



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2022 Summer Peak	2025 Summer Peak	2030 Summer Peak	2022 Winter Peak	2025 Winter Peak	2030 Winter Peak	2022 Spring Off-Peak	2025 Spring Off-Peak	2025 SP High CEC Forecast	2025 SpOP Hi Renew & Min Gas Gen	2022 SP Heavy Renewable & Min Gas Gen	2030 Retirement of QF Generations	2030 Summer Peak w/o Facility Rerates	
Palermo-Wyandotte 115 kV Line	Base Case	P0	N-0	108.0	104.3	108.1	NA	NA	NA	41.2	33.6	105.6	38.6	65.4	NA	108.1	Upgrade the jumper
Caribou-Plumas Jct 60 kV Line	CARIBOU-TABLE MTN 230KV (BELDENTP-TBL MT D)	P2-1	Line Section w/o Fault	Diverge	Diverge	Diverge	NA	NA	NA	Diverge	20.3	Diverge	19.9	Diverge	NA	Diverge	Existing SPS Modification
Caribou 230/115/60 kV Transformer Bank 11 (60 kV-230 kV)	CARIBOU-TABLE MTN 230KV (BELDENTP-TBL MT D)	P2-1	Line Section w/o Fault	Diverge	Diverge	Diverge	NA	NA	NA	Diverge	1.2	Diverge	1.2	Diverge	NA	Diverge	Existing SPS Modification
Cascade-Benton-Deschute 60 kV line	Cottonwood 230kV Bus Section E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	212.8	228.1	Diverge	NA	NA	NA	32.5	102.3	236.3	149.6	Diverge	NA	Diverge	Protection Upgrade
	Cottonwood 230kV Bus Section E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	225.2	239.7	Diverge	NA	NA	NA	26.9	106.0	248.1	154.6	Diverge	NA	Diverge	Protection Upgrade
	Cottonwood 230kV Bus Section E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	143.7	154.2	275.4	NA	NA	NA	14.8	51.9	159.4	72.2	260.9	NA	275.4	Protection Upgrade
	Cottonwood 230kV Bus Section E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	70.4	75.6	133.0	NA	NA	NA	5.2	22.1	78.1	31.4	125.2	NA	133.0	Protection Upgrade
	COTWDPGE 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Falut	106.5	<100	<100	NA	NA	NA	22.8	<100	<100	<100	Diverge	NA	<100	- Cottonwood 115 kV Bus Sectionalizing Breaker Project - Expected ISD: Dec. 2022 - Short term: Action Plan
	COTWDPGE 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Falut	119.4	<100	<100	NA	NA	NA	27.1	<100	<100	<100	Diverge	NA	<100	- Cottonwood 115 kV Bus Sectionalizing Breaker Project - Expected ISD: Dec. 2022 - Short term: Action Plan
Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (Notre Dame Jct-Sycamore)	BUTTE - MD 115KV & BUTTE-CHICO B-TBLE MTN LINE	P2-3	Non-Bus Tie Breaker Fault	130.2	133.0	141.4	NA	NA	NA	52.0	19.4	135.0	26.6	78.7	NA	141.4	Table Mountain SPS recommended in 2017-2018 TPP
	BUTTE 115KV - SECTION MD & ME	P2-4	Bus Tie Breaker Falut	103.8	107.0	116.2	NA	NA	NA	41.0	19.8	108.5	27.0	56.9	NA	116.2	Table Mountain SPS recommended in 2017-2018 TPP
	BUTTE 115KV SECTION MD	P2-2	Bus Fault	100.7	103.8	110.6	NA	NA	NA	41.0	20.0	105.3	27.4	55.7	NA	110.6	Table Mountain SPS recommended in 2017-2018 TPP
	BUTTE-SYCAMORE CREEK 115KV (CHICOTP2-BUTTE)	P2-1	Line Section w/o Fault	100.5	103.4	110.4	NA	NA	NA	40.9	20.1	104.9	27.5	55.6	NA	110.4	System Upgrade/ Preferred Resources/Operating Solution as needed
Cottonwood-Round Mountain 230 kV Line	Round Mountain 230kV Bus 1 & 2 Sec. E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	Diverge	149.0	146.7	NA	NA	NA	58.6	76.4	149.0	6.9	149.6	NA	146.7	Protection upgrade
Cascade-Cottonwood 115 kV Line	Cottonwood 230kV Bus Section E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	112.4	117.8	175.4	NA	NA	NA	49.3	33.1	121.0	45.0	168.1	NA	175.4	Protection Upgrade
	Cottonwood 230kV Bus Section E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	113.8	NA	NA	NA	NA	NA	57.3	NA	NA	NA	158.2	NA	NA	Protection Upgrade
	Cottonwood 230kV Bus Section E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	91.6	97.0	149.8	NA	NA	NA	65.7	46.6	100.2	60.1	145.8	NA	149.8	Protection Upgrade



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2022 Summer Peak	2025 Summer Peak	2030 Summer Peak	2022 Winter Peak	2025 Winter Peak	2030 Winter Peak	2022 Spring Off-Peak	2025 Spring Off-Peak	2025 SP High CEC Forecast	2025 SpOP Hi Renew & Min Gas Gen	2022 SP Heavy Renewable & Min Gas Gen	2030 Retirement of QF Generations	2030 Summer Peak w/o Facility Rerates	
	Cottonwood 230kV Bus Section E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	100.8	105.9	163.8	NA	NA	NA	53.3	28.2	108.9	38.0	164.5	NA	163.8	Protection Upgrade
Glenn #3 60 kV Line (Capay Switches-Capay Jct)	Base Case	P0	N-0	84.5	95.7	108.6	NA	NA	NA	32.1	28.6	96.9	41.0	28.5	NA	108.6	Continueue to monitor
Glenn #3 60 kV Line (Chico Jct-Anita)	Base Case	P0	N-0	81.4	97.9	114.4	NA	NA	NA	30.0	30.3	99.0	42.5	23.5	NA	114.4	Continueue to monitor
Glenn #3 60 kV Line (Glenn-Capay Switches)	Base Case	P0	N-0	84.5	95.6	108.6	NA	NA	NA	32.1	28.6	96.9	41.0	28.4	NA	108.6	Continueue to monitor
Cascade 115/60 kV Transformer Bank No. 1	CASCADE - MA 115KV & CASCADE-COTTONWOOD LINE	P2-3	Non-Bus Tie Breaker Fault	67.0	66.2	68.1	NA	NA	NA	38.0	98.8	66.0	100.3	92.8	NA	68.1	Sensitivity only
	CASCADE 115KV SECTION MA	P2-2	Bus Fault	67.0	66.1	68.1	NA	NA	NA	38.1	98.9	66.0	100.4	92.8	NA	68.1	Sensitivity only
	COTWD_2D - 2D 115KV & COTTONWOOD-PANORAMA LINE	P2-3	Non-Bus Tie Breaker Fault	NA	15.2	74.5	NA	NA	NA		97.3	15.7	100.4	NA	NA	74.5	Sensitivity only
	COTWD_2D 115KV SECTION 2D	P2-2	Bus Fault	NA	15.2	74.5	NA	NA	NA		97.3	15.7	100.4	NA	NA	74.5	Sensitivity only
Coleman-Red Bluff 60 kV Line	COTTONWOOD-RED BLUFF 60KV MOAS OPENED ON RED B JT_RED BLFF	P1-2	N-1	104.5	42.5	49.4	NA	NA	NA	38.8	13.9	43.2	16.0	51.4	NA	49.4	- Red Bluff - Coleman 60 kV Line Upgrade - Expected ISD: Jul. 2023 - Short term: Action Plan
	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7-1	DCTL	104.4	42.5	49.2	NA	NA	NA	38.8	13.9	43.1	16.0	51.4	NA	49.2	- Red Bluff - Coleman 60 kV Line Upgrade - Expected ISD: Jul. 2023 - Short term: Action Plan
	SOUTH G 4.16KV GEN UNIT 1 & COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT_RED BLFF	P3	N-G-1	104.9	<100	<100	NA	NA	NA	<100	<100	<100	<100	<100	NA	<100	- Red Bluff - Coleman 60 kV Line Upgrade - Expected ISD: Jul. 2023 - Short term: Action Plan
	COTTONWOOD-RED BLUFF 60KV MOAS OPENED ON RED B JT_RED BLFF	P1-2	N-1	148.7	60.5	69.4	NA	NA	NA	54.7	18.4	61.4	21.5	75.0	NA	69.4	- Red Bluff - Coleman 60 kV Line Upgrade - Expected ISD: Jul. 2023 - Short term: Action Plan
	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7-1	DCTL	148.6	60.4	69.1	NA	NA	NA	54.7	18.4	61.3	21.6	75.0	NA	69.1	- Red Bluff - Coleman 60 kV Line Upgrade - Expected ISD: Jul. 2023 - Short term: Action Plan
	SOUTH G 4.16KV GEN UNIT 1 & COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT_RED BLFF	P3	N-G-1	149.3	<100	<100	NA	NA	NA	<100	<100	<100	<100	<100	NA	<100	- Red Bluff - Coleman 60 kV Line Upgrade - Expected ISD: Jul. 2023 - Short term: Action Plan
Cottonwood-Benton #1 60 kV Line (Benton-Girvan)	Cottonwood 230kV Bus Section E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	87.4	92.4	165.0	NA	NA	NA	4.4	27.1	95.2	37.8	141.7	NA	165.0	Sensitivity only
Cottonwood-Benton #1 60 kV Line (Girvan-Anderson)	Cottonwood 230kV Bus Section E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	58.4	65.7	121.3	NA	NA	NA	11.2	20.2	68.1	29.6	126.5	NA	121.3	Sensitivity only
Keswick-Cascade 60 kV Line (Keswick-Stillwater)	COTWDPGE 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Falut	119.9	NA	NA	NA	NA	NA	50.5	NA	NA	NA	Diverge	NA	NA	- Cottonwood 115 kV Bus Sectionalizing Breaker Project - Expected ISD: Dec. 2022 - Short term: Action Plan
Keswick-Trinity-Weaverville 60 kV Line (French Gulch-Keswick)	COTWDPGE 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Falut	105.5	NA	NA	NA	NA	NA	46.3	NA	NA	NA	Diverge	NA	NA	- Cottonwood 115 kV Bus Sectionalizing Breaker Project - Expected ISD: Dec. 2022 - Short term: Action Plan
Keswick-Trinity-Weaverville 60 kV Line (Trinity-French Gulch)	COTWDPGE 115KV - SECTION 2D & 1D	P2-4	Bus Tie Breaker Falut	107.7	NA	NA	NA	NA	NA	48.0	NA	NA	NA	Diverge	NA	NA	- Cottonwood 115 kV Bus Sectionalizing Breaker Project - Expected ISD: Dec. 2022 - Short term: Action Plan



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2022 Summer Peak	2025 Summer Peak	2030 Summer Peak	2022 Winter Peak	2025 Winter Peak	2030 Winter Peak	2022 Spring Off-Peak	2025 Spring Off-Peak	2025 SP High CEC Forecast	2025 SpOP Hi Renew & Min Gas Gen	2022 SP Heavy Renewable & Min Gas Gen	2030 Retirement of QF Generations	2030 Summer Peak w/o Facility Rerates	
Peachton-Pease 60 kV Line (Peachton-Gridley\)	P7-1:A3:15_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7-1	DCTL	128.0	52.1	43.6	NA	NA	NA	53.7	14.1	52.0	16.2	28.8	NA	43.6	- East Marysville 115/60 kV Transformer Project - Expected ISD: Dec. 2022 - Short term: Action Plan
Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (Table Mountain-Notre Dame Jct)	TBLE MTN - 1D 115KV & BUTTE-CHICO B-TBLE MTN LINE	P2-3	Non-Bus Tie Breaker Fault	88.3	94.9	102.7	NA	NA	NA	33.2	10.7	96.4	17.6	51.3	NA	102.7	Table Mountain SPS recommended in 2017-2018 TPP
	TBLE MTN 115KV SECTION 1D	P2-2	Bus Fault	88.2	94.8	102.6	NA	NA	NA	33.1	11.0	96.3	17.8	51.1	NA	102.6	Table Mountain SPS recommended in 2017-2018 TPP
Table Mountain-Butte #1 115 kV Line (Butte-Chico Tap 1)	P7-1:A3:4_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	P7-1	DCTL	103.3	111.2	121.3	NA	NA	NA	38.2	14.9	112.9	24.1	55.5	NA	121.3	Table Mountain SPS recommended in 2017-2018 TPP
	SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV [4314] & TABLE MTN-BUTTE #2 115KV [3920]	P6	N-1-1	103.2	111.2	121.3	NA	NA	NA			112.9			NA	121.3	Table Mountain SPS recommended in 2017-2018 TPP
Table Mountain-Butte #1 115 kV Line (Chico Tap 1-Table Mountain)	P7-1:A3:4_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	P7-1	DCTL	121.7	129.3	139.5	NA	NA	NA	45.7	13.7	131.2	23.2	70.4	NA	139.5	Table Mountain SPS recommended in 2017-2018 TPP
Table Mountain-Butte No.2 115 kV Line	BUTTE-CHICO B-TBLE MTN 115KV [0] & SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV [4314]	P6	N-1-1	119.5	128.7	139.9	NA	NA	NA			130.7			NA	139.9	Table Mountain SPS recommended in 2017-2018 TPP
Table Mountain-Peachton 60 kV Line (Peachton-Biggs Jct)	P7-1:A3:15_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7-1	DCTL	139.3	61.6	52.5	NA	NA	NA	56.5	19.6	61.6	24.2	28.0	NA	52.5	- East Marysville 115/60 kV Transformer Project - Expected ISD: Dec. 2022 - Short term: Action Plan
Table Mountain-Peachton 60 kV Line (Tres Vias-Biggs Jct)	P7-1:A3:15_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7-1	DCTL	144.8	65.5	56.7	NA	NA	NA	60.0	17.4	65.5	21.8	32.1	NA	56.7	- East Marysville 115/60 kV Transformer Project - Expected ISD: Dec. 2022 - Short term: Action Plan
Table Mountain-Peachton 60 kV Line (Tres Vias-Table Mountain)	P7-1:A3:15_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7-1	DCTL	138.2	68.6	59.9	NA	NA	NA	56.9	21.0	68.7	27.1	26.4	NA	59.9	- East Marysville 115/60 kV Transformer Project - Expected ISD: Dec. 2022 - Short term: Action Plan
Keswick-Trinity-Weaverville 60 kV Line (French Gulch-Keswick)	CASCADE-BENTON-DESCHUTES 60KV & CASCADE 115/60KV TB 1	P6	N-1-1	116.43	117.14	115.27	NA	NA	NA	<100	<100	120.54	<100	<100	NA	115.27	- East Marysville 115/60 kV Transformer Project - Expected ISD: Dec. 2022 - Short term: Action Plan

Study Area: PG&E North Valley

Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2022 Summer Peak	2025 Summer Peak	2030 Summer Peak	2022 Winter Peak	2025 Winter Peak	2030 Winter Peak	2022 Spring Off-Peak	2025 Spring Off-Peak	2025 SP High CEC Forecast	2025 SpOP Hi Renew & Min Gas Gen	2022 SP Heavy Renewable & Min Gas Gen	2030 Retirement of QF Generations	2030 Summer Peak w/o Facility Rerates	
CANAL TP 60kV	Base Case	P0	N-0	1.02	1.03	0.99	NA	NA	NA	1.04	1.03	1.03	1.04	0.95	NA	NA	Sensitivity only
CR CANAL 60kV				1.02	1.03	0.99	NA	NA	NA	1.04	1.03	1.03	1.04	0.95	NA	NA	Sensitivity only
NEO REDT 60kV				1.03	1.03	0.99	NA	NA	NA	1.05	1.03	1.03	1.04	0.95	NA	NA	Sensitivity only
PALERMO 230kV				0.95	1.00	0.99	NA	NA	NA	1.03	1.04	1.00	1.05	0.98	NA	NA	- Rio Oso Area 230 kV Voltage Support Project - Expected ISD: Sep. 2022 - Short term: Action Plan
TYLER 60kV				1.02	1.03	0.99	NA	NA	NA	1.04	1.03	1.03	1.04	0.95	NA	NA	Sensitivity only
NORD 1 115kV	BUTTE-CHICO B-TBLE MTN 115KV & SYCAMORECREEK-NOTREDAME-TABLEMTN 115KV	P6	N-1-1	>0.9	>0.9	0.90	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	Continue to monitor
SYCAMORE 115kV				>0.9	>0.9	0.88	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	
ANTLER 60kV	CASCADE - MA 115KV & CASCADE-COTTONWOOD LINE	P2-3	Non-Bus Tie Breaker	0.91	0.90	0.91	NA	NA	NA	1.02	1.05	0.90	1.06	0.93	NA	NA	System adjustments or voltage support if needed
CASCADE 115kV				0.88	0.87	0.88	NA	NA	NA	1.12	1.14	0.87	1.14	0.91	NA	NA	
MTN GATE 60kV				0.91	0.90	0.92	NA	NA	NA	1.02	1.05	0.90	1.06	0.93	NA	NA	
PPL 60kV				0.91	0.90	0.91	NA	NA	NA	1.02	1.05	0.90	1.06	0.93	NA	NA	
ANTLER 60kV	CASCADE 115KV SECTION MA	P2-2	Bus Fault	0.91	0.90	0.91	NA	NA	NA	1.02	1.05	0.90	1.06	0.93	NA	NA	System adjustments or voltage support if needed
CASCADE 115kV				0.88	0.87	0.88	NA	NA	NA	1.12	1.14	0.87	1.15	0.91	NA	NA	
MTN GATE 60kV				0.91	0.90	0.92	NA	NA	NA	1.02	1.05	0.90	1.06	0.93	NA	NA	
PPL 60kV				0.91	0.90	0.91	NA	NA	NA	1.02	1.05	0.90	1.06	0.93	NA	NA	
CASCADE 115kV	CASCADE-COTTONWOOD 115KV & CRAGVIEW-CASCADE115KV	P6	N-1-1	>0.9	0.88	0.89	NA	NA	NA	>0.9	>0.9	0.88	>0.9	>0.9	NA	NA	System adjustments or voltage support if needed
CASCADE 115kV				>0.9	>0.9	0.89	NA	NA	NA	>0.9	>0.9	0.90	>0.9	>0.9	NA	NA	
CASCADE 115kV	CASCADE-COTTONWOOD 115KV (CASCADE-OREGNTRL)	P2-1	Line Section w/o Fault	0.88	1.00	0.93	NA	NA	NA	1.12	1.09	1.00	1.10	1.03	NA	NA	System adjustments or voltage support if needed
ANTLER 60kV				0.89	0.96	0.94	NA	NA	NA	1.01	1.06	0.96	1.03	0.99	NA	NA	
CASCADE 115kV				0.85	0.93	0.91	NA	NA	NA	1.06	1.15	0.93	1.11	1.03	NA	NA	
MTN GATE 60kV				0.88	0.96	0.95	NA	NA	NA	1.02	1.06	0.96	1.03	0.99	NA	NA	
OREGNTRL 115kV				0.85	0.93	0.91	NA	NA	NA	1.06	1.15	0.93	1.11	1.02	NA	NA	
PPL 60kV				0.89	0.96	0.94	NA	NA	NA	1.01	1.06	0.96	1.03	0.99	NA	NA	
COTWD_E2 230kV	Cottonwood 230kV Bus Section E (FAILURE OF NON-REDUNDENT RELAY)	P5-5	Non-Redundant Relay	0.88	>0.9	>0.9	NA	NA	NA	0.99	>0.9	>0.9	>0.9	0.52	NA	NA	Protection upgrade
VINA 60kV	COTTONWOOD-RED BLUFF 60KV MOAS OPENED ON RED B JT_RED BLFF	P1-2	N-1	0.91	0.97	0.89	NA	NA	NA	1.02	1.10	0.97	1.10	0.99	NA	NA	Continue to monitor
COTWD_E2 230kV	COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV	P2-4	Bus Tie Breaker	0.87	0.90	0.94	NA	NA	NA	0.98	1.06	0.90	1.05	0.90	NA	NA	System adjustments or voltage support if needed
CASCADE 115kV	COTWDPGE - 2D 115KV & CASCADE-COTTONWOOD LINE	P2-3	Non-Bus Tie Breaker	0.87	>0.9	>0.9	NA	NA	NA	1.11	>0.9	>0.9	>0.9	1.03	NA	NA	System adjustments or voltage support if needed
HONCUT 115kV	FORBSTWN-PALERMO 115KV & PALERMO230/115KVTB2	P6	N-1-1	0.89	>0.9	>0.9	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	- South of Palermo 115 kV Reinforcement Project - Expected ISD: Nov. 2022 - Short term: Action Plan
PALERMO 115kV				0.89	>0.9	>0.9	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	
WYANDTTE 115kV				0.88	>0.9	>0.9	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	
KESWICK 60kV	KESWICK-CASCADE 60KV (CASCADE-STLLWATR)	P2-1	Line Section w/o Fault	0.87	0.84	0.94	NA	NA	NA	0.97	1.05	0.84	1.06	0.93	NA	NA	Disable automatics
STLLWATR 60kV				0.85	0.81	0.92	NA	NA	NA	0.96	1.06	0.81	1.07	0.91	NA	NA	Disable automatics
KESWICK 60kV	KESWICK-CASCADE 60KV MOAS OPENED ON CASCADE_STLLWATR	P1-2	N-1	0.87	0.84	0.94	NA	NA	NA	0.97	1.05	0.84	1.06	0.93	NA	NA	Disable automatics
STLLWATR 60kV				0.85	0.81	0.92	NA	NA	NA	0.96	1.06	0.81	1.07	0.91	NA	NA	
PEACHTON 60kV	P7-1:A3:15_Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	P7-1	DCTL	0.69	0.99	0.98	NA	NA	NA	0.92	1.03	0.99	1.03	0.95	NA	NA	- East Marysville 115/60 kV Project
TBLE MTN 60kV				0.88	1.01	1.00	NA	NA	NA	1.00	1.03	1.01	1.03	0.98	NA	NA	- Expected ISD: Dec. 2022

Study Area: PG&E North Valley

Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2022 Summer Peak	2025 Summer Peak	2030 Summer Peak	2022 Winter Peak	2025 Winter Peak	2030 Winter Peak	2022 Spring Off-Peak	2025 Spring Off-Peak	2025 SP High CEC Forecast	2025 SpOP Hi Renew & Min Gas Gen	2022 SP Heavy Renewable & Min Gas Gen	2030 Retirement of QF Generations	2030 Summer Peak w/o Facility Rerates	
TRES VIS 60kV	PALERMO 230/115KV TB 2 & FORBSTWN-PALERMO115KV			0.78	1.00	0.98	NA	NA	NA	0.96	1.03	1.00	1.03	0.97	NA	NA	- Short term: Action Plan
SYCAMORE 115kV	P7-1:A3:4_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	P7-1	DCTL	0.95	0.93	0.90	NA	NA	NA	1.03	1.07	0.93	1.08	1.00	NA	NA	Table Mountain SPS Recommended in 2017-2018 TPP
HONCUT 115kV	PALERMO 230/115KV TB 2 & FORBSTWN-PALERMO115KV	P6	N-1-1	0.89	>0.9	>0.9	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	- South of Palermo 115 kV Reinforcement Project
PALERMO 115kV				0.89	>0.9	>0.9	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	- Expected ISD: Nov. 2022
WYANDTTE 115kV				0.88	>0.9	>0.9	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	- Short term: Action Plan
WYANDTTE 115kV	PALERMO 230/115KV TB 2 & PALERMO-NICOLAUS 115KV MOAS OPENED ON PALERMO_E.MRYJ2	P6	N-1-1	>0.9	>0.9	0.89	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	Continue to monitor
FORBSTWN 115kV	PALERMO-NICOLAUS 115KV MOAS OPENED ON PALERMO_E.MRY J2 & PALERMO230/115KVTB2	P6	N-1-1	>0.9	>0.9	0.90	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	Continue to monitor
OWID 115kV				>0.9	>0.9	0.90	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	Continue to monitor
PALERMO 115kV				>0.9	>0.9	0.90	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	Continue to monitor
WYANDTTE 115kV				>0.9	>0.9	0.89	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	Continue to monitor
NORD 1 115kV	SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV & BUTTE-CHICOB-TBLEMTN115KV	P6	N-1-1	>0.9	>0.9	0.90	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	Continue to monitor
SYCAMORE 115kV				>0.9	>0.9	0.88	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	Continue to monitor
SYCAMORE 115kV	SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV & TABLEMTN-BUTTE#2115KV	P6	N-1-1	>0.9	>0.9	0.90	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	Continue to monitor
SYCAMORE 115kV	TABLE MTN-BUTTE #2 115KV & SYCAMORECREEK-NOTREDAME-TABLEMTN115KV	P6	N-1-1	>0.9	>0.9	0.90	NA	NA	NA	>0.9	>0.9	>0.9	>0.9	>0.9	NA	NA	Continue to monitor
CANAL TP 60kV	TYLER SVD=V	P1-4	N-1	>0.9	1.03	0.89	NA	NA	NA	>0.9	1.03	1.03	1.04	>0.9	NA	NA	Continue to monitor
CR CANAL 60kV				>0.9	1.03	0.89	NA	NA	NA	>0.9	1.03	1.03	1.04	>0.9	NA	NA	
NEO REDT 60kV				>0.9	1.03	0.89	NA	NA	NA	>0.9	1.03	1.03	1.04	>0.9	NA	NA	
TYLER 60kV				>0.9	1.03	0.89	NA	NA	NA	>0.9	1.03	1.03	1.04	>0.9	NA	NA	

Study Area: PG&E North Valley

Voltage Deviation



Substation	Contingency (All and Worst P3)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)								Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2022 Summer Peak	2025 Summer Peak	2030 Summer Peak	2022 Winter Peak	2025 Winter Peak	2030 Winter Peak	2022 Spring Off-Peak	2025 Spring Off-Peak	2025 SP High CEC Forecast	2025 SpOP Hi Renew & Min Gas Gen	2022 SP Heavy Renewable & Min Gas Gen	2030 Retirement of QF Generation	
FRNCHGLH 60kV	KESWICK-CASCADE 60KV	P1	N-1	8	11	5	NA	NA	NA	2	-3	11	-3	5	NA	Disable automatics
KESWICK 60kV	KESWICK-CASCADE 60KV	P1	N-1	13	17	7	NA	NA	NA	4	-4	17	-5	9	NA	Disable automatics
STLLWATR 60kV	KESWICK-CASCADE 60KV	P1	N-1	15	19	8	NA	NA	NA	4	-5	20	-5	10	NA	Disable automatics
WHITMORE 60kV	CASCADE-BENTON-DESCHUTES 60KV	P1	N-1	2	3	2	NA	NA	NA	-3	-6	3	-8	2	NA	Sensitivity only
CEDR CRK 60kV	CASCADE-BENTON-DESCHUTES 60KV	P1	N-1	2	3	2	NA	NA	NA	-3	-6	3	-8	2	NA	Sensitivity only
DESCHUTS 60kV	CASCADE-BENTON-DESCHUTES 60KV	P1	N-1	2	3	3	NA	NA	NA	-3	-6	3	-8	2	NA	Sensitivity only
KILARC 60kV	CASCADE-BENTON-DESCHUTES 60KV	P1	N-1	2	3	2	NA	NA	NA	-3	-6	3	-8	2	NA	Sensitivity only
RED BLFF 60kV	COTTONWOOD-RED BLUFF 60KV	P1	N-1	10	4	8	NA	NA	NA	2	-3	4	-3	5	NA	- Red Bluff - Coleman 60 kV Line upgrade project (ISD: July 2023) addresses near term issue - Continue to monitor the long term issue
OWID 115kV	PALERMO 230/115KV TB 2	P1	N-1	4	4	8	NA	NA	NA	-1	-7	4	-7	3	NA	Continue to monitor
FORBSTWN 115kV	PALERMO 230/115KV TB 2	P1	N-1	4	3	8	NA	NA	NA	-1	-7	3	-7	2	NA	Continue to monitor
WYANDTTE 115kV	PALERMO 230/115KV TB 2	P1	N-1	6	5	8	NA	NA	NA	-1	-7	5	-7	4	NA	Continue to monitor
PALERMO 115kV	PALERMO 230/115KV TB 2	P1	N-1	5	5	8	NA	NA	NA	-1	-7	5	-7	4	NA	Continue to monitor
NEO REDT 60kV	NEO REDT 60/13.8KV TB 1	P1	N-1	12	1	0	NA	NA	NA	6	0	1	0	0	NA	- Tyler 60 kV Shunt Capacitor Project - Expected ISD: Dec. 2022 - Short term: Action Plan
CR CANAL 60kV	NEO REDT 60/13.8KV TB 1	P1	N-1	11	1	0	NA	NA	NA	6	0	1	0	0	NA	- Tyler 60 kV Shunt Capacitor Project - Expected ISD: Dec. 2022 - Short term: Action Plan
TYLER 60kV	NEO REDT 60/13.8KV TB 1	P1	N-1	11	1	0	NA	NA	NA	6	0	1	0	0	NA	- Tyler 60 kV Shunt Capacitor Project - Expected ISD: Dec. 2022 - Short term: Action Plan
NEO REDT 60kV	TYLER SVD=V	P1	N-1	NA	0	10	NA	NA	NA	NA	0	0	0	NA	NA	Continue to monitor
CR CANAL 60kV	TYLER SVD=V	P1	N-1	NA	0	10	NA	NA	NA	NA	0	0	0	NA	NA	Continue to monitor
TYLER 60kV	TYLER SVD=V	P1	N-1	NA	0	10	NA	NA	NA	NA	0	0	0	NA	NA	Continue to monitor

Study Area: PG&E North Valley

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			Select..	Select..	Select..	Select..	Select..	
In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2019-20 Transmission Planning Process for transient stability studies:								
http://www.caiso.com/Documents/AppendixC-BoardApprovedt2019-2020TransmissionPlan.pdf								

Study Area: PG&E North Valley



Single Contingency Load Drop

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

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

Study Area: PG&E North Valley



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