Study Area: **PG&E Central Valley Sierra - Summer Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-1	32218 DRUM 115 32244 BRNSWCKP 115 2	B2_38_Higgins - Bell 115 kV Line	B	L-1	106.9	106.0	106.4	Reduce Drum Generation
SIERA-SP-T-2	32394 PLACER 60.0 32228 PLACER 115 1	B2_68_Placer - Del Mar 60 kV Line	B	L-1	<100	99.6	103.4	Long Term: Future Action Plan or Placer 2nd 115/60 kV transformer
SIERA-SP-T-3	32218 DRUM 115 32244 BRNSWCKP 115 2	B2_38_Higgins - Bell 115 kV Line & B1_18_ROLLINSF 6.60 Unit ID 1	B	L-1/G-1	99.4	99.0	99.4	Explore potential mitigation
SIERA-SP-T-4	32308 COLGATE 60.0 32313 NRRWS2TP 60.0 2	B2_46_Colgate - Smartville 60 kV Line No. 1 & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1	107.8	<100	<100	Short term: Action Plan
SIERA-SP-T-5	32374 DRUM 60.0 32376 BONNIE N 60.0 1	B2_49_Colgate-Grass Valley 60 kV Line & B1_18_ROLLINSF 6.60 Unit ID 1	B	L-1/G-1	103.4	104.7	111.2	Explore potential mitigation
SIERA-SP-T-6	32376 BONNIE N 60.0 32367 CPEHRNTP 60.0 1	B2_49_Colgate-Grass Valley 60 kV Line & B1_18_ROLLINSF 6.60 Unit ID 1	B	L-1/G-1	99.7	101.0	107.5	Explore potential mitigation
SIERA-SP-T-7	32394 PLACER 60.0 32228 PLACER 115 1	B2_68_Placer - Del Mar 60 kV Line & B1_4_DRUM 5 13.80 Unit ID 1	B	L-1/G-1	<100	105.6	109.5	Explore potential mitigation
SIERA-SP-T-8	32208 GLEAF TP 115 32214 RIO OSO 115 1	C1-1_BUS FAULT AT 30330 RIO OSO 230.00 Bus 1	C1	Bus	101.1	<100	<100	Short Term: Sierra Action Plan, Long Term: New Rio Oso-Atlantic 230 kV Line
SIERA-SP-T-9	32218 DRUM 115 32244 BRNSWCKP 115 2	C1-13_BUS FAULT AT 32232 HIGGINS 115.00	C1	Bus	129.2	127.2	127.6	Reduce Drum Generation
SIERA-SP-T-10	32225 BRNSWKTP 115 32222 DTCH FL2 115 1	C1-13_BUS FAULT AT 32232 HIGGINS 115.00	C1	Bus	116.5	115.4	115.3	Reduce Drum Generation
SIERA-SP-T-11	32218 DRUM 115 32244 BRNSWCKP 115 2	C1-14_BUS FAULT AT 32238 BELL PGE 115.00	C1	Bus	106.7	105.9	106.3	Reduce Drum Generation
SIERA-SP-T-12	30330 RIO OSO 230 30335 ATLANTC 230 1	C1-4_BUS FAULT AT 30337 GOLDHILL 230.00 Bus 2	C1	Bus	101.4	97.2	<100	Short Term: Sierra Action Plan, Long Term: New Rio Oso-Atlantic 230 kV Line

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-13	32018 GOLDHILL 115 32275 CPM TAP 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	112.2	<100	<100	Short term: Action Plan
SIERA-SP-T-14	32250 ELDORAD 115 32481 APLHTAP2 115 2	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	240.6	254.2	257.4	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS, Gold Hill - Missouri Flat 115 kV Lines Reconductor
SIERA-SP-T-15	32250 ELDORAD 115 32482 APLHTAP1 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	184.5	196.7	199.0	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS, Gold Hill - Missouri Flat 115 kV Lines Reconductor
SIERA-SP-T-16	32255 PLCRVLT1 115 32261 MIZOU_T1 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	134.1	140.1	141.8	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS, Gold Hill - Missouri Flat 115 kV Lines Reconductor
SIERA-SP-T-17	32261 MIZOU_T1 115 32267 DIMOND_1 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	112.5	117.5	118.9	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS, Gold Hill - Missouri Flat 115 kV Lines Reconductor
SIERA-SP-T-18	32262 SHPRING1 115 32264 CLRKSVLT 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	112.4	<100	<100	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS, Gold Hill - Missouri Flat 115 kV Lines Reconductor
SIERA-SP-T-19	32267 DIMOND_1 115 32262 SHPRING1 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	112.4	117.5	118.9	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS, Gold Hill - Missouri Flat 115 kV Lines Reconductor

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-20	32275 CPM TAP 115 32264 CLRKSVLT 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	112.3	<100	<100	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS, Gold Hill - Missouri Flat 115 kV Lines Reconductor
SIERA-SP-T-21	32481 APLHTAP2 115 32257 PLCRVLT2 115 2	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	240.5	254.1	257.5	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS, Gold Hill - Missouri Flat 115 kV Lines Reconductor
SIERA-SP-T-22	32482 APLHTAP1 115 32255 PLCRVLT1 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	222.0	232.0	234.7	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS, Gold Hill - Missouri Flat 115 kV Lines Reconductor
SIERA-SP-T-23	31482 PALERMO 115 31506 HONC JT1 115 1	C2-1_RIO OSO 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	115.6	<100	<100	Short Term: Sierra Action Plan, Long Term: South of Palermo 115 kV Reinforcement Project and Rio Oso 230 kV BAAH Conversion
SIERA-SP-T-24	32200 PEASE 115 31506 HONC JT1 115 1	C2-1_RIO OSO 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	115.5	<100	<100	Short Term: Sierra Action Plan, Long Term: South of Palermo 115 kV Reinforcement Project and Rio Oso 230 kV BAAH Conversion
SIERA-SP-T-25	32200 PEASE 115 32288 E.MRY J1 115 1	C2-1_RIO OSO 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	128.2	<100	<100	Short Term: Sierra Action Plan, Long Term: South of Palermo 115 kV Reinforcement Project and Rio Oso 230 kV BAAH Conversion

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-26	32206 BOGUE 115 32286 OLIVH J3 115 1	C2-1_RIO OSO 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	111.0	<100	<100	Short Term: Sierra Action Plan, Long Term: South of Palermo 115 kV Reinforcement Project and Rio Oso 230 kV BAAH Conversion
SIERA-SP-T-27	32208 GLEAF TP 115 32214 RIO OSO 115 1	C2-1_RIO OSO 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	131.3	<100	<100	Short Term: Sierra Action Plan, Long Term: South of Palermo 115 kV Reinforcement Project and Rio Oso 230 kV BAAH Conversion
SIERA-SP-T-28	32212 E.NICOLS 115 32214 RIO OSO 115 1	C2-1_RIO OSO 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	122.8	<100	<100	Short Term: Sierra Action Plan, Long Term: South of Palermo 115 kV Reinforcement Project and Rio Oso 230 kV BAAH Conversion
SIERA-SP-T-29	32290 OLIVH J1 115 32214 RIO OSO 115 1	C2-1_RIO OSO 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	100.1	<100	<100	Short Term: Sierra Action Plan, Long Term: South of Palermo 115 kV Reinforcement Project and Rio Oso 230 kV BAAH Conversion
SIERA-SP-T-30	32290 OLIVH J1 115 32288 E.MRY J1 115 1	C2-1_RIO OSO 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	126.8	<100	<100	Short Term: Sierra Action Plan, Long Term: South of Palermo 115 kV Reinforcement Project and Rio Oso 230 kV BAAH Conversion

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-31	30330 RIO OSO 230 30348 BRIGHTON 230 1	C2-2_RIO OSO 115 kV Bus 1 and 2 - CB 102 Failure	C2	CB	109.1	<100	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion & Rio Oso 115 kV Bus BAAH Conversion
SIERA-SP-T-32	31962 WDLND_BM 115 31970 WOODLD 115 1	C2-2_RIO OSO 115 kV Bus 1 and 2 - CB 102 Failure	C2	CB	121.3	<100	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion & Rio Oso 115 kV Bus BAAH Conversion
SIERA-SP-T-33	31962 WDLND_BM 115 31990 DAVIS 115 1	C2-2_RIO OSO 115 kV Bus 1 and 2 - CB 102 Failure	C2	CB	100.7	<100	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion & Rio Oso 115 kV Bus BAAH Conversion
SIERA-SP-T-34	31978 DPWT_TP2 115 31984 BRIGHTN 115 1	C2-2_RIO OSO 115 kV Bus 1 and 2 - CB 102 Failure	C2	CB	106.3	<100	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion & Rio Oso 115 kV Bus BAAH Conversion
SIERA-SP-T-35	31984 BRIGHTN 115 31993 BRKRJCT 115 1	C2-2_RIO OSO 115 kV Bus 1 and 2 - CB 102 Failure	C2	CB	133.8	<100	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion & Rio Oso 115 kV Bus BAAH Conversion

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-36	31993 BRKRJCT 115 32001 UCD_TP2 115 1	C2-2_RIO OSO 115 kV Bus 1 and 2 - CB 102 Failure	C2	CB	132.3	<100	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion & Rio Oso 115 kV Bus BAAH Conversion
SIERA-SP-T-37	32001 UCD_TP2 115 31990 DAVIS 115 1	C2-2_RIO OSO 115 kV Bus 1 and 2 - CB 102 Failure	C2	CB	131.8	<100	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion & Rio Oso 115 kV Bus BAAH Conversion
SIERA-SP-T-38	30330 RIO OSO 230 30335 ATLANTC 230 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<100	100.6	<100	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-39	32214 RIO OSO 115 30330 RIO OSO 230 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	<100	<100	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-40	32214 RIO OSO 115 30330 RIO OSO 230 2	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	<100	<100	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-41	32214 RIO OSO 115 32225 BRNSWKTP 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	<100	<100	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-42	32214 RIO OSO 115 32244 BRNSWCKP 115 2	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	<100	<100	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-43	32218 DRUM 115 32220 DTCH FL1 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	174.9	166.4	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-44	32218 DRUM 115 32222 DTCH FL2 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	<100	<100	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-45	32218 DRUM 115 32244 BRNSWCKP 115 2	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	<100	<100	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-46	32220 DTCH FL1 115 32224 CHCGO PK 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	110.5	105.7	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-47	32224 CHCGO PK 115 32232 HIGGINS 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	134.4	129.4	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-48	32225 BRNSWKTP 115 32222 DTCH FL2 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	<100	<100	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-49	32228 PLACER 115 32238 BELL PGE 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	<100	<100	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-50	32232 HIGGINS 115 32238 BELL PGE 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	diverge	108.9	104.3	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-51	32412 ATLANTIC 115 32228 PLACER 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<100	123.9	131.1	Short Term: Sierra Action Plan, Long Term: Gold Hill SPS and add 3rd Gold Hill 230/115 kV Transformer or Pine Hill Sub
SIERA-SP-T-52	32218 DRUM 115 32220 DTCH FL1 115 1	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	201.1	<100	<100	short Term: Sierra Action Plan, Long Term: new Atlantic - Placer 115 kV Line
SIERA-SP-T-53	32220 DTCH FL1 115 32224 CHCGO PK 115 1	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	125.9	<100	<100	short Term: Sierra Action Plan, Long Term: new Atlantic - Placer 115 kV Line
SIERA-SP-T-54	32224 CHCGO PK 115 32232 HIGGINS 115 1	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	151.7	<100	<100	short Term: Sierra Action Plan, Long Term: new Atlantic - Placer 115 kV Line
SIERA-SP-T-55	32228 PLACER 115 32238 BELL PGE 115 1	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	114.8	<100	<100	short Term: Sierra Action Plan, Long Term: new Atlantic - Placer 115 kV Line
SIERA-SP-T-56	32232 HIGGINS 115 32238 BELL PGE 115 1	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	124.6	<100	<100	short Term: Sierra Action Plan, Long Term: new Atlantic - Placer 115 kV Line

Study Area: PG&E Central Valley Sierra - Summer Peak

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-57	32214 RIO OSO 115 32356 LINCLN 115 1	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	116.7	<100	<100	Short term: Action Plan
SIERA-SP-T-58	32356 LINCLN 115 32404 SPI JCT 115 1	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	112.5	<100	<100	Short term: Action Plan
SIERA-SP-T-59	32398 ULTRA JT 115 32404 SPI JCT 115 1	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	116.6	<100	<100	Short term: Action Plan
SIERA-SP-T-60	32398 ULTRA JT 115 32408 PLSNT GR 115 1	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	130.7	<100	<100	Short term: Action Plan
SIERA-SP-T-61	32018 GOLDHILL 115 32231 HORSHE2 115 2	B2_19_Placer - Gold Hill 115 kV Line No. 1 & B2_36_Drum - Higgins 115 kV Line	C3	N-1-1	110.2	<100	<100	Short term: Action Plan
SIERA-SP-T-62	32018 GOLDHILL 115 32229 HORSHE1 115 1	B2_20_Placer - Gold Hill 115 kV Line No. 2 & B2_36_Drum - Higgins 115 kV Line	C3	N-1-1	101.5	<100	<100	Short term: Action Plan
SIERA-SP-T-63	32018 GOLDHILL 115 32275 CPM TAP 115 1	B2_22_Missouri Flat - Gold Hill 115 kV No. 2 Line & B2_21_Gold Hill - Clarksville 115 kV Line	C3	N-1-1	150.9	<100	<100	Short term: Action Plan
SIERA-SP-T-64	32275 CPM TAP 115 32264 CLRKSVLT 115 1	B2_22_Missouri Flat - Gold Hill 115 kV No. 2 Line & B2_21_Gold Hill - Clarksville 115 kV Line	C3	N-1-1	150.9	<100	<100	Short term: Action Plan
SIERA-SP-T-65	32200 PEASE 115 32288 E.MRY J1 115 1	B2_3_Table Mountain(D)-Rio Oso 230 kV Line & B2_5_Colgate - Rio Oso 230 kV Line	C3	N-1-1	102.8	<100	<100	Short term: Action Plan
SIERA-SP-T-66	32208 GLEAF TP 115 32214 RIO OSO 115 1	B2_3_Table Mountain(D)-Rio Oso 230 kV Line & B2_5_Colgate - Rio Oso 230 kV Line	C3	N-1-1	104.5	<100	<100	Short term: Action Plan
SIERA-SP-T-67	32290 OLIVH J1 115 32288 E.MRY J1 115 1	B2_3_Table Mountain(D)-Rio Oso 230 kV Line & B2_5_Colgate - Rio Oso 230 kV Line	C3	N-1-1	101.6	<100	<100	Short term: Action Plan

Study Area: PG&E Central Valley Sierra - Summer Peak

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-68	31984 BRIGHTN 115 31993 BRKRJCT 115 1	B2_30_Rio Oso - Woodland #1 115 kV Line & B2_31_Rio Oso - Woodland 115 kV Line No. 1	C3	N-1-1	108.9	109.7	<100	Explore potential mitigation
SIERA-SP-T-69	31993 BRKRJCT 115 32001 UCD_TP2 115 1	B2_30_Rio Oso - Woodland #1 115 kV Line & B2_31_Rio Oso - Woodland 115 kV Line No. 1	C3	N-1-1	107.6	108.3	<100	Explore potential mitigation
SIERA-SP-T-70	32001 UCD_TP2 115 31990 DAVIS 115 1	B2_30_Rio Oso - Woodland #1 115 kV Line & B2_31_Rio Oso - Woodland 115 kV Line No. 1	C3	N-1-1	107.1	107.8	<100	Explore potential mitigation
SIERA-SP-T-71	31960 MOBILCHE 115 31966 WODLNDJ1 115 1	B2_30_Rio Oso - Woodland #1 115 kV Line & B2_8_Rio Oso - Brighton 230 kV Line	C3	N-1-1	96.6	100.7	<100	Explore potential mitigation
SIERA-SP-T-72	31960 MOBILCHE 115 31970 WOODLD 115 1	B2_30_Rio Oso - Woodland #1 115 kV Line & B2_8_Rio Oso - Brighton 230 kV Line	C3	N-1-1	96.6	100.7	<100	Explore potential mitigation
SIERA-SP-T-73	31965 KNIGHT1 115 31966 WODLNDJ1 115 1	B2_30_Rio Oso - Woodland #1 115 kV Line & B2_8_Rio Oso - Brighton 230 kV Line	C3	N-1-1	96.7	100.7	<100	Explore potential mitigation
SIERA-SP-T-74	32214 RIO OSO 115 31965 KNIGHT1 115 1	B2_30_Rio Oso - Woodland #1 115 kV Line & B2_8_Rio Oso - Brighton 230 kV Line	C3	N-1-1	100.0	104.0	<100	Explore potential mitigation
SIERA-SP-T-75	31984 BRIGHTN 115 31993 BRKRJCT 115 1	B2_31_Rio Oso - Woodland 115 kV Line No. 1 & B2_30_Rio Oso - Woodland #1 115 kV Line	C3	N-1-1	108.9	109.7	<100	Explore potential mitigation
SIERA-SP-T-76	31993 BRKRJCT 115 32001 UCD_TP2 115 1	B2_31_Rio Oso - Woodland 115 kV Line No. 1 & B2_30_Rio Oso - Woodland #1 115 kV Line	C3	N-1-1	107.6	108.3	<100	Explore potential mitigation

Study Area: PG&E Central Valley Sierra - Summer Peak

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-77	32001 UCD_TP2 115 31990 DAVIS 115 1	B2_31_Rio Oso - Woodland 115 kV Line No. 1 & B2_30_Rio Oso - Woodland #1 115 kV Line	C3	N-1-1	107.1	107.8	<100	Explore potential mitigation
SIERA-SP-T-78	31964 KNIGHT2 115 31968 WODLNDJ2 115 2	B2_31_Rio Oso - Woodland 115 kV Line No. 1 & B2_8_Rio Oso - Brighton 230 kV Line	C3	N-1-1	103.2	107.4	<100	Explore potential mitigation
SIERA-SP-T-79	32214 RIO OSO 115 31964 KNIGHT2 115 2	B2_31_Rio Oso - Woodland 115 kV Line No. 1 & B2_8_Rio Oso - Brighton 230 kV Line	C3	N-1-1	103.2	107.4	<100	Explore potential mitigation
SIERA-SP-T-80	32214 RIO OSO 115 31986 W.SCRMNO 115 1	B2_31_Rio Oso - Woodland 115 kV Line No. 1 & B2_8_Rio Oso - Brighton 230 kV Line	C3	N-1-1	100.8	105.0	<100	Explore potential mitigation
SIERA-SP-T-81	31962 WDLND_BM 115 31990 DAVIS 115 1	B2_32_Rio Oso - West Sacramento 115 kV Line & B2_8_Rio Oso - Brighton 230 kV Line	C3	N-1-1	122.5	129.1	<100	Explore potential mitigation
SIERA-SP-T-82	32018 GOLDHILL 115 32231 HORSHE2 115 2	B2_36_Drum - Higgins 115 kV Line & B2_19_Placer - Gold Hill 115 kV Line No. 1	C3	N-1-1	110.2	<100	<100	Short term: Action Plan
SIERA-SP-T-83	32018 GOLDHILL 115 32229 HORSHE1 115 1	B2_36_Drum - Higgins 115 kV Line & B2_20_Placer - Gold Hill 115 kV Line No. 2	C3	N-1-1	101.5	<100	<100	Short term: Action Plan
SIERA-SP-T-84	32018 GOLDHILL 115 30337 GOLDHILL 230 2	B2_36_Drum - Higgins 115 kV Line & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	107.9	<100	<100	Short term: Action Plan
SIERA-SP-T-85	32018 GOLDHILL 115 30337 GOLDHILL 230 1	B2_36_Drum - Higgins 115 kV Line & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	107.7	<100	<100	Short term: Action Plan

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-86	32394 PLACER 60.0 32228 PLACER 115 1	B2_37_Placer - Bell 115 kV Line & B2_68_Placer - Del Mar 60 kV Line	C3	N-1-1	<100	124.1	122.0	Explore potential mitigation
SIERA-SP-T-87	31482 PALERMO 115 31506 HONC JT1 115 1	B2_5_Colgate - Rio Oso 230 kV Line & B2_15_Palermo-Nicolaus 115 kV Line	C3	N-1-1	101.3	<100	<100	Short term: Action Plan
SIERA-SP-T-88	32200 PEASE 115 31506 HONC JT1 115 1	B2_5_Colgate - Rio Oso 230 kV Line & B2_15_Palermo-Nicolaus 115 kV Line	C3	N-1-1	101.3	<100	<100	Short term: Action Plan
SIERA-SP-T-89	32200 PEASE 115 32288 E.MRY J1 115 1	B2_5_Colgate - Rio Oso 230 kV Line & B2_3_Table Mountain(D)-Rio Oso 230 kV Line	C3	N-1-1	102.8	<100	<100	Short term: Action Plan
SIERA-SP-T-90	32208 GLEAF TP 115 32214 RIO OSO 115 1	B2_5_Colgate - Rio Oso 230 kV Line & B2_3_Table Mountain(D)-Rio Oso 230 kV Line	C3	N-1-1	104.5	<100	<100	Short term: Action Plan
SIERA-SP-T-91	32290 OLIVH J1 115 32288 E.MRY J1 115 1	B2_5_Colgate - Rio Oso 230 kV Line & B2_3_Table Mountain(D)-Rio Oso 230 kV Line	C3	N-1-1	101.6	<100	<100	Short term: Action Plan
SIERA-SP-T-92	32214 RIO OSO 115 32356 LINCLN 115 1	B2_6_Rio Oso - Atlantic 230 kV Line & B2_10_Atlantic - Gold Hill 230 kV Line	C3	N-1-1	116.7	<100	<100	Short term: Action Plan
SIERA-SP-T-93	32356 LINCLN 115 32404 SPI JCT 115 1	B2_6_Rio Oso - Atlantic 230 kV Line & B2_10_Atlantic - Gold Hill 230 kV Line	C3	N-1-1	112.5	<100	<100	Short term: Action Plan
SIERA-SP-T-94	32398 ULTRA JT 115 32404 SPI JCT 115 1	B2_6_Rio Oso - Atlantic 230 kV Line & B2_10_Atlantic - Gold Hill 230 kV Line	C3	N-1-1	116.6	<100	<100	Short term: Action Plan
SIERA-SP-T-95	32398 ULTRA JT 115 32408 PLSNT GR 115 1	B2_6_Rio Oso - Atlantic 230 kV Line & B2_10_Atlantic - Gold Hill 230 kV Line	C3	N-1-1	130.7	<100	<100	Short term: Action Plan
SIERA-SP-T-96	32394 PLACER 60.0 32228 PLACER 115 1	B2_68_Placer - Del Mar 60 kV Line & B2_37_Placer - Bell 115 kV Line	C3	N-1-1	<100	124.1	122.0	Explore potential mitigation
SIERA-SP-T-97	31960 MOBILCHE 115 31966 WODLNDJ1 115 1	B2_8_Rio Oso - Brighton 230 kV Line & B2_30_Rio Oso - Woodland #1 115 kV Line	C3	N-1-1	96.6	100.7	<100	Explore potential mitigation

Study Area: PG&E Central Valley Sierra - Summer Peak

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-98	31960 MOBILCHE 115 31970 WOODLD 115 1	B2_8_Rio Oso - Brighton 230 kV Line & B2_30_Rio Oso - Woodland #1 115 kV Line	C3	N-1-1	96.6	100.7	<100	Explore potential mitigation
SIERA-SP-T-99	31965 KNIGHT1 115 31966 WODLNDJ1 115 1	B2_8_Rio Oso - Brighton 230 kV Line & B2_30_Rio Oso - Woodland #1 115 kV Line	C3	N-1-1	96.7	100.7	<100	Explore potential mitigation
SIERA-SP-T-100	32214 RIO OSO 115 31965 KNIGHT1 115 1	B2_8_Rio Oso - Brighton 230 kV Line & B2_30_Rio Oso - Woodland #1 115 kV Line	C3	N-1-1	100.0	104.0	<100	Explore potential mitigation
SIERA-SP-T-101	31964 KNIGHT2 115 31968 WODLNDJ2 115 2	B2_8_Rio Oso - Brighton 230 kV Line & B2_31_Rio Oso - Woodland 115 kV Line No. 1	C3	N-1-1	103.2	107.4	<100	Explore potential mitigation
SIERA-SP-T-102	32214 RIO OSO 115 31964 KNIGHT2 115 2	B2_8_Rio Oso - Brighton 230 kV Line & B2_31_Rio Oso - Woodland 115 kV Line No. 1	C3	N-1-1	103.2	107.4	<100	Explore potential mitigation
SIERA-SP-T-103	32214 RIO OSO 115 31986 W.SCRMNO 115 1	B2_8_Rio Oso - Brighton 230 kV Line & B2_31_Rio Oso - Woodland 115 kV Line No. 1	C3	N-1-1	100.8	105.0	<100	Explore potential mitigation
SIERA-SP-T-104	31962 WDLND_BM 115 31970 WOODLD 115 1	B2_8_Rio Oso - Brighton 230 kV Line & B2_32_Rio Oso - West Sacramento 115 kV Line	C3	N-1-1	105.4	111.4	<100	Explore potential mitigation
SIERA-SP-T-105	31962 WDLND_BM 115 31990 DAVIS 115 1	B2_8_Rio Oso - Brighton 230 kV Line & B2_32_Rio Oso - West Sacramento 115 kV Line	C3	N-1-1	122.5	129.1	<100	Explore potential mitigation
SIERA-SP-T-106	32018 GOLDHILL 115 30337 GOLDHILL 230 2	B3_7_Goldhill #1 230/115 kV Transformer & B2_36_Drum - Higgins 115 kV Line	C3	N-1-1	107.9	<100	<100	Short term: Action Plan

Study Area: PG&E Central Valley Sierra - Summer Peak

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-107	32214 RIO OSO 115 30330 RIO OSO 230 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-108	32214 RIO OSO 115 30330 RIO OSO 230 2	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-109	32214 RIO OSO 115 32225 BRNSWKTP 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-110	32214 RIO OSO 115 32244 BRNSWCKP 115 2	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-111	32218 DRUM 115 32220 DTCH FL1 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	160.7	160.6	Explore potential mitigation
SIERA-SP-T-112	32218 DRUM 115 32222 DTCH FL2 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-113	32218 DRUM 115 32244 BRNSWCKP 115 2	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-114	32220 DTCH FL1 115 32224 CHCGO PK 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	102.3	102.3	Explore potential mitigation
SIERA-SP-T-115	32224 CHCGO PK 115 32232 HIGGINS 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	125.5	125.5	Explore potential mitigation

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-116	32225 BRNSWKTP 115 32222 DTCH FL2 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-117	32228 PLACER 115 32238 BELL PGE 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-118	32229 HORSHE1 115 32233 NEWCSTL1 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	<100	100.4	101.7	Explore potential mitigation
SIERA-SP-T-119	32232 HIGGINS 115 32238 BELL PGE 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	diverge	101.2	101.1	Explore potential mitigation
SIERA-SP-T-120	32233 NEWCSTL1 115 32236 FLINT1 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	<100	98.3	99.6	Explore potential mitigation
SIERA-SP-T-121	32236 FLINT1 115 32228 PLACER 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	<100	98.3	99.5	Explore potential mitigation
SIERA-SP-T-122	32412 ATLANTIC 115 32228 PLACER 115 1	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	<100	133.4	136.0	Explore potential mitigation
SIERA-SP-T-123	32018 GOLDHILL 115 30337 GOLDHILL 230 1	B3_8_Goldhill #2 230/115 kV Transformer & B2_36_Drum - Higgins 115 kV Line	C3	N-1-1	107.7	<100	<100	Short term: Action Plan
SIERA-SP-T-124	32214 RIO OSO 115 30330 RIO OSO 230 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan

Study Area: PG&E Central Valley Sierra - Summer Peak

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-125	32214 RIO OSO 115 30330 RIO OSO 230 2	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-126	32214 RIO OSO 115 32225 BRNSWKTP 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-127	32214 RIO OSO 115 32244 BRNSWCKP 115 2	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-128	32218 DRUM 115 32220 DTCH FL1 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	160.7	160.6	Explore potential mitigation
SIERA-SP-T-129	32218 DRUM 115 32222 DTCH FL2 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-130	32218 DRUM 115 32244 BRNSWCKP 115 2	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-131	32220 DTCH FL1 115 32224 CHCGO PK 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	102.3	102.3	Explore potential mitigation
SIERA-SP-T-132	32224 CHCGO PK 115 32232 HIGGINS 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	125.5	125.5	Explore potential mitigation
SIERA-SP-T-133	32225 BRNSWKTP 115 32222 DTCH FL2 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan

Study Area: PG&E Central Valley Sierra - Summer Peak

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-134	32228 PLACER 115 32238 BELL PGE 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	<100	<100	Short term: Action Plan
SIERA-SP-T-135	32229 HORSHE1 115 32233 NEWCSTL1 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	<100	100.4	101.7	Explore potential mitigation
SIERA-SP-T-136	32232 HIGGINS 115 32238 BELL PGE 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	diverge	101.2	101.1	Explore potential mitigation
SIERA-SP-T-137	32233 NEWCSTL1 115 32236 FLINT1 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	<100	98.3	99.6	Explore potential mitigation
SIERA-SP-T-138	32236 FLINT1 115 32228 PLACER 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	<100	98.3	99.5	Explore potential mitigation
SIERA-SP-T-139	32412 ATLANTIC 115 32228 PLACER 115 1	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	<100	133.4	136.0	Explore potential mitigation
SIERA-SP-T-140	32218 DRUM 115 32220 DTCH FL1 115 1	C5_11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 k	C5	DCTL	109.8	108.3	108.7	Short Term: Reduce Drum Gen, Long Term: New Atlantic-Placer 115 kV Line???
SIERA-SP-T-141	31962 WDLND_BM 115 31970 WOODLD 115 1	C5_15_Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	C5	DCTL	103.5	105.7	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion
SIERA-SP-T-142	31984 BRIGHTN 115 31993 BRKRJCT 115 1	C5_15_Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	C5	DCTL	108.9	109.7	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion

Study Area: PG&E Central Valley Sierra - Summer Peak

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-143	31993 BRKRJCT 115 32001 UCD_TP2 115 1	C5_15_Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	C5	DCTL	107.6	108.3	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion
SIERA-SP-T-144	32001 UCD_TP2 115 31990 DAVIS 115 1	C5_15_Rio Oso-Woodland No. 1 115 kV Line & Rio Oso-Woodland No. 2 115 kV Line	C5	DCTL	107.1	107.8	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion
SIERA-SP-T-145	32218 DRUM 115 32220 DTCH FL1 115 1	C5_19_Placer-Gold Hill No. 1 115 kV Line & Placer-Gold Hill No.	C5	DCTL	127.9	<100	<100	Short Term: Sierra Action Plan, Long Term: New Atlantic - Placer 115 kV Line
SIERA-SP-T-146	32224 CHCGO PK 115 32232 HIGGINS 115 1	C5_19_Placer-Gold Hill No. 1 115 kV Line & Placer-Gold Hill No.	C5	DCTL	106.4	<100	<100	Short Term: Sierra Action Plan, Long Term: New Atlantic - Placer 115 kV Line
SIERA-SP-T-147	32214 RIO OSO 115 30330 RIO OSO 230 1	C5_2_Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Li	C5	DCTL	101.0	<100	<100	Short Term: Sierra Action Plan, Long Term: New Atlantic - Placer 115 kV Line
SIERA-SP-T-148	32214 RIO OSO 115 30330 RIO OSO 230 2	C5_2_Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Li	C5	DCTL	100.2	<100	<100	Short Term: Sierra Action Plan, Long Term: New Atlantic - Placer 115 kV Line
SIERA-SP-T-149	31962 WDLND_BM 115 31990 DAVIS 115 1	C5_3_Rio Oso-Brighton 230 kV Line & Rio Oso-Lockeford 230 kV Li	C5	DCTL	101.0	106.5	<100	Short Term: Sacramento Action Plan, Long Term: Vaca-Davis Voltage Conversion
SIERA-SP-T-150	32200 PEASE 115 32288 E.MRY J1 115 1	C5_5_Colgate-Rio Oso 230 kV Line & Table Mountain-Rio Oso 230 k	C5	DCTL	102.8	<100	<100	Short Term: Sierra Action Plan, Long term: South of Palermo 115 kV Reinforcement Project
SIERA-SP-T-151	32208 GLEAF TP 115 32214 RIO OSO 115 1	C5_5_Colgate-Rio Oso 230 kV Line & Table Mountain-Rio Oso 230 k	C5	DCTL	104.6	<100	<100	Short Term: Sierra Action Plan, Long term: South of Palermo 115 kV Reinforcement Project

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-T-152	32290 OLIVH J1 115 32288 E.MRY J1 115 1	C5_5_Colgate-Rio Oso 230 kV Line & Table Mountain-Rio Oso 230 k	C5	DCTL	101.6	<100	<100	Short Term: Sierra Action Plan, Long term: South of Palermo 115 kV Reinforcement Project

Study Area: PG&E Central Valley Sierra - Spring Peak

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					N/A	2019 Spring Peak	N/A	
SIERA-SpP-T-1	32394 PLACER 60.0 32228 PLACER 115 1	B2_19_Placer - Gold Hill 115 kV Line No. 1	B	L-1		125.7		Add Placer 2nd XFMR
SIERA-SpP-T-2	32218 DRUM 115 32244 BRNSWCKP 115 2	B2_38_Higgins - Bell 115 kV Line	B	L-1		108.3		Add third Hill 230/115 kV transformer ot pine Hill Sub
SIERA-SpP-T-3	32225 BRNSWKTP 115 32222 DTCH FL2 115 1	B2_38_Higgins - Bell 115 kV Line	B	L-1		102.2		Add third Hill 230/115 kV transformer ot pine Hill Sub
SIERA-SpP-T-4	32314 SMRTSVLE 60.0 32349 BEALE2J1 60.0 1	B2_5_Colgate - Rio Oso 230 kV Line	B	L-1		105.3		Explore potential mitigation
SIERA-SpP-T-5	32394 PLACER 60.0 32228 PLACER 115 1	B2_72_New Atlantic - Placer 115 kV Line	B	L-1		125.7		Add Placer 2nd XFMR
SIERA-SpP-T-6	32218 DRUM 115 32244 BRNSWCKP 115 2	B2_38_Higgins - Bell 115 kV Line & B1_18_ROLLINSF 6.60 Unit ID 1	B	L-1/G-1		101.9		Explore potential mitigation
SIERA-SpP-T-7	32394 PLACER 60.0 32228 PLACER 115 1	B2_19_Placer - Gold Hill 115 kV Line No. 1 & B1_40_RIO OSO 230.00 Unit ID 1	B	L-1/G-1		146.4		Explore potential mitigation
SIERA-SpP-T-8	32218 DRUM 115 32244 BRNSWCKP 115 2	C1-13_BUS FAULT AT 32232 HIGGINS 115.00	C1	Bus		117.8		Add third Hill 230/115 kV transformer ot pine Hill Sub
SIERA-SpP-T-9	32225 BRNSWKTP 115 32222 DTCH FL2 115 1	C1-13_BUS FAULT AT 32232 HIGGINS 115.00	C1	Bus		111.9		Add third Hill 230/115 kV transformer ot pine Hill Sub
SIERA-SpP-T-10	32218 DRUM 115 32244 BRNSWCKP 115 2	C1-14_BUS FAULT AT 32238 BELL PGE 115.00	C1	Bus		107.6		Explore potential mitigation
SIERA-SpP-T-11	32225 BRNSWKTP 115 32222 DTCH FL2 115 1	C1-4_BUS FAULT AT 30337 GOLDHILL 230.00 Bus 2	C1	Bus		101.5		Add Placer 2nd XFMR
SIERA-SpP-T-12	32394 PLACER 60.0 32228 PLACER 115 1	C1-6_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 1E	C1	Bus		134.2		Add Placer 2nd XFMR
SIERA-SpP-T-13	32394 PLACER 60.0 32228 PLACER 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus		134.3		Add Placer 2nd XFMR
SIERA-SpP-T-14	32250 ELDORAD 115 32481 APLHTAP2 115 2	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus		132.1		Add Placer 2nd XFMR

Study Area: PG&E Central Valley Sierra - Spring Peak

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					N/A	2019 Spring Peak	N/A	
SIERA-SpP-T-15	32250 ELDORAD 115 32482 APLHTAP1 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus		119.0		Add Placer 2nd XFMR
SIERA-SpP-T-16	32394 PLACER 60.0 32228 PLACER 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus		125.8		Add Placer 2nd XFMR
SIERA-SpP-T-17	32481 APLHTAP2 115 32257 PLCRVLT2 115 2	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus		132.2		Add Placer 2nd XFMR
SIERA-SpP-T-18	32482 APLHTAP1 115 32255 PLCRVLT1 115 1	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus		143.5		Add Placer 2nd XFMR
SIERA-SpP-T-19	32314 SMRTSVLE 60.0 32349 BEALE2J1 60.0 1	C1-19_BUS FAULT AT 32320 MRYSVLLE 60.00	C1	Bus		101.0		Sierrra Action Plan
SIERA-SpP-T-20	32218 DRUM 115 32220 DTCH FL1 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB		106.6		Add third Hill 230/115 kV transformer ot pine Hill Sub
SIERA-SpP-T-21	32224 CHCGO PK 115 32232 HIGGINS 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB		108.2		Add third Hill 230/115 kV transformer ot pine Hill Sub
SIERA-SpP-T-22	32394 PLACER 60.0 32228 PLACER 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB		109.0		Add Placer 2nd XFMR
SIERA-SpP-T-23	32394 PLACER 60.0 32228 PLACER 115 1	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB		135.9		Add Placer 2nd XFMR
SIERA-SpP-T-24	31962 WDLND_BM 115 31990 DAVIS 115 1	B2_32_Rio Oso - West Sacramento 115 kV Line & B2_8_Rio Oso - Brighton 230 kV Line	C3	N-1-1		111.4		Explore potential mitigation
SIERA-SpP-T-25	32214 RIO OSO 115 32225 BRNSWKTP 115 1	B2_34_Drum - Rio Oso 115 kV No. 2 Line & B2_38_Higgins - Bell 115 kV Line	C3	N-1-1		174.5		Explore potential mitigation
SIERA-SpP-T-26	32214 RIO OSO 115 32244 BRNSWCKP 115 2	B2_33_Drum - Rio Oso 115 kV No. 1 Line & B2_38_Higgins - Bell 115 kV Line	C3	N-1-1		144.8		Explore potential mitigation
SIERA-SpP-T-27	32218 DRUM 115 32220 DTCH FL1 115 1	B2_33_Drum - Rio Oso 115 kV No. 1 Line & B2_34_Drum - Rio Oso 115 kV No. 2 Line	C3	N-1-1		113.2		Explore potential mitigation

Study Area: PG&E Central Valley Sierra - Spring Peak

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					N/A	2019 Spring Peak	N/A	
SIERA-SpP-T-28	32218 DRUM 115 32222 DTCH FL2 115 1	B2_34_Drum - Rio Oso 115 kV No. 2 Line & B2_38_Higgins - Bell 115 kV Line	C3	N-1-1		155.2		Explore potential mitigation
SIERA-SpP-T-29	32218 DRUM 115 32244 BRNSWCKP 115 2	B2_33_Drum - Rio Oso 115 kV No. 1 Line & B2_38_Higgins - Bell 115 kV Line	C3	N-1-1		175.4		Explore potential mitigation
SIERA-SpP-T-30	32224 CHCGO PK 115 32232 HIGGINS 115 1	B2_33_Drum - Rio Oso 115 kV No. 1 Line & B2_34_Drum - Rio Oso 115 kV No. 2 Line	C3	N-1-1		112.8		Explore potential mitigation
SIERA-SpP-T-31	32225 BRNSWKTP 115 32222 DTCH FL2 115 1	B2_34_Drum - Rio Oso 115 kV No. 2 Line & B2_38_Higgins - Bell 115 kV Line	C3	N-1-1		188.9		Explore potential mitigation
SIERA-SpP-T-32	32314 SMRTSVLE 60.0 32316 YUBAGOLD 60.0 1	B2_53_Smartville - Nicolaus #2 60 kV Line & B2_5_Colgate - Rio Oso 230 kV Line	C3	N-1-1		117.1		Explore potential mitigation
SIERA-SpP-T-33	32314 SMRTSVLE 60.0 32349 BEALE2J1 60.0 1	B2_51_Smartville - Marysville 60 kV Line & B2_5_Colgate - Rio Oso 230 kV Line	C3	N-1-1		121.6		Explore potential mitigation
SIERA-SpP-T-34	32316 YUBAGOLD 60.0 32318 BRWNS VY 60.0 1	B2_53_Smartville - Nicolaus #2 60 kV Line & B2_5_Colgate - Rio Oso 230 kV Line	C3	N-1-1		114.8		Explore potential mitigation
SIERA-SpP-T-35	32318 BRWNS VY 60.0 32320 MRYSVLLE 60.0 1	B2_53_Smartville - Nicolaus #2 60 kV Line & B2_5_Colgate - Rio Oso 230 kV Line	C3	N-1-1		111.1		Explore potential mitigation
SIERA-SpP-T-36	32394 PLACER 60.0 32228 PLACER 115 1	B2_20_Placer - Gold Hill 115 kV Line No. 2 & B2_72_New Atlantic - Placer 115 kV Line	C3	N-1-1		150.4		Explore potential mitigation
SIERA-SpP-T-37	32218 DRUM 115 32220 DTCH FL1 115 1	C5_11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 k	C5	DCTL		100.8		Sierrra Action Plan
SIERA-SpP-T-38	32224 CHCGO PK 115 32232 HIGGINS 115 1	C5_11_Drum-Rio Oso No. 1 115 kV Line & Drum-Rio Oso No. 2 115 k	C5	DCTL		104.8		Sierrra Action Plan

Study Area: **PG&E Central Valley Sierra - Spring Peak**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					N/A	2019 Spring Peak	N/A	
SIERA-SpP-T-39	32394 PLACER 60.0 32228 PLACER 115 1	C5_19_Placer-Gold Hill No. 1 115 kV Line & Placer-Gold Hill No.	C5	DCTL		131.8		Add Placer 2nd XFMR
SIERA-SpP-T-40	32224 CHCGO PK 115 32232 HIGGINS 115 1	C5_2_Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Li	C5	DCTL		101.2		Sierrra Action Plan
SIERA-SpP-T-41	32314 SMRTSVLE 60.0 32349 BEALE2J1 60.0 1	C5_5_Colgate-Rio Oso 230 kV Line & Table Mountain-Rio Oso 230 k	C5	DCTL		118.2		Sierrra Action Plan
SIERA-SpP-T-42	32394 PLACER 60.0 32228 PLACER 115 1	C5_8_Middle Fork-Gold Hill 230 kV Line & Placer-Gold Hill No. 1	C5	DCTL		129.6		Add Placer 2nd XFMR

Study Area: **PG&E Central Valley Sierra - Summer Off-Peak & Summer Light Load**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Off-Peak	2019 Summer Light Load	N/A	
SIERA-NP-T-1	32394 PLACER 60.0 32228 PLACER 115 1	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<100	101.1		Explore potential mitigation
SIERA-NP-T-2	32214 RIO OSO 115 32225 BRNSWKTP 115 1	B2_34_Drum - Rio Oso 115 kV No. 2 Line & B2_38_Higgins - Bell 115 kV Line	C3	N-1-1	<100	117.5		Explore potential mitigation
SIERA-NP-T-3	32214 RIO OSO 115 32244 BRNSWCKP 115 2	B2_33_Drum - Rio Oso 115 kV No. 1 Line & B2_38_Higgins - Bell 115 kV Line	C3	N-1-1	<100	98.0		Explore potential mitigation
SIERA-NP-T-4	32218 DRUM 115 32222 DTCH FL2 115 1	B2_34_Drum - Rio Oso 115 kV No. 2 Line & B2_38_Higgins - Bell 115 kV Line	C3	N-1-1	<100	97.4		Explore potential mitigation
SIERA-NP-T-5	32218 DRUM 115 32244 BRNSWCKP 115 2	B2_33_Drum - Rio Oso 115 kV No. 1 Line & B2_38_Higgins - Bell 115 kV Line	C3	N-1-1	<100	112.7		Explore potential mitigation
SIERA-NP-T-6	32225 BRNSWKTP 115 32222 DTCH FL2 115 1	B2_34_Drum - Rio Oso 115 kV No. 2 Line & B2_38_Higgins - Bell 115 kV Line	C3	N-1-1	<100	124.7		Explore potential mitigation

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-1	BARRY 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer	B	N-1	<5.0	<5.0	5.248	Explore potential mitigation
SIERA-SP-VD-2	OXBOW 60kV	B1_21_OXBOW F 9.11 Unit ID 1	B	N-1	6.74	6.674	6.694	Explore potential mitigation
SIERA-SP-VD-3	TUDOR 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer	B	N-1	<5.0	<5.0	5.189	Explore potential mitigation
SIERA-SP-VD-4	PLUMAS 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer	B	N-1	<5.0	<5.0	5.297	Explore potential mitigation
SIERA-SP-VD-5	CATLETT 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer	B	N-1	<5.0	<5.0	5.143	Explore potential mitigation
SIERA-SP-VD-6	ROLLINS 60kV	B1_18_ROLLINSF 6.60 Unit ID 1	B	N-1	5.388	5.258	5.281	Explore potential mitigation
SIERA-SP-VD-7	WHTLND1 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer	B	N-1	<5.0	<5.0	5.426	Explore potential mitigation
SIERA-SP-VD-8	CATLETJT 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer	B	N-1	<5.0	<5.0	5.075	Explore potential mitigation
SIERA-SP-VD-9	E.MRY J2 115kV	B2_29_East Nicolaus - Rio Oso 115 kV Line	B	N-1	<5.0	<5.0	7.784	Explore potential mitigation
SIERA-SP-VD-10	E.MRYSVE 115kV	B2_29_East Nicolaus - Rio Oso 115 kV Line	B	N-1	<5.0	<5.0	7.787	Explore potential mitigation
SIERA-SP-VD-11	E.NICOLS 115kV	B2_29_East Nicolaus - Rio Oso 115 kV Line	B	N-1	<5.0	<5.0	12.342	Explore potential mitigation
SIERA-SP-VD-12	ENVRO_HY 60kV	B1_21_OXBOW F 9.11 Unit ID 1	B	N-1	6.559	6.492	6.512	Explore potential mitigation
SIERA-SP-VD-13	FORST HL 60kV	B1_21_OXBOW F 9.11 Unit ID 1	B	N-1	5.833	5.768	5.788	Explore potential mitigation
SIERA-SP-VD-14	GRSS VLY 60kV	B2_49_Colgate-Grass Valley 60 kV Line	B	N-1	6.773	7.345	7.793	Explore potential mitigation
SIERA-SP-VD-15	ROLLNSTP 60kV	B1_18_ROLLINSF 6.60 Unit ID 1	B	N-1	5.152	5.023	5.046	Explore potential mitigation
SIERA-SP-VD-16	SPI-LINC 115kV	B1_27_SPILINCF 12.50 Unit ID 1	B	N-1	6.786	<5.0	<5.0	Short term: Action Plan

Study Area: PG&E Central Valley Sierra - Summer Peak

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-17	WHEATLND 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer	B	N-1	<5.0	<5.0	5.427	Explore potential mitigation
SIERA-SP-VD-18	WHTLNDAL 60kV	B2_60_Smartville - Nicolaus #1 60 kV Line	B	N-1	<5.0	<5.0	6.504	Explore potential mitigation
SIERA-SP-VD-19	BARRY 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_1_COLGATE1 13.80 Unit ID 1	B	N-1/G-1	<5.0	<5.0	6.006	Explore potential mitigation
SIERA-SP-VD-20	BOGUE 115kV	B2_27_Bogue - Rio Oso 115 kV Line & B1_2_FREC 13.80 Unit ID 1	B	N-1/G-1	6.115	6.486	7.124	Explore potential mitigation
SIERA-SP-VD-21	TUDOR 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_1_COLGATE1 13.80 Unit ID 1	B	N-1/G-1	<5.0	<5.0	5.938	Explore potential mitigation
SIERA-SP-VD-22	BANGOR 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.644	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-23	GLEAF2 60kV	B2_44_Pease - Marysville - Harter 60 kV Line & B1_25_GRNLEAF2 13.80 Unit ID 1	B	N-1/G-1	5.94	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-24	HARTER 60kV	B2_44_Pease - Marysville - Harter 60 kV Line & B1_25_GRNLEAF2 13.80 Unit ID 1	B	N-1/G-1	7.364	<5.0	5.06	Explore potential mitigation
SIERA-SP-VD-25	PLUMAS 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_1_COLGATE1 13.80 Unit ID 1	B	N-1/G-1	<5.0	<5.0	6.063	Explore potential mitigation
SIERA-SP-VD-26	BEALE_1 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.705	<5.0	<5.0	Explore potential mitigation
SIERA-SP-VD-27	BEALE_2 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.733	<5.0	<5.0	Explore potential mitigation
SIERA-SP-VD-28	CATLETT 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_1_COLGATE1 13.80 Unit ID 1	B	N-1/G-1	<5.0	<5.0	5.885	Explore potential mitigation
SIERA-SP-VD-29	COLGATE 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.531	<5.0	<5.0	Short term: Action Plan

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-30	COLGTE1 230kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.156	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-31	COLGTE2 230kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.141	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-32	DOBBINS 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.573	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-33	ELDORAD 115kV	B2_22_Missouri Flat - Gold Hill 115 kV No. 2 Line & B1_37_ELDRADO1 21.60 Unit ID 1	B	N-1/G-1	5.156	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-34	MRYSVLE 60kV	B3_11_Pease #2 115/60 kV Transformer & B1_25_GRNLEAF2 13.80 Unit ID 1	B	N-1/G-1	5.435	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-35	PEAS RG 60kV	B2_44_Pease - Marysville - Harter 60 kV Line & B1_25_GRNLEAF2 13.80 Unit ID 1	B	N-1/G-1	4.254	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-36	PEASETP 60kV	B3_11_Pease #2 115/60 kV Transformer & B1_25_GRNLEAF2 13.80 Unit ID 1	B	N-1/G-1	5.292	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-37	ROLLINS 60kV	B2_49_Colgate-Grass Valley 60 kV Line & B1_18_ROLLINSF 6.60 Unit ID 1	B	N-1/G-1	<5.0	<5.0	5.063	Explore potential mitigation
SIERA-SP-VD-38	WHTLND1 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_1_COLGATE1 13.80 Unit ID 1	B	N-1/G-1	<5.0	<5.0	6.213	Explore potential mitigation
SIERA-SP-VD-39	ALLEGHNY 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.673	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-40	ALMENDRA 60kV	B2_44_Pease - Marysville - Harter 60 kV Line & B1_25_GRNLEAF2 13.80 Unit ID 1	B	N-1/G-1	5.671	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-41	APLHTAP1 115kV	B2_22_Missouri Flat - Gold Hill 115 kV No. 2 Line & B1_37_ELDRADO1 21.60 Unit ID 1	B	N-1/G-1	5.055	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-42	APLHTAP2 115kV	B2_22_Missouri Flat - Gold Hill 115 kV No. 2 Line & B1_37_ELDRADO1 21.60 Unit ID 1	B	N-1/G-1	5.352	<5.0	<5.0	Short term: Action Plan

Study Area: PG&E Central Valley Sierra - Summer Peak

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-43	APPLE HL 115kV	B2_22_Missouri Flat - Gold Hill 115 kV No. 2 Line & B1_37_ELDRADO1 21.60 Unit ID 1	B	N-1/G-1	5.061	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-44	BEALE1J1 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.705	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-45	BEALE1J2 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.731	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-46	BEALE2J1 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.731	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-47	BEALE2J2 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.33	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-48	BRWNS VY 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.622	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-49	CATLETJT 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_1_COLGATE1 13.80 Unit ID 1	B	N-1/G-1	<5.0	<5.0	5.807	Explore potential mitigation
SIERA-SP-VD-50	CATLETJT 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.873	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-51	CHLLNGEA 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.573	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-52	CLMBA HL 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.58	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-53	COLGATEA 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.573	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-54	E.MRY J2 115kV	B2_29_East Nicolaus - Rio Oso 115 kV Line & B1_1_COLGATE1 13.80 Unit ID 1	B	N-1/G-1	<5.0	6.335	8.231	Explore potential mitigation
SIERA-SP-VD-55	E.MRYSVE 115kV	B2_29_East Nicolaus - Rio Oso 115 kV Line & B1_1_COLGATE1 13.80 Unit ID 1	B	N-1/G-1	<5.0	6.337	8.234	Explore potential mitigation
SIERA-SP-VD-56	E.NICOLS 115kV	B2_29_East Nicolaus - Rio Oso 115 kV Line & B1_1_COLGATE1 13.80 Unit ID 1	B	N-1/G-1	<5.0	10.341	12.971	Explore potential mitigation

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-57	FREC TAP 115kV	B2_27_Bogue - Rio Oso 115 kV Line & B1_2_FREC 13.80 Unit ID 1	B	N-1/G-1	6.114	6.485	7.124	Explore potential mitigation
SIERA-SP-VD-58	GLEAF2TP 60kV	B2_44_Pease - Marysville - Harter 60 kV Line & B1_25_GRNLEAF2 13.80 Unit ID 1	B	N-1/G-1	5.94	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-59	GRSS VLY 60kV	B2_49_Colgate-Grass Valley 60 kV Line & B1_18_ROLLINSF 6.60 Unit ID 1	B	N-1/G-1	12.852	13.439	13.97	Explore potential mitigation
SIERA-SP-VD-60	MIZOU_T1 115kV	B2_23_Missouri Flat - Gold Hill 115 kV No. 1 Line & B1_37_ELDRADO1 21.60 Unit ID 1	B	N-1/G-1	5.207	<5.0	5.608	Explore potential mitigation
SIERA-SP-VD-61	MIZOU_T2 115kV	B2_22_Missouri Flat - Gold Hill 115 kV No. 2 Line & B1_37_ELDRADO1 21.60 Unit ID 1	B	N-1/G-1	5.496	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-62	MRYSVLLE 60kV	B3_11_Pease #2 115/60 kV Transformer & B1_25_GRNLEAF2 13.80 Unit ID 1	B	N-1/G-1	5.435	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-63	NARRWS 1 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.627	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-64	NARRWS 2 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.576	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-65	NRRWS1TP 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.586	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-66	NRRWS2TP 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.586	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-67	OLIVH J3 115kV	B2_27_Bogue - Rio Oso 115 kV Line & B1_2_FREC 13.80 Unit ID 1	B	N-1/G-1	<5.0	5.313	5.884	Explore potential mitigation
SIERA-SP-VD-68	PIKE CTY 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.635	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-69	PLCRVLB2 115kV	B2_22_Missouri Flat - Gold Hill 115 kV No. 2 Line & B1_37_ELDRADO1 21.60 Unit ID 1	B	N-1/G-1	5.482	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-70	PLCRVLB3 115kV	B2_22_Missouri Flat - Gold Hill 115 kV No. 2 Line & B1_37_ELDRADO1 21.60 Unit ID 1	B	N-1/G-1	5.482	<5.0	<5.0	Short term: Action Plan

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Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-71	PLCRVLT1 115kV	B2_23_Missouri Flat - Gold Hill 115 kV No. 1 Line & B1_37_ELDRADO1 21.60 Unit ID 1	B	N-1/G-1	5.062	<5.0	5.437	Explore potential mitigation
SIERA-SP-VD-72	PLCRVLT2 115kV	B2_22_Missouri Flat - Gold Hill 115 kV No. 2 Line & B1_37_ELDRADO1 21.60 Unit ID 1	B	N-1/G-1	5.48	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-73	ROLLNSTP 60kV	B2_49_Colgate-Grass Valley 60 kV Line & B1_18_ROLLINSF 6.60 Unit ID 1	B	N-1/G-1	<5.0	<5.0	5.063	Explore potential mitigation
SIERA-SP-VD-74	SMRTSVLE 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.585	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-75	SMRTVLE1 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.585	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-76	SMRTVLLE 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.585	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-77	SPICAMIN 115kV	B2_22_Missouri Flat - Gold Hill 115 kV No. 2 Line & B1_37_ELDRADO1 21.60 Unit ID 1	B	N-1/G-1	5.06	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-78	WEST JCT 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.035	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-79	WHEATLND 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_1_COLGATE1 13.80 Unit ID 1	B	N-1/G-1	<5.0	<5.0	6.213	Explore potential mitigation
SIERA-SP-VD-80	WHEATLND 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.873	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-81	WHTLNDAL 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.871	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-82	WHTLNDAL 60kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	<5.0	<5.0	5.801	Explore potential mitigation
SIERA-SP-VD-83	YBA CTYJ 60kV	B2_44_Pease - Marysville - Harter 60 kV Line & B1_25_GRNLEAF2 13.80 Unit ID 1	B	N-1/G-1	5.671	<5.0	<5.0	Short term: Action Plan

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ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-84	YUBAGOLD 60kV	B2_4_Palermo-Colgate 230 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	N-1/G-1	5.619	<5.0	<5.0	Short term: Action Plan
SIERA-SP-VD-85	CPM 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	12.929	12.439	12.702	Explore potential mitigation
SIERA-SP-VD-86	CPM TAP 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	12.929	12.439	12.702	Explore potential mitigation
SIERA-SP-VD-87	ELDORAD 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	43	41.244	42.215	Explore potential mitigation
SIERA-SP-VD-88	ENCINAL 60kV	C1-21_BUS FAULT AT 32332 PEASE 60.00	C1	Bus	11.871	12.702	13.809	Explore potential mitigation
SIERA-SP-VD-89	SHPRING 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	56.863	56.54	57.718	Explore potential mitigation
SIERA-SP-VD-90	APLHTAP1 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	38.429	36.263	37.131	Explore potential mitigation
SIERA-SP-VD-91	APLHTAP2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	49.377	48.265	49.311	Explore potential mitigation
SIERA-SP-VD-92	APPLE HL 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	38.492	36.319	37.193	Explore potential mitigation
SIERA-SP-VD-93	CLRKSVLT 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	14.046	13.684	13.979	Explore potential mitigation
SIERA-SP-VD-94	DIMOND_1 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	26.59	23.491	24.056	Explore potential mitigation
SIERA-SP-VD-95	DIMOND_2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	54.694	54.146	55.27	Explore potential mitigation
SIERA-SP-VD-96	DMND SPR 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	54.714	54.168	55.291	Explore potential mitigation
SIERA-SP-VD-97	ENCL TAP 60kV	C1-21_BUS FAULT AT 32332 PEASE 60.00	C1	Bus	11.865	12.696	13.803	Explore potential mitigation
SIERA-SP-VD-98	LIVE OAK 60kV	C1-21_BUS FAULT AT 32332 PEASE 60.00	C1	Bus	11.261	12.055	13.128	Explore potential mitigation
SIERA-SP-VD-99	MIZOU_T1 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	28.758	25.83	26.461	Explore potential mitigation

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					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-100	MIZOU_T2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	53.972	53.343	54.45	Explore potential mitigation
SIERA-SP-VD-101	PLCRVLB2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	53.208	52.495	53.579	Explore potential mitigation
SIERA-SP-VD-102	PLCRVLB3 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	53.22	52.508	53.591	Explore potential mitigation
SIERA-SP-VD-103	PLCRVLT1 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	30.851	28.091	28.788	Explore potential mitigation
SIERA-SP-VD-104	PLCRVLT2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	53.188	52.473	53.558	Explore potential mitigation
SIERA-SP-VD-105	SHPRING1 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	24.665	21.419	21.926	Explore potential mitigation
SIERA-SP-VD-106	SHPRING2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	56.836	56.509	57.688	Explore potential mitigation
SIERA-SP-VD-107	SPICAMIN 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	38.482	36.31	37.183	Explore potential mitigation
SIERA-SP-VD-108	CPM 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	86.103	64.224	63.793	Explore potential mitigation
SIERA-SP-VD-109	DRUM 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	19.069	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-110	FLINT 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	56.674	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-111	OXBOW 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	17.394	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-112	AUBURN 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	58.323	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-113	FLINT1 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	56.95	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-114	FLINT2 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	56.666	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-115	HALSEY 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	58.193	<10.0	<10.0	Short term: Action Plan

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ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-116	LINCLN 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	11.684	<10.0	Explore potential mitigation
SIERA-SP-VD-117	PENRYN 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	59.59	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-118	PLACER 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	58.176	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-119	SUMMIT 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	13.481	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-120	TAYLOR 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	19.108	14.805	Explore potential mitigation
SIERA-SP-VD-121	ATLANTC 230kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	16.923	13.009	Explore potential mitigation
SIERA-SP-VD-122	ATLANTI 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	19.023	14.73	Explore potential mitigation
SIERA-SP-VD-123	CPM TAP 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	86.103	64.224	63.793	Explore potential mitigation
SIERA-SP-VD-124	DEL MAR 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	19.643	15.246	Explore potential mitigation
SIERA-SP-VD-125	ELDORAD 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	88.143	64.856	64.636	Explore potential mitigation
SIERA-SP-VD-126	HIGGINS 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	48.636	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-127	HORSHE1 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	60.28	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-128	HORSHE2 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	58.157	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-129	RIO OSO 230kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	10.683	<10.0	Explore potential mitigation
SIERA-SP-VD-130	ROCKLIN 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	19.143	14.836	Explore potential mitigation
SIERA-SP-VD-131	ROLLINS 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	17.169	<10.0	<10.0	Short term: Action Plan

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ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-132	SHPRING 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	85.98	65.653	65.319	Explore potential mitigation
SIERA-SP-VD-133	APLHTAP1 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	87.895	64.971	64.718	Explore potential mitigation
SIERA-SP-VD-134	APLHTAP2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	87.268	65.31	65.061	Explore potential mitigation
SIERA-SP-VD-135	APPLE HL 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	87.868	65.028	64.774	Explore potential mitigation
SIERA-SP-VD-136	ATLANTIC 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	19.626	16.106	Explore potential mitigation
SIERA-SP-VD-137	BELL PGE 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	54.751	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-138	BONNIE N 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	17.095	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-139	BOWMN PH 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	12.845	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-140	BOWMN TP 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	14.597	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-141	BRNSWALT 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	12.883	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-142	BRNSWCKP 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	13.488	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-143	BRNSWKTP 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	12.832	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-144	BRUNSWCK 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	13.609	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-145	CAPEHORN 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	17.299	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-146	CHCGO PK 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	32.671	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-147	CISCO GR 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	13.92	<10.0	<10.0	Short term: Action Plan

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					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-148	CISCOTAP 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	13.924	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-149	CLRKSVLE 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	85.584	65.082	64.666	Explore potential mitigation
SIERA-SP-VD-150	CLRKSVLT 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	86.193	64.276	63.855	Explore potential mitigation
SIERA-SP-VD-151	COLFAXJT 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	17.29	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-152	CPEHRNTP 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	17.288	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-153	DIMOND_1 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	87.262	64.633	64.293	Explore potential mitigation
SIERA-SP-VD-154	DIMOND_2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	86.347	65.694	65.404	Explore potential mitigation
SIERA-SP-VD-155	DMND SPR 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	86.342	65.705	65.414	Explore potential mitigation
SIERA-SP-VD-156	DRUM 1M 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	16.33	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-157	DRUM 2M 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	16.332	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-158	DTCH FL1 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	25.906	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-159	DTCH FL2 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	16.65	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-160	ENVRO_HY 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	17.431	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-161	FORST HL 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	17.576	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-162	GOLD HLL 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	85.305	60.595	60.922	Explore potential mitigation
SIERA-SP-VD-163	GOLDHILL 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	85.744	63.961	63.483	Explore potential mitigation

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ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-164	HAYPRESS 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	12.842	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-165	HORSESHE 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	60.281	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-166	LIMESTNE 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	85.304	61.55	61.886	Explore potential mitigation
SIERA-SP-VD-167	MIZOU_T1 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	87.464	64.703	64.383	Explore potential mitigation
SIERA-SP-VD-168	MIZOU_T2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	86.474	65.634	65.353	Explore potential mitigation
SIERA-SP-VD-169	MTN_QJCT 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	58.356	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-170	MTN_QUAR 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	58.631	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-171	NEWCSTL1 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	58.062	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-172	NEWCSTL2 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	57.132	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-173	NEWCSTLE 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	58.086	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-174	PLCRVLB2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	86.585	65.583	65.311	Explore potential mitigation
SIERA-SP-VD-175	PLCRVLB3 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	86.582	65.589	65.317	Explore potential mitigation
SIERA-SP-VD-176	PLCRVLT1 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	87.666	64.765	64.463	Explore potential mitigation
SIERA-SP-VD-177	PLCRVLT2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	86.591	65.573	65.301	Explore potential mitigation
SIERA-SP-VD-178	PLSNT GR 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	17.698	14.469	Explore potential mitigation
SIERA-SP-VD-179	ROLLNSTP 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	17.215	<10.0	<10.0	Short term: Action Plan

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ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-VD-180	SHADYGLN 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	17.289	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-181	SHPRING1 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	87.088	64.565	64.209	Explore potential mitigation
SIERA-SP-VD-182	SHPRING2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	85.988	65.635	65.302	Explore potential mitigation
SIERA-SP-VD-183	SIERRAPI 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	19.644	15.246	Explore potential mitigation
SIERA-SP-VD-184	SPAULDNG 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	14.551	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-185	SPI JCT 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	11.824	<10.0	Explore potential mitigation
SIERA-SP-VD-186	SPICAMIN 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	87.872	65.019	64.765	Explore potential mitigation
SIERA-SP-VD-187	TAMARACK 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	13.79	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-188	ULTRA JT 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	16.633	13.547	Explore potential mitigation
SIERA-SP-VD-189	ULTR-RCK 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	<10.0	16.581	13.512	Explore potential mitigation
SIERA-SP-VD-190	WEMR SWS 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	17.392	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-191	PLACER 115kV	C5_19_Placer-Gold Hill No. 1 115 kV Line & Placer-Gold Hill No.	C5	DCTL	12.811	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-192	HIGGINS 115kV	C5_19_Placer-Gold Hill No. 1 115 kV Line & Placer-Gold Hill No.	C5	DCTL	10.242	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-193	BELL PGE 115kV	C5_19_Placer-Gold Hill No. 1 115 kV Line & Placer-Gold Hill No.	C5	DCTL	12.21	<10.0	<10.0	Short term: Action Plan
SIERA-SP-VD-194	E.NICOLS 115kV	C5_12_Rio Oso-Nicolaus 115 kV Line & Bogue-Rio Oso 115 kV Line	C5	DCTL	<10.0	10.075	12.714	Explore potential mitigation

Study Area: PG&E Central Valley Sierra - Spring Peak

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					N/A	2019 Spring Off-Peak	N/A	
SIERA-SpP-VD-1	COLGATE 60kV	B3_1_Colgate #3 230/60 kV Transformer	B	N-1		7.11		Explore potential mitigation
SIERA-SpP-VD-2	DOBBINS 60kV	B3_1_Colgate #3 230/60 kV Transformer	B	N-1		7.141		Explore potential mitigation
SIERA-SpP-VD-3	ALLEGHNY 60kV	B3_1_Colgate #3 230/60 kV Transformer	B	N-1		7.229		Explore potential mitigation
SIERA-SpP-VD-4	CHLLNGEA 60kV	B3_1_Colgate #3 230/60 kV Transformer	B	N-1		7.141		Explore potential mitigation
SIERA-SpP-VD-5	CLMBA HL 60kV	B3_1_Colgate #3 230/60 kV Transformer	B	N-1		7.151		Explore potential mitigation
SIERA-SpP-VD-6	COLGATEA 60kV	B3_1_Colgate #3 230/60 kV Transformer	B	N-1		7.141		Explore potential mitigation
SIERA-SpP-VD-7	E.NICOLS 115kV	B2_29_East Nicolaus - Rio Oso 115 kV Line	B	N-1		5.479		Explore potential mitigation
SIERA-SpP-VD-8	PIKE CTY 60kV	B3_1_Colgate #3 230/60 kV Transformer	B	N-1		7.198		Explore potential mitigation
SIERA-SpP-VD-9	BANGOR & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		5.442		Explore potential mitigation
SIERA-SpP-VD-10	BEALE_1 & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_11_NARROWS1 11.00 Unit ID 1	B	L-1/G-1		5.537		Explore potential mitigation
SIERA-SpP-VD-11	BEALE_1 & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		10.132		Explore potential mitigation
SIERA-SpP-VD-12	BEALE_2 & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		8.098		Explore potential mitigation
SIERA-SpP-VD-13	COLGATE & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		12.384		Explore potential mitigation
SIERA-SpP-VD-14	DOBBINS & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		12.442		Explore potential mitigation
SIERA-SpP-VD-15	WHTLND1 & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		5.103		Explore potential mitigation
SIERA-SpP-VD-16	ALLEGHNY & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		12.604		Explore potential mitigation

Study Area: PG&E Central Valley Sierra - Spring Peak

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					N/A	2019 Spring Off-Peak	N/A	
SIERA-SpP-VD-17	BEALE1J1 & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		10.131		Explore potential mitigation
SIERA-SpP-VD-18	BEALE2J2 & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_11_NARROWS1 11.00 Unit ID 1	B	L-1/G-1		5.509		Explore potential mitigation
SIERA-SpP-VD-19	BRWNS VY & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		6.257		Explore potential mitigation
SIERA-SpP-VD-20	CHLLNGEA & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		12.442		Explore potential mitigation
SIERA-SpP-VD-21	CLMBA HL & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		12.461		Explore potential mitigation
SIERA-SpP-VD-22	CMP FRWT & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		10.081		Explore potential mitigation
SIERA-SpP-VD-23	COLGATEA & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		12.442		Explore potential mitigation
SIERA-SpP-VD-24	GRSS VLY & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		12.615		Explore potential mitigation
SIERA-SpP-VD-25	NARRWS 1 & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		10.024		Explore potential mitigation
SIERA-SpP-VD-26	NARRWS 2 & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		10.123		Explore potential mitigation
SIERA-SpP-VD-27	NRRWS1TP & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_11_NARROWS1 11.00 Unit ID 1	B	L-1/G-1		5.575		Explore potential mitigation
SIERA-SpP-VD-28	NRRWS2TP & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_11_NARROWS1 11.00 Unit ID 1	B	L-1/G-1		5.458		Explore potential mitigation
SIERA-SpP-VD-29	PIKE CTY & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		12.546		Explore potential mitigation
SIERA-SpP-VD-30	SMRTSVLE & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		10.074		Explore potential mitigation
SIERA-SpP-VD-31	SMRTVLE1 & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		10.074		Explore potential mitigation
SIERA-SpP-VD-32	SMRTVLLE & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		10.074		Explore potential mitigation

Study Area: PG&E Central Valley Sierra - Spring Peak

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					N/A	2019 Spring Off-Peak	N/A	
SIERA-SpP-VD-33	WEST JCT & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		10.08		Explore potential mitigation
SIERA-SpP-VD-34	WHEATLND & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		5.103		Explore potential mitigation
SIERA-SpP-VD-35	YUBAGOLD & 60kV	B3_1_Colgate #3 230/60 kV Transformer & B1_12_NARROWS2 13.80 Unit ID 1	B	L-1/G-1		6.899		Explore potential mitigation
SIERA-SpP-VD-36	SHPRING 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus		10.904		Explore potential mitigation
SIERA-SpP-VD-37	BEALE_1 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		10.132		Explore potential mitigation
SIERA-SpP-VD-38	COLGATE 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		12.384		Explore potential mitigation
SIERA-SpP-VD-39	DOBBINS 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		12.442		Explore potential mitigation
SIERA-SpP-VD-40	ALLEGHNY 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		12.604		Explore potential mitigation
SIERA-SpP-VD-41	BEALE1J1 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		10.131		Explore potential mitigation
SIERA-SpP-VD-42	CHLLNGEA 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		12.442		Explore potential mitigation
SIERA-SpP-VD-43	CLMBA HL 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		12.461		Explore potential mitigation
SIERA-SpP-VD-44	CMP FRWT 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		10.081		Explore potential mitigation
SIERA-SpP-VD-45	COLGATEA 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		12.442		Explore potential mitigation
SIERA-SpP-VD-46	E.NICOLS 115kV	B2_15_Palermo-Nicolaus 115 kV Line & B2_29_East Nicolaus - Rio Oso 115 kV Line	C3	N-1-1		18.135		Explore potential mitigation
SIERA-SpP-VD-47	GRSS VLY 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		12.615		Explore potential mitigation
SIERA-SpP-VD-48	NARRWS 1 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		10.024		Explore potential mitigation

Study Area: **PG&E Central Valley Sierra - Spring Peak**

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					N/A	2019 Spring Off-Peak	N/A	
SIERA-SpP-VD-49	NARRWS 2 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		10.123		Explore potential mitigation
SIERA-SpP-VD-50	NRRWS1TP 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		10.12		Explore potential mitigation
SIERA-SpP-VD-51	NRRWS2TP 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		10.1		Explore potential mitigation
SIERA-SpP-VD-52	PIKE CTY 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		12.546		Explore potential mitigation
SIERA-SpP-VD-53	SMRTSVLE 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		10.074		Explore potential mitigation
SIERA-SpP-VD-54	WEST JCT 60kV	B1_12_NARROWS2 13.80 Unit ID 1 & B3_1_Colgate #3 230/60 kV Transformer	C3	N-1-1		10.08		Explore potential mitigation

Study Area: **PG&E Central Valley Sierra - Summer Off-Peak & Summer Light Load**

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Off-Peak	2019 Summer Light Load	N/A	
Sierra-NP-VD-1	PEASE 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	13.101			Explore potential mitigation
Sierra-NP-VD-2	GLEAF2 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	13.107			Explore potential mitigation
Sierra-NP-VD-3	HARTER 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	13.126			Explore potential mitigation
Sierra-NP-VD-4	ENCINAL 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	11.53			Explore potential mitigation
Sierra-NP-VD-5	MRYSVLE 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	13.165			Explore potential mitigation
Sierra-NP-VD-6	PEASETP 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	13.104			Explore potential mitigation
Sierra-NP-VD-7	ALMENDRA 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	13.105			Explore potential mitigation
Sierra-NP-VD-8	ENCL TAP 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	11.527			Explore potential mitigation
Sierra-NP-VD-9	GLEAF2TP 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	13.106			Explore potential mitigation
Sierra-NP-VD-10	GRSS VLY 60kV	B2_49_Colgate-Grass Valley 60 kV Line	B	N-1		5.027		Explore potential mitigation
Sierra-NP-VD-11	LIVE OAK 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	10.981			Explore potential mitigation
Sierra-NP-VD-12	MRYSVLLE 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	13.165			Explore potential mitigation
Sierra-NP-VD-13	YBA CTYJ 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	13.105			Explore potential mitigation
Sierra-NP-VD-14	YUBACITY 60kV	B3_11_Pease #2 115/60 kV Transformer	B	N-1	13.124			Explore potential mitigation
Sierra-NP-VD-15	SPAULDNG & 60kV	B2_65_Drum - Spaulding 60 kV Line & B1_16_SPAULDG 9.11 Unit ID 3	B	L-1/G-1	-5.586	-5.277		Explore potential mitigation
Sierra-NP-VD-16	PEASE 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	13.303			Explore potential mitigation

Study Area: PG&E Central Valley Sierra - Summer Off-Peak & Summer Light Load

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Off-Peak	2019 Summer Light Load	N/A	
Sierra-NP-VD-17	GLEAF2 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	13.309			Explore potential mitigation
Sierra-NP-VD-18	HARTER 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	13.328			Explore potential mitigation
Sierra-NP-VD-19	ENCINAL 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	11.729			Explore potential mitigation
Sierra-NP-VD-20	MRYSVLE 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	13.368			Explore potential mitigation
Sierra-NP-VD-21	PEAS RG 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	17.251			Explore potential mitigation
Sierra-NP-VD-22	PEASETP 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	13.306			Explore potential mitigation
Sierra-NP-VD-23	ALMENDRA 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	13.307			Explore potential mitigation
Sierra-NP-VD-24	ENCL TAP 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	11.726			Explore potential mitigation
Sierra-NP-VD-25	GLEAF2TP 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	13.308			Explore potential mitigation
Sierra-NP-VD-26	LIVE OAK 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	11.178			Explore potential mitigation
Sierra-NP-VD-27	MRYSVLLE 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	13.368			Explore potential mitigation
Sierra-NP-VD-28	YBA CTYJ 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	13.307			Explore potential mitigation
Sierra-NP-VD-29	YUBACITY 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	13.326			Explore potential mitigation
Sierra-NP-VD-30	PEASE 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	20.342	11.037		Explore potential mitigation
Sierra-NP-VD-31	GLEAF2 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	20.352	11.042		Explore potential mitigation
Sierra-NP-VD-32	HARTER 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	20.385	11.033		Explore potential mitigation

Study Area: PG&E Central Valley Sierra - Summer Off-Peak & Summer Light Load

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Off-Peak	2019 Summer Light Load	N/A	
Sierra-NP-VD-33	ENCINAL 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	18.234			Explore potential mitigation
Sierra-NP-VD-34	MRYSVLE 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	20.455	11.046		Explore potential mitigation
Sierra-NP-VD-35	PEAS RG 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	22.411	11.973		Explore potential mitigation
Sierra-NP-VD-36	PEASETP 60kV	B2_26_Pease - Rio Oso 115 kV Line & B2_25_Palermo - Pease 115 kV Line	C3	N-1-1	20.034	11.523		Explore potential mitigation
Sierra-NP-VD-37	ALMENDRA 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	20.349	11.041		Explore potential mitigation
Sierra-NP-VD-38	ENCL TAP 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	18.228			Explore potential mitigation
Sierra-NP-VD-39	GLEAF2TP 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	20.351	11.041		Explore potential mitigation
Sierra-NP-VD-40	LIVE OAK 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	17.463			Explore potential mitigation
Sierra-NP-VD-41	MRYSVLLE 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	20.455	11.046		Explore potential mitigation
Sierra-NP-VD-42	YBA CTYJ 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	20.349	11.041		Explore potential mitigation
Sierra-NP-VD-43	YUBACITY 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	20.383	11.034		Explore potential mitigation
Sierra-NP-VD-44	PEASE 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	20.616	11.492		Explore potential mitigation
Sierra-NP-VD-45	PEASE 115kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	25.67	16.509		Explore potential mitigation
Sierra-NP-VD-46	GLEAF2 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	20.626	11.498		Explore potential mitigation
Sierra-NP-VD-47	HARTER 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	20.659	11.488		Explore potential mitigation
Sierra-NP-VD-48	ENCINAL 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	18.462	10.286		Explore potential mitigation

Study Area: **PG&E Central Valley Sierra - Summer Off-Peak & Summer Light Load**

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Off-Peak	2019 Summer Light Load	N/A	
SIERA-NP-VD-1	MRYSVLE 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	20.727	11.501		Explore potential mitigation
SIERA-NP-VD-2	PEAS RG 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	24.059	13.281		Explore potential mitigation
SIERA-NP-VD-3	PEASETP 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	20.622	11.493		Explore potential mitigation
SIERA-NP-VD-4	ALMENDRA 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	20.624	11.496		Explore potential mitigation
SIERA-NP-VD-5	ENCL TAP 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	18.456	10.283		Explore potential mitigation
SIERA-NP-VD-6	GLEAF2TP 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	20.625	11.497		Explore potential mitigation
SIERA-NP-VD-7	LIVE OAK 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	17.675	9.844		Explore potential mitigation
SIERA-NP-VD-8	MRYSVLLE 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	20.727	11.501		Explore potential mitigation
SIERA-NP-VD-9	YBA CTYJ 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	20.623	11.496		Explore potential mitigation
SIERA-NP-VD-10	YUBACITY 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	20.657	11.49		Explore potential mitigation

Study Area: **PG&E Central Valley Sierra - Summer Peak**

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-1	OXBOW 60kV	B2_49_Colgate-Grass Valley 60 kV Line & B1_21_OXBOW F 9.11 Unit ID 1	B	L-1/G-1	0.8983	0.8997	0.8938	Explore potential mitigation
SIERA-SP-V-2	PEAS RG 60kV	B2_44_Pease - Marysville - Harter 60 kV Line & B1_25_GRNLEAF2 13.80 Unit ID 1	B	L-1/G-1	0.8998	>0.95	>0.95	Explore potential mitigation
SIERA-SP-V-3	E.NICOLS 115kV	B2_29_East Nicolaus - Rio Oso 115 kV Line & B1_1_COLGATE1 13.80 Unit ID 1	B	L-1/G-1	>0.95	>0.95	0.8995	Explore potential mitigation
SIERA-SP-V-4	E.NICOLS 115kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_1_COLGATE1 13.80 Unit ID 1	B	L-1/G-1	>0.95	>0.95	0.8943	Explore potential mitigation
SIERA-SP-V-5	E.NICOLS 115kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_2_FREC 13.80 Unit ID 1	B	L-1/G-1	>0.95	>0.95	0.8983	Explore potential mitigation
SIERA-SP-V-6	E.NICOLS 115kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_25_GRNLEAF2 13.80 Unit ID 1	B	L-1/G-1	>0.95	>0.95	0.8989	Explore potential mitigation
SIERA-SP-V-7	E.NICOLS 115kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_26_YUBA CTY 13.80 Unit ID 1	B	L-1/G-1	>0.95	>0.95	0.8974	Explore potential mitigation
SIERA-SP-V-8	E.NICOLS 115kV	B2_29_East Nicolaus - Rio Oso 115 kV Line & B1_3_COLGATE2 13.80 Unit ID 1	B	L-1/G-1	>0.95	>0.95	0.8996	Explore potential mitigation
SIERA-SP-V-9	E.NICOLS 115kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_3_COLGATE2 13.80 Unit ID 1	B	L-1/G-1	>0.95	>0.95	0.8943	Explore potential mitigation
SIERA-SP-V-10	E.NICOLS 115kV	B3_13_East Nicolaus #2 115/60 kV Transformer & B1_39_YCEC 13.80 Unit ID 1	B	L-1/G-1	>0.95	>0.95	0.8984	Explore potential mitigation
SIERA-SP-V-11	ENVRO_HY 60kV	B2_49_Colgate-Grass Valley 60 kV Line & B1_21_OXBOW F 9.11 Unit ID 1	B	L-1/G-1	0.8983	0.8997	0.8938	Explore potential mitigation

Study Area: PG&E Central Valley Sierra - Summer Peak

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-12	FORST HL 60kV	B2_49_Colgate-Grass Valley 60 kV Line & B1_21_OXBOW F 9.11 Unit ID 1	B	L-1/G-1	0.8982	0.8996	0.8937	Explore potential mitigation
SIERA-SP-V-13	GRSS VLY 60kV	B2_49_Colgate-Grass Valley 60 kV Line & B1_18_ROLLINSF 6.60 Unit ID 1	B	L-1/G-1	0.8966	0.8959	0.8881	Explore potential mitigation
SIERA-SP-V-14	ELDORAD 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.5867	0.6158	0.5991	Explore potential mitigation
SIERA-SP-V-15	ENCINAL 60kV	C1-21_BUS FAULT AT 32332 PEASE 60.00	C1	Bus	0.8855	0.8822	0.872	Explore potential mitigation
SIERA-SP-V-16	SHPRING 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.4431	0.4595	0.4397	Explore potential mitigation
SIERA-SP-V-17	APLHTAP1 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.6335	0.6673	0.6516	Explore potential mitigation
SIERA-SP-V-18	APLHTAP2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.5174	0.5404	0.5222	Explore potential mitigation
SIERA-SP-V-19	APPLE HL 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.6318	0.6657	0.6499	Explore potential mitigation
SIERA-SP-V-20	CLRKSVLT 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.893	>0.9	0.8996	Explore potential mitigation
SIERA-SP-V-21	DIMOND_1 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.7615	0.806	0.7938	Explore potential mitigation
SIERA-SP-V-22	DIMOND_2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.4602	0.4781	0.4586	Explore potential mitigation
SIERA-SP-V-23	DMND SPR 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.4598	0.4777	0.4582	Explore potential mitigation
SIERA-SP-V-24	ENCL TAP 60kV	C1-21_BUS FAULT AT 32332 PEASE 60.00	C1	Bus	0.886	0.8827	0.8725	Explore potential mitigation
SIERA-SP-V-25	LIVE OAK 60kV	C1-21_BUS FAULT AT 32332 PEASE 60.00	C1	Bus	0.8861	0.8828	0.8726	Explore potential mitigation
SIERA-SP-V-26	MIZOU_T1 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.7387	0.7813	0.7683	Explore potential mitigation
SIERA-SP-V-27	MIZOU_T2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.4675	0.4861	0.4668	Explore potential mitigation

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-28	PLCRVLB2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.4751	0.4943	0.4753	Explore potential mitigation
SIERA-SP-V-29	PLCRVLB3 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.4748	0.4941	0.475	Explore potential mitigation
SIERA-SP-V-30	PLCRVLT1 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.7166	0.7573	0.7436	Explore potential mitigation
SIERA-SP-V-31	PLCRVLT2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.4755	0.4948	0.4757	Explore potential mitigation
SIERA-SP-V-32	SHPRING1 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.7817	0.828	0.8163	Explore potential mitigation
SIERA-SP-V-33	SHPRING2 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.4438	0.4602	0.4404	Explore potential mitigation
SIERA-SP-V-34	SPICAMIN 115kV	C1-7_BUS FAULT AT 32018 GOLDHILL 115.00 Bus 2E	C1	Bus	0.6321	0.666	0.6502	Explore potential mitigation
SIERA-SP-V-35	CPM 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.173	0.4042	0.4021	Explore potential mitigation
SIERA-SP-V-36	DRUM 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8481	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-37	FLINT 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.443	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-38	OXBOW 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8278	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-39	AUBURN 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4403	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-40	FLINT1 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4404	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-41	FLINT2 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4432	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-42	HALSEY 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.441	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-43	PENRYN 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4144	>0.9	>0.9	Short term: Action Plan

Study Area: **PG&E Central Valley Sierra - Summer Peak**

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-44	PLACER 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4437	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-45	SUMMIT 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8924	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-46	TAYLOR 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	>0.9	0.8311	0.8637	Explore potential mitigation
SIERA-SP-V-47	ATLANTC 230kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	>0.9	0.8386	0.8726	Explore potential mitigation
SIERA-SP-V-48	ATLANTI 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	>0.9	0.8354	0.8685	Explore potential mitigation
SIERA-SP-V-49	CPM TAP 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.173	0.4042	0.4021	Explore potential mitigation
SIERA-SP-V-50	DEL MAR 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	>0.9	0.8099	0.8418	Explore potential mitigation
SIERA-SP-V-51	ELDORAD 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1352	0.3797	0.3748	Explore potential mitigation
SIERA-SP-V-52	HIGGINS 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.525	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-53	HORSHE1 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4171	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-54	HORSHE2 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4433	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-55	RIO OSO 230kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	>0.9	0.8932	>0.9	Explore potential mitigation
SIERA-SP-V-56	ROCKLIN 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	>0.9	0.8292	0.8616	Explore potential mitigation
SIERA-SP-V-57	ROLLINS 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8371	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-58	SHPRING 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.152	0.3684	0.3637	Explore potential mitigation
SIERA-SP-V-59	APLHTAP1 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1388	0.3802	0.3757	Explore potential mitigation

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-60	APLHTAP2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1385	0.37	0.3647	Explore potential mitigation
SIERA-SP-V-61	APPLE HL 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1381	0.3786	0.3741	Explore potential mitigation
SIERA-SP-V-62	ATLANTIC 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	>0.9	0.832	0.8625	Explore potential mitigation
SIERA-SP-V-63	BELL PGE 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4595	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-64	BONNIE N 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8349	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-65	BOWMN PH 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	>0.9	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-66	BOWMN TP 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8872	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-67	BRNSWALT 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8925	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-68	BRNSWCKP 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.881	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-69	BRNSWKTP 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8963	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-70	BRUNSWCK 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8724	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-71	CAPEHORN 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8289	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-72	CHCGO PK 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.7049	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-73	CISCO GR 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8886	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-74	CISCOTAP 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8883	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-75	CLRKSVLE 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1658	0.3833	0.3799	Explore potential mitigation

Study Area: **PG&E Central Valley Sierra - Summer Peak**

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-76	CLRKSVLT 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1716	0.4031	0.4008	Explore potential mitigation
SIERA-SP-V-77	COLFAXJT 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8296	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-78	CPEHRNTP 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8295	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-79	DIMOND_1 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1548	0.3946	0.3914	Explore potential mitigation
SIERA-SP-V-80	DIMOND_2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1437	0.3627	0.3573	Explore potential mitigation
SIERA-SP-V-81	DMND SPR 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1435	0.3623	0.3569	Explore potential mitigation
SIERA-SP-V-82	DRUM 1M 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8233	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-83	DRUM 2M 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8226	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-84	DTCH FL1 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.7741	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-85	DTCH FL2 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8688	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-86	ENVRO_HY 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8256	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-87	FORST HL 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8168	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-88	GOLD HLL 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.188	0.4326	0.4306	Explore potential mitigation
SIERA-SP-V-89	GOLDHILL 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1786	0.4096	0.408	Explore potential mitigation
SIERA-SP-V-90	HAYPRESS 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	>0.9	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-91	HORSESHE 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4171	>0.9	>0.9	Short term: Action Plan

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-92	LIMESTNE 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1771	0.4118	0.4095	Explore potential mitigation
SIERA-SP-V-93	MIZOU_T1 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1516	0.3925	0.3891	Explore potential mitigation
SIERA-SP-V-94	MIZOU_T2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1425	0.3632	0.3578	Explore potential mitigation
SIERA-SP-V-95	MTN_QJCT 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4392	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-96	MTN_QUAR 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.433	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-97	NEWCSTL1 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4336	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-98	NEWCSTL2 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4432	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-99	NEWCSTLE 115kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.4336	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-100	PLCRVLB2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1413	0.3634	0.358	Explore potential mitigation
SIERA-SP-V-101	PLCRVLB3 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1412	0.3632	0.3578	Explore potential mitigation
SIERA-SP-V-102	PLCRVLT1 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1485	0.3905	0.3869	Explore potential mitigation
SIERA-SP-V-103	PLCRVLT2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1414	0.3637	0.3583	Explore potential mitigation
SIERA-SP-V-104	PLSNT GR 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	>0.9	0.8479	0.8755	Explore potential mitigation
SIERA-SP-V-105	ROLLNSTP 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8343	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-106	SHADYGLN 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8296	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-107	SHPRING1 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1575	0.3965	0.3935	Explore potential mitigation

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ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-108	SHPRING2 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1522	0.3689	0.3643	Explore potential mitigation
SIERA-SP-V-109	SIERRAPI 60kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	>0.9	0.8098	0.8418	Explore potential mitigation
SIERA-SP-V-110	SPAULDNG 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8891	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-111	SPICAMIN 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	0.1382	0.3789	0.3744	Explore potential mitigation
SIERA-SP-V-112	TAMARACK 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8897	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-113	ULTRA JT 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	>0.9	0.86	0.8865	Explore potential mitigation
SIERA-SP-V-114	ULTR-RCK 115kV	C2-3_GOLDHILL 230 kV Bus 1 and 2 - CB 202 Failure	C2	CB	>0.9	0.863	0.8894	Explore potential mitigation
SIERA-SP-V-115	WEMR SWS 60kV	C2-4_GOLDHILL 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	CB	0.8251	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-116	CPM 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.4242	0.4075	Explore potential mitigation
SIERA-SP-V-117	DRUM 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.827	0.8313	Explore potential mitigation
SIERA-SP-V-118	FLINT 115kV	B2_36_Drum - Higgins 115 kV Line & B2_19_Placer - Gold Hill 115 kV Line No. 1	C3	N-1-1	0.8982	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-119	FLINT 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.5922	0.5797	Explore potential mitigation
SIERA-SP-V-120	OXBOW 60kV	B1_18_ROLLINSF 6.60 Unit ID 1 & B1_21_OXBOW F 9.11 Unit ID 1	C3	N-1-1	0.879	0.8825	0.8834	Explore potential mitigation
SIERA-SP-V-121	AUBURN 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.6283	0.6179	Explore potential mitigation

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ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-122	FLINT1 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.5913	0.5788	Explore potential mitigation
SIERA-SP-V-123	FLINT2 115kV	B2_36_Drum - Higgins 115 kV Line & B2_19_Placer - Gold Hill 115 kV Line No. 1	C3	N-1-1	0.8983	>0.9	>0.9	Explore potential mitigation
SIERA-SP-V-124	FLINT2 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.5924	0.5799	Explore potential mitigation
SIERA-SP-V-125	HALSEY 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.6266	0.6156	Explore potential mitigation
SIERA-SP-V-126	PENRYN 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.6032	0.5892	Explore potential mitigation
SIERA-SP-V-127	PLACER 115kV	B2_36_Drum - Higgins 115 kV Line & B2_19_Placer - Gold Hill 115 kV Line No. 1	C3	N-1-1	0.8918	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-128	PLACER 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.6093	0.5972	Explore potential mitigation
SIERA-SP-V-129	SUMMIT 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.8694	0.8978	Explore potential mitigation
SIERA-SP-V-130	TAYLOR 60kV	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	0.8238	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-131	ATLANTC 230kV	B2_6_Rio Oso - Atlantic 230 kV Line & B2_10_Atlantic - Gold Hill 230 kV Line	C3	N-1-1	0.8292	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-132	ATLANTI 60kV	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	0.8277	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-133	CPM TAP 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.4242	0.4075	Explore potential mitigation

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					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-134	DEL MAR 60kV	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	0.8033	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-135	DEL MAR 60kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.8959	0.8898	Explore potential mitigation
SIERA-SP-V-136	ELDORAD 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.3964	0.3792	Explore potential mitigation
SIERA-SP-V-137	HIGGINS 115kV	B2_19_Placer - Gold Hill 115 kV Line No. 1 & B2_36_Drum - Higgins 115 kV Line	C3	N-1-1	0.882	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-138	HIGGINS 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.667	0.6572	Explore potential mitigation
SIERA-SP-V-139	HORSHE1 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.4789	0.4632	Explore potential mitigation
SIERA-SP-V-140	HORSHE2 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.4911	0.4762	Explore potential mitigation
SIERA-SP-V-141	PEAS RG 60kV	B1_25_GRNLEAF2 13.80 Unit ID 1 & B2_44_Pease - Marysville - Harter 60 kV Line	C3	N-1-1	0.8998	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-142	ROCKLIN 60kV	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	0.8222	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-143	ROLLINS 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B1_18_ROLLINSF 6.60 Unit ID 1	C3	N-1-1	>0.9	0.8815	0.8971	Explore potential mitigation
SIERA-SP-V-144	SHPRING 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.3853	0.3681	Explore potential mitigation

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					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-145	APLHTAP1 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.3973	0.3803	Explore potential mitigation
SIERA-SP-V-146	APLHTAP2 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.3862	0.3689	Explore potential mitigation
SIERA-SP-V-147	APPLE HL 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.3957	0.3786	Explore potential mitigation
SIERA-SP-V-148	ATLANTIC 115kV	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	0.8516	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-149	ATLANTIC 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.8983	0.8977	Explore potential mitigation
SIERA-SP-V-150	BELL PGE 115kV	B2_19_Placer - Gold Hill 115 kV Line No. 1 & B2_20_Placer - Gold Hill 115 kV Line No. 2	C3	N-1-1	0.8783	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-151	BELL PGE 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.6205	0.6089	Explore potential mitigation
SIERA-SP-V-152	BONNIE N 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.8121	0.8203	Explore potential mitigation
SIERA-SP-V-153	BOWMN PH 60kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.8589	0.8683	Explore potential mitigation
SIERA-SP-V-154	BOWMN TP 60kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.8458	0.8553	Explore potential mitigation
SIERA-SP-V-155	BRUNSWCK 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.898	0.8958	Explore potential mitigation

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					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-156	CAPEHORN 60kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.7845	0.8004	Explore potential mitigation
SIERA-SP-V-157	CHCGO PK 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.7867	0.7816	Explore potential mitigation
SIERA-SP-V-158	CISCO GR 60kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.86	0.8823	Explore potential mitigation
SIERA-SP-V-159	CISCOTAP 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.8597	0.8819	Explore potential mitigation
SIERA-SP-V-160	CLRKSVLE 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.4026	0.3852	Explore potential mitigation
SIERA-SP-V-161	CLRKSVLT 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.423	0.4062	Explore potential mitigation
SIERA-SP-V-162	COLFAXJT 60kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.7845	0.8006	Explore potential mitigation
SIERA-SP-V-163	CPEHRNTP 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B1_18_ROLLINSF 6.60 Unit ID 1	C3	N-1-1	>0.9	0.883	0.8985	Explore potential mitigation
SIERA-SP-V-164	DIMOND_1 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.4134	0.3964	Explore potential mitigation
SIERA-SP-V-165	DIMOND_2 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.3787	0.3614	Explore potential mitigation
SIERA-SP-V-166	DMND SPR 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.3784	0.361	Explore potential mitigation

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					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-167	DRUM 1M 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.8085	0.8134	Explore potential mitigation
SIERA-SP-V-168	DRUM 2M 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.8085	0.8135	Explore potential mitigation
SIERA-SP-V-169	DTCH FL1 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.828	0.825	Explore potential mitigation
SIERA-SP-V-170	DTCH FL2 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.8852	0.8841	Explore potential mitigation
SIERA-SP-V-171	E.NICOLS 115kV	B1_1_COLGATE1 13.80 Unit ID 1 & B2_29_East Nicolaus - Rio Oso 115 kV Line	C3	N-1-1	>0.9	>0.9	0.8995	Explore potential mitigation
SIERA-SP-V-172	ENVRO_HY 60kV	B1_21_OXBOW F 9.11 Unit ID 1 & B2_49_Colgate-Grass Valley 60 kV Line	C3	N-1-1	0.8983	0.8997	0.8938	Explore potential mitigation
SIERA-SP-V-173	FORST HL 60kV	B1_18_ROLLINSF 6.60 Unit ID 1 & B1_21_OXBOW F 9.11 Unit ID 1	C3	N-1-1	0.8789	0.8824	0.8833	Explore potential mitigation
SIERA-SP-V-174	GOLD HLL 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.4544	0.4366	Explore potential mitigation
SIERA-SP-V-175	GOLDHILL 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.4303	0.4137	Explore potential mitigation
SIERA-SP-V-176	GRSS VLY 60kV	B2_49_Colgate-Grass Valley 60 kV Line & B1_18_ROLLINSF 6.60 Unit ID 1	C3	N-1-1	0.8965	0.8959	0.8881	Explore potential mitigation
SIERA-SP-V-177	HAYPRESS 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.8589	0.8683	Explore potential mitigation
SIERA-SP-V-178	HORSESHE 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.4789	0.4632	Explore potential mitigation

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					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-179	LIMESTNE 60kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.4326	0.4152	Explore potential mitigation
SIERA-SP-V-180	MIZOU_T1 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.4111	0.3941	Explore potential mitigation
SIERA-SP-V-181	MIZOU_T2 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.3792	0.3619	Explore potential mitigation
SIERA-SP-V-182	MTN_QJCT 60kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.627	0.6164	Explore potential mitigation
SIERA-SP-V-183	MTN_QUAR 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.6212	0.6104	Explore potential mitigation
SIERA-SP-V-184	NEWCSTL1 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.5546	0.541	Explore potential mitigation
SIERA-SP-V-185	NEWCSTL2 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.5588	0.5456	Explore potential mitigation
SIERA-SP-V-186	NEWCSTLE 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.5549	0.5413	Explore potential mitigation
SIERA-SP-V-187	PLCRVLB2 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.3793	0.3621	Explore potential mitigation
SIERA-SP-V-188	PLCRVLB3 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.3791	0.3619	Explore potential mitigation
SIERA-SP-V-189	PLCRVLT1 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.4088	0.3918	Explore potential mitigation

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					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-190	PLCRVLT2 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.3797	0.3624	Explore potential mitigation
SIERA-SP-V-191	PLSNT GR 115kV	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	0.8625	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-192	ROLLNSTP 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B1_18_ROLLINSF 6.60 Unit ID 1	C3	N-1-1	>0.9	0.8815	0.8971	Explore potential mitigation
SIERA-SP-V-193	SHADYGLN 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B1_18_ROLLINSF 6.60 Unit ID 1	C3	N-1-1	>0.9	0.8815	0.8971	Explore potential mitigation
SIERA-SP-V-194	SHPRING1 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.4155	0.3986	Explore potential mitigation
SIERA-SP-V-195	SHPRING2 115kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.3859	0.3686	Explore potential mitigation
SIERA-SP-V-196	SIERRAPI 60kV	B2_6_Rio Oso - Atlantic 230 kV Line & B2_10_Atlantic - Gold Hill 230 kV Line	C3	N-1-1	0.8041	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-197	SIERRAPI 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.8958	0.8897	Explore potential mitigation
SIERA-SP-V-198	SPAULDNG 60kV	B3_8_Goldhill #2 230/115 kV Transformer & B3_7_Goldhill #1 230/115 kV Transformer	C3	N-1-1	>0.9	0.8461	0.8561	Explore potential mitigation
SIERA-SP-V-199	SPICAMIN 115kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.3959	0.3789	Explore potential mitigation
SIERA-SP-V-200	TAMARACK 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B3_8_Goldhill #2 230/115 kV Transformer	C3	N-1-1	>0.9	0.8627	0.8869	Explore potential mitigation
SIERA-SP-V-201	ULTRA JT 115kV	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	0.8708	>0.9	>0.9	Short term: Action Plan

Study Area: **PG&E Central Valley Sierra - Summer Peak**

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
SIERA-SP-V-202	ULTR-RCK 115kV	B2_10_Atlantic - Gold Hill 230 kV Line & B2_6_Rio Oso - Atlantic 230 kV Line	C3	N-1-1	0.8738	>0.9	>0.9	Short term: Action Plan
SIERA-SP-V-203	WEMR SWS 60kV	B3_7_Goldhill #1 230/115 kV Transformer & B1_18_ROLLINSF 6.60 Unit ID 1	C3	N-1-1	>0.9	0.8716	0.8897	Explore potential mitigation
SIERA-SP-V-204	PLACER 115kV	C5_19_Placer-Gold Hill No. 1 115 kV Line & Placer-Gold Hill No.	C5	DCTL	0.8798	>0.9	>0.9	Short term: Action Plan

Study Area: **PG&E Central Valley Sierra - Spring Peak**

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					N/A	2019 Spring Peak	N/A	
SIERA-WP-V-1	E.NICOLS 115kV	B2_29_East Nicolaus - Rio Oso 115 kV Line & B2_15_Palermo-Nicolaus 115 kV Line	C3	N-1-1		0.865		Explore potential mitigation

Study Area: **PG&E Central Valley Sierra - Summer Off-Peak & Summer Light Load**

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Off-Peak	2019 Summer Light Load	N/A	
SIERA-NP-V-1	PEAS RG 60kV	C1-9_BUS FAULT AT 32200 PEASE 115.00	C1	Bus	0.8425	>0.95		Dispatch local generation or voltage support
SIERA-NP-V-2	PEASE 115kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.7885	0.8728		Dispatch local generation or voltage support
SIERA-NP-V-3	GLEAF2 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.8302	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-4	HARTER 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.8288	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-5	ENCINAL 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.8451	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-6	MRYSVLE 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.8257	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-7	PEAS RG 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.7726	0.8539		Dispatch local generation or voltage support
SIERA-NP-V-8	PEASETP 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.8303	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-9	ALMENDRA 60kV	B2_26_Pease - Rio Oso 115 kV Line & B2_25_Palermo - Pease 115 kV Line	C3	N-1-1	0.8322	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-10	ENCL TAP 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.8454	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-11	GLEAF2TP 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.8302	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-12	LIVE OAK 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.851	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-13	MRYSVLLE 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.8257	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-14	YBA CTYJ 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.8303	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-15	YUBACITY 60kV	B2_25_Palermo - Pease 115 kV Line & B2_26_Pease - Rio Oso 115 kV Line	C3	N-1-1	0.829	>0.90		Dispatch local generation or voltage support
SIERA-NP-V-16	PEASE 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8325	>0.90		Dispatch local generation or voltage support

Study Area: **PG&E Central Valley Sierra - Summer Off-Peak & Summer Light Load**

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Off-Peak	2019 Summer Light Load	N/A	
SIERA-NP-V-17	PEASE 115kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.7904	0.8731		Explore potential mitigation
SIERA-NP-V-18	GLEAF2 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8321	>0.90		Short term: Action Plan
SIERA-NP-V-19	HARTER 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8308	>0.90		Short term: Action Plan
SIERA-NP-V-20	ENCINAL 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8469	>0.90		Short term: Action Plan
SIERA-NP-V-21	MRYSVLE 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8277	>0.90		Short term: Action Plan
SIERA-NP-V-22	PEAS RG 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.7744	0.8542		Explore potential mitigation
SIERA-NP-V-23	PEASETP 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8323	>0.90		Short term: Action Plan
SIERA-NP-V-24	ALMENDRA 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8323	>0.90		Short term: Action Plan
SIERA-NP-V-25	ENCL TAP 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8472	>0.90		Short term: Action Plan
SIERA-NP-V-26	GLEAF2TP 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8322	>0.90		Short term: Action Plan
SIERA-NP-V-27	LIVE OAK 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8528	>0.90		Short term: Action Plan
SIERA-NP-V-28	MRYSVLLE 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8277	>0.90		Short term: Action Plan
SIERA-NP-V-29	YBA CTYJ 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8323	>0.90		Short term: Action Plan
SIERA-NP-V-30	YUBACITY 60kV	C5_20_Palermo-Pease 115 kV Line & Pease-Rio Oso 115 kV Line	C5	DCTL	0.8309	>0.90		Short term: Action Plan

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Transient Stability

ID	Contingency	Category	Category Description	Transient Stability Performance			Potential Mitigation Solutions
				2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	

No transient stability concerns identified.

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)			Potential Mitigation Solutions
				2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	

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

Study Area: **PG&E Central Valley Sierra - Spring Peak**

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)			Potential Mitigation Solutions
				N/A	2019 Spring Peak	N/A	

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

Study Area: **PG&E Central Valley Sierra - Summer Off-Peak & Summer Light Load**

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)			Potential Mitigation Solutions
				2016 Summer Off-Peak	2019 Summer Light Load	N/A	

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

Study Area: **PG&E Central Valley Sierra - Summer Peak**

Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)			Potential Mitigation Solutions
		2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	

No single source substation with more than 100 MW Load

Study Area: **PG&E Central Valley Sierra - Spring Peak**

Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)			Potential Mitigation Solutions
		N/A	2019 Spring Peak	N/A	

No single source substation with more than 100 MW Load

Study Area: **PG&E Central Valley Sierra - Summer Off-Peak & Summer Light Load**

Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)			Potential Mitigation Solutions
		2016 Summer Off-Peak	2019 Summer Light Load	N/A	

No single source substation with more than 100 MW Load