

Study Area: San Diego Area
Thermal Overloads



Overloaded Facility	Contingency	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			ISO Approved Projects & Potential Mitigation Solutions
				2021 Summer Peak	2024 Summer Peak	2029 Summer Peak	2021 Spring Off-Peak	2024 Spring Off-Peak	2024 SP High CEC Forecast	2024 SpOP Hi Renew & Min Gas Gen	2021 SP Heavy Renewable & Min Gas Gen	
22192 DOUBLTTP 138 22300 FRIARS 138 1 1	P1L-23026_22652 PENSQTOS-22596 OLD TOWN 230 1 -AND- P1L-23033_22832 SYCAMORE-22652 PENSQTOS 230 1	P6*	L-1/L-1	<90	<90	<90	<90	<90	<90	103.2	97.7	Rely on the market congestion management to reduce import from CENACE for the P6 and P7 overloads in the off-peak case; and eliminate the P7 contingency if cost-effective
	P7-TL23013+23071_Lines PQ-OT 230kV ck 1 + SX-PQ 230kV ck 1	P7	L-2	<90	<90	<90	<90	<90	<90	102.9	97.8	
22046 BASILONE 69.0 22368 JAP MESA 69.0 1 1	P5-SA230_SAN LUIS REY 230 kV Bus	P5	Non-Redundant Relay	133.4	<90	<90	<90	<90	<90	<90	172.9	Will be eliminated by previously approved projects or potential upgrade of the San Luis Rey 230 kV bus protection relay. Existing 69kV TL 695A at TA is an interim mitigation
22808 STUARTTP 69.0 22400 LASPULGS 69.0 1 1	P5-SA230_SAN LUIS REY 230 kV Bus	P5	Non-Redundant Relay	118.3	236.9	<90	<90	271.1	302.9	178.4	155.4	
22256 ESCNDIDO 69.0 22724 SANMRCOS 69.0 1 1	P5-SA230_SAN LUIS REY 230 kV Bus	P5	Non-Redundant Relay	101.6	101.6	109.0	<90	96.3	117.6	100.3	91.0	Upgrade the San Luis Rey 230 kV bus protection with redundant relay; and evaluate other mitigations if cost-effective
22256 ESCNDIDO 69.0 22724 SANMRCOS 69.0 2 1	P5-SA230_SAN LUIS REY 230 kV Bus	P5	Non-Redundant Relay	95.4	95.4	102.4	<90	90.5	110.4	94.3	<90	
22440 MELROSE 69.0 22442 MELRSETP 69.0 1 1	P5-SA230_SAN LUIS REY 230 kV Bus	P5	Non-Redundant Relay	96.4	96.7	103.4	<90	106.2	113.0	108.4	<90	
22442 MELRSETP 69.0 22724 SANMRCOS 69.0 1 1	P5-SA230_SAN LUIS REY 230 kV Bus	P5	Non-Redundant Relay	182.4	177.0	188.2	96.2	188.0	205.4	197.0	157.2	
22430 SILVERGT 230 22596 OLD TOWN 230 1 1	P5-MS230_Mission 230 kV Bus	P5	Non-Redundant Relay	<90	90.7	<90	<90	<90	92.9	103.1	104.1	The short term emergency rating of the lines can be relied upon in allowing operation action to reduce generation in the Otay Mesa and Pio Pico area in the summer peak case and curtail import from CENACE in the off-peak case after the P5 contingency
22430 SILVERGT 230 22596 OLD TOWN 230 1 1	P1ML-23019_22596 MISSION-OLD TOWN-SILVERGT 3T 230 1 -AND- P1L-23033_22832 SYCAMORE-22652 PENSQTOS 230 1	P6*	L-1/L-1	95.3	105.1	97.8	<90	91.4	107.5	123.5	124.2	The short term emergency rating of the lines can be relied upon in allowing operation action as System adjustment to reduce generation in the Otay Mesa and Pio Pico area in the summer peak case and curtail import from CENACE in the off-peak case after the P6 contingencies
	P1ML-23019_22596 MISSION-OLD TOWN-SILVERGT 3T 230 1 -AND- P1L-50003RASO_23310 OCOTILLO-22885 SUNCREST 500KV &1	P6*	L-1/L-1	94.5	107.4	101.3	<90	95.9	110.5	127.8	125.7	
22430 SILVERGT 230 22597 OLDTWNTP 230 1 1	P1L-23011_22430 SILVERGT-22596 OLD TOWN 230 1 -AND- P1L-23033_22832 SYCAMORE-22652 PENSQTOS 230 1	P6*	L-1/L-1	94.2	103.4	96.2	<90	<90	105.6	122.1	122.3	
	P1L-23011_22430 SILVERGT-22596 OLD TOWN 230 1 -AND- P1L-50003RASO_23310 OCOTILLO-22885 SUNCREST 500KV &1	P6*	L-1/L-1	94.1	106.5	100.4	<90	95.1	109.4	127.3	124.7	
22430 SILVERGT 230 22771 BAY BLVD 230 1 1	P1ML-23017_22464 MIGUEL-SYCAMORE-OTAYMESA 3T 230 1 -AND- P1L-50003RASO_23310 OCOTILLO-22885 SUNCREST 500KV &1	P6*	L-1/L-1	<90	96.8	94.2	<90	<90	102.0	105.5	108.3	
	P1L-23015_22464 MIGUEL-22504 MISSION 230 2 -AND- P1L-50003RASO_23310 OCOTILLO-22885 SUNCREST 500KV &1	P6*	L-1/L-1	<90	96.3	93.7	<90	<90	101.4	104.3	107.2	
	P1L-23032_22832 SYCAMORE-22464 MIGUEL 230 1 -AND- P1L-50003RASO_23310 OCOTILLO-22885 SUNCREST 500KV &1	P6*	L-1/L-1	<90	95.8	93.2	<90	<90	100.9	104.5	107.0	
22832 SYCAMORE 230 22652 PENSQTOS 230 1 1	P1L-50001RASO_22930 ECO-22468 MIGUEL 500KV &1 -AND- P1L-23060_22010 ARTESN-22832 SYCAMORE 230 1	P6*	L-1/L-1	<90	<90	<90	<90	<90	<90	96.7	100.2	Rely on System adjustment to curtail renewable generation in the greater IV area after the first contingency in the sensitivity case with high renewable output
22886 SUNCREST 230 228860 SUNCREST 230 1 1 and 22886 SUNCREST 230 228861 SUNCREST 230 2 1	P1L-50001RASO_22930 ECO-22468 MIGUEL 500KV &1	P1	L-1	<90	93.8	<90	<90	90.9	100.9	114.7	126.2	Market congestion management, operation procedure, and the 30-minute short term emergency ratings of the lines can be relied upon to perform generation resources redispatch in the SDGE area and adjustment of the IV phase shifters;
	P1G_OT_OTAY MESA Plant G-1 -AND- P1L-50001RASO_22930 ECO-22468 MIGUEL 500KV &1	P3*	G-1/L-1	<90	99.1	94.7	<90	94.7	106.5	<90	133.6	
	P4-ECO-500-4T_CB EAST COUNTY 500KV 4T	P4	Fault+Stuck Breaker	<90	<90	<90	<90	<90	96.6	108.8	120.1	The 30-minute short term emergency ratings of the lines can be relied upon in allowing operation action to redispatch generation in the SDGE area and/or adjust the IV phase shifters after the contingency
22886 SUNCREST 230 228861 SUNCREST 230 2 1	P1L-23054RASO_22886 SUNCREST-22832 SYCAMORE 230KV 1 1	P1	L-1	<90	94.1	<90	<90	<90	100.7	104.6	119.9	
22886 SUNCREST 230 228860 SUNCREST 230 1 1	P4-SX-230-22T_CB SYCAMORE CANYON 230KV 22T	P4	Fault+Stuck Breaker	<90	96.1	<90	<90	<90	102.8	107.6	122.0	Market congestion management, operation procedure, and the 30-minute short term emergency ratings of the lines can be relied upon to redispatch generation resources including preferred resources and energy storage, curtail import, adjust the IV phase shifters, along with existing TL23054/TL23055 RAS.
22886 SUNCREST 230 228861 SUNCREST 230 2 1	P1L-50001RASO_22930 ECO-22468 MIGUEL 500KV &1 -AND- P1L-23054RAS2-P1P6_22886 SUNCREST-22832 SYCAMORE 230KV 1 1	P6*	L-1/L-1	123.2	162.9	152.8	<90	160.6	177.8	206.8	232.1	
	P1L-50001RASO_22930 ECO-22468 MIGUEL 500KV &1 -AND- P1L-23054RAS2-P1P6_22886 SUNCREST-22832 SYCAMORE 230KV 1 1 -WITH- System adjustment between two overlapping P1 events	P6*	L-1/L-1	123.7	117.9	122.5	<90	<90	124.4	122.6	124.7	Existing Miguel BK 80 / BK 81 RAS can be relied upon to eliminate the P4 overload
22464 MIGUEL 230 22472 MIGUELMP 500 1 1	P4-ML-230-2T_CB MIGUEL 230KV 2T	P4	Fault+Stuck Breaker	<90	97.5	<90	<90	<90	104.0	107.7	126.6	
22464 MIGUEL 230 22468 MIGUEL 500 2 1	P1L-50003RASO_23310 OCOTILLO-22885 SUNCREST 500KV &1 -AND- P1T-50012RAS2-PPSD_22464 MIGUEL BK80 500/230KV	P6*	L-1/T-1	97.2	126.6	120.2	<90	124.5	135.5	157.9	174.9	Market congestion management and operation procedure can be relied upon to redispatch generation resources including preferred resources and energy storage, curtail import, and adjust the IV phase shifters, along with existing Miguel BK 80 / BK 81 RAS.
	P1L-50003RASO_23310 OCOTILLO-22885 SUNCREST 500KV &1 -AND- P1T-50012RAS2-PPSD_22464 MIGUEL BK80 500/230KV -WITH- System adjustment between two overlapping P1 events	P6*	L-1/T-1	99.8	93.6	96.8	<90	<90	98.1	94.4	99.2	
22886 SUNCREST 230 22888 SNCRSMP1 500 1 1	P1L-50001RASO_22930 ECO-22468 MIGUEL 500KV &1 -AND- P1T-50022RASO_22885 SUNCREST BK81 500/230KV	P6*	L-1/T-1	104.7	130.9	124.7	<90	127.7	137.2	155.5	152.4	Market congestion management and operation procedure can be relied upon to redispatch generation resources including preferred resources and energy storage, curtail import, and adjust the IV phase shifters
22930 ECO 500 22468 MIGUEL 500 1 1	P1L-50003RASO_23310 OCOTILLO-22885 SUNCREST 500KV &1	P1	L-1	<90	<90	<90	<90	<90	<90	90.5	102.3	Rely on the market congestion management and operation action to redispatch generation resources in the SDGE area and adjust the IV phase shifting transformers. Consider modifying existing TL 23040 IV 500kV N-1 RAS to reduce renewable generation curtailment
	P1G_OT_OTAY MESA Plant G-1 -AND- P1L-50003RASO_23310 OCOTILLO-22885 SUNCREST 500KV &1	P3*	G-1/L-1	<90	<90	<90	<90	<90	<90	<90	109.1	
22609 OTAYMESA 230 20149 TJI-230 230 1 1	P1L-50003RASO_23310 OCOTILLO-22885 SUNCREST 500KV &1 -AND- P1L-50001RAS2-P6_22930 ECO-22468 MIGUEL 500KV &1	P6*	L-1/L-1	<90	128.6	115.4	<90	129.4	140.2	171.8	90.8	

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				2021 Summer Peak	2024 Summer Peak	2029 Summer Peak	2021 Spring Off-Peak	2024 Spring Off-Peak	2024 SP High CEC Forecast	2024 SpOP Hi Renew & Min Gas Gen	2021 SP Heavy Renewable & Min Gas Gen	
22357 IV PFC1 230 22358 IV PFC 230 1 1 and 22357 IV PFC1 230 22358 IV PFC 230 2 1	P1L-50003RAS0_23310 OCOTILLO-22885 SUNCREST 500KV &1 -AND- P1L-50001RAS2-P6_22930 ECO-22468 MIGUEL 500KV &1	P6*	L-1/L-1	<90	113.2	102.3	<90	<90	121.5	122.0	109.5	Rely on the market congestion management and operation action to redispatch generation respources in the SDGE area, curtail import, and adjust the IV phase shifting transformers, along with existing RAS for TL50001 and TL50003
22357 IV PFC1 230 22358 IV PFC 230 1 1 and 22357 IV PFC1 230 22358 IV PFC 230 2 1	P1L-50001RAS0_22930 ECO-22468 MIGUEL 500KV &1 -AND- P1L-50003RAS2-P6_23310 OCOTILLO-22885 SUNCREST 500KV &1	P6*	L-1/L-1	<90	94.7	<90	<90	<90	101.0	103.5	<90	
22358 IV PFC 230 20118 ROA-230 230 1 1	P1L-50003RAS0_23310 OCOTILLO-22885 SUNCREST 500KV &1 -AND- P1L-50001RAS2-P6_22930 ECO-22468 MIGUEL 500KV &1	P6*	L-1/L-1	<90	99.1	<90	<90	<90	109.0	107.5	96.9	
22844 TALEGA 230 24131 S.ONOFRE 230 1 1	P1L-TIE23_22113 CAPSTRNO-24131 S.ONOFRE 230 1 -AND- P1L-50002_22536 N.GILA-22360 IMPRLVLY 500KV &1	P6*	L-1/L-1	<90	108.0	115.8	<90	91.4	122.9	<90	<90	The short term emergency rating of the lines can be relied upon to allow time for operation action as system adjustment to reduce reactive power output from the synchronous condensers at Talega
24072 JOHANNA 230 24134 SANTIAGO 230 1 1	P1L-SCE06_24044 ELLIS-24134 SANTIAGO 230 1 -AND- P1L-50002_22536 N.GILA-22360 IMPRLVLY 500KV &1	P6*	L-1/L-1	<90	98.8	111.5	<90	94.6	113.9	<90	<90	Rely on the market congestion management and operation action to dispatch generation resources including preferred resources in the San Diego area and south Orange county after the first contingency
24044 ELLIS 230 24072 JOHANNA 230 1 1	P1L-SCE06_24044 ELLIS-24134 SANTIAGO 230 1 -AND- P1L-50002_22536 N.GILA-22360 IMPRLVLY 500KV &1	P6*	L-1/L-1	<90	102.9	112.5	<90	101.4	114.7	<90	<90	
24044 ELLIS 230 24134 SANTIAGO 230 1 1	P1L-SCE05_24044 ELLIS-24072 JOHANNA 230 1 -AND- P1L-50002_22536 N.GILA-22360 IMPRLVLY 500KV &1	P6*	L-1/L-1	<90	109.4	119.6	<90	107.5	122.5	<90	<90	
22356 IMPRLVLY 230 21025 ELCENTSW 230 2 1	P1L-50002_22536 N.GILA-22360 IMPRLVLY 500KV &1	P1	L-1	108.1	<90	<90	<90	<90	<90	<90	<90	Will be mitigated by the approved S-line upgrade project with estimated in-service date of December 2021. Existing ISO operation procedure can be used to eliminate the overload concern as an interim solution
22356 IMPRLVLY 230 21025 ELCENTSW 230 2 1	P1G_TDM_TDM Plant G-1 -AND- P1L-50002_22536 N.GILA-22360 IMPRLVLY 500KV &1	P3*	G-1/L-1	143.4	<90	<90	<90	<90	<90	<90	95.9	
22356 IMPRLVLY 230 21025 ELCENTSW 230 2 1	P4-IV-500-8022_CB IMPERIAL VALLEY 500KV 8022	P4	Fault+Stuck Breaker	106.5	<90	<90	<90	<90	<90	<90	<90	

Note: P3 and P6 results are reported without System adjustment between the two single P1 events, unless indicated otherwise in the Contingency description

Study Area: San Diego Area

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			ISO Approved Projects & Potential Mitigation Solutions
				2021 Summer Peak	2024 Summer Peak	2029 Summer Peak	2021 Winter Peak	2024 Winter Peak	2024 SP High CEC Forecast	2024 SpOP Hi Renew & Min Gas Gen	2021 SP Heavy Renewable & Min Gas Gen	
NONE high/low voltage concern												

Study Area: San Diego Area

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage Deviation % (Baseline Scenarios)					Voltage Deviation % (Sensitivity Scenarios)			ISO Approved Projects & Potential Mitigation Solutions
				2021 Summer Peak	2024 Summer Peak	2029 Summer Peak	2021 Spring Off-Peak	2024 Spring Off-Peak	2024 SP High CEC Forecast	2024 SpOP Hi Renew & Min Gas Gen	2021 SP Heavy Renewable & Min Gas Gen	
NONE voltage deviation concern												



Contingency	Category	Category Description	Transient Stability Performance					Potential Mitigation Solutions
			Baseline Scenarios			Sensitivity Scenarios		
			2024 Summer Peak	2029 Summer Peak	2024 Spring Off-Peak	2024 SP High CEC Forecast	2024 SpOP Hi Renew & Min Gas Gen	
P5-SA230_SAN LUIS REY 230 kV bus fault with relay failure to operate	P5	SLG Fault+Relay Failure	stable	stable	stable	stable	stable	No violation
P5-MS230_Mission 230 kV bus fault with relay failure to operate	P5	SLG Fault+Relay Failure	stable	stable	stable	stable	stable	No violation
P5-SG230_Silvergate 230 kV bus fault with relay failure to operate	P5	SLG Fault+Relay Failure	stable	stable	stable	stable	stable	No violation
P5-PEN230_Palamar 230 kV bus fault with relay failure to operate	P5	SLG Fault+Relay Failure	stable	stable	stable	stable	stable	No violation
ECO-MIGUEL 500 KV line out of service followed by the loss of Ocotillo-Suncrest 500 kV line that triggers 500 kV line TL50003 Gen Drop RAS, with system adjustment between the two events	P6	3Ø Fault @ Suncrest 500 kV	stable	stable	stable	stable	stable	No violation
ECO-MIGUEL 500 KV line out of service followed by the loss of Sycamore-Suncrest 230 kV line that triggers newly implemented TL23054/TL23055 RAS, with system adjustment between the two events	P6	3Ø Fault @ Sycamore 230 kV	stable	stable	stable	stable	stable	No violation
Ocotillo-Suncrest 500 KV line out of service followed by the loss of ECO-Miguel 500 kV line that triggers 500 kV line TL50001 Gen Drop RAS, with system adjustment between the two events	P6	3Ø Fault @ Miguel 500 kV	stable	stable	stable	stable	stable	No violation

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Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
			Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
No single contingency resulted in total load drop of more than 250 MW													

Study Area: San Diego Area



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)										Potential Mitigation Solutions
	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
No single source substation with load more than 100 MW											