

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	
Woodland - Davis 115 kV line (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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
	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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
	P1-2:A11:6:_BRIGHTON-BELOTA 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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
Woodland - Davis 115 kV line (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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
	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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
	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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
	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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
	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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
	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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
	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 project Project ISD: on-hold Review project scope
Brighton - Davis 115 kV line (31984 BRIGHTN 115 31993 BRKRJCT 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 project Project ISD: on-hold Review project scope
	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 project Project ISD: on-hold Review project scope

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				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	
Brighton - Davis 115 kV line (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 project Project ISD: on-hold Review project scope
	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 project Project ISD: on-hold Review project scope
Vaca - Plainfield 60 kV line (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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
Vaca - Plainfield 60 kV line (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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
Vaca - Plainfield 60 kV line (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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
Vaca 115/60 kV Transformer No. 5 (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 project 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 project 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 project 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 project Project ISD: on-hold Review project scope
Dixon-Vaca #2 60 kV (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	Project: Vaca-Dixon voltage conversion project Project ISD: on-hold Review project scope
Pease - Rio Oso 115 kV Line (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)
Pease - Rio Oso 115 kV Line (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)
Pease - Rio Oso 115 kV Line (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)

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				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	
Rio Oso - Lincoln 115 kV Line (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	111.0	125.0	116.3	14.7	14.2	113.5	121.1	135.6	75.7	134.4	Protection upgrade Project: Rio Oso - Atlantic 230 kV
	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
Lincoln - Pleasant Grove 115 kV Line (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 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	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
Lincoln - Pleasant Grove 115 kV Line (32398 ULTRA JT 115 32408 PLSNT 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 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	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
Drum - Higgins 115 kV line (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	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
	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	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
	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	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
	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	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
	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	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
Drum - Higgins 115 kV line (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	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
Drum - Higgins 115 kV line (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	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope

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				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	
Stanislaus-Melones-Manteca 115 kV Line No. 1 (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 Project: Vierra looping project
	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 Project: Vierra looping project
	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 Project: Vierra looping project
	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 Project: Vierra looping project
Stanislaus-Melones-Manteca 115 kV Line No. 1 (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 Project: Vierra looping project
Stanislaus-Melones-Manteca 115 kV Line No. 1 (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 Project: Vierra looping project
	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 Project: Vierra looping project
Riverbank Jct - Manteca 115 kV Line (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 Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
Riverbank Jct - Manteca 115 kV Line (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 Project: Vierra looping project
Schulte - Kasson - Manteca 115 kV Line (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 Project: Vierra looping project
Schulte - Kasson - Manteca 115 kV Line (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 Project: Vierra looping project
Schulte - Kasson - Manteca 115 kV Line (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 Project: Vierra looping project
Schulte - Kasson - Manteca 115 kV Line (33540 TESLA 115 33541 AEC_TP1 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	96.6	103.1	105.4	<90	<90	97.9	114.7	108.9	<90	105.8	Short term: Action plan Project: Vierra looping project
Tesla Schulte SW STA #2 115KV (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	Short term: Action plan Project: Vierra looping project
Tesla Schulte SW STA #1 115KV (33540 TESLA 115 33543 AEC_TP2 115 1 1 )	P1-2:A11:47:_TESLA-SCHULTE SW STA #2 115KV P1-2:A11:55:_GWFTRACY-SCHULTE #1 115KV	P6	N-1-1	82.5	87.4	92.6	<90	<90	83.6	100.7	98.9	<90	97.3	Short term: Action plan Project: Vierra looping project
Tesla - Tracy 115 kV Line	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 Project: Vierra looping project



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(33540 TESLA 115 33544 ELLS GTY 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	100.6	107.7	114.7	<90	<90	101.4	130.0	123.3	78.7	114.7	Short term: Action plan Project: Vierra looping project
Tesla - Tracy 115 kV Line (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 Project: Vierra looping project
Tesla - Tracy 115 kV Line (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 Project: Vierra looping project
	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 Project: Vierra looping project
Tesla - Tracy 115 kV Line (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 Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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 Project: Vierra looping project
Tesla - Lawrence Lab 115 kV Line (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 Project: Vierra looping project
Vierra - Tracy - Kasson 115 kV Line (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 Project: Vierra looping project
Stockton "A" - Lockeford - Bellota #1 115KV (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 Project: Vierra looping project
Bellota-Riverbank-Melones 115 kV Line (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 Project: Vierra looping project
	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 Project: Vierra looping project
Cortina 230/115/60 kV Transformer No. 1 (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
Drum - Rio Oso 115 kV No. 1 line (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
Drum - Rio Oso 115 kV No. 2 line (32214 RIO OSO 115 32244 BRNSWCKP 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
Summit - Summit Metering Station 60 kV	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

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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	
(30993 SUMMIT 60.0 64109 SUMMIT 3 60.0 1 1)	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
Drum - Rio Oso 115 kV No. 1 line (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
Drum - Rio Oso 115 kV No. 1 line (32214 RIO OSO 115 32225 BRNSWKTP 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
Drum - Rio Oso 115 kV No. 2 line (32218 DRUM 115 32244 BRNSWKCP 115 2 1)	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
	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
Drum - Summit 60 kV Line (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
Drum - Summit 60 kV Line (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
Drum - Summit 60 kV Line (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
Eldorado - Missouri Flat 115 kV No. 2 Line (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: Load connection reconfiguration

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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 Renewable & Min Gas Gen	2027 Retirement of QF Generations	
Eldorado - Missouri Flat 115 kV No. 2 Line (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: Load connection reconfiguration
Eldorado - Missouri Flat 115 kV No. 1 Line (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: Load connection reconfiguration
Eldorado - Missouri Flat 115 kV No. 1 Line (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: Load connection reconfiguration
Eldorado - Missouri Flat 115 kV No. 1 Line (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: Load connection reconfiguration
Smartville - Camp Far West 60 kV Line (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 setup 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 setup 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 setup if needed
	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 setup 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 setup if needed
Valley Springs - Martell 60 kV Line No. 1 (33610 VLLY SPS 60.0 33619 AMFOR_SW 60.0 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
	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
	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

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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 Renewable & Min Gas Gen	2027 Retirement of QF Generations	
Valley Springs - Martell 60 kV Line No. 1 (33619 AMFOR_SW 60.0 33616 MARTELL 60.0 1 1)	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
Stockton 'A' - Weber 60 kV Line No. 1 (33674 HAZLTN J 60.0 33670 STCKTN A 60.0 1 1)	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	Mitigation under review
Stagg - Country Club 60 kV Line No. 1 (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	Project: Stagg - Hammer 60 kV line project Scope under review
	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	Project: Stagg - Hammer 60 kV line project Scope under review
	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	Project: Stagg - Hammer 60 kV line project Scope under review
Stagg - Hammer 60 kV Line No. 1 (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	Project: Stagg - Hammer 60 kV line project Scope under review
	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	Project: Stagg - Hammer 60 kV line project Scope under review
	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	Project: Stagg - Hammer 60 kV line project Scope under review
	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	Project: Stagg - Hammer 60 kV line project Scope under review
	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	Project: Stagg - Hammer 60 kV line project Scope under review
	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	Project: Stagg - Hammer 60 kV line project Scope under review
Hammer - Country Club 60 kV (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	Project: Stagg - Hammer 60 kV line project Scope under review
Lockeford - Lodi 60 kV Line No. 1 (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	Project: Lockeford-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 Renewable & Min Gas Gen	2027 Retirement of QF Generations	
Lockeford - Lodi 60 kV Line No. 2 (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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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: Lockeford-Lodi area 230 kV development Scope is under review
Lockeford - Lodi 60 kV Line No. 3 (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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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: Lockeford-Lodi area 230 kV development Scope is under review
Lockeford - Industrial 60 kV Line (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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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: Lockeford-Lodi area 230 kV development Scope is under review
Lockeford - Lodi 60 kV Line No. 1 (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: Lockeford-Lodi area 230 kV development Scope is under review
Lockeford - Lodi 60 kV Line No. 2 (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: Lockeford-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 Renewable & Min Gas Gen	2027 Retirement of QF Generations	
Lockeford - Lodi 60 kV Line No. 1 (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: Lockeford-Lodi area 230 kV development Scope is under review
Lockeford - Lodi 60 kV Line No. 3 (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: Lockeford-Lodi area 230 kV development Scope is under review
Lockeford - Lodi 60 kV Line No. 2 (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: Lockeford-Lodi area 230 kV development Scope is under review
Lockeford - Lodi 60 kV Line No. 1 (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: Lockeford-Lodi area 230 kV development Scope is under review
Lockeford - Lodi 60 kV Line No. 2 (33735 INDSTR J 60.0 38060 INDUSTR L 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: Lockeford-Lodi area 230 kV development Scope is under review
Lodi - Industrial 60 kV Line (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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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) Project: Lockeford-Lodi area 230 kV development Scope is under review
	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: Lockeford-Lodi area 230 kV development Scope is under review
Stanislaus-Melones-Manteca 115 kV Line (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 Project: Vierra looping project
	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 Project: Vierra looping project
BELLOTA - RIVERBANK - MELONES 115KV Line (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 Project: Vierra looping project
	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 Project: Vierra looping project

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	
	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 Project: Vierra looping project
Stanislaus-Melones-Riverbank 115 kV Line (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 Project: Vierra looping project
	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 Project: Vierra looping project
Stanislaus-Melones-Riverbank 115 kV Line (33936 MELNS JB 115 33947 RIVRBKJT 115 1 1)	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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 Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
Stanislaus-Melones-Riverbank 115 kV Line (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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project

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	
Stanislaus-Melones-Riverbank 115 kV Line (33947 RIVRBKJT 115 33951 VLYHMTP1 115 1 1)	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 Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
	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	Short term: Action plan Project: Vierra looping project
Bellota - Riverbank - Melones 115KV Line (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 Project: Vierra looping project
	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 Project: Vierra looping project
	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 Project: Vierra looping project
	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 Project: Vierra looping project
Bellota - Riverbank - Melones 115KV Line (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 Project: Vierra looping project
Stanislaus-Melones-Riverbank 115 kV Line (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 Project: Vierra looping project
	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 Project: Vierra looping project
Tesla - Lawrence Lab 115 kV Line (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 Project: Vierra looping project
Table Mountain - Pease 60 kV line (38054 GRIDLEY 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	124.2	<90	Sensitivity only
	P1-2:A5:57:_MRYSVLE-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	166.5	Sensitivity only
	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	Sensitivity only
Table Mountain - Pease 60 kV line (32326 ENCL TAP 60.0 32332 PEASE 60.0 1 1)	P1-2:A5:57:_MRYSVLE-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	Sensitivity only



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	
Table Mountain - Pease 60 kV line (32326 ENCL TAP 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	105.2	<90	Sensitivity only
	P1-3:A5:31:_PEAS RG 60/60KV TB 1													
	P1-2:A5:57:_MRYSVLE-PEASE 60KV	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	116.7	Sensitivity only
	P1-3:A5:31:_PEAS RG 60/60KV TB 1													
Pease - Harter 60 kV Line (32328 YBA CTYJ 60.0 32332 PEASE 60.0 1 1)	P1-3:A5:31:_PEAS RG 60/60KV TB 1	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	113.4	Sensitivity only
	P1-2:A5:57:_MRYSVLE-PEASE 60KV													
Drum - Grass Valley - Weimar 60 kV Line (32374 DRUM 60.0 32376 BONNIE N 60.0 1 1)	P1-1:A5:17:_ROLLINSF 6.60KV GEN UNIT 1	P3	G-1/N-1	92.6	93.8	93.4	<90	<90	94.1	97.0	101.9	<90	93.5	Sensitivity only
	P1-2:A5:50:_COLGATE-GRASS VALLEY 60KV													
Placer - Bell 115 kV line (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	Sensitivity only
Higgins - Bell 115 kV line (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	Sensitivity only
Rio Oso - West Sacramento 115 kV line (32214 RIO OSO 115 31986 W.SCRMNO 115 1 1)	P1-2:A4:25:_WOODLAND-DAVIS 115KV	P6	N-1-1	86.1	97.1	98.8	<90	<90	85.2	101.7	96.6	88.1	98.5	Sensitivity only
	P1-2:A4:9:_RIO OSO-BRIGHTON 230KV													
Rio Oso - Brighton 230 kV Line (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	Sensitivity only
Birds Landing - Contra Costa PP 230 kV Line (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	Sensitivity only
Donnells - Curtis 115KV (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	Sensitivity only
Donnells - Curtis 115KV (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

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	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	Load power factor correction or voltage support if needed
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	Load power factor correction or voltage support if needed
ALMENDRA 60	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	>0.9	>0.9	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Pease Transformer
ALMENDRA 60	P1-3:A5:31:_PEAS RG 60/60KV TB 1 P1-2:A5:57:_MRYSVLLE-PEASE 60KV [0]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.29	Sensitivity only
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	- Load power factor correction - Reactor projects
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	- Load power factor correction - Reactor projects
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	- Load power factor correction - Reactor projects
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	- Load power factor correction - Reactor projects
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	- Load power factor correction - Reactor projects
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	- Load power factor correction - Reactor projects
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	- Load power factor correction for high voltage - Low voltage: Sensitivity only
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	>0.9	0.91	0.92	>0.9	>0.9	>0.9	0.91	0.90	>0.9	0.92	Sensitivity only
ATLAN TI 60	Base Case	P0	N-0	1.08	0.99	0.99	>0.9	1.06	1.08	0.98	0.98	1.00	0.98	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
ATLAN TI 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.08	0.96	0.95	>0.9	1.06	1.08	0.94	0.94	0.97	0.94	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
ATLAN TI 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	>0.9	1.04	1.08	0.91	0.90	0.99	0.88	- Load power factor correction for high voltage - Low voltage: Sensitivity only
ATLAN TI 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	>0.9	1.06	1.08	0.96	0.96	0.99	0.95	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
ATLANTIC 115	Base Case	P0	N-0	1.03	1.00	1.00	>0.9	1.04	1.03	0.99	0.99	1.00	0.99	Load power factor correction or voltage support if needed
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	>0.9	1.02	1.02	0.94	0.92	0.99	0.91	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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
AUBURN 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.87	0.87	>0.9	1.02	0.98	0.83	0.27	0.94	0.88	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
AVENA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.99	0.85	0.85	>0.9	1.03	0.98	0.83	0.84	0.98	0.83	Project: Vierra looping project
B.BTHNY- 60	Base Case	P0	N-0	1.06	1.04	1.04	>0.9	1.06	1.06	1.04	1.04	1.03	1.04	- Load power factor correction - Reactor projects
BANGOR 60	Base Case	P0	N-0	1.04	1.01	1.01	>0.9	1.05	1.04	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects
BANTA 60	Base Case	P0	N-0	1.04	1.04	1.03	>0.9	1.05	1.04	1.03	1.03	1.03	1.03	- Reactor projects
BEALE2J2 60	Base Case	P0	N-0	1.03	1.03	1.03	>0.9	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	>0.9	1.04	1.00	0.75	0.76	1.01	0.74	Bellota 230 kV bus upgrade
BELL PGE 115	Base Case	P0	N-0	1.04	1.01	1.01	>0.9	1.06	1.04	1.01	1.00	1.01	1.01	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
BELL PGE 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	0.99	0.99	>0.9	1.07	1.04	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
BELL PGE 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	0.99	0.99	>0.9	1.07	1.04	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
BELL PGE 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.04	0.99	0.99	>0.9	1.07	1.04	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
BELL PGE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.99	0.99	>0.9	1.06	1.04	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
BELL PGE 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.92	0.83	0.83	>0.9	1.05	0.91	0.80	0.32	0.90	0.84	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
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	>0.9	1.07	1.04	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
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	>0.9	1.07	1.04	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	>0.9	1.07	1.04	1.00	1.00	1.00	1.00	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	>0.9	0.93	0.93	>0.9	>0.9	>0.9	0.91	0.90	>0.9	0.92	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
BELLOTA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.32	0.33	>0.9	1.02	0.82	0.30	0.30	0.87	0.31	Bellota 230 kV bus upgrade
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	>0.9	>0.9	0.92	>0.9	>0.9	0.90	0.75	Action plan or SPS
BELLOTA 230	Base Case	P0	N-0	1.03	1.00	1.00	>0.9	1.03	1.03	0.99	1.00	0.99	0.99	- Load power factor correction - Reactor projects
BOGUE 115	Base Case	P0	N-0	1.05	1.03	1.03	>0.9	1.04	1.05	1.03	1.04	1.03	1.03	- Load power factor correction - Reactor projects
BOGUE 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.05	1.03	1.03	>0.9	1.04	1.05	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
BOGUE 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.05	1.04	1.04	>0.9	1.04	1.05	1.04	1.04	1.03	1.03	- Load power factor correction - Reactor projects
BOGUE 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.05	1.03	1.04	>0.9	1.04	1.05	1.04	1.04	1.03	1.03	- Load power factor correction - Reactor projects
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	>0.9	1.04	1.05	1.04	1.04	1.03	1.03	- Load power factor correction - Reactor projects
BOGUE 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	>0.9	1.04	1.05	1.03	1.04	1.03	1.03	- Load power factor correction - Reactor projects
BOGUE 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.03	1.03	>0.9	1.04	1.05	1.03	1.04	1.03	1.03	- Load power factor correction - Reactor projects
BOGUE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.03	1.03	>0.9	1.04	1.05	1.03	1.03	1.02	1.02	- Load power factor correction - Reactor projects
BOGUE 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.05	1.04	1.04	>0.9	1.04	1.05	1.04	1.04	1.03	1.03	- Load power factor correction - Reactor projects
BOGUE 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.05	1.03	1.03	>0.9	1.04	1.05	1.03	1.04	1.03	1.03	- Load power factor correction - Reactor projects
BOGUE 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.05	1.03	1.03	>0.9	1.04	1.05	1.03	1.03	1.00	1.02	- Load power factor correction - Reactor projects

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	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	>0.9	1.04	1.05	1.03	1.04	1.03	1.03	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	- Load power factor correction - Reactor projects
BOGUE 115	P1-2:A5:17:_ RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_ WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	- Load power factor correction - Reactor projects
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	>0.9	1.04	1.05	1.03	1.04	1.03	1.03	- Load power factor correction - Reactor projects
BOWMN TP 60	Base Case	P0	N-0	1.03	1.04	1.03	>0.9	1.04	1.03	1.04	1.04	1.04	1.03	- Load power factor correction - Reactor projects
BRIGHTN 115	P1-2:A4:9:_ RIO OSO-BRIGHTON 230KV [5600] P1-2:A11:6:_ BRIGHTON-BELLOTA 230KV [4420]	P6	N-1/N-1	>0.9	0.99	0.99	>0.9	>0.9	>0.9	0.98	0.98	>0.9	0.98	Load power factor correction or voltage support if needed
BRIGHTON 230	Base Case	P0	N-0	1.01	0.97	0.97	>0.9	1.02	1.01	0.96	0.96	0.97	0.96	Load power factor correction
BRIGHTON 230	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.99	0.91	0.90	>0.9	1.01	0.99	0.89	0.89	0.93	0.89	- Load power factor correction for high voltage - Low voltage: Sensitivity only
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	>0.9	0.89	0.89	0.85	0.85	0.87	0.85	- Load power factor correction for high voltage - Action Plan or SPS for how voltage
BRIGHTON 230	P7-1:A11:12:_ BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	0.99	0.91	0.90	>0.9	1.01	0.99	0.89	0.89	0.93	0.89	- Load power factor correction for high voltage - Low voltage: Sensitivity only
BRKR SLG 115	Base Case	P0	N-0	1.02	1.02	1.02	>0.9	1.04	1.02	1.02	1.03	1.04	1.02	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
BRNSWALT 115	Base Case	P0	N-0	1.02	1.04	1.03	>0.9	1.05	1.02	1.03	1.04	1.04	1.03	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
BRUNSWCK 115	Base Case	P0	N-0	1.03	1.03	1.02	>0.9	1.05	1.03	1.02	1.03	1.04	1.02	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
CALVO 60	Base Case	P0	N-0	1.04	1.03	1.03	>0.9	1.05	1.04	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
CAMANCH 230	Base Case	P0	N-0	1.03	1.00	1.00	>0.9	1.03	1.03	1.00	1.00	0.99	1.00	Load power factor correction
CAMANCHE 115	P2-4:A11:3:_ BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.32	0.33	>0.9	1.03	0.82	0.30	0.30	0.87	0.31	Bellota 230 kV bus upgrade
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	>0.9	>0.9	0.92	>0.9	>0.9	0.91	0.76	Action plan or SPS
CAMANCPP 230	Base Case	P0	N-0	1.03	1.00	1.00	>0.9	1.03	1.03	1.00	1.00	0.99	1.00	Load power factor correction
CAMPUS 115	Base Case	P0	N-0	1.02	1.02	1.01	>0.9	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
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	>0.9	1.00	0.92	0.88	0.89	0.95	0.88	Project: Vierra looping project
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	>0.9	>0.9	0.93	0.89	0.91	>0.9	0.90	Sensitivity only
CATARACT 115	Base Case	P0	N-0	1.04	1.03	1.03	>0.9	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction
CATARACT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.97	0.75	0.75	>0.9	1.04	0.97	0.73	0.74	0.99	0.73	Bellota 230 kV bus upgrade
CDCRSTN 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.82	0.27	0.28	>0.9	1.01	0.81	0.25	0.25	0.85	0.26	Bellota 230 kV bus upgrade
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	>0.9	>0.9	0.91	>0.9	>0.9	0.88	0.72	Action plan or SPS
CDCRSTNJT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.82	0.27	0.28	>0.9	1.01	0.81	0.25	0.26	0.85	0.27	Bellota 230 kV bus upgrade
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	>0.9	>0.9	0.91	>0.9	>0.9	0.88	0.72	Action plan or SPS
CH.STN 115	Base Case	P0	N-0	1.04	1.02	1.02	>0.9	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction
CH.STN 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.67	0.67	>0.9	1.04	0.94	0.65	0.66	0.96	0.63	Bellota 230 kV bus upgrade
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	>0.9	0.89	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Action plan or SPS
CH.STNJT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.67	0.67	>0.9	1.04	0.94	0.64	0.65	0.96	0.63	Bellota 230 kV bus upgrade
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	>0.9	0.89	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	Action plan or SPS
CHCGO PK 115	Base Case	P0	N-0	1.04	1.03	1.03	>0.9	1.06	1.04	1.03	1.03	1.04	1.03	- Load power factor correction - Reactor projects
CHCGO PK 115	P1-3:A5:23:_DTCH FL1 115/11KV TB 1	P1	N-1	1.05	1.04	1.04	>0.9	1.06	1.05	1.03	1.04	1.04	1.03	- Load power factor correction - Reactor projects
CHCGO PK 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.03	1.02	>0.9	1.06	1.04	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects
CHCGO PK 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.99	0.95	0.95	>0.9	1.05	0.98	0.93	0.62	0.99	0.95	- Load power factor correction for high voltage - Low voltage: Sensitivity only
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	>0.9	1.07	1.04	0.98	0.97	0.99	0.98	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
CHLLNGEA 60	Base Case	P0	N-0	1.05	1.02	1.02	>0.9	1.06	1.05	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
CISCO GR 60	Base Case	P0	N-0	1.03	1.04	1.04	>0.9	1.05	1.03	1.04	1.04	1.04	1.04	Load power factor correction



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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CISCO GR 60	P2-2:A5:39:_SPAULDNG 60KV SECTION MA	P2	Bus	1.02	1.05	1.05	>0.9	1.07	1.02	1.05	1.05	1.06	1.05	- Load power factor correction - Reactor projects
CISCO GR 60	P2-3:A5:63:_DRUM - MA 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.03	1.05	1.05	>0.9	1.06	1.03	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
CISCO GR 60	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.03	1.05	1.05	>0.9	1.05	1.03	1.05	1.06	1.06	1.04	- Load power factor correction - Reactor projects
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	>0.9	1.07	1.02	1.05	1.06	1.06	1.05	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	0.92	>0.9	>0.9	>0.9	0.90	0.91	>0.9	0.92	Sensitivity only
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	>0.9	>0.9	>0.9	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	>0.9	Action plan or SPS
CLMBA HL 60	Base Case	P0	N-0	1.05	1.02	1.02	>0.9	1.05	1.05	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
CLRKSVLE 115	Base Case	P0	N-0	1.05	1.02	1.02	>0.9	1.07	1.05	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
CLRKSVLE 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.02	1.02	>0.9	1.07	1.05	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects
CLRKSVLE 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.03	1.02	>0.9	1.07	1.05	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
CLRKSVLE 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.05	1.03	1.03	>0.9	1.08	1.05	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
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	>0.9	1.08	1.05	1.03	1.02	1.03	1.02	- Load power factor correction - Reactor projects
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	>0.9	1.08	1.06	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
CLRKSVLE 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	>0.9	1.08	1.05	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CLRKSVLE 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.02	1.02	>0.9	1.07	1.05	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects
CLRKSVLE 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.02	1.01	>0.9	1.07	1.05	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects
CLRKSVLE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.00	0.99	>0.9	1.07	1.05	0.99	0.99	1.00	0.98	- Load power factor correction - Reactor projects
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	>0.9	1.08	1.05	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects
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	>0.9	1.07	1.05	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects
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	>0.9	1.07	1.05	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
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	>0.9	1.07	1.05	1.02	1.01	1.02	1.01	- Load power factor correction - Reactor projects
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	>0.9	1.08	1.06	1.03	1.03	1.04	1.03	- Load power factor correction - Reactor projects
CLSA CRS 60	Base Case	P0	N-0	0.99	0.96	0.96	>0.9	1.02	0.99	0.95	0.93	0.96	0.96	Sensitivity only
COLGATE 60	Base Case	P0	N-0	1.05	1.03	1.03	>0.9	1.06	1.05	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
COLONY 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.05	0.86	0.83	>0.9	1.02	1.05	0.81	0.82	0.89	0.80	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
COLONY 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.05	0.86	0.83	>0.9	1.02	1.05	0.79	0.82	0.89	0.79	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
COLONY 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.05	0.93	0.91	>0.9	1.02	1.05	0.90	0.91	0.94	0.90	- Load power factor correction for high voltage - Low voltage: Sensitivity only
COLONY 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.90	0.88	>0.9	1.02	1.05	0.86	0.87	0.93	0.86	Bellota 230 kV bus upgrade
COLONY 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKFORD-BELLOTA 230KV [4990]	P6	N-1/N-1	>0.9	0.86	0.88	>0.9	>0.9	>0.9	0.87	0.88	0.89	0.82	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is 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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
COLONY 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.90	0.88	>0.9	1.02	1.06	0.86	0.87	0.93	0.86	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
COLUSA 60	Base Case	P0	N-0	0.99	0.96	0.96	>0.9	1.02	0.99	0.94	0.93	0.96	0.95	Sensitivity only
CORDELIA 115	Base Case	P0	N-0	1.05	1.02	1.02	>0.9	1.07	1.05	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
CORDELLT 115	Base Case	P0	N-0	1.02	0.99	0.99	>0.9	1.03	1.02	0.99	0.99	0.99	0.99	Load power factor correction
CORRAL 60	Base Case	P0	N-0	1.04	1.01	1.01	>0.9	1.04	1.04	1.00	1.01	1.02	1.01	Load power factor correction
CORTINA 115	Base Case	P0	N-0	1.08	1.07	1.07	>0.9	1.08	1.08	1.07	1.05	1.05	1.07	- Load power factor correction - Reactor projects
CORTINA 115	P2-3:A4:10:_CORTINA 115KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker	1.09	1.08	1.08	>0.9	1.10	1.09	1.07	1.05	1.05	1.07	- Load power factor correction - Reactor projects
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	>0.9	1.09	1.08	1.06	1.05	1.05	1.07	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.11	>0.9	>0.9	>0.9	1.10	- Load power factor correction - Reactor projects
CORTINA 115	P7-1:A4:25:_EAGLE ROCK-CORTINA & CORTINA-MENDOCINO #1 Lines	P7	DCTL	1.09	1.08	1.08	>0.9	1.10	1.09	1.07	1.05	1.05	1.07	- Load power factor correction - Reactor projects
CPM 115	Base Case	P0	N-0	1.06	1.04	1.03	>0.9	1.07	1.06	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
CPM 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.03	1.03	>0.9	1.08	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
CPM 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.07	1.04	1.04	>0.9	1.07	1.07	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
CPM 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.04	1.04	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
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	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
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	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
CPM 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.04	1.04	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
CPM 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.03	1.03	>0.9	1.07	1.07	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
CPM 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
CPM 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.03	1.03	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
CPM 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.01	1.01	>0.9	1.07	1.06	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects
CPM 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.04	1.04	>0.9	1.08	1.08	1.04	1.03	1.04	1.04	- Load power factor correction - Reactor projects
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	>0.9	1.08	1.06	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects
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	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
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	>0.9	1.07	1.07	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
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	>0.9	1.07	1.06	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
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	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
CRBNA JC 60	Base Case	P0	N-0	1.04	1.04	1.03	>0.9	1.05	1.04	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
CURTISS 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.69	0.69	>0.9	1.03	0.94	0.66	0.67	0.97	0.64	Bellota 230 kV bus upgrade
DAVIS 115	Base Case	P0	N-0	1.02	1.02	1.01	>0.9	1.03	1.02	1.01	1.02	1.04	1.01	Load power factor correction
DAVIS 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.00	1.00	>0.9	1.03	1.03	1.00	1.00	1.02	0.99	Load power factor correction
DEEPWATR 115	Base Case	P0	N-0	1.03	1.04	1.03	>0.9	1.03	1.03	1.03	1.04	1.05	1.03	Load power factor correction
DEL MAR 60	Base Case	P0	N-0	1.10	0.97	0.97	>0.9	1.06	1.10	0.97	0.96	0.99	0.96	- Load power factor correction - Reactor projects
DEL MAR 60	P2-2:A5:10:_GOLDHILL 115KV SECTION 1F	P2	Bus	1.10	0.98	0.98	>0.9	1.06	1.10	0.97	0.97	0.99	0.97	- Load power factor correction - Reactor projects
DEL MAR 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.10	0.94	0.93	>0.9	1.05	1.09	0.92	0.92	0.96	0.92	- Load power factor correction - Reactor projects
DEL MAR 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.10	0.98	0.97	>0.9	1.06	1.10	0.97	0.95	0.99	0.97	- Load power factor correction - Reactor projects
DEL MAR 60	P2-4:A5:5:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.10	0.98	0.98	>0.9	1.06	1.10	0.97	0.97	0.99	0.97	- Load power factor correction - Reactor projects
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	>0.9	1.04	1.09	0.89	0.87	0.97	0.86	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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
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	>0.9	0.90	0.91	>0.9	>0.9	>0.9	0.90	0.88	>0.9	>0.9	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	>0.9	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	>0.9	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	>0.9	1.03	1.00	0.96	0.95	0.97	0.97	Sensitivity only
DIST2047 60	P1-2:A4:44:_CORTINA #1 60KV [6580] P1-3:A4:6:_CORTINA 230/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	Sensitivity only
DIXONCAN 60	Base Case	P0	N-0	1.07	1.02	>0.9	>0.9	1.06	1.07	1.01	1.01	1.02	1.02	- Load power factor correction - Reactor projects
DIXONCAN 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.03	>0.9	>0.9	1.06	1.08	1.02	1.01	1.03	1.03	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
DIXONPGE 60	Base Case	P0	N-0	1.07	1.02	>0.9	>0.9	1.06	1.07	1.02	1.01	1.02	1.02	- Load power factor correction - Reactor projects
DIXONPGE 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.08	1.02	>0.9	>0.9	1.06	1.08	1.02	1.01	1.02	1.02	- Load power factor correction - Reactor projects
DIXONPGE 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.02	>0.9	>0.9	1.06	1.07	1.02	1.01	1.02	1.02	- Load power factor correction - Reactor projects
DIXONPGE 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.03	>0.9	>0.9	1.06	1.09	1.02	1.02	1.03	1.03	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
DMND SPR 115	Base Case	P0	N-0	1.05	1.02	>0.9	>0.9	1.06	1.05	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
DMND SPR 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.01	>0.9	>0.9	1.07	1.05	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects
DMND SPR 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
DMND SPR 115	P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P1	N-1	1.06	1.01	>0.9	>0.9	1.07	1.06	1.01	1.00	1.02	1.01	- Load power factor correction - Reactor projects
DMND SPR 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
DMND SPR 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.00	>0.9	>0.9	1.06	1.05	1.00	0.99	1.01	1.00	- Load power factor correction - Reactor projects

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
DMND SPR 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.01	1.02	1.02	- Load power factor correction - Reactor projects
DMND SPR 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
DMND SPR 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
DMND SPR 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.07	1.01	>0.9	>0.9	1.07	1.07	1.01	1.00	1.02	1.00	- Load power factor correction - Reactor projects
DMND SPR 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.05	0.99	>0.9	>0.9	1.06	1.05	0.98	0.98	1.00	0.98	- Load power factor correction - Reactor projects
DMND SPR 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.01	>0.9	>0.9	1.07	1.05	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects
DMND SPR 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.01	>0.9	>0.9	1.07	1.05	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects
DMND SPR 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.99	>0.9	>0.9	1.06	1.05	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects
DMND SPR 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.02	>0.9	>0.9	1.07	1.07	1.02	1.00	1.02	1.02	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.04	0.99	0.83	0.79	0.88	0.85	Connect Shingle Spring load to Missouri Flat-Gold Hill #1 115KV
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	>0.9	>0.9	1.07	1.06	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.06	1.05	1.00	1.00	1.00	1.00	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.06	1.06	1.01	1.00	1.01	1.01	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.07	1.06	1.01	1.00	1.01	1.00	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	1.07	1.06	1.01	1.00	1.02	1.01	- Load power factor correction - Reactor projects

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
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	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
DOBBINS 60	Base Case	P0	N-0	1.05	1.02	>0.9	>0.9	1.06	1.05	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
DONNELLS 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.01	0.79	>0.9	>0.9	1.04	1.01	0.77	0.78	1.02	0.75	Bellota 230 kV bus upgrade
DRUM 115	Base Case	P0	N-0	1.04	1.05	>0.9	>0.9	1.06	1.04	1.04	1.05	1.05	1.04	- Load power factor correction - Reactor projects
DRUM 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.06	>0.9	>0.9	1.06	1.05	1.06	1.06	1.07	1.06	- Load power factor correction - Reactor projects
DRUM 115	P1-3:A5:14:_DRUM 5 13.8/115KV TB 1	P1	N-1	1.05	1.05	>0.9	>0.9	1.06	1.05	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
DRUM 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.06	>0.9	>0.9	1.06	1.05	1.06	1.06	1.07	1.06	- Load power factor correction - Reactor projects
DRUM 115	P2-3:A5:82:_DRUM 115KV - RING R2 & R1	P2	Non-bus-tie breaker	1.05	1.05	>0.9	>0.9	1.06	1.05	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
DRUM 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.04	>0.9	>0.9	1.06	1.04	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
DRUM 115	P2-1:A5:27:_DRUM-HIGGINS 115KV [4393] (DRUM-DTCH FL1)	P2-1	Line Section w/o fault	1.05	1.06	>0.9	>0.9	1.06	1.05	1.06	1.06	1.07	1.06	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.06	1.05	1.06	1.06	1.07	1.06	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
DTCH FL1 115	Base Case	P0	N-0	1.04	1.04	>0.9	>0.9	1.06	1.04	1.03	1.04	1.04	1.03	- Load power factor correction - Reactor projects
DTCH FL1 115	P1-1:A5:10:_DTCHFLT1 11.00KV GEN UNIT 1	P1	N-1	1.04	1.04	>0.9	>0.9	1.06	1.04	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
DTCH FL1 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1	P1	N-1	1.04	1.04	>0.9	>0.9	1.06	1.04	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
DTCH FL1 115	P1-3:A5:14:_DRUM 5 13.8/115KV TB 1	P1	N-1	1.05	1.04	>0.9	>0.9	1.06	1.04	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
DTCH FL1 115	P1-3:A5:23:_DTCH FL1 115/11KV TB 1	P1	N-1	1.04	1.04	>0.9	>0.9	1.06	1.05	1.04	1.04	1.05	1.04	- Load power factor correction - Reactor projects

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
DTCH FL1 115	P2-3:A5:82:_DRUM 115KV - RING R2 & R1	P2	Non-bus-tie breaker	1.05	1.04	>0.9	>0.9	1.06	1.05	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
DTCH FL1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.03	>0.9	>0.9	1.06	1.04	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
DTCH FL1 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.97	>0.9	>0.9	1.05	1.00	0.96	0.71	1.01	0.98	- Load power factor correction for high voltage - Low voltage: Sensitivity only
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	>0.9	>0.9	1.06	1.05	1.06	1.06	1.07	1.06	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
DTCH FL2 115	Base Case	P0	N-0	1.04	1.04	>0.9	>0.9	1.06	1.04	1.04	1.04	1.05	1.04	- Load power factor correction - Reactor projects
DTCH FL2 115	P1-1:A5:4:_DRUM 5 13.80KV GEN UNIT 1	P1	N-1	1.04	1.05	>0.9	>0.9	1.06	1.04	1.05	1.05	1.05	1.04	- Load power factor correction - Reactor projects
DTCH FL2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	1.06	>0.9	>0.9	1.06	1.04	1.05	1.06	1.06	1.05	- Load power factor correction - Reactor projects
DTCH FL2 115	P1-3:A5:14:_DRUM 5 13.8/115KV TB 1	P1	N-1	1.04	1.05	>0.9	>0.9	1.06	1.04	1.05	1.05	1.05	1.04	- Load power factor correction - Reactor projects
DTCH FL2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	1.06	>0.9	>0.9	1.06	1.04	1.05	1.06	1.06	1.05	- Load power factor correction - Reactor projects
DTCH FL2 115	P2-3:A5:82:_DRUM 115KV - RING R2 & R1	P2	Non-bus-tie breaker	1.05	1.05	>0.9	>0.9	1.06	1.05	1.04	1.05	1.05	1.04	- Load power factor correction - Reactor projects
DTCH FL2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.04	>0.9	>0.9	1.05	1.04	1.04	1.03	1.04	1.03	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.06	1.04	1.05	1.06	1.06	1.05	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
E.MRYSVE 115	Base Case	P0	N-0	1.05	1.03	>0.9	>0.9	1.05	1.05	1.02	1.03	1.03	1.02	Load power factor correction
E.MRYSVE 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.04	1.03	>0.9	>0.9	1.05	1.05	1.03	1.03	1.03	1.03	Load power factor correction
E.MRYSVE 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.04	1.02	>0.9	>0.9	1.05	1.05	1.03	1.03	1.03	1.03	Load power factor correction



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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
E.MRYSVE 115	P2-3:A5:17:_RIO OSO - 2D 115KV & BOGUE-RIO OSO LINE	P2	Non-bus-tie breaker	1.04	0.98	>0.9	>0.9	1.05	1.04	0.98	0.98	0.99	0.97	- Load power factor correction - Reactor projects
E.MRYSVE 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.03	>0.9	>0.9	1.05	1.05	1.03	1.03	1.03	1.02	- Load power factor correction - Reactor projects
E.MRYSVE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.02	>0.9	>0.9	1.04	1.05	1.01	1.01	1.02	1.01	Load power factor correction
E.MRYSVE 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.04	1.03	>0.9	>0.9	1.05	1.05	1.03	1.03	1.03	1.03	Load power factor correction
E.MRYSVE 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.04	0.98	>0.9	>0.9	1.05	1.04	0.97	0.98	0.99	0.97	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.04	1.04	1.03	1.04	1.04	1.03	Load power factor correction
E.MRYSVE 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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
E.MRYSVE 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	1.05	1.05	1.03	1.03	1.03	1.02	- Load power factor correction - Reactor projects
E.NICOLS 115	Base Case	P0	N-0	1.05	1.03	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
E.NICOLS 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.05	1.03	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
E.NICOLS 115	P1-2:A5:30:_RIO OSO-NICOLAUS 115KV [3440]	P1	N-1	1.04	0.97	>0.9	>0.9	1.05	1.03	0.96	0.96	0.98	0.96	Load power factor correction
E.NICOLS 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.05	1.04	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
E.NICOLS 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.04	1.04	>0.9	>0.9	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction
E.NICOLS 115	P2-2:A5:15:_RIO OSO 115KV SECTION 2D	P2	Bus	1.03	0.96	>0.9	>0.9	1.05	1.03	0.96	0.96	0.98	0.96	Load power factor correction
E.NICOLS 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.03	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
E.NICOLS 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.04	1.03	>0.9	>0.9	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction
E.NICOLS 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.04	1.03	>0.9	>0.9	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction
E.NICOLS 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.03	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
E.NICOLS 115	P2-3:A5:17:_RIO OSO - 2D 115KV & BOGUE-RIO OSO LINE	P2	Non-bus-tie breaker	1.04	0.96	>0.9	>0.9	1.05	1.04	0.95	0.96	0.98	0.95	Load power factor correction
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	>0.9	>0.9	1.05	1.03	0.96	0.96	0.98	0.96	Load power factor correction
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	>0.9	>0.9	1.05	1.03	0.96	0.96	0.98	0.95	Load power factor correction

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
E.NICOLS 115	P2-3:A5:78:_E.NICOLS 115KV - RING R1 & R2	P2	Non-bus-tie breaker	1.03	0.97	>0.9	>0.9	1.05	1.03	0.96	0.96	0.98	0.96	Load power factor correction
E.NICOLS 115	P2-3:A5:79:_E.NICOLS 115KV - RING R1 & R5	P2	Non-bus-tie breaker	>0.9	>0.9	>0.9	>0.9	1.03	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
E.NICOLS 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	- Load power factor correction - Reactor projects
E.NICOLS 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.03	>0.9	>0.9	1.04	1.04	1.02	1.02	1.03	1.02	Load power factor correction
E.NICOLS 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.04	1.04	>0.9	>0.9	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction
E.NICOLS 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
E.NICOLS 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
E.NICOLS 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction
E.NICOLS 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.03	0.96	>0.9	>0.9	1.05	1.03	0.95	0.96	0.97	0.95	Load power factor correction
E.NICOLS 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.05	1.03	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
E.NICOLS 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.05	1.03	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
E.NICOLS 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.05	1.03	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
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	>0.9	>0.9	1.05	1.04	0.96	0.96	0.97	0.95	- Load power factor correction - Reactor projects
ELDORAD 115	Base Case	P0	N-0	1.06	1.02	>0.9	>0.9	1.06	1.06	1.02	1.02	1.01	1.02	- Load power factor correction - Reactor projects
ELDORAD 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
ELDORAD 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.03	>0.9	>0.9	1.07	1.06	1.02	1.02	1.01	1.02	- Load power factor correction - Reactor projects
ELDORAD 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.03	>0.9	>0.9	1.07	1.06	1.03	1.03	1.02	1.03	- Load power factor correction - Reactor projects
ELDORAD 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.03	>0.9	>0.9	1.07	1.06	1.03	1.02	1.02	1.02	- Load power factor correction - Reactor projects
ELDORAD 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.03	>0.9	>0.9	1.07	1.06	1.03	1.03	1.02	1.03	- Load power factor correction - Reactor projects

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
ELDORAD 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.03	>0.9	>0.9	1.07	1.06	1.03	1.02	1.02	1.03	- Load power factor correction - Reactor projects
ELDORAD 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
ELDORAD 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
ELDORAD 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.00	>0.9	>0.9	1.06	1.06	0.99	0.99	0.99	0.99	- Load power factor correction - Reactor projects
ELDORAD 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.03	>0.9	>0.9	1.07	1.07	1.03	1.01	1.02	1.03	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.05	1.02	0.89	0.86	0.92	0.90	Connect Shingle Spring load to Missouri Flat-Gold Hill #1 115KV
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	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	Connect Shingle Spring load to Missouri Flat-Gold Hill #1 115KV
ELDORAD 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.03	>0.9	>0.9	1.07	1.06	1.02	1.02	1.01	1.02	Connect Shingle Spring load to Missouri Flat-Gold Hill #1 115KV
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	>0.9	>0.9	1.07	1.07	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
ELECTRA 230	Base Case	P0	N-0	1.04	1.01	>0.9	>0.9	1.03	1.04	1.01	1.01	1.01	1.01	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	Action plan or SPS
ELLS GTY 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.35	Sensitivity only
ENCINAL 60	P7-1:A5:20_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.02	0.99	>0.9	>0.9	1.00	1.02	0.99	0.99	0.77	>0.9	Sensitivity only
ENCINAL 60	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	>0.9	>0.9	>0.9	>0.9	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Pease Transformer
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.35	Sensitivity only
ENCL TAP 60	P7-1:A5:20_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.02	0.99	>0.9	>0.9	1.00	1.02	0.99	0.99	0.77	>0.9	Sensitivity only
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	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Action plan or SPS
FLINT 115	Base Case	P0	N-0	1.04	1.01	>0.9	>0.9	1.06	1.04	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
FLINT 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	1.00	>0.9	>0.9	1.07	1.04	0.99	0.98	0.99	0.99	- Load power factor correction - Reactor projects
FLINT 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.02	>0.9	>0.9	1.07	1.05	1.02	1.01	1.01	1.02	- Load power factor correction - Reactor projects
FLINT 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.04	>0.9	>0.9	1.08	1.06	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
FLINT 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.05	1.03	>0.9	>0.9	1.08	1.05	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
FLINT 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.04	>0.9	>0.9	1.08	1.06	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
FLINT 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	1.00	>0.9	>0.9	1.07	1.04	0.99	0.98	0.99	0.99	- Load power factor correction - Reactor projects
FLINT 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.04	1.00	>0.9	>0.9	1.07	1.04	0.99	0.98	0.99	0.99	- Load power factor correction - Reactor projects
FLINT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.99	>0.9	>0.9	1.06	1.04	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects
FLINT 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.92	0.82	>0.9	>0.9	1.05	0.90	0.79	0.30	0.89	0.83	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
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	>0.9	>0.9	1.07	1.04	0.99	0.99	1.00	0.99	- Load power factor correction - Reactor projects
FLINT 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.04	1.00	>0.9	>0.9	1.07	1.04	0.99	0.98	0.99	0.99	- Load power factor correction - Reactor projects
FLINT 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	>0.9	>0.9	1.07	1.05	1.02	1.01	1.01	1.02	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.07	1.05	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
FLINT 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.01	>0.9	>0.9	1.07	1.04	1.00	1.00	1.00	1.00	- Load power factor correction - Reactor projects
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	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Action plan or SPS
FRGTNTP1 115	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.04	1.04	1.02	1.02	1.03	1.02	Load power factor correction
FRGTNTP1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.96	0.73	>0.9	>0.9	1.04	0.96	0.71	0.71	0.98	0.70	Bellota 230 kV bus upgrade
FRGTNTP2 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.02	1.02	1.03	1.02	Load power factor correction
FRGTNTP2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.96	0.73	>0.9	>0.9	1.04	0.96	0.71	0.72	0.98	0.70	Bellota 230 kV bus 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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
FRNCH MS 60	Base Case	P0	N-0	1.03	1.02	>0.9	>0.9	1.03	1.03	1.01	1.01	0.94	1.01	Sensitivity only
FROGTOWN 115	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.04	1.04	1.02	1.02	1.03	1.02	Load power factor correction
FROGTOWN 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.96	0.73	>0.9	>0.9	1.04	0.96	0.71	0.71	0.98	0.70	Bellota 230 kV bus upgrade
GLEAF 1 115	Base Case	P0	N-0	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.04	1.03	1.03	Load power factor correction
GLEAF 1 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.05	1.04	>0.9	>0.9	1.04	1.05	1.03	1.04	1.03	1.03	Load power factor correction
GLEAF 1 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction
GLEAF 1 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.05	1.03	>0.9	>0.9	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction
GLEAF 1 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.05	1.03	>0.9	>0.9	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction
GLEAF 1 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction
GLEAF 1 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction
GLEAF 1 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.03	>0.9	>0.9	1.04	1.05	1.03	1.03	1.02	1.03	Load power factor correction
GLEAF 1 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction
GLEAF 1 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction
GLEAF 1 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction
GLEAF 1 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.04	1.03	1.03	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	1.04	1.05	1.04	1.04	1.03	1.04	Load power factor correction
GLEAF2 60	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	>0.9	>0.9	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Pease Transformer
GLEAF2 60	P1-3:A5:31:_PEAS RG 60/60KV TB 1 P1-2:A5:57:_MRYSVLLE-PEASE 60KV [0]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.28	Sensitivity only
GLEAF2 60	P7-1:A5:20_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.04	1.02	>0.9	>0.9	1.01	1.04	1.01	1.01	0.78	>0.9	Sensitivity only
GOLDHILL 115	Base Case	P0	N-0	1.06	1.04	>0.9	>0.9	1.07	1.06	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
GOLDHILL 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.03	>0.9	>0.9	1.08	1.06	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects
GOLDHILL 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.04	>0.9	>0.9	1.08	1.06	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
GOLDHILL 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.05	>0.9	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
GOLDHILL 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.04	>0.9	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
GOLDHILL 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.05	>0.9	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
GOLDHILL 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.05	>0.9	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
GOLDHILL 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.03	>0.9	>0.9	1.08	1.06	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects
GOLDHILL 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.03	>0.9	>0.9	1.08	1.06	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects
GOLDHILL 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.01	>0.9	>0.9	1.07	1.06	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects
GOLDHILL 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.05	>0.9	>0.9	1.08	1.08	1.04	1.03	1.04	1.04	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.08	1.06	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects
GOLDHILL 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.06	1.03	>0.9	>0.9	1.08	1.06	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects
GOLDHILL 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.04	>0.9	>0.9	1.08	1.06	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
GOLDHILL 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.04	>0.9	>0.9	1.08	1.06	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.08	1.07	1.05	1.04	1.05	1.04	- Load power factor correction - Reactor projects
GOLDHILL 230	Base Case	P0	N-0	1.01	0.98	>0.9	>0.9	1.02	1.01	0.98	0.98	0.98	0.97	Load power factor correction
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	>0.9	0.98	>0.9	>0.9	>0.9	>0.9	0.96	0.97	>0.9	0.97	Load power factor correction
GRANITE 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction
GRANITE 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	>0.9	>0.9	1.06	1.02	0.95	0.97	NConv	0.91	Sensitivity only
GRSS VLY 60	Base Case	P0	N-0	1.03	1.01	>0.9	>0.9	1.05	1.03	1.01	1.00	1.02	1.00	- Load power factor correction - Reactor projects
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	>0.9	0.92	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Action plan or SPS

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Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation %										Project & Potential Mitigation Solutions
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GWFTRACY 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction
HALE 115	Base Case	P0	N-0	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
HALE2 115	Base Case	P0	N-0	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
HALSEY 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.87	>0.9	>0.9	1.03	0.99	0.83	0.27	0.94	0.88	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
HARTER 60	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	>0.9	>0.9	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Pease Transformer
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.28	Sensitivity only
HARTER 60	P7-1:A5:20:_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.04	1.02	>0.9	>0.9	1.00	1.04	1.01	1.01	0.75	>0.9	Sensitivity only
HERDLYN 60	Base Case	P0	N-0	1.06	1.04	>0.9	>0.9	1.05	1.06	1.04	1.04	1.03	1.04	- Load power factor correction - Reactor projects
HERDLYN 60	P2-2:A11:56:_HERDLYN 60KV SECTION 1D	P2	Bus	1.07	1.04	>0.9	>0.9	1.06	1.07	1.04	1.04	1.03	1.04	- Load power factor correction - Reactor projects
HERDLYN 60	P2-3:A11:77:_HERDLYN - 1D 60KV & VASCO-HERDLYN LINE	P2	Non-bus-tie breaker	1.07	1.04	>0.9	>0.9	1.06	1.07	1.04	1.04	1.03	1.04	- Load power factor correction - Reactor projects
HERDLYN 60	P2-3:A11:78:_HERDLYN - 1D 60KV & HERDLYN-BALFOUR LINE	P2	Non-bus-tie breaker	1.07	1.04	>0.9	>0.9	1.06	1.07	1.04	1.04	1.03	1.04	- Load power factor correction - Reactor projects
HIGGINS 115	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.06	1.04	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects
HIGGINS 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	0.99	>0.9	>0.9	1.07	1.04	0.98	0.97	0.98	0.98	- Load power factor correction - Reactor projects
HIGGINS 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	0.99	>0.9	>0.9	1.07	1.04	0.98	0.97	0.99	0.98	- Load power factor correction - Reactor projects
HIGGINS 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.00	>0.9	>0.9	1.06	1.04	0.99	0.99	1.00	0.99	- Load power factor correction - Reactor projects
HIGGINS 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.94	0.86	>0.9	>0.9	1.05	0.93	0.83	0.40	0.93	0.87	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
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	>0.9	>0.9	1.07	1.04	0.98	0.97	0.99	0.98	- Load power factor correction - Reactor projects
HIGGINS 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.04	0.98	>0.9	>0.9	1.07	1.04	0.97	0.97	0.98	0.97	- Load power factor correction - Reactor projects
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	>0.9	0.92	>0.9	>0.9	>0.9	>0.9	0.91	0.89	>0.9	0.91	Mitigation under review
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	>0.9	>0.9	1.05	1.00	0.94	0.93	0.97	0.95	Load power factor correction
HJ HEINZ 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.02	0.96	>0.9	>0.9	1.03	1.02	0.95	0.95	1.00	0.95	Load power factor correction
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	>0.9	0.92	>0.9	>0.9	>0.9	>0.9	0.89	0.90	>0.9	0.91	Sensitivity only
HORSESHE 115	Base Case	P0	N-0	1.05	1.02	>0.9	>0.9	1.07	1.05	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
HORSESHE 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.01	>0.9	>0.9	1.07	1.05	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects
HORSESHE 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.03	>0.9	>0.9	1.07	1.05	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
HORSESHE 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.04	>0.9	>0.9	1.08	1.06	1.04	1.03	1.04	1.03	- Load power factor correction - Reactor projects
HORSESHE 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.05	1.04	>0.9	>0.9	1.08	1.05	1.03	1.03	1.04	1.03	- Load power factor correction - Reactor projects
HORSESHE 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.04	>0.9	>0.9	1.08	1.06	1.04	1.04	1.04	1.03	- Load power factor correction - Reactor projects
HORSESHE 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.04	>0.9	>0.9	1.08	1.06	1.04	1.03	1.04	1.03	- Load power factor correction - Reactor projects
HORSESHE 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.01	>0.9	>0.9	1.07	1.05	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects
HORSESHE 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.01	>0.9	>0.9	1.07	1.05	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects
HORSESHE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	1.00	>0.9	>0.9	1.06	1.05	0.99	0.99	1.00	0.99	- Load power factor correction - Reactor projects
HORSESHE 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.90	0.81	>0.9	>0.9	1.05	0.89	0.77	0.26	0.88	0.81	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
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	>0.9	>0.9	1.07	1.05	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects



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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
HORSESHE 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.05	1.01	>0.9	>0.9	1.07	1.05	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects
HORSESHE 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.03	>0.9	>0.9	1.07	1.05	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
HORSESHE 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	>0.9	>0.9	1.07	1.05	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
INDSTR J 60	Base Case	P0	N-0	1.07	1.02	>0.9	>0.9	1.02	1.06	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects
INDSTR J 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.07	0.92	>0.9	>0.9	1.01	1.07	0.89	0.90	0.94	0.89	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
INDSTR J 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.07	0.92	>0.9	>0.9	1.01	1.07	0.89	0.90	0.94	0.89	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
INDSTR J 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.07	0.84	>0.9	>0.9	1.01	1.07	0.79	0.81	0.88	0.78	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
INDSTR J 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.07	0.84	>0.9	>0.9	1.01	1.07	0.77	0.80	0.88	0.77	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
INDSTR J 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.07	0.92	>0.9	>0.9	1.01	1.07	0.89	0.89	0.93	0.88	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
INDSTR J 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.07	0.88	>0.9	>0.9	1.01	1.07	0.84	0.85	0.91	0.84	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
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	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	0.86	0.86	0.87	0.81	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
INDSTR J 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.07	0.88	>0.9	>0.9	1.01	1.08	0.85	0.86	0.92	0.84	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
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	>0.9	>0.9	>0.9	>0.9	0.83	>0.9	>0.9	>0.9	>0.9	>0.9	Action plan or SPS
INGRM C. 115	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.04	1.04	1.02	1.02	1.02	1.02	Load power factor correction

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
JAMESN-A 115	Base Case	P0	N-0	1.05	1.03	>0.9	>0.9	1.06	1.05	1.02	1.02	1.01	1.03	- Load power factor correction - Reactor projects
JAMESON 115	Base Case	P0	N-0	1.06	1.02	>0.9	>0.9	1.06	1.06	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	0.91	>0.9	0.92	Sensitivity only
KASSON 60	Base Case	P0	N-0	1.04	1.04	>0.9	>0.9	1.05	1.04	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
KNIGHTLD 115	Base Case	P0	N-0	1.03	1.02	>0.9	>0.9	1.04	1.03	1.02	1.03	1.04	1.02	Load power factor correction
KNIGHTLD 115	P1-2:A4:25:_ WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.04	1.02	>0.9	>0.9	1.04	1.04	1.01	1.03	1.03	1.02	Load power factor correction
KNIGHTLD 115	P2-2:A4:17:_ WOODLD 115KV SECTION 1F	P2	Bus	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
KNIGHTLD 115	P2-2:A4:18:_ WOODLD 115KV SECTION 1D	P2	Bus	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	- Load power factor correction - Reactor projects
KNIGHTLD 115	P2-2:A4:20:_ BRIGHTN 115KV SECTION ME	P2	Bus	1.01	1.02	>0.9	>0.9	1.03	1.03	1.02	1.01	1.03	1.01	Load power factor correction
KNIGHTLD 115	P2-2:A4:26:_ DAVIS 115KV SECTION 1D	P2	Bus	1.04	1.03	>0.9	>0.9	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction
KNIGHTLD 115	P2-3:A4:16:_ WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
KNIGHTLD 115	P2-3:A4:17:_ WOODLD - 1F 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
KNIGHTLD 115	P2-3:A4:19:_ BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.01	1.00	>0.9	>0.9	1.03	1.03	1.02	1.01	1.03	1.01	Load power factor correction
KNIGHTLD 115	P2-3:A4:24:_ DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.04	1.02	>0.9	>0.9	1.04	1.04	1.02	1.03	1.03	1.02	Load power factor correction
KNIGHTLD 115	P2-4:A4:10:_ BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.01	1.02	>0.9	>0.9	1.03	1.03	1.02	1.01	1.03	1.01	Load power factor correction
KNIGHTLD 115	P2-4:A4:11:_ DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.03	>0.9	>0.9	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction
KNIGHTLD 115	P2-4:A4:12:_ DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.04	1.02	>0.9	>0.9	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction
KNIGHTLD 115	P2-4:A4:8:_ WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.04	1.04	>0.9	>0.9	1.04	1.04	1.03	1.04	1.04	1.03	Load power factor correction
KNIGHTLD 115	P2-4:A4:9:_ WOODLD 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.05	1.05	>0.9	>0.9	1.04	1.05	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
KNIGHTLD 115	P2-1:A4:14:_ WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.04	1.02	>0.9	>0.9	1.04	1.04	1.02	1.03	1.03	1.02	Load power factor correction
KNIGHTLD 115	P2-1:A4:5:_ WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.04	1.03	>0.9	>0.9	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
KNIGHTLD 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.04	1.03	>0.9	>0.9	1.04	1.04	1.02	1.03	1.04	1.02	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
KNIGHTLD 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
LAMMERS 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	0.90	>0.9	0.91	Sensitivity only
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	>0.9	0.92	>0.9	>0.9	>0.9	>0.9	0.89	0.90	>0.9	0.91	Action plan or SPS
LINCLN 115	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.04	1.04	1.01	1.02	1.02	1.01	Load power factor correction
LINCLN 115	P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P1	N-1	1.05	1.04	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
LINCLN 115	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.97	>0.9	>0.9	1.03	1.02	0.98	0.97	1.01	0.96	Load power factor correction
LINCLN 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210] P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
LIVE OAK 60	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	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Pease Transformer
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.37	Sensitivity only
LIVE OAK 60	P7-1:A5:20_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.02	0.99	>0.9	>0.9	1.00	1.02	0.98	0.98	0.78	>0.9	Sensitivity only
LLNL TAP 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.02	1.02	Load power factor correction
LOCKEFRD 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.05	0.88	>0.9	>0.9	1.03	1.05	0.83	0.84	0.91	0.82	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKEFRD 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.05	0.87	>0.9	>0.9	1.03	1.05	0.81	0.84	0.91	0.81	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKEFRD 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.91	>0.9	>0.9	1.03	1.04	0.88	0.89	0.94	0.88	Significant leading power factor in 2019 (0.7) Project: Lockeford-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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
LOCKEFRD 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	0.88	0.89	0.90	0.84	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKEFRD 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	0.91	>0.9	>0.9	1.03	1.05	0.88	0.89	0.94	0.88	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKFORD 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.31	>0.9	>0.9	1.02	0.82	0.29	0.29	0.87	0.31	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is 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	>0.9	>0.9	>0.9	0.92	>0.9	>0.9	0.90	0.75	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKFORD 230	Base Case	P0	N-0	1.04	0.98	>0.9	>0.9	1.02	1.04	0.98	0.98	0.97	0.98	Load power factor correction
LOCKFORD 230	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.07	0.84	>0.9	>0.9	0.97	1.07	0.82	0.83	0.86	0.82	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKFORD 230	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.07	0.84	>0.9	>0.9	0.97	1.07	0.82	0.83	0.86	0.82	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKFORD 230	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.06	0.81	>0.9	>0.9	0.97	1.06	0.78	0.78	0.83	0.77	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKFORD 230	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.06	0.81	>0.9	>0.9	0.97	1.06	0.76	0.78	0.83	0.76	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKFORD 230	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.07	0.84	>0.9	>0.9	0.97	1.07	0.82	0.82	0.85	0.81	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKFORD 230	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	0.81	>0.9	>0.9	0.97	1.06	0.78	0.79	0.84	0.78	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKFORD 230	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.06	0.81	>0.9	>0.9	0.97	1.06	0.79	0.79	0.84	0.78	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LODI 60	Base Case	P0	N-0	1.06	1.02	>0.9	>0.9	1.02	1.06	1.01	1.01	1.02	1.01	Load power factor correction



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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
LODI 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.07	0.92	>0.9	>0.9	1.01	1.07	0.89	0.90	0.94	0.89	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LODI 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.07	0.92	>0.9	>0.9	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	>0.9	>0.9	1.01	1.07	0.79	0.80	0.88	0.78	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LODI 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.07	0.84	>0.9	>0.9	1.01	1.07	0.77	0.80	0.87	0.77	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LODI 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.07	0.91	>0.9	>0.9	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	>0.9	>0.9	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	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	0.85	0.86	0.87	0.81	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LODI 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.07	0.88	>0.9	>0.9	1.01	1.07	0.84	0.85	0.91	0.84	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
LYOTH-SP 60	Base Case	P0	N-0	1.04	1.04	>0.9	>0.9	1.05	1.04	1.03	1.03	1.03	1.03	Load power factor correction
MADISON 115	Base Case	P0	N-0	1.06	1.03	>0.9	>0.9	1.07	1.07	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
MADISON 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.03	>0.9	>0.9	1.07	1.07	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
MADISON 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.06	1.03	>0.9	>0.9	1.07	1.07	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
MADISON 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.04	>0.9	>0.9	1.07	1.08	1.04	1.03	1.04	1.04	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
MAINE-PR 60	Base Case	P0	N-0	1.07	1.03	>0.9	>0.9	1.07	1.07	1.02	1.02	1.02	1.03	- Load power factor correction - Reactor projects
MAINE-PR 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.08	1.03	>0.9	>0.9	1.07	1.08	1.03	1.02	1.03	1.03	- Load power factor correction - Reactor projects

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
MAINE-PR 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.03	>0.9	>0.9	1.07	1.07	1.02	1.02	1.02	1.03	- Load power factor correction - Reactor projects
MAINE-PR 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.04	>0.9	>0.9	1.07	1.08	1.03	1.02	1.04	1.04	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
MANTECA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.01	0.91	>0.9	>0.9	1.02	1.01	0.90	0.90	0.99	0.90	Sensitivity only
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	0.91	>0.9	>0.9	Sensitivity only
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	>0.9	>0.9	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	- Load power factor correction - Reactor projects
MCD_ISLE 60	Base Case	P0	N-0	1.00	0.99	>0.9	>0.9	1.01	1.00	0.99	0.99	0.98	0.99	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	0.83	>0.9	>0.9	>0.9	>0.9	>0.9	- Load power factor correction - Reactor projects
MDL_RIVR 60	Base Case	P0	N-0	1.01	1.00	>0.9	>0.9	1.02	1.02	1.00	1.00	0.99	1.00	Load power factor correction
MDSNVDXSW159 115	Base Case	P0	N-0	1.07	1.04	>0.9	>0.9	1.07	1.07	1.04	1.04	1.03	1.04	- Load power factor correction - Reactor projects
MDSNVDXSW159 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	>0.9	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
MDSNVDXSW159 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	>0.9	>0.9	1.07	1.07	1.04	1.04	1.03	1.04	- Load power factor correction - Reactor projects
MDSNVDXSW159 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	>0.9	>0.9	1.08	1.08	1.05	1.04	1.05	1.05	- Load power factor correction - Reactor projects
MDSNVDXSW159 115	P1-3:A4:2:_VACA-DIX 500/230KV TB 12 P1-4:A4:6:_VC DX11T SVD=V	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
MDSTO CN 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction
MDSTO CN 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	>0.9	>0.9	1.06	1.02	0.95	0.97	NConv	0.91	Sensitivity only
MDWYWND 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.03	1.03	Load power factor correction
MELONES 115	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction
MELONES 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.93	0.66	>0.9	>0.9	1.04	0.93	0.63	0.64	0.95	0.62	Bellota 230 kV bus upgrade
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	>0.9	>0.9	>0.9	0.98	>0.9	>0.9	0.97	0.89	Action plan or SPS
METTLER 60	Base Case	P0	N-0	1.02	1.02	>0.9	>0.9	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
METTLER 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.02	1.02	>0.9	>0.9	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction
METTLER 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.02	1.02	>0.9	>0.9	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction
METTLER 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.02	1.02	>0.9	>0.9	1.04	1.02	1.02	1.02	1.03	1.01	Load power factor correction
METTLER 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.02	1.02	>0.9	>0.9	1.04	1.02	1.02	1.02	1.03	1.01	Load power factor correction
METTLER 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.02	1.02	>0.9	>0.9	1.04	1.02	1.02	1.01	1.03	1.01	Load power factor correction
METTLER 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.02	1.02	>0.9	>0.9	1.04	1.02	1.01	1.02	1.03	1.02	Load power factor correction
MIDLFORK 230	Base Case	P0	N-0	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.00	0.98	1.00	Load power factor correction
MILLER 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.05	1.03	1.03	1.03	1.02	Load power factor correction
MILLER 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	>0.9	>0.9	1.06	1.02	0.95	0.97	NConv	0.91	Sensitivity only
MI-WUK 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.97	0.72	>0.9	>0.9	1.03	0.96	0.69	0.70	0.99	0.68	Bellota 230 kV bus upgrade
MOBILCHE 115	Base Case	P0	N-0	1.03	1.02	>0.9	>0.9	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction
MOBILCHE 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.01	1.03	1.01	Load power factor correction
MOBILCHE 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.02	1.00	>0.9	>0.9	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction
MOBILCHE 115	P2-2:A4:18:_WOODLD 115KV SECTION 1D	P2	Bus	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	- Load power factor correction - Reactor projects
MOBILCHE 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
MOBILCHE 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.02	1.00	>0.9	>0.9	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction
MOBILCHE 115	P2-3:A4:17:_WOODLD - 1F 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.02	1.00	>0.9	>0.9	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction
MOBILCHE 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.01	>0.9	>0.9	1.04	1.03	1.01	1.02	1.02	1.01	Load power factor correction
MOBILCHE 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.02	>0.9	>0.9	1.04	1.04	1.01	1.02	1.03	1.01	Load power factor correction
MOBILCHE 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.01	1.03	1.00	Load power factor correction
MOBILCHE 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.03	1.03	>0.9	>0.9	1.04	1.03	1.03	1.03	1.04	1.03	Load power factor correction
MOBILCHE 115	P2-4:A4:9:_WOODLD 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.05	1.05	>0.9	>0.9	1.04	1.05	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
MOBILCHE 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.02	1.03	1.01	Load power factor correction
MOBILCHE 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
MOBILCHE 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
MOBILCHE 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
MONDAVI 60	Base Case	P0	N-0	1.06	1.02	>0.9	>0.9	1.02	1.06	1.01	1.01	1.02	1.01	Load power factor correction
MONDAVI 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.07	0.92	>0.9	>0.9	1.01	1.07	0.89	0.90	0.93	0.89	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
MONDAVI 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.07	0.92	>0.9	>0.9	1.01	1.07	0.89	0.90	0.93	0.88	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
MONDAVI 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.07	0.84	>0.9	>0.9	1.01	1.07	0.79	0.80	0.88	0.78	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
MONDAVI 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.07	0.84	>0.9	>0.9	1.01	1.07	0.77	0.80	0.87	0.77	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
MONDAVI 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.07	0.91	>0.9	>0.9	1.01	1.07	0.88	0.89	0.92	0.88	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
MONDAVI 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.07	0.88	>0.9	>0.9	1.01	1.06	0.84	0.85	0.91	0.84	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
MONDAVI 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P6	N-1/N-1	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	0.85	0.86	0.87	0.81	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
MONDAVI 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.07	0.88	>0.9	>0.9	1.01	1.07	0.84	0.85	0.91	0.84	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
MRYSVLE 60	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	>0.9	>0.9	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Pease Transformer
MRYSVLE 60	P1-2:A5:26:_PEASE-RIO OSO 115KV [3270] P1-2:A5:25:_PALERMO-PEASE 115KV [3220]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.72	>0.9	Sensitivity only
MRYSVLE 60	P7-1:A5:20_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.03	0.99	>0.9	>0.9	0.99	1.03	0.98	0.98	0.74	0.00	Sensitivity only
MRYSVLLE 60	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	>0.9	>0.9	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Pease Transformer



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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
MRYSVLLE 60	P7-1:A5:20_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.03	0.99	>0.9	>0.9	0.99	1.03	0.98	0.98	0.74	0.00	Sensitivity only
MTN_QUAR 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.87	>0.9	>0.9	1.02	0.98	0.83	0.26	0.94	0.87	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
NARRWS 1 60	Base Case	P0	N-0	1.02	1.02	>0.9	>0.9	1.04	1.02	1.02	1.01	1.02	1.02	Load power factor correction
NARRWS 2 60	Base Case	P0	N-0	1.02	1.03	>0.9	>0.9	1.05	1.02	1.03	1.03	1.03	1.03	Load power factor correction
NARRWS 2 60	P2-2:A5:30:_SMRTSVLE 60KV SECTION MA	P2	Bus	1.03	1.03	>0.9	>0.9	1.06	1.03	1.03	1.03	1.04	1.03	- Load power factor correction - Reactor projects
NARRWS 2 60	P2-3:A5:40:_SMRTSVLE - MA 60KV & COLGATE-SMARTVILLE #1 LINE	P2	Non-bus-tie breaker	1.03	1.04	>0.9	>0.9	1.06	1.03	1.03	1.03	1.04	1.03	- Load power factor correction - Reactor projects
NARRWS 2 60	P2-3:A5:42:_SMRTSVLE - MA 60KV & SMARTVILLE-MARYSVILLE LINE	P2	Non-bus-tie breaker	1.03	1.03	>0.9	>0.9	1.06	1.03	1.03	1.03	1.04	1.03	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.06	1.03	1.03	1.03	1.04	1.03	- Load power factor correction - Reactor projects
NARRWS 2 60	P2-3:A5:44:_SMRTSVLE - MA 60KV & SMARTVILLE-NICOLAUS #1 LINE	P2	Non-bus-tie breaker	1.03	1.03	>0.9	>0.9	1.06	1.03	1.03	1.03	1.04	1.03	- Load power factor correction - Reactor projects
NEW HOPE 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	1.05	0.91	>0.9	>0.9	1.01	1.05	0.88	0.89	0.93	0.88	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
NEW HOPE 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.05	0.91	>0.9	>0.9	1.01	1.05	0.88	0.89	0.93	0.87	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
NEW HOPE 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.05	0.83	>0.9	>0.9	1.01	1.05	0.78	0.79	0.87	0.77	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
NEW HOPE 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.05	0.83	>0.9	>0.9	1.01	1.05	0.76	0.79	0.87	0.76	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
NEW HOPE 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.05	0.90	>0.9	>0.9	1.01	1.05	0.87	0.88	0.92	0.87	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
NEW HOPE 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.87	>0.9	>0.9	1.01	1.05	0.83	0.84	0.91	0.83	Significant leading power factor in 2019 (0.7) Project: Lockeford-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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
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	>0.9	0.83	>0.9	>0.9	>0.9	>0.9	0.84	0.85	0.87	0.79	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
NEW HOPE 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.87	>0.9	>0.9	1.01	1.05	0.83	0.84	0.91	0.83	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
NEWCSTLE 115	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.07	1.04	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
NEWCSTLE 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.00	>0.9	>0.9	1.07	1.04	0.99	0.99	1.00	0.99	- Load power factor correction - Reactor projects
NEWCSTLE 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.03	>0.9	>0.9	1.07	1.05	1.02	1.02	1.01	1.02	- Load power factor correction - Reactor projects
NEWCSTLE 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.04	>0.9	>0.9	1.08	1.06	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
NEWCSTLE 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.04	>0.9	>0.9	1.08	1.06	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
NEWCSTLE 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.04	>0.9	>0.9	1.08	1.06	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
NEWCSTLE 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.00	>0.9	>0.9	1.07	1.04	0.99	0.99	1.00	0.99	- Load power factor correction - Reactor projects
NEWCSTLE 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.00	>0.9	>0.9	1.07	1.04	0.99	0.99	1.00	0.99	- Load power factor correction - Reactor projects
NEWCSTLE 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.00	>0.9	>0.9	1.06	1.04	0.99	0.99	0.99	0.98	- Load power factor correction - Reactor projects
NEWCSTLE 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.91	0.82	>0.9	>0.9	1.05	0.90	0.78	0.28	0.89	0.82	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
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	>0.9	>0.9	1.07	1.05	1.00	0.99	1.00	1.00	- Load power factor correction - Reactor projects
NEWCSTLE 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.05	1.00	>0.9	>0.9	1.07	1.04	0.99	0.99	1.00	0.99	- Load power factor correction - Reactor projects
NEWCSTLE 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.03	>0.9	>0.9	1.07	1.05	1.02	1.02	1.01	1.02	- Load power factor correction - Reactor projects
NEWCSTLE 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	>0.9	>0.9	1.07	1.05	1.01	1.00	1.01	1.01	- Load power factor correction - Reactor projects

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
OI GLASS 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	0.90	>0.9	0.91	Sensitivity only
OLIVHRST 115	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.04	1.04	1.02	1.02	1.02	1.01	Load power factor correction
OLIVHRST 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.02	>0.9	>0.9	1.04	1.05	1.02	1.03	1.02	1.02	Load power factor correction
OLIVHRST 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.01	>0.9	>0.9	1.03	1.04	1.01	1.01	1.01	1.00	Load power factor correction
OLIVHRST 115	P2-4:A5:6:_RIO OSO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.03	0.97	>0.9	>0.9	1.03	1.03	0.97	0.97	0.97	0.96	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
OLIVHRST 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	1.04	1.05	1.02	1.03	1.02	1.02	Load power factor correction
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	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Action plan or SPS
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	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	Action plan or SPS
PARDEE A 60	Base Case	P0	N-0	1.05	1.05	>0.9	>0.9	1.04	1.05	1.05	1.05	1.06	1.05	- Load power factor correction - Reactor projects
PEAS RG 60	Base Case	P0	N-0	1.01	0.96	>0.9	>0.9	1.00	1.01	0.96	0.96	0.95	0.96	Load power factor correction
PEAS RG 60	P2-2:A5:13:_PEASE 115KV SECTION MA	P2	Bus	0.96	0.94	>0.9	>0.9	0.93	0.96	0.94	0.94	0.89	0.91	Sensitivity only
PEAS RG 60	P2-3:A5:11:_PEASE - MA 115KV & PALERMO-PEASE LINE	P2	Non-bus-tie breaker	0.96	0.94	>0.9	>0.9	0.93	0.96	0.94	0.94	0.89	0.91	Sensitivity only
PEAS RG 60	P2-3:A5:12:_PEASE - MA 115KV & PEASE-RIO OSO LINE	P2	Non-bus-tie breaker	0.96	0.94	>0.9	>0.9	0.93	0.96	0.94	0.94	0.89	0.91	Sensitivity only
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	>0.9	>0.9	>0.9	>0.9	0.93	>0.9	>0.9	>0.9	0.69	>0.9	Sensitivity only
PEAS RG 60	P7-1:A5:20_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	0.93	>0.9	>0.9	0.93	1.01	0.93	0.93	0.71	>0.9	Sensitivity only
PEASE 115	Base Case	P0	N-0	1.04	1.01	>0.9	>0.9	1.03	1.04	1.01	1.01	1.01	1.00	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
PEASE 115	P7-1:A5:20_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.04	0.95	>0.9	>0.9	0.95	1.04	0.94	0.94	0.71	>0.9	Sensitivity only
PEASE 60	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	>0.9	>0.9	>0.9	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Pease Transformer

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.31	Sensitivity only
PEASE 60	P7-1:A5:20_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.03	1.00	>0.9	>0.9	1.00	1.03	1.00	1.00	0.76	>0.9	Sensitivity only
PENRYN 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.86	>0.9	>0.9	1.02	0.99	0.82	0.24	0.94	0.86	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
PEORIA 115	Base Case	P0	N-0	1.03	1.02	>0.9	>0.9	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction
PEORIA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.66	>0.9	>0.9	1.04	0.93	0.64	0.65	0.96	0.63	Bellota 230 kV bus upgrade
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	>0.9	0.88	>0.9	>0.9	>0.9	0.98	>0.9	>0.9	>0.9	0.89	Action plan or SPS
PIKE CTY 60	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.05	1.04	1.01	1.01	1.02	1.01	Load power factor correction
PLACER 115	Base Case	P0	N-0	1.04	1.01	>0.9	>0.9	1.06	1.04	1.01	1.00	1.01	1.01	- Load power factor correction - Reactor projects
PLACER 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.04	1.00	>0.9	>0.9	1.07	1.04	0.99	0.98	0.99	0.99	- Load power factor correction - Reactor projects
PLACER 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.05	1.02	>0.9	>0.9	1.07	1.05	1.02	1.01	1.01	1.01	- Load power factor correction - Reactor projects
PLACER 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	1.00	>0.9	>0.9	1.07	1.04	0.99	0.98	0.99	0.99	- Load power factor correction - Reactor projects
PLACER 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.04	0.99	>0.9	>0.9	1.07	1.04	0.99	0.98	0.99	0.99	- Load power factor correction - Reactor projects
PLACER 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.99	>0.9	>0.9	1.06	1.04	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects
PLACER 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	0.92	0.83	>0.9	>0.9	1.05	0.90	0.79	0.30	0.89	0.83	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
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	>0.9	>0.9	1.07	1.04	0.99	0.98	0.99	0.99	- Load power factor correction - Reactor projects
PLACER 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.04	0.99	>0.9	>0.9	1.07	1.04	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects
PLACER 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.02	>0.9	>0.9	1.07	1.05	1.02	1.01	1.01	1.01	- Load power factor correction - Reactor projects
PLACER 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.05	1.01	>0.9	>0.9	1.07	1.04	1.00	1.00	1.00	1.00	- Load power factor correction - Reactor projects



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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLACER 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.88	>0.9	>0.9	1.02	0.98	0.84	0.27	0.95	0.88	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
PLAINFLD 60	Base Case	P0	N-0	1.02	0.91	>0.9	>0.9	1.07	1.02	0.89	0.90	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-2:A11:55:_GWFTRACY-SCHULTE #1 115KV [0]	P1	N-1	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-2:A4:17:_VACA-LAMBIE SW STA 230KV [5845]	P1	N-1	1.02	0.91	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-2:A4:41:_VACA-SUISUN 115KV [4070]	P1	N-1	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-2:A4:50:_VACA-DXN-TRVS_HPT 60KV [0]	P1	N-1	1.02	0.92	>0.9	>0.9	1.07	1.02	0.90	0.91	0.94	0.91	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-2:A5:11:_MIDDLE FORK-GOLD HILL 230KV [5140]	P1	N-1	1.02	0.91	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-2:A5:2:_POE-RIO OSO 230KV [5540]	P1	N-1	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.03	0.91	>0.9	>0.9	1.07	1.02	0.89	0.90	0.94	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-3:A4:18:_VACA-DIX 115/60KV TB 5	P1	N-1	1.02	0.90	>0.9	>0.9	1.06	1.02	0.88	0.89	0.93	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-3:A4:19:_VACA-DIX 115/60KV TB 9	P1	N-1	1.03	0.89	>0.9	>0.9	1.07	1.03	0.86	0.87	0.92	0.88	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLAINFLD 60	P1-3:A4:7:_VACA-DIX 230/115KV TB 3	P1	N-1	1.02	0.90	>0.9	>0.9	1.06	1.02	0.87	0.88	0.92	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-3:A4:8:_VACA-DIX 230/115KV TB 4	P1	N-1	1.02	0.90	>0.9	>0.9	1.06	1.02	0.87	0.88	0.92	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-4:A4:4:_VACA-DIX SVD=V	P1	N-1	1.02	0.90	>0.9	>0.9	1.06	1.01	0.88	0.89	0.92	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.02	0.91	>0.9	>0.9	1.07	1.02	0.89	0.90	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-2:A11:15:_TESLA E 230KV SECTION 2E	P2	Bus	1.02	0.91	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-2:A4:1:_VACA-DIX 230KV SECTION 1E	P2	Bus	1.01	0.89	>0.9	>0.9	1.06	1.01	0.86	0.87	0.92	0.88	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-2:A4:4:_VACA-DIX 230KV SECTION 1F	P2	Bus	1.01	0.90	>0.9	>0.9	1.06	1.01	0.87	0.88	0.92	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-2:A4:45:_VACA-DXN 60KV SECTION ME	P2	Bus	1.03	0.92	>0.9	>0.9	1.08	1.03	0.90	0.91	0.95	0.91	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-2:A4:47:_PLAINFLD 60KV SECTION 1D	P2	Bus	1.04	0.96	>0.9	>0.9	1.07	1.04	0.94	0.95	0.97	0.95	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-2:A4:48:_DIXONPGE 60KV SECTION 2D	P2	Bus	1.02	0.91	>0.9	>0.9	1.07	1.02	0.89	0.90	0.94	0.91	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-2:A4:49:_DIXONPGE 60KV SECTION 1D	P2	Bus	1.02	0.92	>0.9	>0.9	1.07	1.02	0.90	0.91	0.94	0.91	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLAINFLD 60	P2-2:A4:5:_VACA-DIX 230KV SECTION 2F	P2	Bus	1.02	0.89	>0.9	>0.9	1.07	1.01	0.87	0.88	0.92	0.88	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.04	0.92	>0.9	>0.9	1.07	1.03	0.90	0.90	0.95	0.91	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-2:A5:7:_GOLDHILL 230KV SECTION 2D	P2	Bus	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A11:30:_SCHULTE 115KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A11:6:_TESLA E - 2E 230KV & STAGG-TESLA LINE	P2	Non-bus-tie breaker	1.02	0.91	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A4:1:_LAMBIE 230KV - MIDDLE BREAKER BAY 1	P2	Non-bus-tie breaker	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A4:2:_LAMBIE 230KV - MIDDLE BREAKER BAY 0	P2	Non-bus-tie breaker	1.02	0.91	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A4:28:_VACA-DIX 115KV - MIDDLE BREAKER BAY 7	P2	Non-bus-tie breaker	1.02	0.90	>0.9	>0.9	1.06	1.01	0.87	0.88	0.92	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A4:29:_VACA-DIX 115KV - MIDDLE BREAKER BAY 8	P2	Non-bus-tie breaker	1.02	0.90	>0.9	>0.9	1.06	1.02	0.88	0.89	0.93	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A4:3:_BDLSWSTA 230KV - MIDDLE BREAKER BAY 4	P2	Non-bus-tie breaker	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.92	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A4:32:_VACA-DIX 115KV - MIDDLE BREAKER BAY 6	P2	Non-bus-tie breaker	1.02	0.90	>0.9	>0.9	1.06	1.02	0.87	0.88	0.92	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLAINFLD 60	P2-3:A4:33:_VACA-DIX 115KV - MIDDLE BREAKER BAY 4	P2	Non-bus-tie breaker	1.03	0.88	>0.9	>0.9	1.07	1.03	0.85	0.86	0.92	0.87	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A4:46:_VACA-DXN - ME 60KV & DIXON-VACA #2 LINE	P2	Non-bus-tie breaker	1.03	0.92	>0.9	>0.9	1.08	1.03	0.90	0.91	0.95	0.91	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A4:47:_VACA-DXN - ME 60KV & VACA-DXN-TRVS_HPT LINE	P2	Non-bus-tie breaker	1.03	0.92	>0.9	>0.9	1.08	1.03	0.90	0.91	0.95	0.91	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A4:49:_DIXONPGE - 2D 60KV & DIXON-VACA #2 LINE	P2	Non-bus-tie breaker	1.02	0.91	>0.9	>0.9	1.07	1.02	0.89	0.90	0.94	0.91	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A4:6:_BDLSWSTA 230KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.91	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A5:5:_GOLDHILL - 2D 230KV & MIDDLE FORK-GOLD HILL LINE	P2	Non-bus-tie breaker	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A5:6:_MIDLFORK - 1D 230KV & MIDDLE FORK-GOLD HILL LINE	P2	Non-bus-tie breaker	1.02	0.91	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-3:A5:89:_RIO OSO 230KV - MIDDLE BREAKER BAY 3	P2	Non-bus-tie breaker	>0.9	0.90	>0.9	>0.9	1.07	>0.9	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-4:A11:2:_BELLOTA 230KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.91	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-4:A4:1:_VACA-DIX 230KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.00	0.88	>0.9	>0.9	1.05	1.00	0.85	0.86	0.90	0.87	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-4:A4:2:_VACA-DIX 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.01	0.89	>0.9	>0.9	1.06	1.01	0.86	0.87	0.91	0.88	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope



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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLAINFLD 60	P2-4:A4:22:_DIXONPGE 60KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.02	0.92	>0.9	>0.9	1.07	1.02	0.90	0.91	0.94	0.91	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-4:A4:3:_VACA-DIX 230KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.00	0.88	>0.9	>0.9	1.06	1.00	0.86	0.87	0.90	0.87	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-4:A4:4:_VACA-DIX 230KV - SECTION 2F & 2E	P2	Bus-tie breaker	1.01	0.89	>0.9	>0.9	1.07	1.01	0.87	0.88	0.91	0.88	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P2-1:A11:49:_GWFTTRACY-SCHULTE 115KV [0] NO FAULT	P2-1	Line Section w/o fault	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
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	>0.9	>0.9	1.07	1.02	0.89	0.90	0.94	0.91	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
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	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P1-1:A11:24:_COG.CAPT 9.11KV GEN UNIT 1 P1-2:A11:55:_GWFTTRACY-SCHULTE #1 115KV [0]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P5-5:A11:1:_SCHULTE 115KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P55	Non-Redundant	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P5-5:A4:2:_Lambie 230 kV BAAH Bus #2 (failure of non-redundent relay)	P55	Non-Redundant	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
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	>0.9	>0.9	1.07	1.02	0.88	0.89	0.92	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
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	>0.9	>0.9	1.07	1.02	0.88	0.89	0.91	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
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	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	0.84	0.85	>0.9	0.86	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P7-1:A11:28:_TESLA-NEWARK #1 230KV [5720] & TESLA-RAVENSWOOD 230KV [5730]	P7	DCTL	1.02	0.91	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P7-1:A12:2:_MELONES-WILSON 230KV [5080] & COTTLE-MELONES 230KV [4530]	P7	DCTL	1.02	0.91	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
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	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
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	>0.9	>0.9	1.07	1.03	0.89	0.90	0.94	0.91	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P7-1:A4:23_CORTINA-VACA1 and DELEVAN-CORTINA	P7	DCTL	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P7-1:A4:26:_VACA-SUISUN & VACA-SUISUN-JAMESON	P7	DCTL	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P7-1:A5:4_Poe-Rio Oso 230 kV Line & Cresta-Rio Oso 230 kV Line	P7	DCTL	1.02	0.90	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.89	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLAINFLD 60	P7-1:A5:6_Table Mountain-Rio Oso 230 kV Line & Palermo-Colgate 230 kV Line	P7	DCTL	1.02	0.91	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
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	>0.9	>0.9	1.07	1.02	0.88	0.89	0.93	0.90	Project: Vaca-Dixon voltage conversion projecct Project ISD: on-hold Review project scope
PLCRVLB2 115	Base Case	P0	N-0	1.05	1.02	>0.9	>0.9	1.06	1.05	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLCRVLB2 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.01	>0.9	>0.9	1.07	1.05	1.00	1.00	1.00	1.00	- Load power factor correction - Reactor projects
PLCRVLB2 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	>0.9	>0.9	1.06	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
PLCRVLB2 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
PLCRVLB2 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.00	>0.9	>0.9	1.06	1.05	1.00	0.99	1.01	0.99	- Load power factor correction - Reactor projects
PLCRVLB2 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.01	1.02	1.02	- Load power factor correction - Reactor projects
PLCRVLB2 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
PLCRVLB2 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
PLCRVLB2 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.05	0.99	>0.9	>0.9	1.06	1.05	0.98	0.98	1.00	0.98	- Load power factor correction - Reactor projects
PLCRVLB2 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.01	>0.9	>0.9	1.06	1.05	1.00	1.00	1.00	1.00	- Load power factor correction - Reactor projects
PLCRVLB2 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.01	>0.9	>0.9	1.06	1.05	1.00	1.00	1.00	1.00	- Load power factor correction - Reactor projects
PLCRVLB2 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.99	>0.9	>0.9	1.06	1.05	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects
PLCRVLB2 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.02	>0.9	>0.9	1.07	1.07	1.02	1.01	1.02	1.02	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.04	0.99	0.84	0.80	0.89	0.86	Connect Shingle Spring load to Missouri Flat-Gold Hill #1 115KV
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	>0.9	>0.9	1.07	1.05	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects
PLCRVLB2 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	>0.9	>0.9	1.06	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
PLCRVLB3 115	Base Case	P0	N-0	1.05	1.02	>0.9	>0.9	1.06	1.05	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
PLCRVLB3 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.05	1.01	>0.9	>0.9	1.07	1.05	1.00	1.00	1.00	1.00	- Load power factor correction - Reactor projects
PLCRVLB3 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	>0.9	>0.9	1.06	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.00	>0.9	>0.9	1.06	1.05	1.00	0.99	1.01	0.99	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.01	1.02	1.02	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.08	1.03	>0.9	>0.9	1.07	1.08	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-3:A5:27:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T1 LINE	P2	Non-bus-tie breaker	1.05	0.99	>0.9	>0.9	1.06	1.05	0.98	0.98	1.00	0.98	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.01	>0.9	>0.9	1.06	1.05	1.00	1.00	1.00	1.00	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.05	1.01	>0.9	>0.9	1.06	1.05	1.00	1.00	1.00	1.00	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.99	>0.9	>0.9	1.06	1.05	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.02	>0.9	>0.9	1.07	1.07	1.02	1.01	1.02	1.02	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.04	0.99	0.84	0.80	0.89	0.86	Connect Shingle Spring load to Missouri Flat-Gold Hill #1 115KV
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	>0.9	>0.9	1.07	1.05	1.00	1.00	1.00	1.00	- Load power factor correction - Reactor projects
PLCRVLB3 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	>0.9	>0.9	1.06	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
PLSNT GR 115	Base Case	P0	N-0	1.03	1.00	>0.9	>0.9	1.04	1.03	1.00	1.00	1.00	0.99	Load power factor correction



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High/Low Voltage

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				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 Generation s	
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	>0.9	>0.9	1.02	1.02	0.95	0.93	0.99	0.92	Load power factor correction
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	>0.9	0.94	>0.9	>0.9	>0.9	>0.9	0.95	0.93	>0.9	0.95	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.77	>0.9	Sensitivity only
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	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	Action plan or SPS
POST 115	Base Case	P0	N-0	1.03	1.04	>0.9	>0.9	1.03	1.03	1.03	1.04	1.05	1.03	Load power factor correction
PRDEJCT 60	Base Case	P0	N-0	1.04	1.05	>0.9	>0.9	1.04	1.04	1.05	1.05	1.06	1.05	- Load power factor correction - Reactor projects
PUTH CRK 115	Base Case	P0	N-0	1.07	1.04	>0.9	>0.9	1.07	1.07	1.04	1.04	1.03	1.04	- Load power factor correction - Reactor projects
PUTH CRK 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	>0.9	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
PUTH CRK 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	>0.9	>0.9	1.07	1.07	1.04	1.04	1.03	1.04	- Load power factor correction - Reactor projects
PUTH CRK 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	>0.9	>0.9	1.08	1.08	1.05	1.04	1.05	1.05	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
Q653F 115	Base Case	P0	N-0	1.02	1.02	>0.9	>0.9	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction
Q653F 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	>0.9	>0.9	1.04	1.03	1.02	1.02	1.03	1.01	Load power factor correction
Q653F 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.00	0.96	>0.9	>0.9	1.03	1.02	0.99	0.99	1.01	0.99	Load power factor correction
Q653F 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.00	0.96	>0.9	>0.9	1.02	1.02	0.99	0.99	1.01	0.99	Load power factor correction
Q653F 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.02	>0.9	>0.9	1.04	1.04	1.01	1.02	1.03	1.01	Load power factor correction
Q653F 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.00	1.02	0.99	Load power factor correction
Q653F 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
R.TRACK 115	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction
R.TRACK 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.65	>0.9	>0.9	1.04	0.93	0.63	0.64	0.95	0.62	Bellota 230 kV bus upgrade
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	>0.9	>0.9	>0.9	0.99	>0.9	>0.9	0.97	0.88	Action plan or SPS
RALSTON 230	Base Case	P0	N-0	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.00	0.98	1.00	Load power factor correction

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
RICE 60	Base Case	P0	N-0	1.00	1.00	>0.9	>0.9	1.06	1.00	0.98	0.98	1.01	0.98	- Load power factor correction - Reactor projects
RIO OSO 115	Base Case	P0	N-0	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction
RIO OSO 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction
RIO OSO 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
RIO OSO 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.04	1.05	>0.9	>0.9	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction
RIO OSO 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
RIO OSO 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction
RIO OSO 115	P2-3:A4:17:_WOODLD - 1F 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
RIO OSO 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.04	1.04	>0.9	>0.9	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction
RIO OSO 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.04	1.04	>0.9	>0.9	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction
RIO OSO 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.04	1.04	Load power factor correction
RIO OSO 115	P2-3:A5:83:_DRUM 115KV - RING R5 & R4	P2	Non-bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
RIO OSO 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	1.04	>0.9	>0.9	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction
RIO OSO 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.04	1.05	>0.9	>0.9	1.04	1.05	1.05	1.05	1.05	1.05	Load power factor correction
RIO OSO 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction
RIO OSO 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction
RIO OSO 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.05	1.05	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
RIO OSO 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
RIO OSO 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction
RIO OSO 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.05	1.04	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	1.04	1.05	1.04	1.05	1.05	1.04	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
RIO OSO 230	Base Case	P0	N-0	1.00	0.97	>0.9	>0.9	1.02	1.00	0.96	0.96	0.97	0.96	Load power factor correction
RIPON 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.99	0.85	>0.9	>0.9	1.02	0.98	0.83	0.84	0.98	0.83	Project: Vierra looping project
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	>0.9	>0.9	0.86	Project: Vierra looping project
ROCKLIN 60	Base Case	P0	N-0	1.09	0.99	>0.9	>0.9	1.06	1.09	0.98	0.98	1.00	0.98	- Load power factor correction - Reactor projects
ROCKLIN 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.09	0.95	>0.9	>0.9	1.05	1.09	0.94	0.94	0.97	0.93	- Load power factor correction - Reactor projects
ROCKLIN 60	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.08	0.91	>0.9	>0.9	1.04	1.08	0.91	0.89	0.98	0.88	- Load power factor correction for high voltage - Low voltage: Sensitivity only
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	>0.9	0.92	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	- Load power factor correction for high voltage - Low voltage: Sensitivity only
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	>0.9	>0.9	1.06	1.09	0.96	0.95	0.99	0.94	- Load power factor correction - Reactor projects
RVRBANK 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.84	0.35	>0.9	>0.9	1.03	0.83	0.32	0.33	0.88	0.33	Bellota 230 kV bus upgrade
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	>0.9	>0.9	>0.9	0.92	>0.9	>0.9	0.91	0.76	Action plan or SPS
SAFEWAY 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction
SALADO 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.05	1.04	1.03	1.03	1.03	1.02	Load power factor correction
SALADO 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	1.00	>0.9	>0.9	1.06	1.02	0.95	0.97	NConv	0.91	Sensitivity only
SANDBAR 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.77	>0.9	>0.9	1.04	1.00	0.74	0.75	1.01	0.73	Bellota 230 kV bus upgrade
SCHMLBCH 115	Base Case	P0	N-0	1.05	1.03	>0.9	>0.9	1.06	1.05	1.02	1.02	1.01	1.03	- Load power factor correction - Reactor projects
SCHULTE 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.02	1.03	Load power factor correction

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SHPRING 115	Base Case	P0	N-0	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.01	>0.9	>0.9	1.07	1.06	1.01	1.00	1.01	1.01	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.01	1.02	1.01	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P1	N-1	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.06	1.03	>0.9	>0.9	1.07	1.06	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.05	1.01	>0.9	>0.9	1.07	1.05	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.06	1.03	>0.9	>0.9	1.07	1.06	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.06	1.03	>0.9	>0.9	1.07	1.06	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.06	1.03	>0.9	>0.9	1.07	1.06	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.01	>0.9	>0.9	1.07	1.06	1.01	1.00	1.01	1.01	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support



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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SHPRING 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.01	>0.9	>0.9	1.07	1.06	1.01	1.00	1.01	1.00	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	0.99	>0.9	>0.9	1.06	1.05	0.98	0.98	0.99	0.98	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.07	1.03	>0.9	>0.9	1.07	1.07	1.02	1.01	1.02	1.02	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	>0.9	>0.9	1.03	0.99	0.82	0.78	0.88	0.84	Connect Shingle Spring load to Missouri Flat-Gold Hill #1 115KV
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	>0.9	>0.9	1.07	1.06	1.01	1.00	1.01	1.01	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.06	1.01	>0.9	>0.9	1.07	1.06	1.00	1.00	1.01	1.00	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.01	1.02	1.01	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SHPRING 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
SHPRING 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393] P1-2:A5:38:_ELDORAD-MIZOU_T2 115KV [0]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	1.07	1.06	1.01	1.01	1.02	1.01	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	>0.9	>0.9	1.07	1.07	1.03	1.02	1.03	1.02	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SIERRAPI 60	Base Case	P0	N-0	1.10	0.97	>0.9	>0.9	1.06	1.10	0.97	0.96	0.99	0.96	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SIERRAPI 60	P2-2:A5:10:_GOLDHILL 115KV SECTION 1F	P2	Bus	1.10	0.98	>0.9	>0.9	1.06	1.10	0.97	0.97	0.99	0.97	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SIERRAPI 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.10	0.94	>0.9	>0.9	1.05	1.09	0.92	0.92	0.96	0.92	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SIERRAPI 60	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.10	0.98	>0.9	>0.9	1.06	1.10	0.97	0.95	0.99	0.97	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SIERRAPI 60	P2-4:A5:5:_GOLDHILL 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.10	0.98	>0.9	>0.9	1.06	1.10	0.97	0.97	0.99	0.97	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SIERRAPI 60	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.09	0.89	>0.9	>0.9	1.04	1.09	0.89	0.87	0.97	0.86	Protection upgrade
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	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	0.90	0.88	>0.9	>0.9	Action plan or SPS
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	>0.9	>0.9	1.06	1.10	0.97	0.97	0.99	0.97	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
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	>0.9	>0.9	1.06	1.09	0.94	0.94	0.98	0.93	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SMRTSVLE 60	Base Case	P0	N-0	1.02	1.02	>0.9	>0.9	1.04	1.02	1.02	1.02	1.03	1.02	Load power factor correction
SNDBR JT 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.77	>0.9	>0.9	1.04	0.99	0.74	0.75	1.01	0.73	Bellota 230 kV bus upgrade
SOUTH BY 60	Base Case	P0	N-0	1.06	1.04	>0.9	>0.9	1.06	1.06	1.04	1.04	1.03	1.04	- Load power factor correction - Reactor projects - Project: Rio Oso Area 230 kV Voltage Support
SPAULDNG 60	Base Case	P0	N-0	1.03	1.04	>0.9	>0.9	1.04	1.04	1.04	1.04	1.04	1.04	Load power factor correction
SPAULDNG 60	P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P1	N-1	1.05	1.05	>0.9	>0.9	1.06	1.05	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
SPAULDNG 60	P2-2:A5:40:_SPAULDNG 60KV SECTION 1D	P2	Bus	1.05	1.05	>0.9	>0.9	1.06	1.05	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
SPAULDNG 60	P2-3:A5:61:_SPAULDNG - 1D 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.05	1.05	>0.9	>0.9	1.06	1.05	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
SPAULDNG 60	P2-3:A5:63:_DRUM - MA 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.05	1.05	>0.9	>0.9	1.06	1.05	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SPAULDNG 60	P2-1:A5:100:_DRUM-SPAULDING 60KV [6770] (SPAULDNG-BOWMN TP)	P2-1	Line Section w/o fault	1.05	1.05	>0.9	>0.9	1.06	1.05	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
SPI JCT 115	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.04	1.04	1.01	1.02	1.02	1.01	Load power factor correction
SPI JCT 115	P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P1	N-1	1.05	1.04	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	1.03	1.02	0.98	0.97	1.01	0.96	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
SPICAMIN 115	Base Case	P0	N-0	1.06	1.02	>0.9	>0.9	1.06	1.06	1.02	1.02	1.01	1.02	- Load power factor correction - Reactor projects
SPICAMIN 115	P1-2:A5:36:_DRUM-HIGGINS 115KV [4393]	P1	N-1	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
SPICAMIN 115	P1-2:A5:37:_BELL-PLACER 115KV [4395]	P1	N-1	1.06	1.03	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-2:A5:19:_PLACER 115KV SECTION 1D	P2	Bus	1.07	1.03	>0.9	>0.9	1.07	1.07	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-2:A5:21:_ELDORAD 115KV SECTION 1D	P2	Bus	1.07	1.02	>0.9	>0.9	1.07	1.07	1.02	1.01	1.02	1.01	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-3:A5:22:_PLACER - 1D 115KV & PLACER-GOLD HILL #1 LINE	P2	Non-bus-tie breaker	1.07	1.03	>0.9	>0.9	1.07	1.07	1.03	1.02	1.02	1.02	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-3:A5:23:_PLACER - 1D 115KV & PLACER-GOLD HILL #2 LINE	P2	Non-bus-tie breaker	1.07	1.03	>0.9	>0.9	1.07	1.07	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-3:A5:24:_PLACER - 1D 115KV & BELL-PLACER LINE	P2	Non-bus-tie breaker	1.07	1.03	>0.9	>0.9	1.07	1.07	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-3:A5:26:_ELDORAD - 1D 115KV & ELDORAD-MIZOU_T2 LINE	P2	Non-bus-tie breaker	1.08	1.02	>0.9	>0.9	1.07	1.08	1.02	1.02	1.03	1.02	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-3:A5:81:_DRUM 115KV - RING R2 & R3	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
SPICAMIN 115	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.06	1.00	>0.9	>0.9	1.06	1.06	0.99	0.99	0.99	0.99	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-4:A5:4:_GOLDHILL 115KV - SECTION 1F & 2F	P2	Bus-tie breaker	1.08	1.03	>0.9	>0.9	1.07	1.08	1.03	1.01	1.02	1.03	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.05	1.03	0.91	0.88	0.94	0.92	Sensitivity only
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	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-1:A5:31:_DRUM-HIGGINS 115KV [4393] (CHCGO PK-HIGGINS)	P2-1	Line Section w/o fault	1.06	1.02	>0.9	>0.9	1.07	1.06	1.01	1.01	1.01	1.01	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-1:A5:34:_BELL-PLACER 115KV [4395] (PLACER-BELL PGE)	P2-1	Line Section w/o fault	1.07	1.03	>0.9	>0.9	1.07	1.06	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
SPICAMIN 115	P2-1:A5:37:_HIGGINS-BELL 115KV [1412] (HIGGINS-BELL PGE)	P2-1	Line Section w/o fault	1.06	1.02	>0.9	>0.9	1.07	1.06	1.02	1.01	1.01	1.02	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.07	1.07	1.02	1.02	1.02	1.02	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.07	1.07	1.03	1.03	1.03	1.03	- Load power factor correction - Reactor projects
SPI-LINC 115	Base Case	P0	N-0	1.04	1.02	>0.9	>0.9	1.04	1.04	1.01	1.02	1.02	1.01	Load power factor correction
SPI-LINC 115	P1-2:A5:18:_LINCOLN-PLEASANT GROVE 115KV [7400]	P1	N-1	1.05	1.04	>0.9	>0.9	1.04	1.05	1.03	1.04	1.04	1.03	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	1.03	1.02	0.98	0.97	1.01	0.96	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
SPISONORA 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.94	0.69	>0.9	>0.9	1.03	0.94	0.66	0.67	0.97	0.65	Bellota 230 kV bus upgrade
SPRNG GJ 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.99	0.77	>0.9	>0.9	1.04	0.99	0.74	0.75	1.01	0.72	Bellota 230 kV bus upgrade
SPRNG GP 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.00	0.77	>0.9	>0.9	1.04	0.99	0.74	0.75	1.01	0.73	Bellota 230 kV bus upgrade
STAGG 60	Base Case	P0	N-0	1.04	1.05	>0.9	>0.9	1.05	1.04	1.05	1.05	1.05	1.04	Sensitivity only
STANISLS 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.04	1.03	Load power factor correction
STANISLS 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.98	0.76	>0.9	>0.9	1.04	0.97	0.74	0.75	0.99	0.73	Bellota 230 kV bus 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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
STKTON A 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.82	0.26	>0.9	>0.9	1.01	0.81	0.24	0.25	0.84	0.25	Bellota 230 kV bus upgrade
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	>0.9	>0.9	>0.9	0.91	>0.9	>0.9	0.88	0.71	Action plan or SPS
STKTON B 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.83	0.30	>0.9	>0.9	1.02	0.82	0.28	0.28	0.86	0.29	Bellota 230 kV bus upgrade
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	>0.9	>0.9	>0.9	0.92	>0.9	>0.9	0.90	0.74	Action plan or SPS
STN COGN 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.82	0.27	>0.9	>0.9	1.01	0.81	0.25	0.25	0.84	0.26	Bellota 230 kV bus upgrade
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	>0.9	>0.9	>0.9	0.91	>0.9	>0.9	0.88	0.72	Action plan or SPS
SUISUN 115	Base Case	P0	N-0	1.05	1.03	>0.9	>0.9	1.06	1.05	1.02	1.02	1.01	1.03	- Load power factor correction - Reactor projects
SUMMIT 60	Base Case	P0	N-0	1.02	1.05	>0.9	>0.9	1.06	1.02	1.05	1.05	1.05	1.04	- Load power factor correction - Reactor projects
SUMMIT 60	P1-2:A5:67:_DRUM-SPAULDING 60KV [6770]	P1	N-1	1.03	1.05	>0.9	>0.9	1.06	1.03	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
SUMMIT 60	P2-2:A5:39:_SPAULDNG 60KV SECTION MA	P2	Bus	1.02	1.06	>0.9	>0.9	1.07	1.02	1.05	1.06	1.06	1.05	- Load power factor correction - Reactor projects
SUMMIT 60	P2-2:A5:40:_SPAULDNG 60KV SECTION 1D	P2	Bus	1.03	1.05	>0.9	>0.9	1.06	1.03	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
SUMMIT 60	P2-3:A5:61:_SPAULDNG - 1D 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.03	1.05	>0.9	>0.9	1.06	1.03	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
SUMMIT 60	P2-3:A5:63:_DRUM - MA 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.03	1.05	>0.9	>0.9	1.06	1.03	1.05	1.05	1.05	1.04	- Load power factor correction - Reactor projects
SUMMIT 60	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.02	1.06	>0.9	>0.9	1.06	1.02	1.05	1.06	1.06	1.05	- Load power factor correction - Reactor projects
SUMMIT 60	P2-1:A5:100:_DRUM-SPAULDING 60KV [6770] (SPAULDNG-BOWMN TP)	P2-1	Line Section w/o fault	1.03	1.05	>0.9	>0.9	1.06	1.03	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
SUMMIT 60	P2-1:A5:93:_SPAULDING-SUMMIT 60KV [8060] (TAMARACK-SUMMIT)	P2-1	Line Section w/o fault	1.03	1.06	>0.9	>0.9	1.08	1.03	1.06	1.06	1.06	1.06	- Load power factor correction - Reactor projects
SUMMIT 60	P2-1:A5:94:_SPAULDING-SUMMIT 60KV [8060] (CISCO GR-TAMARACK)	P2-1	Line Section w/o fault	1.02	1.06	>0.9	>0.9	1.08	1.02	1.06	1.06	1.06	1.05	- Load power factor correction - Reactor projects
SUMMIT 60	P2-1:A5:95:_SPAULDING-SUMMIT 60KV [8060] (CISCO GR-SPAULDNG)	P2-1	Line Section w/o fault	1.02	1.06	>0.9	>0.9	1.07	1.02	1.06	1.06	1.06	1.05	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
TAMARACK 60	Base Case	P0	N-0	1.03	1.04	>0.9	>0.9	1.05	1.03	1.04	1.04	1.05	1.04	- Load power factor correction - Reactor projects
TAMARACK 60	P2-2:A5:39:_SPAULDNG 60KV SECTION MA	P2	Bus	1.02	1.05	>0.9	>0.9	1.07	1.02	1.05	1.06	1.06	1.05	- Load power factor correction - Reactor projects
TAMARACK 60	P2-3:A5:63:_DRUM - MA 60KV & DRUM-SPAULDING LINE	P2	Non-bus-tie breaker	1.03	1.05	>0.9	>0.9	1.06	1.03	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
TAMARACK 60	P2-3:A5:85:_BRNSWALT 115KV - RING R4 & R3	P2	Non-bus-tie breaker	1.03	1.06	>0.9	>0.9	1.05	1.03	1.05	1.06	1.06	1.04	- Load power factor correction - Reactor projects
TAMARACK 60	P2-1:A5:94:_SPAULDING-SUMMIT 60KV [8060] (CISCO GR-TAMARACK)	P2-1	Line Section w/o fault	1.02	1.06	>0.9	>0.9	1.08	1.02	1.06	1.06	1.06	1.05	- Load power factor correction - Reactor projects
TAMARACK 60	P2-1:A5:95:_SPAULDING-SUMMIT 60KV [8060] (CISCO GR-SPAULDNG)	P2-1	Line Section w/o fault	1.02	1.06	>0.9	>0.9	1.07	1.02	1.05	1.06	1.06	1.05	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
TAYLOR 60	Base Case	P0	N-0	1.09	0.99	>0.9	>0.9	1.06	1.09	0.98	0.98	1.00	0.98	- Load power factor correction - Reactor projects
TAYLOR 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.08	0.95	>0.9	>0.9	1.06	1.08	0.94	0.94	0.97	0.94	- Load power factor correction - Reactor projects
TAYLOR 60	P5-5:A5:1:_Atlantic 230 kV BAAH Bus #1 (failure of non-redundent relay)	P55	Non-Redundant	1.08	0.91	>0.9	>0.9	1.04	1.08	0.91	0.89	0.98	0.88	- Load power factor correction for high voltage - Low voltage: Sensitivity only
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	>0.9	0.92	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	Load power factor correction
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	>0.9	>0.9	1.06	1.08	0.96	0.96	0.99	0.94	- Load power factor correction - Reactor projects
TEICHERT 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction
TEICHERT 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.02	0.99	>0.9	>0.9	1.06	1.02	0.95	0.97	NConv	0.91	Sensitivity only
TESLA 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.03	1.03	Load power factor correction
TH.E.DV. 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.03	1.03	Load power factor correction
TIGR CRK 230	Base Case	P0	N-0	1.04	1.01	>0.9	>0.9	1.03	1.04	1.01	1.01	1.00	1.01	Load power factor correction
TOSCO-PP 60	Base Case	P0	N-0	1.06	1.04	>0.9	>0.9	1.06	1.06	1.04	1.04	1.03	1.04	- Load power factor correction - Reactor projects
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	>0.9	0.92	>0.9	>0.9	>0.9	>0.9	0.89	0.90	>0.9	0.91	Action plan or SPS
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
TULLOCH 115	Base Case	P0	N-0	1.04	1.03	>0.9	>0.9	1.04	1.04	1.03	1.03	1.03	1.02	Load power factor correction
TULLOCH 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.89	0.55	>0.9	>0.9	1.04	0.88	0.53	0.54	0.93	0.53	Bellota 230 kV bus upgrade
TULLOCH 115	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	1.04	1.03	>0.9	>0.9	0.98	1.04	1.02	1.03	NConv	1.01	Sensitivity only
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	>0.9	>0.9	>0.9	0.95	>0.9	>0.9	0.95	0.84	Action plan or SPS
ULTR-RCK 115	Base Case	P0	N-0	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.00	1.01	0.99	Load power factor correction
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	>0.9	>0.9	1.03	1.02	0.95	0.94	1.00	0.92	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.94	>0.9	>0.9	Load power factor correction
VACA-CB 115	Base Case	P0	N-0	1.08	1.07	>0.9	>0.9	1.09	1.08	1.07	1.06	1.06	1.07	- Load power factor correction - Reactor projects
VACA-CB 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.09	1.07	>0.9	>0.9	1.09	1.09	1.07	1.06	1.06	1.07	- Load power factor correction - Reactor projects
VACA-CB 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.08	1.07	>0.9	>0.9	1.09	1.08	1.07	1.06	1.06	1.07	- Load power factor correction - Reactor projects
VACA-CB 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.10	1.08	>0.9	>0.9	1.09	1.10	1.07	1.07	1.07	1.08	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
VACA-D&1 115	Base Case	P0	N-0	1.05	1.03	>0.9	>0.9	1.06	1.05	1.03	1.03	1.02	1.03	- Load power factor correction - Reactor projects
VACA-DIX 115	Base Case	P0	N-0	1.07	1.04	>0.9	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
VACA-DIX 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.05	>0.9	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
VACA-DIX 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	>0.9	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
VACA-DIX 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.06	>0.9	>0.9	1.08	1.08	1.05	1.04	1.05	1.05	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
VACA-DXN 60	Base Case	P0	N-0	1.07	1.04	>0.9	>0.9	1.07	1.07	1.04	1.03	1.03	1.04	- Load power factor correction - Reactor projects
VACA-DXN 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	>0.9	>0.9	1.08	1.08	1.04	1.03	1.03	1.04	- Load power factor correction - Reactor projects

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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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
VACA-DXN 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	>0.9	>0.9	1.07	1.07	1.04	1.03	1.03	1.04	- Load power factor correction - Reactor projects
VACA-DXN 60	P2-2:A4:45:_VACA-DXN 60KV SECTION ME	P2	Bus	1.08	1.05	>0.9	>0.9	1.09	1.08	1.05	1.04	1.04	1.05	- Load power factor correction - Reactor projects
VACA-DXN 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.09	1.05	>0.9	>0.9	1.08	1.08	1.04	1.04	1.04	1.05	- Load power factor correction - Reactor projects
VACA-DXN 60	P2-3:A4:46:_VACA-DXN - ME 60KV & DIXON-VACA #2 LINE	P2	Non-bus-tie breaker	1.08	1.05	>0.9	>0.9	1.09	1.08	1.05	1.04	1.04	1.05	- Load power factor correction - Reactor projects
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	>0.9	>0.9	1.09	1.08	1.05	1.04	1.04	1.05	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
VACAVLL1 115	Base Case	P0	N-0	1.07	1.04	>0.9	>0.9	1.07	1.07	1.04	1.03	1.03	1.04	- Load power factor correction - Reactor projects
VACAVLL1 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	>0.9	>0.9	1.08	1.07	1.04	1.04	1.04	1.04	- Load power factor correction - Reactor projects
VACAVLL1 115	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.07	1.04	>0.9	>0.9	1.07	1.07	1.04	1.03	1.03	1.04	- Load power factor correction - Reactor projects
VACAVLL1 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	>0.9	>0.9	1.08	1.08	1.05	1.04	1.05	1.05	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
VACAVLL2 115	Base Case	P0	N-0	1.06	1.04	>0.9	>0.9	1.07	1.06	1.03	1.03	1.03	1.04	- Load power factor correction - Reactor projects
VACAVLL2 115	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.07	1.04	>0.9	>0.9	1.07	1.07	1.04	1.03	1.03	1.04	- Load power factor correction - Reactor projects
VACAVLL2 115	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.08	1.05	>0.9	>0.9	1.07	1.08	1.04	1.03	1.04	1.05	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
VALLY HM 115	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.98	0.80	>0.9	>0.9	1.02	0.98	0.78	0.79	0.97	0.78	Bellota 230 kV bus upgrade
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	0.89	Project: Vierra looping project
VICTOR 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.06	0.86	>0.9	>0.9	1.03	1.06	0.81	0.83	0.90	0.80	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is 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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
VICTOR 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.06	0.86	>0.9	>0.9	1.03	1.06	0.80	0.82	0.89	0.79	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
VICTOR 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.05	0.93	>0.9	>0.9	1.02	1.05	0.90	0.91	0.94	0.90	- Load power factor correction for high voltage - Low voltage: Sensitivity only
VICTOR 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.05	0.90	>0.9	>0.9	1.03	1.05	0.86	0.87	0.93	0.86	Bellota 230 kV bus 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	>0.9	>0.9	1.00	1.07	0.98	0.98	0.99	0.98	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is 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	>0.9	0.86	>0.9	>0.9	>0.9	>0.9	0.87	0.88	0.89	0.83	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
VICTOR 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.05	0.90	>0.9	>0.9	1.03	1.06	0.86	0.88	0.93	0.86	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	0.91	>0.9	0.92	Sensitivity only
VLLY SPS 230	Base Case	P0	N-0	1.03	1.00	>0.9	>0.9	1.03	1.03	1.00	1.00	0.99	1.00	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	0.82	>0.9	>0.9	>0.9	>0.9	>0.9	Action plan or SPS
VLLY SPS 60	Base Case	P0	N-0	1.04	1.05	>0.9	>0.9	1.04	1.04	1.05	1.05	1.05	1.05	- Load power factor correction - Reactor projects
VSLDSW87 60	Base Case	P0	N-0	1.04	1.05	>0.9	>0.9	1.05	1.05	1.05	1.05	1.06	1.05	- Load power factor correction - Reactor projects
W.SCRMNO 115	Base Case	P0	N-0	1.04	1.04	>0.9	>0.9	1.03	1.03	1.03	1.04	1.05	1.03	- Load power factor correction - Reactor projects
WATRLJCT 60	P2-3:A11:81:_LOCKFORD 230KV - RING R3 & R4	P2	Non-bus-tie breaker	1.05	0.88	>0.9	>0.9	1.03	1.05	0.83	0.84	0.91	0.82	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
WATRLJCT 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.05	0.87	>0.9	>0.9	1.03	1.05	0.81	0.84	0.91	0.81	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
WATRLJCT 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.04	0.91	>0.9	>0.9	1.03	1.04	0.88	0.89	0.94	0.88	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is 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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
WATRLJCT 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKFORD-BELLOTA 230KV [4990]	P6	N-1/N-1	>0.9	0.87	>0.9	>0.9	>0.9	>0.9	0.88	0.89	0.90	0.84	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
WATRLJCT 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.04	0.91	>0.9	>0.9	1.03	1.05	0.88	0.89	0.94	0.88	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
WDLND_BM 115	Base Case	P0	N-0	1.03	1.02	>0.9	>0.9	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction
WDLND_BM 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	>0.9	>0.9	1.04	1.03	1.02	1.02	1.03	1.01	Load power factor correction
WDLND_BM 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.04	1.02	>0.9	>0.9	1.04	1.04	1.02	1.02	1.03	1.01	Load power factor correction
WDLND_BM 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.01	1.03	1.00	Load power factor correction
WDLND_BM 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
WDLND_BM 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
WEC 115	Base Case	P0	N-0	1.05	1.03	>0.9	>0.9	1.06	1.05	1.03	1.03	1.02	1.03	- Load power factor correction - Reactor projects
WEST JCT 60	Base Case	P0	N-0	1.03	1.03	>0.9	>0.9	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction
WEST PNT 60	Base Case	P0	N-0	1.04	1.04	>0.9	>0.9	1.03	1.04	1.04	1.04	1.05	1.04	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	Action plan or SPS
WEST SDE 60	Base Case	P0	N-0	1.05	1.03	>0.9	>0.9	1.05	1.06	1.04	1.03	1.03	1.03	- Load power factor correction - Reactor projects
WESTLEY 60	P2-3:A11:15:_KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA LINE	P2	Non-bus-tie breaker	0.91	0.91	>0.9	>0.9	0.99	0.91	0.89	0.90	0.95	0.89	Project: Vierra looping project
WESTLEY 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.95	0.90	>0.9	>0.9	1.01	0.95	0.90	0.90	0.98	0.90	Project: Vierra looping project
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	0.90	>0.9	>0.9	Sensitivity only
WILKINS 60	P1-2:A4:44:_CORTINA #1 60KV [6580] P1-3:A4:6:_CORTINA 230/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	Sensitivity only
WINTERS 60	Base Case	P0	N-0	1.05	1.00	>0.9	>0.9	1.07	1.05	0.99	0.99	1.00	1.00	- Load power factor correction - Reactor projects
WINTERS 60	P1-3:A4:1:_VACA-DIX 500/230KV TB 11	P1	N-1	1.06	1.00	>0.9	>0.9	1.07	1.06	0.99	0.99	1.01	1.00	- Load power factor correction - Reactor projects

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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
WINTERS 60	P1-4:A4:6:_VC DX11T SVD=V	P1	N-1	1.05	1.00	>0.9	>0.9	1.07	1.05	0.99	0.99	1.00	0.99	- Load power factor correction - Reactor projects
WINTERS 60	P2-2:A4:45:_VACA-DXN 60KV SECTION ME	P2	Bus	1.06	1.01	>0.9	>0.9	1.08	1.06	1.00	1.00	1.01	1.01	- Load power factor correction - Reactor projects
WINTERS 60	P2-2:A4:7:_VACA-DIX 230KV SECTION NA	P2	Bus	1.07	1.01	>0.9	>0.9	1.07	1.06	1.00	0.99	1.01	1.01	- Load power factor correction - Reactor projects
WINTERS 60	P2-3:A4:46:_VACA-DXN - ME 60KV & DIXON-VACA #2 LINE	P2	Non-bus-tie breaker	1.06	1.01	>0.9	>0.9	1.08	1.06	1.00	1.00	1.01	1.01	- Load power factor correction - Reactor projects
WINTERS 60	P2-3:A4:47:_VACA-DXN - ME 60KV & VACA-DXN-TRVS_HPT LINE	P2	Non-bus-tie breaker	1.06	1.01	>0.9	>0.9	1.08	1.06	1.00	1.00	1.01	1.01	- Load power factor correction - Reactor projects
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
WLKSLICT 60	P1-2:A4:44:_CORTINA #1 60KV [6580] P1-3:A4:6:_CORTINA 230/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	Sensitivity only
WODBRG J 60	Base Case	P0	N-0	1.06	1.02	>0.9	>0.9	1.02	1.06	1.01	1.02	1.02	1.01	Load power factor correction
WODBRG J 60	P1-2:A11:7:_LOCKFORD-BELLOTA 230KV [4990]	P1	N-1	1.07	0.92	>0.9	>0.9	1.01	1.07	0.89	0.90	0.94	0.89	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
WODBRG J 60	P2-2:A11:9:_BELLOTA 230KV SECTION 2E	P2	Bus	1.07	0.92	>0.9	>0.9	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	>0.9	>0.9	1.02	1.07	0.80	0.81	0.88	0.78	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
WODBRG J 60	P2-3:A11:82:_LOCKFORD 230KV - RING R3 & R2	P2	Non-bus-tie breaker	1.07	0.84	>0.9	>0.9	1.02	1.07	0.78	0.80	0.88	0.77	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
WODBRG J 60	P2-4:A11:1:_BELLOTA 230KV - SECTION 2D & 2E	P2	Bus-tie breaker	1.07	0.92	>0.9	>0.9	1.01	1.07	0.89	0.90	0.93	0.88	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
WODBRG J 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	1.07	0.88	>0.9	>0.9	1.02	1.07	0.85	0.86	0.91	0.84	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
WODBRG J 60	P1-3:A11:5:_LOCKFORD 230/60KV TB 3 P1-2:A11:7:_LOCKFORD-BELLOTA 230KV [4990]	P6	N-1/N-1	>0.9	0.84	>0.9	>0.9	>0.9	>0.9	0.86	0.86	0.88	0.81	Significant leading power factor in 2019 (0.7) Project: Lockeford-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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
WODBRG J 60	P7-1:A11:12:_BRIGHTON-BELLOTA 230KV [4420] & LOCKEFORD-BELLOTA 230KV [4990]	P7	DCTL	1.07	0.88	>0.9	>0.9	1.02	1.07	0.85	0.86	0.92	0.85	Significant leading power factor in 2019 (0.7) Project: Lockeford-Lodi area 230 kV development Scope is under review
WOODLD 115	Base Case	P0	N-0	1.02	1.02	>0.9	>0.9	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction
WOODLD 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.01	1.02	1.01	Load power factor correction
WOODLD 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.02	1.00	>0.9	>0.9	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction
WOODLD 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
WOODLD 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.02	1.00	>0.9	>0.9	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction
WOODLD 115	P2-3:A4:17:_WOODLD - 1F 115KV & RIO OSO-WOODLAND #2 LINE	P2	Non-bus-tie breaker	1.02	1.00	>0.9	>0.9	1.04	1.02	0.99	1.00	1.02	1.00	Load power factor correction
WOODLD 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.02	1.02	1.01	Load power factor correction
WOODLD 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
WOODLD 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.01	1.03	1.00	Load power factor correction
WOODLD 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.03	1.03	>0.9	>0.9	1.04	1.03	1.03	1.03	1.04	1.03	Load power factor correction
WOODLD 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.03	1.01	>0.9	>0.9	1.04	1.03	1.00	1.01	1.03	1.01	Load power factor correction
WOODLD 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
WOODLD 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
WOODLD 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
WSID 60	P2-3:A11:15:_KASSON - 1D 115KV & SCHULTE SW STA-KASSON-MANTECA LINE	P2	Non-bus-tie breaker	0.91	0.91	>0.9	>0.9	0.99	0.91	0.89	0.90	0.95	0.89	Project: Vierra looping project
WSID 60	P2-4:A11:3:_BELLOTA 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	0.95	0.90	>0.9	>0.9	1.01	0.95	0.90	0.90	0.98	0.90	Project: Vierra looping project
WSID 60	P2-4:A11:9:_TESLA 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	0.94	0.95	>0.9	>0.9	1.02	0.94	0.91	0.93	NConv	0.91	Sensitivity only
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	0.90	>0.9	>0.9	Project: Vierra looping project
ZAMORA 115	Base Case	P0	N-0	1.02	1.02	>0.9	>0.9	1.03	1.02	1.01	1.02	1.03	1.01	Load power factor correction
ZAMORA 115	P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P1	N-1	1.02	1.01	>0.9	>0.9	1.04	1.02	1.01	1.02	1.03	1.01	Load power factor correction
ZAMORA 115	P2-2:A4:17:_WOODLD 115KV SECTION 1F	P2	Bus	1.03	1.04	>0.9	>0.9	1.04	1.03	1.03	1.04	1.04	1.03	Load power factor correction
ZAMORA 115	P2-2:A4:20:_BRIGHTN 115KV SECTION ME	P2	Bus	1.00	1.01	>0.9	>0.9	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction



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	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP High CEC Forecast	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generation s	
ZAMORA 115	P2-2:A4:26:_DAVIS 115KV SECTION 1D	P2	Bus	1.03	1.02	>0.9	>0.9	1.04	1.03	1.02	1.03	1.03	1.02	Load power factor correction
ZAMORA 115	P2-3:A4:16:_WOODLD - 1F 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.03	>0.9	>0.9	1.04	1.03	1.03	1.04	1.04	1.03	Load power factor correction
ZAMORA 115	P2-3:A4:19:_BRIGHTN - ME 115KV & WEST SACRAMENTO-BRIGHTON LINE	P2	Non-bus-tie breaker	1.00	0.99	>0.9	>0.9	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction
ZAMORA 115	P2-3:A4:20:_BRIGHTN - ME 115KV & BRIGHTN-DAVIS-BRKR SLG LINE	P2	Non-bus-tie breaker	1.00	0.99	>0.9	>0.9	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction
ZAMORA 115	P2-3:A4:24:_DAVIS - 1D 115KV & WOODLAND-DAVIS LINE	P2	Non-bus-tie breaker	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
ZAMORA 115	P2-4:A4:10:_BRIGHTN 115KV - SECTION ME & MD	P2	Bus-tie breaker	1.00	1.01	>0.9	>0.9	1.03	1.02	1.01	1.01	1.02	1.01	Load power factor correction
ZAMORA 115	P2-4:A4:11:_DAVIS 115KV - SECTION 1D & 1E	P2	Bus-tie breaker	1.03	1.02	>0.9	>0.9	1.04	1.03	1.02	1.02	1.03	1.01	Load power factor correction
ZAMORA 115	P2-4:A4:12:_DAVIS 115KV - SECTION 1E & 1F	P2	Bus-tie breaker	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
ZAMORA 115	P2-4:A4:8:_WOODLD 115KV - SECTION 1F & 1E	P2	Bus-tie breaker	1.03	1.04	>0.9	>0.9	1.04	1.04	1.04	1.04	1.04	1.04	Load power factor correction
ZAMORA 115	P2-1:A4:14:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-WOODLD)	P2-1	Line Section w/o fault	1.03	1.02	>0.9	>0.9	1.04	1.03	1.01	1.02	1.03	1.01	Load power factor correction
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	>0.9	>0.9	1.04	1.03	1.03	1.04	1.04	1.03	Load power factor correction
ZAMORA 115	P2-1:A4:5:_WOODLAND-DAVIS 115KV [4210] (Q653FJCT-DAVIS)	P2-1	Line Section w/o fault	1.03	1.02	>0.9	>0.9	1.04	1.03	1.02	1.03	1.03	1.01	Load power factor correction
ZAMORA 115	P2-1:A4:6:_WOODLAND-DAVIS 115KV [4210] (WOODLANDTP-Q653FJCT)	P2-1	Line Section w/o fault	1.03	1.02	>0.9	>0.9	1.03	1.03	1.01	1.02	1.03	1.01	Load power factor correction
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	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
ZAMORA 115	P1-2:A5:17:_RIO OSO-LINCOLN 115KV [1320] P1-2:A4:25:_WOODLAND-DAVIS 115KV [4210]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
	P2-4:A5:3:_GOLDHILL 230KV - SECTION 2D & 1D	P2	Bus-tie breaker	Diverge	Diverge	Diverge	>0.9	>0.9	Diverge	Diverge	Diverge	Diverge	Diverge	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope
	P1-3:A5:7:_GOLDHILL 230/115KV TB 1 P1-3:A5:8:_GOLDHILL 230/115KV TB 2	P6	N-1/N-1	Diverge	Diverge	Diverge	>0.9	>0.9	Diverge	Diverge	Diverge	Diverge	Diverge	Project: Atlantic-Placer 115 kV line Project ISD: on-hold Review project scope

Study Area: PG&E Central Valley

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	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	
COLONY 60	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	Project: Lockeford-Lodi area 230 kV development Scope is under review
INDSTR J 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	12.4	Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKEFRD 60	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	Project: Lockeford-Lodi area 230 kV development Scope is under review
LOCKFORD 230	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-3.1	13.9	14.6	-6.2	4.7	-3.0	15.5	15.0	11.8	15.9	Project: Lockeford-Lodi area 230 kV development Scope is under review
LODI 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	Project: Lockeford-Lodi area 230 kV development Scope is under review
MONDAVI 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	Project: Lockeford-Lodi area 230 kV development Scope is under review
NEW HOPE 60	P1-2:A11:7:_LOCKEFORD-BELLOTA 230KV [4990]	P1	N-1	-0.8	10.0	10.9	-5.0	0.5	-1.4	12.1	11.4	8.6	12.6	Project: Lockeford-Lodi area 230 kV development Scope is under review
PLUMAS 60	P1-2:A5:30:_RIO OSO-NICOLAUS 115KV [3440]	P1	N-1	1.0	7.0	7.3	-0.6	-0.8	1.0	7.3	8.0	5.9	7.6	Sensitivity only
RIPON 115	P1-2:A11:104:_MANTECA-RIPON 115KV [0]	P1	N-1	<8.0	6.1	7.4	<8.0	2.0	<8.0	8.1	6.3	3.3	8.2	Project: Vierra looping project
VICTOR 60	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	Project: Lockeford-Lodi area 230 kV development Scope is under review
WATRLJCT 60	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	Project: Lockeford-Lodi area 230 kV development Scope is under review
WHEATLND 60	P1-2:A5:30:_RIO OSO-NICOLAUS 115KV [3440]	P1	N-1	1.0	7.1	7.4	-0.5	-0.8	1.0	7.4	8.2	5.9	7.7	Sensitivity only
WINERY J 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	Project: Lockeford-Lodi area 230 kV development Scope is under review
WODBRG J 60	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	Project: Lockeford-Lodi area 230 kV development Scope is 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 GWFTTracy 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