

| Overloaded Facility | Contingency (All and Worst P6) | Category | Category Description | Loading % (Baseline Scenarios) | | | | | Loading % (Sensitivity Scenarios) | | | | Project & Potential Mitigation Solutions |
|---|--|----------|------------------------------|--------------------------------|------------------|------------------|----------------------|----------------------|-----------------------------------|---------------------------|---------------------------------------|---------------------|--|
| | | | | 2024 Summer Peak | 2027 Summer Peak | 2032 Summer Peak | 2024 Spring Off-Peak | 2027 Spring Off-Peak | 2035 ATE | 2027 SP High CEC Forecast | 2024 SP Heavy Renewable & Min Gas Gen | 2024 OP Sensitivity | |
| 31522 COTWD_2D 115 31466 JESSUP1 115 1 1 | COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2 | P6 | N-1-1 | <100 | 111 | 166 | <100 | <100 | <100 | 115 | <100 | <100 | Operating solution |
| Benton-Deschutes 60 kV Line | P2-4:A3:22:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV | P2-4 | Bus Tie Breaker Fault | 38 | 48 | 116 | 12 | 147 | 104 | 54 | 72 | 56 | Continue to monitor |
| Benton-Deschutes 60 kV Line | P5-5(DC):A3:3:_Station | p5 | Non-Redundant Battery Supply | NConv | NConv | NConv | NConv | NConv | NConv | NConv | 20 | 74 | Install redundant battery supply |
| Benton-Deschutes 60 kV Line | P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY) | p5 | Non-Redundant Relay | NConv | NConv | NConv | NConv | NConv | NConv | NConv | 20 | 76 | Install Redundant Relay |
| Caribou No.11 230/115/60 kV Transformer | P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (BELDENTP-TABLE MTN D) | P2-1 | Line Section w/o Fault | NConv | NConv | NConv | NConv | NConv | NConv | NConv | NConv | NConv | Existing RAS |
| Caribou No.11 230/115/60 kV Transformer | P2-2:A3:28:_TABLE MTN D 230KV SECTION 1D | P2-2 | Bus | NConv | NConv | NConv | NConv | NConv | NConv | NConv | NConv | NConv | Existing RAS |
| Caribou No.11 230/115/60 kV Transformer | P2-3:A3:27:_TABLE MTN D - 1D 230KV & LINE | P2-3 | Non-Bus Tie Breaker Fault | NConv | NConv | NConv | NConv | NConv | <100 | NConv | NConv | NConv | Existing RAS |
| Caribou No.11 230/115/60 kV Transformer | P2-4:A3:23:_TABLE MTN D SECTION 1D & TABLE MTN E SECTION 1E 230KV | P2-4 | Bus Tie Breaker Fault | NConv | NConv | NConv | NConv | NConv | NConv | NConv | NConv | NConv | Existing RAS |
| Caribou No.11 230/115/60 kV Transformer | P2-4:A3:6:_TABLE MTN D 230KV - SECTION 1D & 2D | P2-4 | Bus Tie Breaker Fault | NConv | NConv | NConv | NConv | NConv | <100 | NConv | NConv | NConv | Existing RAS |
| Caribou No.11 230/115/60 kV Transformer | P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDANT RELAY) | p5 | Non-Redundant Relay | NConv | NConv | NConv | NConv | NConv | <100 | NConv | NConv | NConv | Existing RAS |
| Caribou-Plumas Jct 60 kV Line | P2-1:A3:21:_CARIBOU-TABLE MTN 230KV [4440] (BELDENTP-TABLE MTN D) | P2-1 | Line Section w/o Fault | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | NConv | Monitor future forecast |
| Caribou-Plumas Jct 60 kV Line | P2-2:A3:28:_TABLE MTN D 230KV SECTION 1D | P2-2 | Bus | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | NConv | Monitor future forecast |
| Caribou-Plumas Jct 60 kV Line | P2-4:A3:23:_TABLE MTN D SECTION 1D & TABLE MTN E SECTION 1E 230KV | P2-4 | Bus-Tie-Breaker | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | NConv | Monitor future forecast |
| Cascade-Benton-Deschute 60 kV line | P2-4:A3:22:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV | P2-4 | Bus Tie Breaker Fault | <100 | <100 | 116 | <100 | 147 | <100 | <100 | <100 | <100 | Continue to monitor |
| Cascade-Benton-Deschute 60 kV line | COTTONWOOD 230KV BUS SECTION E/G (FAILURE OF NON-REDUNDANT RELAY) | p5 | Non-Redundant Relay | NConv | NConv | NConv | NConv | NConv | <100 | NConv | <100 | <100 | Operating solution |
| Cascade-Benton-Deschute 60 kV line | COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2 | P6 | N-1-1 | 146 | 149 | 241 | <100 | 108 | <100 | 153 | <100 | <100 | Operating solution |
| Cascade-Cottonwood 115 kV Line (31459 31469) | P2-4: COTTONWD 60KV - SECTION 1D & 1E | P2-4 | Bus Tie Breaker Fault | <100 | <100 | Nconv | <100 | <100 | <100 | <100 | <100 | <100 | Continue to monitor |
| Cascade-Cottonwood 115 kV Line (31459 31469) | COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2 | P6 | N-1-1 | 116 | 110 | 170 | <100 | <100 | <100 | 116 | <100 | <100 | Operating solution |
| Cascade-Craig View 115 kV Line (Path 25) | P5-5(DC):A3:1:_Station | P5 | Non-Redundant Battery Supply | NConv | NConv | NConv | 60 | N/A | <100 | NConv | NConv | NConv | Install redundant battery supply |
| Cascade-Craig View 115 kV Line (Path 25) | P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY) | p5 | Non-Redundant Relay | NConv | NConv | NConv | NConv | N/A | <100 | NConv | 43 | 84 | Operating solution |
| Cascade-Craig View 115 kV Line (Path 25) | P5-5(DC):A3:3:_Station | p5 | Non-Redundant Battery Supply | NConv | NConv | NConv | NConv | N/A | <100 | NConv | 42 | 85 | Install redundant battery supply |
| Cascade-Deschutes 60 kV Line (31578 31592) | P2-4:A3:22:_COTWD_F2 SECTION 2F & COTWD_E2 SECTION 2E 230KV | P2-4 | Bus Tie Breaker Fault | 22 | 81 | 182 | 30 | 162 | <100 | 87 | <100 | <100 | Continue to monitor |
| Cascade-Deschutes 60 kV Line (31578 31592) | P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY) | p5 | Non-Redundant Relay | NConv | NConv | NConv | NConv | NConv | <100 | NConv | <100 | <100 | Operating solution |
| Cascade-Deschutes 60 kV Line (31578 31592) | P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDANT RELAY) | p5 | Non-Redundant Relay | NConv | 78 | NConv | NConv | 42 | <100 | 82 | NConv | NConv | Operating solution |
| Cascade-Deschutes 60 kV Line (31578 31592) | P5-5(DC):A3:1:_Station | P5 | Non-Redundant Battery Supply | NConv | NConv | NConv | 36 | 17 | <100 | NConv | NConv | NConv | Install redundant battery supply |
| Cascade-Deschutes 60 kV Line (31578 31592) | P5-5(DC):A3:24:_Station | P5 | Non-Redundant Battery Supply | 65 | 67 | NConv | 51 | 42 | <100 | 71 | 40 | 53 | Install redundant battery supply |
| Cascade-Deschutes 60 kV Line (31578 31592) | P5-5(DC):A3:3:_Station | p5 | Non-Redundant Battery Supply | NConv | NConv | NConv | NConv | NConv | <100 | NConv | 41 | 94 | Install redundant battery supply |
| Cascade-Deschutes 60 kV Line (31578 31592) | COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2 | P6 | N-1-1 | 223 | 228 | 366 | 108 | 172 | <100 | 233 | <100 | <100 | Operating solution |
| Cottonwood-Benton No.1 60 kV Line (31570 31572) | P5-5:A3:10:_COTTONWOOD 230KV BUS SECTION E/G/WAPA/F (FAILURE OF NON-REDUNDANT RELAY) | p5 | Non-Redundant Relay | NConv | NConv | NConv | NConv | NConv | <100 | NConv | <100 | <100 | Operating solution |
| Cottonwood-Benton No.1 60 kV Line (31570 31572) | P5-5(DC):A3:3:_Station | p5 | Non-Redundant Battery Supply | NConv | NConv | NConv | NConv | NConv | <100 | NConv | 18 | 43 | Install redundant battery supply |
| Cottonwood-Benton No.1 60 kV Line (31570 31572) | COTWD_E 230/60KV TB 3 & COTWD_E2 230/60KV TB 2 | P6 | N-1-1 | <100 | <100 | 148 | <100 | <100 | <100 | <100 | <100 | <100 | Continue to monitor |
| Cottonwood-Round Mountain 230 kV Line | P5-5(DC):A3:2:_Station | P5 | Non-Redundant Battery Supply | NConv | NConv | NConv | 2 | 61 | NConv | NConv | NConv | NConv | Install redundant battery supply |
| Cottonwood-Round Mountain 230 kV Line | ROUND MOUNTAIN 230KV BUS 1 & 2 SEC. E (FAILURE OF NON-REDUNDANT RELAY) | p5 | Non-Redundant Relay | NConv | NConv | NConv | NConv | NConv | <100 | NConv | NConv | NConv | Operating solution |

| Overloaded Facility | Contingency (All and Worst P6) | Category | Category Description | Loading % (Baseline Scenarios) | | | | | Loading % (Sensitivity Scenarios) | | | | Project & Potential Mitigation Solutions |
|--|--|----------|------------------------------|--------------------------------|------------------|------------------|----------------------|----------------------|-----------------------------------|---------------------------|---------------------------------------|---------------------|--|
| | | | | 2024 Summer Peak | 2027 Summer Peak | 2032 Summer Peak | 2024 Spring Off-Peak | 2027 Spring Off-Peak | 2035 ATE | 2027 SP High CEC Forecast | 2024 SP Heavy Renewable & Min Gas Gen | 2024 OP Sensitivity | |
| Delevan-Cortina 230 kV Line | P5-5(DC):A3:2:_Station | P5 | Non-Redundant Battery Supply | NConv | NConv | NConv | 58 | 6 | <100 | NConv | NConv | NConv | Install redundant battery supply |
| Delevan-Cortina 230 kV Line | P7-1:A3:4:_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines | P7 | DCTL | 102 | 106 | 123 | 59 | 12 | <100 | 107 | 47 | 59 | Operating solution |
| Glenn No.1 60 kV Line | P1-2:A3:99:_GLENN #5 60KV [8427] | P1 | N-1 | <100 | 100 | 103 | 48 | 12 | 114 | 101 | 27 | 48 | Operating solution |
| Glenn No.1 60 kV Line | P1-1:A3:56:_CSC HYDR 9.11KV GEN UNIT 1 & P1-2:A3:99:_GLENN #5 60KV [8427] | P3 | N-1/G-1 | <100 | 111 | 119 | <100 | <100 | <100 | <100 | <100 | <100 | Operating solution |
| Keswick-Cascade 60 kV Line (31564 31566) | P2-4:A3:8:_COTWDPGE 115KV - SECTION 2D & 1D | P2-4 | Bus Tie Breaker Fault | 106 | <100 | <100 | NConv | <100 | <100 | <100 | NConv | NConv | Project: Cottonwood 115 kV Bus Sectionalizing Breakers Project |
| Keswick-Cascade 60 kV Line (31564 31566) | P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDANT RELAY) | p5 | Non-Redundant Relay | NConv | 82 | NConv | NConv | 79 | NConv | 90 | NConv | NConv | Operating solution |
| Keswick-Cascade 60 kV Line (31564 31566) | P5-5(DC):A3:2:_Station | P5 | Non-Redundant Battery Supply | 45 | 46 | NConv | 39 | 65 | NConv | 53 | 43 | 37 | Install redundant battery supply |
| Keswick-Cascade 60 kV Line (31564 31566) | P6: CASCADE-COTTONWOOD 115KV [1240] & CASCADE-BENTON-DESCHUTES 60KV [6310] | P6 | N-1-1 | 163 | 161 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | Operating solution |
| Oroville-Thermalito-Table Mountain No.3 230 kV Line | P2-1:A3:29:_TABLE MTN E-THM JCT 230KV [1] NO FAULT | P2-1 | Line Section w/o Fault | 89 | 89 | 103 | 114 | 92 | 103 | 121 | 91 | 116 | Continue to monitor |
| Round Mountain 500/230 kV Bank | P5-5(DC):A3:2:_Station | P5 | Non-Redundant Battery Supply | NConv | NConv | NConv | 64 | 117 | <100 | NConv | NConv | NConv | Install redundant battery supply |
| Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498) | P2-1:A3:68:_BUTTE-SYCAMORE CREEK 115KV [1190] (CHICOTP2-BUTTE) | P2-1 | Line Section w/o Fault | 90 | 93 | 104 | 58 | 15 | <100 | 93 | 39 | 58 | Continue to monitor |
| Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498) | P2-2:A3:49:_TBLE MTN 115KV SECTION 1D | P2-2 | Bus | 86 | 89 | 104 | 51 | 9 | <100 | 89 | 41 | 51 | Table Mountain SPS recommended in 2017-2018 TPP |
| Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498) | P2-2:A3:45:_BUTTE 115KV SECTION MD | P2-2 | Bus | 90 | 93 | 104 | 58 | 15 | <100 | 93 | 39 | 58 | Continue to monitor |
| Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498) | P2-3:A3:47:_BUTTE - MD 115KV & TABLE MTN-BUTTE #1 LINE | P2-3 | Non-Bus Tie Breaker Fault | 115 | 117 | 132 | <100 | <100 | <100 | 118 | <100 | <100 | Table Mountain SPS recommended in 2017-2018 TPP |
| Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498) | P2-4:A3:12:_BUTTE 115KV - SECTION MD & ME | P2-4 | Bus Tie Breaker Fault | 93 | 96 | 108 | 58 | 15 | <100 | 96 | 39 | 58 | Continue to monitor |
| Sycamore Creek-Notre Dame-Table Mountain 115 kV Line (31497 31498) | TABLE MTN-BUTTE #2 115KV [3920] & TABLE MTN-BUTTE #1 115KV [3910] | P6 | N-1-1 | <100 | <100 | 103 | <100 | <100 | <100 | <100 | <100 | <100 | Table Mountain SPS recommended in 2017-2018 TPP |
| Table Mountain No.3 230/115 kV Transformer | P2-2:A3:28:_TABLE MTN D 230KV SECTION 1D | P2-2 | Bus | NConv | NConv | NConv | NConv | 69 | NConv | NConv | NConv | NConv | Existing RAS |
| Table Mountain No.3 230/115 kV Transformer | P2-3:A3:26:_TABLE MTN D - 1D 230KV & CARIBOU-TABLE MTN LINE | P2-3 | Non-Bus Tie Breaker Fault | 79 | NConv | NConv | 8 | 69 | NConv | NConv | 31 | 26 | Existing RAS |
| Table Mountain-Butte No.1 115 kV Line (31500 31501) | TABLE MTN-BUTTE #2 115KV [3920] & SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115KV [4314] | P6 | N-1-1 | 117 | 121 | 140 | <100 | <100 | <100 | 122 | <100 | <100 | Table Mountain SPS recommended in 2017-2018 TPP |
| Table Mountain-Butte No.1 115 kV Line (31500 31501) | P7-1:A3:4:_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines | P7 | DCTL | 117 | 121 | 140 | <100 | <100 | <100 | 122 | <100 | <100 | Table Mountain SPS recommended in 2017-2018 TPP |
| Table Mountain-Paradise 115 kV Line (31478 31494) | P2-2:A3:49:_TBLE MTN 115KV SECTION 1D | P2-2 | Bus | 89 | 93 | 109 | 51 | 9 | <100 | 93 | 45 | 51 | Continue to monitor |
| Table Mountain-Paradise 115 kV Line (31478 31494) | P2-3:A3:51:_TBLE MTN - 1D 115KV & TABLE MTN-BUTTE #1 LINE | P2-3 | Non-Bus Tie Breaker Fault | 89 | 93 | 108 | 51 | 8 | <100 | 93 | 45 | 51 | Continue to monitor |
| Table Mountain-Paradise 115 kV Line (31478 31494) | TABLE MTN-BUTTE #1 115KV [3910] & TABLE MTN-BUTTE #2 115KV [3920] | P6 | N-1-1 | <100 | <100 | 107 | <100 | <100 | <100 | <100 | <100 | <100 | Continue to monitor |
| Trinity-Keswick 60 kV Line (31556 31564) | P5-5(DC):A3:24:_Station | P5 | Non-Redundant Battery Supply | 14 | 75 | NConv | 19 | 70 | <100 | 82 | 24 | 17 | Install redundant battery supply |
| Trinity-Keswick 60 kV Line (31556 31564) | P1-2:A3:70:_CASCADE-BENTON-DESCHUTES 60KV [6310] | P6 | N-1-1 | 158 | 160 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | Operating solution |

| Substation | Contingency (All and Worst P6) | Category | Category Description | High/Low Voltage | Voltage PU (Baseline Scenarios) | | | | | Voltage PU (Sensitivity Scenarios) | | | | Project & Potential Mitigation Solutions |
|--------------------|--------------------------------|----------|----------------------|------------------|---------------------------------|------------------|------------------|----------------------|----------------------|------------------------------------|---------------------------|---------------------------------------|---------------------|---|
| | | | | | 2024 Summer Peak | 2027 Summer Peak | 2032 Summer Peak | 2024 Spring Off-Peak | 2027 Spring Off-Peak | 2035 ATE | 2027 SP High CEC Forecast | 2024 SP Heavy Renewable & Min Gas Gen | 2024 OP Sensitivity | |
| AMERESCO 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| AMERESCOTAP 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| ANITA 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| BCKS CRK 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.08 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| BELDEN 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| BELDENTP 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| BIG BAR 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.06 | <1.05 | System adjustments or voltage support if needed |
| BIGBENTP 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| BTTE CRK 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| BUTTE 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| BUTTVLLY 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| CANAL TP 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | 1.05 | <1.05 | N/A | <1.05 | <1.05 | 1.05 | System adjustments or voltage support if needed |
| CARBOU M 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| CARIBOU 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| CARIBOU 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| CEDR CRK 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | 1.06 | 1.07 | N/A | <1.05 | 1.07 | 1.06 | System adjustments or voltage support if needed |
| CHALLENGE 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | 1.06 | 1.09 | N/A | <1.05 | <1.05 | 1.05 | System adjustments or voltage support if needed |
| CHICOTP2 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| CLARK RD 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| CLOV TAP 60 kV | Basecase | P0 | Normal Condition | High | 1.05 | <1.05 | 1.05 | 1.06 | 1.07 | 1.05 | <1.05 | 1.07 | <1.05 | System adjustments or voltage support if needed |
| CNTRVLE 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| CORNING 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | 1.05 | <1.05 | N/A | <1.05 | <1.05 | 1.06 | System adjustments or voltage support if needed |
| COWCK TP 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.05 | <1.05 | System adjustments or voltage support if needed |
| CR CANAL 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | 1.05 | <1.05 | N/A | <1.05 | <1.05 | 1.05 | System adjustments or voltage support if needed |
| CRESTA 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.08 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| DE SABLE 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| DRHM JCA 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| DRHMSW45 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| ELKCREEK 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | 1.05 | System adjustments or voltage support if needed |
| FORBSTWN 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | 1.07 | 1.05 | 1.06 | 1.07 | <1.05 | 1.07 | <1.05 | System adjustments or voltage support if needed |
| FRBSTNTP 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | 1.07 | 1.05 | 1.06 | 1.07 | <1.05 | 1.07 | <1.05 | System adjustments or voltage support if needed |
| FRSTGLEN 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.07 | <1.05 | System adjustments or voltage support if needed |
| GPH-BC 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.07 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| GRIZZLY1 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.07 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| GRIZZLYT4-2 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.07 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| GROUSCRK 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.06 | <1.05 | System adjustments or voltage support if needed |
| HONC JT1 115 kV | Basecase | P0 | Normal Condition | High | 1.05 | 1.05 | <1.05 | 1.06 | 1.06 | N/A | <1.05 | 1.06 | 1.06 | System adjustments or voltage support if needed |
| HONC JT3 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | 1.05 | 1.06 | 1.06 | 1.05 | <1.05 | 1.05 | 1.05 | System adjustments or voltage support if needed |
| HONCUT 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | 1.05 | 1.06 | 1.06 | 1.05 | <1.05 | 1.05 | 1.05 | System adjustments or voltage support if needed |
| HYAMPOM 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.06 | <1.05 | System adjustments or voltage support if needed |
| HYMPOMJT 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.06 | <1.05 | System adjustments or voltage support if needed |
| JACINTO 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | 1.06 | <1.05 | System adjustments or voltage support if needed |
| KANAKAUT 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | 1.07 | 1.05 | 1.06 | 1.07 | <1.05 | 1.07 | <1.05 | System adjustments or voltage support if needed |
| KILARC 60 kV | Basecase | P0 | Normal Condition | High | 1.05 | <1.05 | 1.05 | 1.06 | 1.07 | 1.05 | <1.05 | 1.07 | 1.06 | System adjustments or voltage support if needed |
| MALACHA1 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.08 | <1.05 | System adjustments or voltage support if needed |
| MALACHA2 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.07 | <1.05 | System adjustments or voltage support if needed |
| MCNE JCT 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| NDAME J 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| NEO REDT 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | 1.05 | <1.05 | N/A | <1.05 | <1.05 | 1.05 | System adjustments or voltage support if needed |
| NORD 1 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| NOTRDAME 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| OLSEN JCT 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | 1.05 | 1.06 | 1.07 | 1.05 | <1.05 | 1.07 | 1.06 | System adjustments or voltage support if needed |
| OLSENHYDRO 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | 1.05 | 1.06 | 1.07 | 1.05 | <1.05 | 1.07 | 1.06 | System adjustments or voltage support if needed |
| OWID 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | 1.07 | 1.05 | 1.06 | 1.07 | <1.05 | 1.07 | <1.05 | System adjustments or voltage support if needed |

2022-2023 ISO Reliability Assessment - Study Results

Study Area: PG&E North Valley

High/Low Voltages



| Substation | Contingency (All and Worst P6) | Category | Category Description | High/Low Voltage | Voltage PU (Baseline Scenarios) | | | | | Voltage PU (Sensitivity Scenarios) | | | | Project & Potential Mitigation Solutions |
|--------------------|---|----------|----------------------|------------------|---------------------------------|------------------|------------------|----------------------|----------------------|------------------------------------|---------------------------|---------------------------------------|---------------------|---|
| | | | | | 2024 Summer Peak | 2027 Summer Peak | 2032 Summer Peak | 2024 Spring Off-Peak | 2027 Spring Off-Peak | 2035 ATE | 2027 SP High CEC Forecast | 2024 SP Heavy Renewable & Min Gas Gen | 2024 OP Sensitivity | |
| PALERMO 115 kV | Basecase | P0 | Normal Condition | High | 1.05 | 1.05 | 1.06 | 1.06 | 1.06 | 1.06 | <1.05 | 1.06 | 1.05 | System adjustments or voltage support if needed |
| PALERMO 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| PARADISE 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| POE 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.07 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| RASN JNT 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | 1.05 | <1.05 | N/A | <1.05 | <1.05 | 1.05 | System adjustments or voltage support if needed |
| RED B JT 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | 1.05 | <1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| RED BLFF 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | 1.05 | <1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| RK C JT1 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| RK C JT2 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.08 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| ROCKCK 1 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| ROCKCK 2 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.08 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| SLYCREEK 115 kV | Basecase | P0 | Normal Condition | High | 1.05 | 1.05 | 1.08 | 1.05 | 1.06 | 1.08 | <1.05 | 1.08 | 1.05 | System adjustments or voltage support if needed |
| SYCAMORE 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| TABLE MTN D 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| TABLE MTN E 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.06 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| TAP 65 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.06 | <1.05 | System adjustments or voltage support if needed |
| TBL MT2M 230 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| TBLE MTN 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | 1.05 | N/A | <1.05 | <1.05 | <1.05 | System adjustments or voltage support if needed |
| TKO TAP 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.05 | <1.05 | System adjustments or voltage support if needed |
| TRINITY 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.06 | <1.05 | System adjustments or voltage support if needed |
| TRINITY 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.06 | <1.05 | System adjustments or voltage support if needed |
| TYLER 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | 1.05 | <1.05 | N/A | <1.05 | <1.05 | 1.05 | System adjustments or voltage support if needed |
| WHITMORE 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | 1.06 | 1.06 | N/A | <1.05 | 1.07 | 1.05 | System adjustments or voltage support if needed |
| WILDWOOD 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | 1.07 | <1.05 | System adjustments or voltage support if needed |
| WILLOWS 60 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | <1.05 | <1.05 | <1.05 | N/A | <1.05 | <1.05 | 1.05 | System adjustments or voltage support if needed |
| WOODLEAFJCT 115 kV | Basecase | P0 | Normal Condition | High | <1.05 | <1.05 | 1.08 | 1.05 | 1.06 | 1.08 | <1.05 | 1.08 | 1.05 | System adjustments or voltage support if needed |
| WYANDJT3 115 kV | Basecase | P0 | Normal Condition | High | 1.05 | 1.05 | 1.06 | 1.06 | 1.06 | 1.05 | <1.05 | 1.06 | 1.06 | System adjustments or voltage support if needed |
| WYANDTTE 115 kV | Basecase | P0 | Normal Condition | High | 1.05 | 1.05 | 1.06 | 1.06 | 1.06 | 1.05 | <1.05 | 1.06 | 1.06 | System adjustments or voltage support if needed |
| CANAL TP 60 kV | P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1 | P1 | N-1 | Low | 0.90 | 1.00 | 1.01 | 1.00 | 1.05 | N/A | 0.99 | 0.93 | 1.00 | Project: Tyler 60kV capacitor |
| CR CANAL 60 kV | P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1 | P1 | N-1 | Low | 0.89 | 1.00 | 1.01 | 1.00 | 1.05 | N/A | 0.99 | 0.93 | 1.00 | Project: Tyler 60kV capacitor |
| NEO REDT 60 kV | P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1 | P1 | N-1 | Low | 0.90 | 1.00 | 1.01 | 1.00 | 1.05 | N/A | 0.99 | 0.93 | 1.00 | Project: Tyler 60kV capacitor |
| RASN JNT 60 kV | P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1 | P1 | N-1 | Low | 0.90 | 1.00 | 1.01 | 1.00 | 1.05 | N/A | 0.99 | 0.93 | 1.00 | Project: Tyler 60kV capacitor |
| TYLER 60 kV | P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1 | P1 | N-1 | Low | 0.90 | 1.00 | 1.01 | 1.00 | 1.05 | N/A | 1.00 | 0.93 | 1.00 | Project: Tyler 60kV capacitor |
| CHESTER 60 kV | P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440] | P1 | N-1 | Low | 0.85 | NConv | NConv | 0.91 | 0.90 | N/A | NConv | 0.85 | 0.91 | Existing RAS |
| COLLINSPINE 60 kV | P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440] | P1 | N-1 | Low | 0.84 | NConv | NConv | 0.91 | 0.90 | N/A | NConv | 0.84 | 0.91 | Existing RAS |
| COLLINSPNJCT 60 kV | P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440] | P1 | N-1 | Low | 0.85 | NConv | NConv | 0.91 | 0.90 | N/A | NConv | 0.85 | 0.91 | Existing RAS |
| HMLTN BR 60 kV | P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440] | P1 | N-1 | Low | 0.89 | NConv | NConv | 0.95 | 0.94 | N/A | NConv | 0.89 | 0.94 | Existing RAS |
| ULTR WSD 60 kV | P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440] | P1 | N-1 | Low | 0.89 | NConv | NConv | 0.95 | 0.94 | N/A | NConv | 0.89 | 0.94 | Existing RAS |
| WESTWOOD 60 kV | P1-2:A3:24:_CARIBOU-TABLE MTN 230KV [4440] | P1 | N-1 | Low | 0.89 | NConv | NConv | 0.94 | 0.94 | N/A | NConv | 0.89 | 0.94 | Existing RAS |
| KESWICK 60 kV | P1-2:A3:71:_KESWICK-CASCADE 60KV [7260] MOAS OPENED ON CASCADE_STLLWATR | P1 | N-1 | Low | 0.97 | 0.96 | 0.89 | 0.98 | 1.02 | N/A | 0.95 | 1.05 | 0.98 | Continue to monitor |
| STLLWATR 60 kV | P1-2:A3:71:_KESWICK-CASCADE 60KV [7260] MOAS OPENED ON CASCADE_STLLWATR | P1 | N-1 | Low | 0.96 | 0.95 | 0.88 | 0.98 | 1.02 | N/A | 0.94 | 1.04 | 0.97 | Continue to monitor |

| Substation | Contingency (All and Worst P6) | Category | Category Description | High/Low Voltage | Voltage PU (Baseline Scenarios) | | | | | Voltage PU (Sensitivity Scenarios) | | | | Project & Potential Mitigation Solutions |
|-------------------|---|----------|---------------------------|------------------|---------------------------------|------------------|------------------|----------------------|----------------------|------------------------------------|---------------------------|---------------------------------------|---------------------|--|
| | | | | | 2024 Summer Peak | 2027 Summer Peak | 2032 Summer Peak | 2024 Spring Off-Peak | 2027 Spring Off-Peak | 2035 ATE | 2027 SP High CEC Forecast | 2024 SP Heavy Renewable & Min Gas Gen | 2024 OP Sensitivity | |
| ANTLER 60 kV | P2-2:A3:37:_ CASCADE 115KV SECTION MA | P2-2 | Bus Section | Low | 0.93 | 0.92 | 0.90 | 0.94 | 1.01 | 0.89 | 0.92 | 0.99 | 0.94 | Continue to monitor |
| BIG MDWS 60 kV | P2-3:A3:21:_ CARIBOU - 1D 230KV & CARIBOU-TABLE MTN LINE | P2-3 | Non-Bus Tie Breaker Fault | Low | 0.90 | NConv | NConv | 0.95 | 0.95 | N/A | NConv | 0.90 | 0.95 | Existing RAS |
| CHESTER 60 kV | P2-1:A3:19:_ CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP) | P2-1 | Line Section w/o Fault | Low | 0.85 | NConv | NConv | >0.9 | >0.9 | N/A | NConv | 0.85 | >0.9 | Existing RAS |
| COLLINSPINE 60 kV | P2-1:A3:19:_ CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP) | P2-1 | Line Section w/o Fault | Low | 0.84 | NConv | NConv | >0.9 | 0.90 | N/A | NConv | 0.84 | >0.9 | Existing RAS |
| HMLTN BR 60 kV | P2-1:A3:19:_ CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP) | P2-1 | Line Section w/o Fault | Low | 0.89 | NConv | NConv | >0.9 | >0.9 | N/A | NConv | 0.89 | >0.9 | Existing RAS |
| PPL 60 kV | P2-2:A3:37:_ CASCADE 115KV SECTION MA | P2-2 | Bus Section | Low | 0.93 | 0.92 | 0.90 | 0.94 | 1.01 | 0.89 | 0.92 | 0.99 | 0.94 | Continue to monitor |
| ULTR WSD 60 kV | P2-1:A3:19:_ CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP) | P2-1 | Line Section w/o Fault | Low | 0.89 | NConv | NConv | >0.9 | >0.9 | N/A | NConv | 0.89 | >0.9 | Existing RAS |
| WESTWOOD 60 kV | P2-1:A3:19:_ CARIBOU-TABLE MTN 230KV [4440] (CARIBOU-BELDENTP) | P2-1 | Line Section w/o Fault | Low | 0.89 | NConv | NConv | 0.94 | 0.94 | N/A | NConv | 0.89 | 0.94 | Existing RAS |
| CASCADE 115kV | P1-1:A3:10:_ NEO REDB 13.80KV GEN UNIT 1 & P1-2:A3:42:_ CASCADE-COTTONWOOD 115KV [1240] | P3 | N-1/G-1 | Low | 0.89 | >0.9 | >0.9 | >0.9 | >0.9 | N/A | >0.9 | >0.9 | >0.9 | Install reactive support or SPS (Cascade 115kV Area) |
| NEO REDT 60kV | P1-1:A3:10:_ NEO REDB 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3 | P3 | N-1/G-1 | Low | 0.89 | >0.9 | >0.9 | >0.9 | >0.9 | N/A | >0.9 | >0.9 | >0.9 | Project: Tyler 60kV capacitor |
| RASN JNT 60kV | P1-1:A3:10:_ NEO REDB 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3 | P3 | N-1/G-1 | Low | 0.89 | >0.9 | >0.9 | >0.9 | >0.9 | N/A | >0.9 | >0.9 | >0.9 | Project: Tyler 60kV capacitor |
| TYLER 60kV | P1-1:A3:10:_ NEO REDB 13.80KV GEN UNIT 1 & P1-3:A3:13:_COTWD_E 230/60KV TB 3 | P3 | N-1/G-1 | Low | 0.89 | >0.9 | >0.9 | >0.9 | >0.9 | N/A | >0.9 | >0.9 | >0.9 | Project: Tyler 60kV capacitor |
| CASCADE 115kV | P1-1:A3:47:_ VOLTA1-2 9.11KV GEN UNIT 1 & P1-2:A3:42:_ CASCADE-COTTONWOOD 115KV [1240] | P3 | N-1/G-1 | Low | >0.9 | 0.89 | >0.9 | >0.9 | >0.9 | N/A | 0.88 | >0.9 | >0.9 | Install reactive support or SPS (Cascade 115kV Area) |
| LS ML JT 60kV | P1-1:A3:47:_ VOLTA1-2 9.11KV GEN UNIT 1 & P1-2:A3:81:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT RED BLFF | P3 | N-1/G-1 | Low | >0.9 | >0.9 | 0.89 | >0.9 | >0.9 | N/A | >0.9 | >0.9 | >0.9 | Continue to monitor |
| VINA 60kV | P1-1:A3:47:_ VOLTA1-2 9.11KV GEN UNIT 1 & P1-2:A3:81:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT RED BLFF | P3 | N-1/G-1 | Low | >0.9 | >0.9 | 0.88 | >0.9 | >0.9 | N/A | >0.9 | >0.9 | >0.9 | Continue to monitor |
| RED BLFF 60kV | P1-1:A3:49:_ SOUTH G 4.16KV GEN UNIT 1 & P1-2:A3:81:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT RED BLFF | P3 | N-1/G-1 | Low | >0.9 | >0.9 | 0.90 | >0.9 | >0.9 | N/A | >0.9 | >0.9 | >0.9 | Continue to monitor |

| Substation | Contingency (All and Worst P6) | Category | Category Description | High/Low Voltage | Voltage PU (Baseline Scenarios) | | | | | Voltage PU (Sensitivity Scenarios) | | | | Project & Potential Mitigation Solutions |
|-------------------|---|----------|------------------------------|------------------|---------------------------------|------------------|------------------|----------------------|----------------------|------------------------------------|---------------------------|---------------------------------------|---------------------|--|
| | | | | | 2024 Summer Peak | 2027 Summer Peak | 2032 Summer Peak | 2024 Spring Off-Peak | 2027 Spring Off-Peak | 2035 ATE | 2027 SP High CEC Forecast | 2024 SP Heavy Renewable & Min Gas Gen | 2024 OP Sensitivity | |
| LS MLNSJ 60kV | P1-1:A3:79:_COLEMAN 6.60KV GEN UNIT 1 & P1-2:A3:81:_COTTONWOOD-RED BLUFF 60KV [6660] MOAS OPENED ON RED B JT RED BLFF | P3 | N-1/G-1 | Low | >0.9 | >0.9 | 0.89 | >0.9 | >0.9 | N/A | >0.9 | >0.9 | >0.9 | Continue to monitor |
| KESWICK 60 kV | P5-5(DC):A3:15:_Station | P5 | Non-Redundant Battery Supply | Low | 0.97 | 0.96 | 0.89 | 0.99 | 1.02 | 0.88 | 0.95 | 1.05 | 0.98 | Install station back-up battery |
| STLLWATR 60 kV | P5-5(DC):A3:15:_Station | P5 | Non-Redundant Battery Supply | Low | 0.96 | 0.95 | 0.88 | 0.98 | 1.02 | 0.86 | 0.94 | 1.05 | 0.97 | Install station back-up battery |
| COLLINSPIKE 60 kV | P5-5(DC):A3:2:_Station | P5 | Non-Redundant Battery Supply | Low | NConv | NConv | NConv | >0.9 | 0.90 | N/A | NConv | NConv | NConv | Install station back-up battery |
| ANTLER 60 kV | P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY) | P5 | Non-Redundant Relay | Low | NConv | 0.89 | NConv | NConv | >0.9 | N/A | 0.88 | NConv | NConv | Operating solution |
| CASCADE 115 kV | P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY) | P5 | Non-Redundant Relay | Low | NConv | 0.86 | NConv | NConv | >0.9 | N/A | 0.85 | NConv | NConv | Operating solution |
| MTN GATE 60 kV | P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY) | P5 | Non-Redundant Relay | Low | NConv | 0.89 | NConv | NConv | >0.9 | N/A | 0.88 | NConv | NConv | Operating solution |
| PPL 60 kV | P5-5:A3:11:_COTTONWOOD 115KV BUS 1/BUS 2 (FAILURE OF NON-REDUNDENT RELAY) | P5 | Non-Redundant Relay | Low | NConv | 0.89 | NConv | NConv | >0.9 | N/A | 0.88 | NConv | NConv | Operating solution |
| CHESTER 60 kV | P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY) | P5 | Non-Redundant Relay | Low | 0.85 | NConv | 0.90 | >0.9 | >0.9 | 0.90 | NConv | 0.84 | >0.9 | Install Redundant Relay |
| COLLINSPIKE 60 kV | P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY) | P5 | Non-Redundant Relay | Low | 0.84 | NConv | 0.90 | >0.9 | >0.9 | 0.89 | NConv | 0.84 | >0.9 | Install Redundant Relay |
| HMLTN BR 60 kV | P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY) | P5 | Non-Redundant Relay | Low | 0.89 | NConv | 0.95 | >0.9 | >0.9 | N/A | NConv | 0.89 | >0.9 | Install Redundant Relay |
| ULTR WSD 60 kV | P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY) | P5 | Non-Redundant Relay | Low | 0.89 | NConv | >0.9 | >0.9 | >0.9 | N/A | NConv | 0.88 | >0.9 | Install Redundant Relay |
| WESTWOOD 60 kV | P5-5:A3:2:_CARIBOU 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY) | P5 | Non-Redundant Relay | Low | 0.89 | NConv | >0.9 | >0.9 | >0.9 | N/A | NConv | 0.88 | >0.9 | Install Redundant Relay |
| BIG MDWS 60 kV | P5-5:A3:7:_TABLE MTN 230KV BUS SECTION D/E (FAILURE OF NON-REDUNDENT RELAY) | P5 | Non-Redundant Relay | Low | 0.90 | NConv | 0.95 | >0.9 | >0.9 | N/A | NConv | 0.90 | >0.9 | Install Redundant Relay |
| CASCADE 115kV | P1-2:A3:42:_CASCADE-COTTONWOOD 115KV [1240] & P1-3:A3:39:_TRINITY 115/60KV TB 1 | P6 | N-1-1 | Low | 0.89 | 0.88 | >0.9 | >0.9 | >0.9 | N/A | 0.88 | >0.9 | >0.9 | Operating solution |
| DIRYVLE 60kV | P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3 | P6 | N-1-1 | Low | 0.86 | 0.90 | 0.56 | >0.9 | >0.9 | N/A | 0.89 | >0.9 | >0.9 | Operating solution |
| GERBER 60kV | P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3 | P6 | N-1-1 | Low | 0.85 | 0.90 | 0.55 | >0.9 | >0.9 | N/A | 0.89 | >0.9 | >0.9 | Operating solution |
| LPSP1 60kV | P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3 | P6 | N-1-1 | Low | 0.86 | >0.9 | 0.57 | >0.9 | >0.9 | N/A | >0.9 | >0.9 | >0.9 | Operating solution |

| Substation | Contingency (All and Worst P6) | Category | Category Description | High/Low Voltage | Voltage PU (Baseline Scenarios) | | | | | Voltage PU (Sensitivity Scenarios) | | | | Project & Potential Mitigation Solutions |
|-------------------|--|----------|----------------------|------------------|---------------------------------|------------------|------------------|----------------------|----------------------|------------------------------------|---------------------------|---------------------------------------|---------------------|--|
| | | | | | 2024 Summer Peak | 2027 Summer Peak | 2032 Summer Peak | 2024 Spring Off-Peak | 2027 Spring Off-Peak | 2035 ATE | 2027 SP High CEC Forecast | 2024 SP Heavy Renewable & Min Gas Gen | 2024 OP Sensitivity | |
| LS MLNSJ 60kV | P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3 | P6 | N-1-1 | Low | 0.85 | 0.89 | 0.54 | >0.9 | >0.9 | N/A | 0.88 | >0.9 | >0.9 | Operating solution |
| RWSN J2 60kV | P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3 | P6 | N-1-1 | Low | 0.86 | >0.9 | 0.58 | >0.9 | >0.9 | N/A | >0.9 | >0.9 | >0.9 | Operating solution |
| VINA 60kV | P1-3:A3:12:_COTWD_E2 230/60KV TB 2 & P1-3:A3:13:_COTWD_E 230/60KV TB 3 | P6 | N-1-1 | Low | 0.84 | 0.88 | 0.53 | >0.9 | >0.9 | N/A | 0.88 | >0.9 | >0.9 | Operating solution |
| BIG MDWS 60 kV | P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line | P7 | DCTL | Low | 0.89 | NConv | NConv | >0.9 | >0.9 | N/A | NConv | 0.89 | 0.95 | Operating solution |
| CHESTER 60 kV | P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line | P7 | DCTL | Low | 0.83 | NConv | NConv | >0.9 | >0.9 | N/A | NConv | 0.84 | 0.91 | Operating solution |
| COLLINSPIKE 60 kV | P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line | P7 | DCTL | Low | 0.83 | NConv | NConv | >0.9 | 0.90 | N/A | NConv | 0.83 | 0.90 | Operating solution |
| GANSNER 60 kV | P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line | P7 | DCTL | Low | 0.90 | NConv | NConv | >0.9 | >0.9 | N/A | NConv | >0.9 | >0.9 | Operating solution |
| HMLTN BR 60 kV | P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line | P7 | DCTL | Low | 0.88 | NConv | NConv | >0.9 | >0.9 | N/A | NConv | 0.88 | 0.94 | Operating solution |
| ULTR WSD 60 kV | P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line | P7 | DCTL | Low | 0.88 | NConv | NConv | >0.9 | >0.9 | N/A | NConv | 0.88 | 0.94 | Operating solution |
| WESTWOOD 60 kV | P7-1:A3:6_Table Mountain-Paradise 115 kV Line and Caribou-Table Mountain 230 kV Line | P7 | DCTL | Low | 0.88 | NConv | NConv | >0.9 | >0.9 | N/A | NConv | 0.88 | 0.94 | Operating solution |

Study Area: PG&E North Valley

Voltage Deviation



| Substation | Contingency (All and Worst P6) | Category | Category Description | Post Cont. Voltage Deviation % (Baseline Scenarios) | | | | | Post Cont. Voltage Deviation % (Sensitivity Scenarios) | | | | Project & Potential Mitigation Solutions |
|-------------|---|----------|----------------------|---|------------------|------------------|----------------------|----------------------|--|---------------------------|---------------------------------------|---------------------|--|
| | | | | 2024 Summer Peak | 2027 Summer Peak | 2032 Summer Peak | 2024 Spring Off-Peak | 2027 Spring Off-Peak | 2035 ATE | 2027 SP High CEC Forecast | 2024 SP Heavy Renewable & Min Gas Gen | 2024 OP Sensitivity | |
| TYLER 60 kV | P1-1:A3:10:_NEO REDB 13.80KV GEN UNIT 1 | P1 | N-1 | 13 | <8 | <8 | <8 | <8 | NA | <8 | <8 | <8 | Project: Tyler 60kV capacitor |

Study Area: PG&E North Valley

Transient Stability



| Contingency | Category | Category Description | Transient Stability Performance | | | | | | Potential Mitigation Solutions |
|---|----------|----------------------|---------------------------------|------------------|------------------|----------------------|---------------------------|---------------------|--------------------------------|
| | | | Baseline Scenarios | | | | Sensitivity Scenarios | | |
| | | | 2024 Spring Off-Peak | 2027 Summer Peak | 2032 Summer Peak | 2032 Spring Off-Peak | 2027 SP High CEC Forecast | 2024 OP Sensitivity | |
| In accordance with TPL-001-4- Requirement R2.6, this area relies on the past studies from the 2019-20 Transmission Planning Process for transient stability studies: | | | | | | | | | |
| http://www.caiso.com/Documents/AppendixC-BoardApproved2019-2020TransmissionPlan.pdf | | | | | | | | | |

Study Area: PG&E North Valley



Single Contingency Load Drop

| Worst Contingency | Category | Category Description | Amount of Load Drop (MW) | | | | | | | | | | | | | Potential Mitigation Solutions |
|-------------------|----------|----------------------|--------------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|---------------------------|---------------------------------------|---------------------|--|--------------------------------|
| | | | 2024 Summer Peak | 2027 Summer Peak | 2032 Summer Peak | 2024 Winter Peak | 2027 Winter Peak | 2032 Winter Peak | 2024 Spring Off-Peak | 2027 Spring Off-Peak | 2032 Spring Off-Peak | 2027 SP High CEC Forecast | 2024 SP Heavy Renewable & Min Gas Gen | 2024 OP Sensitivity | 2032 SP with Additional Transportation Electrification | |
| | | | | | | | | | | | | | | | | |

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

Study Area: PG&E North Valley



Single Source Substation with more than 100 MW Load

| Substation | Load Served (MW) | | | | | | | | | | | | | Potential Mitigation Solutions |
|------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------|----------------------|----------------------|---------------------------|---------------------------------------|---------------------|--|--------------------------------|
| | 2024 Summer Peak | 2027 Summer Peak | 2032 Summer Peak | 2024 Winter Peak | 2027 Winter Peak | 2032 Winter Peak | 2024 Spring Off-Peak | 2027 Spring Off-Peak | 2032 Spring Off-Peak | 2027 SP High CEC Forecast | 2024 SP Heavy Renewable & Min Gas Gen | 2024 OP Sensitivity | 2032 SP with Additional Transportation Electrification | |
| | | | | | | | | | | | | | | |

No single source substation with more than 100 MW