Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
Hassayampa and Hoodoo Wash System Divergence	GR1409_Gen GR1409 GEN1 ID VS AND HAA-HDW_Line HAA-HDW 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	< 100	< 100	The Hassayampa 500 kV generic solar resource identified in the CPUC portfolio has an installed capacity of 2,286 MW. In the long-term base cases, it was modeled as a single resource. In reality, however, this generation capacity would be distributed among several resources; therefore, this contingency would not be considered critical.
	HAA-HDW_Line HAA-HDW 500kV ck 1 AND HAA-NG_Line HAA-NG 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	< 100	< 100	
	HAA-HDW_Line HAA-HDW 500kV ck 1 AND TL50002-GR1414 Loop NG_Line NG-GR1414 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	< 100	< 100	
	HAA-HDW_Line HAA-HDW 500kV ck 1 AND TL50002-GR1414 Loop IV_Line IV-GR1414 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	< 100	< 100	
	HAA-HDW_Line HAA-HDW 500kV ck 1 AND TL50004_Line IV-ECO 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	< 100	< 100	
	HAA-HDW_Line HAA-HDW 500kV ck 1 AND TL50005_Line IV-OCO 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	< 100	< 100	
	HAA-HDW_Line HAA-HDW 500kV ck 1 AND NG-IV-2_Line NG-IV 500kV ck 2	P6	N-1-1	< 100	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	< 100	< 100	
	HAA-HDW_Line HAA-HDW 500kV ck 1 AND HDWSH-Q227_Line HDW-Q227 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	Diverge	< 100	< 100	< 100	< 100	< 100	< 100	
15090 HASSYAMP 500 22342 HDWSH 500 1 1	HDW-NG_Line HDW-NG 500kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	107.9	< 100	< 100	< 100	< 100	< 100	< 100	The Hoodoo Wash 500 kV generic solar resource identified in the CPUC portfolio has an installed capacity of 2,388 MW. Under high solar generation conditions in the long-term planning scenario, dispatch from the Hoodoo Wash resources results in power flows that exceed the emergency ratings of both the Hassayampa–Hoodoo Wash and Hoodoo Wash–North Gila 500 kV transmission lines following P1 contingencies. In addition, several combinations of P3 and P6 contingencies result in even higher loading levels and, in some cases, lead to power flow divergence. To mitigate these reliability concerns, pre-contingency congestion management can be used to protect against P1 outages by reducing generation output at Hoodoo Wash substation. For P3 and P6 events, additional congestion management after the first contingency would be required, including reductions in generation output at Hoodoo Wash, North Gila, and/or GR1414 substations.
	GR1409_Gen GR1409 GEN1 ID VS AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	110.6	< 100	< 100	< 100	< 100	< 100	< 100	
	PV_UNIT1_Gen PALOVRD1 ID 1 AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	109.6	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1414_Gen GR1414 GEN1 ID VS AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	109.4	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1411_Gen GR1411 GEN1 ID VS AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	108.9	< 100	< 100	< 100	< 100	< 100	< 100	
	IV_GEN1_ALL_Gen IV GEN1 CT2/CT3/STG ID 1 AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	108.8	< 100	< 100	< 100	< 100	< 100	< 100	
	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	108.7	< 100	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	108.7	< 100	< 100	< 100	< 100	< 100	< 100	
	EA_ALL_Gen EA GEN1 U6/U7/U8/U9/U10 ID 1 AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	108.6	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1415_Gen GR1415 GEN1 ID VS AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	108.4	< 100	< 100	< 100	< 100	< 100	< 100	
	DW GEN4_Gen DW GEN2 ID 1/2 AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	108.4	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1412_Gen GR1412 GEN1 ID VS AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	108.2	< 100	< 100	< 100	< 100	< 100	< 100	
	DW GEN3_Gen DW GEN3 ID 1/2 AND HDW-NG_Line HDW-NG 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	108.1	< 100	< 100	< 100	< 100	< 100	< 100	
	HDW-NG_Line HDW-NG 500kV ck 1 AND GR1414POI-GR1414_Line GR1414POI-GR1414 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	109.4	< 100	< 100	< 100	< 100	< 100	< 100	
22342 HDWSH 500 22536 N.GILA 500 1 1	HAA-HDW_Line HAA-HDW 500kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	106.1	< 100	< 100	< 100	< 100	< 100	< 100	
	PV_UNIT1_Gen PALOVRD1 ID 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	110.3	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1414_Gen GR1414 GEN1 ID VS AND HAA-HDW_Line HAA-HDW 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	107.0	< 100	< 100	< 100	< 100	< 100	< 100	
	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	106.9	< 100	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	106.9	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1411_Gen GR1411 GEN1 ID VS AND HAA-HDW_Line HAA-HDW 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	107.0	< 100	< 100	< 100	< 100	< 100	< 100	
	EA_ALL_Gen EA GEN1 U6/U7/U8/U9/U10 ID 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	106.8	< 100	< 100	< 100	< 100	< 100	< 100	
	IV_GEN1_ALL_Gen IV GEN1 CT2/CT3/STG ID 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	106.9	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1415_Gen GR1415 GEN1 ID VS AND HAA-HDW_Line HAA-HDW 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	106.6	< 100	< 100	< 100	< 100	< 100	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
	DW GEN4_Gen DW GEN2 ID 1/2 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	106.5	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1414POI-GR1414_Line GR1414POI-GR1414 500kV ck 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	109.2	< 100	< 100	< 100	< 100	< 100	< 100	
22930 ECO 500 22468 MIGUEL 500 1 2	IV-RECON_Line IV-RECON 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	110.4	103.6	100.3	< 100	< 100	< 100	< 100	< 100	In the 2036 Summer Off-Peak case, rely on congestion management by reducing battery energy storage charging in the San Diego Metro area and the dispatch of resources in the greater Imperial Valley area after the first contingency for the P6 event. In the 2041 Summer Peak and 2041 Winter Peak cases, rely on system adjustments by reducing generation output in the greater Imperial Valley area, dispatching conventional gas generation, preferred resources, and/or battery energy storage in the San Diego Metro area, and adjusting the Imperial Valley phase shifting transformers after the first contingency for the P6 event. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed.
22356 IMPRLVLY 230 22361 IV BK80 MP 500 1 1	DW_GEN8_Gen DW GEN8 ID 1 AND IV_BK81_Tran IV 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	102.6	< 100	< 100	< 100	< 100	< 100	< 100	Rely on the 30-min emergency ratings (20% higher than their 24-hr ratings), to allow the market and operators to bring down the overloads that do not exceed 120% for the P3, P4, and P6 contingencies within the 24-hr ratings in 30 minutes as operational mitigation measures. For the contingencies that exceed 120%, the operational mitigations would need to be performed after the first contingency. The system adjustment would involve the reduction of the resources connected at Imperial Valley 230 kV substation.
	GR1410_Gen GR1410 GEN1 ID VS AND IV_BK81_Tran IV 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	101.8	< 100	< 100	< 100	< 100	< 100	< 100	
	IV_GEN6_Gen IV_GEN6 ID 1 AND IV_BK81_Tran IV 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	100.9	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1409_Gen GR1409 GEN1 ID VS AND IV_BK81_Tran IV 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	100.7	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1414POI-GR1414_Line GR1414POI-GR1414 500kV ck 1 AND IV_BK81_Tran IV 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	100.6	< 100	< 100	< 100	< 100	< 100	< 100	
	IV GEN5_Gen IV GEN5 ID 1 AND IV_BK81_Tran IV 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	100.3	< 100	< 100	< 100	< 100	< 100	< 100	
	IV-230-15S_CB IMPERIAL VALLEY 230kV 15S	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	105.5	< 100	< 100	< 100	< 100	< 100	< 100	
	IV_BK81_Tran IV 500/230kV ck 2 AND IV_BK82_Tran IV 500/230kV ck 3	P6	N-1-1	< 100	< 100	< 100	< 100	139.4	< 100	< 100	< 100	< 100	< 100	< 100	
22356 IMPRLVLY 230 22911 IV BK81 MP 500 2 1	DW_GEN8_Gen DW GEN8 ID 1 AND IV_BK80_Tran IV 500/230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	103.0	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1410_Gen GR1410 GEN1 ID VS AND IV_BK80_Tran IV 500/230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	102.2	< 100	< 100	< 100	< 100	< 100	< 100	
	IV_GEN6_Gen IV_GEN6 ID 1 AND IV_BK80_Tran IV 500/230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	101.3	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1409_Gen GR1409 GEN1 ID VS AND IV_BK80_Tran IV 500/230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	101.1	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1414_Gen GR1414 GEN1 ID VS AND IV_BK80_Tran IV 500/230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	101.0	< 100	< 100	< 100	< 100	< 100	< 100	
	IV GEN5_Gen IV GEN5 ID 1 AND IV_BK80_Tran IV 500/230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	100.8	< 100	< 100	< 100	< 100	< 100	< 100	
	IV-230-12S_CB IMPERIAL VALLEY 230kV 12S	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	105.9	< 100	< 100	< 100	< 100	< 100	< 100	
	IV_BK80_Tran IV 500/230kV ck 1 AND IV_BK82_Tran IV 500/230kV ck 3	P6	N-1-1	< 100	< 100	< 100	< 100	139.7	< 100	< 100	< 100	< 100	< 100	< 100	
22355 IMPRLVLY WST 230 22362 IV BK82 MP 500 3 1	IV_BK80_Tran IV 500/230kV ck 1 AND IV_BK81_Tran IV 500/230kV ck 2	P6	N-1-1	< 100	< 100	< 100	< 100	122.6	< 100	< 100	< 100	< 100	< 100	< 100	
22356 IMPRLVLY 230 22357 IV PFC1 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	108.7	120.6	< 100	< 100	< 100	< 100	< 100	< 100	128.3	< 100	124.2	
	TL50001_Line ECO-ML 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	119.0	101.2	< 100	< 100	< 100	< 100	< 100	< 100	
	TL50004_Line IV-ECO 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	105.3	< 100	< 100	< 100	< 100	< 100	< 100	
22357 IV PFC1 230 22358 IV PFC 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	123.9	138.7	< 100	< 100	< 100	< 100	< 100	101.8	142.7	< 100	142.6	
	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	< 100	109.5	< 100	< 100	< 100	< 100	< 100	< 100	110.1	< 100	112.9	
	IV_PST2_IV PFC2 Tran 230/230kV ck 2 AND TL23040_Line OM-TJI 230kV ck 1	P6	N-1-1	< 100	< 100	124.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	In the near-term, rely on existing TL50001 Gen Drop RAS or TL50003 Gen Drop RAS to trip generation in the greater Imperial Valley area. If this is not enough to mitigate the overloads, congestion management and additional system adjustments can be
	TL50004_Line IV-ECO 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	119.7	< 100	< 100	< 100	< 100	< 100	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
	TL50001_Line ECO-ML 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	111.1	132.3	115.5	108.6	< 100	< 100	< 100	< 100	< 100	used after the first contingency for the P6 events.
22357 IV PFC1 230 22358 IV PFC 230 2 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	123.9	138.7	< 100	< 100	< 100	< 100	< 100	101.8	142.7	< 100	142.6	The system adjustments could involve the reduction of generation output in the greater Imperial Valley area, dispatch of conventional gas generation, preferred resources, and battery energy storage in the San Diego Metro area, adjust the Imperial Valley phase shifting transformers, and bypass the series capacitor banks in the 500 kV transmission lines between Hassayampa and North Gila as needed. In the long-term, the ISO approved "Imperial Valley–North of SONGS 500 kV Line and Substation" project (ISD October 2032) will help reduce the thermal overloads but the following additional mitigations are needed: In the 2036 Summer Off-Peak case, there is a need to rely on congestion management by reducing battery energy storage charging in the San Diego Metro area and the dispatch of resources in the greater Imperial Valley area after the first contingency for the P6 event. In the 2036 Summer Peak, 2041 Summer Peak, and 2041 Winter Peak cases, rely on system adjustments by reducing generation output in the greater Imperial Valley area and dispatching conventional gas generation, preferred resources, and/or battery energy storage in the San Diego Metro area, and adjusting the Imperial Valley phase shifting transformers after the first contingency for the P6 event. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed. Additionally, in the 2036 Summer Peak case, the P6 outage of one Imperial Valley phase shifting transformer and TL23040 Otay Mesa - Tijuana I requires coordination with CENACE, to reduce their import from 600 MW to 400 MW after the first contingency for the P6 event.
	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	< 100	109.5	< 100	< 100	< 100	< 100	< 100	< 100	110.1	< 100	112.9	
	IV_PST1_IV PFC1 Tran 230/230kV ck 1 AND TL23040_Line OM-TJI 230kV ck 1	P6	N-1-1	< 100	< 100	124.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL50004_Line IV-ECO 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	119.7	< 100	< 100	< 100	< 100	< 100	< 100	
	TL50001_Line ECO-ML 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	111.1	132.3	115.5	108.6	< 100	< 100	< 100	< 100	< 100	
22358 IV PFC 230 20118 ROA-230 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	108.7	120.6	< 100	< 100	< 100	< 100	< 100	< 100	128.3	< 100	124.2	
	TL50001_Line ECO-ML 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	119.0	101.2	< 100	< 100	< 100	< 100	< 100	< 100	
	TL50004_Line IV-ECO 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	105.3	< 100	< 100	< 100	< 100	< 100	< 100	
20102 RUM-230 230 20118 ROA-230 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	114.1	103.8	< 100	< 100	< 100	< 100	< 100	< 100	130.6	< 100	106.1	
	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.1	< 100	< 100	
	TL50001_Line ECO-ML 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	109.5	< 100	< 100	< 100	< 100	< 100	
20238 HRA-230 230 20102 RUM-230 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	115.4	< 100	< 100	
20238 HRA-230 230 20118 ROA-230 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	104.8	< 100	< 100	< 100	< 100	< 100	< 100	< 100	120.9	< 100	< 100	
22609 OTAYMESA 230 20149 TJI-230 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	137.9	150.5	< 100	< 100	< 100	< 100	< 100	108.8	163.3	104.8	154.6	
	TL50001+GEN_DROP_RAS_Line ECO-ML 500kV ck 1 + GEN DROP RAS AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	109.6	120.9	< 100	< 100	< 100	< 100	< 100	< 100	122.5	< 100	124.7	
	TL50001_Line ECO-ML 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	105.3	103.9	121.8	< 100	< 100	< 100	< 100	< 100	
	TL50004_Line IV-ECO 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	108.3	< 100	< 100	< 100	< 100	< 100	< 100	
22886 SUNCREST 230 22888 SNCRSMP1 500 1 1	SCR_BK81_Tran SCR 500/230kV ck 2 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	109.7	< 100	< 100	< 100	< 100	< 100	< 100	122.9	< 100	112.1	In the near-term, rely on the 30-min emergency ratings of the Suncrest banks (25% higher than their 24-hr ratings). If this is not enough to mitigate the overloads, congestion management and additional system adjustments can be used after the first contingency for the P6 events. The system adjustments could involve the reduction of generation output in the greater Imperial Valley area, dispatch conventional gas generation, preferred resources, and battery energy storage in the San Diego Metro area, adjust the Imperial Valley phase shifting transformers, and bypass the series capacitor banks in the 500 kV transmission lines between Hassayampa and North Gila as needed. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed. The ISO approved "Miguel-Sycamore Canyon 230 kV line Loop-in to Suncrest" project (ISD December 2032) solves this reliability issue in the long-term since it includes a third Suncrest 500/230 kV bank.
22886 SUNCREST 230 22889 SNCRSMP2 500 2 1	SCR_BK80_Tran SCR 500/230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	109.7	< 100	< 100	< 100	< 100	< 100	< 100	122.9	< 100	112.1	
22886 SUNCREST 230 22832 SYCAMORE 230 1 1	TL23055_Line SCR-SX 230kV ck 2 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	130.3	146.4	< 100	< 100	< 100	< 100	< 100	< 100	164.4	< 100	150.0	In the near-term, rely on the existing TL23054/TL23055 RAS, along with the 30-minute short-term emergency ratings of the 230 kV lines (30% higher than their continuous ratings), to allow the market and operators to bring down the overloads that do not exceed 130% for the P6 contingencies within the continuous ratings in 30 minutes as operational mitigation measures. For the contingencies that exceed 130%, the operational mitigations would need to be performed after the first contingency. The system adjustments could involve the reduction of generation output in the greater Imperial Valley area, dispatch conventional gas generation, preferred
	TL23055+RAS_Line SCR-SX 230kV ck 2 + RAS AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	105.3	120.1	< 100	< 100	< 100	< 100	< 100	< 100	129.7	< 100	123.6	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
22886 SUNCREST 230 22832 SYCAMORE 230 2 1	TL23054_Line SCR-SX 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	130.4	146.4	< 100	< 100	< 100	< 100	< 100	< 100	164.4	< 100	150.0	greater Imperial Valley area, dispatch conventional gas generation, preferred resources, and battery energy storage in the San Diego Metro area, adjust the Imperial Valley phase shifting transformers, and bypass the series capacitor banks in the 500 kV transmission lines between Hassayampa and North Gila as needed. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed. The ISO approved "Miguel-Sycamore Canyon 230 kV line Loop-in to Suncrest" project (ISD December 2032) solves this reliability issue in the long-term.
	TL23054+RAS_Line SCR-SX 230kV ck 1 + RAS AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	105.4	120.1	< 100	< 100	< 100	< 100	< 100	< 100	129.7	< 100	123.6	
22464 MIGUEL 230 22472 MIGUELMP 500 1 1	ML_BK81_Tran ML 500/230kV ck 2	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.1	< 100	< 100	Rely on existing Miguel BK 80/BK 81 RAS to trip generation in the greater Imperial Valley area.
	KU_GEN_Gen KUMEYAAY ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.8	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.7	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	106.5	< 100	< 100	
	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND ML_BK81_Tran ML 500/230kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.0	
	ML-230-2T_CB MIGUEL 230kV 2T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.2	< 100	< 100	
	ML_BK81_Tran ML 500/230kV ck 2 AND ML_BK82_Tran ML 500/230kV ck 3	P6	N-1-1	< 100	< 100	< 100	113.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	In the near-term, rely on the existing Miguel BK 80/BK 81 RAS (if necessary, the 30-min emergency rating, which is 25% higher than the 24-hr rating, may also be utilized). If this is not enough to mitigate the overloads, congestion management and additional system adjustments can be used after the first contingency for the P6 events. The system adjustments could involve the reduction of generation output in the greater Imperial Valley area, dispatch conventional gas generation, preferred resources, and battery energy storage in the San Diego Metro area, adjust the Imperial Valley phase shifting transformers, and bypass the series capacitor banks in the 500 kV transmission lines between Hassayampa and North Gila as needed. The ISO approved "Miguel-Sycamore Canyon 230 kV line Loop-in to Suncrest" project (ISD December 2032) mostly solves these reliability issues in the long-term since it includes a third Miguel 500/230 kV bank, but the issue would reappear in the 2041 Summer Peak case due to load growth in the San Diego Metro area. System adjustments would be needed by reducing generation output in the greater Imperial Valley area, dispatch conventional gas generation, preferred resources, and battery energy storage in the San Diego Metro area, and adjusting the Imperial Valley phase shifting transformers. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed.
	ML_BK81_Tran ML 500/230kV ck 2 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	115.2	129.4	< 100	< 100	< 100	< 100	< 100	< 100	147.3	< 100	132.4	
	ML_BK81+RAS_Tran ML 500/230kV ck 2 + RAS AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	< 100	106.8	< 100	< 100	< 100	< 100	< 100	< 100	118.3	< 100	109.7	
22464 MIGUEL 230 22455 ML MP BK81 500 2 1	ML_BK80_Tran ML 500/230kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.0	< 100	< 100	Rely on existing Miguel BK 80/BK 81 RAS to trip generation in the greater Imperial Valley area.
	KU_GEN_Gen KUMEYAAY ID 1 AND ML_BK80_Tran ML 500/230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.6	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND ML_BK80_Tran ML 500/230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.5	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND ML_BK80_Tran ML 500/230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.3	< 100	< 100	
	ML-230-3T_CB MIGUEL 230kV 3T and 3N	P4	Fault + Stuck Breaker	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.0	< 100	< 100	
	ML_BK80_Tran ML 500/230kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	114.0	127.9	< 100	< 100	< 100	< 100	< 100	< 100	145.6	< 100	130.9	In the near-term, rely on the existing Miguel BK 80/BK 81 RAS (if necessary, the 30-min emergency rating, which is 26% higher than the 24-hr rating, may also be utilized). If this is not enough to mitigate the overloads, congestion management and additional

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
	ML_BK80+RAS_Tran ML 500/230kV ck 1 + RAS AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	< 100	105.6	< 100	< 100	< 100	< 100	< 100	< 100	117.0	< 100	108.5	system adjustments can be used after the first contingency for the P6 events. The system adjustments could involve the reduction of generation output in the greater Imperial Valley area, dispatch conventional gas generation, preferred resources, and battery energy storage in the San Diego Metro area, adjust the Imperial Valley phase shifting transformers, and bypass the series capacitor banks in the 500 kV transmission lines between Hassayampa and North Gila as needed. The ISO approved "Miguel-Sycamore Canyon 230 kV line Loop-in to Suncrest" project (ISD December 2032) mostly solves these reliability issues in the long-term since it includes a third Miguel 500/230 kV bank, but the overload would reappear in the 2041 Summer Peak case due to load growth in the San Diego Metro area. System adjustments would be needed by reducing generation output in the greater Imperial Valley area, dispatch conventional gas generation, preferred resources, and battery energy storage in the San Diego Metro area, and adjusting the Imperial Valley phase shifting transformers. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed.
	ML_BK80_Tran ML 500/230kV ck 1 AND ML_BK82_Tran ML 500/230kV ck 3	P6	N-1-1	< 100	< 100	< 100	112.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22464 MIGUEL 230 22474 MIGUELMP3 500 3 1	ML_BK80_Tran ML 500/230kV ck 1 AND ML_BK81_Tran ML 500/230kV ck 2	P6	N-1-1	< 100	< 100	< 100	112.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22609 OTAYMESA 230 22466 MLMS3TAP 230 1 1	TL23041_Line SX-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	103.3	106.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.0	Rely on existing TL23041/TL23042 RAS to trip generation at Otay Mesa substation. If RAS is not sufficient to mitigate the overloads, rely on congestion management by reducing generation output in Otay Mesa substation after the first contingency for the P6 events.
22771 BAY BLVD 230 22466 MLMS3TAP 230 1 1	TL23041_Line SX-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	106.4	109.4	< 100	< 100	< 100	100.0	< 100	< 100	< 100	< 100	111.3	
22609 OTAYMESA 230 22467 MLSXTAP 230 1 1	TL23042_Line BB-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	111.0	113.8	< 100	< 100	< 100	104.6	< 100	< 100	< 100	< 100	115.7	
22464 MIGUEL 230 22467 MLSXTAP 230 1 1	TL23042_Line BB-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	113.6	118.3	< 100	< 100	< 100	104.2	< 100	< 100	< 100	< 100	120.5	
	TL23042+RAS_Line BB-OM-ML 230kV ck 1 + RAS AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	102.3	104.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.1	
22430 SILVERGT 230 22381 VINE 230 1 1	IV-RECON_Line IV-RECON 500kV ck 1 AND TL23028_Line SG-MS-OT 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	104.1	< 100	< 100	< 100	< 100	< 100	Rely on 2-hr short-term emergency rating (29% higher than its normal rating), giving the market and operators enough time to eliminate the identified thermal overload. The system adjustment that can be implemented is to reduce generation output at Otay Mesa substation.
22597 OLDTWNTP 230 22504 MISSION 230 1 1	TL23026_Line SG-BB 230kV ck 1 AND TL23027_Line OT-MS 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	102.0	100.9	< 100	< 100	< 100	< 100	< 100	< 100	In the 2036 Summer Off-Peak case, rely on congestion management by reducing battery energy storage charging at Silvergate 230 kV substation after the first contingency for the P6 events. In the 2041 Summer Peak case, rely on congestion management by dispatching battery energy storage at Silvergate substation after the first contingency for the P6 event. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed.
22716 SANLUSRY 230 24131 S.ONOFRE 230 1 1	TL50001_Line ECO-ML 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	100.8	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Rely on system adjustments by reducing generation output in the greater Imperial Valley area and dispatching conventional gas generation, preferred resources, and/or battery energy storage in the San Diego Metro area, and adjusting the Imperial Valley phase shifting transformers after the first contingency for the P6 event. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed.
22844 TALEGA 230 24131 S.ONOFRE 230 1 1	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL23007_Line SJC-SO 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	110.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1403_Gen GR1403 GEN1 ID VW AND TL23007_Line SJC-SO 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	103.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	EA_ALL_Gen EA GEN1 U6/U7/U8/U9/U10 ID 1 AND TL23007_Line SJC-SO 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	102.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	OMEC_ALL_Gen OTAYMGT1/GT2/ST1 ID 1 AND TL23007_Line SJC-SO 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	102.5	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	IV_GEN1_ALL_Gen IV GEN1 CT2/CT3/STG ID 1 AND TL23007_Line SJC-SO 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	101.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	OMEC_ST_Gen OTAYMST1 ID 1 AND TL23007_Line SJC-SO 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	100.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL50001_Line ECO-ML 500kV ck 1 AND TL50003-Loop2_Line GR1404_POI-SCR 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	114.5	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL23007_Line SJC-SO 230kV ck 1 AND TL23030_Line ES-TA-SJC 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	105.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	It should be noted that load growth in the Southern Orange County is primarily driven by transportation electrification, which, according to the CEC Load Forecast, reaches its peak at HE 24. As a result, the thermal overloads observed in 2041 Summer case potentially could occur at an earlier year while assessing load pocket peak load. Therefore, discussions with the PTO may be necessary to evaluate potential upgrade solutions.
	TL23007+23030_Lines SJC-SO 230kV ck 1 + ES-TA-SJC 230kV ck 1	P7	DCTL	< 100	< 100	< 100	105.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22113 CAPSTRNO 230 24131 S.ONOFRE 230 1 1	TL23030_Line ES-TA-SJC 230kV ck 1 AND TL23052_Line TA-SO 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	102.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22846 TA230 TAP 230 22260 ESCNDIDO 230 1 1	TL23007_Line SJC-SO 230kV ck 1 AND TL23052_Line TA-SO 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	100.5	< 100	< 100	< 100	< 100	< 100	< 100	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
22840 TALEGA 230 22200 ESCNDIDO 230 1 1	TL23007+23052_Lines SJC-SO 230kV ck 1 + TA-SO 230kV ck 1	P7	DCTL	< 100	< 100	< 100	100.5	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22808 STUARTTP 69.0 22400 LASPULGS 69.0 1 1	TL23007_Line SJC-SO 230kV ck 1 AND TL23052_Line TA-SO 230kV ck 1	P6	N-1-1	150.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Rely on the existing TL 695 at Talega OLS in the near-term. The ISO approved "TL690E Stuart Tap-Las Pulgas 69 kV Sections Re-Conductor" project (ISD July 2029) solves this reliability issue in the long-term.
	TL23007+23052_Lines SJC-SO 230kV ck 1 + TA-SO 230kV ck 1	P7	DCTL	150.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22588 OCNSDETP 69.0 22808 STUARTTP 69.0 1 1	TL23007_Line SJC-SO 230kV ck 1 AND TL23052_Line TA-SO 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	143.9	< 100	118.6	< 100	< 100	< 100	< 100	< 100	It should be noted that load growth in the Southern Orange County is primarily driven by transportation electrification, which, according to the CEC Load Forecast, reaches its peak at HE 24. As a result, the thermal overloads observed in 2041 Summer and Winter Peak cases potentially could occur at an earlier year while assessing load pocket peak load. Therefore, discussions with the PTO may be necessary to evaluate potential upgrade solutions.
	TL23007+23052_Lines SJC-SO 230kV ck 1 + TA-SO 230kV ck 1	P7	DCTL	< 100	< 100	< 100	143.9	< 100	118.6	< 100	< 100	< 100	< 100	< 100	
22708 SANLUSRY 69.0 22584 OCEANSDE 69.0 1 1	TL23007_Line SJC-SO 230kV ck 1 AND TL23052_Line TA-SO 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	103.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL23007+23052_Lines SJC-SO 230kV ck 1 + TA-SO 230kV ck 1	P7	DCTL	< 100	< 100	< 100	103.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22840 TALEGA 138 22720 SANMATEO 138 1 1	TL13831_Line TA-RMV 138kV ck 1 AND TL13836_Line TA-PI 138kV ck 1	P6	N-1-1	< 100	< 100	< 100	119.3	< 100	105.2	< 100	< 100	< 100	< 100	< 100	
22112 CAPSTRNO 138 22396 LAGNA NL 138 1 1	TL13847_Line SJC-LNL 138kV ck 2	P1	N-1	< 100	< 100	< 100	101.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor the thermal overload concerns identified in the 2041 Summer Peak case and discuss with the PTO the potential for upgrade solutions.
	SJC-138-16T_CB CAPSTRNO 138kV 16T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	100.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22112 CAPSTRNO 138 22396 LAGNA NL 138 2 1	TL13837_Line SJC-LNL 138kV ck 1	P1	N-1	< 100	< 100	< 100	101.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	SJC-138-14T_CB CAPSTRNO 138kV 14T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	101.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22124 CHCARITA 138 22760 SHADOWR 138 1 1	SX_BK60_Tran SX 230/138kV ck 1 AND TL13822_Line MS-CH 138kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	103.2	< 100	< 100	< 100	< 100	< 100	< 100	Rely on congestion management by limiting the charging of Sycamore Canyon 138 kV battery energy storage after the first contingency for the P6 event.
22672 PRCTRVLY 138 22460 MIGUEL 138 1 1	ML_BK60_Tran ML 230/138kV ck 1 AND TL23026_Line SG-BB 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	102.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Rely on 30-min short-term emergency rating (17% higher than its normal rating), giving the market and operators enough time to eliminate the identified thermal overload. The system adjustment that can be implemented is to reduce the output of Otay Mesa gas generation.
22708 SANLUSRY 69.0 22582 OCEAN RANCH 69.0 1 1	TL680_1_Line SA-New OS Sub 69kV ck 1	P1	N-1	< 100	< 100	100.8	118.2	< 100	105.1	< 100	< 100	< 100	< 100	< 100	In the 2036 Summer Peak case, rely on pre-contingency congestion management to protect against the P1 outages by dispatching additional Pala gas generation and Melrose battery energy storage. Furthermore, for P3 events, rely on additional Melrose and/or Avocado battery energy storage after the first contingency. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed. In the 2028 Spring Off-Peak sensitivity case, rely on pre-contingency congestion management to protect against the P1 outages by limiting the charging of Melrose and Avocado battery energy storage. Furthermore, for the P3 and P6 events, rely on additional Avocado battery energy storage charging curtailment after the first contingency. Similarly, for the 2036 Summer Off-Peak case, rely on congestion management after the first contingency for the P3 events. Continue to monitor the thermal overload concerns identified in the 2041 Summer Peak and 2041 Winter Peak cases and discuss with the PTO the potential for upgrade solutions.
	TL680_2_Line New OS Sub-ME-SM 69kV ck 1	P1	N-1	< 100	< 100	< 100	111.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL693_Line ME-SA 69kV ck 1	P1	N-1	< 100	< 100	106.3	127.5	< 100	113.2	< 100	< 100	< 100	107.9	< 100	
	TL6912_Line PN-SA 69kV ck 1	P1	N-1	< 100	< 100	< 100	113.2	< 100	< 100	< 100	< 100	< 100	105.5	< 100	
	TL6951_Line PA-PA GEN 69kV ck 1	P1	N-1	< 100	< 100	< 100	103.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL691_Line MN-PN-AV 69kV ck 1	P1	N-1	< 100	< 100	< 100	106.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	PA-69-W_Bus PALA 69kV W	P2	Bus Section Fault	< 100	< 100	< 100	103.5	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	ES_GEN2_Gen CALPK_ES ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	129.6	101.2	< 100	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL680_1_Line SA-New OS Sub 69kV ck 1	P3	G-1/N-1	< 100	< 100	108.6	126.2	< 100	113.7	< 100	< 100	< 100	< 100	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL680_1_Line SA-New OS Sub 69kV ck 1	P3	G-1/N-1	< 100	< 100	105.8	123.5	< 100	110.3	< 100	< 100	< 100	< 100	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL680_1_Line SA-New OS Sub 69kV ck 1	P3	G-1/N-1	< 100	< 100	105.8	123.5	< 100	110.3	< 100	< 100	< 100	< 100	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	112.4	133.9	106.2	119.5	< 100	< 100	< 100	114.0	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	112.4	133.9	106.2	119.5	< 100	< 100	< 100	114.0	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL693_Line ME-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	112.5	133.8	106.1	120.0	< 100	< 100	< 100	113.7	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	121.0	105.9	106.7	< 100	< 100	< 100	113.3	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	121.0	105.9	106.7	< 100	< 100	< 100	113.3	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	118.6	102.8	104.9	< 100	< 100	< 100	110.5	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL680_Line SA-ME-SM 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.7	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL680_Line SA-ME-SM 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.7	< 100	
	ES-230-2N_CB ESCONDIDO 230kV 2N	P4	Fault + Stuck Breaker	< 100	< 100	< 100	104.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	Bus-PEN230-EW_PALOMAR ENERGY 230 kV E+W BUS	P5	Non-Redundant Relay	< 100	< 100	< 100	110.1	< 100	100.8	< 100	< 100	< 100	< 100	< 100	
	TL6932_Line LI-PA 69kV ck 1 AND TL6951_Line PA-PA GEN 69kV ck 1	P6	N-1-1	< 100	< 100	< 100	109.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL23014_Line PEN-ES 230kV ck 1 AND TL23015_Line PEN-ES 230kV ck 2	P6	N-1-1	< 100	< 100	< 100	110.1	< 100	101.7	< 100	< 100	< 100	< 100	< 100	
22440 MELROSE 69.0 22708 SANLUSRY 69.0 1 1	TL6966_Line OR-SA 69kV ck 1	P1	N-1	< 100	< 100	< 100	105.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL6966_Line OR-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	110.8	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL6966_Line OR-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	110.8	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6966_Line OR-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	110.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22528 NORTHVALLEY 69.0 22440 MELROSE 69.0 1 1	TL6912_Line PN-SA 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.8	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	107.5	106.1	< 100	< 100	< 100	< 100	119.4	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	107.5	106.1	< 100	< 100	< 100	< 100	119.4	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.3	< 100	
	ME_BAT_Gen ME GEN 1 ID BS1/BS2 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.2	< 100	
22512 MONSRATE 69.0 22528 NORTHVALLEY 69.0 1 1	PA_GEN1_Gen PA GEN1 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.2	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	111.2	< 100	
22512 MONSRATE 69.0 22016 AVCADOTP 69.0 1 1	TL6912_Line PN-SA 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	100.3	< 100	< 100	< 100	< 100	< 100	< 100	
22640 PENDLETN 69.0 22708 SANLUSRY 69.0 1 1	TL694_Line ME-NORTHVALLEY 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	114.1	< 100	In the 2041 Summer Peak case, rely on congestion management by dispatching additional Pala gas generation and battery energy storage at Avocado substation after the first contingency for the P3 events. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed. In the 2036 Summer Off-Peak case and 2028 Spring Off-Peak sensitivity case, rely on pre-contingency congestion management to protect against the P1 outages by limiting the charging of Melrose, Avocado, and/or Pendleton battery energy storage. Furthermore, for the P3 and P6 events, rely on additional Avocado and/or Pendleton battery energy storage charging curtailment after the first contingency. The P2 reliability concern would be eliminated by the pre-contingency congestion management identified above.
	TL698_Line AV-MN-PA 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	114.0	< 100	< 100	< 100	< 100	112.0	< 100	
	TL6901_Line MN-NORTHVALLEY 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.5	< 100	
	TL6951_Line PA-PA GEN 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	103.5	< 100	< 100	< 100	< 100	106.9	< 100	
	PA-69-W_Bus PALA 69kV W	P2	Bus Section Fault	< 100	< 100	< 100	< 100	114.3	< 100	< 100	< 100	< 100	112.3	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL694_Line ME-NORTHVALLEY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	112.1	120.1	< 100	< 100	< 100	< 100	131.4	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL694_Line ME-NORTHVALLEY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	112.1	120.1	< 100	< 100	< 100	< 100	131.4	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL6901_Line MN-NORTHVALLEY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	115.6	< 100	< 100	< 100	< 100	125.8	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL6901_Line MN-NORTHVALLEY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	115.6	< 100	< 100	< 100	< 100	125.8	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL694_Line ME-NORTHVALLEY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	104.5	< 100	< 100	< 100	< 100	117.9	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6901_Line MN-NORTHVALLEY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.3	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6951_Line PA-PA GEN 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	107.2	< 100	< 100	< 100	< 100	110.0	< 100	
	PA_U1_Gen PALA ID 88 AND TL694_Line ME-NORTHVALLEY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.8	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL688_Line ES-LI 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.7	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.1	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND PA_GEN2_Gen PA GEN2 ID 1	P3	G-1-1	< 100	< 100	< 100	< 100	103.5	< 100	< 100	< 100	< 100	106.9	< 100	
	TL6932_Line LI-PA 69kV ck 1 AND TL6951_Line PA-PA GEN 69kV ck 1	P6	N-1-1	< 100	< 100	< 100	102.7	124.6	< 100	< 100	< 100	< 100	123.9	< 100	
22016 AVCADOTP 69.0 22020 AVOCADO 69.0 1 1	TL698_Line AV-MN-PA 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	115.0	< 100	< 100	< 100	< 100	121.8	< 100	Rely on existing Avocado RAS that reduces the charging of Avocado battery energy storage.
	PA-69-W_Bus PALA 69kV W	P2	Bus Section Fault	< 100	< 100	< 100	< 100	115.0	< 100	< 100	< 100	< 100	121.8	< 100	
22870 VALCNTR 69.0 22012 ASH TP 69.0 1 1	TL683_Line RIN-LI 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	119.1	< 100	In the near-term, limiting the charging of Valley Center battery energy storage, mainly outside daylight hours, continues to be necessary to avoid the P0 concerns. Additionally, there is a need to rely on existing Valley Center RAS to further reduce the charging of Valley Center energy storage for the remaining P1, P2, P3, P6, and P7 events. The ISO approved "Valley Center System Improvement" project (ISD January 2031) solves this reliability issue in the long-term.
	TL688_Line ES-LI 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.4	< 100	
	TL6926_Line RIN-VC 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	108.9	< 100	
	TL637_Line ST-CRE 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.2	< 100	
	TL6951_Line PA-PA GEN 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.8	< 100	
	TL6912_Line PN-SA 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.2	< 100	
	LI-69-S_Bus LILAC 69kV S	P2	Bus Section Fault	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	119.4	< 100	
	ES-69-SW_Bus ESCONDIDO 69kV SW	P2	Bus Section Fault	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	107.9	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL688_Line ES-LI 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	119.8	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL688_Line ES-LI 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	119.8	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL637_Line ST-CRE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.0	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL637_Line ST-CRE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.0	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL685_Line WR-ST 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.7	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL685_Line WR-ST 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.7	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.9	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL6912_Line PN-SA 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	105.9	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND PA_GEN2_Gen PA GEN2 ID 1	P3	G-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.7	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL694_Line ME-NORTHVALLEY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.7	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL694_Line ME-NORTHVALLEY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.7	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL6917_Line CRE-SX 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.9	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL6917_Line CRE-SX 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.9	< 100	
	PA_GEN1_Gen PA GEN1 ID 1 AND TL6901_Line MN-NORTHVALLEY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.0	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL6901_Line MN-NORTHVALLEY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.0	< 100	
	TL688_Line ES-LI 69kV ck 1 AND TL6951_Line PA-PA GEN 69kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	130.4	< 100	
	TL23030+688_Lines ES-TA-SJC 230kV ck 1 + ES-LI 69kV ck 1	P7	DCTL	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	109.2	< 100	
22008 ASH 69.0 22012 ASH TP 69.0 1 1	TL688_Line ES-LI 69kV ck 1 AND TL6951_Line PA-PA GEN 69kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	104.1	< 100	
22688 RINCON 69.0 22870 VALCNTR 69.0 1 1	TL681_Line AS-VC-FE 69kV ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.3	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
22256 ESCNDIDO 69.0 22404 LILAC 69.0 1 1	PA_GEN1_Gen PA GEN1 ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.0	< 100	
	PA_GEN2_Gen PA GEN2 ID 1 AND TL681_Line AS-VC-FE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	103.0	< 100	
22208 EL CAJON 69.0 22408 LOSCOCHS 69.0 1 1	EC-69-S_Bus EL CAJON 69kV S	P2	Bus Section Fault	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	100.9	< 100	< 100	Continue to monitor the thermal overload concern identified in the 2028 Summer Peak sensitivity case.
	EC GEN1_Gen EC GEN1 ID 1 AND TL630_Line EC-GR 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	101.6	< 100	< 100	< 100	< 100	< 100	< 100	Rely on congestion management by limiting the charging of El Cajon battery energy storage after the first contingency for the P3 events.
	EC GEN2_Gen EC GEN2 ID 1 AND TL630_Line EC-GR 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	103.6	< 100	< 100	< 100	< 100	< 100	< 100	
22768 BAY BLVD 69.0 22352 IMPRLBCH 69.0 1 1	Base Case	P0	Base Case	< 100	< 100	< 100	121.4	< 100	110.6	< 100	< 100	< 100	< 100	< 100	In the 2036 Summer Peak case, rely on 30-min short-term emergency rating (27% higher than its normal rating), giving the market and operators enough time to eliminate the identified thermal overload. The system adjustments that can be implemented are to dispatch battery energy storage at Otay or Border substations. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed. It should be noted that load growth in the Border Subarea is primarily driven by transportation electrification, which, according to the CEC Load Forecast, reaches its peak at HE 24. As a result, the mitigation identified for the 2036 Summer Peak case (HE 18) may not be sufficient to address the peak load within the load pocket. Therefore, discussions with the PTO may be necessary to evaluate potential upgrade solutions.
	TL646_Line BB-OY 69kV ck 2	P1	N-1	< 100	< 100	< 100	160.9	< 100	149.3	< 100	< 100	< 100	< 100	< 100	
	TL645_Line BB-OY 69kV ck 1	P1	N-1	< 100	< 100	< 100	148.4	< 100	137.0	< 100	< 100	< 100	< 100	< 100	
	TL649_1_Line BD-NEWBD 69kV ck 1	P1	N-1	< 100	< 100	< 100	143.6	< 100	132.2	< 100	< 100	< 100	< 100	< 100	
	TL6964_Line ML-SLT 69kV ck 1	P1	N-1	< 100	< 100	< 100	133.2	< 100	118.7	< 100	< 100	< 100	< 100	< 100	
	TL6935_Line BD-BD GEN1&2 69kV ck 1	P1	N-1	< 100	< 100	< 100	130.9	< 100	120.3	< 100	< 100	< 100	< 100	< 100	
	OY_GEN_Gen OY GEN ID 1	P1	G-1	< 100	< 100	< 100	128.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL6929_Line OY-OY GEN 69kV ck 1	P1	N-1	< 100	< 100	< 100	128.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL649_2_Line OY-SYO-NEWBD 69kV ck 1	P1	N-1	< 100	< 100	< 100	128.1	< 100	119.6	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1	P1	G-1	< 100	< 100	< 100	127.2	< 100	116.4	< 100	< 100	< 100	< 100	< 100	
	TL6936_Line BD-BD GEN3 69kV ck 1	P1	N-1	< 100	< 100	< 100	127.2	< 100	115.4	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1	P1	G-1	< 100	< 100	< 100	126.1	< 100	115.3	< 100	< 100	< 100	< 100	< 100	
	BD_GEN2_Gen LRKSPBD2 ID 1	P1	G-1	< 100	< 100	< 100	126.1	< 100	115.4	< 100	< 100	< 100	< 100	< 100	
	ML_BK70_Tran ML 230/69kV ck 1	P1	N-1	< 100	< 100	< 100	125.0	< 100	113.8	< 100	< 100	< 100	< 100	< 100	
	ML_BK71_Tran ML 230/69kV ck 2	P1	N-1	< 100	< 100	< 100	125.0	< 100	113.8	< 100	< 100	< 100	< 100	< 100	
	OY_GEN_Gen OY GEN ID 1 AND TL646_Line BB-OY 69kV ck 2	P3	G-1/N-1	< 100	< 100	103.1	174.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL646_Line BB-OY 69kV ck 2	P3	G-1/N-1	< 100	< 100	100.6	171.4	< 100	159.8	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL646_Line BB-OY 69kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	169.3	< 100	157.9	< 100	< 100	< 100	< 100	< 100	
	BD_GEN2_Gen LRKSPBD2 ID 1 AND TL646_Line BB-OY 69kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	169.3	< 100	157.9	< 100	< 100	< 100	< 100	< 100	
	OY_GEN_Gen OY GEN ID 1 AND TL645_Line BB-OY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	159.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL645_Line BB-OY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	157.4	< 100	146.1	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL645_Line BB-OY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	155.6	< 100	144.4	< 100	< 100	< 100	< 100	< 100	
	BD_GEN2_Gen LRKSPBD2 ID 1 AND TL645_Line BB-OY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	155.6	< 100	144.4	< 100	< 100	< 100	< 100	< 100	
	OY_GEN_Gen OY GEN ID 1 AND TL649_1_Line BD-NEWBD 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	152.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL6964_Line ML-SLT 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	145.9	< 100	131.2	< 100	< 100	< 100	< 100	< 100	
	ML-230-4T_CB MIGUEL 230kV 4T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	125.5	< 100	114.7	< 100	< 100	< 100	< 100	< 100	
	TL23020_Line BB-ML 230kV ck 1 AND TL23042_Line BB-OM-ML 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	116.5	< 100	106.3	< 100	< 100	< 100	< 100	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
22352 IMPRLBCH 69.0 22608 OTAY TP 69.0 1 1	TL647_Line BB-IB 69kV ck 1	P1	N-1	< 100	< 100	< 100	112.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	In the 2036 Summer Off-Peak case, rely on congestion management by limiting the charging of Otay or Border battery energy storage after the first contingency for the P3 events. It should be noted that load growth in the Border Subarea is primarily driven by transportation electrification, which, according to the CEC Load Forecast, reaches its peak at HE 24. No overloads were identified on the TL645 and TL646 Bay Boulevard - Otay 69 kV lines in the 2036 Summer Peak case (HE 18). However, because the load pocket peak occurs at a different hour, discussions with the PTO may be warranted to evaluate potential upgrade solutions should reliability concerns arise during the peak load hour.
22768 BAY BLVD 69.0 22604 OTAY 69.0 1 1	TL646_Line BB-OY 69kV ck 2	P1	N-1	< 100	< 100	< 100	147.4	< 100	143.6	< 100	< 100	< 100	< 100	< 100	
	TL649_1_Line BD-NEWBD 69kV ck 1	P1	N-1	< 100	< 100	< 100	111.6	< 100	108.3	< 100	< 100	< 100	< 100	< 100	
	TL647_Line BB-IB 69kV ck 1	P1	N-1	< 100	< 100	< 100	106.9	< 100	102.1	< 100	< 100	< 100	< 100	< 100	
	OY_GEN_Gen OY GEN ID 1 AND TL646_Line BB-OY 69kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	170.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL646_Line BB-OY 69kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	164.5	< 100	160.7	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL646_Line BB-OY 69kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	161.1	< 100	157.5	< 100	< 100	< 100	< 100	< 100	
	BD_GEN2_Gen LRKSPBD2 ID 1 AND TL646_Line BB-OY 69kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	161.1	< 100	157.6	< 100	< 100	< 100	< 100	< 100	
	OY_GEN_Gen OY GEN ID 1 AND TL649_1_Line BD-NEWBD 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	125.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	OY_GEN_Gen OY GEN ID 1 AND TL647_Line BB-IB 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	120.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL647_Line BB-IB 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	117.2	< 100	112.4	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL6964_Line ML-SLT 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	115.3	< 100	107.0	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL647_Line BB-IB 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	115.2	< 100	110.5	< 100	< 100	< 100	< 100	< 100	
	BD_GEN2_Gen LRKSPBD2 ID 1 AND TL647_Line BB-IB 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	115.2	< 100	110.6	< 100	< 100	< 100	< 100	< 100	
22768 BAY BLVD 69.0 22604 OTAY 69.0 2 1	TL645_Line BB-OY 69kV ck 1	P1	N-1	< 100	< 100	< 100	156.0	< 100	151.8	< 100	< 100	< 100	< 100	< 100	
	TL649_1_Line BD-NEWBD 69kV ck 1	P1	N-1	< 100	< 100	< 100	139.0	< 100	134.8	< 100	< 100	< 100	< 100	< 100	
	TL647_Line BB-IB 69kV ck 1	P1	N-1	< 100	< 100	< 100	133.0	< 100	127.1	< 100	< 100	< 100	< 100	< 100	
	TL6964_Line ML-SLT 69kV ck 1	P1	N-1	< 100	< 100	< 100	119.5	< 100	109.5	< 100	< 100	< 100	< 100	< 100	
	TL6935_Line BD-BD GEN1&2 69kV ck 1	P1	N-1	< 100	< 100	< 100	115.0	< 100	112.4	< 100	< 100	< 100	< 100	< 100	
	OY_GEN_Gen OY GEN ID 1	P1	G-1	< 100	< 100	< 100	111.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL6929_Line OY-OY GEN 69kV ck 1	P1	N-1	< 100	< 100	< 100	111.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL6936_Line BD-BD GEN3 69kV ck 1	P1	N-1	< 100	< 100	< 100	108.0	< 100	103.1	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1	P1	G-1	< 100	< 100	< 100	107.9	< 100	105.1	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1	P1	G-1	< 100	< 100	< 100	105.8	< 100	103.0	< 100	< 100	< 100	< 100	< 100	
	BD_GEN2_Gen LRKSPBD2 ID 1	P1	G-1	< 100	< 100	< 100	105.8	< 100	103.0	< 100	< 100	< 100	< 100	< 100	
	ML_BK70_Tran ML 230/69kV ck 1	P1	N-1	< 100	< 100	< 100	103.5	< 100	100.0	< 100	< 100	< 100	< 100	< 100	
	ML_BK71_Tran ML 230/69kV ck 2	P1	N-1	< 100	< 100	< 100	103.5	< 100	100.0	< 100	< 100	< 100	< 100	< 100	
	OY_GEN_Gen OY GEN ID 1 AND TL645_Line BB-OY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	180.6	104.6	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL645_Line BB-OY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	174.1	101.6	169.9	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL645_Line BB-OY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	170.5	< 100	166.5	< 100	< 100	< 100	< 100	< 100	
	BD_GEN2_Gen LRKSPBD2 ID 1 AND TL645_Line BB-OY 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	170.5	< 100	166.6	< 100	< 100	< 100	< 100	< 100	
	OY_GEN_Gen OY GEN ID 1 AND TL649_1_Line BD-NEWBD 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	156.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
	OY_GEN_Gen OY GEN ID 1 AND TL647_Line BB-IB 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	150.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL647_Line BB-IB 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	145.9	< 100	140.0	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL6964_Line ML-SLT 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	143.6	< 100	133.2	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL647_Line BB-IB 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	143.4	< 100	137.6	< 100	< 100	< 100	< 100	< 100	
	BD_GEN2_Gen LRKSPBD2 ID 1 AND TL647_Line BB-IB 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	143.4	< 100	137.6	< 100	< 100	< 100	< 100	< 100	
	ML-230-4T_CB MIGUEL 230kV 4T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	104.1	< 100	101.3	< 100	< 100	< 100	< 100	< 100	
	ML_BK70_Tran ML 230/69kV ck 1 AND TL23026_Line SG-BB 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	102.1	< 100	< 100	< 100	< 100	< 100	
	TL23041_Line SX-OM-ML 230kV ck 1 AND TL50001_Line ECO-ML 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	101.0	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22604 OTAY 69.0 22080 BORDERTP 69.0 1 1	Base Case	P0	Base Case	< 100	< 100	< 100	131.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	In the 2036 Summer Peak case, 2028 Summer Peak sensitivity case and 2031 Summer Peak sensitivity case, rely on congestion management by dispatching additional gas generation and/or battery energy storage at Border substation after the first contingency for the P3 events. The use of energy storage is subject to verification that it has sufficient MWh capability and can be fully charged when needed. In the 2036 Summer Off-Peak case, 2031 Spring Off-Peak case and 2028 Spring Off-Peak sensitivity case, rely on existing TL649 RAS to reduce the charging of Border energy storage after the P3 events. It should be noted that load growth in the Border Subarea is primarily driven by transportation electrification, which, according to the CEC Load Forecast, reaches its peak at HE 24. As a result, the mitigation identified for the 2036 Summer Peak case (HE 18) may not be sufficient to address the peak load within the load pocket. Therefore, discussions with the PTO may be necessary to evaluate potential upgrade solutions.
	TL649_1_Line BD-NEWBD 69kV ck 1	P1	N-1	< 100	< 100	< 100	259.4	< 100	221.5	< 100	< 100	< 100	< 100	< 100	
	TL623_Line OY-IB-SYO 69kV ck 1	P1	N-1	< 100	< 100	< 100	239.8	< 100	188.5	< 100	< 100	< 100	< 100	< 100	
	TL6964_Line ML-SLT 69kV ck 1	P1	N-1	< 100	< 100	< 100	200.2	< 100	145.3	< 100	< 100	< 100	< 100	< 100	
	TL6935_Line BD-BD GEN1&2 69kV ck 1	P1	N-1	< 100	< 100	< 100	185.9	< 100	153.8	< 100	< 100	< 100	< 100	< 100	
	TL6936_Line BD-BD GEN3 69kV ck 1	P1	N-1	< 100	< 100	< 100	164.6	< 100	125.5	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1	P1	G-1	< 100	< 100	< 100	164.6	< 100	131.5	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1	P1	G-1	< 100	< 100	< 100	157.9	< 100	125.1	< 100	< 100	< 100	< 100	< 100	
	BD_GEN2_Gen LRKSPBD2 ID 1	P1	G-1	< 100	< 100	< 100	157.9	< 100	125.3	< 100	< 100	< 100	< 100	< 100	
	ML_BK70_Tran ML 230/69kV ck 1	P1	N-1	< 100	< 100	< 100	151.1	< 100	116.1	< 100	< 100	< 100	< 100	< 100	
	ML_BK71_Tran ML 230/69kV ck 2	P1	N-1	< 100	< 100	< 100	151.0	< 100	116.0	< 100	< 100	< 100	< 100	< 100	
	TL6910_Line BD-SLT 69kV ck 1	P1	N-1	< 100	< 100	< 100	144.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL623_Line OY-IB-SYO 69kV ck 1	P3	G-1/N-1	< 100	< 100	105.3	285.1	106.7	233.6	< 100	< 100	< 100	< 100	< 100	
	BD_GEN2_Gen LRKSPBD2 ID 1 AND TL623_Line OY-IB-SYO 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	276.0	< 100	225.3	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL623_Line OY-IB-SYO 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	276.0	< 100	225.1	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL6964_Line ML-SLT 69kV ck 1	P3	G-1/N-1	< 100	< 100	126.0	273.7	148.7	217.3	< 100	133.8	< 100	117.9	102.2	
	OY_GEN_Gen OY GEN ID 1 AND TL649_1_Line BD-NEWBD 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	262.2	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN2_Gen LRKSPBD2 ID 1 AND TL6964_Line ML-SLT 69kV ck 1	P3	G-1/N-1	< 100	< 100	112.2	258.9	127.6	203.3	< 100	< 100	< 100	< 100	< 100	
	BD_GEN1_Gen LRKSPBD1 ID 1 AND TL6964_Line ML-SLT 69kV ck 1	P3	G-1/N-1	< 100	< 100	112.2	258.9	127.6	203.2	< 100	< 100	111.4	< 100	< 100	
	KU_GEN_Gen KUMEYAAY ID 1 AND TL623_Line OY-IB-SYO 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	242.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	OY_GEN_Gen OY GEN ID 1 AND TL623_Line OY-IB-SYO 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	234.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL6935_Line BD-BD GEN1&2 69kV ck 1	P3	G-1/N-1	< 100	< 100	111.4	222.3	128.3	190.5	< 100	< 100	< 100	108.7	< 100	
	BD_GEN3_Gen CALPK_BD ID 1 AND TL6910_Line BD-SLT 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	213.3	120.5	169.0	< 100	135.2	< 100	< 100	< 100	
	ML-230-4T_CB MIGUEL 230kV 4T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	152.8	< 100	119.5	< 100	< 100	< 100	< 100	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
	ML_BK70_Tran ML 230/69kV ck 1 AND TL23026_Line SG-BB 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	156.2	< 100	121.5	< 100	< 100	< 100	< 100	< 100	
22581 NORTHCTY 69.0 22644 PENSQTOS 69.0 1 1	TL667_Line DM-PQ 69kV ck 2	P1	N-1	< 100	< 100	< 100	103.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22160 DEL MAR 69.0 22644 PENSQTOS 69.0 1 1	TL6952_Line NCW-PQ 69kV ck 1	P1	N-1	< 100	< 100	< 100	125.9	< 100	117.2	< 100	< 100	< 100	< 100	< 100	
	TL667_Line DM-PQ 69kV ck 2	P1	N-1	< 100	< 100	< 100	121.3	< 100	113.7	< 100	< 100	< 100	< 100	< 100	
	PQ-69-SW_Bus PENASQUITOS 69kV SW	P2	Bus Section Fault	< 100	< 100	< 100	121.3	< 100	113.7	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6952_Line NCW-PQ 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	128.0	< 100	119.7	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL667_Line DM-PQ 69kV ck 2	P3	G-1/N-1	< 100	< 100	< 100	123.6	< 100	116.4	< 100	< 100	< 100	< 100	< 100	
22160 DEL MAR 69.0 22644 PENSQTOS 69.0 2 1	TL6952_Line NCW-PQ 69kV ck 1	P1	N-1	< 100	< 100	< 100	164.0	< 100	152.6	< 100	< 100	< 100	< 100	< 100	
	TL610_Line DM-PQ 69kV ck 1	P1	N-1	< 100	< 100	< 100	141.4	< 100	132.6	< 100	< 100	< 100	< 100	< 100	
	TL616_Line SF-ARR-LHM 69kV ck 1	P1	N-1	< 100	< 100	< 100	128.9	< 100	119.2	< 100	< 100	< 100	< 100	< 100	
	TL674_Line EN-SF 69kV ck 1	P1	N-1	< 100	< 100	< 100	117.9	< 100	109.0	< 100	< 100	< 100	< 100	< 100	
	TL6973_Line NCW-DM 69kV ck 1	P1	N-1	< 100	< 100	< 100	109.8	< 100	104.2	< 100	< 100	< 100	< 100	< 100	
	ARR_BK70_Tran ARR 230/69kV ck 1	P1	N-1	< 100	< 100	< 100	106.1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	It should be noted that load growth in the Del Mar, Encinitas and North City West substations is primarily driven by transportation electrification, which, according to the CEC Load Forecast, reaches its peak at HE 24. No overloads were identified on the TL610 and TL667 Del Mar - Penasquitos, TL6952 North City West - Penasquitos, and TL660 Del Mar - Encinitas 69 kV lines in the 2036 Summer Peak case (HE 18). However, because the load pocket peak occurs at a different hour, discussions with the PTO may be warranted to evaluate potential upgrade solutions should reliability concerns arise during the peak load hour.
	TL6930_Line OV-ES 69kV ck 1	P1	N-1	< 100	< 100	< 100	101.6	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL6913_Line PO-POM 69kV ck 1	P1	N-1	< 100	< 100	< 100	101.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6952_Line NCW-PQ 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	166.7	< 100	155.8	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL610_Line DM-PQ 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	144.1	< 100	135.8	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6973_Line NCW-DM 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	112.5	< 100	107.2	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND ARR_BK70_Tran ARR 230/69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	< 100	101.7	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL23051_Line SX-ARR 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	104.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	PEC_ALL_Gen PEN_CT1/CT2/ST ID 1 AND TL6913_Line PO-POM 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	103.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	ARR_230_1T_CB ARTESIAN RANCH 230kV 1T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	106.7	< 100	100.3	< 100	< 100	< 100	< 100	< 100	
	ES-230-2N_CB ESCONDIDO 230kV 2N	P4	Fault + Stuck Breaker	< 100	< 100	< 100	102.8	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	Bus-PEN230-EW_PALOMAR ENERGY 230 kV E+W BUS	P5	Non-Redundant Relay	< 100	< 100	< 100	104.8	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	TL23051_Line SX-ARR 230kV ck 1 AND TL23072_Line ARR-PEN 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	106.7	< 100	100.3	< 100	< 100	< 100	< 100	< 100	
	TL23007+23052_Lines SJC-SO 230kV ck 1 + TA-SO 230kV ck 1	P7	DCTL	< 100	< 100	< 100	101.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22252 ENCNITAS 69.0 22160 DEL MAR 69.0 1 1	TL616_Line SF-ARR-LHM 69kV ck 1	P1	N-1	< 100	< 100	< 100	110.2	< 100	102.8	< 100	< 100	< 100	< 100	< 100	
22324 GLENCLIF 69.0 22328 GLNCLFTP 69.0 1 1	KU_GEN_Gen KUMEYAAY ID 1 AND TL678_Line LC-AL 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	107.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	KU_GEN_Gen KUMEYAAY ID 1 AND TL625_Line LL-DE 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	107.3	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	KU_GEN_Gen KUMEYAAY ID 1 AND TL6957_Line BAR-LL 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	102.4	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	KU_GEN_Gen KUMEYAAY ID 1 AND TL6914_Line ML-LL 138kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	100.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
	KU_GEN_Gen KUMEYAAY ID 1 AND TL6904_Line LL-AL 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	100.7	< 100	< 100	< 100	< 100	< 100	< 100	< 100	Continue to monitor the thermal overload concerns identified in the 2041 Summer Peak and 2041 Winter Peak cases and discuss with the PTO the potential for upgrade solutions.

California ISO

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
22456 MIGUEL 69.0 22416 LOVELAND 69.0 1 1	KU_GEN_Gen KUMEYAAY ID 1 AND TL678_Line LC-AL 69kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	102.5	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22828 SYCAMORE 69.0 22756 SCRIPPS 69.0 1 1	SX_BK60_Tran SX 230/138kV ck 1 AND TL23071_Line SX-PQ 230kV ck 1	P6	N-1-1	< 100	< 100	< 100	100.5	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
22256 ESCNDIDO 69.0 22260 ESCNDIDO 230 2 1	ES-230-2N_CB ESCONDIDO 230kV 2N	P4	Fault + Stuck Breaker	< 100	< 100	< 100	100.6	< 100	102.0	< 100	< 100	< 100	< 100	< 100	
22804 STUART 69.0 22808 STUARTTP 69.0 1 1	Base Case	P0	Base Case	< 100	< 100	< 100	100.9	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
21331 EC161_SS 161 21059 PILOT_KNB161 161 1 1	S-LINE1_Line WIXOM_SS-IV_WST 230kV ck 1	P1	N-1	< 100	< 100	< 100	106.0	123.8	127.6	< 100	< 100	< 100	< 100	< 100	In the 2036 Summer Off-Peak case, review with IID the planned S-Line RAS, which is designed to trip solar and battery energy storage resources. It is recommended to avoid the tripping of the battery energy storage resources when they are charging and there is a high solar generation output. Furthermore, in the 2036 Summer Peak, 2041 Summer Peak, and 2041 Winter Peak cases, adding the CPUC generic geothermal resources mapped to the Wixom 230 kV Substation to the planned S-Line RAS would mitigate the identified thermal overloads.
	S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS	P1	N-1	< 100	< 100	< 100	106.0	123.7	127.6	< 100	< 100	< 100	< 100	< 100	
	GR1403_Gen GR1403 GEN1 ID VW AND S-LINE1_Line WIXOM_SS-IV_WST 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	110.1	< 100	130.9	< 100	< 100	< 100	< 100	< 100	
	GR1410_Gen GR1410 GEN1 ID VS AND S-LINE1_Line WIXOM_SS-IV_WST 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	133.6	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1410_Gen GR1410 GEN1 ID VS AND S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS	P3	G-1/N-1	< 100	< 100	< 100	< 100	133.4	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1414_Gen GR1414 GEN1 ID VS AND S-LINE1_Line WIXOM_SS-IV_WST 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	130.4	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1414_Gen GR1414 GEN1 ID VS AND S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS	P3	G-1/N-1	< 100	< 100	< 100	< 100	130.3	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1409_Gen GR1409 GEN1 ID VS AND S-LINE1_Line WIXOM_SS-IV_WST 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	128.9	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1409_Gen GR1409 GEN1 ID VS AND S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS	P3	G-1/N-1	< 100	< 100	< 100	< 100	128.8	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1411_Gen GR1411 GEN1 ID VS AND S-LINE1_Line WIXOM_SS-IV_WST 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	126.8	< 100	< 100	< 100	< 100	< 100	< 100	
	GR1411_Gen GR1411 GEN1 ID VS AND S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS	P3	G-1/N-1	< 100	< 100	< 100	< 100	126.7	< 100	< 100	< 100	< 100	< 100	< 100	
	IV_GEN1_ALL_Gen IV GEN1 CT2/CT3/STG ID 1 AND S-LINE1_Line WIXOM_SS-IV_WST 230kV ck 1	P3	G-1/N-1	< 100	< 100	100.2	108.1	126.5	129.8	< 100	< 100	< 100	< 100	< 100	
	GR1415_Gen GR1415 GEN1 ID VS AND S-LINE1_Line WIXOM_SS-IV_WST 230kV ck 1	P3	G-1/N-1	< 100	< 100	< 100	< 100	126.5	< 100	< 100	< 100	< 100	< 100	< 100	
	IV_GEN1_ALL_Gen IV GEN1 CT2/CT3/STG ID 1 AND S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS	P3	G-1/N-1	< 100	< 100	< 100	108.1	126.4	129.8	< 100	< 100	< 100	< 100	< 100	
	GR1415_Gen GR1415 GEN1 ID VS AND S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS	P3	G-1/N-1	< 100	< 100	< 100	< 100	126.4	< 100	< 100	< 100	< 100	< 100	< 100	
	IV-230-20N_CB IMPERIAL VALLEY 230kV 20N	P4	Fault + Stuck Breaker	< 100	< 100	< 100	106.0	123.8	127.6	< 100	< 100	< 100	< 100	< 100	
	IV-230-20T_CB IMPERIAL VALLEY 230kV 20T	P4	Fault + Stuck Breaker	< 100	< 100	< 100	106.0	123.8	127.6	< 100	< 100	< 100	< 100	< 100	
	S-LINE1_Line WIXOM_SS-IV_WST 230kV ck 1 AND VAL-ALB_Line VAL-ALB 500kV ck 1	P6	N-1-1	< 100	< 100	116.3	118.0	135.7	138.4	< 100	< 100	< 100	< 100	< 100	
	S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS AND VAL-ALB_Line VAL-ALB 500kV ck 1	P6	N-1-1	< 100	< 100	115.8	118.0	135.5	138.4	< 100	< 100	< 100	< 100	< 100	
21731 VEGA_3_SS 161 21047 NILAND161 161 1 1	S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS AND VAL-ALB_Line VAL-ALB 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	105.9	< 100	< 100	< 100	< 100	< 100	< 100	
	S-LINE1_Line WIXOM_SS-IV_WST 230kV ck 1 AND VAL-ALB_Line VAL-ALB 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	105.5	< 100	< 100	< 100	< 100	< 100	< 100	
21204 ARKANSAS_SS 161 21047 NILAND161 161 1 1	S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS	P1	N-1	< 100	< 100	< 100	< 100	100.0	< 100	< 100	< 100	< 100	< 100	< 100	
	S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS AND HAA-HDW_Line HAA-HDW 500kV ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	104.5	< 100	< 100	< 100	< 100	< 100	< 100	

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
22342 HDWSH 500 kV	HAA-NG_Line HAA-NG 500kV ck 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P6	N-1-1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	1.101	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	Coordinate voltage control with APS after the first contingency for the P6 event by disconnecting shunt capacitors and/or connecting tertiary shunt reactors.
22972 AGUACAL1 500 kV	HAA-NG_Line HAA-NG 500kV ck 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P6	N-1-1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	1.101	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	
230172 GR1410_HV 500 kV	HAA-NG_Line HAA-NG 500kV ck 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P6	N-1-1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	1.101	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	
14433 Q225 500 kV	HAA-NG_Line HAA-NG 500kV ck 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P6	N-1-1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	1.101	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	
148135 Q227 500 kV	HAA-NG_Line HAA-NG 500kV ck 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P6	N-1-1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	1.101	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	
148280 Q332 500 kV	HAA-NG_Line HAA-NG 500kV ck 1 AND HAA-HDW_Line HAA-HDW 500kV ck 1	P6	N-1-1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	1.101	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	0.945 < V < 1.1	
20238 HRA-230 230 kV	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.891	0.9 < V < 1.1	0.9 < V < 1.1	Rely on existing TL50001 Gen Drop RAS or TL50003 Gen Drop RAS to trip generation in the greater Imperial Valley area.
20392 TOY-230 230 kV	TL50001_Line ECO-ML 500kV ck 1 AND TL50003_Line OCO-SCR 500kV ck 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.894	0.9 < V < 1.1	0.9 < V < 1.1	
21072 YUCCA161 161 kV	HAA-HDW_Line HAA-HDW 500kV ck 1 AND S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.898	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	Review with IID the planned S-Line RAS, which is designed to trip solar and battery energy storage resources. It is recommended to avoid the tripping of the battery energy storage resources when they are charging and there is a high solar generation output.
21059 PILOT_KNB161 161 kV	HAA-HDW_Line HAA-HDW 500kV ck 1 AND S-LINE1+RAS_Line WIXOM_SS-IV_WST 230kV ck 1 + RAS	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.899	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	

Overloaded Facility	Contingency (P1 and P3)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)								Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
22004 ALPINE 69 kV	KU_GEN_Gen KUMEYAAY ID 1 AND TL678_Line LC-AL 69kV ck 1	P3	G-1/N-1	< 8	< 8	< 8	9.16	< 8	< 8	< 8	< 8	< 8	< 8	< 8	Due to the radial nature of these rural substations, there are no systems adjustments that could be performed to reduce the post contingency voltage deviation. Therefore, the reliability concern identified in the 2041 Summer Peak case will be monitored in future planning cycles.
22040 BARRETT 69 kV	KU_GEN_Gen KUMEYAAY ID 1 AND TL678_Line LC-AL 69kV ck 1	P3	G-1/N-1	< 8	< 8	< 8	8.75	< 8	< 8	< 8	< 8	< 8	< 8	< 8	
22104 CAMERON 69 kV	KU_GEN_Gen KUMEYAAY ID 1 AND TL678_Line LC-AL 69kV ck 1	P3	G-1/N-1	< 8	< 8	< 8	8.82	< 8	< 8	< 8	< 8	< 8	< 8	< 8	
22168 DESCANSO 69 kV	KU_GEN_Gen KUMEYAAY ID 1 AND TL625_Line LL-DE 69kV ck 1	P3	G-1/N-1	< 8	< 8	< 8	9.32	< 8	< 8	< 8	< 8	< 8	< 8	< 8	
	KU_GEN_Gen KUMEYAAY ID 1 AND TL678_Line LC-AL 69kV ck 1	P3	G-1/N-1	< 8	< 8	< 8	8.79	< 8	< 8	< 8	< 8	< 8	< 8	< 8	
22324 GLENCLIF 69 kV	KU_GEN_Gen KUMEYAAY ID 1 AND TL625_Line LL-DE 69kV ck 1	P3	G-1/N-1	< 8	< 8	< 8	8.50	< 8	< 8	< 8	< 8	< 8	< 8	< 8	
	KU_GEN_Gen KUMEYAAY ID 1 AND TL678_Line LC-AL 69kV ck 1	P3	G-1/N-1	< 8	< 8	< 8	8.85	< 8	< 8	< 8	< 8	< 8	< 8	< 8	
22416 LOVELAND 69 kV	KU_GEN_Gen KUMEYAAY ID 1 AND TL678_Line LC-AL 69kV ck 1	P3	G-1/N-1	< 8	< 8	< 8	8.59	< 8	< 8	< 8	< 8	< 8	< 8	< 8	
22902 CRESTWD 69 kV	KU_GEN_Gen KUMEYAAY ID 1 AND TL678_Line LC-AL 69kV ck 1	P3	G-1/N-1	< 8	< 8	< 8	8.85	< 8	< 8	< 8	< 8	< 8	< 8	< 8	
22903 KUMEYAAY 69 kV	KU_GEN_Gen KUMEYAAY ID 1 AND TL678_Line LC-AL 69kV ck 1	P3	G-1/N-1	< 8	< 8	< 8	8.85	< 8	< 8	< 8	< 8	< 8	< 8	< 8	

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2031 Summer Peak	2036 Summer Peak	2028 Spring Off-Peak	2036 Summer Off-Peak	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
SLO 3PH Fault at DEVERS 500, trip DEVERS - VALLEYSC 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at PALO VERDE 500kV, trip PALO VERDE - COLRIVER 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 500kV, trip IMPRLVLY - ECO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 500kV, trip IMPRLVLY - N.GILA 500kV ck 1	P1	N-1	No issues	-	No issues	-	No issues	No issues	No violation
SLO 3PH Fault at IV 500kV, trip IMPRLVLY - GR1414 POI 500kV ck 1	P1	N-1	-	No issues	-	No issues	-	-	No violation
SLO 3PH Fault at HAA 500kV, trip HAA - HDWSH 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at NG 500kV, trip NG - HAA 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at HDWSH 500kV, trip HDWSH - NG 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at ML 500kV, trip MIGUEL - ECO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 500kV, trip IMPRLVLY - OCOTILLO 500kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at SCR 500kV, trip SUNCREST - OCOTILLO 500kV ck 1	P1	N-1	No issues	-	No issues	-	No issues	No issues	No violation
SLO 3PH Fault at SCR 500kV, trip SUNCREST - GR1404 500kV	P1	N-1	-	No issues	-	No issues	-	-	No violation
SLO 3PH Fault at IV 500kV, trip IMPRLVLY - RECON 500kV ck 1	P1	N-1	-	No issues	-	No issues	-	-	No violation
SLO 3PH Fault at RECON 500kV, trip RECON - SERRANO 500kV ck 1	P1	N-1	-	No issues	-	No issues	-	-	No violation
SLO 3PH Fault at PEN 230kV, trip PEN - ESCNDIDO 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at PQ 230kV, trip PENSQTOS - OLD TOWN 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at SA 230kV, trip SANLUSRY - ENCINA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at TA 230kV, trip S.ONOFRE - TALEGA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at PQ 230kV, trip PENSQTOS - SYCAMORE 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at SG 230kV, trip SILVERGT - BAY BLVD 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 230kV, trip IMPRLVLY PFC - ROA-230 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at TA 230kV, trip TALEGA - ESCNDIDO - CAPSTRNO 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at OM 230kV, trip MIGUEL - BAY BLVD - OTAY MESA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at OT 230kV, trip OLD TOWN - MISSION - SILVERGT 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at OM 230kV, trip OTAYMESA - TJI-230 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 230kV, trip IMPRLVLY - ELCENTSW 230kV ck 1	P1	N-1	No issues	-	No issues	-	No issues	No issues	No violation
SLO 3PH Fault at IV 230kV, trip IMPRLVLY WST - WIXOM_SS 230kV ck 1	P1	N-1	-	No issues	-	No issues	-	-	No violation
SLO 3PH Fault at RECON 230kV, trip RECON - VIEJO 230kV ck 1	P1	N-1	-	No issues	-	No issues	-	-	No violation
SLO 3PH Fault at NG 500kV, trip N.GILA - IMPRLVLY 500kV ck 2	P1	N-1	-	No issues	-	No issues	-	-	No violation
SLO 3PH Fault at SA 230kV, trip SANLUSRY - S.ONOFRE 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at SJC 230kV, trip CAPSTRNO - S.ONOFRE 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at ML 230kV, trip MIGUEL - MISSION 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at ML 230kV, trip MIGUEL - SYCAMORE - OTAYMESA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at ARR 230kV, trip ARTESN - SYCAMORE 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at SA 230kV, trip SANLUSRY - ENCINA - PEN 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at IV 230kV, trip IMPRLVLY - DREW 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at PEN 230kV, trip PEN - ARTESN 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at PQ 230kV, trip PENSQTOS - ENCINA 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at SCR 230kV, trip SUNCREST - SYCAMORE 230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH Fault at SCR 230kV, trip SUNCREST - MIGUEL 230kV ck 1	P1	N-1	-	No issues	-	No issues	-	-	No violation
BUS 3PH Fault at SCR SVC 230kV	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUS 3PH Fault at ML-Syncon A+B 500kV	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUS 3PH Fault at SA-Syncon 230kV	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUS 3PH Fault at TA-Syncon 230kV	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SLO 3PH at IV-Bus Reactor 230kV	P1	N-1	-	No issues	-	No issues	-	-	No violation
BUS 3PH Fault at Tran IV 500/230kV ck 3	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUS 3PH Fault at Tran ML 500/230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUS 3PH Fault at Tran SCR 500/230kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUS 3PH Fault at Tran SX 230/69kV ck 1	P1	N-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUS 3PH Fault at EA Gen 1 (CEC) 230kV	P1	G-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUS 3PH Fault at Pio Pico (PEC) 230kV	P1	G-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUS 3PH Fault at Otay Mesa (OMEC) 230kV	P1	G-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUS 3PH Fault at IV Gen 1 230kV	P1	G-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
Loss of PEN_ST and 3PH Fault at Encina	P3	G-1-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
Loss of PEN_ST and 3PH Fault at Otay Mesa	P3	G-1-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2031 Summer Peak	2036 Summer Peak	2028 Spring Off-Peak	2036 Summer Off-Peak	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	
Loss of Encina and 3PH Fault at Otay Mesa	P3	G-1-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
Loss of Encina and 3PH Fault at IV GEN 1	P3	G-1-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
Loss of PEN_ST and 3PH Fault at IV GEN 1	P3	G-1-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
Loss of IV GEN 1 and 3PH Fault at INTBCT	P3	G-1-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BQ-138 Bus BATIQUITOS 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
BUE-138 BUS BOULEVARD EAST 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
CAN-138 BUS CANNON 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
ECO-138 BUS EAST COUNTY 138kv E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
FR-138 BUS FRIARS 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
GHL-138 BUS GRANT HILL 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
MS-138 Bus MISSION 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
PAR-138 BUS PALOMAR AIRPORT 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
PEN-230 BUS PALOMAR ENERGY 230kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
PI-138 BUS PICO 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
PV-138 BUS PROCTOR VALLEY 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
RMV-138 BUS RANCHO MISSION VIEJO 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SN-138 BUS SANTEE 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SH-138 BUS SHADOWRIDGE 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
SX-138 BUS SYCAMORE CANYON 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
TA-138 BUS TALEGA 138kV E+W	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
TC-138 BUS TELEGRAPH CANYON 138kV N+S	P5.5	Non-Redundant Relay	No issues	No issues	No issues	No issues	No issues	No issues	No violation
TL 50001 out of service and 3PH fault at bus on one remote end connecting TL 50003	P6	N-1-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
TL 50001 out of service and 3PH fault at bus on one remote end connecting TL 23054	P6	N-1-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
TL 50001 out of service and 3PH fault on Line IV-RECON	P6	N-1-1	-	No issues	-	No issues	-	-	No violation
IV-NG line #2 out of service and 3PH fault on Line IV-RECON	P6	N-1-1	-	No issues	-	No issues	-	-	No violation
NG-GR1414 line #1 out of service and 3ph fault on IV-NG line #2	P6	N-1-1	-	No issues	-	No issues	-	-	No violation
IV_BK81 taken out of service and 3PH fault on IV_BK82 Transformer	P6	N-1-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
ML_BK80 taken out of service and 3PH fault on SCR_BK80 Transformer	P6	N-1-1	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at ML 230kV, trip both lines MIGUEL - MISSION 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at SA 230kV, trip TL23002 and TL23010 SANLUSRY - S.ONOFRE 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at SO 230kV, trip both lines S.ONOFRE - SANTIAGO 230kV	P7	DCTL	No issues	-	No issues	-	No issues	No issues	No violation
DLO 3PH Fault at RECON 230kV, trip both lines RECON - SANTIAGO 230kV	P7	DCTL	-	No issues	-	No issues	-	-	No violation
DLO 3PH Fault at SA 230kV, trip both lines SANLUSRY SC - MISSION 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at OM 230kV, trip MIGUEL - BAY BLVD - OTAYMESA and MIGUEL - SYCAMORE - OTAYMESA 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at ML 230kV, trip MIGUEL - SYCAMORE 230kV and MIGUEL - SYCAMORE - OTAYMESA 230kV	P7	DCTL	No issues	-	No issues	-	No issues	No issues	No violation
DLO 3PH Fault at ML 230kV, trip MIGUEL - SUNCREST 230kV and MIGUEL - SYCAMORE - OTAYMESA 230kV	P7	DCTL	-	No issues	-	No issues	-	-	No violation
DLO 3PH Fault at SA 230kV, trip SANLUSRY - ENCINA 230kV and SANLUSRY - ENCINATP 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at PEN 230kV, trip PEN - ARTESN 230kV and PEN - ENCINATP 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at SCR 230kV, trip both lines SUNCREST - SYCAMORE 230kV	P7	DCTL	No issues	No issues	No issues	No issues	No issues	No issues	No violation
DLO 3PH Fault at RECON 230kV, trip two lines S.ONOFRE - RECON 230kV	P7	DCTL	-	No issues	-	No issues	-	-	No violation
DLO 3PH Fault at SO 230kV, trip S.ONOFRE - RECON ck 3 230kV and S.ONOFRE - SERRANO 230kV ck 1	P7	DCTL	-	No issues	-	No issues	-	-	No violation

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)											Potential Mitigation Solutions
			2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	

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

Substation	Load Served (MW)											Potential Mitigation Solutions
	2028 Summer Peak	2031 Summer Peak	2036 Summer Peak	2041 Summer Peak	2036 Summer Off-Peak	2041 Winter Peak	2028 Spring Off-Peak	2031 Spring Off-Peak	2028 Summer Peak Heavy Renewable & Minimum Gas Generation	2028 Spring Off-Peak Storage charging in load pockets	2031 Summer Peak 1-in-20 load forecast	

No single source substation with more than 100 MW