

Study Area: **SCE Metro**

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirement s	2025 SP High CEC Load	N/A	
METRO-T-1	LUGO – VICTORVL 500 KV #1	LUGO – ELDORDO 500 KV #1	P1	L-1	<100	<100	99.80	<100	<100	<100	115.11		Increase the rating of the line or build a new transmission line.
METRO-T-2		LUGO – ELDORDO 500 KV #1 & MOUNTAIN VIEW CC MODULE	P3	G-1/L-1	<100	<100	100.53	<100	<100	<100	116.29		
METRO-T-3	LAGUBELL – MESA CAL 230 #1	MESA CAL – LITEHIPE 230.0 #1 & MESA CAL – REDONDO 230.0 #1	P6	L-1/L-1	<100	<100	107.66	<100	<100	<100	115.85		Utilize Preferred Resources and Energy Storage. Additional mitigation may be needed if high load growth materializes.
METRO-T-4		MESA CAL – LITEHIPE 230.0 #1 & MESACALS – LAGUBELL 230.0 #2	P7	L-2	<100	<100	101.99	<100	<100	<100	109.92		
METRO-T-5		MESA 500./230 KV #3 & #4	P6	T-1/T-1	<100	<100	104.66	<100	<100	<100	112.68		
METRO-T-6	LUGO – VICTORVL 500 KV #1	LUGO – ELDORDO 500 KV #1 & MOHAVE – ELDORDO 500 KV #1 OR MOHAVE – LUGO 500 KV #1	P6	L-1/L-1	113.98	111.50	127.47	<100	<100	115.87	148.89		Increase the rating of the line or build a new transmission line.
METRO-T-7	LCIENEGA – LA FRESA 230KV #1	EL NIDO – LA FRESA 230 KV #3 & #4	P7	L-2	<100	<100	<100	103.00	<100	<100	<100		Increase pre-contingency generation in the El Nido local area.
METRO-T-8	SERRANO 500/230 KV #1, #2, OR #3	TWO SERRANO 500/230 KV TRAN.	P6	T-1/T-1	100.97	108.46	117.37	125.03	<100	123.19	126.65		Energize available spare single phase transformers. Perform system adjustments after intial or second contingency including dispatching generation and Preferred Resources & Storage until spares can be enregized.
METRO-T-9	MIRALOMA 500/230 KV #4	MIRALOMA – SERRANO 500 KV #2 & LUGO – RANCHVST 500 KV #1	P6	L-1/L-1	127.82	122.02	<100	<100	<100	128.12	<100		System adjustments after initial or second contingency including looping-in the Rancho Vista-Serrano line into Mira Loma.

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					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirement s	2025 SP High CEC Load	N/A	
METRO-T-10	MIRALOMA 500/230 KV #1 OR #2	MIRALOMA 500/230 KV #2 OR #1 & MIRALOMA – SERRANO 500 KV #2	P6	T-1/L-1	107.67	108.08	<100	<100	<100	114.56	<100		System adjustments after first or second contingency including looping-in the Rancho Vista-Serrano line into Mira Loma and energizing the spare Mira Loma 500/230 kV transformer.
METRO-T-11	BARRE – LEWIS 230 KV #1	S.ONOFRE – SERRANO 230 KV # & BARRE – VILLA PK 230 KV #1	P6	L-1/L-1	<100	<100	<100	110.90	<100	<100	<100		Dispatch generation in Orange County after intital contingency .
METRO-T-12	MIRALOMA – SERRANO 500 KV #2	LUGO – RANCHVST 500 KV #1 & PALOVRDE – COLRIVER 500 KV #1	P6	L-1/L-1	105.65	<100	<100	<100	<100	<100	<100		Dispatch generation in LA Basin or loop-in Rancho Vista-Serrano line into Mira Loma after initial or second contingency.
METRO-T-13	MIDWAY – WIRLWIND 500 KV #3	MIDWAY – VINCENT 500 KV #1 & #2	P7	L-2	111.72	108.60	104.57	<100	<100	108.23	105.65		Reduce transfers on Path 26 within 30 minutes after the contingency.
METRO-T-14	MESA CAL – REDONDO 230KV #1	LAGUBELL – MESA CAL 230 KV #1 & LITEHIPE – MESA CAL 230.0 #1	P6	L-1/L-1	<100	<100	<100	<100	<100	<100	101.18		Utilize available Preferred Resources & Energy Storage.
METRO-T-15	ELLIS – JOHANNA 230 KV #1	ECO – MIGUEL 500 KV #1 & OCOTILLO – SUNCREST 500 #1	P6	L-1/L-1	<100	<100	<100	<100	<100	<100	Diverged		System adjustments after initial contingency including IV phase shifter adjustment and dispatching preferred resources.
METRO-T-16	PARDEE – SYLMAR S 230 KV #1 OR #2	LUGO – VICTORVL 500 KV & PARDEE – SYLMAR S 230 #2 OR #1	P6	L-1/L-1	<100	<100	<100	<100	<100	<100	108.81		System adjustments after intial contingency including reducing transfers on PDCI



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					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirement s	2025 SP High CEC Load	N/A	
METRO-T-17	EAGLROCK – SYLMAR S 230 kV #1	LUGO – VICTORVL 500 KV #1 & SYLMAR S – GOULD 230 KV # 1	P6	L-1/L-1	<100	<100	<100	<100	<100	101.87	<100		System adjustments after intial contingency including reducing transfers on PDCI
METRO-T-18	SERRANO – VILLA PK 230 #1	LEWIS – SERRANO 230.0 #1 OR #2 & SERRANO – VILLA PK #2	P6	L-1/L-1	<100	<100	<100	<100	<100	<100	102.41		Utilize available Preferred Resources & Energy Storage

The Metro area 2020 SP sensitivity scenario “Summer Peak with OTC plants replaced” in Table 4-2 of the Study Plan was changed to a Summer Peak scenario with early OTC retirements (Northwest LA Basin).

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Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirements	2025 SP High CEC Load	N/A	
Metro-VD-1	GOLETA 66 KV	S.CLARA – GOLETA #1 OR #2	P1	L-1	<5%	<5%	<5%	<5%	5%	<5%	<5%	<5%	Voltage deviation at limit. Available generators at Goletta can be used to reduce voltage deviation.

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High/Low Voltage



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirements	2025 SP High CEC Load	N/A	

No high/low voltage deviations identified.

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Transient Stability



ID	Contingency	Category	Category Description	Transient Stability Performance								Potential Mitigation Solutions	
				2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirements	2025 SP High CEC Load	N/A		
METRO-TS-1	#1 & SAN BERNARDIO – VISTA #2, 3-PHASE FAULT AT SAN BERNARDIO	P6	L-1/L-1	Utilization of the new WECC Phase 1 composite load model (CMPLDW) resulted in activation of under frequency load shed at San Bernardino									The 2015-16 TPP is the first year in which the new WECC Phase 1 composite load model (CMPLDW) was included in the transient stability assessment. Utilization of this new model resulted in activation of under frequency load shed and transient voltage dip in the simulations. Further investigation is required in the next planning cycle to confirm the parameters in the new WECC Phase 1 composite load model and determine if this system response is valid.
METRO-TS-2	AGO #1 & ELLIS – JOHANNA #1, 3 PHASE FAULT AT JOHANNA	P6	L-1/L-1	Utilization of the new WECC Phase 1 composite load model (CMPLDW) resulted in activation of under frequency load shed at Ellis									
METRO-TS-3	ECO–MIGUEL 500 KV #1 & OCOTILLO–SUNCREST 500 KV #1, 3-PHASE FAULT AT SUNCREST (With system adjustment after the initial contingency)	P6	L-1/L-1	None	None	None	None	None	Up to 40.5% transient voltage dip at 9 buses	Up to 42.7% transient voltage dip at 26 buses			

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)								Potential Mitigation Solutions
				2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirements	2025 SP High CEC Load	N/A	
X-SP-SLD-1												

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

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Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirements	2025 SP High CEC Load	N/A	
X-SP-SS-1										

No single source substation with more than 100 MW Load