

Study Area: PG&E North 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	
Cascade - Cottonwood 115 kV Line (31459 OREGNTRL 115 31469 SPI_AND 115 1 1)	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1-1	82.9	87.9	91.3	<80	71.3	88.9	116.1	105.4	<80	87.8	Sensitivity only
	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	NConv	NConv	96.0	7.5	51.0	94.5	NConv	NConv	63.3	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	93.8	90.5	93.7	6.7	54.6	91.4	NConv	NConv	26.1	NConv	Sensitivity only
	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	83.9	92.4	NConv	7.3	54.1	93.2	106.4	NConv	27.1	95.4	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	NConv	NConv	96.0	7.5	51.0	94.5	NConv	NConv	63.3	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	83.9	91.9	94.6	7.3	54.1	93.4	NConv	NConv	27.1	NConv	Sensitivity only
Cascade - Cottonwood 115 kV Line (31464 COTWDPGE 115 31466 JESSUPJ1 115 1 1)	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1-1	78.6	83.2	88.3	<80	90.1	84.2	114.4	101.6	<80	113.9	Sensitivity only
	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	79.6	83.3	NConv	14.6	72.9	84.9	100.8	NConv	31.9	119.3	Project: Cottonwood - Red Bluff - Scope under review
Cascade - Cottonwood 115 kV Line (31466 JESSUPJ1 115 31469 SPI_AND 115 1 1)	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	60.0	64.4	NConv	19.9	76.0	66.7	78.4	NConv	43.2	98.5	Project: Cottonwood - Red Bluff - Scope under review
Cascade - Cottonwood 115 kV Line (31468 CASCADE 115 31459 OREGNTRL 115 1 1)	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1-1	71.0	75.4	78.9	<80	72.0	76.3	101.7	92.0	<80	75.2	Sensitivity only
	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	72.0	80.8	NConv	4.8	54.7	81.5	93.3	NConv	31.6	84.0	Project: Cottonwood - Red Bluff - Scope under review
Palermo - Wyandotte 115 kV Line (31480 WYANDTTE 115 31518 WYANDJT1 115 1 1)	Base Case	P0	Normal	90.5	93.3	94.5	26.1	21.7	93.8	103.0	99.0	64.1	94.6	Sensitivity only
Caribou - Palermo 115KV (31482 PALERMO 115 31516 WYANDJT2 115 2 1)	P1-2:A3:53:_PALERMO-WYANDOTTE 115KV P1-2:A3:22:_CARIBOU-TABLE MTN 230KV	P6	N-1-1	85.0	86.8	104.4	<80	<80	87.4	96.3	93.6	75.2	104.5	Action plan or SPS
Sycamore Creek - Notre Dame - Table Mountain 115 kV Line (31497 NDAME J 115 31498 SYCAMORE 115 1 1)	P2-1:A3:50:_BUTTE-SYCAMORE CREEK 115KV (NORD 1-CHICOTP2)	P2-1	Line Section w/o fault	90.3	95.4	97.9	16.3	9.6	91.5	106.9	100.8	63.8	98.0	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P2-2:A3:43:_BUTTE 115KV SECTION MD	P2	Bus	91.0	95.4	98.0	16.9	9.2	91.5	107.0	100.9	63.5	98.1	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P2-3:A3:50:_BUTTE - MD 115KV & BUTTE-CHICO B-TBLE MTN LINE	P2	Non-bus-tie breaker	118.3	123.7	126.1	23.3	17.9	119.7	137.3	131.3	83.0	126.2	Project: Table Mountain - Sycamore 115 kV Line - Scope under review

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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	
	P2-3:A3:54:_TBLE MTN - 1D 115KV & BUTTE-CHICO B-TBLE MTN LINE	P2	Non-bus-tie breaker	81.7	87.9	90.9	15.7	11.2	85.7	100.0	93.8	57.9	90.3	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P2-4:A3:11:_BUTTE 115KV - SECTION MD & ME	P2	Bus-tie breaker	91.0	98.0	100.9	16.9	9.2	93.7	110.5	103.7	64.5	101.0	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
Table Mountain - Butte #1 115 kV (31500 BUTTE 115 31501 CHICOTP1 115 1 1)	P1-2:A3:48:_SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV P1-2:A3:51:_TABLE MTN-BUTTE #2 115KV	P6	N-1-1	106.3	113.5	120.5	<80	<80	110.6	131.8	121.7	74.9	120.6	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P7-1:A3:4_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	P7	DCTL	106.3	113.6	120.5	21.8	17.6	110.6	131.8	121.7	74.9	120.6	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
Table Mountain - Butte #2 115 kV (31500 BUTTE 115 31504 TBLE MTN 115 2 1)	P1-2:A3:48:_SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV P1-2:A3:50:_BUTTE-CHICO B-TBLE MTN 115KV	P6	N-1-1	120.5	130.2	136.4	<80	<80	127.3	150.3	139.9	86.0	136.5	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
Table Mountain - Butte #1 115 kV (31501 CHICOTP1 115 31504 TBLE MTN 115 1 1)	P1-2:A3:48:_SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV P1-2:A3:51:_TABLE MTN-BUTTE #2 115KV	P6	N-1-1	123.3	131.0	137.8	<80	<80	128.2	150.3	140.4	87.3	138.0	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P2-2:A3:46:_TBLE MTN 115KV SECTION 2D	P2	Bus	92.1	96.5	100.0	20.5	18.5	95.0	109.3	103.1	65.1	100.1	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P2-3:A3:52:_TBLE MTN - 2D 115KV & PARADISE-TABLE MTN LINE	P2	Non-bus-tie breaker	92.1	96.6	100.1	20.4	18.5	95.1	109.4	103.2	65.2	100.2	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P2-3:A3:53:_TBLE MTN - 2D 115KV & SYCAMORE CREEK-NOTRE DAME-TABLE MTN LINE	P2	Non-bus-tie breaker	92.7	97.6	101.2	20.5	18.5	96.0	110.2	104.4	65.6	101.2	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P7-1:A3:4_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	P7	DCTL	123.3	131.0	137.8	26.4	23.3	128.3	150.3	140.4	87.3	137.9	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
Butte - Sycamore Creek 115 kV (31503 CHICOTP2 115 31500 BUTTE 115 1 1)	P1-2:A3:48:_SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV P1-2:A3:50:_BUTTE-CHICO B-TBLE MTN 115KV	P6	N-1-1	83.8	90.6	92.8	<80	<80	87.8	102.8	97.3	<80	92.9	Project: Table Mountain - Sycamore 115 kV Line - Scope under review

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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	
Sycamore Creek - Notre Dame - Table Mountain 115 kV Line (31504 TBLE MTN 115 31497 NDAME J 115 1 1)	P1-2:A3:50:_ BUTTE-CHICO B-TBLE MTN 115KV P1-2:A3:51:_ TABLE MTN-BUTTE #2 115KV	P6	N-1-1	90.0	96.2	101.5	<80	<80	94.1	110.8	103.2	<80	100.8	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P2-2:A3:47:_ TBLE MTN 115KV SECTION 1D	P2	Bus	89.9	96.4	101.2	19.0	16.4	94.8	110.9	103.0	63.8	101.2	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P2-3:A3:54:_ TBLE MTN - 1D 115KV & BUTTE-CHICO B-TBLE MTN LINE	P2	Non-bus-tie breaker	89.9	96.6	101.3	18.9	16.6	95.0	111.0	103.1	63.9	100.7	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
Paradise - Table Mountain 115 kV (31514 PARADSE 115 31494 BIGBENTP 115 1 1)	P1-2:A3:50:_ BUTTE-CHICO B-TBLE MTN 115KV P1-2:A3:51:_ TABLE MTN-BUTTE #2 115KV	P6	N-1-1	90.6	96.0	100.1	<80	<80	94.6	109.1	102.6	<80	99.5	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P2-2:A3:47:_ TBLE MTN 115KV SECTION 1D	P2	Bus	90.7	96.5	100.1	20.0	17.7	95.6	109.4	102.7	64.5	100.1	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
	P2-3:A3:54:_ TBLE MTN - 1D 115KV & BUTTE-CHICO B-TBLE MTN LINE	P2	Non-bus-tie breaker	90.5	96.4	100.0	19.8	17.7	95.5	109.3	102.5	64.5	99.3	Project: Table Mountain - Sycamore 115 kV Line - Scope under review
Keswick - Trinity 60 kV (31556 TRINITY 60.0 31564 FRNCHGLH 60.0 1 1)	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	22.5	26.8	34.2	148.8	96.2	11.1	37.4	82.4	63.7	143.7	Project: Cottonwood - Red Bluff - Scope under review
Keswick - Trinity 60 kV (31564 FRNCHGLH 60.0 31566 KESWICK 60.0 1 1)	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	21.8	25.2	32.4	146.6	94.1	11.0	39.3	84.3	62.3	141.3	Project: Cottonwood - Red Bluff - Scope under review
Keswick - Cascade 60 kV (31566 KESWICK 60.0 31582 STILLWATR 60.0 1 1)	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	18.6	20.1	27.9	165.0	106.1	12.4	52.7	105.6	65.7	153.5	Project: Cottonwood - Red Bluff - Scope under review
Cottonwood - Benton #1 60 kV (31570 BENTON 60.0 31572 GIRVAN 60.0 1 1)	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1-1	73.1	76.5	84.3	<80	<80	74.9	106.6	89.9	<80	85.1	Project: Cascade - Benton - Scope under review
	P2-2:A3:62:_COTTONWD 60KV SECTION 1D	P2	Bus	74.3	81.1	91.9	19.8	11.3	79.2	101.0	86.7	52.3	93.8	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	56.6	69.8	NConv	15.9	7.5	68.3	90.3	NConv	38.1	83.2	Project: Cottonwood - Red Bluff - Scope under review
	P2-4:A3:20:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2	Bus-tie breaker	4.0	6.0	7.6	103.7	91.2	11.8	26.3	15.3	39.6	31.6	Project: Cottonwood - Red Bluff - Scope under review
Cottonwood - Benton #1 60 kV	P1-2:A3:63:_COTTONWOOD-BENTON #2 60KV P1-3:A3:42:_CASCADE 115/60KV TB 1	P6	N-1-1	102.1	111.2	116.0	<80	<80	112.6	129.7	121.2	73.6	104.8	Project: Cascade - Benton - Scope under review

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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	
(31574 ANDERSON 60.0 31604 COTTONWD 60.0 1 1)	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	30.8	37.8	42.9	17.2	36.8	40.4	64.5	66.9	37.0	125.4	Project: Cottonwood - Red Bluff - Scope under review
Cascade - Benton - Deschutes 60 kV (31576 WNTU PMS 60.0 31570 BENTON 60.0 1 1)	P1-3:A3:3:_COTWD_E2 230/115KV TB 1 P1-3:A3:6:_COTWD_F2 230/115KV TB 4	P6	N-1-1	<80	<80	<80	207.0	189.7	<80	<80	<80	68.9	<80	Project: Cascade - Benton - Scope under review
	P2-2:A3:62:_COTTONWD 60KV SECTION 1D	P2	Bus	74.4	81.1	91.9	20.0	11.2	79.2	101.0	86.6	52.2	93.8	Project: Cottonwood - Red Bluff - Scope under review
	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	NConv	NConv	111.2	20.6	10.9	94.5	NConv	NConv	59.2	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	75.1	95.4	110.2	20.6	11.0	92.8	NConv	NConv	52.2	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	74.3	94.2	NConv	20.5	11.0	91.9	122.9	NConv	51.9	113.8	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	NConv	NConv	111.2	20.6	10.9	94.5	NConv	NConv	59.2	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	74.3	94.0	108.4	20.5	11.0	92.0	NConv	NConv	51.9	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-4:A3:20:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2	Bus-tie breaker	36.4	35.3	30.1	204.5	189.6	55.2	15.6	12.8	65.6	45.2	Project: Cottonwood - Red Bluff - Scope under review
Cascade - Benton - Deschutes 60 kV (31580 CASCADE 60.0 31581 OREGNTRL 60.0 1 1)	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	46.2	56.4	57.3	65.1	87.9	46.0	16.2	22.6	17.8	145.1	Project: Cottonwood - Red Bluff - Scope under review
	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1-1	173.9	188.3	203.6	99.9	76.5	187.6	267.3	227.1	<80	201.3	Project: Cascade - Benton - Scope under review
	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	NConv	NConv	229.8	19.2	8.6	218.5	NConv	NConv	146.9	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	209.0	209.6	220.8	28.7	14.6	207.7	NConv	NConv	88.1	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	177.1	208.7	NConv	28.5	12.6	208.5	250.5	NConv	73.8	227.6	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	NConv	NConv	229.8	19.2	8.6	218.5	NConv	NConv	146.9	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	177.1	209.9	220.3	28.4	12.6	211.8	NConv	NConv	73.8	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-4:A3:20:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2	Bus-tie breaker	22.2	17.2	10.6	261.4	245.9	42.9	49.6	20.8	88.5	74.8	Project: Cottonwood - Red Bluff - Scope under review

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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	
	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	88.4	98.8	99.6	75.7	107.9	86.2	44.2	8.0	16.0	165.9	Project: Cottonwood - Red Bluff - Scope under review
Keswick - Cascade 60 kV (31580 CASCADE 60.0 31582 STILLWATR 60.0 1 1)	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	13.7	6.0	3.6	137.8	90.2	27.1	65.0	111.2	44.6	116.1	Project: Cottonwood - Red Bluff - Scope under review
Cascade - Benton - Deschutes 60 kV (31581 OREGNTRL 60.0 31578 LOMS JCT 60.0 1 1)	P1-3:A3:3:_COTWD_E2 230/115KV TB 1 P1-3:A3:6:_COTWD_F2 230/115KV TB 4	P6	N-1-1	31.9	27.7	21.0	261.4	234.4	87.9	<80	<80	87.0	<80	Project: Cascade - Benton - Scope under review
	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	NConv	NConv	216.9	22.6	8.9	205.0	NConv	NConv	138.9	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	197.7	194.1	211.8	32.1	13.8	194.3	NConv	NConv	81.3	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	165.9	198.9	NConv	31.9	11.9	198.6	235.2	NConv	67.3	214.2	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	NConv	NConv	216.9	22.6	8.9	205.0	NConv	NConv	138.9	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	165.9	195.5	210.9	31.8	11.9	196.7	NConv	NConv	67.3	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-4:A3:20:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2	Bus-tie breaker	32.5	28.3	21.9	257.9	246.8	54.1	37.6	9.1	83.2	67.3	Project: Cottonwood - Red Bluff - Scope under review
	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	77.2	88.6	89.5	72.1	108.8	75.5	32.6	5.6	13.1	176.1	Project: Cottonwood - Red Bluff - Scope under review
Volta - Deschutes 60 kV (31592 DESCHUTS 60.0 31594 VOLTA 60.0 1 1)	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	NConv	NConv	107.9	51.2	5.5	108.6	NConv	NConv	78.0	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	80.3	98.0	109.2	60.4	20.2	99.4	NConv	NConv	7.1	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	52.4	88.6	NConv	59.8	17.8	91.3	105.5	NConv	9.9	91.5	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	NConv	NConv	107.9	51.2	5.5	108.6	NConv	NConv	78.0	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	52.4	86.3	93.1	59.7	17.8	87.1	NConv	NConv	10.0	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P1-2:A3:73:_COTTONWD-RED BLFF 60KV P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV	P6	N-1-1	<80	146.8	147.6	<80	<80	149.6	150.9	151.2	<80	142.1	Project: Cascade - Benton - Scope under review
	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	NConv	NConv	157.0	45.3	13.0	159.3	NConv	NConv	125.8	NConv	Project: Cottonwood - Red Bluff - Scope under review

Study Area: PG&E North 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	
Volta - South 60 kV (31594 VOLTA 60.0 31596 SOUTH 60.0 1 1)	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	108.4	143.6	153.9	56.6	26.1	145.4	NConv	NConv	29.8	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	75.1	136.1	NConv	55.6	21.3	138.6	154.3	NConv	8.8	135.5	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	NConv	NConv	157.0	45.3	13.0	159.3	NConv	NConv	125.8	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	75.1	133.1	138.7	55.5	21.2	134.3	NConv	NConv	8.7	NConv	Project: Cottonwood - Red Bluff - Scope under review
Coleman - Red Bluff 60 kV Line (31602 COLEMAN 60.0 31606 CLMN JCT 60.0 1 1)	P1-1:A3:75:_COLUSGT1 18.00KV & COLUSGT2 18.00KV & COLUSST1 18.00KV GEN UNITS P1-2:A3:73:_COTTONWD-RED BLFF 60KV	P3	G-1/N-1	119.4	122.6	124.5	<80	123.4	141.8	132.7	<80	123.7	<80	Project: Cottonwood - Red Bluff - Scope under review
	P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV P1-2:A3:73:_COTTONWD-RED BLFF 60KV	P6	N-1-1	119.3	NConv	222.8	<80	<80	224.0	228.9	NConv	<80	220.1	Project: Cottonwood - Red Bluff - Scope under review
	P1-2:A3:73:_COTTONWD-RED BLFF 60KV	P1	N-1	119.4	121.9	124.5	33.5	10.8	122.8	140.8	132.1	74.7	124.7	Project: Cottonwood - Red Bluff - Scope under review
	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	NConv	NConv	175.0	39.9	26.2	179.5	NConv	NConv	185.3	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	158.7	196.4	185.9	39.3	25.9	198.5	NConv	NConv	114.6	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	120.2	183.9	NConv	32.3	10.9	185.5	169.7	NConv	77.6	171.2	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	NConv	NConv	175.0	39.9	26.2	179.5	NConv	NConv	185.3	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	120.3	187.7	179.1	32.5	10.8	186.8	NConv	NConv	77.5	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	DCTL	119.6	121.7	124.3	33.5	10.8	122.6	140.6	131.8	74.3	124.4	Project: Cottonwood - Red Bluff - Scope under review
Cottonwood - Red Bluff 60 kV Line (31604 COTTONWD 60.0 31607 RED B JT 60.0 1 1)	P2-1:A3:94:_COLEMAN-RED BLUFF 60KV (COLEMAN-CLMN JCT)	P2-1	Line Section w/o fault	119.1	118.4	121.0	33.8	10.7	119.1	135.8	127.7	72.7	121.2	Project: Cottonwood - Red Bluff - Scope under review
	P2-2:A3:61:_COLEMAN 60KV SECTION 1D	P2	Bus	119.2	118.3	121.0	33.9	10.7	119.0	135.8	127.6	73.0	121.2	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:68:_COLEMAN - 1D 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	119.1	118.3	121.0	33.8	10.7	118.9	135.8	127.5	73.0	121.2	Project: Cottonwood - Red Bluff - Scope under review

Study Area: PG&E North 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	
Coleman - Red Bluff 60 kV Line (31606 CLMN JCT 60.0 31608 RED BLFF 60.0 1 1)	P1-1:A3:75:_COLUSGT1 18.00KV & COLUSGT2 18.00KV & COLUSST1 18.00	P3	G-1/N-1	<80	<80	<80	<80	<80	104.7	98.1	<80	<80	<80	Project: Cottonwood - Red Bluff - Scope under review
	P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV P1-2:A3:73:_COTTONWD-RED BLFF 60KV	P6	N-1-1	<80	<80	160.4	<80	<80	162.2	164.6	NConv	<80	157.4	Project: Cottonwood - Red Bluff - Scope under review
	P1-2:A3:73:_COTTONWD-RED BLFF 60KV	P1	N-1	85.9	90.2	92.3	23.4	8.6	90.7	102.7	97.6	56.3	92.5	Project: Cottonwood - Red Bluff - Scope under review
	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	NConv	NConv	134.1	29.8	24.0	136.8	NConv	NConv	147.0	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	124.2	150.0	140.3	29.3	23.8	151.9	NConv	NConv	93.3	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	86.5	133.1	NConv	22.5	8.7	133.1	121.6	NConv	58.2	124.7	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	NConv	NConv	134.1	29.8	24.0	136.8	NConv	NConv	147.0	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	86.6	134.7	128.2	22.7	8.5	135.0	NConv	NConv	58.1	NConv	Project: Cottonwood - Red Bluff - Scope under review
	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	DCTL	86.0	90.0	92.2	23.4	8.6	90.6	103.6	97.4	56.1	92.3	Project: Cottonwood - Red Bluff - Scope under review
Cottonwood - Red Bluff 60 kV Line (31607 RED B JT 60.0 31608 RED BLFF 60.0 1 1)	P2-1:A3:94:_COLEMAN-RED BLUFF 60KV (COLEMAN-CLMN JCT)	P2-1	Line Section w/o fault	118.7	118.3	121.0	33.2	10.7	119.1	134.9	127.7	72.0	121.2	Project: Cottonwood - Red Bluff - Scope under review
	P2-2:A3:61:_COLEMAN 60KV SECTION 1D	P2	Bus	118.8	118.4	121.0	33.2	10.7	119.0	135.7	127.6	73.0	121.2	Project: Cottonwood - Red Bluff - Scope under review
	P2-3:A3:68:_COLEMAN - 1D 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	118.7	118.3	121.0	33.2	10.7	118.9	135.6	127.5	73.0	121.2	Project: Cottonwood - Red Bluff - Scope under review
Glen #4 60 kV Line (31626 CORNING 60.0 31729 CORNSWCH 60.0 4 1)	Base Case	P0	Normal	88.3	89.1	97.2	26.7	23.1	86.6	103.6	93.6	62.5	97.1	Sensitivity only
Glen #4 60 kV Line (31722 GLENN 60.0 31729 CORNSWCH 60.0 4 1)	Base Case	P0	Normal	88.3	89.1	97.2	26.7	22.9	86.6	103.6	93.6	62.5	97.1	Sensitivity only

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
ANDERSON 60	P2-2:A3:62:_COTTONWD 60KV SECTION 1D	P2	Bus	1.00	0.91	0.89	1.06	1.02	0.92	0.88	0.90	0.96	0.87	Project: Cottonwood - Red Bluff - Scope under review
ANDERSON 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.90	0.76	0.74	1.06	1.02	0.77	0.74	0.80	0.84	0.74	Project: Cottonwood - Red Bluff - Scope under review
ANDERSON 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.00	0.77	0.74	1.06	1.02	0.78	0.46	0.66	0.95	0.48	Project: Cottonwood - Red Bluff - Scope under review
ANDERSON 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.01	0.78	0.76	1.06	1.02	0.79	0.72	0.75	0.96	0.72	Project: Cottonwood - Red Bluff - Scope under review
ANDERSON 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.90	0.76	0.74	1.06	1.02	0.77	0.74	0.80	0.84	0.74	Project: Cottonwood - Red Bluff - Scope under review
ANDERSON 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.01	0.78	0.75	1.06	1.02	0.79	0.73	0.74	0.96	0.69	Project: Cottonwood - Red Bluff - Scope under review
ANDERSON 60	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1/N-1	>0.9	0.91	0.89	>0.9	>0.9	0.93	0.85	0.88	0.97	0.89	Project: Cascade - Benton - Scope under review
ANITA 60	Base Case	P0	Normal	1.01	1.00	1.00	1.03	1.05	1.01	1.00	1.01	1.02	1.00	Glenn 230/60 kV Transformer Tap Adjustment
ANTLER 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.94	0.86	0.85	1.05	1.02	0.86	0.87	0.89	0.90	0.86	Project: Cottonwood - Red Bluff - Scope under review
ANTLER 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	0.99	0.86	0.85	1.05	1.02	0.87	0.69	0.80	0.97	0.69	Project: Cottonwood - Red Bluff - Scope under review
ANTLER 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.00	0.87	0.86	1.05	1.02	0.87	0.84	0.85	0.98	0.83	Project: Cottonwood - Red Bluff - Scope under review
ANTLER 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.94	0.86	0.85	1.05	1.02	0.86	0.87	0.89	0.90	0.86	Project: Cottonwood - Red Bluff - Scope under review
ANTLER 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.00	0.87	0.86	1.05	1.02	0.88	0.85	0.85	0.98	0.81	Project: Cottonwood - Red Bluff - Scope under review
ANTLER 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.01	1.00	1.00	1.00	1.01	0.99	0.99	0.99	0.99	0.77	Sensitivity only
ANTLER 60	P1-3:A3:42:_CASCADE 115/60KV TB 1 P1-2:A3:64:_CASCADE-BENTON-DESCHUTES 60KV [6310]	P6	N-1/N-1	0.63	0.35	0.53	0.93	0.86	0.33	0.35	0.33	0.69	0.54	Project: Cascade - Benton - Scope under review
APT ORVC 60	Base Case	P0	Normal	1.03	1.01	1.01	1.07	1.03	1.02	1.01	1.01	1.01	1.01	Load power factor correction
APT ORVC 60	P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P1	N-1	1.03	1.00	0.99	1.10	1.02	1.01	1.00	1.00	1.00	0.99	Load power factor correction
APT ORVC 60	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.04	1.00	1.00	1.10	1.03	1.00	0.99	1.00	1.01	0.99	Load power factor correction
APT ORVC 60	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.04	1.00	1.00	1.10	1.03	1.00	0.99	1.00	1.01	0.99	Load power factor correction
APT ORVC 60	P2-3:A3:105:_PALERMO 230KV - RING R2 & R3	P2	Non-bus-tie breaker	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
APT ORVC 60	P2-3:A3:29:_TBL MT E - 1E 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.03	1.00	1.00	1.10	1.03	1.00	0.99	0.99	1.00	0.99	Load power factor correction

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
APT ORVC 60	P1-1:A3:62:_OROVILLE 9.11KV GEN UNIT 1 P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P3	G-1/N-1	>0.9	>0.9	>0.9	1.11	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
APT ORVC 60	P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690] P1-3:A3:35:_PALERMO 230/115KV TB 2	P6	N-1/N-1	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
BCKS CRK 230	Base Case	P0	Normal	1.04	1.02	1.02	1.06	1.04	1.03	1.02	1.02	1.00	1.02	Load power factor correction
BELDEN 230	Base Case	P0	Normal	1.03	1.02	1.02	1.07	1.04	1.03	1.02	1.02	1.02	1.02	Load power factor correction
BENTON 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.91	0.78	0.77	1.06	1.03	0.79	0.77	0.83	0.86	0.77	Project: Cottonwood - Red Bluff - Scope under review
BENTON 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.01	0.80	0.77	1.06	1.03	0.80	0.50	0.69	0.97	0.53	Project: Cottonwood - Red Bluff - Scope under review
BENTON 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.02	0.80	0.78	1.06	1.03	0.81	0.75	0.77	0.97	0.75	Project: Cottonwood - Red Bluff - Scope under review
BENTON 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.91	0.78	0.77	1.06	1.03	0.79	0.77	0.83	0.86	0.77	Project: Cottonwood - Red Bluff - Scope under review
BENTON 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.02	0.80	0.78	1.06	1.03	0.81	0.76	0.77	0.97	0.72	Project: Cottonwood - Red Bluff - Scope under review
BENTON 60	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1/N-1	>0.9	0.93	0.91	>0.9	>0.9	0.94	0.87	0.90	>0.9	0.90	Project: Cascade - Benton - Scope under review
BIG BEND 115	Base Case	P0	Normal	1.04	1.02	1.02	1.07	1.05	1.03	1.02	1.02	1.02	1.02	Load power factor correction
	P2-1:A3:14:_CARIBOU-TABLE MTN 230KV [4440] (BELDENTP-TBL MT D)	P2-1	Line Section w/o fault	>0.9	Nconv	Nconv	>0.9	>0.9	Nconv	Nconv	Nconv	Nconv	Nconv	Existing Caribou RAS should drop Caribou generator
	P2-2:A3:24:_TBL MT D 230KV SECTION 1D	P2	Bus	>0.9	Nconv	Nconv	>0.9	>0.9	Nconv	Nconv	Nconv	Nconv	Nconv	Existing Caribou RAS should drop Caribou generator
BIG BEND 115	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	0.97	0.70	0.68	1.06	1.03	0.70	0.69	0.70	0.95	0.68	Mitigation under review
	P2-4:A3:24:_TBL MT D SECTION 1D & TBL MT E SECTION 1E 230KV	P2	Bus-tie breaker	>0.9	Nconv	Nconv	>0.9	>0.9	Nconv	Nconv	Nconv	Nconv	Nconv	Existing Caribou RAS should drop Caribou generator
BIG BEND 115	P1-1:A3:66:_GRIZZLYG 6.90KV GEN UNIT 1 P1-3:A3:23:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
BIG BEND 115	P1-3:A3:23:_CARIBOU 230/230KV TB 11 P1-3:A3:2:_TABLE MT 500/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	1.13	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
BIG MDWS 60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.03	0.95	0.90	1.04	1.02	0.95	0.94	0.94	1.01	0.90	Issue is in long term - Continue to monitor
BIGGSJCT 60	P7-1:A3:15_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	0.99	0.99	1.02	1.00	0.99	0.99	0.99	0.84	0.99	Sensitivity only
BTTE CRK 60	Base Case	P0	Normal	1.04	1.02	1.03	1.05	1.05	1.03	1.02	1.02	1.03	1.03	Load power factor correction
BURNEY 60	Base Case	P0	Normal	1.01	1.04	1.04	1.07	1.05	1.04	1.04	1.04	1.04	1.04	Load power factor correction and/or transformer tap adjustment

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
BURNEY 60	P1-1:A3:67:_HAT CRK1 6.60KV GEN UNIT 1 P1-3:A3:11:_PIT 1 230/11KV TB 1	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	1.11	>0.9	>0.9	>0.9	>0.9	>0.9	Transformer tap adjustment
BURNEY 60	P1-3:A3:11:_PIT 1 230/11KV TB 1 P1-3:A3:62:_HT CRKRG 60/60KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	1.11	>0.9	>0.9	>0.9	>0.9	>0.9	Transformer tap adjustment
BUTTVLLY 115	Base Case	P0	Normal	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.03	Load power factor correction
BUTTVLLY 115	P1-1:A3:66:_GRIZZLYG 6.90KV GEN UNIT 1 P1-3:A3:23:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
BUTTVLLY 115	P1-3:A3:23:_CARIBOU 230/230KV TB 11 P1-3:A3:2:_TABLE MT 500/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	1.13	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
CAPAY 60	Base Case	P0	Normal	1.04	1.04	1.04	1.04	1.05	1.05	1.04	1.05	1.05	1.04	Glenn 230/60 kV Transformer Tap Adjustment
CAPYSWCH 60	Base Case	P0	Normal	1.05	1.05	1.04	1.04	1.05	1.05	1.05	1.05	1.05	1.04	Glenn 230/60 kV Transformer Tap Adjustment
CARIBOU 115	Base Case	P0	Normal	1.04	1.03	1.03	1.06	1.04	1.04	1.03	1.03	1.03	1.03	Load power factor correction
CARIBOU 115	P1-1:A3:66:_GRIZZLYG 6.90KV GEN UNIT 1 P1-3:A3:23:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
CARIBOU 115	P1-3:A3:23:_CARIBOU 230/230KV TB 11 P1-3:A3:2:_TABLE MT 500/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	1.13	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
CARIBOU 60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.02	0.94	0.90	1.04	1.02	0.94	0.93	0.93	1.01	0.90	Issue is in long term - Continue to monitor
CASCADE 115	Base Case	P0	Normal	1.04	1.02	1.02	1.06	1.04	1.03	1.02	1.03	1.02	1.02	Load power factor correction
CASCADE 115	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.02	0.94	0.93	1.07	1.04	0.95	0.84	0.90	1.01	0.83	Project: Cottonwood - Red Bluff - Scope under review
CASCADE 115	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.04	1.02	1.02	1.04	1.03	1.02	1.01	1.01	1.02	0.79	Project: Cottonwood - Red Bluff - Scope under review
CASCADE 60	Base Case	P0	Normal	1.04	1.02	1.02	1.05	1.04	1.02	1.02	1.02	1.02	1.01	Load power factor correction
CASCADE 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.96	0.89	0.88	1.06	1.03	0.89	0.89	0.92	0.92	0.88	Project: Cottonwood - Red Bluff - Scope under review
CASCADE 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.02	0.89	0.88	1.06	1.03	0.90	0.73	0.83	0.99	0.73	Project: Cottonwood - Red Bluff - Scope under review
CASCADE 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.03	0.89	0.89	1.06	1.03	0.90	0.87	0.88	1.00	0.86	Project: Cottonwood - Red Bluff - Scope under review
CASCADE 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.96	0.89	0.88	1.06	1.03	0.89	0.89	0.92	0.92	0.88	Project: Cottonwood - Red Bluff - Scope under review
CASCADE 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.03	0.90	0.88	1.06	1.03	0.90	0.88	0.88	1.00	0.84	Project: Cottonwood - Red Bluff - Scope under review
CASCADE 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.04	1.02	1.02	1.01	1.02	1.02	1.01	1.01	1.01	0.80	Project: Cottonwood - Red Bluff - Scope under review
CASCADE 60	P1-3:A3:42:_CASCADE 115/60KV TB 1 P1-2:A3:64:_CASCADE-BENTON-DESCHUTES 60KV [6310]	P6	N-1/N-1	0.67	0.40	0.58	0.94	0.88	0.39	0.41	0.38	0.72	0.58	Project: Cascade - Benton - Scope under review

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
CEDR CRK 60	Base Case	P0	Normal	1.05	1.04	1.04	1.08	1.05	1.04	1.03	1.04	1.05	1.02	Load power factor correction and/or transformer tap adjustment
CEDR CRK 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.89	0.80	0.78	1.08	1.04	0.80	0.78	0.83	0.88	0.77	Project: Cottonwood - Red Bluff - Scope under review
CEDR CRK 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.04	0.81	0.78	1.09	1.04	0.82	0.51	0.68	1.01	0.51	Project: Cottonwood - Red Bluff - Scope under review
CEDR CRK 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.04	0.81	0.80	1.09	1.04	0.82	0.77	0.78	1.04	0.76	Project: Cottonwood - Red Bluff - Scope under review
CEDR CRK 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.89	0.80	0.78	1.08	1.04	0.80	0.78	0.83	0.88	0.77	Project: Cottonwood - Red Bluff - Scope under review
CEDR CRK 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.04	0.82	0.80	1.09	1.04	0.83	0.79	0.78	1.04	0.72	Project: Cottonwood - Red Bluff - Scope under review
CEDR CRK 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.05	1.04	1.04	1.06	1.05	1.04	1.03	1.03	1.04	0.88	Project: Cottonwood - Red Bluff - Scope under review
CEDR CRK 60	P1-2:A3:64:_CASCADE-BENTON-DESCHUTES 60KV [6310] P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1/N-1	>0.9	>0.9	>0.9	1.13	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
CHALLENGE 60	Base Case	P0	Normal	1.05	1.02	1.02	1.08	1.05	1.02	1.02	1.02	1.02	1.02	Load power factor correction
CHALLENGE 60	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.05	1.02	1.02	1.10	1.05	1.01	1.01	1.01	1.02	1.01	Load power factor correction
CHALLENGE 60	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.05	1.02	1.02	1.10	1.05	1.01	1.01	1.01	1.02	1.01	Load power factor correction
CHESTER 60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.03	0.97	0.87	1.04	1.03	0.97	0.96	0.96	1.02	0.87	Issue is in long term - Continue to monitor
CHICO JT 60	Base Case	P0	Normal	1.02	1.02	1.02	1.04	1.05	1.03	1.02	1.03	1.04	1.02	Glenn 230/60 kV Transformer Tap Adjustment
CLMN FSH 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.43	0.42	0.41	1.06	1.01	0.42	0.38	0.43	0.54	0.43	Project: Cottonwood - Red Bluff - Scope under review
CLMN FSH 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.03	0.47	0.46	1.08	1.02	0.46	0.41	0.41	0.98	0.44	Project: Cottonwood - Red Bluff - Scope under review
CLMN FSH 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.43	0.42	0.41	1.06	1.01	0.42	0.38	0.43	0.54	0.43	Project: Cottonwood - Red Bluff - Scope under review
CLMN FSH 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.03	0.48	0.45	1.08	1.03	0.48	0.43	0.40	0.98	0.37	Project: Cottonwood - Red Bluff - Scope under review
CLMN FSH 60	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1/N-1	>0.9	0.93	0.91	>0.9	>0.9	0.94	0.86	0.90	>0.9	0.90	Project: Cascade - Benton - Scope under review
COLEMAN 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.43	0.42	0.41	1.06	1.01	0.42	0.38	0.43	0.55	0.43	Project: Cottonwood - Red Bluff - Scope under review
COLEMAN 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	0.99	0.47	0.43	1.08	1.02	0.47	0.08	0.25	0.94	0.19	Project: Cottonwood - Red Bluff - Scope under review

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
COLEMAN 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.03	0.47	0.46	1.08	1.03	0.47	0.41	0.41	0.98	0.44	Project: Cottonwood - Red Bluff - Scope under review
COLEMAN 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.43	0.42	0.41	1.06	1.01	0.42	0.38	0.43	0.55	0.43	Project: Cottonwood - Red Bluff - Scope under review
COLEMAN 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.03	0.48	0.45	1.09	1.03	0.48	0.43	0.40	0.98	0.37	Project: Cottonwood - Red Bluff - Scope under review
COLEMAN 60	P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0] P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1/N-1	>0.9	0.56	0.56	>0.9	>0.9	0.56	0.54	0.55	>0.9	0.57	Project: Cottonwood - Red Bluff - Scope under review
CORNSWCH 60	Base Case	P0	Normal	1.05	1.05	1.04	1.04	1.05	1.05	1.05	1.05	1.05	1.04	Glenn 230/60 kV Transformer Tap Adjustment
COTTONWD 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.90	0.77	0.75	1.06	1.03	0.78	0.75	0.81	0.85	0.75	Project: Cottonwood - Red Bluff - Scope under review
COTTONWD 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.01	0.78	0.75	1.06	1.02	0.79	0.47	0.67	0.96	0.50	Project: Cottonwood - Red Bluff - Scope under review
COTTONWD 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.02	0.78	0.77	1.06	1.02	0.80	0.73	0.76	0.96	0.73	Project: Cottonwood - Red Bluff - Scope under review
COTTONWD 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.90	0.77	0.75	1.06	1.03	0.78	0.75	0.81	0.85	0.75	Project: Cottonwood - Red Bluff - Scope under review
COTTONWD 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.02	0.79	0.76	1.06	1.02	0.80	0.74	0.75	0.96	0.70	Project: Cottonwood - Red Bluff - Scope under review
COTTONWD 60	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1/N-1	>0.9	0.92	0.90	>0.9	>0.9	0.94	0.85	0.89	0.98	0.89	Project: Cottonwood - Red Bluff - Scope under review
COTWDPGE 115	Base Case	P0	Normal	1.05	1.03	1.03	1.06	1.05	1.04	1.04	1.04	1.02	1.03	Load power factor correction
CR CANAL 60	Base Case	P0	Normal	1.06	1.03	1.03	1.05	1.04	1.04	1.03	1.03	1.03	1.03	Load power factor correction
CRESTA 230	Base Case	P0	Normal	1.04	1.02	1.02	1.06	1.04	1.03	1.02	1.02	1.00	1.02	Load power factor correction
DE SABLA 60	Base Case	P0	Normal	1.04	1.02	1.03	1.05	1.05	1.03	1.02	1.02	1.03	1.03	Load power factor correction
DESCHUTS 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.87	0.77	0.75	1.06	1.03	0.77	0.76	0.80	0.84	0.75	Project: Cottonwood - Red Bluff - Scope under review
DESCHUTS 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.01	0.78	0.76	1.06	1.03	0.79	0.47	0.65	0.98	0.50	Project: Cottonwood - Red Bluff - Scope under review
DESCHUTS 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.03	0.79	0.78	1.06	1.03	0.80	0.74	0.76	0.99	0.74	Project: Cottonwood - Red Bluff - Scope under review
DESCHUTS 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.87	0.77	0.75	1.06	1.03	0.77	0.76	0.80	0.84	0.75	Project: Cottonwood - Red Bluff - Scope under review
DESCHUTS 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.03	0.79	0.77	1.06	1.03	0.80	0.76	0.75	0.99	0.70	Project: Cottonwood - Red Bluff - Scope under review

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
DESCHUTS 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.03	1.02	1.02	1.03	1.03	1.02	1.01	1.01	1.02	0.87	Sensitivity only
DESCHUTS 60	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1/N-1	>0.9	0.94	0.93	>0.9	>0.9	0.96	0.89	0.92	>0.9	0.93	Sensitivity only
DIRYVLE 60	P2-1:A3:94:_COLEMAN-RED BLUFF 60KV [6440] (COLEMAN-CLMN JCT)	P2-1	Line Section w/o fault	1.02	0.91	0.90	1.04	1.03	0.92	0.89	0.90	0.96	0.90	Sensitivity only
DIRYVLE 60	P2-2:A3:61:_COLEMAN 60KV SECTION 1D	P2	Bus	1.02	0.91	0.90	1.04	1.03	0.92	0.89	0.90	0.96	0.90	Sensitivity only
DIRYVLE 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.26	0.25	0.24	1.05	0.99	0.24	0.21	0.23	0.37	0.26	Project: Cottonwood - Red Bluff - Scope under review
DIRYVLE 60	P2-3:A3:68:_COLEMAN - 1D 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.02	0.91	0.90	1.04	1.03	0.92	0.89	0.91	0.96	0.90	Sensitivity only
DIRYVLE 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	0.93	0.28	0.25	1.07	1.00	0.27	>0.9	0.13	0.85	0.10	Project: Cottonwood - Red Bluff - Scope under review
DIRYVLE 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.01	0.29	0.29	1.09	1.02	0.29	0.24	0.26	0.92	0.27	Project: Cottonwood - Red Bluff - Scope under review
DIRYVLE 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.26	0.25	0.24	1.05	0.99	0.24	0.21	0.23	0.37	0.26	Project: Cottonwood - Red Bluff - Scope under review
DIRYVLE 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.01	0.30	0.28	1.09	1.02	0.30	0.23	0.25	0.92	0.24	Project: Cottonwood - Red Bluff - Scope under review
DIRYVLE 60	P1-1:A3:75:_COLUSGT1 18.00KV & COLUSGT2 18.00KV & COLUSST1 18.00KV GEN UNITS P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0]	P3	G-1/N-1	>0.9	0.92	>0.9	>0.9	>0.9	0.92	0.90	0.91	>0.9	>0.9	Sensitivity only
DIRYVLE 60	P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0] P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1/N-1	>0.9	0.35	0.34	>0.9	>0.9	0.34	0.33	0.33	>0.9	0.36	Project: Cottonwood - Red Bluff - Scope under review
ELIZ TWN 60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.03	0.96	0.87	1.05	1.03	0.96	0.95	0.95	1.01	0.87	Issue is in long term - Continue to monitor
FRNCHGLH 60	Base Case	P0	Normal	1.04	1.03	1.03	1.05	1.05	1.03	1.03	1.03	1.02	1.01	Load power factor correction
FRNCHGLH 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.04	0.96	0.95	1.06	1.04	0.96	0.86	0.92	1.01	0.85	Project: Cottonwood - Red Bluff - Scope under review
FRNCHGLH 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.07	1.06	1.06	0.98	1.06	1.03	1.02	0.99	1.06	0.83	Sensitivity only
FRNCHGLH 60	P1-2:A3:34:_HUMBOLDT-TRINITY 115KV [1820] P1-2:A3:35:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1/N-1	>0.9	>0.9	>0.9	0.95	0.97	>0.9	>0.9	>0.9	>0.9	0.89	Sensitivity only
FRNCHGLH 60	P1-2:A3:37:_TRINITY-COTTONWOOD 115KV [4040] P1-2:A3:65:_KESWICK-CASCADE 60KV [7260]	P6	N-1/N-1	>0.9	>0.9	>0.9	1.10	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
FRNCHGLH 60	P1-3:A3:42:_CASCADE 115/60KV TB 1 P1-2:A3:64:_CASCADE-BENTON-DESCHUTES 60KV [6310]	P6	N-1/N-1	0.83	0.67	0.77	>0.9	0.96	0.67	0.67	0.66	0.87	0.77	Project: Cascade - Benton - Scope under review
FRSTGLEN 115	Base Case	P0	Normal	1.06	1.04	1.04	1.06	1.07	1.05	1.04	1.04	1.04	1.04	Glenn 230/60 kV Transformer Tap Adjustment

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
FRSTGLEN 115	P2-1:A3:27:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (WILDWOOD-FRSTGLEN)	P2-1	Line Section w/o fault	1.06	1.04	1.05	1.07	1.12	1.04	1.04	1.03	1.08	1.05	Project: Cottonwood - Red Bluff - Scope under review
FRSTGLEN 115	P2-1:A3:28:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (WILDWOOD-COTWDPGE)	P2-1	Line Section w/o fault	1.08	1.05	1.05	1.08	1.13	1.05	1.04	1.04	1.10	1.06	Project: Cottonwood - Red Bluff - Scope under review
FRSTGLEN 115	P2-2:A3:33:_COTWDPGE 115KV SECTION 2D	P2	Bus	1.08	1.05	1.05	1.08	1.13	1.05	1.04	1.04	1.10	1.06	Project: Cottonwood - Red Bluff - Scope under review
FRSTGLEN 115	P2-3:A3:35:_COTWDPGE - 2D 115KV & CASCADE-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.07	1.05	1.05	1.08	1.13	1.05	1.04	1.04	1.09	1.06	Project: Cottonwood - Red Bluff - Scope under review
FRSTGLEN 115	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.13	1.11	1.12	1.06	1.15	1.05	1.04	1.03	1.15	1.03	Project: Cottonwood - Red Bluff - Scope under review
GANSNER 60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.04	0.93	0.89	1.05	1.02	0.93	0.92	0.92	1.00	0.89	Issue is in long term - Continue to monitor
GERBER 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.17	0.17	0.17	1.04	0.97	0.17	0.14	0.15	0.28	0.18	Project: Cottonwood - Red Bluff - Scope under review
GERBER 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	0.87	0.20	0.17	1.06	0.98	0.19	0.00	0.08	0.79	0.06	Project: Cottonwood - Red Bluff - Scope under review
GERBER 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.17	0.17	0.17	1.04	0.97	0.17	0.14	0.15	0.28	0.18	Project: Cottonwood - Red Bluff - Scope under review
GERBER 60	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1/N-1	>0.9	0.86	0.85	>0.9	>0.9	0.88	0.79	0.83	0.94	0.84	Project: Cascade - Benton - Scope under review
GIRVAN 60	P2-2:A3:62:_COTTONWD 60KV SECTION 1D	P2	Bus	1.02	0.92	0.91	1.06	1.03	0.93	0.90	0.92	0.97	0.89	Sensitivity only
GIRVAN 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.91	0.77	0.75	1.06	1.03	0.78	0.76	0.81	0.85	0.76	Project: Cottonwood - Red Bluff - Scope under review
GIRVAN 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.01	0.78	0.75	1.06	1.02	0.79	0.48	0.67	0.96	0.50	Project: Cottonwood - Red Bluff - Scope under review
GIRVAN 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.02	0.79	0.77	1.06	1.02	0.80	0.74	0.76	0.97	0.73	Project: Cottonwood - Red Bluff - Scope under review
GIRVAN 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.91	0.77	0.75	1.06	1.03	0.78	0.76	0.81	0.85	0.76	Project: Cottonwood - Red Bluff - Scope under review
GIRVAN 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.02	0.79	0.77	1.06	1.02	0.80	0.75	0.75	0.97	0.70	Project: Cottonwood - Red Bluff - Scope under review
GIRVAN 60	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1/N-1	>0.9	0.92	0.90	>0.9	>0.9	0.94	0.86	0.89	>0.9	0.89	Project: Cascade - Benton - Scope under review
GLENN 60	Base Case	P0	Normal	1.05	1.05	1.04	1.04	1.05	1.05	1.05	1.05	1.05	1.04	Glenn 230/60 kV Transformer Tap Adjustment
GRIZZLY1 115	Base Case	P0	Normal	1.04	1.04	1.03	1.06	1.05	1.04	1.04	1.04	1.03	1.03	Load power factor correction

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
GRIZZLY1 115	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.02	0.89	0.86	1.06	1.04	0.89	0.88	0.88	1.00	0.86	Mitigation under review
GRIZZLY1 115	P1-1:A3:66:_GRIZZLYG 6.90KV GEN UNIT 1 P1-3:A3:23:_CARIBOU 230/230KV TB 11	P3	G-1/N-1	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
GRIZZLY1 115	P1-3:A3:23:_CARIBOU 230/230KV TB 11 P1-3:A3:2:_TABLE MT 500/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	1.14	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
GROUSCRK 60	P1-2:A3:34:_HUMBOLDT-TRINITY 115KV [1820] P1-2:A3:35:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1/N-1	>0.9	>0.9	>0.9	0.90	0.94	>0.9	>0.9	0.95	>0.9	0.85	Project: Cascade - Benton - Scope under review
HAMILTON 60	Base Case	P0	Normal	1.03	1.02	1.02	1.05	1.06	1.03	1.02	1.03	1.04	1.02	Load power factor correction and/or transformer tap adjustment
HAT CRK1 60	Base Case	P0	Normal	1.03	1.04	1.04	1.07	1.05	1.04	1.04	1.04	1.04	1.04	Load power factor correction and/or transformer tap adjustment
HAT CRK1 60	P1-1:A3:42:_PIT 1 U1 11.00KV GEN UNIT 2 P1-3:A3:60:_HAT CRK1 6.6/60KV TB 1	P3	G-1/N-1	>0.9	>0.9	>0.9	1.10	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction and/or transformer tap adjustment
HAT CRK1 60	P1-3:A3:11:_PIT 1 230/11KV TB 1 P1-3:A3:60:_HAT CRK1 6.6/60KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	1.10	1.11	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction and/or transformer tap adjustment
HAT CRK2 60	Base Case	P0	Normal	1.02	1.04	1.04	1.07	1.06	1.04	1.04	1.04	1.04	1.04	Load power factor correction and/or transformer tap adjustment
HAT CRK2 60	P1-1:A3:42:_PIT 1 U1 11.00KV GEN UNIT 2 P1-3:A3:60:_HAT CRK1 6.6/60KV TB 1	P3	G-1/N-1	>0.9	>0.9	>0.9	1.10	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction and/or transformer tap adjustment
HAT CRK2 60	P1-1:A3:67:_HAT CRK1 6.60KV GEN UNIT 1 P1-3:A3:11:_PIT 1 230/11KV TB 1	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	1.11	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction and/or transformer tap adjustment
HAT CRK2 60	P1-3:A3:11:_PIT 1 230/11KV TB 1 P1-3:A3:62:_HT CRKRG 60/60KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	1.11	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction and/or transformer tap adjustment
HAT CRK2 60	P1-3:A3:60:_HAT CRK1 6.6/60KV TB 1 P1-1:A3:42:_PIT 1 U1 11.00KV GEN UNIT 2	P6	N-1/N-1	>0.9	>0.9	>0.9	1.10	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction and/or transformer tap adjustment
HATLOSCK 60	Base Case	P0	Normal	1.05	1.05	1.05	1.08	1.07	1.06	1.05	1.05	1.05	1.05	Load power factor correction and/or transformer tap adjustment
HEADGATE 60	Base Case	P0	Normal	1.03	1.03	1.03	1.04	1.05	1.04	1.03	1.04	1.04	1.03	Glenn 230/60 kV Transformer Tap Adjustment
HMLTN BR 60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.02	0.96	0.90	1.04	1.02	0.96	0.95	0.95	1.01	0.90	Issue is in long term - Continue to monitor
HONCUT 115	Base Case	P0	Normal	1.06	1.03	1.03	1.10	1.05	1.03	1.03	1.03	1.03	1.03	Load power factor correction
HONCUT 115	P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690]	P1	N-1	1.05	1.02	1.02	1.10	1.03	1.01	1.02	1.02	1.01	1.01	Load power factor correction
HONCUT 115	P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P1	N-1	1.06	1.02	1.02	1.13	1.03	1.03	1.02	1.02	1.01	1.02	Load power factor correction
HONCUT 115	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.06	1.03	1.02	1.13	1.05	1.02	1.02	1.02	1.02	1.02	Load power factor correction
HONCUT 115	P1-3:A3:35:_PALERMO 230/115KV TB 2	P1	N-1	1.05	1.02	1.02	1.10	1.03	1.01	1.02	1.02	1.02	1.02	Load power factor correction
HONCUT 115	P1-4:A3:3:_TB MT 1T SVD=V	P1	N-1	1.06	1.03	1.03	1.12	1.05	1.03	1.03	1.03	1.03	1.03	Load power factor correction

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
HONCUT 115	P2-1:A3:20:_TABLE MTN-PALERMO 230KV [5690] (TBL MT D-PALERMO)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.10	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction
HONCUT 115	P2-1:A3:42:_PALERMO-BOGUE 115KV [3200] (PALERMO-HONC JT3)	P2-1	Line Section w/o fault	1.06	1.04	1.04	1.10	1.04	1.03	1.04	1.04	1.03	1.04	Load power factor correction
HONCUT 115	P2-2:A3:25:_TBL MT D 230KV SECTION 2D	P2	Bus	1.06	1.03	1.03	1.11	1.05	1.03	1.03	1.03	1.03	1.03	Load power factor correction
HONCUT 115	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.06	1.03	1.02	1.13	1.05	1.02	1.02	1.02	1.02	1.02	Load power factor correction
HONCUT 115	P2-2:A3:38:_PALERMO 115KV SECTION 1D	P2	Bus	1.06	1.04	1.04	1.10	1.04	1.03	1.04	1.04	1.03	1.04	Load power factor correction
HONCUT 115	P2-3:A3:104:_PALERMO 230KV - RING R2 & R1	P2	Non-bus-tie breaker	1.05	1.02	1.01	1.10	1.03	1.01	1.02	1.02	1.01	1.01	Load power factor correction
HONCUT 115	P2-3:A3:105:_PALERMO 230KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.02	1.01	1.10	1.03	1.01	1.02	1.02	1.01	1.01	Load power factor correction
HONCUT 115	P2-3:A3:106:_PALERMO 230KV - RING R1 & R3	P2	Non-bus-tie breaker	1.05	1.02	1.02	1.10	1.03	1.01	1.02	1.02	1.02	1.02	Load power factor correction
HONCUT 115	P2-3:A3:27:_TBL MT D - 2D 230KV & TABLE MTN-PALERMO LINE	P2	Non-bus-tie breaker	1.05	1.02	1.02	1.12	1.03	1.01	1.02	1.02	1.02	1.02	Load power factor correction
HONCUT 115	P2-3:A3:28:_TBL MT D - 2D 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction
HONCUT 115	P2-3:A3:29:_TBL MT E - 1E 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.13	1.05	1.02	1.02	1.02	1.02	1.02	Load power factor correction
HONCUT 115	P2-3:A3:39:_PALERMO - 1D 115KV & WOODLEAF-PALERMO LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.10	1.04	1.03	1.04	1.04	1.03	1.04	Load power factor correction
HONCUT 115	P2-3:A3:40:_PALERMO - 1D 115KV & PALERMO-PEASE LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.10	1.04	1.03	1.04	1.04	1.03	1.04	Load power factor correction
HONCUT 115	P2-3:A3:42:_PALERMO - 1D 115KV & CARIBOU-PALERMO LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.10	1.04	1.03	1.04	1.04	1.03	1.04	Load power factor correction
HONCUT 115	P2-3:A3:43:_PALERMO - 1D 115KV & PALERMO-NICOLAUS LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.10	1.04	1.03	1.04	1.04	1.03	1.04	Load power factor correction
HONCUT 115	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.10	1.04	1.03	1.04	1.04	1.03	1.04	Load power factor correction
	P2-4:A3:5:_TBL MT D 230KV - SECTION 1D & 2D	P2	Bus-tie breaker	Nconv	Nconv	Nconv	>0.9	Nconv	Nconv	Nconv	Nconv	Nconv	Nconv	Existing Caribou RAS should drop Caribou generator
HONCUT 115	P1-3:A3:23:_CARIBOU 230/230KV TB 11 P1-3:A3:2:_TABLE MT 500/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	1.13	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
HONCUT 115	P7-1:A3:18_Table Mountain(D)-Rio Oso 230 kV Line and Table Mountain(D)-Palermo 230 kV Line	P7	DCTL	1.06	1.03	1.03	1.11	1.04	1.03	1.03	1.03	1.02	1.03	Load power factor correction
HOWELLS 60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.03	0.93	0.89	1.04	1.02	0.93	0.93	0.93	1.00	0.89	Issue is in long term - Continue to monitor
HT CRKG 60	Base Case	P0	Normal	1.05	1.05	1.05	1.08	1.06	1.06	1.05	1.05	1.05	1.05	Load power factor correction and/or transformer tap adjustment
HYAMPOM 60	P1-2:A3:34:_HUMBOLDT-TRINITY 115KV [1820] P1-2:A3:35:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1/N-1	>0.9	>0.9	>0.9	0.90	0.94	>0.9	>0.9	0.95	>0.9	0.85	Project: Cascade - Benton - Scope under review

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
INSKIP 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.52	0.51	0.50	1.06	1.02	0.50	0.47	0.52	0.62	0.51	Project: Cottonwood - Red Bluff - Scope under review
INSKIP 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	0.99	0.55	0.51	1.08	1.03	0.55	0.11	0.34	0.96	0.22	Project: Cottonwood - Red Bluff - Scope under review
INSKIP 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.03	0.54	0.54	1.09	1.03	0.54	0.49	0.50	1.00	0.52	Project: Cottonwood - Red Bluff - Scope under review
INSKIP 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.52	0.51	0.50	1.06	1.02	0.50	0.47	0.52	0.62	0.51	Project: Cottonwood - Red Bluff - Scope under review
INSKIP 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.03	0.55	0.53	1.09	1.03	0.56	0.51	0.49	1.00	0.46	Project: Cottonwood - Red Bluff - Scope under review
INSKIP 60	P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0] P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1/N-1	>0.9	0.64	0.64	>0.9	>0.9	0.64	0.63	0.63	>0.9	0.65	Project: Cottonwood - Red Bluff - Scope under review
JACINTO 60	Base Case	P0	Normal	1.01	1.00	1.00	1.05	1.06	1.01	1.00	1.01	1.02	1.00	Glenn 230/60 kV Transformer Tap Adjustment
JESSUP 115	Base Case	P0	Normal	1.05	1.03	1.03	1.06	1.05	1.04	1.03	1.03	1.02	1.02	Load power factor correction
JESSUP 115	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.04	1.02	1.02	1.04	1.03	1.02	1.01	1.01	1.02	0.77	Project: Cottonwood - Red Bluff - Scope under review
KESWICK 60	Base Case	P0	Normal	1.04	1.02	1.02	1.05	1.04	1.02	1.02	1.02	1.02	1.01	Load power factor correction
KESWICK 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.98	0.91	0.90	1.06	1.04	0.91	0.91	0.94	0.94	0.90	Project: Cottonwood - Red Bluff - Scope under review
KESWICK 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.02	0.91	0.90	1.06	1.04	0.92	0.77	0.86	1.00	0.77	Project: Cottonwood - Red Bluff - Scope under review
KESWICK 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.03	0.91	0.91	1.06	1.04	0.92	0.89	0.90	1.00	0.88	Project: Cottonwood - Red Bluff - Scope under review
KESWICK 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.98	0.91	0.90	1.06	1.04	0.91	0.91	0.94	0.94	0.90	Project: Cottonwood - Red Bluff - Scope under review
KESWICK 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.03	0.92	0.91	1.06	1.04	0.92	0.90	0.90	1.00	0.86	Project: Cottonwood - Red Bluff - Scope under review
KESWICK 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.05	1.03	1.03	0.99	1.03	1.02	1.01	1.00	1.03	0.79	Project: Cottonwood - Red Bluff - Scope under review
KESWICK 60	P1-3:A3:42:_CASCADE 115/60KV TB 1 P1-2:A3:64:_CASCADE-BENTON-DESCHUTES 60KV [6310]	P6	N-1/N-1	0.73	0.49	0.64	0.96	0.91	0.49	0.50	0.48	0.78	0.65	Project: Cascade - Benton - Scope under review
KILARC 60	Base Case	P0	Normal	1.05	1.04	1.04	1.08	1.05	1.04	1.04	1.04	1.05	1.02	Project: Cascade - Benton - Scope under review
KILARC 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.90	0.80	0.78	1.09	1.05	0.81	0.78	0.83	0.88	0.77	Project: Cottonwood - Red Bluff - Scope under review

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
KILARC 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.04	0.81	0.79	1.09	1.04	0.82	0.51	0.69	1.01	0.52	Project: Cottonwood - Red Bluff - Scope under review
KILARC 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.05	0.82	0.81	1.09	1.05	0.83	0.77	0.79	1.04	0.76	Project: Cottonwood - Red Bluff - Scope under review
KILARC 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.90	0.80	0.78	1.09	1.05	0.81	0.78	0.83	0.88	0.77	Project: Cottonwood - Red Bluff - Scope under review
KILARC 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.05	0.82	0.80	1.09	1.05	0.83	0.79	0.78	1.04	0.72	Project: Cottonwood - Red Bluff - Scope under review
KILARC 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.06	1.04	1.04	1.06	1.05	1.04	1.04	1.04	1.05	0.89	Project: Cottonwood - Red Bluff - Scope under review
KILARC 60	P1-2:A3:64:_CASCADE-BENTON-DESCHUTES 60KV [6310] P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1/N-1	>0.9	>0.9	>0.9	1.13	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
KLLY RDE 60	Base Case	P0	Normal	1.04	1.02	1.03	1.07	1.04	1.03	1.02	1.02	1.02	1.02	Load power factor correction
KLLY RDE 60	P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P1	N-1	1.04	1.01	1.01	1.11	1.03	1.02	1.01	1.01	1.01	1.00	Load power factor correction
KLLY RDE 60	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.04	1.01	1.01	1.11	1.04	1.01	1.00	1.01	1.02	1.00	Load power factor correction
KLLY RDE 60	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.04	1.01	1.01	1.11	1.04	1.01	1.00	1.01	1.02	1.00	Load power factor correction
KLLY RDE 60	P2-3:A3:105:_PALERMO 230KV - RING R2 & R3	P2	Non-bus-tie breaker	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
KLLY RDE 60	P2-3:A3:29:_TBL MT E - 1E 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.04	1.01	1.01	1.11	1.04	1.01	1.00	1.00	1.02	1.00	Load power factor correction
KLLY RDE 60	P1-1:A3:62:_OROVLL 9.11KV GEN UNIT 1 P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P3	G-1/N-1	>0.9	>0.9	>0.9	1.11	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
KLLY RDE 60	P1-3:A3:35:_PALERMO 230/115KV TB 2 P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690]	P6	N-1/N-1	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
LP FB SP 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.19	0.18	0.18	1.04	0.97	0.18	0.15	0.17	0.29	0.20	Project: Cottonwood - Red Bluff - Scope under review
LP FB SP 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	0.88	0.21	0.19	1.06	0.98	0.21	0.00	0.09	0.80	0.07	Project: Cottonwood - Red Bluff - Scope under review
LP FB SP 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.19	0.18	0.18	1.04	0.97	0.18	0.15	0.17	0.29	0.20	Project: Cottonwood - Red Bluff - Scope under review
LP FB SP 60	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1/N-1	>0.9	0.88	0.86	>0.9	>0.9	0.90	0.81	0.85	0.95	0.85	Project: Cascade - Benton - Scope under review
LSNA PCC 60	Base Case	P0	Normal	1.03	1.01	1.01	1.07	1.03	1.02	1.01	1.01	1.01	1.01	Load power factor correction
LSNA PCC 60	P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P1	N-1	1.03	1.00	0.99	1.10	1.02	1.01	1.00	1.00	1.00	0.99	Load power factor correction
LSNA PCC 60	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.04	1.00	1.00	1.10	1.03	1.00	0.99	1.00	1.01	0.99	Load power factor correction
LSNA PCC 60	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.04	1.00	1.00	1.10	1.03	1.00	0.99	1.00	1.01	0.99	Load power factor correction
LSNA PCC 60	P2-3:A3:105:_PALERMO 230KV - RING R2 & R3	P2	Non-bus-tie breaker	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction

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Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
LSNA PCC 60	P2-3:A3:29:_TBL MT E - 1E 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.03	1.00	1.00	1.10	1.03	1.00	0.99	0.99	1.00	0.99	Load power factor correction
LSNA PCC 60	P1-1:A3:62:_OROVLE 9.11KV GEN UNIT 1 P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P3	G-1/N-1	>0.9	>0.9	>0.9	1.11	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
LSNA PCC 60	P1-3:A3:35:_PALERMO 230/115KV TB 2 P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690]	P6	N-1/N-1	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
MTN GATE 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.94	0.86	0.85	1.05	1.02	0.87	0.87	0.90	0.90	0.86	Project: Cottonwood - Red Bluff - Scope under review
MTN GATE 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.00	0.87	0.86	1.05	1.02	0.88	0.70	0.80	0.98	0.70	Project: Cottonwood - Red Bluff - Scope under review
MTN GATE 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.01	0.87	0.87	1.05	1.02	0.88	0.85	0.86	0.98	0.83	Project: Cottonwood - Red Bluff - Scope under review
MTN GATE 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.94	0.86	0.85	1.05	1.02	0.87	0.87	0.90	0.90	0.86	Project: Cottonwood - Red Bluff - Scope under review
MTN GATE 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.01	0.88	0.86	1.05	1.02	0.88	0.86	0.85	0.98	0.82	Project: Cottonwood - Red Bluff - Scope under review
MTN GATE 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.02	1.00	1.00	1.00	1.01	1.00	1.00	0.99	1.00	0.77	Project: Cottonwood - Red Bluff - Scope under review
MTN GATE 60	P1-3:A3:42:_CASCADE 115/60KV TB 1 P1-2:A3:64:_CASCADE-BENTON-DESCHUTES 60KV [6310]	P6	N-1/N-1	0.64	0.36	0.54	0.93	0.86	0.35	0.37	0.34	0.70	0.55	Project: Cascade - Benton - Scope under review
NEO REDT 60	Base Case	P0	Normal	1.06	1.03	1.03	1.05	1.04	1.05	1.03	1.03	1.04	1.03	Project: Cascade - Benton - Scope under review
OREGNTRL 115	Base Case	P0	Normal	1.04	1.02	1.02	1.06	1.04	1.03	1.02	1.03	1.02	1.02	Load power factor correction
OREGNTRL 115	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.02	0.95	0.94	1.07	1.04	0.96	0.86	0.92	1.01	0.85	Project: Cottonwood - Red Bluff - Scope under review
OREGNTRL 115	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.04	1.02	1.02	1.04	1.03	1.02	1.01	1.01	1.02	0.79	Project: Cottonwood - Red Bluff - Scope under review
OREGNTRL 60	Base Case	P0	Normal	1.04	1.02	1.02	1.05	1.04	1.02	1.02	1.02	1.02	1.01	Load power factor correction
OREGNTRL 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.94	0.85	0.83	1.06	1.03	0.85	0.85	0.88	0.90	0.84	Project: Cottonwood - Red Bluff - Scope under review
OREGNTRL 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.03	0.86	0.84	1.06	1.03	0.86	0.63	0.77	0.99	0.64	Project: Cottonwood - Red Bluff - Scope under review
OREGNTRL 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.03	0.86	0.85	1.06	1.03	0.87	0.83	0.84	1.00	0.82	Project: Cottonwood - Red Bluff - Scope under review
OREGNTRL 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.94	0.85	0.83	1.06	1.03	0.85	0.85	0.88	0.90	0.84	Project: Cottonwood - Red Bluff - Scope under review

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Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
OREGNTRL 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.03	0.86	0.85	1.06	1.03	0.87	0.84	0.83	1.00	0.79	Project: Cottonwood - Red Bluff - Scope under review
OREGNTRL 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.04	1.02	1.02	1.02	1.03	1.02	1.02	1.01	1.02	0.83	Project: Cottonwood - Red Bluff - Scope under review
ORLAND B 60	Base Case	P0	Normal	1.04	1.03	1.03	1.04	1.05	1.04	1.03	1.04	1.04	1.03	Glenn 230/60 kV Transformer Tap Adjustment
OROENEGY 60	Base Case	P0	Normal	1.03	1.01	1.02	1.07	1.03	1.02	1.01	1.01	1.01	1.01	Load power factor correction
OROENEGY 60	P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P1	N-1	1.03	1.00	1.00	1.10	1.02	1.01	1.00	1.00	1.00	0.99	Load power factor correction
OROENEGY 60	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.04	1.00	1.00	1.10	1.03	1.00	0.99	1.00	1.01	0.99	Load power factor correction
OROENEGY 60	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.04	1.00	1.00	1.10	1.03	1.00	0.99	1.00	1.01	0.99	Load power factor correction
OROENEGY 60	P2-3:A3:105:_PALERMO 230KV - RING R2 & R3	P2	Non-bus-tie breaker	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
OROENEGY 60	P2-3:A3:29:_TBL MT E - 1E 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.04	1.00	1.00	1.10	1.03	1.00	0.99	0.99	1.01	0.99	Load power factor correction
OROENEGY 60	P1-3:A3:35:_PALERMO 230/115KV TB 2 P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690]	P6	N-1/N-1	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
OROVILLE 60	Base Case	P0	Normal	1.03	1.01	1.01	1.07	1.03	1.02	1.01	1.01	1.01	1.00	Load power factor correction
OROVILLE 60	P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P1	N-1	1.03	1.00	0.99	1.10	1.02	1.01	1.00	1.00	1.00	0.98	Load power factor correction
OROVILLE 60	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.04	1.00	1.00	1.10	1.03	1.00	0.99	0.99	1.01	0.99	Load power factor correction
OROVILLE 60	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.04	1.00	1.00	1.10	1.03	1.00	0.99	0.99	1.01	0.99	Load power factor correction
OROVILLE 60	P2-3:A3:105:_PALERMO 230KV - RING R2 & R3	P2	Non-bus-tie breaker	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
OROVILLE 60	P2-3:A3:29:_TBL MT E - 1E 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.03	1.00	1.00	1.10	1.03	1.00	0.99	0.99	1.00	0.98	Load power factor correction
OROVILLE 60	P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690] P1-3:A3:23:_CARIBOU 230/230KV TB 11	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	0.91	>0.9	>0.9	0.92	0.90	Sensitivity only
OROVILLE 60	P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690] P1-3:A3:35:_PALERMO 230/115KV TB 2	P6	N-1/N-1	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
OWID 115	Base Case	P0	Normal	1.05	1.03	1.03	1.09	1.05	1.04	1.03	1.03	1.03	1.03	Load power factor correction and/or transformer tap adjustment
OWID 115	P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690]	P1	N-1	1.04	1.02	1.02	1.11	1.03	1.02	1.02	1.02	1.02	1.02	Load power factor correction
OWID 115	P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P1	N-1	1.05	1.03	1.02	1.13	1.04	1.03	1.03	1.03	1.02	1.02	Load power factor correction
OWID 115	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.05	1.03	1.03	1.13	1.05	1.03	1.02	1.03	1.03	1.03	Load power factor correction
OWID 115	P1-3:A3:35:_PALERMO 230/115KV TB 2	P1	N-1	1.04	1.02	1.02	1.10	1.03	1.02	1.02	1.02	1.02	1.02	Load power factor correction
OWID 115	P1-4:A3:3:_TB MT 1T SVD=V	P1	N-1	1.05	1.03	1.03	1.12	1.05	1.04	1.03	1.03	1.03	1.03	Load power factor correction
OWID 115	P2-1:A3:20:_TABLE MTN-PALERMO 230KV [5690] (TBL MT D-PALERMO)	P2-1	Line Section w/o fault	1.05	1.03	1.03	1.11	1.05	1.03	1.03	1.03	1.03	1.03	Load power factor correction
OWID 115	P2-2:A3:25:_TBL MT D 230KV SECTION 2D	P2	Bus	1.05	1.03	1.03	1.11	1.05	1.03	1.03	1.03	1.03	1.03	Load power factor correction
OWID 115	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.05	1.03	1.03	1.13	1.05	1.03	1.02	1.03	1.03	1.03	Load power factor correction

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Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
OWID 115	P2-3:A3:104:_PALERMO 230KV - RING R2 & R1	P2	Non-bus-tie breaker	1.04	1.02	1.02	1.10	1.03	1.02	1.02	1.02	1.02	1.02	Load power factor correction
OWID 115	P2-3:A3:105:_PALERMO 230KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	1.02	1.02	1.10	1.03	1.02	1.02	1.02	1.02	1.02	Load power factor correction
OWID 115	P2-3:A3:106:_PALERMO 230KV - RING R1 & R3	P2	Non-bus-tie breaker	1.04	1.02	1.02	1.10	1.03	1.02	1.02	1.02	1.02	1.02	Load power factor correction
OWID 115	P2-3:A3:27:_TBL MT D - 2D 230KV & TABLE MTN-PALERMO LINE	P2	Non-bus-tie breaker	1.05	1.02	1.02	1.12	1.04	1.02	1.02	1.03	1.03	1.02	Load power factor correction
OWID 115	P2-3:A3:28:_TBL MT D - 2D 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.11	1.05	1.03	1.03	1.03	1.03	1.03	Load power factor correction
OWID 115	P2-3:A3:29:_TBL MT E - 1E 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.13	1.05	1.03	1.02	1.02	1.03	1.02	Load power factor correction
	P2-4:A3:5:_TBL MT D 230KV - SECTION 1D & 2D	P2	Bus-tie breaker	Nconv	Nconv	Nconv	>0.9	Nconv	Nconv	Nconv	Nconv	Nconv	Nconv	Existing Caribou RAS should drop Caribou generator
OWID 115	P1-3:A3:23:_CARIBOU 230/230KV TB 11 P1-3:A3:2:_TABLE MT 500/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	1.13	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
OWID 115	P7-1:A3:18_Table Mountain(D)-Rio Oso 230 kV Line and Table Mountain(D)-Palermo 230 kV Line	P7	DCTL	1.05	1.03	1.03	1.11	1.05	1.03	1.03	1.03	1.03	1.03	Load power factor correction
PALERMO 115	Base Case	P0	Normal	1.06	1.03	1.03	1.09	1.05	1.04	1.03	1.03	1.03	1.03	Load power factor correction and/or transformer tap adjustment
PALERMO 115	P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690]	P1	N-1	1.05	1.01	1.01	1.10	1.03	1.01	1.01	1.01	1.01	1.01	Load power factor correction
PALERMO 115	P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P1	N-1	1.05	1.02	1.01	1.13	1.03	1.03	1.02	1.02	1.01	1.01	Load power factor correction
PALERMO 115	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.06	1.02	1.02	1.13	1.06	1.02	1.02	1.02	1.02	1.02	Load power factor correction
PALERMO 115	P1-3:A3:35:_PALERMO 230/115KV TB 2	P1	N-1	1.05	1.01	1.01	1.10	1.03	1.01	1.01	1.01	1.01	1.01	Load power factor correction
PALERMO 115	P1-4:A3:3:_TB MT 1T SVD=V	P1	N-1	1.06	1.03	1.03	1.12	1.05	1.04	1.03	1.03	1.03	1.03	Load power factor correction
PALERMO 115	P2-1:A3:20:_TABLE MTN-PALERMO 230KV [5690] (TBL MT D-PALERMO)	P2-1	Line Section w/o fault	1.06	1.03	1.03	1.10	1.05	1.03	1.03	1.03	1.03	1.02	Load power factor correction
PALERMO 115	P2-2:A3:25:_TBL MT D 230KV SECTION 2D	P2	Bus	1.06	1.03	1.03	1.11	1.05	1.03	1.03	1.03	1.03	1.03	Load power factor correction
PALERMO 115	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.06	1.02	1.02	1.13	1.06	1.02	1.02	1.02	1.02	1.02	Load power factor correction
PALERMO 115	P2-3:A3:104:_PALERMO 230KV - RING R2 & R1	P2	Non-bus-tie breaker	1.04	1.01	1.01	1.10	1.03	1.01	1.01	1.01	1.01	1.01	Load power factor correction
PALERMO 115	P2-3:A3:105:_PALERMO 230KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	1.01	1.01	1.10	1.03	1.01	1.01	1.01	1.01	1.01	Load power factor correction
PALERMO 115	P2-3:A3:106:_PALERMO 230KV - RING R1 & R3	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.10	1.03	1.01	1.01	1.01	1.01	1.01	Load power factor correction
PALERMO 115	P2-3:A3:27:_TBL MT D - 2D 230KV & TABLE MTN-PALERMO LINE	P2	Non-bus-tie breaker	1.05	1.02	1.02	1.12	1.03	1.01	1.02	1.02	1.02	1.01	Load power factor correction
PALERMO 115	P2-3:A3:28:_TBL MT D - 2D 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.06	1.03	1.03	1.11	1.05	1.03	1.03	1.03	1.03	1.03	Load power factor correction
PALERMO 115	P2-3:A3:29:_TBL MT E - 1E 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.06	1.02	1.02	1.13	1.05	1.02	1.01	1.02	1.02	1.02	Load power factor correction

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
	P2-4:A3:5:_TBL MT D 230KV - SECTION 1D & 2D	P2	Bus-tie breaker	Nconv	Nconv	Nconv	>0.9	Nconv	Nconv	Nconv	Nconv	Nconv	Nconv	Existing Caribou RAS should drop Caribou generator
PALERMO 115	P1-3:A3:23:_CARIBOU 230/230KV TB 11 P1-3:A3:2:_TABLE MT 500/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	1.13	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
PALERMO 115	P7-1:A3:18_Table Mountain(D)-Rio Oso 230 kV Line and Table Mountain(D)-Palermo 230 kV Line	P7	DCTL	1.06	1.03	1.03	1.11	1.05	1.03	1.03	1.03	1.02	1.02	Load power factor correction
PALERMO 230	P1-2:A3:40:_WOODLEAF-PALERMO 115KV [4220] P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	>0.9	>0.9	0.89	0.89	Sensitivity only
PALERMO 60	Base Case	P0	Normal	1.04	1.01	1.02	1.07	1.03	1.02	1.01	1.01	1.01	1.01	Load power factor correction
PALERMO 60	P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P1	N-1	1.03	1.00	1.00	1.10	1.02	1.01	1.00	1.00	1.00	0.99	Load power factor correction
PALERMO 60	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.04	1.00	1.00	1.10	1.03	1.00	0.99	1.00	1.01	0.99	Load power factor correction
PALERMO 60	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.04	1.00	1.00	1.10	1.03	1.00	0.99	1.00	1.01	0.99	Load power factor correction
PALERMO 60	P2-3:A3:105:_PALERMO 230KV - RING R2 & R3	P2	Non-bus-tie breaker	>0.9	>0.9	>0.9	1.11	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
PALERMO 60	P1-1:A3:62:_OROVILLE 9.11KV GEN UNIT 1 P1-3:A3:2:_TABLE MT 500/230KV TB 1	P3	G-1/N-1	>0.9	>0.9	>0.9	1.10	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
PANRAMA 115	Base Case	P0	Normal	1.05	1.03	1.03	1.06	1.05	1.04	1.03	1.04	1.02	1.03	Load power factor correction
PEACHTON 60	P7-1:A3:15_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.01	0.98	0.99	1.02	1.00	0.99	0.98	0.98	0.82	0.99	Sensitivity only
PIT 1 60	Base Case	P0	Normal	1.03	1.04	1.04	1.07	1.06	1.04	1.04	1.04	1.05	1.04	Load power factor correction and/or transformer tap adjustment
PIT 1 60	P2-2:A3:66:_PIT 1 60KV SECTION MA	P2	Bus	1.07	1.06	1.06	1.10	1.07	1.07	1.06	1.06	1.06	1.06	Load power factor correction
PIT 1 60	P2-3:A3:77:_PIT 1 - MA 60KV & PIT #1-MCARTHUR LINE	P2	Non-bus-tie breaker	1.07	1.06	1.06	1.10	1.07	1.07	1.06	1.06	1.06	1.06	Load power factor correction
PIT 1 60	P2-3:A3:78:_PIT 1 - MA 60KV & HAT CREEK #1-PIT #1 LINE	P2	Non-bus-tie breaker	1.07	1.06	1.06	1.10	1.07	1.07	1.06	1.06	1.06	1.06	Load power factor correction
PIT 1 60	P2-3:A3:79:_PIT 1 - MA 60KV & PIT #1-HAT CREEK #2-BURNEY LINE	P2	Non-bus-tie breaker	1.07	1.06	1.06	1.10	1.07	1.07	1.06	1.06	1.06	1.06	Load power factor correction
PIT 1 60	P1-1:A3:42:_PIT 1 U1 11.00KV GEN UNIT 2 P1-3:A3:60:_HAT CRK1 6.6/60KV TB 1	P3	G-1/N-1	>0.9	>0.9	>0.9	1.10	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
PIT 1 60	P1-3:A3:11:_PIT 1 230/11KV TB 1 P1-3:A3:62:_HT CRKR 60/60KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	1.11	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction and/or transformer tap adjustment
PIT 1 60	P1-3:A3:60:_HAT CRK1 6.6/60KV TB 1 P1-1:A3:42:_PIT 1 U1 11.00KV GEN UNIT 2	P6	N-1/N-1	>0.9	>0.9	>0.9	1.10	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
POE 230	Base Case	P0	Normal	1.03	1.02	1.02	1.07	1.04	1.02	1.01	1.01	1.02	1.02	Load power factor correction
PPL 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.94	0.86	0.85	1.05	1.02	0.86	0.87	0.89	0.90	0.86	Project: Cottonwood - Red Bluff - Scope under review
PPL 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	0.99	0.86	0.85	1.05	1.02	0.87	0.69	0.80	0.97	0.69	Project: Cottonwood - Red Bluff - Scope under review

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
PPL 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.00	0.87	0.86	1.05	1.02	0.87	0.84	0.85	0.98	0.83	Project: Cottonwood - Red Bluff - Scope under review
PPL 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.94	0.86	0.85	1.05	1.02	0.86	0.87	0.89	0.90	0.86	Project: Cottonwood - Red Bluff - Scope under review
PPL 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.00	0.87	0.86	1.05	1.02	0.88	0.85	0.85	0.98	0.81	Project: Cottonwood - Red Bluff - Scope under review
PPL 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.01	1.00	1.00	1.00	1.01	0.99	0.99	0.99	0.99	0.77	Project: Cottonwood - Red Bluff - Scope under review
PPL 60	P1-3:A3:42:_CASCADE 115/60KV TB 1 P1-2:A3:64:_CASCADE-BENTON-DESCHUTES 60KV [6310]	P6	N-1/N-1	0.63	0.35	0.53	0.93	0.86	0.33	0.35	0.33	0.69	0.54	Project: Cascade - Benton - Scope under review
RED BLFF 60	P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0]	P1	N-1	1.01	0.90	0.89	1.05	1.02	0.90	0.88	0.89	0.95	0.89	Project: Cottonwood - Red Bluff - Scope under review
RED BLFF 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.21	0.20	0.20	1.05	0.98	0.20	0.16	0.18	0.32	0.21	Project: Cottonwood - Red Bluff - Scope under review
RED BLFF 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	0.90	0.23	0.20	1.06	0.98	0.23	0.00	0.10	0.81	0.08	Project: Cottonwood - Red Bluff - Scope under review
RED BLFF 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.00	0.26	0.26	1.09	1.01	0.25	0.21	0.24	0.91	0.24	Project: Cottonwood - Red Bluff - Scope under review
RED BLFF 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.21	0.20	0.20	1.05	0.98	0.20	0.16	0.18	0.32	0.21	Project: Cottonwood - Red Bluff - Scope under review
RED BLFF 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.00	0.27	0.24	1.09	1.01	0.27	0.20	0.23	0.91	0.21	Project: Cottonwood - Red Bluff - Scope under review
RED BLFF 60	P1-1:A3:68:_COLEMAN 6.60KV GEN UNIT 1 P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0]	P3	G-1/N-1	>0.9	0.90	0.89	>0.9	>0.9	0.90	0.87	0.89	>0.9	0.89	Project: Cottonwood - Red Bluff - Scope under review
RED BLFF 60	P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0] P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1/N-1	>0.9	0.31	0.30	>0.9	>0.9	0.30	0.29	0.29	>0.9	0.32	Project: Cottonwood - Red Bluff - Scope under review
RED BLFF 60	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	DCTL	1.00	0.90	0.89	1.05	1.02	0.90	0.88	0.89	0.95	0.89	Project: Cottonwood - Red Bluff - Scope under review
ROCKCK 1 230	Base Case	P0	Normal	1.03	1.02	1.02	1.07	1.04	1.02	1.02	1.02	1.02	1.02	Load power factor correction
ROCKCK 2 230	Base Case	P0	Normal	1.04	1.02	1.02	1.06	1.04	1.03	1.02	1.02	1.00	1.02	Load power factor correction
SLYCREEK 115	Base Case	P0	Normal	1.06	1.04	1.04	1.10	1.05	1.04	1.04	1.04	1.04	1.04	Load power factor correction and/or transformer tap adjustment
SLYCREEK 115	P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690]	P1	N-1	1.05	1.03	1.03	1.11	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction
SLYCREEK 115	P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P1	N-1	1.05	1.04	1.03	1.13	1.04	1.04	1.04	1.04	1.03	1.03	Load power factor correction
SLYCREEK 115	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.06	1.04	1.04	1.13	1.05	1.04	1.03	1.04	1.04	1.04	Load power factor correction

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
SLYCREEK 115	P1-3:A3:35:_PALERMO 230/115KV TB 2	P1	N-1	1.05	1.03	1.03	1.11	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction
SLYCREEK 115	P1-4:A3:3:_TB MT 1T SVD=V	P1	N-1	1.06	1.04	1.04	1.12	1.05	1.04	1.04	1.04	1.04	1.04	Load power factor correction
SLYCREEK 115	P2-1:A3:20:_TABLE MTN-PALERMO 230KV [5690] (TBL MT D-PALERMO)	P2-1	Line Section w/o fault	1.06	1.04	1.04	1.11	1.05	1.04	1.04	1.04	1.04	1.04	Load power factor correction
SLYCREEK 115	P2-2:A3:25:_TBL MT D 230KV SECTION 2D	P2	Bus	1.06	1.04	1.04	1.12	1.05	1.04	1.04	1.04	1.04	1.04	Load power factor correction
SLYCREEK 115	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.06	1.04	1.04	1.13	1.05	1.04	1.03	1.04	1.04	1.04	Load power factor correction
SLYCREEK 115	P2-3:A3:104:_PALERMO 230KV - RING R2 & R1	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.11	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction
SLYCREEK 115	P2-3:A3:105:_PALERMO 230KV - RING R2 & R3	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.11	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction
SLYCREEK 115	P2-3:A3:106:_PALERMO 230KV - RING R1 & R3	P2	Non-bus-tie breaker	1.05	1.03	1.03	1.11	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction
SLYCREEK 115	P2-3:A3:27:_TBL MT D - 2D 230KV & TABLE MTN-PALERMO LINE	P2	Non-bus-tie breaker	1.05	1.04	1.03	1.12	1.04	1.03	1.04	1.04	1.04	1.03	Load power factor correction
SLYCREEK 115	P2-3:A3:28:_TBL MT D - 2D 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.12	1.05	1.04	1.04	1.04	1.04	1.04	Load power factor correction
SLYCREEK 115	P2-3:A3:29:_TBL MT E - 1E 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.13	1.05	1.04	1.03	1.04	1.04	1.03	Load power factor correction
	P2-4:A3:5:_TBL MT D 230KV - SECTION 1D & 2D	P2	Bus-tie breaker	Nconv	Nconv	Nconv	>0.9	Nconv	Nconv	Nconv	Nconv	Nconv	Nconv	Existing Caribou RAS should drop Caribou generator
SLYCREEK 115	P1-3:A3:23:_CARIBOU 230/230KV TB 11 P1-3:A3:2:_TABLE MT 500/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	1.13	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
SLYCREEK 115	P7-1:A3:18_Table Mountain(D)-Rio Oso 230 kV Line and Table Mountain(D)-Palermo 230 kV Line	P7	DCTL	1.06	1.04	1.04	1.11	1.05	1.04	1.04	1.04	1.04	1.04	Load power factor correction
SMPSN-AN 115	Base Case	P0	Normal	1.05	1.03	1.03	1.06	1.05	1.04	1.03	1.04	1.02	1.03	Load power factor correction
SOUTH 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.57	0.55	0.54	1.07	1.03	0.55	0.52	0.56	0.65	0.55	Project: Cottonwood - Red Bluff - Scope under review
SOUTH 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	0.99	0.59	0.55	1.08	1.03	0.59	0.14	0.39	0.97	0.25	Project: Cottonwood - Red Bluff - Scope under review
SOUTH 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.03	0.58	0.58	1.09	1.03	0.58	0.53	0.54	1.00	0.55	Project: Cottonwood - Red Bluff - Scope under review
SOUTH 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.57	0.55	0.54	1.07	1.03	0.55	0.52	0.56	0.65	0.55	Project: Cottonwood - Red Bluff - Scope under review
SOUTH 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.03	0.59	0.57	1.09	1.03	0.60	0.55	0.53	1.00	0.50	Project: Cottonwood - Red Bluff - Scope under review
SOUTH 60	P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0] P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1/N-1	>0.9	0.68	0.68	>0.9	>0.9	0.68	0.67	0.67	>0.9	0.69	Project: Cottonwood - Red Bluff - Scope under review
SPANSHCK 60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.03	0.93	0.89	1.05	1.02	0.93	0.93	0.93	1.00	0.89	Issue is in long term - Continue to monitor
SPI_AND 115	Base Case	P0	Normal	1.05	1.03	1.03	1.06	1.05	1.04	1.03	1.03	1.02	1.02	Load power factor correction

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
SPI_AND 115	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.04	1.02	1.02	1.04	1.04	1.02	1.01	1.01	1.02	0.77	Sensitivity only
SPIQUINCY 60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.03	0.96	0.87	1.05	1.03	0.96	0.96	0.96	1.02	0.87	Issue is in long term - Continue to monitor
SPIQUINCYJCT60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.03	0.96	0.87	1.05	1.03	0.96	0.96	0.96	1.02	0.87	Issue is in long term - Continue to monitor
STLLWATR 60	Base Case	P0	Normal	1.03	1.02	1.02	1.05	1.04	1.02	1.02	1.02	1.02	1.01	Load power factor correction
STLLWATR 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.96	0.89	0.88	1.06	1.03	0.89	0.90	0.92	0.93	0.88	Project: Cottonwood - Red Bluff - Scope under review
STLLWATR 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.02	0.89	0.88	1.06	1.03	0.90	0.73	0.83	0.99	0.73	Project: Cottonwood - Red Bluff - Scope under review
STLLWATR 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.02	0.90	0.89	1.06	1.03	0.90	0.87	0.88	1.00	0.86	Project: Cottonwood - Red Bluff - Scope under review
STLLWATR 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.96	0.89	0.88	1.06	1.03	0.89	0.90	0.92	0.93	0.88	Project: Cottonwood - Red Bluff - Scope under review
STLLWATR 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.02	0.90	0.89	1.06	1.03	0.91	0.88	0.88	1.00	0.84	Project: Cottonwood - Red Bluff - Scope under review
STLLWATR 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.04	1.02	1.02	1.00	1.02	1.02	1.01	1.01	1.02	0.79	Project: Cottonwood - Red Bluff - Scope under review
STLLWATR 60	P1-3:A3:42:_CASCADE 115/60KV TB 1 P1-2:A3:64:_CASCADE-BENTON-DESCHUTES 60KV [6310]	P6	N-1/N-1	0.68	0.41	0.59	0.95	0.89	0.40	0.42	0.39	0.73	0.59	Project: Cascade - Benton - Scope under review
TBLE MTN 115	Base Case	P0	Normal	1.04	1.04	1.04	1.04	1.04	1.05	1.05	1.05	1.04	1.04	Transformer tap adjustment
TRES VIS 60	P7-1:A3:15_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7	DCTL	1.02	0.99	0.99	1.03	1.01	1.00	0.99	0.99	0.88	0.99	Sensitivity only
TRINITY 115	Base Case	P0	Normal	1.05	1.04	1.04	1.05	1.05	1.04	1.04	1.04	1.03	1.03	Load power factor correction and/or transformer tap adjustment
TRINITY 115	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.10	1.09	1.10	1.01	1.11	1.05	1.04	1.02	1.12	0.94	Project: Cottonwood - Red Bluff - Scope under review
TRINITY 115	P1-2:A3:37:_TRINITY-COTTONWOOD 115KV [4040] P1-2:A3:65:_KESWICK-CASCADE 60KV [7260]	P6	N-1/N-1	>0.9	>0.9	>0.9	1.10	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
TRINITY 60	Base Case	P0	Normal	1.05	1.04	1.04	1.05	1.05	1.04	1.04	1.04	1.03	1.03	Load power factor correction and/or transformer tap adjustment
TRINITY 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.10	1.09	1.09	1.01	1.11	1.05	1.04	1.01	1.11	0.93	Project: Cottonwood - Red Bluff - Scope under review
TRINITY 60	P1-2:A3:34:_HUMBOLDT-TRINITY 115KV [1820] P1-2:A3:35:_BRIDGEVILLE-COTTONWOOD 115KV [1110]	P6	N-1/N-1	>0.9	>0.9	>0.9	0.91	0.94	>0.9	>0.9	0.95	>0.9	0.85	Sensitivity only
TYLERJT 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.19	0.19	0.18	1.04	0.97	0.18	0.15	0.17	0.30	0.20	Project: Cottonwood - Red Bluff - Scope under review

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
TYLERJT 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	0.89	0.21	0.19	1.06	0.98	0.21	0.00	0.09	0.80	0.07	Project: Cottonwood - Red Bluff - Scope under review
TYLERJT 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.19	0.19	0.18	1.04	0.97	0.18	0.15	0.17	0.30	0.20	Project: Cottonwood - Red Bluff - Scope under review
TYLERJT 60	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1/N-1	>0.9	0.88	0.87	>0.9	>0.9	0.90	0.81	0.85	0.95	0.86	Project: Cascade - Benton - Scope under review
ULTR WSD 60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.02	0.96	0.90	1.04	1.02	0.96	0.95	0.96	1.01	0.90	Issue is in long term - Continue to monitor
VINA 60	P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0]	P1	N-1	1.02	0.91	0.91	1.04	1.03	0.92	0.89	0.90	0.96	0.90	Project: Cottonwood - Red Bluff - Scope under review
VINA 60	P2-1:A3:94:_COLEMAN-RED BLUFF 60KV [6440] (COLEMAN-CLMN JCT)	P2-1	Line Section w/o fault	1.01	0.90	0.89	1.04	1.03	0.91	0.88	0.89	0.96	0.89	Project: Cottonwood - Red Bluff - Scope under review
VINA 60	P2-2:A3:61:_COLEMAN 60KV SECTION 1D	P2	Bus	1.01	0.90	0.89	1.04	1.03	0.91	0.88	0.89	0.96	0.89	Project: Cottonwood - Red Bluff - Scope under review
VINA 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.25	0.23	0.23	1.05	0.99	0.23	0.19	0.22	0.36	0.24	Project: Cottonwood - Red Bluff - Scope under review
VINA 60	P2-3:A3:68:_COLEMAN - 1D 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.01	0.90	0.89	1.04	1.03	0.91	0.88	0.90	0.96	0.89	Project: Cottonwood - Red Bluff - Scope under review
VINA 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	0.93	0.26	0.24	1.07	1.00	0.26	0.00	0.12	0.84	0.09	Project: Cottonwood - Red Bluff - Scope under review
VINA 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.01	0.27	0.28	1.09	1.02	0.27	0.23	0.25	0.92	0.26	Project: Cottonwood - Red Bluff - Scope under review
VINA 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.25	0.23	0.23	1.05	0.99	0.23	0.19	0.22	0.36	0.24	Project: Cottonwood - Red Bluff - Scope under review
VINA 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.01	0.28	0.26	1.09	1.02	0.29	0.22	0.24	0.92	0.23	Project: Cottonwood - Red Bluff - Scope under review
VINA 60	P1-1:A3:47:_SOUTH G 4.16KV GEN UNIT 1 P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0]	P3	G-1/N-1	>0.9	0.91	0.90	>0.9	>0.9	>0.9	0.89	0.90	>0.9	0.90	Project: Cottonwood - Red Bluff - Scope under review
VINA 60	P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0] P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1/N-1	>0.9	0.33	0.32	>0.9	>0.9	0.33	0.31	0.31	>0.9	0.34	Project: Cottonwood - Red Bluff - Scope under review
VINA 60	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	DCTL	1.01	0.91	0.91	1.04	1.03	0.92	0.90	0.91	0.96	0.91	Project: Cottonwood - Red Bluff - Scope under review
VOLTA 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.64	0.59	0.58	1.06	1.03	0.59	0.56	0.61	0.70	0.59	Project: Cottonwood - Red Bluff - Scope under review
VOLTA 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.01	0.62	0.59	1.07	1.03	0.63	0.14	0.41	0.98	0.24	Project: Cottonwood - Red Bluff - Scope under review

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
VOLTA 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.04	0.63	0.62	1.08	1.03	0.63	0.57	0.58	1.01	0.59	Project: Cottonwood - Red Bluff - Scope under review
VOLTA 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.64	0.59	0.58	1.06	1.03	0.59	0.56	0.61	0.70	0.59	Project: Cottonwood - Red Bluff - Scope under review
VOLTA 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.04	0.64	0.61	1.08	1.03	0.64	0.60	0.57	1.01	0.53	Project: Cottonwood - Red Bluff - Scope under review
VOLTA 60	P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0] P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV [6430]	P6	N-1/N-1	>0.9	0.73	0.73	>0.9	>0.9	0.73	0.72	0.73	>0.9	0.74	Project: Cottonwood - Red Bluff - Scope under review
WESTWOOD 60	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	1.02	0.96	0.90	1.04	1.01	0.96	0.95	0.96	1.01	0.90	Issue is in long term - Continue to monitor
WHEELBR 115	Base Case	P0	Normal	1.05	1.03	1.03	1.06	1.05	1.04	1.03	1.04	1.02	1.03	Load power factor correction
WHITMORE 60	Base Case	P0	Normal	1.05	1.04	1.04	1.08	1.05	1.04	1.03	1.04	1.04	1.02	Load power factor correction and/or transformer tap adjustment
WHITMORE 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.89	0.79	0.78	1.08	1.04	0.80	0.78	0.83	0.87	0.77	Project: Cottonwood - Red Bluff - Scope under review
WHITMORE 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.04	0.81	0.78	1.08	1.04	0.82	0.51	0.68	1.01	0.51	Project: Cottonwood - Red Bluff - Scope under review
WHITMORE 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.04	0.81	0.80	1.09	1.04	0.82	0.77	0.78	1.03	0.76	Project: Cottonwood - Red Bluff - Scope under review
WHITMORE 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.89	0.79	0.78	1.08	1.04	0.80	0.78	0.83	0.87	0.77	Project: Cottonwood - Red Bluff - Scope under review
WHITMORE 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.04	0.82	0.80	1.09	1.04	0.83	0.79	0.78	1.03	0.72	Project: Cottonwood - Red Bluff - Scope under review
WHITMORE 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.05	1.04	1.04	1.05	1.05	1.04	1.03	1.03	1.04	0.89	Project: Cottonwood - Red Bluff - Scope under review
WHITMORE 60	P1-2:A3:71:_COLEMAN-COTTONWOOD 60KV [6430] P1-2:A3:64:_CASCADE-BENTON-DESCHUTES 60KV [6310]	P6	N-1/N-1	>0.9	>0.9	>0.9	1.12	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
WILDWOOD 115	Base Case	P0	Normal	1.06	1.04	1.04	1.06	1.06	1.05	1.04	1.04	1.04	1.04	Load power factor correction and/or transformer tap adjustment
WILDWOOD 115	P2-1:A3:28:_BRIDGEVILLE-COTTONWOOD 115KV [1110] (WILDWOOD-COTWDPGE)	P2-1	Line Section w/o fault	1.08	1.05	1.05	1.09	1.13	1.05	1.04	1.04	1.10	1.06	Reactor Projects
WILDWOOD 115	P2-2:A3:33:_COTWDPGE 115KV SECTION 2D	P2	Bus	1.08	1.05	1.05	1.08	1.13	1.05	1.04	1.04	1.10	1.06	Project: Cottonwood - Red Bluff - Scope under review
WILDWOOD 115	P2-3:A3:35:_COTWDPGE - 2D 115KV & CASCADE-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.07	1.05	1.05	1.08	1.13	1.05	1.04	1.04	1.09	1.06	Project: Cottonwood - Red Bluff - Scope under review
WILDWOOD 115	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.13	1.11	1.12	1.06	1.15	1.05	1.04	1.03	1.15	1.03	Project: Cottonwood - Red Bluff - Scope under review

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
WNTU PMS 60	P2-2:A3:63:_COTTONWD 60KV SECTION MA	P2	Bus	0.91	0.80	0.79	1.06	1.03	0.81	0.79	0.84	0.87	0.79	Project: Cottonwood - Red Bluff - Scope under review
WNTU PMS 60	P2-3:A3:70:_COTTONWD - MA 60KV & COLEMAN-COTTONWOOD LINE	P2	Non-bus-tie breaker	1.02	0.81	0.79	1.06	1.03	0.82	0.54	0.71	0.98	0.56	Project: Cottonwood - Red Bluff - Scope under review
WNTU PMS 60	P2-3:A3:71:_COTTONWD - MA 60KV & COTTONWD-RED BLFF LINE	P2	Non-bus-tie breaker	1.03	0.82	0.80	1.06	1.03	0.83	0.77	0.79	0.98	0.77	Project: Cottonwood - Red Bluff - Scope under review
WNTU PMS 60	P2-3:A3:72:_COTTONWD - MA 60KV & COTTONWOOD #2 LINE	P2	Non-bus-tie breaker	0.91	0.80	0.79	1.06	1.03	0.81	0.79	0.84	0.87	0.79	Project: Cottonwood - Red Bluff - Scope under review
WNTU PMS 60	P2-3:A3:73:_COTTONWD - MA 60KV & COTTONWOOD #1 LINE	P2	Non-bus-tie breaker	1.03	0.82	0.80	1.06	1.03	0.83	0.79	0.79	0.98	0.74	Project: Cottonwood - Red Bluff - Scope under review
WNTU PMS 60	P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	1.04	1.02	1.02	1.03	1.04	1.03	1.02	1.02	1.02	0.89	Project: Cottonwood - Red Bluff - Scope under review
WNTU PMS 60	P1-3:A3:4:_COTWD_E2 230/60KV TB 2 P1-3:A3:5:_COTWD_E 230/60KV TB 3	P6	N-1/N-1	>0.9	0.94	0.93	>0.9	>0.9	0.96	0.89	0.92	>0.9	0.92	Project: Cascade - Benton - Scope under review
WYANDTTE 115	Base Case	P0	Normal	1.06	1.02	1.02	1.09	1.05	1.03	1.02	1.02	1.02	1.02	Load power factor correction and/or transformer tap adjustment
WYANDTTE 115	P1-2:A3:27:_TABLE MTN-PALERMO 230KV [5690]	P1	N-1	1.04	1.00	1.00	1.10	1.03	1.00	1.00	1.00	1.00	1.00	Load power factor correction
WYANDTTE 115	P1-2:A3:29:_IDLE LINE - NO DATA 230KV [9999]	P1	N-1	1.05	1.01	1.01	1.13	1.03	1.02	1.01	1.01	1.01	1.01	Load power factor correction
WYANDTTE 115	P1-3:A3:2:_TABLE MT 500/230KV TB 1	P1	N-1	1.06	1.02	1.01	1.13	1.05	1.01	1.01	1.01	1.02	1.01	Load power factor correction
WYANDTTE 115	P1-3:A3:35:_PALERMO 230/115KV TB 2	P1	N-1	1.04	1.01	1.01	1.10	1.03	1.00	1.01	1.01	1.01	1.01	Load power factor correction
WYANDTTE 115	P1-4:A3:3:_TB MT 1T SVD=V	P1	N-1	1.06	1.02	1.02	1.12	1.05	1.03	1.02	1.02	1.02	1.02	Load power factor correction
WYANDTTE 115	P2-1:A3:20:_TABLE MTN-PALERMO 230KV [5690] (TBL MT D-PALERMO)	P2-1	Line Section w/o fault	1.06	1.02	1.02	1.10	1.05	1.02	1.02	1.02	1.02	1.02	Load power factor correction
WYANDTTE 115	P2-2:A3:25:_TBL MT D 230KV SECTION 2D	P2	Bus	1.06	1.03	1.03	1.11	1.05	1.02	1.02	1.02	1.03	1.02	Load power factor correction
WYANDTTE 115	P2-2:A3:26:_TBL MTX1 230KV SECTION NA	P2	Bus	1.06	1.02	1.01	1.13	1.05	1.01	1.01	1.01	1.02	1.01	Load power factor correction
WYANDTTE 115	P2-3:A3:104:_PALERMO 230KV - RING R2 & R1	P2	Non-bus-tie breaker	1.04	1.00	1.00	1.10	1.03	1.00	1.00	1.00	1.00	1.00	Load power factor correction
WYANDTTE 115	P2-3:A3:105:_PALERMO 230KV - RING R2 & R3	P2	Non-bus-tie breaker	1.04	1.00	1.00	1.10	1.03	1.00	1.00	1.00	1.00	1.00	Load power factor correction
WYANDTTE 115	P2-3:A3:106:_PALERMO 230KV - RING R1 & R3	P2	Non-bus-tie breaker	1.04	1.01	1.01	1.10	1.03	1.00	1.01	1.01	1.01	1.01	Load power factor correction
WYANDTTE 115	P2-3:A3:27:_TBL MT D - 2D 230KV & TABLE MTN-PALERMO LINE	P2	Non-bus-tie breaker	1.05	1.01	1.01	1.12	1.03	1.00	1.01	1.01	1.01	1.01	Load power factor correction
WYANDTTE 115	P2-3:A3:28:_TBL MT D - 2D 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.06	1.03	1.02	1.11	1.05	1.02	1.02	1.02	1.03	1.02	Load power factor correction
WYANDTTE 115	P2-3:A3:29:_TBL MT E - 1E 230KV & IDLE LINE - NO DATA LINE	P2	Non-bus-tie breaker	1.06	1.01	1.01	1.13	1.05	1.01	1.01	1.01	1.02	1.01	Load power factor correction
WYANDTTE 115	P2-3:A3:44:_PALERMO - 1D 115KV & PALERMO-WYANDOTTE LINE	P2	Non-bus-tie breaker	0.95	0.32	0.30	1.08	1.00	0.31	0.29	0.30	0.87	0.30	Mitigation under review

Study Area: PG&E North Valley



Voltage Deviations

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. 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 Generation s	
WYANDTTE 115	P1-3:A3:23:_CARIBOU 230/230KV TB 11 P1-3:A3:2:_TABLE MT 500/230KV TB 1	P6	N-1/N-1	>0.9	>0.9	>0.9	1.13	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction
WYANDTTE 115	P7-1:A3:18_Table Mountain(D)-Rio Oso 230 kV Line and Table Mountain(D)-Palermo 230 kV Line	P7	DCTL	1.06	1.02	1.02	1.11	1.04	1.02	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	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	
CR CANAL 60	P1-3:A3:59:_NEO REDT 60/13.8KV TB 1	P1	N-1	4.3	10.7	11.7	4.2	5.2	7.3	11.7	11.0	8.6	11.2	Project: Cottonwood - Red Bluff - Scope under review
NEO REDT 60	P1-3:A3:59:_NEO REDT 60/13.8KV TB 1	P1	N-1	4.3	10.8	11.7	4.2	5.2	7.3	11.8	11.1	8.6	11.2	Project: Cottonwood - Red Bluff - Scope under review
RED BLFF 60	P1-2:A3:73:_COTTONWD-RED BLFF 60KV [0]	P1	N-1	2.4	9.3	9.5	-0.7	1.2	9.4	10.9	10.2	5.7	9.5	Project: Cottonwood - Red Bluff - Scope under review
TYLER 60	P1-3:A3:59:_NEO REDT 60/13.8KV TB 1	P1	N-1	4.3	10.7	11.6	4.2	5.2	7.3	11.7	11.0	8.6	11.1	Project: Cottonwood - Red Bluff - Scope under review

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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..	
Colusa Generator fault (steam unit)	P1-1		0	0	0	1	1						Under review with PTO
Table Mountain to Thermalito 230 kV line fault	P1-2		0	0	0	0	0						No Violation
Round Mountain 500/230 kV Transformer fault	P1-3		0	0	0	0	0						No Violation
Delevan SVD fault	P1-4		0	1	1	0	1						Under review with PTO
Round Mountain 230 kV Bus Section fault	P2-2		1	1	1	1	1						Under review with PTO
Round Mountain 230 kV non-bus-tie breaker fault	P2-3		1	1	1	1	1						Under review with PTO
Round Mountain 230 kV bus-tie breaker fault	P2-4		1	1	1	1	1						Under review with PTO
Colusa steam unit out and gas unit fault	P3-1		0	0	0	1	1						Under review with PTO
Colusa steam unit out and Table Mountain to Thermalito 230 kV line fault	P3-2		0	0	0	1	1						Under review with PTO
Colusa generator out and Round Mountain 500/230 kV Transformer	P3-3		0	0	0	1	1						Under review with PTO
Colusa generator out and Delevan SVD fault	P3-4		0	1	1	1	1						Under review with PTO
Colusa steam and gas units fault + stuck breaker	P4-1		0	0	0	1	1						Under review with PTO
Table Mountain -Rio Oso and Table Mountain-Palermo 230 kV line fault + stuck breaker	P4-2		1	1	1	1	1						Under review with PTO
Round Mountain transformer and Round Mountain - Cottonwood 230 kV lines + stuck breaker	P4-3		0	0	0	0	0						No Violation
Delevan SVD fault plus stuck breaker	P4-4		0	1	1	0	1						Under review with PTO
Round Mountain bus section fault plus stuck breaker (non-bus-tie breaker)	P4-5		0	0	0	0	0						No Violation
Round Mountain bus section fault plus stuck breaker (bus-tie breaker)	P4-6		1	1	1	1	1						Under review with PTO
Colusa gas turbine fault plus relay failure	P5-1		0	0	0	1	1						Under review with PTO
Table Mountain - Rio Oso 230 kV line fault plus relay failure	P5-2		0	0	0	0	0						No Violation
Round Mountain 500/230 kV Transformer fault plus relay failure	P5-3		0	0	0	0	0						No Violation
Delevan SVD fault plus relay failure	P5-4		0	1	1	0	1						Under review with PTO
Round Mountain 230 kV Bus section fault plus relay failure	P5-5		1	1	1	1	1						Under review with PTO
Tesla 230 kV Bus section fault plus relay failure	P5-5		0	0	0	0	0						No Violation
Round Mountain Transformer and Round Mountain - Thermalito and Hyatt 230 kV lines	P6-1		0	0	0	0	0						No Violation
Round Mountain and Table Mountain transformer faults	P6-2		0	0	0	0	0						No Violation
Delevan and Cottonwood SVD faults	P6-3		0	1	1	0	1						Under review with PTO
Palermo-Pease and Palermo-Rio Oso 115 kV lines - Temporary DCTL fault	P7-1		1	1	1	1	1						Under review with PTO
Palermo-Pease and Palermo-Rio Oso 115 kV lines - Permanent DCTL fault	P7-1		0	1	1	1	1						Under review with PTO

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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.

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Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)										Potential Mitigation Solutions
	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	

No single Source Substation with more than 100 MW Load.