PLFLDJCT 60	P5-5:A4:4:_Bird's Landing Sw. Sta. 230 kV BAAH Bus #2 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.92	0.91	Protection upgrade
PLFLDJCT 60	P1-3:A4:19:_VACA-DIX 115/60KV TB 9 P1-3:A4:7:_VACA-DIX 230/115KV TB 3	P6	N-1/N-1		0.88	0.88				0.85	0.87		0.87	Mitigation under review
PLFLDJCT 60	P1-3:A4:19:_VACA-DIX 115/60KV TB 9 P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
PLFLDJCT 60	P7-1:A11:28:_TESLA-NEWARK #1 230KV [5720] & TESLA-RAVENSWOOD 230KV [5730]	P7	DCTL	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.93	0.91	Mitigation under review
PLFLDJCT 60	P7-1:A12:2:_MELONES-WILSON 230KV [5080] & COTTLE-MELONES 230KV [4530]	P7	DCTL	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review



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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLFLDJCT 60	P7-1:A4:12_ Lambie Sw Sta-Birds Landing Sw Sta 230 kV Line & Peabody-Birds Landing Sw Sta 230 kV Line	P7	DCTL	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.93	0.91	Mitigation under review
PLFLDJCT 60	P7-1:A4:26:_VACA-SUISUN & VACA-SUISUN-JAMESON	P7	DCTL	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P7-1:A5:4_ Poe-Rio Oso 230 kV Line & Cresta-Rio Oso 230 kV Line	P7	DCTL	1.02	0.91	0.91	1.09	1.07	1.02	0.89	0.90	0.93	0.91	Mitigation under review
PLFLDJCT 60	P7-1:A5:6_ Table Mountain-Rio Oso 230 kV Line & Palermo-Colgate 230 kV Line	P7	DCTL	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLFLDJCT 60	P7-1:A5:8_ Middle Fork-Gold Hill 230 kV Line & Placer-Gold Hill No. 1 115 kV Line	P7	DCTL	1.02	0.92	0.91	1.09	1.07	1.02	0.89	0.90	0.94	0.91	Mitigation under review
PLSNT GR 115	Base Case	P0	N-0	1.03	1.00	1.00	1.08	1.04	1.03	1.00	1.00	1.00	0.99	Load power factor correction or voltage support if needed
PLSNT GR 115	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.94	0.95	1.10	1.02	1.02	0.95	0.93	0.99	0.92	Load power factor correction or voltage support if needed
PLSNT GR 115	P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590] P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330]	P6	N-1/N-1		0.94	0.95	1.10			0.95	0.93		0.95	Load power factor correction or voltage support if needed
PLUMAS 60	P1-2:A5:63:_NICOLAUS-MARYSVILLE 60KV [7690] P1-3:A5:31:_ PEAS RG 60/60KV TB 1	P6	N-1/N-1									0.77		Mitigation under review
PNE GRVE 60	P1-2:A11:12:_ VALLEY SPRINGS-BELLOTA 230KV [5860] P1-2:A11:9:_ TIGER CREEK-VALLEY SPRINGS 230KV [5790]	P6	N-1/N-1					0.89						Mitigation under review
POST 115	Base Case	P0	N-0	1.03	1.04	1.03	1.05	1.03	1.03	1.03	1.04	1.05	1.03	Load power factor correction or voltage support if needed
POST 115	P2-2:A4:23:_W.SCRMNO 115KV SECTION 1F	P2	Bus	1.00	0.98	0.98	1.06	1.03	1.00	0.98	0.98	1.01	0.98	Mitigation under review
POST 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.01	0.96	1.01	1.09	1.02	1.04	1.00	1.00	1.02	1.00	Mitigation under review
POST 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.01	0.96	1.01	1.09	1.02	1.04	1.00	1.00	1.02	1.00	Mitigation under review
POST 115	P7-1:A4:17_ Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	1.02	0.97	0.97	1.05	1.02	1.02	1.01	1.01	1.03	1.01	Mitigation under review
PRDEJCT 60	Base Case	P0	N-0	1.04	1.05	1.05	1.04	1.04	1.04	1.05	1.05	1.06	1.05	Mitigation under review
PUTH CRK 115	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
PUTH CRK 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	1.04	1.10	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
PUTH CRK 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
PUTH CRK 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	1.05	1.10	1.08	1.08	1.05	1.04	1.05	1.05	Load power factor correction or voltage support if needed



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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PUTH CRK 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
PUTHCRK1 115	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
PUTHCRK1 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	1.04	1.10	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
PUTHCRK1 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
PUTHCRK1 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	1.05	1.10	1.08	1.08	1.05	1.04	1.05	1.05	Load power factor correction or voltage support if needed
PUTHCRK1 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
Q653F 115	Base Case	P0	N-0	1.02	1.02	1.01	1.06	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
Q653F 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	1.02	1.10	1.04	1.03	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
Q653F 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.00	0.96	1.00	1.09	1.03	1.02	0.99	0.99	1.01	0.99	Mitigation under review
Q653F 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.00	0.96	1.00	1.09	1.02	1.02	0.99	0.99	1.01	0.99	Mitigation under review
Q653F 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.02	1.02	1.10	1.04	1.04	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
Q653F 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.01	1.00	1.11	1.04	1.03	1.00	1.00	1.02	0.99	Load power factor correction or voltage support if needed
Q653F 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
Q653FJCT 115	Base Case	P0	N-0	1.02	1.02	1.01	1.06	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
Q653FJCT 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	1.02	1.10	1.04	1.03	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
Q653FJCT 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.00	0.96	1.00	1.09	1.03	1.02	0.99	0.99	1.01	0.99	Mitigation under review
Q653FJCT 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.00	0.96	1.00	1.09	1.02	1.02	0.99	0.99	1.01	0.99	Mitigation under review
Q653FJCT 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.02	1.02	1.10	1.04	1.04	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
Q653FJCT 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.01	1.00	1.11	1.04	1.03	1.00	1.00	1.02	0.99	Load power factor correction or voltage support if needed
Q653FJCT 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
R.TRACK 115	Base Case	P0	N-0	1.04	1.02	1.02	1.06	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
R.TRACK 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.65	0.66	1.05	1.04	0.93	0.63	0.64	0.95	0.62	Mitigation under review
R.TRACK 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.99	0.87	0.88			0.99			0.97	0.88	Mitigation under review
RALSTON 230	Base Case	P0	N-0	1.03	1.01	1.01	1.05	1.04	1.03	1.00	1.00	0.98	1.00	Load power factor correction or voltage support if needed
RCTRK J. 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.68	0.68	1.04	1.03	0.94	0.65	0.66	0.97	0.64	Mitigation under review
RCTRK J. 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1		0.90	0.90							0.90	Mitigation under review
RICE 60	Base Case	P0	N-0	1.00	1.00	0.99	1.02	1.06	1.00	0.98	0.98	1.01	0.98	Mitigation under review
RIO OSO 115	Base Case	P0	N-0	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.05	1.04	1.04	1.10	1.04	1.05	1.03	1.04	1.04	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.04	1.05	1.05	1.11	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
RIO OSO 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P2-3:A4:17:_WOODLD - 1F 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.04	1.04	1.05	1.11	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
RIO OSO 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.04	1.04	1.05	1.10	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
RIO OSO 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.04	1.04	Load power factor correction or voltage support if needed

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
RIO OSO 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.04	1.04	1.11	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.04	1.03	1.11	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
RIO OSO 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.04	1.05	1.05	1.11	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
RIO OSO 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.05	1.04	1.04	1.11	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.05	1.05	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
RIO OSO 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
RIO OSO 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	1.04	1.03	1.11	1.04	1.04	1.03	1.03	1.04	1.02	Load power factor correction or voltage support if needed
RIO OSO 115	P7-1:A5:11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 kV Line	P7	DCTL	1.05	1.04	1.04	1.11	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
RIO OSO 230	Base Case	P0	N-0	1.00	0.97	0.97	1.05	1.02	1.00	0.96	0.96	0.97	0.96	Load power factor correction or voltage support if needed
RIO OSO 230	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.92	0.92	1.07	1.01	1.00	0.91	0.91	0.94	0.91	Substation upgrade
RIO OSO 230	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.00	0.92	0.92	1.07	1.01	1.00	0.91	0.91	0.94	0.91	Mitigation under review
RIPON 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.99	0.85	0.85	1.04	1.02	0.98	0.83	0.84	0.98	0.83	Mitigation under review
RIPON 115	P1-2:A11:104:_MANTECA-RIPON 115KV [0] P1-2:A11:61:_BELLOTA-RIVERBANK-MELONES SW STA 115KV [1070]	P6	N-1/N-1			0.90				0.87			0.86	Mitigation under review
RIVRBKJT 115	P2-3:A11:92:_MANTECA 115KV - RING R4 & R5	P2	Non-bus-tie breaker	1.04	0.96	0.95	1.05	1.01	1.04	0.94	0.96	0.98	0.94	Mitigation under review

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
RIVRBKJT 115	P2-3:A11:98:_MANTECA 115KV - RING R6 & R5	P2	Non-bus-tie breaker	1.04	0.96	0.94	1.05	1.01	1.04	0.94	0.95	0.98	0.93	Mitigation under review
RIVRBKJT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.98	0.79	0.79	1.05	1.02	0.97	0.77	0.78	0.97	0.77	Mitigation under review
RIVRBKJT 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.01	0.98	0.97	1.04	1.02	1.00	0.94	0.96	0.00	0.94	Mitigation under review
RIVRBKJT 115	P1-2:A11:104:_MANTECA-RIPON 115KV [0] P1-2:A11:61:_BELLOTA-RIVERBANK-MELONES SW STA 115KV [1070]	P6	N-1/N-1										0.89	Mitigation under review
ROCKLIN 60	Base Case	P0	N-0	1.09	0.99	0.98	1.11	1.06	1.09	0.98	0.98	1.00	0.98	Load power factor correction or voltage support if needed
ROCKLIN 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.09	0.97	0.97	1.12	1.06	1.09	0.96	0.96	0.98	0.96	Load power factor correction or voltage support if needed
ROCKLIN 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.09	0.97	0.96	1.12	1.06	1.09	0.95	0.95	0.98	0.95	Load power factor correction or voltage support if needed
ROCKLIN 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.09	0.97	0.96	1.12	1.06	1.09	0.95	0.95	0.98	0.95	Load power factor correction or voltage support if needed
ROCKLIN 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.09	0.95	0.95	1.12	1.05	1.09	0.94	0.94	0.97	0.93	Load power factor correction or voltage support if needed
ROCKLIN 60	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P3	G-1/N-1				1.12							Load power factor correction or voltage support if needed
ROCKLIN 60	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.08	0.91	0.91	1.14	1.04	1.08	0.91	0.89	0.98	0.88	Load power factor correction or voltage support if needed
ROCKLIN 60	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330] P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590]	P6	N-1/N-1		0.92		1.14				0.90			Load power factor correction or voltage support if needed
ROCKLIN 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.09	0.95	0.95	1.12	1.06	1.09	0.94	0.94	0.97	0.94	Load power factor correction or voltage support if needed
ROCKLIN 60	P7-1:A5:7 _Atlantic-Gold Hill 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	1.09	0.96	0.96	1.12	1.06	1.09	0.96	0.95	0.99	0.94	Load power factor correction or voltage support if needed
RPN JNCN 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.99	0.88	0.87	1.05	1.02	0.99	0.86	0.87	0.98	0.86	Mitigation under review
RPN JNCN 115	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1							0.90	0.91			Mitigation under review
RPNJN2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker		0.83	0.83		1.02		0.81	0.82	0.98	0.81	Mitigation under review
RPNJN2 115	P1-2:A11:104:_MANTECA-RIPON 115KV [0] P1-2:A11:61:_BELLOTA-RIVERBANK-MELONES SW STA 115KV [1070]	P6	N-1/N-1							0.88			0.87	Mitigation under review
RVRBANK 115	P2-4:A11:12:_BELLOTA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.00	0.99	0.98	1.05	1.05	1.00	0.97	0.98	1.01	0.96	Substation upgrade
RVRBANK 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.84	0.35	0.35	1.04	1.03	0.83	0.32	0.33	0.88	0.33	Mitigation under review

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
RVRBANK 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.92	0.74	0.76			0.92			0.91	0.76	Mitigation under review
RVRBK J1 115	P2-4:A11:12:_BELLOTA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.00	0.99	0.98	1.05	1.05	1.00	0.97	0.98	1.01	0.96	Substation upgrade
RVRBK J1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.33	0.34	1.04	1.02	0.82	0.31	0.32	0.87	0.32	Mitigation under review
RVRBK J1 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.92	0.73	0.75			0.92			0.91	0.76	Mitigation under review
RVRBK J2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.86	0.86	1.05	1.03	1.00	0.85	0.85	0.99	0.84	Substation upgrade
RVRBK TP 115	P2-4:A11:12:_BELLOTA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.01	0.99	0.99	1.05	1.05	1.01	0.98	0.99	1.01	0.97	Substation upgrade
RVRBK TP 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.85	0.37	0.38	1.04	1.03	0.84	0.35	0.36	0.89	0.36	Mitigation under review
RVRBK TP 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.93	0.76	0.78			0.93			0.92	0.78	Mitigation under review
SAFEWAY 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
SALADO 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.05	1.04	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
SALADO 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	1.00	0.98	1.05	1.06	1.02	0.95	0.97	0.00	0.91	Substation upgrade
SALADO J 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
SALADO J 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	1.00	0.98	1.05	1.06	1.02	0.95	0.97	0.00	0.91	Substation upgrade
SALDO TP 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
SALDO TP 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	0.98	1.05	1.06	1.02	0.95	0.97	0.00	0.91	Substation upgrade
SANDBAR 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.77	0.77	1.04	1.04	1.00	0.74	0.75	1.01	0.73	Mitigation under review
SCHMLBCH 115	Base Case	P0	N-0	1.05	1.03	1.03	1.08	1.06	1.05	1.02	1.02	1.01	1.03	Load power factor correction or voltage support if needed
SCHMLBCH 115	P1-2:A4:41:_VACA-SUISUN 115KV [4070]	P1	N-1	1.02	0.98	0.98	1.07	1.04	1.02	0.98	0.97	0.99	0.98	Mitigation under review
SCHMLBCH 115	P2-3:A4:33:_VACA-DIX 115KV - MIDDLE BREAKER BAY 4	P2	Non-bus-tie breaker	1.02	0.98	0.98	1.07	1.04	1.02	0.97	0.97	0.99	0.98	Mitigation under review
SCHMLBCH 115	P2-1:A4:31:_VACA-SUISUN 115KV [4070] (WEC-SUISUN)	P2-1	Line Section w/o fault	1.02	0.98	0.98	1.07	1.04	1.02	0.98	0.97	0.99	0.98	Mitigation under review
SCHMLBCH 115	P7-1:A4:26:_VACA-SUISUN & VACA-SUISUN-JAMESON	P7	DCTL	1.02	0.98	0.98	1.07	1.04	1.02	0.98	0.97	0.99	0.98	Mitigation under review
SCHULTE 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
SFWY_TP1 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
SFWY_TP2 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SHPRING 115	Base Case	P0	N-0	1.06	1.02	1.02	1.10	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
SHPRING 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
SHPRING 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.01	1.02	1.01	Load power factor correction or voltage support if needed
SHPRING 115	P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P1	N-1	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
SHPRING 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SHPRING 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
SHPRING 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SHPRING 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SHPRING 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SHPRING 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.06	1.02	1.01	1.11	1.07	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
SHPRING 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
SHPRING 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.00	Load power factor correction or voltage support if needed
SHPRING 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
SHPRING 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
SHPRING 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	0.99	0.84	0.85	1.08	1.03	0.99	0.82	0.78	0.88	0.84	Mitigation under review
SHPRING 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
SHPRING 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
SHPRING 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.01	1.02	1.01	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SHPRING 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
SHPRING 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
SHPRING 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393] P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
SHPRING 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	0.99	0.99	1.11	1.06	1.05	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
SHPRING 115	P7-1:A5:18_El Dorado-Missouri Flat No. 2 115 kV Line & El Dorado-Missouri Flat No. 1 115 kV Line	P7	DCTL	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
SHPRING 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SHPRING1 115	Base Case	P0	N-0	1.06	1.03	1.03	1.10	1.07	1.06	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
SHPRING1 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
SHPRING1 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.07	1.04	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
SHPRING1 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.04	1.04	1.03	Load power factor correction or voltage support if needed
SHPRING1 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SHPRING1 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.03	1.04	1.03	Load power factor correction or voltage support if needed
SHPRING1 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
SHPRING1 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.04	1.04	1.03	Load power factor correction or voltage support if needed
SHPRING1 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SHPRING1 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.03	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SHPRING1 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
SHPRING1 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SHPRING1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.00	1.00	Load power factor correction or voltage support if needed
SHPRING1 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.04	1.04	1.11	1.07	1.08	1.04	1.02	1.03	1.04	Load power factor correction or voltage support if needed
SHPRING1 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	1.05	0.98	0.98	1.10	1.06	1.05	0.97	0.95	0.99	0.97	Mitigation under review
SHPRING1 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
SHPRING1 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK HIGGINS)	P2-1	Line Section w/o fault	1.06	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
SHPRING1 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.04	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
SHPRING1 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.11	1.07	1.06	1.03	1.02	1.02	1.02	Load power factor correction or voltage support if needed
SHPRING1 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
SHPRING1 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
SHPRING1 115	P7-1:A5:18_El Dorado-Missouri Flat No. 2 115 kV Line & El Dorado-Missouri Flat No. 1 115 kV Line	P7	DCTL	1.06	1.04	1.04	1.11	1.08	1.06	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
SHPRING1 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.04	1.04	1.11	1.07	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
SHPRING2 115	Base Case	P0	N-0	1.06	1.02	1.02	1.10	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
SHPRING2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
SHPRING2 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.01	1.02	1.01	Load power factor correction or voltage support if needed
SHPRING2 115	P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P1	N-1	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
SHPRING2 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SHPRING2 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.01	1.01	1.11	1.07	1.05	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
SHPRING2 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.02	1.11	1.07	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed

Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SHPRING2 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SHPRING2 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.07	1.06	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SHPRING2 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.02	1.01	1.11	1.07	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
SHPRING2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
SHPRING2 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
SHPRING2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	0.99	0.99	1.11	1.06	1.06	0.98	0.98	0.99	0.98	Load power factor correction or voltage support if needed
SHPRING2 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
SHPRING2 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	0.99	0.84	0.85	1.08	1.03	0.99	0.82	0.78	0.88	0.84	Mitigation under review
SHPRING2 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.07	1.06	1.01	1.00	1.01	1.01	Load power factor correction or voltage support if needed
SHPRING2 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.06	1.01	1.01	1.11	1.07	1.06	1.00	1.00	1.01	1.00	Load power factor correction or voltage support if needed
SHPRING2 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.02	1.01	1.02	1.02	Load power factor correction or voltage support if needed
SHPRING2 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
SHPRING2 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
SHPRING2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393] P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
SHPRING2 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	0.99	0.99	1.11	1.06	1.06	0.99	0.98	0.99	0.98	Load power factor correction or voltage support if needed
SHPRING2 115	P7-1:A5:18_El Dorado-Missouri Flat No. 2 115 kV Line & El Dorado-Missouri Flat No. 1 115 kV Line	P7	DCTL	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
SHPRING2 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SIERRAPI 60	Base Case	P0	N-0	1.10	0.97	0.97	1.12	1.06	1.10	0.97	0.96	0.99	0.96	Load power factor correction or voltage support if needed

Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SIERRAPI 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.10	0.95	0.95	1.12	1.05	1.10	0.94	0.94	0.97	0.94	Load power factor correction or voltage support if needed
SIERRAPI 60	P2-2:A5:10:_GOLDHILL 115KV SECTION 1F	P2	Bus	1.10	0.98	0.98	1.11	1.06	1.10	0.97	0.97	0.99	0.97	Load power factor correction or voltage support if needed
SIERRAPI 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.10	0.95	0.94	1.12	1.05	1.10	0.94	0.94	0.97	0.93	Load power factor correction or voltage support if needed
SIERRAPI 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.10	0.95	0.94	1.12	1.05	1.10	0.94	0.94	0.97	0.93	Load power factor correction or voltage support if needed
SIERRAPI 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.10	0.94	0.93	1.12	1.05	1.09	0.92	0.92	0.96	0.92	Load power factor correction or voltage support if needed
SIERRAPI 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.10	0.98	0.97	1.12	1.06	1.10	0.97	0.95	0.99	0.97	Load power factor correction or voltage support if needed
SIERRAPI 60	P2-4:A5:5:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.10	0.98	0.98	1.12	1.06	1.10	0.97	0.97	0.99	0.97	Load power factor correction or voltage support if needed
SIERRAPI 60	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P3	G-1/N-1				1.12							Load power factor correction or voltage support if needed
SIERRAPI 60	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.09	0.89	0.90	1.14	1.04	1.09	0.89	0.87	0.97	0.86	Load power factor correction or voltage support if needed
SIERRAPI 60	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330] P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590]	P6	N-1/N-1		0.90	0.91	1.14			0.90	0.88			Load power factor correction or voltage support if needed
SIERRAPI 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.10	0.94	0.93	1.13	1.05	1.09	0.92	0.92	0.96	0.92	Load power factor correction or voltage support if needed
SIERRAPI 60	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.10	0.98	0.98	1.12	1.06	1.10	0.97	0.97	0.99	0.97	Load power factor correction or voltage support if needed
SIERRAPI 60	P7-1:A5:7_Atlantic-Gold Hill 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	1.10	0.95	0.94	1.12	1.06	1.09	0.94	0.94	0.98	0.93	Load power factor correction or voltage support if needed
SMRTSVLE 60	Base Case	P0	N-0	1.02	1.02	1.02	1.06	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SMRTVLE1 60	Base Case	P0	N-0	1.02	1.02	1.02	1.06	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SMRTVLE 60	Base Case	P0	N-0	1.02	1.02	1.02	1.06	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SNDBR JT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.77	0.77	1.04	1.04	0.99	0.74	0.75	1.01	0.73	Mitigation under review
SOUTH BY 60	Base Case	P0	N-0	1.06	1.04	1.04	1.09	1.06	1.06	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SPAULDNG 60	Base Case	P0	N-0	1.03	1.04	1.04	1.05	1.04	1.04	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
SPAULDNG 60	P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P1	N-1	1.05	1.05	1.05	1.10	1.06	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
SPAULDNG 60	P2-2:A5:40:_SPAULDNG 60KV SECTION 1D	P2	Bus	1.05	1.05	1.05	1.10	1.06	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
SPAULDNG 60	P2-3:A5:61:_SPAULDNG - 1D 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.05	1.05	1.05	1.10	1.06	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
SPAULDNG 60	P2-3:A5:63:_DRUM - MA 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.05	1.05	1.05	1.10	1.06	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
SPAULDNG 60	P2-1:A5:100:_DRUM-SPAULDING 60KV [6770] (SPAULDNG-BOWMN TP)	P2-1	Line Section w/o fault	1.05	1.05	1.05	1.10	1.06	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
SPAULDNG 60	P1-1:A5:13:_SPAULDG 9.11KV GEN UNIT 1 P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
SPAULDNG 60	P1-1:A5:13:_SPAULDG 9.11KV GEN UNIT 1 P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
SPI JCT 115	Base Case	P0	N-0	1.04	1.02	1.02	1.09	1.04	1.04	1.01	1.02	1.02	1.01	Load power factor correction or voltage support if needed
SPI JCT 115	P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P1	N-1	1.05	1.04	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
SPI JCT 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.98	0.98	1.07	1.04	1.02	0.98	0.98	0.99	0.96	Substation upgrade
SPI JCT 115	P2-1:A5:26:_RIO OSO-LINCOLN 115KV [1320] (RIO OSO-SPI JCT)	P2-1	Line Section w/o fault	1.02	0.98	0.98	1.07	1.04	1.02	0.98	0.98	0.99	0.96	Mitigation under review
SPI JCT 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P3	G-1/N-1				1.10							Load power factor correction or voltage support if needed
SPI JCT 115	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.98	0.98	1.10	1.03	1.02	0.98	0.97	1.01	0.96	Load power factor correction or voltage support if needed
SPI JCT 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210] P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
SPICAMIN 115	Base Case	P0	N-0	1.06	1.02	1.02	1.10	1.06	1.06	1.02	1.02	1.01	1.02	Load power factor correction or voltage support if needed
SPICAMIN 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
SPICAMIN 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.03	1.02	1.10	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SPICAMIN 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.07	1.02	1.02	1.11	1.07	1.07	1.02	1.01	1.02	1.01	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.02	1.02	1.02	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.08	1.02	1.02	1.11	1.07	1.08	1.02	1.02	1.03	1.02	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.10	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.00	1.00	1.11	1.06	1.06	0.99	0.99	0.99	0.99	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.03	1.03	1.10	1.07	1.08	1.03	1.01	1.02	1.03	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-1:A5:12:_MISSOURI FLAT-GOLD HILL #2 115KV [2670] (GOLDHILL-SHPRING2)	P2-1	Line Section w/o fault	1.03	0.92	0.93	1.09	1.05	1.03	0.91	0.88	0.94	0.92	Mitigation under review
SPICAMIN 115	P2-1:A5:30:_DRUM-HIGGINS 115KV [4393] (DTCH FL1-CHCGO PK)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.11	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.10	1.07	1.06	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.03	1.03	1.10	1.07	1.06	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.10	1.07	1.06	1.02	1.01	1.01	1.02	Load power factor correction or voltage support if needed
SPICAMIN 115	P2-1:A5:39:_EL DORADO-MISSOURI FLAT #1 115KV [1530] (ELDORAD-APLHTAP1)	P2-1	Line Section w/o fault	1.07	1.02	1.02	1.11	1.07	1.07	1.02	1.02	1.02	1.02	Load power factor correction or voltage support if needed
SPICAMIN 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990] P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
SPICAMIN 115	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	1.00	1.00	1.11	1.06	1.06	0.99	0.99	0.99	0.99	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SPICAMIN 115	P7-1:A5:19_Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	1.07	1.03	1.03	1.11	1.07	1.07	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
SPI-LINC 115	Base Case	P0	N-0	1.04	1.02	1.02	1.09	1.04	1.04	1.01	1.02	1.02	1.01	Load power factor correction or voltage support if needed
SPI-LINC 115	P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P1	N-1	1.05	1.04	1.03	1.10	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
SPI-LINC 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.98	0.98	1.07	1.04	1.02	0.98	0.98	0.99	0.96	Substation upgrade
SPI-LINC 115	P2-1:A5:26:_RIO OSO-LINCOLN 115KV [1320] (RIO OSO-SPI JCT)	P2-1	Line Section w/o fault	1.02	0.98	0.98	1.07	1.04	1.02	0.98	0.98	0.99	0.96	Mitigation under review
SPI-LINC 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P3	G-1/N-1				1.10							Load power factor correction or voltage support if needed
SPI-LINC 115	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.98	0.98	1.10	1.03	1.02	0.98	0.97	1.01	0.96	Load power factor correction or voltage support if needed
SPI-LINC 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210] P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
SPISONORA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.69	0.69	1.04	1.03	0.94	0.66	0.67	0.97	0.65	Mitigation under review
SPISONORAJCT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.69	0.69	1.04	1.03	0.94	0.66	0.67	0.97	0.65	Mitigation under review
SPRNG GJ 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.99	0.77	0.77	1.04	1.04	0.99	0.74	0.75	1.01	0.72	Mitigation under review
SPRNG GP 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.77	0.77	1.04	1.04	0.99	0.74	0.75	1.01	0.73	Mitigation under review
STAGG 60	Base Case	P0	N-0	1.04	1.05	1.04	1.04	1.05	1.04	1.05	1.05	1.05	1.04	Mitigation under review
STAGG JT 60	Base Case	P0	N-0	1.04	1.05	1.04	1.04	1.05	1.04	1.05	1.05	1.05	1.04	Mitigation under review
STANISLS 115	Base Case	P0	N-0	1.04	1.03	1.03	1.05	1.04	1.04	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
STANISLS 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.98	0.76	0.76	1.05	1.04	0.97	0.74	0.75	0.99	0.73	Mitigation under review
STCKTNJB 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.30	0.31	1.03	1.02	0.82	0.28	0.28	0.86	0.29	Mitigation under review
STCKTNJB 115	P1-3:A11:11:_BELLOTA 230/115KV TB 2 P1-3:A11:10:_BELLOTA 230/115KV TB 1	P6	N-1/N-1	0.92	0.71	0.74			0.92			0.90	0.74	Mitigation under review
STKTON A 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.82	0.26	0.26	1.03	1.01	0.81	0.24	0.25	0.84	0.25	Mitigation under review
STKTON A 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.91	0.69	0.71			0.91			0.88	0.71	Mitigation under review
STKTON B 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.30	0.31	1.03	1.02	0.82	0.28	0.28	0.86	0.29	Mitigation under review
STKTON B 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.92	0.71	0.74			0.92			0.90	0.74	Mitigation under review
STN COGN 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.82	0.27	0.27	1.03	1.01	0.81	0.25	0.25	0.84	0.26	Mitigation under review
STN COGN 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.91	0.69	0.71			0.91			0.88	0.72	Mitigation under review
STNSLSRP 60	Base Case	P0	N-0	1.04	1.03	1.03	1.05	1.05	1.04	1.04	1.04	1.04	1.01	Mitigation under review

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SUISUN 115	Base Case	P0	N-0	1.05	1.03	1.03	1.08	1.06	1.05	1.02	1.02	1.01	1.03	Load power factor correction or voltage support if needed
SUISUN 115	P1-2:A4:41:_VACA-SUISUN 115KV [4070]	P1	N-1	1.02	0.98	0.98	1.06	1.04	1.02	0.97	0.97	0.99	0.98	Mitigation under review
SUISUN 115	P2-3:A4:33:_VACA-DIX 115KV - MIDDLE BREAKER BAY 4	P2	Non-bus-tie breaker	1.01	0.98	0.98	1.06	1.04	1.02	0.97	0.96	0.99	0.98	Mitigation under review
SUISUN 115	P2-1:A4:31:_VACA-SUISUN 115KV [4070] (WEC-SUISUN)	P2-1	Line Section w/o fault	1.01	0.98	0.98	1.06	1.04	1.02	0.97	0.97	0.99	0.98	Mitigation under review
SUISUN 115	P7-1:A4:26:_VACA-SUISUN & VACA-SUISUN-JAMESON	P7	DCTL	1.02	0.98	0.98	1.06	1.04	1.02	0.97	0.97	0.99	0.98	Mitigation under review
SUMMIT 60	Base Case	P0	N-0	1.02	1.05	1.04	1.08	1.06	1.02	1.05	1.05	1.05	1.04	Load power factor correction or voltage support if needed
SUMMIT 60	P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P1	N-1	1.03	1.05	1.05	1.10	1.06	1.03	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
SUMMIT 60	P2-2:A5:39:_SPAULDNG 60KV SECTION MA	P2	Bus	1.02	1.06	1.05	1.11	1.07	1.02	1.05	1.06	1.06	1.05	Load power factor correction or voltage support if needed
SUMMIT 60	P2-2:A5:40:_SPAULDNG 60KV SECTION 1D	P2	Bus	1.03	1.05	1.05	1.10	1.06	1.03	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
SUMMIT 60	P2-3:A5:61:_SPAULDNG - 1D 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.03	1.05	1.05	1.10	1.06	1.03	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
SUMMIT 60	P2-3:A5:63:_DRUM - MA 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.03	1.05	1.05	1.10	1.06	1.03	1.05	1.05	1.05	1.04	Load power factor correction or voltage support if needed
SUMMIT 60	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.02	1.06	1.05	1.10	1.06	1.02	1.05	1.06	1.06	1.05	Load power factor correction or voltage support if needed
SUMMIT 60	P2-1:A5:100:_DRUM-SPAULDING 60KV [6770] (SPAULDNG-BOWMN TP)	P2-1	Line Section w/o fault	1.03	1.05	1.05	1.10	1.06	1.03	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
SUMMIT 60	P2-1:A5:93:_SPAULDING-SUMMIT 60KV [8060] (TAMARACK-SUMMIT)	P2-1	Line Section w/o fault	1.03	1.06	1.06	1.11	1.08	1.03	1.06	1.06	1.06	1.06	Load power factor correction or voltage support if needed
SUMMIT 60	P2-1:A5:94:_SPAULDING-SUMMIT 60KV [8060] (CISCO GR-TAMARACK)	P2-1	Line Section w/o fault	1.02	1.06	1.05	1.11	1.08	1.02	1.06	1.06	1.06	1.05	Load power factor correction or voltage support if needed
SUMMIT 60	P2-1:A5:95:_SPAULDING-SUMMIT 60KV [8060] (CISCO GR-SPAULDNG)	P2-1	Line Section w/o fault	1.02	1.06	1.05	1.11	1.07	1.02	1.06	1.06	1.06	1.05	Load power factor correction or voltage support if needed
SUMMIT 60	P1-1:A5:13:_SPAULDG 9.11KV GEN UNIT 1 P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
SUMMIT 60	P1-2:A5:67:_DRUM-SPAULDING 60KV [6770] P1-3:A5:33:_SPAULDNG 60/9.11KV TB 1	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
TAMARACK 60	Base Case	P0	N-0	1.03	1.04	1.04	1.07	1.05	1.03	1.04	1.04	1.05	1.04	Load power factor correction or voltage support if needed
TAMARACK 60	P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P1	N-1	1.03	1.05	1.05	1.10	1.06	1.03	1.05	1.05	1.05	1.05	Mitigation under review
TAMARACK 60	P2-2:A5:39:_SPAULDNG 60KV SECTION MA	P2	Bus	1.02	1.05	1.05	1.11	1.07	1.02	1.05	1.06	1.06	1.05	Load power factor correction or voltage support if needed
TAMARACK 60	P2-3:A5:61:_SPAULDNG - 1D 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.03	1.05	1.05	1.10	1.06	1.03	1.05	1.05	1.05	1.05	Mitigation under review
TAMARACK 60	P2-3:A5:63:_DRUM - MA 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.03	1.05	1.05	1.10	1.06	1.03	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
TAMARACK 60	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.03	1.06	1.05	1.10	1.05	1.03	1.05	1.06	1.06	1.04	Load power factor correction or voltage support if needed
TAMARACK 60	P2-1:A5:94:_SPAULDING-SUMMIT 60KV [8060] (CISCO GR-TAMARACK)	P2-1	Line Section w/o fault	1.02	1.06	1.05	1.11	1.08	1.02	1.06	1.06	1.06	1.05	Load power factor correction or voltage support if needed
TAMARACK 60	P2-1:A5:95:_SPAULDING-SUMMIT 60KV [8060] (CISCO GR-SPAULDNG)	P2-1	Line Section w/o fault	1.02	1.06	1.05	1.11	1.07	1.02	1.05	1.06	1.06	1.05	Load power factor correction or voltage support if needed
TAMARACK 60	P1-1:A5:13:_SPAULDG 9.11KV GEN UNIT 1 P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
TAMARACK 60	P1-1:A5:13:_SPAULDG 9.11KV GEN UNIT 1 P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
TAYLOR 60	Base Case	P0	N-0	1.09	0.99	0.99	1.11	1.06	1.09	0.98	0.98	1.00	0.98	Load power factor correction or voltage support if needed
TAYLOR 60	P1-2:A11:7:_LOCKFORD-BELLOTA 230KV [4990]	P1	N-1	1.09	0.97	0.97	1.12	1.06	1.09	0.96	0.96	0.98	0.96	Load power factor correction or voltage support if needed
TAYLOR 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.09	0.97	0.96	1.12	1.06	1.09	0.96	0.96	0.98	0.95	Load power factor correction or voltage support if needed
TAYLOR 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.09	0.97	0.96	1.12	1.06	1.09	0.95	0.95	0.98	0.95	Load power factor correction or voltage support if needed
TAYLOR 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.08	0.95	0.95	1.12	1.06	1.08	0.94	0.94	0.97	0.94	Load power factor correction or voltage support if needed
TAYLOR 60	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A11:7:_LOCKFORD-BELLOTA 230KV [4990]	P3	G-1/N-1				1.12							Load power factor correction or voltage support if needed
TAYLOR 60	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.08	0.91	0.91	1.14	1.04	1.08	0.91	0.89	0.98	0.88	Load power factor correction or voltage support if needed
TAYLOR 60	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330] P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590]	P6	N-1/N-1		0.92		1.14				0.90			Load power factor correction or voltage support if needed



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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
TAYLOR 60	P7-1:A11:12:_ BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.08	0.95	0.95	1.12	1.06	1.08	0.94	0.94	0.97	0.94	Load power factor correction or voltage support if needed
TAYLOR 60	P7-1:A5:7_ Atlantic-Gold Hill 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	1.08	0.96	0.96	1.12	1.06	1.08	0.96	0.96	0.99	0.94	Load power factor correction or voltage support if needed
TCHRT_T1 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
TCHRT_T1 115	P2-4:A11:9:_ TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	0.98	1.05	1.06	1.02	0.95	0.97	0.00	0.91	Mitigation under review
TCHRT_T2 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.02	1.03	1.02	1.02	Load power factor correction or voltage support if needed
TCHRT_T2 115	P2-4:A11:9:_ TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	0.98	1.05	1.05	1.01	0.95	0.97	0.00	0.93	Mitigation under review
TCHRTJCT 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
TCHRTJCT 115	P2-4:A11:9:_ TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	0.98	1.05	1.06	1.02	0.95	0.97	0.00	0.91	Mitigation under review
TEICHERT 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
TEICHERT 115	P2-4:A11:9:_ TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	0.98	1.05	1.06	1.02	0.95	0.97	0.00	0.91	Mitigation under review
TESLA 115	Base Case	P0	N-0	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
TH.E.DV. 115	Base Case	P0	N-0	1.04	1.03	1.03	1.05	1.04	1.04	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
TIGR CRK 230	Base Case	P0	N-0	1.04	1.01	1.01	1.05	1.03	1.04	1.01	1.01	1.00	1.01	Load power factor correction or voltage support if needed
TOSCO-PP 60	Base Case	P0	N-0	1.06	1.04	1.04	1.09	1.06	1.06	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
TRACY 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.02	0.96	0.96	1.05	1.03	1.02	0.95	0.95	1.00	0.95	Substation upgrade
TRACY 115	P1-2:A11:54:_ SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_ TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1		0.92	0.91				0.89	0.90		0.91	Mitigation under review
TRACY JC 115	Base Case	P0	N-0	1.03	1.02	1.01	1.05	1.03	1.03	1.01	1.01	1.01	1.01	Load power factor correction or voltage support if needed
TRACY JC 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.02	0.97	0.97	1.05	1.03	1.02	0.96	0.97	1.01	0.96	Substation upgrade
TRAVISJT 60	P1-2:A4:50:_ VACA-DXN-TRVS_HPT 60KV [0]	P1	N-1	1.07	1.05	1.05	1.09	1.08	1.07	1.05	1.04	1.04	1.05	Mitigation under review
TRAVISJT 60	P2-2:A4:49:_ DIXONPGE 60KV SECTION 1D	P2	Bus	1.07	1.05	1.05	1.09	1.08	1.07	1.05	1.04	1.04	1.05	Mitigation under review
TRAVISJT 60	P2-4:A4:22:_ DIXONPGE 60KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.07	1.05	1.05	1.09	1.08	1.07	1.05	1.04	1.04	1.05	Substation upgrade
TRAVISJT 60	P2-1:A4:62:_ TRAVIS TAP 60KV [6731] (TRAVIS-TRAVISJT)	P2-1	Line Section w/o fault	1.08	1.04	1.04	1.10	1.07	1.08	1.03	1.03	1.03	1.03	Mitigation under review

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
TRAVISJT 60	P1-4:A4:6:_VC DX11T SVD=V P1-2:A4:50:_VACA-DXN-TRVS_HPT 60KV [0]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
TULLOCH 115	Base Case	P0	N-0	1.04	1.03	1.03	1.05	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction or voltage support if needed
TULLOCH 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.89	0.55	0.56	1.04	1.04	0.88	0.53	0.54	0.93	0.53	Mitigation under review
TULLOCH 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.04	1.03	1.03	1.04	0.98	1.04	1.02	1.03	0.00	1.01	Mitigation under review
TULLOCH 115	P1-3:A11:10:_BELLOTA 230/115KV TB 1 P1-3:A11:11:_BELLOTA 230/115KV TB 2	P6	N-1/N-1	0.96	0.83	0.84			0.95			0.95	0.84	Mitigation under review
UCD_TP2 115	Base Case	P0	N-0	1.02	1.02	1.01	1.06	1.03	1.02	1.01	1.02	1.04	1.01	Load power factor correction or voltage support if needed
UCD_TP2 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	0.99	0.95	1.00	1.09	1.02	1.02	0.99	0.99	1.01	0.99	Mitigation under review
UCDAVSJ1 115	Base Case	P0	N-0	1.02	1.02	1.01	1.06	1.03	1.02	1.01	1.02	1.04	1.01	Load power factor correction or voltage support if needed
UCDAVSJ1 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	0.99	0.95	1.00	1.09	1.02	1.02	0.99	0.99	1.01	0.99	Mitigation under review
ULTRA JT 115	Base Case	P0	N-0	1.03	1.00	1.00	1.08	1.04	1.03	1.00	1.00	1.01	0.99	Load power factor correction or voltage support if needed
ULTRA JT 115	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.95	0.95	1.10	1.03	1.02	0.95	0.94	1.00	0.92	Load power factor correction or voltage support if needed
ULTRA JT 115	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330] P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590]	P6	N-1/N-1				1.10				0.94			Load power factor correction or voltage support if needed
ULTR-RCK 115	Base Case	P0	N-0	1.03	1.01	1.01	1.08	1.04	1.03	1.00	1.00	1.01	0.99	Load power factor correction or voltage support if needed
ULTR-RCK 115	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.95	0.96	1.10	1.03	1.02	0.95	0.94	1.00	0.92	Load power factor correction or voltage support if needed
ULTR-RCK 115	P1-2:A5:10:_ATLANTIC-GOLD HILL 230KV [4330] P1-2:A5:6:_RIO OSO-ATLANTIC 230KV [5590]	P6	N-1/N-1				1.10				0.94			Load power factor correction or voltage support if needed
VACA-CB 115	Base Case	P0	N-0	1.08	1.07	1.07	1.10	1.09	1.08	1.07	1.06	1.06	1.07	Load power factor correction or voltage support if needed
VACA-CB 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.09	1.07	1.07	1.11	1.09	1.09	1.07	1.06	1.06	1.07	Load power factor correction or voltage support if needed
VACA-CB 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.08	1.07	1.07	1.11	1.09	1.08	1.07	1.06	1.06	1.07	Load power factor correction or voltage support if needed
VACA-CB 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.10	1.08	1.08	1.12	1.09	1.10	1.07	1.07	1.07	1.08	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
VACA-CB 115	P1-3:A4:2: _VACA-DIX 500/230KV TB 12 P1-4:A4:6: _VC DX11T SVD=V	P6	N-1/N-1				1.12							Load power factor correction or voltage support if needed
VACA-D&1 115	Base Case	P0	N-0	1.05	1.03	1.03	1.08	1.06	1.05	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
VACA-DIX 115	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
VACA-DIX 115	P1-3:A4:1: _VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.05	1.05	1.10	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
VACA-DIX 115	P1-4:A4:6: _VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
VACA-DIX 115	P2-2:A4:7: _VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.06	1.05	1.10	1.08	1.08	1.05	1.04	1.05	1.05	Load power factor correction or voltage support if needed
VACA-DIX 115	P1-3:A4:2: _VACA-DIX 500/230KV TB 12 P1-4:A4:6: _VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
VACA-DXN 60	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.03	1.03	1.04	Load power factor correction or voltage support if needed
VACA-DXN 60	P1-3:A4:1: _VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	1.04	1.10	1.08	1.08	1.04	1.03	1.03	1.04	Load power factor correction or voltage support if needed
VACA-DXN 60	P1-4:A4:6: _VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.07	1.07	1.04	1.03	1.03	1.04	Load power factor correction or voltage support if needed
VACA-DXN 60	P2-2:A4:45: _VACA-DXN 60KV SECTION ME	P2	Bus	1.08	1.05	1.05	1.10	1.09	1.08	1.05	1.04	1.04	1.05	Load power factor correction or voltage support if needed
VACA-DXN 60	P2-2:A4:7: _VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.05	1.05	1.10	1.08	1.08	1.04	1.04	1.04	1.05	Load power factor correction or voltage support if needed
VACA-DXN 60	P2-3:A4:46: _VACA-DXN - ME 60KV & DIXON-VACA #2 LINE	P2	Non-bus-tie breaker	1.08	1.05	1.05	1.10	1.09	1.08	1.05	1.04	1.04	1.05	Load power factor correction or voltage support if needed
VACA-DXN 60	P2-3:A4:47: _VACA-DXN - ME 60KV & VACA-DXN-TRVS_HPT LINE	P2	Non-bus-tie breaker	1.08	1.05	1.05	1.10	1.09	1.08	1.05	1.04	1.04	1.05	Load power factor correction or voltage support if needed
VACA-DXN 60	P1-3:A4:19: _VACA-DIX 115/60KV TB 9 P1-3:A4:1: _VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
VACA-JT1 60	Base Case	P0	N-0	1.07	1.03	1.03	1.08	1.07	1.07	1.02	1.02	1.02	1.03	Load power factor correction or voltage support if needed
VACA-JT1 60	P2-1:A4:58: _DIXON-VACA #1 60KV [6730] (VACA-DXN-VACA-JT1)	P2-1	Line Section w/o fault	1.04	0.97	0.97	1.05	1.03	1.04	0.97	0.96	0.97	0.97	Mitigation under review
VACA-JT1 60	P1-3:A4:19: _VACA-DIX 115/60KV TB 9 P1-3:A4:1: _VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
VACA-JT2 60	Base Case	P0	N-0	1.07	1.03	1.03	1.09	1.07	1.07	1.03	1.02	1.03	1.03	Load power factor correction or voltage support if needed
VACA-JT2 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.08	1.03	1.03	1.10	1.07	1.08	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
VACA-JT2 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.03	1.03	1.10	1.07	1.07	1.03	1.02	1.03	1.03	Load power factor correction or voltage support if needed
VACA-JT2 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.04	1.04	1.10	1.07	1.08	1.04	1.03	1.04	1.04	Load power factor correction or voltage support if needed
VACA-JT2 60	P1-2:A4:50:_VACA-DXN-TRVS_HPT 60KV [0] P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
VACAVLL1 115	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.03	1.03	1.04	Load power factor correction or voltage support if needed
VACAVLL1 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	1.04	1.10	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
VACAVLL1 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.07	1.07	1.04	1.03	1.03	1.04	Load power factor correction or voltage support if needed
VACAVLL1 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	1.05	1.10	1.08	1.08	1.05	1.04	1.05	1.05	Load power factor correction or voltage support if needed
VACAVLL1 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
VACAVLL2 115	Base Case	P0	N-0	1.06	1.04	1.04	1.09	1.07	1.06	1.03	1.03	1.03	1.04	Load power factor correction or voltage support if needed
VACAVLL2 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	1.04	1.10	1.07	1.07	1.04	1.03	1.03	1.04	Load power factor correction or voltage support if needed
VACAVLL2 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	1.05	1.10	1.07	1.08	1.04	1.03	1.04	1.05	Load power factor correction or voltage support if needed
VACAVLL2 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
VALLY HM 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.98	0.80	0.80	1.05	1.02	0.98	0.78	0.79	0.97	0.78	Mitigation under review
VALLY HM 115	P1-2:A11:104:_MANTECA-RIPON 115KV [0] P1-2:A11:61:_BELLOTA-RIVERBANK-MELONES SW STA 115KV [1070]	P6	N-1/N-1							0.90			0.89	Mitigation under review
VCVLE1J 115	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
VCVLE1J 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	1.04	1.10	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
VCVLE1J 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
VCVLE1J 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	1.05	1.10	1.08	1.08	1.05	1.04	1.05	1.05	Load power factor correction or voltage support if needed
VCVLE1J 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
VCVLE2J 115	Base Case	P0	N-0	1.07	1.04	1.04	1.09	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
VCVLE2J 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	1.04	1.10	1.08	1.07	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
VCVLE2J 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	1.04	1.10	1.07	1.07	1.04	1.04	1.03	1.04	Load power factor correction or voltage support if needed
VCVLE2J 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	1.05	1.10	1.08	1.08	1.05	1.04	1.05	1.05	Load power factor correction or voltage support if needed
VCVLE2J 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
VICTOR 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.05	0.94	0.92	1.10	1.02	1.05	0.91	0.92	0.95	0.91	Mitigation under review
VICTOR 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.05	0.94	0.92	1.09	1.03	1.05	0.91	0.92	0.95	0.91	Mitigation under review
VICTOR 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.06	0.86	0.84	1.11	1.03	1.06	0.81	0.83	0.90	0.80	Load power factor correction or voltage support if needed
VICTOR 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.06	0.86	0.83	1.11	1.03	1.06	0.80	0.82	0.89	0.79	Load power factor correction or voltage support if needed
VICTOR 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.05	0.93	0.92	1.09	1.02	1.05	0.90	0.91	0.94	0.90	Substation upgrade
VICTOR 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.90	0.89	1.10	1.03	1.05	0.86	0.87	0.93	0.86	Substation upgrade
VICTOR 60	P2-1:A11:142:_LOCKEFORD-LODI #2 60KV [7440] (LOCKEFRD-VICTOR)	P2-1	Line Section w/o fault	1.07	0.99	0.98	1.08	1.00	1.07	0.98	0.98	0.99	0.98	Mitigation under review
VICTOR 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.86	0.89	1.11			0.87	0.88	0.89	0.83	Load power factor correction or voltage support if needed
VICTOR 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.90	0.89	1.10	1.03	1.06	0.86	0.88	0.93	0.86	Mitigation under review
VIERRA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.01	0.93	0.93	1.05	1.03	1.01	0.92	0.92	1.00	0.92	Substation upgrade
VIERRA 115	P1-2:A11:54:_SCHULTE SW STA-LAMMERS 115KV [3993] P1-2:A11:48:_TESLA-TRACY 115KV [4020] MOAS OPENED ON LEPRINO TRACY JC	P6	N-1/N-1							0.90	0.91		0.92	Mitigation under review
VLLY SPS 230	Base Case	P0	N-0	1.03	1.00	1.00	1.05	1.03	1.03	1.00	1.00	0.99	1.00	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
VLLY SPS 230	P1-2:A11:12:_ VALLEY SPRINGS-BELLOTA 230KV [5860] P1-2:A11:9:_ TIGER CREEK-VALLEY SPRINGS 230KV [5790]	P6	N-1/N-1					0.82						Mitigation under review
VLLY SPS 60	Base Case	P0	N-0	1.04	1.05	1.05	1.04	1.04	1.04	1.05	1.05	1.05	1.05	Mitigation under review
VLYHMT P1 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.98	0.80	0.80	1.05	1.02	0.98	0.78	0.79	0.97	0.78	Mitigation under review
VLYHMT P1 115	P1-2:A11:104:_ MANTECA-RIPON 115KV [0] P1-2:A11:61:_ BELLOTA-RIVERBANK-MELONES SW STA 115KV [1070]	P6	N-1/N-1							0.90			0.89	Mitigation under review
VLYHMT P2 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.87	0.87	1.05	1.03	1.00	0.85	0.86	0.99	0.85	Substation upgrade
VSLDSW87 60	Base Case	P0	N-0	1.04	1.05	1.05	1.04	1.05	1.05	1.05	1.05	1.06	1.05	Mitigation under review
W.SCRMNO 115	Base Case	P0	N-0	1.04	1.04	1.03	1.05	1.03	1.03	1.03	1.04	1.05	1.03	Load power factor correction or voltage support if needed
W.SCRMNO 115	P2-3:A4:19:_ BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.01	0.96	1.02	1.09	1.02	1.04	1.01	1.00	1.02	1.00	Mitigation under review
W.SCRMNO 115	P2-3:A4:20:_ BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.01	0.96	1.01	1.09	1.02	1.04	1.00	1.00	1.02	1.00	Mitigation under review
W.SCRMNO 115	P7-1:A4:17_ Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	1.03	0.98	0.97	1.05	1.02	1.02	1.01	1.02	1.04	1.01	Mitigation under review
WATRLJCT 60	P1-2:A11:7:_ LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.05	0.95	0.94	1.09	1.03	1.05	0.92	0.93	0.96	0.92	Mitigation under review
WATRLJCT 60	P2-2:A11:9:_ BELLOTA 230KV SECTION 2E	P2	Bus	1.05	0.95	0.94	1.09	1.03	1.05	0.92	0.93	0.96	0.92	Mitigation under review
WATRLJCT 60	P2-3:A11:81:_ LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.05	0.88	0.85	1.10	1.03	1.05	0.83	0.84	0.91	0.82	Load power factor correction or voltage support if needed
WATRLJCT 60	P2-3:A11:82:_ LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.05	0.87	0.85	1.10	1.03	1.05	0.81	0.84	0.91	0.81	Load power factor correction or voltage support if needed
WATRLJCT 60	P2-4:A11:1:_ BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.04	0.95	0.93	1.08	1.03	1.04	0.92	0.92	0.96	0.91	Substation upgrade
WATRLJCT 60	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.91	0.90	1.09	1.03	1.04	0.88	0.89	0.94	0.88	Substation upgrade
WATRLJCT 60	P1-3:A11:5:_ LOCKFORD 230/60KV TB 3 P1-2:A11:7:_ LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.87	0.90	1.10			0.88	0.89	0.90	0.84	Load power factor correction or voltage support if needed
WATRLJCT 60	P7-1:A11:12:_ BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	0.91	0.90	1.09	1.03	1.05	0.88	0.89	0.94	0.88	Mitigation under review
WDLND_BM 115	Base Case	P0	N-0	1.03	1.02	1.01	1.07	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WDLND_BM 115	P2-2:A4:26:_ DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	1.02	1.10	1.04	1.03	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WDLND_BM 115	P2-4:A4:11:_ DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.02	1.02	1.10	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WDLND_BM 115	P2-4:A4:12:_ DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.01	1.01	1.11	1.04	1.03	1.00	1.01	1.03	1.00	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
WDLND_BM 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WDLND_BM 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WDLND_BM 115	P1-3:A4:3:_BRIGHTON 230/115KV TB 10 P1-3:A4:4:_BRIGHTON 230/115KV TB 9	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
WEC 115	Base Case	P0	N-0	1.05	1.03	1.03	1.08	1.06	1.05	1.03	1.03	1.02	1.03	Load power factor correction or voltage support if needed
WEST JCT 60	Base Case	P0	N-0	1.03	1.03	1.03	1.05	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction or voltage support if needed
WEST PNT 60	Base Case	P0	N-0	1.04	1.04	1.04	1.05	1.03	1.04	1.04	1.04	1.05	1.04	Load power factor correction or voltage support if needed
WEST PNT 60	P1-2:A11:12:_VALLEY SPRINGS-BELLOTA 230KV [5860] P1-2:A11:9:_TIGER CREEK-VALLEY SPRINGS 230KV [5790]	P6	N-1/N-1					0.89						Mitigation under review
WEST SDE 60	Base Case	P0	N-0	1.05	1.03	1.03	1.09	1.05	1.06	1.04	1.03	1.03	1.03	Load power factor correction or voltage support if needed
WESTLEY 60	P2-3:A11:15:_KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA LINE	P2	Non-bus-tie breaker	0.91	0.91	0.90	0.99	0.99	0.91	0.89	0.90	0.95	0.89	Mitigation under review
WESTLEY 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.95	0.90	0.90	1.01	1.01	0.95	0.90	0.90	0.98	0.90	Mitigation under review
WESTLEY 60	P1-2:A11:36:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] P1-2:A11:45:_VIERRA-TRACY-KASSON 115KV [4310]	P6	N-1/N-1							0.89	0.90			Mitigation under review
WILKINS 60	P1-2:A4:44:_CORTINA #1 60KV [6580] P1-3:A4:6:_CORTINA 230/230KV TB 1	P6	N-1/N-1							0.89				Mitigation under review
WINERY J 60	Base Case	P0	N-0	1.06	1.02	1.01	1.06	1.02	1.06	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
WINERY J 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.07	0.92	0.90	1.11	1.01	1.07	0.89	0.90	0.94	0.89	Load power factor correction or voltage support if needed
WINERY J 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.07	0.92	0.90	1.11	1.01	1.07	0.89	0.90	0.93	0.88	Load power factor correction or voltage support if needed
WINERY J 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.07	0.84	0.81	1.13	1.01	1.07	0.79	0.80	0.88	0.78	Load power factor correction or voltage support if needed
WINERY J 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.07	0.84	0.81	1.13	1.01	1.07	0.77	0.80	0.87	0.77	Load power factor correction or voltage support if needed
WINERY J 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.07	0.91	0.90	1.11	1.01	1.07	0.88	0.89	0.92	0.88	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
WINERY J 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.07	0.88	0.86	1.11	1.01	1.07	0.84	0.85	0.91	0.84	Load power factor correction or voltage support if needed
WINERY J 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.84	0.87	1.13			0.85	0.86	0.87	0.81	Load power factor correction or voltage support if needed
WINERY J 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.07	0.88	0.86	1.11	1.01	1.07	0.84	0.85	0.91	0.84	Load power factor correction or voltage support if needed
WINTERS 60	Base Case	P0	N-0	1.05	1.00	1.00	1.09	1.07	1.05	0.99	0.99	1.00	1.00	Load power factor correction or voltage support if needed
WINTERS 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.06	1.00	1.00	1.10	1.07	1.06	0.99	0.99	1.01	1.00	Load power factor correction or voltage support if needed
WINTERS 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.05	1.00	1.00	1.10	1.07	1.05	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
WINTERS 60	P2-2:A4:45:_VACA-DXN 60KV SECTION ME	P2	Bus	1.06	1.01	1.01	1.10	1.08	1.06	1.00	1.00	1.01	1.01	Load power factor correction or voltage support if needed
WINTERS 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.07	1.01	1.01	1.10	1.07	1.06	1.00	0.99	1.01	1.01	Load power factor correction or voltage support if needed
WINTERS 60	P2-3:A4:46:_VACA-DXN - ME 60KV & DIXON-VACA #2 LINE	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.10	1.08	1.06	1.00	1.00	1.01	1.01	Load power factor correction or voltage support if needed
WINTERS 60	P2-3:A4:47:_VACA-DXN - ME 60KV & VACA-DXN-TRVS_HPT LINE	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.10	1.08	1.06	1.00	1.00	1.01	1.01	Load power factor correction or voltage support if needed
WINTERS 60	P1-3:A4:19:_VACA-DIX 115/60KV TB 9 P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
WLKSLJCT 60	P1-2:A4:44:_CORTINA #1 60KV [6580] P1-3:A4:6:_CORTINA 230/230KV TB 1	P6	N-1/N-1							0.89				Mitigation under review
WODBRG J 60	Base Case	P0	N-0	1.06	1.02	1.02	1.06	1.02	1.06	1.01	1.02	1.02	1.01	Load power factor correction or voltage support if needed
WODBRG J 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.07	0.92	0.91	1.11	1.01	1.07	0.89	0.90	0.94	0.89	Load power factor correction or voltage support if needed
WODBRG J 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.07	0.92	0.91	1.11	1.01	1.07	0.89	0.90	0.94	0.89	Load power factor correction or voltage support if needed
WODBRG J 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.07	0.85	0.82	1.13	1.02	1.07	0.80	0.81	0.88	0.78	Load power factor correction or voltage support if needed
WODBRG J 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.07	0.84	0.82	1.13	1.02	1.07	0.78	0.80	0.88	0.77	Load power factor correction or voltage support if needed
WODBRG J 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.07	0.92	0.90	1.11	1.01	1.07	0.89	0.90	0.93	0.88	Load power factor correction or voltage support if needed

Study Area: PG&E Central Valley



High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
WODBRG J 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.07	0.88	0.87	1.11	1.02	1.07	0.85	0.86	0.91	0.84	Load power factor correction or voltage support if needed
WODBRG J 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1		0.84	0.87	1.13			0.86	0.86	0.88	0.81	Load power factor correction or voltage support if needed
WODBRG J 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.07	0.88	0.87	1.11	1.02	1.07	0.85	0.86	0.92	0.85	Load power factor correction or voltage support if needed
WODLNDJ1 115	Base Case	P0	N-0	1.03	1.02	1.02	1.08	1.04	1.03	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
WODLNDJ1 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.04	1.02	1.02	1.11	1.04	1.04	1.01	1.02	1.03	1.02	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-2:A4:18:_WOODLD 115KV SECTION 1D	P2	Bus	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.01	1.02	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.04	1.03	1.03	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.01	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-3:A4:17:_WOODLD - 1F 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.01	0.99	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.01	1.02	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.03	1.02	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.04	1.04	1.03	1.11	1.04	1.04	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-4:A4:9:_WOODLD 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.05	1.05	1.05	1.10	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
WODLNDJ1 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.04	1.03	1.02	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
WODLNDJ1 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.04	1.02	1.02	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
WODLNDJ1 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
WODLNDJ1 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
WODLNDJ2 115	Base Case	P0	N-0	1.03	1.02	1.02	1.09	1.04	1.03	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
WODLNDJ2 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.03	1.02	1.01	1.11	1.04	1.03	1.01	1.02	1.03	1.02	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.04	1.04	1.04	1.11	1.04	1.04	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.01	1.02	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.04	1.03	1.02	1.11	1.04	1.04	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.04	1.04	1.04	1.11	1.04	1.04	1.03	1.05	1.05	1.04	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.01	0.99	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.02	1.02	1.11	1.04	1.03	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.01	1.02	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.03	1.02	1.11	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.04	1.04	1.04	1.11	1.04	1.04	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.03	1.02	1.02	1.11	1.04	1.03	1.01	1.03	1.03	1.02	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
WODLNDJ2 115	P2-1:A4:16:_RIO OSO-WOODLAND #2 115KV [3470] (WODLNDJ2-WOODLD)	P2-1	Line Section w/o fault	1.04	1.04	1.04	1.10	1.04	1.04	1.03	1.04	1.05	1.03	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	1.02	1.11	1.04	1.03	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
WODLNDJ2 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	1.02	1.10	1.04	1.03	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
WODLNDJ2 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
WODLNDJ2 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
WOODLANDTP 115	Base Case	P0	N-0	1.02	1.02	1.01	1.07	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WOODLANDTP 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	1.02	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WOODLANDTP 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.03	1.02	1.02	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WOODLANDTP 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.01	1.01	1.10	1.04	1.03	1.00	1.01	1.03	1.00	Load power factor correction or voltage support if needed
WOODLANDTP 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WOODLANDTP 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WOODLANDTP 115	P1-3:A4:3:_BRIGHTON 230/115KV TB 10 P1-3:A4:4:_BRIGHTON 230/115KV TB 9	P6	N-1/N-1				1.10							Load power factor correction or voltage support if needed
WOODLD 115	Base Case	P0	N-0	1.02	1.02	1.01	1.07	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WOODLD 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.03	1.01	1.00	1.11	1.04	1.03	1.00	1.01	1.02	1.01	Load power factor correction or voltage support if needed
WOODLD 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.02	1.00	1.00	1.10	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction or voltage support if needed
WOODLD 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	1.02	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WOODLD 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.02	1.00	0.99	1.10	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction or voltage support if needed
WOODLD 115	P2-3:A4:17:_WOODLD - 1F 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.02	1.00	1.00	1.10	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
WOODLD 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.01	1.01	1.11	1.04	1.03	1.00	1.02	1.02	1.01	Load power factor correction or voltage support if needed
WOODLD 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.03	1.02	1.02	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WOODLD 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.01	1.01	1.11	1.04	1.03	1.00	1.01	1.03	1.00	Load power factor correction or voltage support if needed
WOODLD 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.03	1.03	1.03	1.11	1.04	1.03	1.03	1.03	1.04	1.03	Load power factor correction or voltage support if needed
WOODLD 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.03	1.01	1.01	1.11	1.04	1.03	1.00	1.01	1.03	1.01	Load power factor correction or voltage support if needed
WOODLD 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WOODLD 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
WOODLD 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
WOODLD 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
WSID 60	P2-3:A11:15:_KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA LINE	P2	Non-bus-tie breaker	0.91	0.91	0.90	0.99	0.99	0.91	0.89	0.90	0.95	0.89	Mitigation under review
WSID 60	P2-3:A11:16:_KASSON - 1D 115KV & VIERRA-TRACY-KASSON LINE	P2	Non-bus-tie breaker	0.93	0.93	0.93	1.00	1.00	0.93	0.91	0.92	0.96	0.92	Mitigation under review
WSID 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.95	0.90	0.90	1.01	1.01	0.95	0.90	0.90	0.98	0.90	Mitigation under review
WSID 60	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	0.94	0.95	0.94	1.00	1.02	0.94	0.91	0.93	0.00	0.91	Mitigation under review
WSID 60	P1-2:A11:36:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] P1-2:A11:45:_VIERRA-TRACY-KASSON 115KV [4310]	P6	N-1/N-1							0.89	0.90			Mitigation under review
WSID TAP 60	P2-3:A11:15:_KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA LINE	P2	Non-bus-tie breaker	0.91	0.91	0.90	0.99	0.99	0.91	0.89	0.90	0.95	0.89	Mitigation under review
WSID TAP 60	P2-3:A11:16:_KASSON - 1D 115KV & VIERRA-TRACY-KASSON LINE	P2	Non-bus-tie breaker	0.93	0.93	0.93	1.00	1.00	0.93	0.91	0.92	0.96	0.92	Mitigation under review
WSID TAP 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.95	0.90	0.90	1.01	1.01	0.95	0.90	0.90	0.98	0.90	Mitigation under review
WSID TAP 60	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	0.94	0.95	0.94	1.00	1.02	0.94	0.91	0.93	0.00	0.91	Mitigation under review
WSID TAP 60	P1-2:A11:36:_SCHULTE SW STA-KASSON-MANTECA 115KV [7472] P1-2:A11:45:_VIERRA-TRACY-KASSON 115KV [4310]	P6	N-1/N-1							0.89	0.90			Mitigation under review
YBA CTYJ 60	P1-3:A5:31:_PEAS RG 60/60KV TB 1 P1-2:A5:57:_MRYSVLLE-PEASE 60KV [0]	P6	N-1/N-1										0.29	Mitigation under review

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
YBA CTYJ 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.04	1.01	1.01	1.01	1.01	1.04	1.01	1.01	0.78	0.00	Mitigation under review
YUBACITY 60	P1-2:A5:26:_PEASE-RIO OSO 115KV [3270] P1-2:A5:25:_ PALERMO-PEASE 115KV [3220]	P6	N-1/N-1									0.73		Mitigation under review
YUBACITY 60	P7-1:A5:20_Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	1.04	1.02	1.01	1.01	1.00	1.04	1.01	1.01	0.75	0.00	Mitigation under review
ZAMORA 115	Base Case	P0	N-0	1.02	1.02	1.02	1.09	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.02	1.01	1.01	1.11	1.04	1.02	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.03	1.04	1.03	1.11	1.04	1.03	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
ZAMORA 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.00	1.01	1.01	1.10	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	1.02	1.11	1.04	1.03	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
ZAMORA 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.03	1.03	1.11	1.04	1.03	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
ZAMORA 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.00	0.99	1.01	1.10	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.00	0.99	1.01	1.10	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.02	1.01	1.11	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.00	1.01	1.01	1.10	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.03	1.02	1.02	1.11	1.04	1.03	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.02	1.01	1.11	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.03	1.04	1.04	1.11	1.04	1.04	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
ZAMORA 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.11	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P2-1:A4:16:_RIO OSO-WOODLAND #2 115KV [3470] (WODLNDJ2-WOODLD)	P2-1	Line Section w/o fault	1.03	1.03	1.03	1.10	1.04	1.03	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
ZAMORA 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	1.02	1.11	1.04	1.03	1.02	1.03	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	1.02	1.11	1.03	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
ZAMORA 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.12							Load power factor correction or voltage support if needed
ZAMORA1 115	Base Case	P0	N-0	1.03	1.02	1.02	1.08	1.04	1.03	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
ZAMORA1 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.04	1.02	1.02	1.11	1.04	1.04	1.01	1.02	1.03	1.02	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-2:A4:18:_WOODLD 115KV SECTION 1D	P2	Bus	1.05	1.04	1.04	1.10	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.01	1.02	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.04	1.03	1.03	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.01	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-3:A4:17:_WOODLD - 1F 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.03	1.02	1.01	1.10	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.01	0.99	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.01	1.02	1.02	1.10	1.03	1.03	1.01	1.01	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.03	1.02	1.11	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.04	1.04	1.03	1.11	1.04	1.04	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed

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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
ZAMORA1 115	P2-4:A4:9:_WOODLD 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.05	1.05	1.05	1.10	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.04	1.02	1.02	1.11	1.04	1.04	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.04	1.03	1.02	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
ZAMORA1 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.04	1.02	1.02	1.10	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction or voltage support if needed
ZAMORA1 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
ZAMORA1 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.11							Load power factor correction or voltage support if needed
ZAMORA2 115	Base Case	P0	N-0	1.02	1.02	1.02	1.09	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA2 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.03	1.01	1.01	1.11	1.04	1.02	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.03	1.04	1.03	1.11	1.04	1.03	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.00	1.01	1.01	1.10	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	1.02	1.11	1.04	1.03	1.02	1.03	1.03	1.02	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.03	1.03	1.11	1.04	1.03	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.00	0.99	1.01	1.10	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.00	0.99	1.01	1.10	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.02	1.01	1.11	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.00	1.01	1.01	1.10	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.03	1.02	1.02	1.11	1.04	1.03	1.02	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.02	1.01	1.11	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed



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High/Low Voltage

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
ZAMORA2 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.04	1.04	1.04	1.11	1.04	1.04	1.04	1.04	1.04	1.04	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.03	1.02	1.01	1.11	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-1:A4:16:_RIO OSO-WOODLAND #2 115KV [3470] (WODLNDJ2-WOODLD)	P2-1	Line Section w/o fault	1.03	1.03	1.03	1.10	1.04	1.03	1.03	1.04	1.04	1.03	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	1.02	1.11	1.04	1.03	1.02	1.03	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA2 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	1.02	1.11	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction or voltage support if needed
ZAMORA2 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1 P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P3	G-1/N-1				1.11							Load power factor correction or voltage support if needed
ZAMORA2 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1				1.12							Load power factor correction or voltage support if needed

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Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage (PU)										Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
ALMENDRA 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	9.8	10.7	-5.0	0.5	-1.4	11.9	11.2	8.5	12.4	Pease 115/60 kV Transformer project
APLHTAP1 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	9.7	10.6	-5.0	0.5	-1.4	11.8	11.1	8.4	12.2	Under review: Existing operating procedure
DTCH FL2 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	9.5	10.4	-5.0	0.5	-1.4	11.5	10.9	8.3	12.0	Under review: Existing operating procedure
ELDORAD 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	9.9	10.8	-4.9	0.5	-1.4	12.0	11.3	8.6	12.4	Under review: Existing operating procedure
FORST HL 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	9.9	10.8	-4.9	0.5	-1.4	12.0	11.3	8.6	12.5	Under review: Existing operating procedure
HORSHE2 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	9.9	10.8	-4.9	0.5	-1.4	12.0	11.3	8.6	12.5	Under review: Existing operating procedure
KNTJALT 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	9.9	10.8	-5.0	0.5	-1.4	12.0	11.3	8.6	12.5	Pease 115/60 kV Transformer project
SHPRING 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	9.7	10.6	-5.0	0.5	-1.4	11.7	11.0	8.4	12.2	Under review: Existing operating procedure
SHPRING1 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	9.5	10.4	-5.0	0.5	-1.4	11.5	10.9	8.3	12.0	Under review: Existing operating procedure
SPAULDNG 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	9.9	10.8	-4.9	0.5	-1.4	12.0	11.3	8.6	12.5	Under review: Existing operating procedure
SUISUN 115	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	9.8	10.8	-4.9	0.5	-1.4	11.9	11.3	8.5	12.4	Vaca Dixon voltage conversion project. Scope under review

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions
			2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	Select..	Select..	Select..	Select..	Select..	
Colgate Generator 1 Trip	P1-1		0	0	0	0	0						No Violation
Tesla - Newark 230 kV Line Fault	P1-2		0	0	0	0	0						No Violation
Tesla 500/230 kV Transformer Fault	P1-3		0	0	0	0	0						No Violation
Atlantic SVD Fault	P1-4		0	1	1	0	1						Under review with PTO
Tesla 230 kV Bus Fault	P2-2		0	0	0	0	0						No Violation
Tesla 230 kV non-tie-breaker fault	P2-3		0	0	0	0	0						No Violation
Tesla 230 kV tie-breaker fault	P2-4		0	0	0	0	0						No Violation
Golgate out and GWFT Tracy Generator fault	P3-1		0	0	0	1	1						Under review with PTO
Golgate out and Tesla-Newark 230 kV line fault	P3-2		0	0	0	0	0						No Violation
Colgate out and Tesla 500/230 kV Transformer Fault	P3-3		0	0	0	0	0						No Violation
Colgate out and Atlantic SVD Fault	P3-4		0	1	1	1	1						Under review with PTO
USWP-RUS Generator fault plus stuck breaker	P4-1		0	0	0	0	0						No Violation
Bellota line fault plus stuck breaker	P4-2		0	0	0	0	0						No Violation
Vaca Dixon transformer fault plus stuck breaker	P4-3		0	0	0	0	0						No Violation
Atlantic SVD Fault plus stuck breaker	P4-4		0	1	1	0	1						Under review with PTO
Tesla 230 kV bus section fault plus stuck breaker	P4-5		0	0	0	1	1						Under review with PTO
Tesla 230 kV bus tie-breaker fault	P4-6		1	1	1	1	1						Under review with PTO
Solano generator fault plus relay failure	P5-1		0	0	0	0	0						No Violation
Bellota line fault plus relay failure	P5-2		0	0	0	0	0						No Violation
Vaca Dixon transformer fault plus relay failure	P5-3		0	0	0	0	0						No Violation
Atlantic SVD Fault plus relay failure	P5-4		0	1	1	0	1						Under review with PTO
Tesla transformer out and Tesla-ADCC 230 kV line fault	P6-1		1	1	1	1	1						Under review with PTO
Tesla transformer out and another Tesla transformer fault	P6-2		0	0	0	0	0						No Violation
Atlantic SVD out and Vaca Dixon SVD fault	P6-3		0	1	1	0	1						Under review with PTO
Pease-Palermo and Pease-Rio Oso 115 kV lines (DCTL)-Temporary fault	P7-1		1	1	1	1	1						Under review with PTO
Pease-Palermo and Pease-Rio Oso 115 kV lines (DCTL)-Permanent fault	P7-1		1	1	1	1	1						Under review with PTO
Stanislaus-Manteca and Stanislaus-Melones_Riverbank 115 kV lines (DCTL) - Temporary fault	P7-1		0	0	0	0	0						No Violation
Stanislaus-Manteca and Stanislaus-Melones_Riverbank 115 kV lines (DCTL) - Permanent fault	P7-1		1	1	1	1	1						Under review with PTO

Study Area: PG&E Central Valley



Single Contingency Load Drop

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

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

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



*Single Source Substation with more than 100 MW Load*

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
												Under review with PTO