

APPENDIX C: Reliability Assessment Study Results

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ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)							Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2026 Summer Partial Peak	2018 Spring off-peak	2021 Spring Light Load	2026 Spring Off-Peak	
PGE BIK-T-1	LOS BANOS - QUINTO_SS 230 kV	normal conditions	P0	normal	<95%	<95%	<95%	<95%	101.6%	<95%	97.3%	congestion management: reduce generation from the project connected to the Panoche-Los Banos 230 kV line to the total output of 150 MW. Or consider line upgrade
PGE BIK-T-2	MOSSLANDING-LAS AGUILAS 230 kV	normal conditions	P0	normal	<95%	<95%	<95%	<95%	97.8%	<95%	<95%	congestion management if overload: reduce output of the project connected to Las Aguilas, increase generation from Moss Landing
PGE BIK-T-3	WILSON A-LE GRAND 115 kV	normal conditions	P0	normal	<95%	<95%	<95%	<95%	99.5%	<95%	<95%	congestion management if overload: reduce solar PV output from Chowchilla 115 kV
PGE BIK-T-4	CHICO JCT-ANITA 60 kV	normal conditions	P0	normal	103.4%	111.9%	112.7%	111.9%	<95%	<95%	<95%	radial line, section of Glenn-Anita line, mitigation in area studies
PGE BIK-T-5	GLENN-CAPAY JCT - HEADGATE 60 kV	normal conditions	P0	normal	96.4%	101.9%	102.4%	101.6%	<95%	<95%	<95%	mitigation in area studies
PGE BIK-T-6	TAFT-TX_BV_HILLS 70 kV	normal conditions	P0	normal	96.0%	98.9%	95.1%	96.2%	<95%	<95%	<95%	radial line, section of Taft-Elk Hills 70 kV, mitigation in area studies
PGE BIK-T-7	JCBS TAP-GUR3TPT 70 kV (Guersney-Jacobs Corner)	normal conditions	P0	normal	<95%	<95%	116.5%	132.1%	<95%	<95%	<95%	congestion management, reduce generation from Guersney
PGE BIK-T-8	GUERSNEY-GUR3TPT 70 kV (Guersney-Jacobs Corner)	normal conditions	P0	normal	<95%	<95%	<95%	109.3%	<95%	<95%	<95%	congestion management, reduce generation from Guersney
PGE BIK-T-9	KANSAS JCT-HENRIETTA 70 kV	normal conditions	P0	normal	<95%	<95%	<95%	97.4%	<95%	<95%	<95%	reduce generation at Henrietta, if overload
PGE BIK-T-10	GFFNJCT-GIFFEN 70 kV (Westlands-Helm 70 kV)	normal conditions	P0	normal	<95%	<95%	<95%	<95%	98.2%	<95%	<95%	reduce output for solar PV at Giffen, if overload
PGE BIK-T-11	E. NICOLAUS-PLUMAS 60 kV	normal conditions	P0	normal	<95%	<95%	99.7%	<95%	<95%	<95%	<95%	radial line, mitigation in area studies
PGE BIK-T-12	AVENAL T - KETTLEMAN T 70 kV	normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	<95%	177.4%	reduce output from Sun City and/or Sandrag
PGE BIK-T-13	KETTLEMAN T -GATES 70 kV	normal conditions	P0	normal	<95%	<95%	<95%	<95%	<95%	<95%	136.7%	reduce output from Sun City and/or Sandrag
PGE BIK-T-2	MOSSLANDING-LAS AGUILAS 230 kV	Moss Landing -Los Banos 500 kV	P1	L-1	<95%	<95%	<95%	<95%	136.6%	<95%	119.1%	reduce output of the project connected to Las Aguilas, increase generation from Moss Landing, reduce Path 15 flow. Use short-term rating
		Los Banos-Midway 500 kV	P1	L-1	<95%	<95%	<95%	<95%	100.0%	<95%	<95%	
		Los Banos-Gates 500 kV # 1	P1	L-1	<95%	<95%	<95%	<95%	104.6%	<95%	<95%	
		Metcalf-Tesla 500 kV	P1	L-1	<95%	<95%	<95%	<95%	103.1%	<95%	<95%	
		Moss Landing -Metcalf 500 kV	P1	L-1	<95%	<95%	<95%	<95%	102.7%	<95%	<95%	
		Los Banos-Tesla 500 kV	P1	L-1	<95%	<95%	<95%	<95%	101.1%	<95%	<95%	
		Moss Landing 500/230 kV x-former	P1	T-1	<95%	<95%	<95%	<95%	106.9%	<95%	<95%	
PGE BIK-T-1	LOS BANOS - QUINTO_SS 230 kV	Moss Landing -Los Banos 500 kV	P1	L-1	<95%	<95%	<95%	<95%	107.2%	<95%	100.6%	reduce generation from the project connected to the Panoche-Los Banos 230 kV line to the total output of 150 MW under normal conditions, use short-term rating if still overload
		Los Banos-Tracy 500 kV	P1	L-1	<95%	<95%	<95%	<95%	115.6%	<95%	109.6%	
		Moss Landing -Metcalf 500 kV	P1	L-1	<95%	<95%	<95%	<95%	102.7%	<95%	98.1%	



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		Los Banos-Tesla 500 kV	P1	L-1	<95%	<95%	<95%	<95%	120.7%	<95%	114.1%	
PGE BIK-T-14	ROUND MTN –TABLE MTN #1 or #2 500 kV	Rnd Mtn –Table Mtn #2 or # 1 500 kV	P1	L-1	103.5%	103.4%	101.2%	96.6%	<95%	<95%	<95%	bypass ser caps on the remaining Round Mtn-Table Mtn 500 kV line or Tbl Mtn-Vaca Dix or reduce COI flow according to seasonal nomogram
PGE BIK-T-15	ROUND MTN 500/230 kV x-former	Olinda 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	103.0%	<95%	<95%	congestion management, reduce some Pit River generation or add Round Mtn x-former to Colusa SPS
PGE BIK-T-16	OLINDA 500/230 kV x-former	Round Mtn 500/230 kV transformer	P1	T-1	<95%	<95%	<95%	<95%	99.5%	<95%	<95%	use Colusa SPS if overload
PGE BIK-T-1	LOS BANOS - QUINTO_SS 230 kV	Metcalfe 500 kV stuck breaker	P4	BRK	<95%	<95%	<95%	<95%	102.3%	<95%	98.0%	congestion management: reduce generation from the project connected to the Panoche-Los Banos 230 kV line to the total output of 150 MW under normal conditions, use short-term raring if still overload
		Moss Landing 500 kV stuck breaker	P4	BRK	<95%	<95%	<95%	<95%	107.2%	<95%	100.6%	
		Los Banos 500 kV stuck breaker	P4	BRK	<95%	<95%	<95%	<95%	119.0%	<95%	112.3%	
PGE BIK-T-2	MOSSLANDING-LAS AGUILAS 230 kV (same as P1)	Los Banos stuck Brk 500 kV	P4	BRK	<95%	<95%	<95%	<95%	111.7%	<95%	97.5%	reduce output of the project connected to Las Aguilas, increase generation from Moss Landing, use short-term rating,
		Mosslanding stuck Brk 500 kV	P4	BRK	<95%	<95%	<95%	<95%	136.63	<95%	119.1%	
PGE BIK-T-3	WILSON A-LE GRAND 115 kV	Los Banos stuck Brk 500 kV	P4	BRK	<95%	<95%	<95%	<95%	98.7%	<95%	<95%	congestion management if overload: reduce solar PV output from Chowchilla 115 kV
PGE BIK-T-14	ROUND MTN –TABLE MTN #1 or #2 500 kV	Table Mtn-Thermalito 230 kV & Round Mtn-Table Mtn #2 or # 1	P6	L-1/L-1	112.6%	114.2%	111.3%	101.3%	<95%	<95%	<95%	bypass ser caps on the remaining Round Mtn-Table Mtn 500 kV line or Tbl Mtn-Vaca Dix or reduce COI flow according to seasonal nomogram
		Table Mtn 500/230 kV x-former & Round Mtn-Table Mtn #2 or # 1	P6	T-1/L-1	104.8%	105.5%	102.2%	95.0%	<95%	<95%	<95%	
		Tracy-Tesla 500 kV & Round Mtn-Table Mtn #2 or # 1	P6	L-1/L-1	111.3%	111.4%	106.4%	100.6%	<95%	<95%	<95%	
		Table Mtn-Oroville 230 kV & Round Mtn-Table Mtn #2 or # 1	P6	L-1/L-1	111.8%	113.1%	110.5%	100.2%	<95%	<95%	<95%	
		Delevan-Cortina 230 kV & Round Mtn-Table Mtn #2 or # 1	P6	L-1/L-1	108.9%	108.6%	103.7%	98.1%	<95%	<95%	<95%	
		Tracy 500/230 kV x-former kV & Round Mtn-Table Mtn #2 or # 1	P6	T-1/L-1	106.7%	106.6%	105.4%	96.0%	<95%	<95%	<95%	
		Any 230 kV line from Cottonwood & Round Mtn-Table Mtn #2 or # 1	P6	L-1/L-1	up to 104.4%	up to 103.4%	up to 102.7%	<95%	<95%	<95%	<95%	
PGE BIK-T-14	ROUND MT -TABLE MT 500 kV #2 (or #1)	Round Mountain-Table Mountain #1 (or # 2) and Olinda-Tracy 500 kV	P6	L-1/L-1	112.8%	113.1%	112.3%	<95%	<95%	<95%	<95%	Reduce COI flow after first contingency past 3200 MW mandated by Operational Procedure. Bypass series caps on remaining Round Mtn-Table Mtn line if overload
		Round Mountain-Table Mountain #1 (or # 2) and Capt Jack-Olinda 500 kV	P6	L-1/L-1	104.3%	103.5%	102.8%	<95%	<95%	<95%	<95%	
		Olinda-Tracy 500 kV & Capt Jack-Olinda 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	107.0%	<95%	<95%	
		Olinda-Tracy 500 kV & Olinda 500/230 kV x-former	P6	L-1/T-1	<95%	<95%	<95%	<95%	107.4%	<95%	<95%	



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PGE BIK-T-15	ROUND MTN 500/230 kV x-former	Round Mtn-Table Mtn #1 or 2 500 kV & Olinda 500/230 kV x-former	P6	L-1/T-1	<95%	<95%	<95%	<95%	104.4%	<95%	<95%	reduce some Pit River generation after first contingency or add Round Mtn x-former to Colusa SPS
		KE South-Obanion 230 kV & Olinda 500/230 kV x-former	P6	L-1/T-1	<95%	<95%	<95%	<95%	107.4%	<95%	<95%	
		230 kV line in Olinda area & Olinda 500/230 kV x-former	P6	L-1/T-1	<95%	<95%	<95%	<95%	up to 107%	<95%	<95%	
		Capt Jack-Olinda 500 kV and Table Mtn 500/230 kV x-former	P6	T-1/L-1	<95%	<95%	<95%	<95%	99.7%	<95%	<95%	
PGE BIK-T-2	MOSSLANDING-LAS AGUILAS 230 kV	Mosslanding-Los Banos 500 kV & Tesla-Metcalf 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	214.1%	<95%	185.1%	Dispatch Moss Landing generation, reduce generation connected to Las Aguilas
		Tesla-Los Banos 500 kV & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	174.2%	<95%	153.3%	
		Tracy-Los Banos 500 kV & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	163.2%	<95%	143.6%	
		Mosslanding 500/230 kV x-former & Mosslanding - Coburn 230 kV	P6	L-1/T-1	<95%	<95%	<95%	<95%	133.0%	<95%	109.6%	
		Mosslanding 500/230 kV x-former & other 230 kV lines	P6	L-1/T-1	<95%	<95%	<95%	<95%	up to 120.2%	<95%	up to 119%	
		Tesla-Metcalf 500 kV & Moss Landing-Moss Landing PP	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	<95%	107.2%	
		Los Banos-Midway 500 kV & Moss Landing-Moss Landing PP	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	<95%	102.9%	
		Moss Landing 500/230 kV x-former & Metcalf-Moss Landing 500 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	130.7%	<95%	109.6%	
		Moss Landing 500/230 kV x-former & other 500 kV lines	P6	T-1/L-1	<95%	<95%	<95%	<95%	up to 121.2%	<95%	up to 121%	
		Moss Landing 500/230 kV x-former & Moss Landing-Moss Landing PP 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	118.0%	<95%	117.1%	
		Gates-Midway 500 kV & Tranquility-Mc Mullin 230 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	101.3%	<95%	<95%	
		Los Banos 500/230 kV x-former & 230 kV line Quinto generation	P6	T-1/L-1	<95%	<95%	<95%	<95%	120.1%	<95%	108.8%	
		Tesla (or Tracy) - Los Banos 500 kV & 230 kV line Quinto generation	P6	L-1/L-1	<95%	<95%	<95%	<95%	up to 120.6%	<95%	up to 108.2%	
		Mosslanding-Coburn 230 kV & 500 kV line from Los Banos	P6	L-1/L-1	<95%	<95%	<95%	<95%	up to 162.1%	<95%	up to 143.1%	
		Los Banos 500/230 kV x-former & Westley-Quinto 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	126.0%	<95%	114.1%	
		Moss Landing-Los Banos 500 kV & Westley-Quinto 230 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	157.5%	<95%	140.5%	
Moss Landing-Los Banos 500 kV & other 230 kV lines 230 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	up to 151.2%	<95%	up to 132.0%			
other 500 kV lines & Westley-Quinto 230 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	up to 122.9%	<95%	up to 110.4%			



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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2026 Summer Partial Peak	2018 Spring off-peak	2021 Spring Light Load	2026 Spring Off-Peak	
PGE BIK-T-18	MOSS LANDING (SPRING)-METCALF 230 kV	Metcalf-Tesla 500 kV & Metcalf-Mosslanding 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	96.6%	<95%	101.7%	reduce Moss Landing or increase Metcalf generation after first contingency
PGE BIK-T-19	MOSS LANDING-COBURN 230 kV	Metcalf-Tesla 500 kV & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	103.0%	<95%	<95%	Dispatch Moss Landing generation after first contingency
		Moss Landing - Las Aguilas 230 kV & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	97.0%	<95%	<95%	
PGE BIK-T-1	LOS BANOS - QUINTO_SS 230 kV	Moss Langing-Los Banos 500 kV & Tesla-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	163.8%	<95%	151.7%	dispatch Moss Landing generation, reduce generation from the project connected to the Panoche-Los Banos 230 kV line, use short term rating if still overload. Consider line upgrade
		Moss Langing-Los Banos 500 kV & Tracy-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	152.1%	<95%	141.6%	
		Tesla-Los Banos 500 kV & Metcalf-Moss Landing 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	149.9%	<95%	141.9%	
		Tracy-Los Banos 500 kV & Metcalf-Moss Landing 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	140.6%	<95%	133.7%	
		Moss Langing-Los Banos 500 kV & 230 kV line	P6	L-1/L-1	<95%	<95%	<95%	<95%	up to 116.0%	<95%	up to 111.6%	
		Tesla-Los Banos 500 kV & a 230 kV line	P6	L-1/L-1	<95%	<95%	<95%	<95%	up to 130.0%	<95%	up to 124.7%	
		Tracy-Los Banos & a 230 kV line	P6	L-1/L-1	<95%	<95%	<95%	<95%	up to 125%	<95%	up to 120%	
PGE BIK-T-20	WESTLEY - QUINTO_SS 230 kV	Moss Landing-Los Banos 500 kV & Tesla-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	101.5%	<95%	<95%	reduce generation connected to Los Banos-Westely line after first contingency
PGE BIK-T-24	LAS AGUILASS - PANOCHE 230kV # 1 or 2	Tesla-Metcalf 500 kV & Moss Landing-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	105.8%	<95%	<95%	Dispatch Moss Landing generation after first contingency
PGE BIK-T-25	METCALF 500/230 kV x-former #11, 12 or 13	Metcalf 500/230 kV Tranfomers #11 and #12 or #13	P6	T-1/T-1	up to 98.3%	<95%	<95%	up to 96%	up to 123.0%	<95%	up to 113.6%	dispatch Ls Esteros peakers after 1st contingency, trip load in San Jose if overload persists
PGE BIK-T-26	MIDWAY 500/230 kV x-former #1, 2 or 3	MIDWAY 500/230 kV x-former #1& 2 or 2&3 or 1&3	P6	T-1/T-1	<95%	<95%	<95%	<95%	106.3%	<95%	<95%	reduce generation at Midway 230 kV after first contingency
PGE BIK-T-27	LS ESTEROS - NWK DIST 230 kV	Tesla-Metcalf 500 kV & Moss Landing-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	114.0%	114.3%	101.9%	dispatch Ls Esteros peakers after 1st contingency
PGE BIK-T-28	NEWARK E - NWK DIST 230 kV	Tesla-Metcalf 500 kV & Moss Landing-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	111.7%	109.0%	100.0%	Dispatch generation in San Jose after first contingency
PGE BIK-T-16	OLINDA 500/230 kV x-former	Round Mtn 500/230 kV x-former & Olinda-Obanion 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	104.3%	<95%	<95%	use Colusa SPS for off-peak overload
		Round Mtn and Table Mtn 500/230 kV x-formers	P6	T-1/L-1	<95%	<95%	<95%	<95%	103.9%	<95%	<95%	
		Round Mtn 500/230 kV x-former & Round Mtn-Table Mtn 500 kV # 1 or # 2	P6	T-1/L-1	<95%	<95%	<95%	<95%	99.9%	<95%	<95%	
		Round Mtn 500/230 kV x-former & Cortina-Vaca Dix 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	101.9%	<95%	<95%	
		Round Mtn 500/230 kV x-former & Cortina-Delevan 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	104.1%	<95%	<95%	



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		Round Mtn 500/230 kV x-former & Cottonwood-Roseville 230 kV	P6	T-1/L-1	<95%	<95%	<95%	<95%	104.0%	<95%	<95%	
PGE BIK-T-29	TRACY 500 /230 kV x-former #1 or # 2	Tesla-Tracy 500 kV Line and Tracy 500/230 kV x-former # 2 or # 1	P6	L-1/T-1	<95%	<95%	<95%	103.1%	<95%	<95%	<95%	open Tracy-Tesla 230 kV lines if overload, trip Tracy pumps if it persists
PGE BIK-T-30	C. COS SUB-BIRDS LANDING 230 kV	Contra-Costa-Birds Landing 230 kV & Vaca Dix-Tesla 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	110.2%	<95%	congestion management, reduce generation from Birds Landing after 1st contingency
		Contra-Costa-Birds Landing 230 kV & Metcalf-Tesla 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	97.5%	<95%	
PGE BIK-T-31	CONTRA COSTA-C.COS SUB 230 kV	Contra-Costa-Birds Landing 230 kV & Vaca Dix-Tesla 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	<95%	106.4%	<95%	
PGE BIK-T-32	CONTRA COSTA-BIRDS LANDING 230 kV	C. Cos Sub-Birds Landing 230 kV & Vaca Dix-Tesla 500 kV	P6	L-1/T-1	<95%	<95%	<95%	<95%	<95%	113.1%	<95%	
		C. Cos Sub-Contra Costa 230 kV & Vaca Dix-Tesla 500 kV	P6	L-1/T-1	<95%	<95%	<95%	<95%	<95%	108.0%	<95%	
PGE BIK-T-33	TRIMBLE-SJB DG 115 kV	Tesla-Metcalf 500 kV & Moss Landing-Los Banos 500 kV	P6	L-1/L-1	<95%	106.0%	119.6%	111.7%	118.3%	128.5%	98.7%	Dispatch generation in San Jose after first contingency
		Tesla-Metcalf 500 kV & Moss Landing-Metcalf 500 kV	P6	L-1/L-1	98.6%	99.5%	109.9%	95.3%	<95%	99.9%	<95%	
		Tesla-Metcalf 500 kV & SSS 230 - NRSriser 230	P6	L-1/L-1	<95%	<95%	96.9%	<95%	<95%	<95%	<95%	
PGE BIK-T-34	COTTONWD E-ROUND MTN 230kV #2	COTTONWD E-RND MTN 230kV #1 or 2 & Round Mtn 500/230 kV x-former	P6	L-1/T-1	<95%	<95%	<95%	<95%	98.1%	<95%	<95%	not a violation, monitor this line
		COTTONWD E-RND MTN 230kV #1 or 2 & Captain Jack-Olinda 500 kV	P6	L-1/L-1	98.9%	<95%	<95%	<95%	<95%	<95%	<95%	not a violation, monitor this line
PGE BIK-T-35	COTTONWD E-ROUND MTN 230kV #3	COTTONWD E-RND MTN 230kV #1 or 2 & Round Mtn 500/230 kV x-former	P6	L-1/T-1	101.2%	101.5%	101.4%	<95%	110.0%	<95%	<95%	upgrade the line, or limit COI import within nomogram for peak, reduce Pit River generaion after 1st contingency for off-peak and if first contingency is 230 kV line
		Table Mtn 500/230 kV x-former & Captain Jack-Olinda 500 kV	P6	T-1/L-1	103.1%	97.7%	<95%	<95%	<95%	<95%	<95%	
		COTTONWD E-RND MTN 230kV #1 or 2 & Captain Jack-Olinda 500 kV	P6	L-1/L-1	110.2%	104.2%	96.6%	<95%	<95%	<95%	<95%	
PGE BIK-T-36	OLINDAW - COTWWAP2 230 kV	Round Mtn 500/230 kV x-former and OLINDAW- COTWDWAP 230 kV	P6	L-1/T-1	<95%	<95%	<95%	<95%	109.9%	<95%	<95%	reduce Shasta generation
	OLINDAW - COTWWAP 230 kV	Round Mtn 500/230 kV x-former and OLINDAW- COTWDWAP2 230 kV	P6	L-1/T-1	<95%	<95%	<95%	<95%	109.0%	<95%	<95%	
		Round Mtn 500/230 kV x-former and COTWWAP2 - COTWD_F2 230	P6	L-1/T-1	<95%	<95%	<95%	<95%	105.1%	<95%	<95%	
		Capt Jack-Olinda 500 kV and COTWWAP2 - COTWD_F2 230	P6	L-1/T-1	98.4%	98.7%	100.7%	<95%	<95%	<95%	<95%	
PGE BIK-T-37	DELEVAN-CORTINA 230 kV	Olinda-Tracy 500 kV & Round 500/230 kV x-former	P6	L-1/T-1	98.1%	100.1%	99.9%	<95%	<95%	<95%	<95%	reduce Colusa generation after 1st conitngency, if overload
		Olinda-Tracy 500 kV & Delevan-Vaca-Dixon 230 kV	P6	L-1/L-1	97.1%	98.1%	100.2%	96.9%	<95%	<95%	<95%	
PGE BIK-T-40	TABLE MTN-RIO OSO 230 kV	Table Mtn-Vaca Dix 500 kV & Olinda-Tracy 500 kV	P6	L-1/T-1	98.5%	<95%	<95%	<95%	<95%	<95%	<95%	Upgrade terminal equipment on this line.



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)							Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2026 Summer Partial Peak	2018 Spring off-peak	2021 Spring Light Load	2026 Spring Off-Peak	
PGE BIK-T-41	RIO OSO-GREENLEAF TAP 115 kV	Tesla 500/230 kV x-former & Table Mtn D-E 230 kV BRK	P6	T-1/L-1	100.0%	<95%	<95%	<95%	<95%	<95%	<95%	South of Palermo Project. Prior to the project, reduce Green Leaf generation
		Table Mtn 500/230 kV x-former & Colgate-Rio Oso 230 kV	P6	T-1/L-1	100.0%	106.7%	<95%	<95%	<95%	<95%	<95%	
		Tesla & Round Mtn 500/230 kV x-formers	P6	T-1/T-1	100.0%	<95%	<95%	<95%	<95%	<95%	<95%	
PGE BIK-T-54	PEASE-E. MARYSVL J - OLIVEHN J 115 kV (Pease-Rio Oso)	Table Mtn 500/230 kV x-former & Colgate-Rio Oso 230 kV	P6	T-1/L-1	97.4%	112.7%	<95%	<95%	<95%	<95%	<95%	
PGE BIK-T-42	MORROBAY- SOLARSS 230 kV # 1 or # 2	Gates-Midway 500 kV & Morro Bay-Solar SS 230 kV # 2 or # 1	P6	L-1/L-1	<95%	<95%	<95%	<95%	118.6%	<95%	108.0%	reduce generation from Topaz Solar after first contingency
		Midway 500/230 kV x-former # 11,12 or 13 & Morro Bay-Solar SS 230 kV #2 or #1	P6	L-1/L-1	<95%	<95%	<95%	<95%	108.8%	<95%	96.1%	
		Gates-Diablo 500 kV & Morro Bay-Solar SS 230 kV # 2 or # 1	P6	L-1/L-1	<95%	<95%	<95%	<95%	105.0%	<95%	<95%	
		Los Banos-Midway 500 kV & Morro Bay-Solar SS 230 kV # 2 or # 1	P6	L-1/L-1	<95%	<95%	<95%	<95%	110.0%	<95%	97.6%	
PGE BIK-T-43	GATES -CALFLATSSS 230 kV	Gates-Midway 500 kV and GATES-TEMPLTON 230 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	97.3%	<95%	111.8%	reduce generation from renewable project connected to Estrella-Gates 230 kV line
		Gates-Midway 500 kV and Gates-Diablo 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	100.3%	<95%	105.1%	
		Gates-Midway 500 kV and Morro BAY-TEMPLTON 230 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	104.1%	<95%	106.9%	
PGE BIK-T-48	TESLA-LOS BANOS 500 kV	Tracy-Los Banos 500 kV and Moss Landing-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	106.7%	<95%	96.5%	dispatch generation at Metcalf Energy Center after first contingency
PGE BIK-T-51	CAPTAIN JACK-OLINDA 500 kV	Malin- Round Mtn #1 and #2 500 kV	P7	L-2	103.3%	103.9%	99.6%	100.4%	<95%	<95%	<95%	operate within COI seasonal nomogram
		Round Mtn-Table Mtn # 1 & # 2 500 kV	P7	L-2	104.4%	105.2%	101.1%	100.2%	<95%	<95%	<95%	
PGE BIK-T-52	OLINDA-TRACY 500 KV	Round Mtn-Table Mtn # 1 & # 2 500 kV	P7	L-2	97.0%	98.1%	95.2%	<95%	<95%	<95%	<95%	not a violation, monitor this line. Operate within COI nomogram
PGE BIK-T-1	LOS BANOS - QUINTO_SS 230 kV	Los Banos-Tesla and Los Banos-Tracy 500 kV with RAS	P7	L-2	<95%	<95%	<95%	<95%	140.3%	<95%	127.6%	congestion management: reduce generation from the project connected to the Panoche-Los Banos 230 kV line to the total output of 150 MW under normal conditions, use short-term rating if still overload
		Tracy-Tesla and Los Banos-Tracy 500 kV	P7	L-2	<95%	<95%	<95%	<95%	119.3%	<95%	113.5%	
PGE BIK-T-2	MOSSLANDING-LAS AGUILAS 230 kV	Los Banos-Gates #1 and Los Banos-Midway 500 kV	P7	L-2	<95%	<95%	<95%	<95%	107.4%	<95%	<95%	use short-term rating , or trip renewable generation connected to this line, or trip 3rd Helms pump
		Gates-Mustang 230 kV # 1 and 2	P7	L-2	<95%	<95%	<95%	<95%	100.9%	<95%	<95%	
PGE BIK-T-21	LOS BANOS-SWITCHING STA 230 kV(Los Banos-Panoche)	Los Banos-Gates #1 and Los Banos-Midway 500 kV	P7	L-2	<95%	<95%	<95%	<95%	103.8%	<95%	97.6%	trip renewable generation connected to this line, or trip 3rd Helms pump if overload
PGE BIK-T-35	COTTONWD E-ROUND MTN 230kV #3	Tbl Mtn-Tesla and Tbl Mtn-Vaca Dix 500 kV	P7	L-2	103.4%	104.1%	98.7%	<95%	<95%	<95%	<95%	upgrade the line, or limit COI import within nomogram
PGE BIK-T-41	RIO OSO-GREENLEAF TAP 115 kV	Tbl Mtn-Tesla & Tbl Mtn-Vaca Dix 500 kV	P7	L-2	101.4%	101.1%	<95%	<95%	<95%	<95%	<95%	South of Palermo Project. Prior to the project: limit COI import within nomogram



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)							Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2026 Summer Partial Peak	2018 Spring off-peak	2021 Spring Light Load	2026 Spring Off-Peak	
PGE Bk-T-40	TABLE MTN-RIO OSO 230 kV	Tbl Mtn-Tesla and Tbl Mtn-Vaca Dix 500 kV	P7	L-2	105.1%	<95%	<95%	<95%	<95%	<95%	<95%	Upgrade terminal equipment on this line.
PGE Bk-T-54	PEASE-E. MARYSVLJ - OLIVEHN J 115 kV (Pease-Rio Oso)	Tbl Mtn-Tesla and Tbl Mtn-Vaca Dix 500 kV	P7	L-2	101.8%	109.5%	<95%	<95%	<95%	<95%	<95%	South of Palermo Project. Prior to the project: limit COI import within nomogram

Study Area: **PG&E Bulk**

Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %							Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2026 Summer Partial Peak	2018 Spring off-peak	2021 Spring Light Load	2026 Spring Off-Peak	
PGE Blk-VD-1	buses in NW 115 kV and below	PDCI mono-pole outage	P1	PDCI	none	deviations up to 8.7% (Northcst 69 kV)	none	none	none	none	none	adjust svds and transformer taps



ID	Substation	Worst Contingency	Category	Category Description	Voltage (kV)							Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2026 Summer Partial Peak	2018 Spring off-peak	2021 Spring Light Load	2026 Spring Off-Peak	
PGE Bk-V-1	500 kV in NW	normal conditions and all contingencies	P0-P7	normal & outages	no violations	no violations	no violations	no violations	up to 553 kV Rock Crk, BPA	up to 549 kV, Bell BPA	up to 553 kV, Bell BPA	consider installing additional reactors
PGE Bk-V-2	Diablo 500kV	normal conditions and all contingencies	P0-P7	normal & outages	no violations	no violations	>=553 kV	>=548 kV	no violations	no violations	>=539 kV	consider installing shunt reactor on Diablo or Gates 500 kV after Diablo Canyon plant retires and opening one of the Diablo-Midway 500kV lines
PGE Bk-V-3	Midway 500 kV	normal conditions and all contingencies	P0-P7	normal & outages	no violations	no violations	>543 kV	540 kV	no violations	no violations	no violations	
PGE Bk-V-4	Gates 500 kV	normal conditions and all contingencies	P0-P7	normal & outages	no violations	no violations	>546 kV	>=541 kV	no violations	no violations	no violations	
PGE Bk-V-5	Pit River 1 area 60 kV	normal conditions and all contingencies	P0-P7	normal & outages	no violations	up to 65.3 kV	no violations	up to 64.2 kV	up to 65.5 kV	no violations	up to 65.2 kV	mitigation in area studies
PGE Bk-V-6	Vaca Dix 115 kV and adjacent buses	normal conditions	P0-P7	normal & outages	no violations	no violations	no violations	no violations	122 kV	no violations	no violations	mitigation in area studies
PGE Bk-V-7	Gold Hill-Newcastle-Placer 115 kV area	normal conditions	P0-P7	normal & outages	no violations	no violations	no violations	no violations	no violations	up to 124 kV	up to 123.6 kV	mitigation in area studies
PGE Bk-V-8	Atlantic-Rocklin 60 kV area	normal conditions	P0-P7	normal & outages	no violations	no violations	no violations	no violations	no violations	up to 64.8 kV	up to 64.6 kV	mitigation in area studies
PGE Bk-V-9	500 kV buses in NW	Table Mtn-Tesla & Table Mtn-Vaca Dix 500 kV	P0-P7	normal & outages	no violations	no violations	no violations	up to 552 kV Knight, Summer Lake	no violations	no violations	no violations	turn off shunt capacitors at high voltage



ID	Generator/Load	Contingency	Category	Category Description	Transient Stability Performance							Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2026 Summer Partial Peak	2018 Spring off-peak	2021 Spring Light Load	2026 Spring Off-Peak	
PGE Blk-TS-1	Solar PV COLUMBIA 0.36 kV (bus 33102), capacity 19.2 MW	3 Ph fault Contra Costa-La Positas 230 kV	P1	L-1	4.8 MW output, no tripping	4.8 MW output, no tripping	tripped for high voltage at 2.3 sec. 4.8 MW output, 1.083 p.u. voltage in the base case	the unit is off in the base case	18.2 MW output, tripped for high voltage in 2.3 sec	the unit is off in the base case	18.8 MW output, no tripping	Modeled with old solar PV model (wt4g, wt4e), protection trips at 1.1 pu in 1 sec, no issues if shunt capacitor on the collector system is turned off, or generator can absorb reactive power in power flow. Consider having voltage regulation requirement for this project. Need to contact generation owner and update the models
		3 Ph fault Newark-Ravenswood 230 kV	P1	L-1								
		3ph fault Pittsburg 230 kV, Pittsb-Tesla # 1 and 2	P7	L-2	tripped for high volt at 2.3 sec							
		3 Ph fault Tesla-Newark 230 kV	P1	L-1	no tripping							
		3ph fault Vaca Dix 500/230 kV x-former	P1	T-1								
		Tesla 500 kV stuck breaker	P4	BRK								
		3Ph fault C.-Costa-Brentwood and C.Costa-Delta 230 kV	P7	L-2								
3 Ph fault Contra Costa-La Positas and C.Costa-Lone Tree 230 kV	P7	L-2										
PGE Blk-TS-2	wind generators at Shilo # 2 (bus 32177), capacity 150 MW	3Ph fault Contra-Costa-Brentwood and Contra Costa-Delta 230 kV	P7	L-2	tripped for low voltage	tripped for low voltage	tripped for low voltage, output 49.5 MW	the unit is off in this case	tripped for low voltage, output 150 MW	tripped for low voltage	tripped for low voltage	these are old induction generator units that don't have LVRT, they may trip with faults close to these units
		Tesla 500 kV stuck breaker	P4	BRK	not tripped	not tripped	not tripped			not tripped	not tripped	
		3 Ph fault C. Costa-La Positas 230 kV	P1	L-1	tripped for low voltage	tripped for low voltage	tripped for low voltage			tripped for low voltage, output 150 MW		
		3 Ph fault Tesla-Newark 230 kV	P1	L-1	not tripped, output 49.5 MW	not tripped, output 49.5 MW	not tripped			tripped for low voltage, output 150 MW		
		3 Ph fault Newark 230 kV, Newark-Ravenswood	P1	L-1	tripped for low voltage	tripped for low voltage	tripped for low voltage			not tripped		
		3 Ph fault Contra Costa-La Positas and C.Costa-Lone Tree 230 kV	P7	L-2	tripped for low voltage	tripped for low voltage	tripped for low voltage			tripped for low voltage		
Solar PV # 1 and 2 (bus 34347) connected to Las Aguilas 230 kV substation, total capacity 244 MW		3 ph fault on Gates 230 kV, any outage	P7	L-2	tripped for high voltage with fault	tripped for high voltage with fault	tripped for high voltage with fault	units are off in this case	tripped for high voltage with fault, output 239 MW	units are off in this case	need to contact generation owner and to check the models and protection settings	
		3Ph fault on Gates 500 kV, any outage	P1	L-1, T-1	not tripped, output 60 MW	not tripped, output 60 MW	not tripped, output 60 MW					not tripped
		3Ph fault on Los Banos 500 kV, any single outage	P1	L-1, T-1								tripped for high voltage w/fault
		3Ph fault on Los Banos 500 kV, DLO North of Los Banos	P7	L-2								not tripped
		3Ph fault on Midway 500 kV, Midway-Gates 500 kV	P1	L-1								tripped for high voltage with fault, output 232 MW
		3Ph fault on Midway 500 kV, Midway-Vincent 500 kV #1&2	P7	L-2								not tripped
		3Ph fault on Midway 500 kV, DLO North of Midway	P7	L-2								tripped for high voltage with fault, output 232 MW
		3Ph fault on Tesla 500 kV, any outage	P1, P7	L-1, L-2								tripped for high voltage with fault, output 232 MW
		3Ph fault on Tesla 230 kV, Tesla-Newark 230 kV	P1	L-1								tripped for high voltage with fault, output 232 MW
		3Ph fault on Tracy 500 kV, Tracy-Los Banos 500 kV	P1	L-1								tripped for high voltage with fault, output 232 MW
3Ph fault on Los Banos 500 kV, 500/230 kV x-former	P1	T-1	tripped for high voltage with fault, output 232 MW									



ID	Generator/Load	Contingency	Category	Category Description	Transient Stability Performance							Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2026 Summer Partial Peak	2018 Spring off-peak	2021 Spring Light Load	2026 Spring Off-Peak		
PGE Blk-TS-3		3Ph fault on MossLanding 500 kV, Mosslanding-Metcalf 500 kV	P1	L-1								not tripped	
		3Ph fault on Metcalf 500 kV, 500/230 kV x-former	P1	T-1								not tripped	
		3Ph fault on Tracy or Tesla 500 kV, 500/230 kV x-former	P1	T-1								tripped for high voltage w/fault	
		3Ph fault on Tracy 500 kV, DLO south of Tracy 500 kV	P7	L-2									
		3Ph fault on Tesla 500 kV, DLO north of Tesla 500 kV	P7	L-2									
PGE Blk-TS-4	Solar PV KANSAS 12.47 (bus 34680), capacity 20 MW	3Ph fault on Gates 230 kV, any single or double contingency	P1, P7	L-1, L-2	not tripped, output 5 MW	not tripped, output 5 MW	not tripped, output 5 MW	the unit is off in this case	tripped for low voltage w/fault	the unit is off in this case	tripped for low voltage w/fault, output 19.8 MW	Modeled with old solar PV model (wt4g, wt4e). Need to contact generation owner and update the models and check protection settings	
PGE Blk-TS-5	Solar PV KENT_S (bus 34694), capacity 20 MW	3ph fault Gates 230 kV, Gates-Midway 230 kV	P1	L-1	not tripped, output 7.9 MW	not tripped, output 5 MW	not tripped, output 5 MW	the unit is off in this case	tripped for low voltage w/fault	the unit is off in this case	tripped for low voltage w/fault	Old wt4g, wt4e models. Under-voltage protection trips in 0.02 sec with vlt 0.5 p.u. Need to discuss protection settings and the plant model parameters with the generation owner.	
		3ph fault Los Banos 500 kV, Gates-Los Banos 500 kV # 1 or 3	P1	L-1					tripped for high frequency with fault, output 19 MW		tripped for high frequency with fault, output 19.6 MW		
		3ph fault Los Banos 500 kV, Los Banos-Midway 500 kV	P1	L-1									
		3ph fault Los Banos 500 kV, Los Banos-Moss landing 500 kV	P1	L-1					tripped for low voltage w/fault		tripped for low voltage w/fault		
		3ph fault Los Banos 500 kV, Los Banos 500/230 kV x-former	P1	T-1									
		3ph fault Los Banos 500 kV, DLO north of Los Banos	P7	L-2					tripped for low voltage w/fault		tripped for low voltage w/fault		
		3ph fault Los Banos 500 kV, DLO south of Los Banos	P7	L-2									
		3ph fault Gates 230 kV Gates-Arco and Gates-Midway 230 kV	P7	L-2									
3 ph Gates 230 kV, Gates-Greg and Gates-MCal	P7	L-2											
PGE Blk-TS-6	Solar PV REGULUS 0.38 kV (Bus 35019), capacity 60.5 MW	3Ph fault on Midway 500 kV or 230 kV, any contingency	P1, P7	L-1, L-2	not tripped, output 25.7 MW	not tripped, output 15 MW	not tripped, output 15 MW	the unit is off in this case	tripped for high frequency with fault, output 57.5 MW	the unit is off in this case	no tripping, output 59.3 MW	Modeled with old solar PV model (wt4g, wt4e). Need to contact generation owner and update the models and check protection settings	
PGE Blk-TS-7	Wind generator NSR_WND1 0.69 kV (bus 29474), capacity 162 MW	1 Diablo unit	P1	G-1	the unit is off in this case	tripped for high voltage with fault, output 160 MW	the unit is off in this case	the unit is off in this case	the unit is off in this case	the unit is off in this case	N/A	This generator is on the SCE system. Need to discuss generator model and study results with SCE	
		any contingency w/3 ph fault on Diablo 500 kV	P1,P7	L-1/L-2									
		any contingency w/3 ph fault on Los Banos 500 kV	P1,P7	L-1/L-2									
		any contingency w/3 ph fault on Midway 500 kV	P1,P7	L-1/L-2									
		any contingency w/3 ph fault on Gates 500 kV	P1,P7	L-1/L-2									

ID	Generator/Load	Contingency	Category	Category Description	Transient Stability Performance							Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2026 Summer Partial Peak	2018 Spring off-peak	2021 Spring Light Load	2026 Spring Off-Peak	
PGE Blk-TS-8	Solar PV AD SOLAR 0.26 kV (bus 26949), capacity 10 MW	any contingency w/3 ph fault on Midway 500 kV	P1,P7	L-1/L-2	not tripped, output 10 MW	not tripped, output 7.5 MW	tripped for high volt after 9 sec, output 7.5 MW	not tripped, output 7.5 MW	off in this case	off in this case	off in this case	This generator is on the LADWP system. Need to discuss generator model and study results with LADWP
PGE Blk-TS-9	Solar PV connected to Wheeler 115 kV (bus 35021), capacity 20 MW	3Ph fault on Midway 230 kV, Gates-Midway 230 kV	P1	L-1	tripped for low voltage with fault, output 5 MW	tripped for low voltage with fault, output 5 MW	tripped for low voltage with fault, output 5 MW	the unit is off in this case	tripped for low voltage with fault, output 19 MW	the unit is off in this case	tripped for low voltage with fault, output 19 MW	Old wt4g, wt4e models. Under-voltage protection trips in 0.02 sec with vlt 0.5 p.u. Need to discuss protection settings and the plant model parameters with the generation owner.
		3Ph fault Midway230 kV, Midway-Kern # 1 and 2 230 kV	P7	L-2					tripped for high frequency with fault		not tripped	
		3Ph fault Midway 500 kV, any contingency	P1, P7	L-1, L-2	not tripped	not tripped	not tripped					
PGE Blk-TS-10	Solar PV ORION (35082), capacity 20 MW	3Ph fault on Midway 230 kV, Gates-Midway 230 kV	P1	L-1	tripped for low voltage with fault, output 5 MW	tripped for low voltage with fault, output 5 MW	tripped for low voltage with fault, output 5 MW	the unit is off in this case	tripped for low voltage with fault, output 19 MW	the unit is off in this case	tripped for low voltage with fault, output 19.6 MW	Old wt4g, wt4e models. Under-voltage protection trips in 0.02 sec with vlt 0.5 p.u. Over-frequency trips for 60. 5 Hz in 0.02 sec. Need to discuss protection settings and the plant model parameters with the generation owner.
		3Ph fault on Midway 230 kV, Midway - Kern PP# 2 and 3 230 kV	P7	L-2					tripped for high frequency with fault		tripped for high frequency with fault	
		3Ph fault Midway 500 kV, any contingency	P1, P7	L-1, T-1, L-2	not tripped	not tripped	not tripped					
PGE Blk-TS-11	Solar PV Willwood (bus 39184, on Goose Lake-Semitrophic 115 kV line), capacity 20 MW	3Ph fault on Midway 230 kV, Gates-Midway 230 kV	P1	L-1	tripped for high frequency with fault, output 5 MW	not tripped, output 5 MW	not tripped, output 5 MW	the unit is off in this case	tripped for high frequency with fault, output 19 MW	the unit is off in this case	output 19.6 MW, no tripping	Frequency protection trips the unit at 60.5 Hz or 59.3 Hz in 0.02 sec. Need to discuss the models and protection settings with the generation owner. Same refers to the Pumpjack plant (bus 39176)
		3Ph fault on Midway 230 kV, Midway - Kern PP# 2 and 3 230 kV	P7	L-2								
PGE Blk-TS-12	Solar PV, bus 35069 on Copus-Old River 70 kV line, capacity 20 MW	3Ph fault on Midway 500 kV, any contingency	P1 ,P7	L-1, T-1, L-2	tripped for high volt w/fault, 3 MW	tripped for high volt w/fault, 3 MW	not tripped, output 3 MW	the unit is off in this case	tripped for high volt w/fault, 11.4 MW	the unit is off in this case	tripped for high volt w/fault, 11.8 MW	this is old dynamic model. Need to update the model and specify model parameters and protection settings with the generation owner
PGE Blk-TS-13	Solar PV plant at buses 34663 & 34667, connected to Gates-Estrella 230 kV line	3Ph fault on Gates 230 kV or 500 kV, any contingency	P1,P7	L-1, L-2		normal recovery			slow freq recovery			need to contact generation owner and to check the models and protection settings.
		3Ph fault Midway 500 kV, any outage	P7	L-2		normal recovery						
PGE Blk-TS-14	Load on Gates 115 kV	3Ph fault on Gates 230 kV, Gates-Midway 230 kV	P1	L-1	tripped by UFLS	not tripped	tripped by UFLS	tripped by UFLS	tripped by UFLS	not tripped	tripped by UFLS	slow frequency recovery, load tripped with fault, modeling issue because of low impedance between the fault and load.
		3Ph fault on Gates 230 kV, Gates-Gregg, Gates-Mc Call 230 kV	P7	L-2	tripped by UFLS		tripped by UFLS	tripped by UFLS	tripped by UFLS			
		3Ph Fault Gates-Arco, Gates-Midway 230 kV	P7	L-2	tripped by UFLS		tripped by UFLS	tripped by UFLS	tripped by UFLS			
PGE Blk-TS-15	Load on Gates-distr 12.5 kV	3Ph fault on Gates 230 kV, Gates-Midway 230 kV	P1	L-1	tripped by UFLS	tripped by UFLS	tripped by UFLS	tripped by UFLS	not tripped	not tripped	not tripped	slow frequency recovery, load tripped with fault, modeling issue because of low impedance between the fault and load
		3Ph fault on Gates 230 kV, Gates-Gregg, Gates-Mc Call 230 kV	P7	L-2	tripped by UFLS	tripped by UFLS	tripped by UFLS	tripped by UFLS				
		3Ph Fault Gates-Arco, Gates-Midway 230 kV	P7	L-2	tripped by UFLS	tripped by UFLS	tripped by UFLS	tripped by UFLS				
PGE Blk-TS-16	Load on Ashlan 230 kV	3Ph fault Gregg 230 kV, Greg-Herndon 230 kV # 1 & 2	P7	L-2		slow frequency recovery						need to check load model at Ashlan



ID	Generator/Load	Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2026 Summer Partial Peak	2018 Spring off-peak	2021 Spring Light Load		2026 Spring Off-Peak
PGE Blk-TS-17	Load on Santiago 66 kV (SCE)	3Ph fault Midway 500 kV, any contingency	P1, P7	L-1, L-2		slow frequency recovery						need to check load model at Santiago
PGE Blk-TS-18	Caribou 230 kV, Butt Vly, Grizzly, Big Bend 115 kV, 60 kV buses between Caribou& Table Mtn	3 Ph fault Table Mtn 500kV, Table Mtn 500/230 kV x-former out	P1	T-1	no violations	no violations	no violations	no violations	large frequency dip between 1.8 & 2.2 sec	large frequency dip between 1.7 & 2.0 sec	large frequency dip between 1.5 & 1.7 sec	not a violation according to the new standard
PGE Blk-TS-19	70 kV and 115 kV buses around Midway	3Ph fault on Midway 230 kV, any contingency	P1	L-1	slow voltage and frequency recovery						This is a possible numerical issue because of slow convergence due to large amount of inverter-based generation in the area and composite load models. Large voltage dips observed around 0.1 sec after fault clearing. Also slow frequency recovery after the fault in Midway area. According to the new standard, these are not violations	
PGE Blk-TS-20	Buena Vista pumps		P1	L-1								
PGE Blk-TS-21	Wheeler Ridge pumps		P1	L-1								
PGE Blk-TS-22	Wind Gap pumps		P1	L-1								

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Study Area: PG&E Bulk

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)					
				Select..	Select..	Select..	Select..	Select..	Select..
PGE Bulk-SLD-1	NONE								

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



		Potential Mitigation Solutions
Select..	Select..	



Study Area: **PG&E Bulk**

Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
PGE Bulk-SS-1	NONE									

No single source substation with more than 100 MW Load



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)						Potential Mitigation Solutions
					2021 Peak high renewable	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-Peak Base	2026 Summer Peak no DG	2026 Summer Peak Base	
PGE BIK-T-1	LOS BANOS - QUINTO_SS 230 kV	normal conditions	P0	normal	<95%	<95%	98.5%	101.6%	<95%	<95%	congestion management: reduce generation from the project connected to the Panoche-Los Banos 230 kV line to the total output of 150 MW. Or consider line upgrade
PGE BIK-T-2	MOSSLANDING-LAS AGUILAS 230 kV	normal conditions	P0	normal	<95%	<95%	102.0%	97.8%	<95%	<95%	congestion management if overload: reduce output of the project connected to Las Aguilas, increase generation from Moss Landing
PGE BIK-T-3	WILSON A-LE GRAND 115 kV	normal conditions	P0	normal	<95%	<95%	100.6%	99.5%	<95%	<95%	congestion management if overload: reduce solar PV output from Chowchilla 115 kV
PGE BIK-T-4	CHICO JCT-ANITA 60 kV	normal conditions	P0	normal	102.5%	111.9%	<95%	<95%	119.0%	112.7%	radial line, section of Glenn-Anita line, mitigation in area studies
PGE BIK-T-5	GLENN-CAPAY JCT - HEADGATE 60 kV	normal conditions	P0	normal	<95%	101.9%	<95%	<95%	109.5%	102.4%	mitigation in area studies
PGE BIK-T-6	TAFT-TX_BV_HILLS 70 kV	normal conditions	P0	normal	<95%	98.9%	<95%	<95%	99.3%	95.1%	radial line, section of Taft-Elk Hills 70 kV, mitigation in area studies
PGE BIK-T-7	JCBS TAP-GUR3TPT 70 kV (Guersney-Jacobs Corner)	normal conditions	P0	normal	<95%	<95%	<95%	<95%	127.9%	116.5%	congestion management, reduce generation from Guersney
PGE BIK-T-8	GUERSNEY-GUR3TPT 70 kV (Guersney-Jacobs Corner)	normal conditions	P0	normal	<95%	<95%	<95%	<95%	105.7%	<95%	congestion management, reduce generation from Guersney
PGE BIK-T-11	E. NICOLAUS-PLUMAS 60 kV	normal conditions	P0	normal	<95%	<95%	<95%	<95%	106.7%	99.7%	radial line, mitigation in area studies
PGE BIK-T-12	AVENAL T - KETTLEMAN T 70 kV	normal conditions	P0	normal	162.8%	<95%	97.0%	<95%	<95%	<95%	reduce output from Sun City and/or Sandrag
PGE BIK-T-13	KETTLEMAN T -GATES 70 kV	normal conditions	P0	normal	114.9%	<95%	<95%	<95%	<95%	<95%	reduce output from Sun City and/or Sandrag
PGE BIK-T-2	MOSSLANDING-LAS AGUILAS 230 kV	Moss Landing -Los Banos 500 kV	P1	L-1	115.0%	<95%	139.3%	136.6%	<95%	<95%	reduce output of the project connected to Las Aguilas, increase generation from Moss Landing, reduce Path 15 flow. Use short-term rating
		Los Banos-Midway 500 kV	P1	L-1	<95%	<95%	103.4%	100.0%	<95%	<95%	
		Los Banos-Gates 500 kV # 1	P1	L-1	<95%	<95%	108.2%	104.6%	<95%	<95%	
		Los Banos-Gates 500 kV # 3	P1	L-1	<95%	<95%	99.5%	<95%	<95%	<95%	
		Metcalf-Tesla 500 kV	P1	L-1	98.4%	<95%	106.9%	103.1%	<95%	<95%	
		Moss Landing -Metcalf 500 kV	P1	L-1	<95%	<95%	<95%	102.7%	<95%	<95%	
		Los Banos-Tracy 500 kV	P1	L-1	<95%	<95%	101.8%	<95%	<95%	<95%	
		Los Banos-Tesla 500 kV	P1	L-1	<95%	<95%	104.6%	101.1%	<95%	<95%	
		Moss Landing 500/230 kV x-former	P1	T-1	102.7%	<95%	114.2%	106.9%	<95%	<95%	
PGE BIK-T-1	LOS BANOS - QUINTO_SS 230 kV	Moss Landing -Los Banos 500 kV	P1	L-1	<95%	<95%	104.0%	107.2%	<95%	<95%	reduce generation from the project connected to the Panoche-Los Banos 230 kV line to the total output of 150 MW under normal conditions, use short-term rating if still overload
		Los Banos-Tracy 500 kV	P1	L-1	<95%	<95%	111.8%	115.6%	<95%	<95%	
		Moss Landing -Metcalf 500 kV	P1	L-1	<95%	<95%	98.8%	102.7%	<95%	<95%	
		Los Banos-Tesla 500 kV	P1	L-1	<95%	<95%	116.9%	120.7%	<95%	<95%	



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)						Potential Mitigation Solutions
					2021 Peak high renewable	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-Peak Base	2026 Summer Peak no DG	2026 Summer Peak Base	
PGE BIK-T-14	ROUND MTN –TABLE MTN #1 or #2 500 kV	Rnd Mtn –Table Mtn #2 or # 1 500 kV	P1	L-1	100.0%	103.4%	<95%	<95%	103.7%	101.2%	bypass ser caps on the remaining Round Mtn-Table Mtn 500 kV line or Tbl Mtn-Vaca Dix or reduce COI flow according to seasonal nomogram
PGE BIK-T-15	ROUND MTN 500/230 kV x-former	Olinda 500/230 kV transformer	P1	T-1	<95%	<95%	102.0%	103.0%	<95%	<95%	congestion management, reduce some Pit River generation or add Round Mtn x-former to Colusa SPS
PGE BIK-T-16	OLINDA 500/230 kV x-former	Round Mtn 500/230 kV transformer	P1	T-1	<95%	<95%	98.0%	99.5%	<95%	<95%	use Colusa SPS if overload
PGE BIK-T-1	LOS BANOS - QUINTO_SS 230 kV	Metcalfe 500 kV stuck breaker	P4	BRK	<95%	<95%	98.7%	102.3%	<95%	<95%	congestion management: reduce generation from the project connected to the Panoche-Los Banos 230 kV line to the total output of 150 MW under normal conditions, use short-term raring if still overload
		Moss Landing 500 kV stuck breaker	P4	BRK	<95%	<95%	104.4%	107.2%	<95%	<95%	
		Los Banos 500 kV stuck breaker	P4	BRK	<95%	<95%	115.9%	119.0%	<95%	<95%	
PGE BIK-T-2	MOSSLANDING-LAS AGUILAS 230 kV	Los Banos stuck Brk 500 kV	P4	BRK	<95%	<95%	114.8%	111.7%	<95%	<95%	reduce output of the project connected to Las Aguilas, increase generation from Moss Landing, use short-term rating,
		Gates 500 kV stuck breaker	P4	BRK	<95%	<95%	98.6%	<95%	<95%	<95%	
		Mosslanding stuck Brk 500 kV	P4	BRK	115.0%	<95%	139.3%	136.63	<95%	<95%	
PGE BIK-T-3	WILSON A-LE GRAND 115 kV	Los Banos stuck Brk 500 kV	P4	BRK	<95%	<95%	99.5%	98.7%	<95%	<95%	congestion management if overload: reduce solar PV output from Chowchilla 115 kV
PGE BIK-T-14	ROUND MTN –TABLE MTN #1 or #2 500 kV	Table Mtn-Thermalito 230 kV & Round Mtn-Table Mtn #2 or # 1	P6	L-1/L-1	108.6%	114.2%	<95%	<95%	109.8%	111.3%	bypass ser caps on the remaining Round Mtn-Table Mtn 500 kV line or Tbl Mtn-Vaca Dix or reduce COI flow according to seasonal nomogram
		Table Mtn 500/230 kV x-former & Round Mtn-Table Mtn #2 or # 1	P6	T-1/L-1	119.4%	105.5%	<95%	<95%	119.5%	102.2%	
		Tracy-Tesla 500 kV & Round Mtn-Table Mtn #2 or # 1	P6	L-1/L-1	109.6%	111.4%	<95%	<95%	109.8%	106.4%	
		Table Mtn-Oroville 230 kV & Round Mtn-Table Mtn #2 or # 1	P6	L-1/L-1	106.4%	113.1%	<95%	<95%	108.1%	110.5%	
		Delevan-Cortina 230 kV & Round Mtn-Table Mtn #2 or # 1	P6	L-1/L-1	104.1%	108.6%	<95%	<95%	106.7%	103.7%	
		Tracy 500/230 kV x-former kV & Round Mtn-Table Mtn #2 or # 1	P6	T-1/L-1	100.7%	106.6%	<95%	<95%	104.1%	105.4%	
		one 230 kV line in N.Cal & Round Mtn-Table Mtn #2 or # 1	P6	L-1/L-1	up to 107%	up to 103%	<95%	<95%	up to 112%	up to 103%	
PGE BIK-T-14	ROUND MT -TABLE MT 500 kV #1 (or #2)	Round Mountain-Table Mountain #1 (or # 2) and Olinda-Tracy 500 kV	P6	L-1/L-1	104.7%	113.1%	<95%	<95%	110.1%	112.3%	Reduce COI flow after first contingency past 3200 MW mandated by Operational Procedure. Bypass series caps on remaining Round Mtn-Table Mtn line if overload
		Round Mountain-Table Mountain #1 (or # 2) and Capt Jack-Olinda 500 kV	P6	L-1/L-1	98.2%	103.5%	<95%	<95%	101.0%	102.8%	
		Olinda-Tracy 500 kV & Capt Jack-Olinda 500 kV	P6	L-1/L-1	<95%	<95%	107.2%	107.0%	<95%	<95%	
		Olinda-Tracy 500 kV & Olinda 500/230 kV x-former	P6	L-1/T-1	<95%	<95%	107.6%	107.4%	<95%	<95%	



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)						Potential Mitigation Solutions
					2021 Peak high renewable	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-Peak Base	2026 Summer Peak no DG	2026 Summer Peak Base	
PGE BIK-T-15	ROUND MTN 500/230 kV x-former	Round Mtn-Table Mtn #1 or 2 500 kV & Olinda 500/230 kV x-former	P6	L-1/T-1	<95%	<95%	102.7%	104.4%	<95%	<95%	reduce some Pit River generation after first contingency or add Round Mtn x-former to Colusa SPS
		Captain Jack-Olinda & Olinda 500/230 kV x-former	P6	L-1/T-1	<95%	<95%	107.2%	105.4%	<95%	<95%	
		KE South-Obanion 230 kV & Olinda 500/230 kV x-former	P6	L-1/T-1	<95%	<95%	107.2%	107.4%	<95%	<95%	
		230 kV line in Olinda area & Olinda 500/230 kV x-former	P6	L-1/T-1	<95%	<95%	up to 107%	up to 107%	<95%	<95%	
		Capt Jack-Olinda 500 kV and Table Mtn 500/230 kV x-former	P6	T-1/L-1	<95%	<95%	99.7%	99.7%	<95%	<95%	
PGE BIK-T-2	MOSSLANDING-LAS AGUILAS 230 kV	Mosslanding-Los Banos 500 kV & Tesla-Metcalf 500 kV	P6	L-1/L-1	diverged	<95%	214.6%	214.1%	97.7%	<95%	Dispatch Moss Landing generation, reduce generation connected to Las Aguilas
		Tesla-Los Banos 500 kV & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	136.2%	<95%	173.5%	174.2%	<95%	<95%	
		Tesla-Tracy 500 kV & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	122.8%	124.8%	144.8%	142.7%	<95%	<95%	
		Tracy-Los Banos 500 kV & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	128.3%	<95%	163.8%	163.2%	<95%	<95%	
		Mosslanding 500/230 kV x-former & Mosslanding - Coburn 230 kV	P6	L-1/T-1	125.7%	<95%	140.8%	133.0%	<95%	<95%	
		Mosslanding 500/230 kV x-former & other 230 kV lines	P6	L-1/T-1	up to 117%	<95%	up to 117%	up to 120.2%	<95%	<95%	
		Moss Landing 500/230 kV x-former & Metcalf-Moss Landing 500 kV	P6	T-1/L-1	131.2%	<95%	147.0%	130.7%	<95%	<95%	
		Moss Landing 500/230 kV x-former & other 500 kV lines	P6	T-1/L-1	up to 124%	<95%	up to 126%	up to 121.2%	<95%	<95%	
		Mosslanding-Coburn 230 kV & 500 kV line from Los Banos	P6	L-1/L-1	up to 137%	<95%	up to 165.3%	up to 162.1%	<95%	<95%	
		Moss Landing-Los Banos 500 kV & Westley-Quinto 230 kV	P6	L-1/L-1	133.4%	<95%	159.2%	157.5%	<95%	<95%	
		Moss Landing-Los Banos 500 kV & other 230 kV lines 230 kV	P6	L-1/L-1	up to 133%	<95%	up to 159%	up to 151.2%	<95%	<95%	
		other 500 kV lines & Westley-Quinto or Tesla-Quinto 230 kV	P6	L-1/L-1	up 131%	<95%	up to 157%	up to 122.9%	<95%	<95%	
PGE BIK-T-19	MOSS LANDING-COBURN 230 kV	Metcalf-Tesla 500 kV & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	diverged	<95%	103.5%	103.0%	<95%	<95%	Dispatch Moss Landing generation after first contingency
		Moss Landing - Las Aguilas 230 kV & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	98.8%	97.0%	<95%	<95%	
		Moss Langing-Los Banos 500 kV & Tesla-Los Banos 500 kV	P6	L-1/L-1	123.6%	<95%	157.2%	163.8%	<95%	<95%	
		Tesla-Los Banos 500 kV & Tracy-Los Banos 500 kV	P6	L-1/L-1	125.1%	<95%	191.8%	125.2%	<95%	<95%	
		Moss Langing-Los Banos 500 kV & Tracy-Los Banos 500 kV	P6	L-1/L-1	114.7%	<95%	145.8%	152.1%	<95%	<95%	



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)						Potential Mitigation Solutions
					2021 Peak high renewable	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-Peak Base	2026 Summer Peak no DG	2026 Summer Peak Base	
PGE BIK-T-1	LOS BANOS - QUINTO_SS 230 kV	Tesla-Los Banos 500 kV & Metcalf-Moss Landing 500 kV	P6	L-1/L-1	107.9%	<95%	142.4%	149.9%	<95%	<95%	dispatch Moss Landing generation, reduce generation from the project connected to the Panoche-Los Banos 230 kV line, use short term rating if still overload. Consider line upgrade
		Tracy-Los Banos 500 kV & Metcalf-Moss Landing 500 kV	P6	L-1/L-1	101.9%	<95%	133.8%	140.6%	<95%	<95%	
		Moss Langing-Los Banos 500 kV & 230 kV line	P6	L-1/L-1	up to 100%	<95%	up to 122%	up to 116.0%	<95%	<95%	
		Tesla-Los Banos 500 kV & a 230 kV line	P6	L-1/L-1	up to 101%	<95%	125%	130.0%	<95%	<95%	
		Tracy-Los Banos & a 230 kV line	P6	L-1/L-1	up to 97%	<95%	up to 121%	up to 125%	<95%	<95%	
PGE BIK-T-20	WESTLEY - QUINTO_SS 230 kV	Moss Landing-Los Banos 500 kV & Tesla-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	97.6%	101.5%	<95%	<95%	reduce generation connected to Los Banos-Westely line after first contingency
PGE BIK-T-61	PALERMO-PEASE 115 kV	Table Mtn 500/230 kV x-former & Colgate-Rio Oso 230 kV	P6	L-1/L-1	101.8%	<95%	<95%	<95%	<95%	<95%	dispatch Yuba city peaking generation after first contingency
PGE BIK-T-24	LAS AGUILASS - PANOCHE 230kV # 1 or 2	Tesla-Metcalf 500 kV & Moss Landing-Los Banos 500 kV	P6	L-1/L-1	diverged	<95%	106.2%	105.8%	<95%	<95%	Dispatch Moss Landing generation after first contingency
PGE BIK-T-25	METCALF 500/230 kV x-former #11, 12 or 13	Metcalf 500/230 kV Transformers #11 and #12 or #13	P6	T-1/T-1	up to 140%	<95%	up to 118%	up to 123.0%	up to 102%	<95%	dispatch Ls Esteros peakers after 1st contingency, and Metcalf Energy Centr, trip load in San Jose if overload persists
		Metcalf 500/230 kV # 11,12 or 13 & Moss Landing 500/230 kV x-formers	P6	T-1/T-1	105.3%	<95%	<95%	<95%	<95%	<95%	
PGE BIK-T-26	MIDWAY 500/230 kV x-former #1, 2 or 3	MIDWAY 500/230 kV x-former #1& 2 or 2&3 or 1&3	P6	T-1/T-1	<95%	<95%	112.8%	106.3%	<95%	<95%	reduce generation at Midway 230 kV after first contingency
PGE BIK-T-27	LS ESTEROS - NWK DIST 230 kV	Tesla-Metcalf 500 kV & Moss Landing-Los Banos 500 kV	P6	L-1/L-1	diverged	<95%	113.1%	114.0%	<95%	<95%	dispatch Ls Esteros peakers after 1st contingency
		Tesla-Metcalf 500 kV & Moss Landing-Metcalf 500 kV	P6	L-1/L-1	100.9%	<95%	<95%	<95%	<95%	<95%	
PGE BIK-T-28	NEWARK E - NWK DIST 230 kV	Tesla-Metcalf 500 kV & Moss Landing-Los Banos 500 kV	P6	L-1/L-1	diverged	<95%	110.5%	111.7%	<95%	<95%	Dispatch generation in San Jose after first contingency
		Tesla-Metcalf 500 kV & Moss Landing-Metcalf 500 kV	P6	L-1/L-1	99.7%	<95%	<95%	<95%	<95%	<95%	Dispatch generation in San Jose after first contingency
PGE BIK-T-16	OLINDA 500/230 kV x-former	Round Mtn 500/230 kV x-former & Olinda (or KE South)-Obanion 230 kV	P6	T-1/L-1	<95%	<95%	104.9%	104.3%	<95%	<95%	use Colusa SPS for off-peak overload
		Round Mtn and Table Mtn 500/230 kV x-formers	P6	T-1/L-1	<95%	<95%	103.4%	103.9%	<95%	<95%	
		Round Mtn 500/230 kV x-former & Round Mtn-Table Mtn 500 kV # 1 or # 2	P6	T-1/L-1	<95%	<95%	99.2%	99.9%	<95%	<95%	
		Round Mtn 500/230 kV x-former & Cortina-Vaca Dix 230 kV	P6	T-1/L-1	<95%	<95%	100.7%	101.9%	<95%	<95%	
		Round Mtn 500/230 kV x-former & Cortina-Delevan 230 kV	P6	T-1/L-1	<95%	<95%	102.0%	104.1%	<95%	<95%	
		Round Mtn 500/230 kV x-former & 230 kV line between Cottonw & Roseville	P6	T-1/L-1	<95%	<95%	up to 104%	up to 104%	<95%	<95%	



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					2021 Peak high renewable	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-Peak Base	2026 Summer Peak no DG	2026 Summer Peak Base	
PGE BIK-T-29	TRACY 500 /230 kV x-former #1 or # 2	Tesla-Tracy 500 kV Line and Tracy 500/230 kV x-former # 2 or # 1	P6	L-1/T-1	137.8%	<95%	<95%	<95%	102.7%	<95%	open Tracy-Tesla 230 kV lines if overload, trip Tracy pumps if it persists or dispatch generation in SMUD after first contingency
PGE BIK-T-56	NEWARK-LOCKHEED JCT #1 115 kV	Tesla-Metcalf 500 kV & Moss Landing-Los Banos 500 kV	P6	L-1/L-1	diverged	<95%	<95%	<95%	99.6%	<95%	Dispatch generation in San Jose after first contingency
PGE BIK-T-33	TRIMBLE-SJB DG 115 kV	Tesla-Metcalf 500 kV & Moss Landing-Los Banos 500 kV	P6	L-1/L-1	diverged	106.0%	116.8%	118.3%	116.0%	119.6%	Dispatch generation in San Jose after first contingency
		Tesla-Metcalf 500 kV & Moss Landing-Metcalf 500 kV	P6	L-1/L-1	<95%	99.5%	<95%	<95%	102.2%	109.9%	
PGE BIK-T-34	COTTONWD E-ROUND MTN 230kV #2	COTTONWD E-RND MTN 230kV #1 or 2 & Round Mtn 500/230 kV x-former	P6	L-1/T-1	<95%	<95%	97.9%	98.1%	<95%	<95%	not a violation, monitor this line
		COTTONWD E-RND MTN 230kV #1 or 2 & Captain Jack-Olinda 500 kV	P6	L-1/L-1	99.9%	<95%	<95%	<95%	<95%	<95%	not a violation, monitor this line
PGE BIK-T-35	COTTONWD E-ROUND MTN 230kV #3	COTTONWD E-RND MTN 230kV #1 or 2 & Round Mtn 500/230 kV x-former	P6	L-1/T-1	101.8%	101.5%	109.9%	110.0%	101.4%	101.4%	upgrade the line, or limit COI import within nomogram for peak, reduce Pit River generaion after 1st contingency for off-peak and if first contingency is 230 kV line
		Table Mtn 500/230 kV x-former & Captain Jack-Olinda 500 kV	P6	T-1/L-1	104.1%	97.7%	<95%	<95%	<95%	<95%	
		COTTONWD E-RND MTN 230kV #1 or 2 & Captain Jack-Olinda 500 kV	P6	L-1/L-1	111.8%	104.2%	<95%	<95%	100.3%	96.6%	
PGE BIK-T-36	OLINDAW - COTWWAP2 230 kV	Round Mtn 500/230 kV x-former and OLINDAW- COTWDWAP 230 kV	P6	L-1/T-1	<95%	<95%	108.6%	109.9%	<95%	<95%	reduce Shasta generation
	OLINDAW - COTWWAP 230 kV	Round Mtn 500/230 kV x-former and OLINDAW- COTWDWAP2 230 kV	P6	L-1/T-1	<95%	<95%	112.4%	109.0%	<95%	<95%	
		Round Mtn 500/230 kV x-former and COTWWAP2 - COTWD_F2 230	P6	L-1/T-1	<95%	<95%	104.7%	105.1%	<95%	<95%	
		Capt Jack-Olinda 500 kV and COTWWAP2 - COTWD_F2 230	P6	L-1/T-1	102.3%	98.7%	<95%	<95%	97.7%	100.7%	
PGE BIK-T-37	DELEVAN-CORTINA 230 kV	Olinda-Tracy 500 kV & Round 500/230 kV x-former	P6	L-1/T-1	<95%	100.1%	<95%	<95%	105.1%	99.9%	reduce Colusa generation after 1st conitngency, if overload
		Olinda-Tracy 500 kV & Delevan-Vaca-Dixon 230 kV	P6	L-1/L-1	<95%	98.1%	<95%	<95%	105.9%	100.2%	
PGE BIK-T-42	MORROBAY- SOLARSS 230 kV # 1 or # 2	Gates-Midway 500 kV & Morro Bay-Solar SS 230 kV # 2 or # 1	P6	L-1/L-1	<95%	<95%	112.6%	118.6%	<95%	<95%	reduce generation from Topaz Solar after first contingency
		any Midway 500/230 kV x-former & Morro Bay-Solar SS 230 kV #2 or #1	P6	L-1/L-1	<95%	<95%	105.3%	108.8%	<95%	<95%	
		Gates-Diablo 500 kV & Morro Bay-Solar SS 230 kV # 2 or # 1	P6	L-1/L-1	<95%	<95%	100.8%	105.0%	<95%	<95%	
		Los Banos-Midway 500 kV & Morro Bay-Solar SS 230 kV # 2 or # 1	P6	L-1/L-1	<95%	<95%	105.5%	110.0%	<95%	<95%	
PGE BIK-T-43	GATES -CALFLATSSS 230 kV	Gates-Midway 500 kV and GATES-TEMPLTON 230 kV	P6	L-1/L-1	<95%	<95%	95.8%	97.3%	<95%	<95%	reduce generation from renewable project connected to Estrella-Gates 230 kV line
		Gates-Midway 500 kV and Gates-Diablo 500 kV	P6	L-1/L-1	<95%	<95%	98.1%	100.3%	<95%	<95%	
		Gates-Midway 500 kV and Morro BAY-TEMPLTON 230 kV	P6	L-1/L-1	<95%	<95%	102.0%	104.1%	<95%	<95%	

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)						Potential Mitigation Solutions
					2021 Peak high renewable	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-Peak Base	2026 Summer Peak no DG	2026 Summer Peak Base	
PGE BIK-T-48	TESLA-LOS BANOS 500 kV	Tracy-Los Banos 500 kV and Moss Landing-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	101.6%	106.7%	<95%	<95%	dispatch generation at Metcalf Energy Center after first contingency
PGE BIK-T-57	WILSON A-LE GRAND 115 kV	Gregg-Henrietta 230 kV & Tesla-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	107.2%	<95%	<95%	<95%	mitigation in area studies, overloads with local contingencies. Wilson-Le Grand reconductoring project
		Tesla-Los Banos 500 kV & Westley-Quinto 230 kV	P6	L-1/L-1	<95%	<95%	113.1%	<95%	<95%	<95%	
		Los Banos 500/230 kV x-former & Quinto-Los Banos 230 kV	P6	L-1/L-1	<95%	<95%	107.9%	<95%	<95%	<95%	
		Kearney-Mc Mullin 230 kV & Tesla-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	105.0%	<95%	<95%	<95%	
PGE BIK-T-58	ALTM MDW - TESLA D 230	TableMtn-Vaca Dix 500 kV & Vaca Dix-Tesla 500 kV	P6	L-1/L-1	110.9%	<95%	<95%	<95%	<95%	<95%	Dispatch generation in Bay Area
PGE BIK-T-59	BORDEN-GREGG 230 kV #1	BORDEN-GREGG 230 kV #2 & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	98.4%	<95%	<95%	<95%	111.5%	96.5%	congestion management, reduce generation at Henrietta or Helms
		BORDEN-GREGG 230 kV #2 & Midway-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	110.4%	<95%	
		BORDEN-GREGG 230 kV #2 & Los Banos-Gates # 1 500 kV	P6	L-1/L-1	100.5%	<95%	<95%	<95%	110.4%	<95%	
		BORDEN-GREGG 230 kV #2 & Mosslanding-Metcalf 500 kV	P6	L-1/L-1	98.4%	<95%	<95%	<95%	111.5%	96.0%	
PGE BIK-T-60	BORDEN-GREGG # 2 230 kV	BORDEN-GREGG 230 kV #1 & Mosslanding-Los Banos 500 kV	P6	L-1/L-1	<95%	<95%	<95%	<95%	102.4%	<95%	congestion management, reduce generation at Henrietta or Helms
BORDEN-GREGG 230 kV #1 & Mosslanding-Metcalf 500 kV		P6	L-1/L-1	<95%	<95%	<95%	<95%	102.3%	<95%		
BORDEN-GREGG 230 kV #1 & Los Banos-Gates # 1 500 kV		P6	L-1/L-1	<95%	<95%	<95%	<95%	101.1%	<95%		
PGE BIK-T-55	RNCHSECO -BELLOTA 230 kV # 1 or 2	Captain Jack-Olinda 500 kV (or other 500 kV lines) & Rancho Seco-Bellota # 2 or # 1 230 kV	P6	L-1/L-1	up to 117%	<95%	<95%	<95%	<95%	<95%	dispatch Cosumnes generation under peak load conditions
		Tracy 500/230 kV x-former (or other 500/230 kV x-formers)& Rancho Seco-Bellota # 2 or # 1 230 kV	P6	L-1/L-1	up to 114%	<95%	<95%	<95%	<95%	<95%	
PGE BIK-T-51	CAPTAIN JACK-OLINDA 500 kV	Malin- Round Mtn #1 and #2 500 kV	P7	L-2	diverged	103.9%	<95%	<95%	102.4%	99.6%	operate within COI seasonal nomogram
		Round Mtn-Table Mtn # 1 & # 2 500 kV	P7	L-2	diverged	105.2%	<95%	<95%	104.5%	101.1%	
PGE BIK-T-52	OLINDA-TRACY 500 kV	Round Mtn-Table Mtn # 1 & # 2 500 kV	P7	L-2	diverged	98.1%	<95%	<95%	96.7%	95.2%	not a violation, monitor this line. Operate within COI nomogram
PGE BIK-T-1	LOS BANOS - QUINTO_SS 230 kV	Los Banos-Tesla and Los Banos-Tracy 500 kV with RAS	P7	L-2	106.0%	<95%	133.0%	140.3%	<95%	<95%	Use more RAS for Path 15 in 2021 Peak case with high renewables, use short-term rating if still overload. Consider line upgrade
		Los Banos-Tesla and Los Banos-Tracy 500 kV with maximum RAS	P7	L-2	100.2%	<95%	128.0%	135.0%	<95%	<95%	
		Tracy-Tesla and Los Banos-Tracy 500 kV	P7	L-2	<95%	<95%	115.7%	119.3%	<95%	<95%	



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)						Potential Mitigation Solutions
					2021 Peak high renewable	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-Peak Base	2026 Summer Peak no DG	2026 Summer Peak Base	
PGE BIK-T-2	MOSSLANDING-LAS AGUILAS 230 kV	Los Banos-Gates #1 and Los Banos-Midway 500 kV	P7	L-2	<95%	<95%	110.7%	107.4%	<95%	<95%	use short-term rating , or trip renewable generation connected to this line, or trip 3rd Helms pump
		Los Banos-Tesla 500 kV and Los Banos-Tracy 500 kV	P7	L-2	<95%	<95%	98.5%	<95%	<95%	<95%	
		Tracy-Tesla and Los Banos-Tracy 500 kV	P7	L-2	<95%	<95%	101.7%	<95%	<95%	<95%	
		Midway-Gates 500 kV & Midway-Los Banos 500 kV w/RAS	P7	L-2	<95%	<95%	98.5%	<95%	<95%	<95%	
		Gates-Mustang 230 kV # 1 and 2	P7	L-2	<95%	<95%	105.9%	100.9%	<95%	<95%	
PGE BIK-T-21	LOS BANOS-SWITCHING STA 230 kV (Los Banos-Panoche)	Los Banos-Gates #1 and Los Banos-Midway 500 kV	P7	L-2	<95%	<95%	103.2%	103.8%	<95%	<95%	trip renewable generation connected to this line, or trip 3rd Helms pump if overload
PGE BIK-T-35	COTTONWD E-ROUND MTN 230kV #3	Tbl Mtn-Tesla and Tbl Mtn-Vaca Dix 500 kV	P7	L-2	diverged	104.1%	<95%	<95%	101.8%	98.7%	upgrade the line, or limit COI import within nomogram
PGE BIK-T-37	DELEVAN-CORTINA 230 kV	Tbl Mtn-Tesla and Tbl Mtn-Vaca Dix 500 kV	P7	L-2	diverged	<95%	<95%	<95%	101.2%	95.8%	upgrade or re-rate the line or reduce Colusa generation, or operate within seasonal COI nomogram
PGE BIK-T-41	RIO OSO-GREENLEAF TAP 115 kV	Tbl Mtn-Tesla & Tbl Mtn-Vaca Dix 500 kV	P7	L-2	diverged	101.1%	<95%	<95%	<95%	<95%	South of Palermo Project. Prior to the project: limit COI import within nomogram
PGE BIK-T-40	TABLE MTN-RIO OSO 230 kV	Tbl Mtn-Tesla and Tbl Mtn-Vaca Dix 500 kV	P7	L-2	diverged	<95%	<95%	<95%	<95%	<95%	Upgrade terminal equipment on this line.
PGE BIK-T-54	PEASE-E. MARYSVLJ - OLIVEHN J 115 kV (Pease-Rio Oso)	Tbl Mtn-Tesla and Tbl Mtn-Vaca Dix 500 kV	P7	L-2	diverged	109.5%	<95%	<95%	<95%	<95%	South of Palermo Project. Prior to the project: limit COI import within nomogram



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %							Potential Mitigation Solutions
					2021 Peak High Renewables	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-peak	2026 Summer Peak no DG	2026 Summer Peak	2026 Spring Off-Peak	
PGE Blk-VD-1	buses in NW 115 kV and below	PDCI mono-pole outage	P1	PDCI	deviations up to 7% (Northcst 69 kV)	deviations up to 8.7% (Northcst 69 kV)	none	none	none	none	none	adjust svds and transformer taps
	insufficient reactive support	Moss Landing-Los Banos 500 kV & Tesla-Metcalf 500 kV	P6	L-2	diverged	no volt deviation violations					add voltage support in Northern California	
	insufficient reactive support	Malin-Round Mountain 500 kV # 1&2	P7	L-2	diverged	no volt deviation violations					add voltage support in Northern California	
	insufficient reactive support	Round Mtn-Table Mtn 500 kV # 1& 2	P7	L-2	diverged	no volt deviation violations					add voltage support in Northern California	
	insufficient reactive support	Table Mtn-Vaca Dix & Table Mtn-Tesla 500 kV	P7	L-2	diverged	no volt deviation violations					add voltage support in Northern California	
	insufficient reactive support	Vaca Dixon 500 kV stuck breaker # 732	P4	BRK	diverged	no volt deviation violations					add voltage support at Vaca Dixon	
	insufficient reactive support	Table Mtn 500 kV stuck breaker # 812	P4	BRK	diverged	no volt deviation violations					add voltage support in Northern California	



ID	Substation	Worst Contingency	Category	Category Description	Voltage (kV)						Potential Mitigation Solutions
					2021 Peak High Renewables	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-peak	2026 Summer Peak no DG	2026 Summer Peak	
PGE Blk-V-1	500 kV in NW	normal conditions and all contingencies	P0-P7	normal & outages	no violations	no violations	up to 554 kV Rock Crk, BPA	up to 553 kV Rock Crk, BPA	no violations	no violations	consider installing additional reactors
PGE Blk-V-2	Diablo 500kV	normal conditions and all contingencies	P0-P7	normal & outages	no violations	no violations	no violations	no violations	>=551 kV	>=553 kV	consider installing shunt reactor on Diablo or Gates 500 kV after Diablo Canyon plant retires and opening one of the Diablo-Midway 500kV lines
PGE Blk-V-3	Midway 500 kV	normal conditions and all contingencies	P0-P7	normal & outages	no violations	no violations	no violations	no violations	>=542 kV	>=543 kV	
PGE Blk-V-4	Gates 500 kV	normal conditions and all contingencies	P0-P7	normal & outages	no violations	no violations	no violations	no violations	>=544 kV	>546 kV	
PGE Blk-V-5	Pit River 1 area 60 kV	normal conditions and all contingencies	P0-P7	normal & outages	no violations	up to 65.3 kV	up to 65.5 kV	up to 65.5 kV	up to 65.3 kV	up to 65.3 kV	mitigation in area studies
PGE Blk-V-6	Vaca Dix 115 kV and adjacent buses	normal conditions	P0-P7	normal & outages	no violations	no violations	122.2 kV	122 kV	no violations	no violations	mitigation in area studies
PGE Blk-V-7	Gold Hill-Newcastle-Placer 115 kV area	normal conditions	P0-P7	normal & outages	no violations	no violations	no violations	no violations	no violations	no violations	mitigation in area studies
PGE Blk-V-8	Atlantic-Rocklin 60 kV area	normal conditions	P0-P7	normal & outages	no violations	no violations	no violations	no violations	no violations	no violations	mitigation in area studies
	COLUSA 60 kV	normal conditions	P0	normal	no violations	no violations	no violations	no violations	56.1 kV	56.7 kV	mitigation in area studies



ID	Generator/Load	Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions		
					2021 Peak high renewable	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-Peak Base	2026 Summer Peak no DG	2026 Summer Peak Base			
PGE Blk-TS-1	Solar PV COLUMBIA 0.36 kV (bus 33102), capacity 19.2 MW	3 Ph fault Contra Costa-La Positas 230 KV	P1	L-1	not tripped	4.8 MW output, not tripped	tripped for high volt at 2.3 sec	18.2 MW output, tripped for high voltage in 2.3 sec	tripped for high voltage at 2.3 sec. 4.8 MW output, 1.081 p.u. voltage in the base case	tripped for high voltage at 2.3 sec. 4.8 MW output, 1.083 p.u. voltage in the base case	Modeled with old solar PV model (wt4g, wt4e), protection trips at 1.1 pu in 1 sec, no issues if shunt capacitor on the collector system is turned off, or generator can absorb reactive power in power flow. Consider having voltage regulation requirement for this project. Need to contact generation owner and update the models		
		3 Ph fault Newark-Ravenswood 230 kV	P1	L-1									
		3ph fault Pittsburg 230 kV, Pittsb-Tesla # 1 and 2	P7	L-2	tripped for high volt at 2.9 sec		not tripped, output 18.2 MW	not tripped				tripped for high voltage at 2.3 sec	tripped for high voltage at 2.3 sec
		3 Ph fault Tesla-Newark 230 kV	P1	L-1	not tripped, output 19.2 MW		tripped for high volt at 2.3 sec	tripped for high voltage at 2.3 sec				tripped for high voltage at 2.3 sec	tripped for high voltage at 2.3 sec
		3ph fault Vaca Dix 500/230 kV x-former, or Vaca Dix-Tesla 500 kV	P1	T-1									
		Tesla 500 kV stuck breaker	P4	BRK									
		3Ph fault C.-Costa-Brentwood and C.Costa-Delta 230 kV	P7	L-2									
		3 Ph fault Contra Costa-La Positas and C.Costa-Lone Tree 230 KV	P7	L-2	tripped for high volt at 2.6 sec		not tripped, output 18.2 MW	not tripped				not tripped	not tripped
Vca Dix stuck brk # 732													
PGE Blk-TS-2	wind generators at Shilo # 2 (bus 32177), capacity 150 MW	3Ph fault Contra-Costa-Brentwood and Contra Costa-Delta 230 kV	P7	L-2	tripped for low voltage w/fault, 49.5 MW		tripped for low voltage, output 150 MW	tripped for low voltage, output 150 MW	tripped for low voltage, output 49.5 MW		these are old induction generator units that don't have LVRT, they may trip with faults close to these units		
		Tesla 500 kV stuck breaker	P4	BRK	tripped for low volt w/fault	not tripped			not tripped				
		3 Ph fault C. Costa-La Positas 230 KV	P1	L-1	tripped for low volt 49.5 MW				tripped for low voltage				
		3 Ph fault Tesla-Newark 230 KV	P1	L-1	tripped for low voltage w/fault 49.5 MW	not tripped, output 49.5 MW			not tripped, output 49.5 MW				
		3 Ph fault Newark 230 KV, Newark-Ravenswood	P1	L-1	tripped for low volt w/fault 49.5 MW				tripped for low voltage				
		3 Ph fault Contra Costa-La Positas and C.Costa-Lone Tree 230 KV	P7	L-2	tripped for low volt w/fault 49.5 MW				tripped for low voltage				
		3 ph fault on Gates 230 kV, any outage	P7	L-2	not tripped	tripped for high voltage with fault	not tripped	not tripped	tripped for high voltage with fault, 60 MW				
		3Ph fault on Malin 500 kV, single or double outage to Round Mtn	P1, P7	L-1, L-2	tripped for low freq w/fault, output 244 MW	not tripped			tripped for high voltage with fault, 60 MW				
		3Ph fault on Olinda 500 kV, Olinda-Tracy, or Olinda 500/230 kV x-former	P1	L-1, T-1									
		3ph fault Newark 230 kV, Newark-Ravenswood outage	P1	L-1									
		3Ph fault on Gates 500 kV, any outage	P1	L-1, T-1									
		3Ph fault on Los Banos 500 kV, any single line outage	P1	L-1	not tripped, output 244 MW	not tripped			tripped for high voltage w/fault				
		3Ph fault on Los Banos 500 kV, DLO North of Los Banos	P7	L-2									
3Ph fault on Midway 500 kV, Midway-Gates 500 kV	P1	L-1											



ID	Generator/Load	Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
					2021 Peak high renewable	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-Peak Base	2026 Summer Peak no DG	2026 Summer Peak Base	
PGE Blk-TS-3	Solar PV # 1 and 2 (bus 34347) connected to Las Aguilas 230 kV substation, total capacity 244 MW	3Ph fault on Midway 500 kV, Midway-Vincent 500 kV #1&2	P7	L-2		not tripped, output 60 MW	not tripped	not tripped	not tripped, output 60 MW	not tripped, output 60 MW	need to contact generation owner and to check the models and protection settings. Slow frequency recovery on generator and high voltage buses with other faults (Capt Jack Olinda)
		3Ph fault on Midway 500 kV, DLO North of Midway	P7	L-2			not tripped				
		3Ph fault on Tesla 500 kV, any outage	P1, P7	L-1, L-2	tripped for high volt w/fault						
		3Ph fault on Tesla 230 kV, Tesla-Newark 230 kV	P1	L-1	tripped for high volt w/fault						
		3Ph fault on Tracy 500 kV, Tracy-Los Banos 500 kV	P1	L-1	tripped for high volt w/fault		tripped for high voltage w/fault, 232 MW	tripped for high voltage with fault, 232 MW			
		3Ph fault on Los Banos 500 kV, 500/230 kV x-former	P1	T-1							
		3Ph fault on MossLanding 500 kV, Mosslanding-Metcalf 500 kV	P1	L-1	not tripped, ouput 244 MW						
		3Ph fault on Metcalf 500 kV, 500/230 kV x-former	P1	T-1							
		3Ph fault on Tracy or Tesla 500 kV, 500/230 kV x-former	P1	T-1	tripped for high volt w/fault		tripped for high voltage w/fault, 232 MW				
		3Ph fault on Tracy 500 kV, DLO south of Tracy 500 kV	P7	L-2	tripped for high volt w/fault			tripped for high voltage w/fault			
		3ph fault Vaca Dix 500/230 kV x-former, or Vaca Dix-Tesla	P1	T-1			not tripped				
					tripped for high volt w/fault		tripped for high volt w/fault				
		3Ph fault on Tesla 500 kV, DLO north of Tesla 500 kV	P7	L-2							
3Ph fault Round Mtn 500 kV, any contingency	P1, P7	L-1, T-1, L-2	slow frequency recovery	normal recovery	tripped for low freq w/fault	slow frequency recovery	normal recovery				
PGE Blk-TS-4	Solar PV KANSAS 12.47 (bus 34680), capacity 20 MW	3Ph fault on Gates 230 kV, any single or double contingency	P1, P7	L-1, L-2	tripped for low voltage w/fault, output 20 MW	not tripped, output 5 MW	tripped for low voltage w/fault, 19 MW		not tripped, output 5 MW	Modeled with old solar PV model (wt4g, wt4e). Need to contact generation owner and update the models and check protection settings	
PGE Blk-TS-5	Solar PV KENT_S (bus 34694), capacity 20 MW	3ph fault Gates 230 kV, Gates-Midway 230 kV	P1	L-1	tripped for low volt w/fault	not tripped, output 5 MW	tripped for low voltage w/fault		not tripped, output 5 MW	Old wt4g, wt4e models. Under-voltage protection trips in 0.02 sec with vlt 0.5 p.u. Need to discuss protection settings and the plant model parameters with the generation owner.	
		3ph fault Los Banos 500 kV, Gates-Los Banos 500 kV # 1 or 3	P1	L-1							
		3ph fault Los Banos 500 kV, Los Banos-Midway 500 kV	P1	L-1							
		3ph fault Los Banos 500 kV, Los Banos-Moss landing 500 kV	P1	L-1	not tripped, output 20 MW		tripped for high frequency with fault, output 19 MW	tripped for high frequency with fault, output 19 MW			
		3ph fault Los Banos 500 kV, Los Banos 500/230 kV x-former	P1	T-1							
		3ph fault Los Banos 500 kV, DLO north of Los Banos	P7	L-2							
		3ph fault Los Banos 500 kV, DLO south of Los Banos	P7	L-2							
		3ph fault Gates 230 kV Gates-Arco and Gates-Midway 230 kV	P7	L-2							
		3 ph Gates 230 kV, Gates-Greg and Gates-MCal	P7	L-2	tripped for low volt w/fault, 20 MW			tripped for low volt w/fault, 19 MW			



ID	Generator/Load	Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
					2021 Peak high renewable	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-Peak Base	2026 Summer Peak no DG	2026 Summer Peak Base	
PGE Blk-TS-6	Solar PV REGULUS 0.38 kV (Bus 35019), capacity 60.5 MW	3Ph fault on Midway 500 kV or 230 kV, any contingency	P1, P7	L-1, L-2	not tripped, output 60.5 MW	not tripped, output 15 MW	tripped for high frequency with fault, output 57.5 MW		not tripped, output 15 MW		Modeled with old solar PV model (wt4g, wt4e). Need to contact generation owner and update the models and check protection settings
PGE Blk-TS-7	Wind generator NSR_WND1 0.69 kV (bus 29474), capacity 162 MW	1 Diablo unit	P1	G-1	tripped for high voltage with fault, output 160 MW	tripped for high voltage with fault, output 160 MW	the unit is off in this case		the unit is off in this case		This generator is on the SCE system. Need to discuss generator model and study results with SCE
		any contingency w/3 ph fault on Diablo 500 kV	P1,P7	L-1/L-2							
		any contingency w/3 ph fault on Los Banos 500 kV	P1,P7	L-1/L-2							
		any contingency w/3 ph fault on Midway 500 kV	P1,P7	L-1/L-2							
PGE Blk-TS-8	Solar PV AD SOLAR 0.26 kV (bus 26949), capacity 10 MW	any contingency w/3 ph fault on Midway 500 kV	P1,P7	L-1/L-2	not tripped, output 7.5 MW	not tripped, output 7.5 MW	off in this case	off in this case	tripped for high volt after 8.8 sec, output 7.5 MW, except for Midway-Vincent # 1 or # 2	tripped for high volt after 9 sec, output 7.5 MW	This generator is on the LADWP system. Need to discuss generator model and study results with LADWP
PGE Blk-TS-9	Solar PV connected to Wheeler 115 kV (bus 35021), capacity 20 MW	3Ph fault on Midway 230 kV, Gates-Midway 230 kV	P1	L-1	tripped for low voltage w/fault, output 20 MW	tripped for low voltage with fault, output 5 MW	not tripped	tripped for low voltage with fault, output 19 MW	tripped for low voltage with fault, output 5 MW		Old wt4g, wt4e models. Under-voltage protection trips in 0.02 sec with vlt 0.5 p.u. Need to discuss protection settings and the plant model parameters with the generation owner.
		3Ph fault Midway230 kV, Midway-Kern # 1 and 2 230 kV	P7	L-2			tripped for low volt w/fault				
		3Ph fault Midway 500 kV, any contingency	P1, P7	L-1, L-2	not tripped	not tripped	tripped for high frequency with fault, 19 MW	not tripped	not tripped		
PGE Blk-TS-10	Solar PV ORION (35082), capacity 20 MW	3Ph fault on Midway 230 kV, Gates-Midway 230 kV	P1	L-1	tripped for low voltage w/fault, output 20 MW	tripped for low voltage with fault, output 5 MW	tripped for low voltage with fault, output 19 MW		tripped for low voltage with fault, output 5 MW		Old wt4g, wt4e models. Under-voltage protection trips in 0.02 sec with vlt 0.5 p.u. Over-frequency trips for 60.5 Hz in 0.02 sec. Need to discuss protection settings and the plant model parameters with the generation owner.
		3Ph fault on Midway 230 kV, Midway - Kern PP# 2 and 3 230 kV	P7	L-2							
		3Ph fault Midway 500 kV, any contingency	P1, P7	L-1, T-1, L-2	not tripped	not tripped	tripped for high frequency with fault, 19 MW	not tripped			
PGE Blk-TS-11	Solar PV Willwood (bus 39184, on Goose Lake-Semitrophic 115 kV line), capacity 20 MW	3Ph fault on Midway 230 kV, Gates-Midway 230 kV	P1	L-1	tripped for high freq w/fault, output 20 MW	not tripped, output 5 MW	tripped for high frequency with fault, 19 MW	tripped for high frequency with fault, output 19 MW	not tripped, output 5 MW		Frequency protection trips the unit at 60.5 Hz or 59.3 Hz in 0.02 sec. Need to discuss the models and protection settings with the generation owner. Same refers to the Pumpjack plant (bus 39176)
		3Ph fault on Midway 230 kV, Midway - Kern PP# 2 and 3 230 kV	P7	L-2			not tripped				
PGE Blk-TS-12	Solar PV, bus 35069 on Copus-Old River 70 kV line, capacity 20 MW	3Ph fault on Gates 500 kV, any contingency	P1 ,P7	L-1, T-1, L-2	tripped for high voltage w/fault, 12 MW	not tripped, output 3 MW	not tripped		not tripped, output 3 MW	not tripped, output 3 MW	this is old dynamic model. Need to update the model and specify model parameters and protection settings with the generation owner
		3Ph fault on Midway 500 kV, any contingency	P1 ,P7	L-1, T-1, L-2		tripped for high voltage with fault			tripped for high volt w/fault, 11.4 MW	tripped for high volt with fault	



ID	Generator/Load	Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
					2021 Peak high renewable	2021 Summer Peak Base	2018 Off-Peak Max PV	2018 Spring off-Peak Base	2026 Summer Peak no DG	2026 Summer Peak Base	
PGE Blk-TS-13	Russel City, 15 kV, 18 kV and 230 kV buses	3Ph fault East Shore 230 kV, East Shore-San Mateo	P1	L-1	slow freq recovery	normal recovery	normal recovery		normal recovery		Russel City plant off in the 2021 peak sensitivity case
PGE Blk-TS-14	Gateway & Marsh Landing 16.5, 18 kV & 230 kV buses	3Ph fault on Contra Costa 230 kV, any outage	P1, P7	L-1, L-2	normal recovery		slow freq recovery		normal recovery		These plants are off in the 2018 off-peak cases
PGE Blk-TS-15	Solar PV plant at buses 34663 & 34667, connected to Gates-Estrella 230 kV line	3Ph fault on Gates 230 kV or 500 kV, any contingency	P1,P7	L-1, L-2	slow freq recovery	normal recovery	slow freq recovery		normal recovery		need to contact generation owner and to check the models and protection settings.
		3Ph fault Midway 500 kV, any outage	P7	L-2			normal recovery		normal recovery		
PGE Blk-TS-16	Topaz Solar PV plant	3Ph fault Midway 500 kV, any outage	P1, P7	L-1, T-1,L-2	slow freq recovery	normal recovery	normal recovery		normal recovery		need to check the models with the generator owners
PGE Blk-TS-16	Load on Ashlan 230 kV	3Ph fault Gregg 230 kV, Greg-Herndon 230 kV # 1 & 2	P7	L-2	normal recovery	slow frequency recovery	normal recovery		normal recovery		need to check load model at Ashlan
PGE Blk-TS-18	Load on Santiago 66 kV (SCE)	3Ph fault Midway 500 kV, any contingency	P1, P7	L-1, L-2	normal recovery	slow frequency recovery	normal recovery		normal recovery		need to check load model at Santiago
PGE Blk-TS-19	Load on Gates 115 kV	3Ph fault on Gates 230 kV, Gates-Midway 230 kV	P1	L-1	tripped by UFLS	not tripped, slow frequency recovery	tripped by UFLS		not tripped, slow frequency recovery	tripped by UFLS	slow frequency recovery, load tripped with fault, modeling issue because of low impedance between the fault and load.
		3Ph fault on Gates 230 kV, Gates-Gregg, Gates-Mc Call 230 kV	P7	L-2	tripped by UFLS		tripped by UFLS			not tripped	
		3Ph Fault Gates-Arco, Gates-Midway 230 kV	P7	L-2	tripped by UFLS		tripped by UFLS				
PGE Blk-TS-20	Load on Gates-distr 12.5 kV	3Ph fault on Gates 230 kV, Gates-Midway 230 kV	P1	L-1	not tripped	tripped by UFLS	not tripped		tripped by UFLS	slow frequency recovery, load tripped with fault, modeling issue because of low impedance between the fault and load	
		3Ph fault on Gates 230 kV, Gates-Gregg, Gates-Mc Call 230 kV	P7	L-2							
		3Ph Fault Gates-Arco, Gates-Midway 230 kV	P7	L-2							
PGE Blk-TS-21	Caribou 230 kV, Butt Vly, Grizzly, Big Bend 115 kV, 60 kV buses between Caribou& Table Mtn	3 Ph fault Table Mtn 500kV, Table Mtn 500/230 kV x-former out	P1	T-1	no violations	no violations	large frequency dip between 1.6 & 1.9 sec	large frequency dip between 1.8 & 2.2 sec	no violations		not a violation according to the new standard
PGE Blk-TS-22	Load in Santa Clara on Palm, Mission, Walsh & Kenneth 60 kV	3Ph fault on Los Banos 500 kV, Round Mtn 500 kV, Table Mtn 500 kV, Tesla 500 kV or Vaca Dix 500 kV any contingency	P1, P7	L-1,T-1,L-2	tripped by UFLS, 1st stage	not tripped	not tripped		not tripped		under investigation
PGE Blk-TS-23	70 kV and 115 kV buses around Midway	3Ph fault on Midway 230 kV, any contingency	P1	L-1	slow voltage and frequency recovery						This is a possible numerical issue because of slow convergence due to large amount of inverter-based generation in the area and composite load models. Large voltage dips observed around 0.1 sec after fault clearing. Also slow frequency recovery after the fault in Midway area. According to the new standard, these are not violations
PGE Blk-TS-24	Buena Vista pumps		P1	L-1							
PGE Blk-TS-25	Wheeler Ridge pumps		P1	L-1							
PGE Blk-TS-26	Wind Gap pumps		P1	L-1							

2016-2017 ISO Reliability Assessment -Final Study Results

Study Area: PG&E Bulk

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)					
				Select..	Select..	Select..	Select..	Select..	Select..
PGE Bulk-SLD-1	NONE								

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



		Potential Mitigation Solutions
Select..	Select..	

Study Area: **PG&E Bulk**

Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
PGE Bulk-SS-1	NONE									

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load	N/A	N/A	
HUMB-T-01	HUMBOLDT-BRDGVLE 115 kV # 1 1	P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820] &	P1-2	T-line	<100	<100	100.08	<100	<100	<100	<100	99.78			Monitor line loading due to long lead time (Humboldt-Bridgeville 115 kV Line overload)
HUMB-T-02	HUMBOLDT-HMBLT JT 60 kV 1 1	P1-2:A1:13:_HUMBOLDT BAY-HUMBOLDT #2 60kV [7090] &	P1-2	T-line	99.19	<100	108.91	<100	<100	<100	106.95	110.3			Redispatch Humboldt Bay generation (Humboldt Bay-Humboldt #1 60 kV Line overload)
HUMB-T-03	HMBLT BY-EEL RIVR 60 kV 1 1	P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810] &	P1-2	T-line	<100	<100	112.83	<100	<100	103.17	<100	99.99			Redispatch Humboldt Bay generation (Humboldt Bay-Rio Dell Jct 60 kV Line)
HUMB-T-04	CARLOTTA-RIODLLTP 60 kV 1 1	P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810] &	P1-2	T-line	98.09	99.36	121.94	<100	<100	<100	103.79	118.62			Existing action Plan (Rio Dell Jct Jct-Bridgeville 60 kV Line overload). Gen redispatch/reduce gen at Humboldt Bay
HUMB-T-05	CARLOTTA-SWNS FLT 60 kV 1 1	P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810] &	P1-2	T-line	<100	96.19	118.72	<100	<100	<100	100.93	115.57			Existing action Plan (Rio Dell Jct Jct-Bridgeville 60 kV Line overload). Gen redispatch/reduce gen at Humboldt Bay
HUMB-T-06	SWNS FLT-BRDGVLE 60 kV 1 1	P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810] &	P1-2	T-line	<100	<100	118.31	<100	<100	<100	100.55	115.18			Existing action Plan (Rio Dell Jct Jct-Bridgeville 60 kV Line overload). Gen redispatch/reduce gen at Humboldt Bay
HUMB-T-07	FRUTLDJT-FTSWRDJT 60 kV 1 1	P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110] &	P1-2	T-line	100.48	99.86	<100	<100	<100	<100	<100	<100			Existing Action Plan (Bridgeville-Garberville 60 KV Line). Gen redispatch: Reduce gen at Humboldt Bay
HUMB-T-08	HUMBOLDT-BRDGVLE 115 kV 1 1	P2-1:A1:1:_HUMBOLDT-TRINITY 115kV [1820] (HUMBOLDT-TRINITY) &	P2-1	Open-ended line	72.76	76.73	100.08	72.53	72.71	87.14	81.68	99.78			Monitor line loading due to long lead time. (Humboldt-Bridgeville 115 kV Line)
HUMB-T-09	CARLOTTA-RIODLLTP 60 kV 1 1	P2-2:A1:1:_HUMBOLDT 115kV Section MA &	P2-2	Bus	<100	<100	105.78	<100	<100	<100	108.77	116.36			Monitor line loading. Upgrade bus. Interim: Gen redispatch (Rio Dell-Bridgeville 60 kV Line).
HUMB-T-10	CARLOTTA-SWNS FLT 60 kV 1 1	P2-2:A1:1:_HUMBOLDT 115kV Section MA &	P2-2	Bus	74.86	63.61	102.62	<100	<100	<100	105.92	113.35			Monitor line loading. Upgrade bus. Interim: Gen redispatch (Rio Dell-Bridgeville 60 kV Line).

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions		
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load	N/A	N/A	
HUMB-T-11	SWNS FLT-BRDGVLE 60 kV 1 1	P2-2:A1:1:_HUMBOLDT 115kV Section MA &	P2-2	Bus	74.47	63.24	102.23	<100	<100	<100	105.54	112.95			Monitor line loading. Upgrade bus. Interim: Gen redispatch (Rio Dell-Bridgeville 60 kV Line).
HUMB-T-12	FRUTLDJT-FTSWRDJT 60 kV 1 1	P2-2:A1:3:_LOW GAP1 115kV Section 1D &	P2-2	Bus	100.48	99.87	22.61	<100	<100	<100	86.01	79.69			Approved Bridgeville-Gabreville 115 kV Line project (Bridgeville-Gabreville 60 kV Line)
HUMB-T-13	HUMBOLDT-HMBLT JT 60 kV 1 1	P2-3:A1:13:_HMBLT BY 60kV - Middle Breaker Bay 3 &	P2-3	Circuit breaker	110.51	89.54	117.69	<100	<100	<100	110.43	114.77			Interim: Gen redispatch at Humboldt Bay. Upgrade and increase capacity of the approved Humboldt Bay-Humboldt #1 60 kV reconductor project (Humboldt Bay-Humboldt #1 60 kV Line)
HUMB-T-14	HMBLT BY-EEL RIVR 60 kV 1 1	P2-3:A1:21:_BRDGVLE 115kV - Ring R1 & R3 &	P2-3	Circuit breaker	85.09	81.85	<100	86.78	87.84	89.68	<100	<100			Interim: Gen redispatch. Monitor line loading due to long lead time (Humboldt Bay-Rio Dell Jct 60 kV Line)
HUMB-T-15	HMBLT BY-EEL RIVR 60 kV 1 1	P1-1:A1:2:_PAC.LUMB 14kV Gen Unit 1 or 2 & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P3	L-/G-1	99.35	98.6	99.19	99.89	99.98	99.68	<100	100.38			Gen redispatch at Humboldt Bay (Humboldt Bay-Rio Dell Jct 60 kV Line)
HUMB-T-16	CARLOTTA-RIODLLTP 60 kV 1 1	P1-1:A1:10:_HUMB_G2 14kV Gen Unit 5 or 3 & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P3	L-/G-1	<100	<100	100.04	<100	<100	<100	<100	100.69			Monitor. Gen redispatch at Humboldt Bay (Rio Dell Jct-Bridgeville 60 kV Line overload)
HUMB-T-17	HMBLT BY-EEL RIVR 60 kV 1 1	P1-1:A1:2:_PAC.LUMB 14kV Gen Unit 1 & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P3	L-/G-1	99.35	98.6	99.19	101.44	102.65	112.88	95.29	100.38			Reconductor. Interim: Gen Redispatch (Humboldt Bay-Rio Dell Jct 60 kV Line overload)
HUMB-T-18	EUREKA-HMBLT BY 60 kV 1 1	P1-2:A1:13:_HUMBOLDT BAY-HUMBOLDT #2 60kV [7090] & P1-2:A1:12:_HUMBOLDT BAY-HUMBOLDT #1 60kV [7080]	P6	N-1-1	102.16	100.95	102.16	129.19	122.34	138.5	102.45	98.61			Action Plan: SPS/redispatch Humboldt Bay generation (Humboldt Bay-Eureka 60 kV Line)
HUMB-T-19	HMBLT BY-EEL RIVR 60 kV 1 1	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	<100	<100	104.85	102.23	103.37	114.55	<100	<100			SPS/reconductor (Humboldt Bay-Rio Dell Jcte 60 kV Line)
HUMB-T-20	HMBLT BY-EEL RIVR 60 kV 1 1	P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820] & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	<100	<100	<100	150.32	152.1	172.47	<100	<100			SPS/reconductor (Humboldt Bay-Rio Dell Jcte 60 kV Line)

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load	N/A	N/A	
HUMB-T-21	NEWBURG-RIODLLTP 60 kV 1 1	P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820] & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	<100	<100	<100	<100	<100	107.93	<100	<100			Action Plan: SPS/redispach Humboldt Bay generation (Humboldt Bay-Rio Dell Jcte 60 kV Line)
HUMB-T-22	CARLOTTA-RIODLLTP 60 kV 1 1	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	100.15	100.31	113.42	122.06	122.52	140.79	101.19	109.14			Existing action Plan (Rio Dell Jct-Bridgeville 60 KV Line overload). Gen redispach/reduce gen at Humboldt Bay
HUMB-T-23	CARLOTTA-SWNS FLT 60 kV 1 1	P1-2:A1:17:_TRINITY-MAPLE CREEK 60kV [8170] MOAS OPENED on TRINITY_TAP 65 & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	95.95	96.95	113.43	118.32	118.97	137.41	97.7	107.63			Existing action Plan (Rio Dell Jct-Bridgeville 60 KV Line overload). Gen redispach/reduce gen at Humboldt Bay
HUMB-T-24	SWNS FLT-BRDGVILLE 60 kV 1 1	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	96.22	96.76	109.86	116.89	117.6	136.03	97.96	105.77			Existing action Plan (Rio Dell Jct-Bridgeville 60 KV Line overload). Gen redispach/reduce gen at Humboldt Bay
HUMB-T-25	BRDGVILLE-FRUTLDJT 60 kV 1 1	P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110] & P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820]	P6	N-1-1	100.53	100.29	<100	107.51	108.26	<100	99.03	<100			Approved Bridgeville-Gabreville 115 kV project (Bridgeville-Garberville 60 kV Line)
HUMB-T-26	GRBRVILLE-KEKAWAKA 60 kV 1 1	P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820] & P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110]	P6	N-1-1	<100	<100	101.08	<100	<100	104.79	<100	<100			Approved Bridgeville-Gabreville 115 kV project (Garberville-Laytonville 60 kV Line overload)
HUMB-T-27	KEKAWAKA-LYTNVILLE 60 kV 1 1	P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110] & P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820]	P6	N-1-1	<100	<100	100.97	<100	<100	119.66	<100	<100			Approved Bridgeville-Gabreville 115 kV project (Garberville-Laytonville 60 kV Line overload)
HUMB-T-28	FRUTLDJT-FTSWRDJT 60 kV 1 1	P1-2:A1:25:_BRDGVILLE-GRBRVILLE #2 115kV [0] & P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110]	P6	N-1-1	<100	<100	100.43	<100	<100	<100	<100	<100			Approved Bridgeville-Gabreville 115 kV project (Bridgeville-Garberville 60 kV Line)
HUMB-T-29	FRUTLDJT-FTSWRDJT 60 kV 1 1	P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110] & P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820]	P6	N-1-1	101.1	101.19	<100	<100	<100	<100	101.48	<100			Approved Bridgeville-Gabreville 115 kV project (Bridgeville-Garberville 60 kV Line)

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								N/A		Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load	N/A	N/A	
HUMB-T-30	FTSWRDJT-GRBRVLE 60 kV 1 1	P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110] & P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820]	P6	N-1-1	99.1	99.29	<100	<100	<100	<100	99.84	<100			Approved Bridgeville-Gabreville 115 kV project (Bridgeville-Garberville 60 kV Line)
HUMB-T-31	HUMBOLDT-HMBLT JT 60 kV 1 1	P7-1:A1:7:_HUMBOLDT BAY-HUMBOLDT #2 & HUMBOLDT BAY-HUMBOLDT #2 Lines & 32.2	P7	N-2 (DCTL)	105.31	<100	116.12	<100	<100	<100	112.32	119.56			Interim: Gen redispatch at Humboldt Bay. Upgrade and increase capacity of the approved Humboldt Bay-Humboldt #1 60 kV Line reconductor project (Humboldt Bay-Humboldt #1 60 kV Line overload).

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A		

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A		
HUMB-V-01	FRUITLND 60 kV	P1-2:A1:22:_BRIDGEVILLE-GARBERVILLE 60kV [6220] MOAS OPENED on BRDGVILLE_FRUTLDJT &	P1-2	Gen	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.8933			Monitor
HUMB-V-02	BRDGVILLE 115 kV	P1-4:A1:6:_HUMBOLDT SVD=v &	P1-4	Transformer	1.1167	1.1003	<1.10	1.123	1.1101	<1.10	1.131	<1.10				Under review
HUMB-V-03	HUMBOLDT 115 kV	P1-4:A1:6:_HUMBOLDT SVD=v &	P1-4	Transformer	1.1544	1.1393	1.1155	1.158	1.1466	1.107	1.1684	<1.10				Under review
HUMB-V-04	FRT SWRD 60 kV	P2-1:A1:34:_BRIDGEVILLE-GARBERVILLE 60kV [6220] (BRDGVILLE-FRUTLDJT) &	P2-1	Open-ended line	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.90			Corrective Action Plan
HUMB-V-05	FRUITLND 60 kV	P2-1:A1:34:_BRIDGEVILLE-GARBERVILLE 60kV [6220] (BRDGVILLE-FRUTLDJT) &	P2-1	Open-ended line	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.893			Corrective Action Plan
HUMB-V-06	FRT SWRD 60 kV	P2-2:A1:8:_GRBRVILLE 60kV Section 1E &	P2-2	Bus	1.1171	1.1136		1.1199	1.1176	<1.10	1.1361	<1.10				Under review
HUMB-V-07	BRDGVILLE 115 kV	P2-3:A1:21:_BRDGVILLE 115kV - Ring R1 & R3 &	P2-3	Circuit Breaker	0.8891	0.8915	0.8706	0.889	0.8879	0.8807	0.9121	0.8434				Corrective Action Plan
HUMB-V-08	FRUITLND 60 kV	P2-3:A1:15:_BRDGVILLE - MA 60kV & RIO DELL JCT-BRIDGEVILLE line &	P2-3	Circuit Breaker	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.8933			Corrective Action Plan
HUMB-V-09	GRBRVILLE 60 kV	P2-3:A1:19:_BRDGVILLE 115kV - Ring R3 & R2 &	P2-3	Circuit Breaker	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.8959			Corrective Action Plan
HUMB-V-10	BRDGVILLE 115 kV	P3: P1-1:A1:6:_HUMB_G1 14kV Gen Unit 1 & P1-4:A1:6:_HUMBOLDT SVD=v	P3	L-1/G-1	1.1206	1.1124	<1.10	1.125	1.1175	<1.10	<1.10	<1.10				Under review
HUMB-V-11	HUMBOLDT 115 kV	P3: P1-1:A1:6:_HUMB_G1 14kV Gen Unit 1 & P1-4:A1:6:_HUMBOLDT SVD=v	P3	L-1/G-1	1.1582	1.1543	1.1232	<1.10	1.1557	1.1159	<1.10	<1.10				Under review
HUMB-V-12	BRDGVILLE 115 kV	P6: P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820] & P1-4:A1:6:_HUMBOLDT SVD=v	P6	N-1-1	1.1245	1.1172	<1.10	<1.10	<1.10	<1.10	1.1425	<1.10				Under review
HUMB-V-13	BRDGVILLE 115 kV	P6: P1-4:A1:4:_GRBRVILLE SVD=v & P1-4:A1:6:_HUMBOLDT SVD=v	P6	N-1-1	1.1208	1.1084	1.1302	<1.10	<1.10	<1.10	1.143	<1.10				Under review
HUMB-V-14	FRT SWRD 60 kV	P1-4:A1:4:_GRBRVILLE SVD=v & P1-2:A1:23:_GARBERVILLE-LAYTONVILLE 60kV [8365]	P6	N-1-1	1.1122	1.1136	<1.10	<1.10	<1.10	<1.10	1.1362	<1.10				Under review

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A		
HUMB-V-15	FRUITLND 60 kV	P1-2:A1:21:_RIO DELL JCT-BRIDGEVILLE 60kV [7850] MOAS OPENED on CARLOTTA_SWNS FLT & P1-3:A1:3:_BRDGVILLE 115/60kV TB 1	P6	N-1-1	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.891			Corrective Action Plan
HUMB-V-16	FRUITLND 60 kV	P1-2:A1:22:_BRIDGEVILLE-GARBERVILLE 60kV [6220] MOAS OPENED on BRDGVILLE_FRUTLDJT & P1-4:A1:4:_GRBRVLE SVD=v	P6	N-1-1	1.0751	1.0781	1.0781	<1.10	<1.10	<1.10	1.1899	<1.10				Under review
HUMB-V-17	GRBRVLE 60 kV	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60kV [6220] MOAS OPENED on FTSWRDJT_GRBRVLE & P1-4:A1:4:_GRBRVLE SVD=v	P6	N-1-1	1.1933	1.1992	1.0941	<1.10	<1.10	<1.10	1.262	<1.10				Under review
HUMB-V-18	GRBRVLE 60 kV	P1-4:A1:4:_GRBRVLE SVD=v & P1-4:A1:6:_HUMBOLDT SVD=v	P6	N-1-1	<1.10	<1.10	1.145	<1.10	<1.10	<1.10	1.1235	<1.10				Monitor
HUMB-V-19	HOOPA 60 kV	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK & P1-4:A1:7:_MPLE CRK SVD=v	P6	N-1-1	0.8331	0.829	0.8297	>0.90	>0.90	>0.90	0.9184	0.9274				Corrective Action Plan
HUMB-V-20	HUMBOLDT 115 kV	P1-4:A1:6:_HUMBOLDT SVD=v & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	1.1795	1.1774	1.1806	<1.10	1.1768	1.1779	1.1861	<1.10				Under review
HUMB-V-21	MPLE CRK 60 kV	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK & P1-4:A1:1:_HUMBOLDT SHUNT=7h	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10				Monitor

ID	Contingency	Category	Category Description	Transient Stability Performance - Number of Voltage and Frequency Violations										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	N/A	N/A	N/A		
HUMB-TS-01	HUMBOLDT 115.00	P2-2	Bus			4									Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-02	HUMBOLDT 115.00	P2-2	Bus				6								Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-03	HUMBOLDT 115.00	P2-2	Bus		4										Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-04	HUMBOLDT 115.00	P2-2	Bus					7							Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-05	HUMBOLDT 115.00	P2-2	Bus	6											Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-06	Bridgeville - Garberville 60 kV Line (BRDGVLE-FRUTLDJT)	P1-2	T-line		12										Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-07	Bridgeville - Garberville 60 kV Line (BRDGVLE-FRUTLDJT)	P1-2	T-line					8							Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-08	Bridgeville - Garberville 60 kV Line (BRDGVLE-FRUTLDJT)	P1-2	T-line				8								Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-09	Bridgeville - Garberville 60 kV Line (BRDGVLE-FRUTLDJT)	P1-2	T-line			12									Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-10	Bridgeville - Garberville 60 kV Line (BRDGVLE-FRUTLDJT)	P1-2	T-line	14											Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-11	Humboldt 115/60 No.2 Transformer	P1-3	Transformer		1										Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-12	Humboldt 115/60 No.2 Transformer	P1-3	Transformer			0									Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-13	Humboldt 115/60 No.2 Transformer	P1-3	Transformer				2								Reassess with actual fault clearing times and SLG fault impedances where applicable

ID	Contingency	Category	Category Description	Transient Stability Performance - Number of Voltage and Frequency Violations										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	N/A	N/A	N/A		
HUMB-TS-14	Humboldt 115/60 No.2 Transformer	P1-3	Transformer	0											Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-15	Humboldt 115/60 No.2 Transformer	P1-3	Transformer					17							Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-16	HUMBOLDT 60.00 SVD ID v	P1-4	Shunt device		0										Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-17	HUMBOLDT 60.00 SVD ID v	P1-4	Shunt device	1											Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-18	HUMBOLDT 60.00 SVD ID v	P1-4	Shunt device				2								Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-19	HUMBOLDT 60.00 SVD ID v	P1-4	Shunt device			3									Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-20	HUMBOLDT 60.00 SVD ID v	P1-4	Shunt device					17							Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-21	NON-BUS-TIE BREAKER CB6622 FAULT AT 31080 HUMBOLDT 60.00	P2-3	Circuit breaker		11										Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-22	NON-BUS-TIE BREAKER CB6622 FAULT AT 31080 HUMBOLDT 60.00	P2-3	Circuit breaker			11									Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-23	NON-BUS-TIE BREAKER CB6622 FAULT AT 31080 HUMBOLDT 60.00	P2-3	Circuit breaker					29							Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-24	NON-BUS-TIE BREAKER CB6622 FAULT AT 31080 HUMBOLDT 60.00	P2-3	Circuit breaker				11								Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-25	NON-BUS-TIE BREAKER CB6622 FAULT AT 31080 HUMBOLDT 60.00	P2-3	Circuit breaker	13											Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-26	BUS-TIE BREAKER FAULT AT 31000 HUMBOLDT 115.00	P2-4	Bus tie-breaker			4									Reassess with actual fault clearing times and SLG fault impedances where applicable

ID	Contingency	Category	Category Description	Transient Stability Performance - Number of Voltage and Frequency Violations										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	N/A	N/A	N/A		
HUMB-TS-27	BUS-TIE BREAKER FAULT AT 31000 HUMBOLDT 115.00	P2-4	Bus tie-breaker	6											Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-28	BUS-TIE BREAKER FAULT AT 31000 HUMBOLDT 115.00	P2-4	Bus tie-breaker					7							Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-29	BUS-TIE BREAKER FAULT AT 31000 HUMBOLDT 115.00	P2-4	Bus tie-breaker		4										Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-30	BUS-TIE BREAKER FAULT AT 31000 HUMBOLDT 115.00	P2-4	Bus tie-breaker				6								Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-31	FAIRHAVN 13.80	P4-1	Stuck breaker			6									Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-32	FAIRHAVN 13.80	P4-1	Stuck breaker					8							Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-33	FAIRHAVN 13.80	P4-1	Stuck breaker				8								Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-34	FAIRHAVN 13.80	P4-1	Stuck breaker		6										Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-35	FAIRHAVN 13.80	P4-1	Stuck breaker	8											Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-36	Bridgeville - Garberville 60 kV Line (31110 - 31120)	P4-2	T-line/stuck breaker			12									Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-37	Bridgeville - Garberville 60 kV Line (31110 - 31120)	P4-2	T-line/stuck breaker				14								Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-38	Bridgeville - Garberville 60 kV Line (31110 - 31120)	P4-2	T-line/stuck breaker					38							Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-39	Bridgeville - Garberville 60 kV Line (31110 - 31120)	P4-2	T-line/stuck breaker	14											Reassess with actual fault clearing times and SLG fault impedances where applicable

ID	Contingency	Category	Category Description	Transient Stability Performance - Number of Voltage and Frequency Violations										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	N/A	N/A	N/A		
HUMB-TS-40	Humboldt 115/60 No.2 Transformer (31000)	P4-3	Transformer/stuck breaker					100							Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-41	Humboldt 115/60 No.2 Transformer (31000)	P4-3	Transformer/stuck breaker			140									Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-42	Humboldt 115/60 No.2 Transformer (31000)	P4-3	Transformer/stuck breaker		148										Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-43	Humboldt 115/60 No.2 Transformer (31000)	P4-3	Transformer/stuck breaker	143											Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-44	Humboldt 115/60 No.2 Transformer (31000)	P4-3	Transformer/stuck breaker				101								Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-45	Humboldt	P5-1	generator/relay failure					105							Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-46	Humboldt	P5-1	generator/relay failure				101								Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-47	Humboldt	P5-1	generator/relay failure			138									Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-48	Humboldt	P5-1	generator/relay failure	153											Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-49	Humboldt	P5-1	generator/relay failure		148										Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-50	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	P7-1	Two circuits/common structure			6									Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-51	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	P7-1	Two circuits/common structure	8											Reassess with actual fault clearing times and SLG fault impedances where applicable



ID	Contingency	Category	Category Description	Transient Stability Performance - Number of Voltage and Frequency Violations										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	N/A	N/A	N/A		
HUMB-TS-52	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	P7-1	Two circuits/comm on structure	8				15							Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-53	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	P7-1	Two circuits/comm on structure		6										Reassess with actual fault clearing times and SLG fault impedances where applicable
HUMB-TS-54	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	P7-1	Two circuits/comm on structure				15								Reassess with actual fault clearing times and SLG fault impedances where applicable

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1														

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1												

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUMB-T-SENS-01	HUMBOLDT-BRDGVILLE 115 kV # 1 1	P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820] &	P1-2	T-line	<100	<100	100.08	<100	99.78	<100	<100	<100	<100		Monitor line loading due to long lead time (Humboldt-Bridgeville 115 kV Line overload)
HUMB-T-SENS-02	HUMBOLDT-HMBLT JT 60 kV 1 1	P1-2:A1:13:_HUMBOLDT BAY-HUMBOLDT #2 60kV [7090] &	P1-2	T-line	99.19	<100	108.91	106.95	110.3	98.42	<100	106.57	<100		Redispatch Humboldt Bay generation (Humboldt Bay-Humboldt #1 60 kV Line overload)
HUMB-T-SENS-03	HMBLT BY-EEL RIVR 60 kV 1 1	P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810] &	P1-2	T-line	<100	<100	112.83	<100	99.99	<100	<100	111.6	110.94		Redispatch Humboldt Bay generation (Humboldt Bay-Rio Dell Jct 60 kV Line)
HUMB-T-SENS-04	CARLOTTA-RIODLLTP 60 kV 1 1	P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810] &	P1-2	T-line	98.09	99.36	121.94	103.79	118.62	97.75	98.27	116.35	<100		Existing action Plan (Rio Dell Jct Jct-Bridgeville 60 kV Line overload). Gen redispatch/reduce gen at Humboldt Bay
HUMB-T-SENS-05	CARLOTTA-SWNS FLT 60 kV 1 1	P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810] &	P1-2	T-line	<100	96.19	118.72	100.93	115.57	<100	<100	112.89	<100		Existing action Plan (Rio Dell Jct Jct-Bridgeville 60 kV Line overload). Gen redispatch/reduce gen at Humboldt Bay
HUMB-T-SENS-06	SWNS FLT-BRDGVILLE 60 kV 1 1	P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810] &	P1-2	T-line	<100	<100	118.31	100.55	115.18	<100	<100	112.49	<100		Existing action Plan (Rio Dell Jct Jct-Bridgeville 60 kV Line overload). Gen redispatch/reduce gen at Humboldt Bay
HUMB-T-SENS-07	FRUTLDJT-FTSWRDJT 60 kV 1 1	P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110] &	P1-2	T-line	100.48	99.86	<100	<100	<100	100.45	100.11	<100	<100		Existing Action Plan (Bridgeville-Garberville 60 KV Line). Gen redispatch: Reduce gen at Humboldt Bay
HUMB-T-SENS-08	HUMBOLDT-BRDGVILLE 115 kV 1 1	P2-1:A1:1:_HUMBOLDT-TRINITY 115kV [1820] (HUMBOLDT-TRINITY) &	P2-1	Open-ended line	72.76	76.73	100.08	81.68	99.78	72.7	74.94	95.42	65.47		Monitor line loading due to long lead time. (Humboldt-Bridgeville 115 kV Line)
HUMB-T-SENS-09	CARLOTTA-RIODLLTP 60 kV 1 1	P2-2:A1:1:_HUMBOLDT 115kV Section MA &	P2-2	Bus	<100	<100	105.78	108.77	116.36	<100	<100	<100	<100		Monitor line loading. Upgrade bus. Interim: Gen redispatch (Rio Dell-Bridgeville 60 kV Line).

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUMB-T-SENS-10	CARLOTTA-SWNS FLT 60 kV 1 1	P2-2:A1:1:_HUMBOLDT 115kV Section MA &	P2-2	Bus	74.86	63.61	102.62	105.92	113.35	69.38	60.21	88.13	11.84		Monitor line loading. Upgrade bus. Interim: Gen redispatch (Rio Dell-Bridgeville 60 kV Line).
HUMB-T-SENS-11	SWNS FLT-BRDGVLE 60 kV 1 1	P2-2:A1:1:_HUMBOLDT 115kV Section MA &	P2-2	Bus	74.47	63.24	102.23	105.54	112.95	68.99	59.83	87.74	11.16		Monitor line loading. Upgrade bus. Interim: Gen redispatch (Rio Dell-Bridgeville 60 kV Line).
HUMB-T-SENS-12	FRUTLDJT-FTSWRDJT 60 kV 1 1	P2-2:A1:3:_LOW GAP1 115kV Section 1D &	P2-2	Bus	100.48	99.87	22.61	86.01	79.69	100.46	100.11	21.64	14.43		Approved Bridgeville-Gabreville 115 kV Line project (Bridgeville-Garberville 60 kV Line)
HUMB-T-SENS-13	HUMBOLDT-HMBLT JT 60 kV 1 1	P2-3:A1:13:_HMBLT BY 60kV - Middle Breaker Bay 3 &	P2-3	Circuit breaker	110.51	89.54	117.69	110.43	114.77	110.5	106.2	117.71	117.68		Interim: Gen redispatch at Humboldt Bay. Upgrade and increase capacity of the approved Humboldt Bay-Humboldt #1 60 kV reconductor project (Humboldt Bay-Humboldt #1 60 kV Line)
HUMB-T-SENS-14	HMBLT BY-EEL RIVR 60 kV 1 1	P2-3:A1:21:_BRDGVLE 115kV - Ring R1 & R3 &	P2-3	Circuit breaker	85.09	81.85	<100	<100	<100	85.98	88.17	93.87	115.3		Interim: Gen redispatch. Monitor line loading due to long lead time (Humboldt Bay-Rio Dell Jct 60 kV Line)
HUMB-T-SENS-15	HMBLT BY-EEL RIVR 60 kV 1 1	P1-1:A1:2:_PAC.LUMB 14kV Gen Unit 1 or 2 & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P3	L-/G-1	99.35	98.6	99.19	<100	100.38	99.9	99.98	99.28	<100		Gen redispatch at Humboldt Bay (Humboldt Bay-Rio Dell Jct 60 kV Line)
HUMB-T-SENS-16	CARLOTTA-RIODLLTP 60 kV 1 1	P1-1:A1:10:_HUMB_G2 14kV Gen Unit 5 or 3 & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P3	L-/G-1	<100	<100	100.04	<100	100.69	<100	<100	99.84	<100		Monitor. Gen redispatch at Humboldt Bay (Rio Dell Jct-Bridgeville 60 kV Line overload)
HUMB-T-SENS-17	HMBLT BY-EEL RIVR 60 kV 1 1	P1-1:A1:2:_PAC.LUMB 14kV Gen Unit 1 & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P3	L-/G-1	99.35	98.6	99.19	95.29	100.38	99.9	99.98	99.28	<100		Reconductor. Interim: Gen Redispatch (Humboldt Bay-Rio Dell Jct 60 kV Line overload)
HUMB-T-SENS-18	EUREKA-HMBLT BY 60 kV 1 1	P1-2:A1:13:_HUMBOLDT BAY-HUMBOLDT #2 60kV [7090] & P1-2:A1:12:_HUMBOLDT BAY-HUMBOLDT #1 60kV [7080]	P6	N-1-1	102.16	100.95	102.16	102.45	98.61	102.12	101.71	102	101.44		Action Plan: SPS/redispatch Humboldt Bay generation (Humboldt Bay-Eureka 60 kV Line)

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A		
HUMB-T-SENS-19	HMBLT BY-EEL RIVR 60 kV 1 1	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	<100	<100	104.85	<100	<100	<100	<100	96.47	107.91	99.95		SPS/reconductor (Humboldt Bay-Rio Dell Jcte 60 kV Line)
HUMB-T-SENS-20	HMBLT BY-EEL RIVR 60 kV 1 1	P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820] & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	96.38	96.04	100.08		SPS/reconductor (Humboldt Bay-Rio Dell Jcte 60 kV Line)
HUMB-T-SENS-21	NEWBURG-RIODLLTP 60 kV 1 1	P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820] & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100		Action Plan: SPS/redispach Humboldt Bay generation (Humboldt Bay-Rio Dell Jcte 60 kV Line)
HUMB-T-SENS-22	CARLOTTA-RIODLLTP 60 kV 1 1	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	100.15	100.31	113.42	101.19	109.14	100.66	100.28	112.29	<100			Existing action Plan (Rio Dell Jct-Bridgeville 60 KV Line overload). Gen redispach/reduce gen at Humboldt Bay
HUMB-T-SENS-23	CARLOTTA-SWNS FLT 60 kV 1 1	P1-2:A1:17:_TRINITY-MAPLE CREEK 60kV [8170] MOAS OPENED on TRINITY_TAP 65 & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	95.95	96.95	113.43	97.7	107.63	95.76	96.7	97.09	<100			Existing action Plan (Rio Dell Jct-Bridgeville 60 KV Line overload). Gen redispach/reduce gen at Humboldt Bay
HUMB-T-SENS-24	SWNS FLT-BRDGVILLE 60 kV 1 1	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	96.22	96.76	109.86	97.96	105.77	96.62	96.46	108.45	<100			Existing action Plan (Rio Dell Jct-Bridgeville 60 KV Line overload). Gen redispach/reduce gen at Humboldt Bay
HUMB-T-SENS-25	BRDGVILLE-FRUTLDJT 60 kV 1 1	P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110] & P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820]	P6	N-1-1	100.53	100.29	<100	99.03	<100	101.35	100.42	<100	<100			Approved Bridgeville-Gabreville 115 kV project (Bridgeville-Garberville 60 kV Line)
HUMB-T-SENS-26	GRBRVILLE-KEKAWAKA 60 kV 1 1	P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820] & P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110]	P6	N-1-1	<100	<100	101.08	<100	<100	<100	<100	101.09	<100			Approved Bridgeville-Gabreville 115 kV project (Garberville-Laytonville 60 kV Line overload)

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUMB-T-SENS-27	KEKAWAKA-LYTNVLE 60 kV 1 1	P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110] & P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820]	P6	N-1-1	<100	<100	100.97	<100	<100	<100	<100	<100	100.97	<100	Approved Bridgeville-Gabreville 115 kV project (Garberville-Laytonville 60 kV Line overload)
HUMB-T-SENS-28	FRUTLDJT-FTSWRDJT 60 kV 1 1	P1-2:A1:25:_BRDGVLE-GRBRVLE #2 115kV [0] & P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110]	P6	N-1-1	<100	<100	100.43	<100	<100	<100	<100	<100	100.66	<100	Approved Bridgeville-Gabreville 115 kV project (Bridgeville-Garberville 60 kV Line)
HUMB-T-SENS-29	FRUTLDJT-FTSWRDJT 60 kV 1 1	P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110] & P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820]	P6	N-1-1	101.1	101.19	<100	101.48	<100	102.11	101.03	<100	<100	Approved Bridgeville-Gabreville 115 kV project (Bridgeville-Garberville 60 kV Line)	
HUMB-T-SENS-30	FTSWRDJT-GRBRVLE 60 kV 1 1	P1-2:A1:4:_BRIDGEVILLE-COTTONWOOD 115kV [1110] & P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820]	P6	N-1-1	99.1	99.29	<100	99.84	<100	100.12	99.1	<100	<100	Approved Bridgeville-Gabreville 115 kV project (Bridgeville-Garberville 60 kV Line)	
HUMB-T-SENS-31	HUMBOLDT-HMBLT JT 60 kV 1 1	P7-1:A1:7:_HUMBOLDT BAY-HUMBOLDT #2 & HUMBOLDT BAY-HUMBOLDT #2 Lines & 32.2	P7	N-2 (DCTL)	105.31	<100	116.12	112.32	119.56	104.89	98.95	114	103.14	Interim: Gen redispatch at Humboldt Bay. Upgrade and increase capacity of the approved Humboldt Bay-Humboldt #1 60 kV Line reconductor project (Humboldt Bay-Humboldt #1 60 kV Line overload).	

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUMB-V-SENS-01	FRUITLND 60 kV	P1-2:A1:22:_BRIDGEVILLE-GARBERVILLE 60kV [6220] MOAS OPENED on BRDGVILLE_FRUTLDJT &	P1-2	Gen	>0.90	>0.90	>0.90	>0.90	0.8933	>0.90	>0.90	>0.90	>0.90		Monitor
HUMB-V-SENS-02	BRDGVILLE 115 kV	P1-4:A1:6:_HUMBOLDT SVD=v &	P1-4	Transformer	1.1167	1.1003	<1.10	1.131	<1.10	1.1123	1.0941	<1.10	<1.10		Under review
HUMB-V-SENS-03	HUMBOLDT 115 kV	P1-4:A1:6:_HUMBOLDT SVD=v &	P1-4	Transformer	1.1544	1.1393	1.1155	1.1684	<1.10	1.1482	1.1323	1.1145	1.1147		Under review
HUMB-V-SENS-04	FRT SWRD 60 kV	P2-1:A1:34:_BRIDGEVILLE-GARBERVILLE 60kV [6220] (BRDGVILLE-FRUTLDJT) &	P2-1	Open-ended line	>0.90	>0.90	>0.90	>0.90	0.90	>0.90	>0.90	>0.90	>0.90		Corrective Action Plan
HUMB-V-SENS-05	FRUITLND 60 kV	P2-1:A1:34:_BRIDGEVILLE-GARBERVILLE 60kV [6220] (BRDGVILLE-FRUTLDJT) &	P2-1	Open-ended line	>0.90	>0.90	>0.90	>0.90	0.893	>0.90	>0.90	>0.90	>0.90		Corrective Action Plan
HUMB-V-SENS-06	FRT SWRD 60 kV	P2-2:A1:8:_GRBRVILLE 60kV Section 1E &	P2-2	Bus	1.1171	1.1136		1.1361	<1.10	1.1149	1.1088	<1.10	1.0807		Under review
HUMB-V-SENS-07	BRDGVILLE 115 kV	P2-3:A1:21:_BRDGVILLE 115kV - Ring R1 & R3 &	P2-3	Circuit Breaker	0.8891	0.8915	0.8706	0.9121	0.8434	0.888	0.8874	0.8747	0.8913		Corrective Action Plan
HUMB-V-SENS-08	FRUITLND 60 kV	P2-3:A1:15:_BRDGVILLE - MA 60kV & RIO DELL JCT-BRIDGEVILLE line &	P2-3	Circuit Breaker	>0.90	>0.90	>0.90	>0.90	0.8933	>0.90	>0.90	>0.90	>0.90		Corrective Action Plan
HUMB-V-SENS-09	GRBRVILLE 60 kV	P2-3:A1:19:_BRDGVILLE 115kV - Ring R3 & R2 &	P2-3	Circuit Breaker	>0.90	>0.90	>0.90	>0.90	0.8959	>0.90	>0.90	>0.90	>0.90		Corrective Action Plan
HUMB-V-SENS-10	BRDGVILLE 115 kV	P3: P1-1:A1:6:_HUMB_G1 14kV Gen Unit 1 & P1-4:A1:6:_HUMBOLDT SVD=v	P3	L-1/G-1	1.1206	1.1124	<1.10	<1.10	<1.10	1.1195	1.1021	<1.10	<1.10		Under review
HUMB-V-SENS-11	HUMBOLDT 115 kV	P3: P1-1:A1:6:_HUMB_G1 14kV Gen Unit 1 & P1-4:A1:6:_HUMBOLDT SVD=v	P3	L-1/G-1	1.1582	1.1543	1.1232	<1.10	<1.10	1.1574	1.1395	<1.10	1.1293		Under review

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUMB-V-SENS-12	BRDGVILLE 115 kV	P6: P1-2:A1:3:_HUMBOLDT-TRINITY 115kV [1820] & P1-4:A1:6:_HUMBOLDT SVD=v	P6	N-1-1	1.1245	1.1172	<1.10	1.1425	<1.10	1.124	1.1164	<1.10	1.0895		Under review
HUMB-V-SENS-13	BRDGVILLE 115 kV	P6: P1-4:A1:4:_GRBRVILLE SVD=v & P1-4:A1:6:_HUMBOLDT SVD=v	P6	N-1-1	1.1208	1.1084	1.1302	1.143	<1.10	1.1197	1.0962	1.1287	1.133		Under review
HUMB-V-SENS-14	FRT SWRD 60 kV	P1-4:A1:4:_GRBRVILLE SVD=v & P1-2:A1:23:_GARBERVILLE-LAYTONVILLE 60kV [8365]	P6	N-1-1	1.1122	1.1136	<1.10	1.1362	<1.10	1.1149	1.1089	<1.10	<1.10		Under review
HUMB-V-SENS-15	FRUITLND 60 kV	P1-2:A1:21:_RIO DELL JCT-BRIDGEVILLE 60kV [7850] MOAS OPENED on CARLOTTA_SWNS FLT & P1-3:A1:3:_BRDGVILLE 115/60kV TB 1	P6	N-1-1	>0.90	>0.90	>0.90	>0.90	0.891	>0.90	>0.90	>0.90	>0.90		Corrective Action Plan
HUMB-V-SENS-16	FRUITLND 60 kV	P1-2:A1:22:_BRIDGEVILLE-GARBERVILLE 60kV [6220] MOAS OPENED on BRDGVILLE_FRUTLDJT & P1-4:A1:4:_GRBRVILLE SVD=v	P6	N-1-1	1.0751	1.0781	1.0781	1.1899	<1.10	<1.10	<1.10	1.0767	1.0811		Under review
HUMB-V-SENS-17	GRBRVILLE 60 kV	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60kV [6220] MOAS OPENED on FTSWRDJT_GRBRVILLE & P1-4:A1:4:_GRBRVILLE SVD=v	P6	N-1-1	1.1933	1.1992	1.0941	1.262	<1.10	1.1879	1.1817	1.0924	1.0962		Under review
HUMB-V-SENS-18	GRBRVILLE 60 kV	P1-4:A1:4:_GRBRVILLE SVD=v & P1-4:A1:6:_HUMBOLDT SVD=v	P6	N-1-1	<1.10	<1.10	1.145	1.1235	<1.10	<1.10	<1.10	1.1432	1.1486		Monitor
HUMB-V-SENS-19	HOOPA 60 kV	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK & P1-4:A1:7:_MPLE CRK SVD=v	P6	N-1-1	0.8331	0.829	0.8297	0.9184	0.9274	0.8266	0.8146	0.8157	0.8408		Corrective Action Plan
HUMB-V-SENS-20	HUMBOLDT 115 kV	P1-4:A1:6:_HUMBOLDT SVD=v & P1-2:A1:2:_HUMBOLDT-BRIDGEVILLE 115kV [1810]	P6	N-1-1	1.1795	1.1774	1.1806	1.1861	<1.10	1.1779	1.173	1.1788	1.1808		Under review
HUMB-V-SENS-21	MPLE CRK 60 kV	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK & P1-4:A1:1:_HUMBOLDT SHUNT=7h	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.104	<1.10	<1.10		Monitor



ID	Contingency	Category	Category Description	Transient Stability Performance										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-TS-1														
X-TS-2														
X-TS-3														
X-TS-4														
X-TS-5														
X-TS-6														
X-TS-7														
X-TS-8														
X-TS-9														
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X-TS-28														
X-TS-29														
X-TS-30														
X-TS-31														

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1														

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1												

No single source substation with more than 100 MW Load

Study Area: **PG&E North Coast & North Bay**

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions		
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	
NCNB-T-001	GRANITE-HPLND JT 60 kV 1 1	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861] &	P1-2	T-line	103.02	91.16	34.38	<100	<100	<100	71.55	<100			Approved Clear Lake Reinforcement Project. Interim: Redispatch Geysers, Potter Valley gens
NCNB-T-002	MOLINO-TRNTN_JC 60 kV 1 1	P1-2:A2:62:_FULTON-LAGUNA-COTATI-SNMALDFL 60kV [6911] &	P1-2	T-line	87.27	76.19	85.96	<100	<100	<100	60.95	50.57			Monitor line loading due to long lead time
NCNB-T-003	PETLMA A-LKVLE JT 60 kV 1 1	P1-2:A2:66:_LAKEVILLE-PETALUMA C 60kV [7350] &	P1-2	T-line	100.53	86.04	94.6	106.24	104.01	100.19	63.89	54.66			Reconductor/replace limiting equipment at Petaluma A station
NCNB-T-004	LAKEVILLE-LKVLE JT 60 kV 1 1	P1-2:A2:66:_LAKEVILLE-PETALUMA C 60kV [7350] &	P1-2	T-line	94.14	80.57	88.59	<100	<100	<100	59.83	51.23			Reconductor the Lakeville #1 60 kV Line to address without BTM sensitivity overloads
NCNB-T-005	GRANITE-HPLND JT 60 kV 1 1	P2-1:A2:55:_KONOCTI-EAGLE ROCK 60kV [6861] (KONOCTI6-EGLE RCK) &	P2-1	Open-ended line	103.02	91.16	34.38	<100	<100	<100	71.55	56.33			Approved Clear Lake Reinforcement Project. Redispatch Geysers, Potter Valley gens
NCNB-T-006	NAPA-TULCY JT 60 kV 1 1	P2-1:A2:86:_TULUCAY-NAPA #2 60kV [8190] (TULUCAY-BSLT TAP) &	P2-1	Open-ended line	123.06	<100	<100	122.76	<100	<100	81.33	<100			Interim: Action Plan. Upgrade and increase capacity of the approved Napa-Tulucay 60 kV Reconducting project
NCNB-T-007	IGNACO B-WOODACRE 60 kV 1 1	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT) &	P2-1	Open-ended line	80.87	71.67	82.92	<100	<100	<100	44.67	32.27			Ignacio-Bolinas-Stafford area 115 Voltage Conversion. Reconductor Ignacio-Bolinas #2 60 kV line to address without BTM sensitivity overloads
NCNB-T-008	STAF_JCT-TOCA_JCT 60 kV 1 1	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT) &	P2-1	Open-ended line	82.03	72.5	85.75	<100	<100	<100	42.68	30.07			Ignacio-Bolinas-Stafford area 115 Voltage Conversion. Reconductor Ignacio-Bolinas #2 60 kV line to address without BTM sensitivity overloads
NCNB-T-009	STAFFORD-STAF_JCT 60 kV 1 1	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT) &	P2-1	Open-ended line	55.05	48.71	57.61	<100	<100	<100	28.68	20.17			Ignacio-Bolinas-Stafford area 115 Voltage Conversion. Reconductor Ignacio-Bolinas #2 60 kV line to address without BTM sensitivity overloads

Study Area: **PG&E North Coast & North Bay**

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions		
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	
NCNB-T-010	OLEMA-BOLINAS 60 kV 1 1	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT) &	P2-1	Open-ended line	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	105.58	74.69			Ignacio-Bolinas-Stafford area 115 Voltage Conversion. Reconductor Ignacio-Bolinas #1 60 kV line/Drop load
NCNB-T-011	GRANITE-HPLND JT 60 kV 1 1	P2-3:A2:27:_EGLE RCK - MA 115kV & EAGLE ROCK-CORTINA line &	P2-3	Circuit breaker	106.23	95.63	96.62	<100	<100	<100	74.79	62.13			Approved Clear Lake Reinforcement Project. Redispatch Geysers, Potter Valley gens to address sensitivity scenariooverloads
NCNB-T-012	MOLINO-TRNTN_JC 60 kV 1 1	P2-3:A2:61:_LAGUNA - 1D 60kV & FULTON-LAGUNATP-COTATI-SNMA TAP line &	P2-3	Circuit breaker	87.27	76.19	85.96	<100	<100	<100	60.95	<100			Monitor line loading for sensitivity scenario overloads due to long lead time
NCNB-T-013	PETLMA A-LKVLE JT 60 kV 1 1	P2-3:A2:66:_LAKEVILLE - 1D 60kV & LAKEVILLE-PETALUMA C line &	P2-3	Circuit breaker	94.09	80.31	88.25	<100	<100	<100	59.69	51.22			Reconductor or replace limiting equipment at Petaluma A station to address without BTM sensitivity overloads
NCNB-T-014	WILLITS-LYTNVLE 60 kV 1 1	P2-3:A2:39:_MENDOCNO - MA 60kV & MENDOCINO-PHILO JCT-HOPLAND line &	P2-3	Circuit breaker	NConv	NConv	96.43	NConv	NConv	NConv	NConv	59.14			Add a new line. Interim: Open Gerbreville-Laytonville line at Willits or Bridgeville depending on whether Humboldt or Geysers feeds load.
NCNB-T-015	KEKAWAKA-LYTNVLE 60 kV 1 1	P2-3:A2:39:_MENDOCNO - MA 60kV & MENDOCINO-PHILO JCT-HOPLAND line &	P2-3	Circuit breaker	NConv	NConv	116.58	NConv	NConv	NConv	NConv	72.51			Add a new line. Interim: Open Gerbreville-Laytonville 60 kV Line and radialize and feed load via Humboldt
NCNB-T-016	LAKEVILLE-VACA-DIX 230 kV 1 1	P2-4:A2:3:_LAKEVILLE 230kV - Section 2E & 2D &	P2-4	Bus-tie	94.8	<100	<100	<100	<100	<100	64.32	<100			Upgrade the Approved Vaca Dixon-Lakeville reconductoring project to address without BTM sensitivity overloads
NCNB-T-017	TULUCAY-VACA-DIX 230 kV 1 1	P2-4:A2:1:_LAKEVILLE 230kV - Section 1E & 2E &	P2-4	Bus-tie	93.84	<100	<100	<100	<100	<100	69.94	<100			Upgrade the Approved Vaca Dixon-Lakeville reconductoring project to address without BTM sensitivity overloads
NCNB-T-018	PENNGRVE-CORONA 115 kV 1 1	P2-4:A2:7:_FULTON 115kV - Section 2D & 1D &	P2-4	Bus-tie	104.78	98.23	105.96	103.5	104.24	104.38	71.44	59.16			Reconductor Corona-Lakeville 115 kV Line (Lakeville-Corona-Penngrove sections)

Study Area: **PG&E North Coast & North Bay**

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	
NCNB-T-019	CORONA-LAKEVILLE 115 kV 1 1	P2-4:A2:7:_FULTON 115kV - Section 2D & 1D &	P2-4	Bus-tie	99.1	92.85	99.95	108.8	109.47	109.4	67.72	<100			Reconductor Corona-Lakeville 115 kV Line (Lakeville-Corona-Penngrove sections)
NCNB-T-020	GRANITE-HPLND JT 60 kV 1 1	P3: P1-1:A2:19:_POTTRVLY 2kV Gen Unit 1 & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P3	L-1/G-1	102.85	<100	<100	<100	<100	<100	<100	<100			Upgrade approved Clear Lake Reinforcement Project to address sensitivity overloads. Redispatch Geysers, Potter Valley gens
NCNB-T-021	PETLMA A-LKVLE JT 60 kV 1 1	P3: P1-1:A2:9:_GEYSER11 14kV Gen Unit 1 & P1-2:A2:66:_LAKEVILLE-PETALUMA C 60kV [7350]	P3	L-1/G-1	<100	<100	<100	108.58	106.37	102.23	<100	<100			Reconductor/Replace limiting equipment at Petaluma A station
NCNB-T-022	PENNGRVE-CORONA 115 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	95.13	81.34	50.33	<100	<100	<100	57.02	41.22			Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
NCNB-T-023	CORONA-LAKEVILLE 115 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	<100	<100	<100	100.86	98.58	56.03	<100	<100			Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
NCNB-T-024	MLNO JCT-LAGUNATP 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	99.28	79.39	50.92	<100	<100	<100	55.18	47.93			Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
NCNB-T-025	COTATI-PETC_JCT 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	157.37	129.09	90.66	130.2	126.59	74.88	92.33	76.25			Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
NCNB-T-026	PETLMA A-LKVLE JT 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	110.55	91.04	64.65	114.89	111.68	67.19	65.2	53.76			Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
NCNB-T-027	LAKEVILLE-LKVLE JT 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	103.51	85.25	60.57	<100	<100	<100	61.06	50.4			Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
NCNB-T-028	COTATI-SNMA TAP 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	98.87	78.32	49.92	<100	<100	<100	55.09	47.75			Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
NCNB-T-029	SNMA TAP-LAGUNATP 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	109.17	88.44	56.44	<100	<100	<100	64.48	54.32			Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads

Study Area: **PG&E North Coast & North Bay**

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions		
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	
NCNB-T-030	TULUCAY-VACA-DIX 230 kV 1 1	P6: P1-2:A2:9:_VACA-LAKEVILLE #1 230kV [5840] & P1-2:A2:3:_GEYSR18-LAKEVILLE-GEYSR20-SNTAFE-GEYSR13 230kV [4781]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100		Approved Vaca Dixon-Lakeville reconductoring project
NCNB-T-031	KEKAWAKA-LYTNVLE 60 kV 1 1	P6: P1-2:A2:24:_CORTINA-MENDOCINO #1 115kV [1330] & P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100		Monitor. reduce generation at Humboldt Bay to address sensitivity overloads/SPS
NCNB-T-032	INDIN VL-LUCERNJ1 115 kV 1 1	P6: P1-2:A2:13:_EAGLE ROCK-REDBUD 115kV [1480] & P1-2:A2:12:_EAGLE ROCK-CORTINA 115kV [1470]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100		Monitor due to long lead time of sensitivity overloads/SPS
NCNB-T-033	INDIN VL-CORTINA 115 kV 1 1	P1-2:A2:13:_EAGLE ROCK-REDBUD 115kV [1480] & P1-2:A2:12:_EAGLE ROCK-CORTINA 115kV [1470]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100		Monitor due to long lead time of sensitivity overloads/SPS
NCNB-T-034	FULTON-MONROE2 115 kV 1 1	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:34:_CORONA-LAKEVILLE 115kV [4311]	P6	N-1-1	108.14	102.56	109.28	101.34	101.44	101.62	<100	<100	<100		Interim: Gen dispatch/Action Plan/SPS. Reconductor parallel lines
NCNB-T-035	MONROE1-SNTA RSA 115 kV 1 1	P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630] & P1-2:A2:34:_CORONA-LAKEVILLE 115kV [4311]	P6	N-1-1	99.23	<100	100.7	<100	<100	<100	<100	<100	<100		Gen redispatch/Action Plan to address sensitivity overloads. SPS
NCNB-T-036	BELLVUE-PENNGRVE 115 kV 1 1	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630]	P6	N-1-1	99.9	<100	101.96	<100	<100	<100	<100	<100	<100		Reconductor/SPS. Action Plan
NCNB-T-037	PENNGRVE-CORONA 115 kV 1 1	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630]	P6	N-1-1	104.66	<100	106.79	<100	<100	<100	<100	<100	<100		Reconductor. Action Plan/SPS

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Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions			
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A		
NCNB-T-038	CORONA-LAKEVILLE 115 kV 1 1	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630]	P6	N-1-1	98.99	<100	100.72	<100	<100	<100	<100	<100	<100			Reconductor/SPS. Gen redispatch. Action Plan
NCNB-T-039	MENDOCNO-UKIAH JT 60 kV 1 1	P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE & P1-2:A2:14:_MENDOCINO-UKIAH 115kV [2420] MOAS OPENED on MENDOCNO_CALPELLA	P6	N-1-1	109.26	100.07	98.69	<100	<100	<100	<100	<100	<100			Gen redispatch/Action Plan or SPS to address sensitivity overloads
NCNB-T-040	MENDOCNO-UPPR LKE 60 kV 1 1	P1-2:A2:54:_CLEAR LAKE-HOPLAND 60kV [6390] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	NonConv	NonConv	<100	117.34	112.97	<100	150.02	100.78				Load transfer/Action Plan. Reconductor/SPS
NCNB-T-041	PHLO JCT-HPLND JT 60 kV 1 1	P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE & P1-2:A2:14:_MENDOCINO-UKIAH 115kV [2420] MOAS OPENED on MENDOCNO_CALPELLA	P6	N-1-1	108.42	<100	<100	<100	<100	<100	<100	<100	<100			Action Plan/SPS to also address sensitivity overloads
NCNB-T-042	UKIAH JT-PHLO JCT 60 kV 1 1	P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE & P1-2:A2:14:_MENDOCINO-UKIAH 115kV [2420] MOAS OPENED on MENDOCNO_CALPELLA	P6	N-1-1	109.32	100.13	98.75	<100	<100	<100	<100	<100	<100			Action Plan/SPS to also address sensitivity overloads
NCNB-T-043	UPPR LKE-HARTLEY 60 kV 1 1	P1-2:A2:54:_CLEAR LAKE-HOPLAND 60kV [6390] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	NonConv	NonConv	<100	109.01	104.97	<100	140.49	<100				Action Plan/SPS to also address sensitivity overloads
NCNB-T-044	HARTLEY-CLER LKE 60 kV 1 1	P1-2:A2:54:_CLEAR LAKE-HOPLAND 60kV [6390] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	NonConv	NonConv	<100	<100	<100	<100	107.84	<100				Action Plan/SPS to also address sensitivity overloads

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Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	
NCNB-T-045	CLER LKE-GRANITE 60 kV 1 1	P1-2:A2:44:_MENDOCINO-HARTLEY 60kV [7510] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	NonConv	NonConv	<100	<100	<100	<100	110.2	<100			Action Plan/SPS to also address sensitivity overloads
NCNB-T-046	CLER LKE-KONOCTI6 60 kV 1 1	P1-2:A2:13:_EAGLE ROCK-REDBUD 115kV [1480] & P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE	P6	N-1-1	116.13	106.58	120.02	<100	<100	<100	<100	101.62			Action Plan/SPS to also address sensitivity overloads
NCNB-T-047	GRANITE-HPLND JT 60 kV 1 1	P1-2:A2:44:_MENDOCINO-HARTLEY 60kV [7510] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	181.35	158.77	<100	<100	<100	<100	113.71	<100			Action Plan/SPS to also address sensitivity overloads
NCNB-T-048	GRANITE-HPLND JT 60 kV 1 1	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861] & P1-2:A2:71:_HOMSTKTP-MIDDLTWN #1 115kV [0]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100			Action Plan/SPS to address sensitivity overloads
NCNB-T-049	HPLND JT-HPLND JT 115 kV 2 1	P1-2:A2:14:_MENDOCINO-UKIAH 115kV [2420] MOAS OPENED on MENDOCNO_CALPELLA & P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE	P6	N-1-1	155.41	146.21	152.43	144.21	143.23	141.71	126.15	113.81			Action Plan. Reverse Power Relay will trip. Load drop if overload persists post Hopland bank tripping via existing Reverse Power Relay activation
NCNB-T-050	HPLND JT-CLVRDLJT 60 kV 1 1	P1-3:A2:33:_FULTON 115/60kV TB 2 & P1-3:A2:32:_FULTON 115/60kV TB 1	P6	N-1-1	NonConv	NonConv	NonConv	136.36	138.07	141.95	NonConv	159.14			Reconductor/SPS. Action Plan.
NCNB-T-051	MOLINO-MLNO JCT 60 kV 1 1	P1-3:A2:33:_FULTON 115/60kV TB 2 & P1-3:A2:32:_FULTON 115/60kV TB 1	P6	N-1-1	114.04	108.94	116.24	<100	<100	<100	<100	<100			Action Plan/SPS to also address sensitivity overloads
NCNB-T-052	MLNO JCT-FULTON 60 kV 1 1	P1-3:A2:22:_LAKEVILE 230/60kV TB 5 & P1-3:A2:21:_LAKEVILE 230/60kV TB 3	P6	N-1-1	NonConv	<100	235.8	115.87	115.09	115.76	106.47	<100			Add new transformer at Lakeville/ Action Plan (Drop load)
NCNB-T-053	MLNO JCT-LAGUNATP 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv			Reconductor/SPS. Action Plan

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Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	
NCNB-T-054	CLVRDLJTGYSRJCT1 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	119.17	120.67	124.06	NonConv	149.99			Reconductor/SPS. Action Plan
NCNB-T-055	GYSRJCT1-FTCHMTNP 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	218.57	221.99	118.65	120.09	123.1	NonConv	149.01			Reconductor/SPS. Action Plan
NCNB-T-056	FULTON-FTCHMTNP 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	<100	<100	<100	<100	<100	NonConv	<100			Reconductor/SPS. Action Plan
NCNB-T-057	COTATI-PETC_JCT 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv			SPS/Action Plan. Add new 115/60 kV transformer at Lakeville/Reconductor Fulton-Molino-Cotati-Pet A-Lakeville Jct 60 kV line section
NCNB-T-058	COTATI-SNMA TAP 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv			SPS/Action Plan. Add new 115/60 kV transformer at Lakeville/Reconductor Fulton-Molino-Cotati-Pet A-Lakeville Jct 60 kV line section
NCNB-T-059	MCDWLLSW-LAKEVILLE 60 kV 1 1	P1-3:A2:22:_LAKEVILLE 230/60kV TB 5 & P1-3:A2:21:_LAKEVILLE 230/60kV TB 3	P6	N-1-1	133.24	<100	132.52	<100	<100	<100	<100	<100			Add new transformer at Lakeville/Reconductor/SPS. Action Plan/Drop load
NCNB-T-060	PETC_JCT-PETLMA A 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	164.08	157.24	NonConv	NonConv			SPS/Action Plan. Add new 115/60 kV transformer at Lakeville/Reconductor Fulton-Molino-Cotati-Pet A-Lakeville Jct 60 kV line section
NCNB-T-061	PETLMA A-LKVLE JT 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv			SPS/Action Plan. Add new 115/60 kV transformer at Lakeville/Reconductor Fulton-Molino-Cotati-Pet A-Lakeville Jct 60 kV line section
NCNB-T-062	SNMA TAP-LAGUNATP 60 kV 1 1	P1-3:A2:22:_LAKEVILLE 230/60kV TB 5 & P1-3:A2:21:_LAKEVILLE 230/60kV TB 3	P6	N-1-1	NonConv	NonConv	NonConv	155.4	155	156.83	157.48	116.08			SPS/Action Plan. Add new 115/60 kV transformer at Lakeville/Reconductor Fulton-Molino-Cotati-Pet A-Lakeville Jct 60 kV line section

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Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions			
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A		
NCNB-T-063	LAKEVILLE-LKVLE JT 60 kV 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv			SPS/Action Plan. Add new Lakeville 115/60 kV transformer bank/Reconductor
NCNB-T-064	IGNACIO- LS GLLNS 115 kV 3	P1-2:A6:15:_IGNACIO-SAN RAFAEL #1 115kV [1850] & P1-2:A6:28:_IGNACIO-SAN RAFL #2 115kV [0]	P6	N-1-1	<100	<100	105.24	<100	<100	<100	<100	<100	<100			Monitor. Reconductor/SPS. Action Plan
NCNB-T-065	IGNACIO-SAN RAFL 115 kV 1	P1-2:A6:28:_IGNACIO-SAN RAFL #2 115kV [0] & P1-2:A6:14:_IGNACIO-SAN RAFAEL #3 115kV [1860] MOAS OPENED on IGNACIO_LS GLLNS	P6	N-1-1	<100	<100	<100	<100	<100	110.33	<100	<100	<100			Action Plan. SPS
NCNB-T-066	IGNACIO-SAN RAFL 115 kV 2	P1-2:A6:15:_IGNACIO-SAN RAFAEL #1 115kV [1850] & P1-2:A6:14:_IGNACIO-SAN RAFAEL #3 115kV [1860] MOAS OPENED on IGNACIO_LS GLLNS	P6	N-1-1	<100	<100	119.78	<100	<100	<100	<100	<100	<100			Upgrade Ignacio-Alto Voltage Conversion project with higher rated conductors
NCNB-T-067	LS GLLNS-SAN RAFL 115 kV 3	P1-2:A6:15:_IGNACIO-SAN RAFAEL #1 115kV [1850] & P1-2:A6:28:_IGNACIO-SAN RAFL #2 115kV [0]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100			Monitor. Action Plan to address sensitivity overloads
NCNB-T-068	SAN RAFL-Greenbrae 115 kV 1	P1-3:A6:9:_IGNACIO 115/60kV TB 1 & P1-3:A6:8:_IGNACIO 115/60kV TB 3	P6	N-1-1	<100	<100	122.51	<100	<100	<100	<100	<100	<100			Monitor. Ignacio-Alto Voltage Conversion project. Action Plan
NCNB-T-069	IG JCT-SAN_RFLJ 60 kV 1	P1-2:A6:23:_IGNACIO-ALTO-SAUSALITO #2 60kV [7170] & P1-2:A6:24:_IGNACIO-ALTO-SAUSALITO #1 60kV [7160]	P6	N-1-1	128.1	118.23	<100	104.62	104.13	<100	<100	<100	<100			Ignacio-Alto Voltage Conversion project/SPS. Action Plan
NCNB-T-070	SAN_RFLJ-GREENBRE 60 kV 1	P1-2:A6:24:_IGNACIO-ALTO-SAUSALITO #1 60kV [7160] & P1-2:A6:23:_IGNACIO-ALTO-SAUSALITO #2 60kV [7170]	P6	N-1-1	127.18	117.43	<100	<100	<100	<100	<100	<100	<100			Action Plan. SPS to also address sensitivity overloads

Study Area: **PG&E North Coast & North Bay**

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions			
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A		
NCNB-T-071	GREENBRE-ALTO 60 kV 1 1	P6: P1-3:A6:8:_IGNACIO 115/60kV TB 3 & P1-3:A6:9:_IGNACIO 115/60kV TB 1	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100			Monitor. Action Plan/SPS to address long term sensitivity overload
NCNB-T-072	BELLVUE-PENNGRVE 115 kV 1 1	P7-1:A2:14:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 Lines &	P7	N-2 (DCTL)	99.9	93.56	101.96	<100	<100	<100	68.16	56.26			SPS/Action Plan. Reconductor Lakeville-Corona-Penngrrove-Bellvue line sections.	
NCNB-T-073	PENNGRVE-CORONA 115 kV 1 1	P7-1:A2:14:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 Lines &	P7	N-2 (DCTL)	104.66	98.19	106.79	103.4	104.12	104.3	71.43	59.17			SPS/Action Plan. Reconductor Lakeville-corona-Penngrrove-Bellvue line sections.	
NCNB-T-074	CORONA-LAKEVILLE 115 kV 1 1	P7-1:A2:14:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 Lines &	P7	N-2 (DCTL)	98.99	92.81	100.72	108.7	109.34	109.31	67.72	<100			SPS/Action Plan. Reconductor Lakeville-Corona-Penngrrove-Bellvue line sections.	
NCNB-T-075	HPLND JT-CLVRDLJT 60 kV 1 1	P7-1:A2:6:_GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO Lines &	P7	N-2 (DCTL)	80.52	99.86	100.81	<100	<100	<100	80.46	87.52			Monitor line loading due to long lead line.	
NCNB-T-076	MOLINO-TRNTN_JC 60 kV 1 1	P7-1:A2:24:_FULTON-SANTA ROSA #1 & FULTON-MOLINO-COTATI Lines &	P7	N-2 (DCTL)	<100	<100	85.94	<100	<100	<100	<100	<100			Monitor line loading due to long lead line for sensitivity scenarion overloads	
NCNB-T-077	COTATI-PETC_JCT 60 kV 1 1	P7-1:A2:10:_FULTON-IGNACIO #1 & FULTON-LAKEVILLE Lines &	P7	N-2 (DCTL)	75.27	51.87	68.74	<100	<100	<100	16.8	20.05			Monitor line loading due to long lead line for sensitivity scenarion overloads	
NCNB-T-078	IGNACIO-LS GLLNS 115 kV 3 1	P7-1:A6:23:_Ignacio - San Rafael #1 & #2 Lines &	P7	N-2 (DCTL)	<100	<100	105.24	<100	<100	<100	<100	<100			Monitor. Reconductor. Action Plan	
NCNB-T-079	IG JCT-SAN_RFLJ 60 kV 1 1	P7-1:A6:6:_IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 Lines &	P7	N-2 (DCTL)	128.15	118.23	<100	118.21	122.17	<100	78.87	57.76			Upgrade Ignacio-Alto Voltage Conversion project to also address sensitivity scenario overloads	
NCNB-T-080	SAN_RFLJ-GREENBRE 60 kV 1 1	P7-1:A6:6:_IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 Lines &	P7	N-2 (DCTL)	127.28	117.43	<100	106.9	110.49	<100	78.34	57.35			Upgrade Ignacio-Alto Voltage Conversion project to also address sensitivity scenario overloads	
NCNB-T-081	IGNACIO-SAN RAFL 115 kV 2 1	P7-1:A6:14:_Ignacio-San Rafael #1 & Las Gallinas-San Rafael #3 115kV Lines &	P7	N-2 (DCTL)	<100	<100	95.12	<100	<100	<100	<100	<100			Monitor. Upgrade Ignacio-Alto Voltage Conversion project to also address sensitivity scenario overloads	

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	
NCNB-VD-01	LOWR LKE 60 kV	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P1-2	T-line	15.609	13.956	<5.0	14.097	13.249	<5.0	10.326	5.947			Under review
NCNB-VD-02	EGLE RCK 60 kV	P1-3:A2:29:_EGLE RCK 115/60kV TB 1	P1-3	Transformer	18.196	16.456	5.68	16.604	15.566	5.058	12.34	6.813			Under review
NCNB-VD-03	BIG RIVR 60 kV	P1-4:A2:1:_BIG RIVR SVD=v	P1-4	Shunt device	<5.0	-5.359	-5.051	<5.0	<5.0	<5.0	-6.604	<5.0			Action Plan/ Radialize
NCNB-VD-04	LOWR LKE 60 kV	P2-1:A2:55:_KONOCTI-EAGLE ROCK 60kV [6861] (KONOCTI6-EGLE RCK)	P2-1	Open-ended line	15.609	13.956	<5.0	14.097	13.249	<5.0	10.326	5.947			Under review
NCNB-VD-05	NOVATO 60 kV	P2-1:A6:20:_IGNACIO-ALTO 60kV [7150] (IGNACO A-IG JCT)	P2-1	Open-ended line	14.104	13.151	N/A	14.108	14.376	N/A	8.065	<5.0			Under review
NCNB-VD-06	STAFFORD 60 kV	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT)	P2-1	Open-ended line	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	15.843	8.131			Under review
NCNB-VD-07	WOODACRE 60 kV	P2-1:A6:24:_IGNACIO-BOLINAS #1 60kV [7140] (IGNACO B-WOODACRE)	P2-1	Open-ended line	12.269	11.202	12.117	12.188	12.465	12.095	7.391	<5.0			Under review
NCNB-VD-08	EGLE RCK 60 kV	P2-2:A2:24:_EGLE RCK 115kV Section MA	P2-2	Bus	<10.0	<10.0	<10.0	16.157	16.003	<10.0	<10.0	<10.0			Under review
NCNB-VD-09	LOWR LKE 60 kV	P2-2:A2:58:_EGLE RCK 60kV Section 1D	P2-2	Bus	<10.0	<10.0	<10.0	14.097	<10.0	<10.0	<10.0	<10.0			Under review
NCNB-VD-10	EGLE RCK 60 kV	P2-3:A2:29:_EGLE RCK - MA 115kV & EGGLE RCK-FULTON-SILVERDO line	P2-3	Circuit breaker	18.924	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0			Under review
NCNB-VD-11	WILLITS 60 kV	P2-3:A2:39:_MENDOCNO - MA 60kV & MENDOCINO-PHILO JCT-HOPLAND line	P2-3	Circuit breaker	NonConv	NonConv	10.845	NonConv	NonConv	NonConv	NonConv	8.558			Open Gerbreville-Laytonville line at Willits or Bridgeville depending on whether Humboldt or Geysers feeds load.
NCNB-VD-12	LOWR LKE 60 kV	P2-3:A2:27:_EGLE RCK - MA 115kV & EAGLE ROCK-CORTINA line	P2-3	Circuit breaker	<10.0	14.269	16.912	<10.0	<10.0	15.028	11.321	6.025			Under review
NCNB-VD-13	SNTA RSA 115 kV	P2-4:A2:7:_FULTON 115kV - Section 2D & 1D	P2-4	Bus-tie	10.981	9.453	10.576	11.396	10.931	11.153	7.851	<10.0			Under review
NCNB-VD-14	SONOMA 115 kV	P2-4:A2:10:_LAKEVILLE 115kV - Section 1D & 2D	P2-4	Bus-tie	11.553	10.194	11.361	10.314	10.51	9.708	<10.0	<10.0			Under review
NCNB-VD-15	CALISTGA 60 kV	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Relay failure	12.158	10.585	<10.0	14.103	13.92	<10.0	6.231	<10.0			Under review
NCNB-VD-16	FULTON 115 kV	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Relay failure	12.899	10.696	<10.0	14.016	12.832	<10.0	9.276	6.429			Under review
NCNB-VD-17	ALTO 60 kV	P7-1:A6:6:_IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 Lines	P7	N-2 (DCTL)	11.093	10.264	<10.0	11.069	11.874	<10.0	5.775	<10.0			Under review

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %								N/A	N/A	Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load			
NCNB-VD-18	MONROE2 115 kV	P7-1:A2:14:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 Lines	P7	N-2 (DCTL)	11.41	9.935	11.847	11.861	11.385	11.661	8.258	5.14			Under review
NCNB-VD-19	SNTA RSA 115 kV	P7-1:A2:14:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 Lines	P7	N-2 (DCTL)	10.874	9.415	11.286	11.314	10.823	11.084	7.842	<10.0			Under review
NCNB-VD-20	SONOMA 115 kV	P7-1:A2:15:_LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 Lines	P7	N-2 (DCTL)	10.401	9.15	10.435	9.087	9.297	8.802	<10.0	<10.0			Under review
X-VD-21															
X-VD-22															
X-VD-23															
X-VD-24															
X-VD-25															
X-VD-26															
X-VD-27															
X-VD-28															
X-VD-29															
X-VD-30															
X-VD-31															
X-VD-32															
X-VD-33															
X-VD-34															
X-VD-35															



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	
NCNB-V-01	CALPELLA 115 kV	Base Case	P0	Normal	1.0556	<1.05	<1.05	<1.05	1.0598	<1.05	1.051	<1.05			Under review
NCNB-V-02	INDIN VL 115 kV	Base Case	P0	Normal	1.0577	1.054	<1.05	1.0521	1.0681	<1.05	1.0633	1.0503			Under review
NCNB-V-03	LUCERNE 115 kV	Base Case	P0	Normal	1.0559	<1.05	<1.05	<1.05	1.0638	<1.05	1.0585	<1.05			Under review
NCNB-V-04	MENDOCNO 115 kV	Base Case	P0	Normal	1.0622	<1.05	<1.05	<1.05	1.0668	<1.05	1.0562	<1.05			Under review
NCNB-V-05	SKAGGS 115 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	1.0502			Under review
NCNB-V-06	EGLE RCK 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	1.0505	<1.05	1.0515	<1.05			Under review
NCNB-V-07	FTCHMTNP 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	1.0501	<1.05			Under review
NCNB-V-08	FULTON 60 kV	Base Case	P0	Normal	1.0509	1.0527	1.0532	1.0529	1.054	1.0539	1.0562	1.0531			Under review
NCNB-V-09	IGNACO B 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	1.0512			Under review
NCNB-V-10	MIRABEL 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	1.0525			Under review
NCNB-V-11	NOVATO 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	1.051			Under review
NCNB-V-12	SAUSALTO 60 kV	Base Case	P0	Normal	>0.95	>0.95	>0.95	>0.95	0.9467	>0.95	>0.95	>0.95			Under review
NCNB-V-13	WOHLER 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	1.0516			Under review
NCNB-V-14	WOODACRE 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	1.0502			Under review
NCNB-V-15	LOWR LKE 60 kV	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861] &	P1-2	T-line	0.8468	0.8626	>0.90	0.8594	0.8756	>0.90	0.9147	0.9632			Clearlake Reinforcement Project
NCNB-V-16	EGLE RCK 60 kV	P1-3:A2:29:_EGLE RCK 115/60kV TB 1 &	P1-3	Transformer	0.8677	0.8813	0.9914	0.8792	0.8948	0.9969	0.9281	0.9704			Clearlake Reinforcement Project
NCNB-V-17	BIG RIVR 60 kV	P1-4:A2:1:_BIG RIVR SVD=v &	P1-4	Shunt device	>0.90	1.0886	1.0854	<1.10	<1.10	<1.10	1.1009	<1.10			Action Plan
NCNB-V-18	LOWR LKE 60 kV	P2-1:A2:55:_KONOCTI-EAGLE ROCK 60kV [6861] (KONOCTI6-EGLE RCK) &	P2-1	Open-ended line	0.8468	0.8626	>0.90	0.8594	0.8756	>0.90	0.9147	0.9632			Clearlake Reinforcement Project
NCNB-V-19	NOVATO 60 kV	P2-1:A6:20:_IGNACIO-ALTO 60kV [7150] (IGNACO A-IG JCT) &	P2-1	Open-ended line	0.8762	0.8641	N/A	0.8775	0.8509	N/A	0.9572				Ignacio - Alto Voltage Conversion



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	
NCNB-V-20	TOCALOMA 60 kV	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT) &	P2-1	Open-ended line	0.7021	0.7205	0.6847	0.7071	0.655	0.684	0.8836	0.9722			Under review
NCNB-V-21	WOODACRE 60 kV	P2-1:A6:24:_IGNACIO-BOLINAS #1 60kV [7140] (IGNACO B-WOODACRE) &	P2-1	Open-ended line	0.8861	0.8756	0.8832	0.8882	0.8614	0.8821	0.9586				Under review
NCNB-V-22	EGLE RCK 60 kV	P2-2:A2:24:_EGLE RCK 115kV Section MA &	P2-2	Bus fault	>0.90	>0.90	>0.90	0.8837	0.8905	>0.90	>0.90	>0.90			Clearlake Reinforcement Project
NCNB-V-23	LOWR LKE 60 kV	P2-2:A2:58:_EGLE RCK 60kV Section 1D &	P2-2	Bus fault	>0.90	>0.90	>0.90	0.8594	>0.90	>0.90	>0.90	>0.90			Under review
NCNB-V-24	COVELO6 60 kV	P2-3:A2:39:_MENDOCNO - MA 60kV & MENDOCINO-PHILO JCT-HOPLAND line &	P2-3	Circuit breaker	NonConv	NonConv	0.8768	NonConv	NonConv	NonConv	NonConv	0.877			Under review
NCNB-V-25	LOWR LKE 60 kV	P2-3:A2:27:_EGLE RCK - MA 115kV & EAGLE ROCK-CORTINA line &	P2-3	Circuit breaker	>0.90	0.8595	0.8635	>0.90	>0.90	0.883	0.9047	0.9624			Under review
NCNB-V-26	MONROE2 115 kV	P2-4:A2:7:_FULTON 115kV - Section 2D & 1D &	P2-4	Bus-tie	0.891	0.8979	0.8916	0.8844	0.8792	0.8819	0.94	0.9907			Add VAR support
NCNB-V-27	SONOMA 115 kV	P2-4:A2:10:_LAKEVILLE 115kV - Section 1D & 2D &	P2-4	Bus-tie	0.9054	0.9113	0.9044	0.9194	0.9086	0.9199	<1.10	>0.90			Under review
NCNB-V-28	KONOCTI6 60 kV	P1-1:A2:9:_GEYSER11 14kV Gen Unit 1 & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P3	L-1/G-1	0.8629	0.8767	>0.90	0.8732	0.8895	>0.90	0.9246	>0.90			Clearlake Reinforcement Project
NCNB-V-29	LOWR LKE 60 kV	P1-1:A2:9:_GEYSER11 14kV Gen Unit 1 & P1-3:A2:29:_EGLE RCK 115/60kV TB 1	P3	L-1/G-1	0.8444	0.8603	>0.90	0.8556	0.8726	>0.90	0.9127	>0.90			Clearlake Reinforcement Project
NCNB-V-30	CALISTGA 60 kV	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P6	N-1-1	0.8577	0.882	>0.90	0.84	0.8428	>0.90	0.9478	>0.90			Under review
NCNB-V-31	FULTON 115 kV	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P6	N-1-1	0.8885	0.9016	>0.90	0.8752	0.8775	>0.90	0.9388	0.9835			Under review
NCNB-V-32	ALTO 60 kV	P1-2:A6:23:_IGNACIO-ALTO-SAUSALITO #2 60kV [7170] & P1-2:A6:24:_IGNACIO-ALTO-SAUSALITO #1 60kV [7160]	P6	N-1-1	0.8689	0.857	>0.90	0.8704	0.8371	>0.90	>0.90	>0.90			Under review
NCNB-V-33	ANNAPOLS 60 kV	P1-3:A2:33:_FULTON 115/60kV TB 2 & P1-3:A2:32:_FULTON 115/60kV TB 1	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	0.6302			Corrective Action Plan/Under review
NCNB-V-34	BELLVUE 115 kV	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630]	P6	N-1-1	0.9151	0.9206	0.9085	0.9093	0.9049	0.9075	0.9554	>0.90			Monitor



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)								Potential Mitigation Solutions		
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load		N/A	N/A
NCNB-V-35	BIG RIVR 60 kV	P1-2:A2:49:_FORT BRAGG-ELK 60kV [2060] MOAS OPENED on FRT BRGG_BIG RIVR & P1-4:A2:1:_BIG RIVR SVD=v	P6	N-1-1	1.2669	1.2812	1.2809	<1.10	<1.10	<1.10	1.2867	<1.10			Under review
NCNB-V-36	BOLINAS 60 kV	P1-3:A6:8:_IGNACIO 115/60kV TB 3 & P1-3:A6:9:_IGNACIO 115/60kV TB 1	P6	N-1-1	>0.90	>0.90	0.8924	>0.90	>0.90	0.8912	>0.90	>0.90			Monitor
NCNB-V-37	CALPELLA 115 kV	P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE & P1-2:A2:14:_MENDOCINO-UKIAH 115kV [2420] MOAS OPENED on MENDOCNO_CALPELLA	P6	N-1-1	0.7756	0.818	0.8079	0.7957	0.7991	0.8147	0.8574	0.9207			Under review
NCNB-V-38	CLER LKE 60 kV	P1-2:A2:54:_CLEAR LAKE-HOPLAND 60kV [6390] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	>0.90	0.7291	0.8872			Clearlake Reinforcement Project
NCNB-V-39	DUNBAR 60 kV	P1-3:A2:21:_LAKEVILE 230/60kV TB 3 & P1-3:A2:22:_LAKEVILE 230/60kV TB 5	P6	N-1-1	0.1966	>0.90	0.1926	0.1764	0.1748	0.1736	0.8284	>0.90			Under review
NCNB-V-40	EGLE RCK 60 kV	P1-2:A2:54:_CLEAR LAKE-HOPLAND 60kV [6390] & P1-3:A2:29:_EGLE RCK 115/60kV TB 1	P6	N-1-1	0.193	0.2231	0.965	0.2408	0.2555	>0.90	0.6864	0.8706			Clearlake Reinforcement Project
NCNB-V-41	FRT BRGG 60 kV	P1-2:A2:50:_FORT BRAGG-ELK 60kV [2060] MOAS OPENED on BIG RIVR_ELK & P1-4:A2:1:_BIG RIVR SVD=v	P6	N-1-1	1.1224	1.1359	1.1296	<1.10	<1.10	<1.10	1.1475	<1.10			Under review
NCNB-V-42	GARCIA 60 kV	P1-2:A2:43:_MENDOCINO-PHILO JCT-HOPLAND 60kV [7520] & P1-4:A2:1:_BIG RIVR SVD=v	P6	N-1-1	1.1164	1.139	1.131	<1.10	<1.10	<1.10	1.1738	<1.10			Under review
NCNB-V-43	GRANITE 60 kV	P1-2:A2:44:_MENDOCINO-HARTLEY 60kV [7510] & P1-3:A2:29:_EGLE RCK 115/60kV TB 1	P6	N-1-1	0.8657	0.8849	>0.90	0.8873	0.9116		0.9444	>0.90			Clearlake Reinforcement Project/Under review
NCNB-V-44	HOMEPROC 115 kV	P1-2:A2:12:_EAGLE ROCK-CORTINA 115kV [1470] & P1-2:A2:23:_EAGLE ROCK-CORTINA 115kV [1470] (2)	P6	N-1-1	>0.90	>0.90	0.8908	>0.90	>0.90	>0.90	>0.90	>0.90			Monitor
NCNB-V-45	IGNACO A 60 kV	P1-3:A6:9:_IGNACIO 115/60kV TB 1 & P1-3:A6:8:_IGNACIO 115/60kV TB 3	P6	N-1-1	>0.90	>0.90	0.909	>0.90	>0.90	0.9078	>0.90	>0.90			Monitor



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A		
NCNB-V-46	LOWR LKE 60 kV	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861] & P1-3:A2:26:_HPLND JT 115/60kV TB 2	P6	N-1-1	0.7913	0.8244	>0.90	>0.90	>0.90	>0.90	>0.90	0.8795	>0.90			Clearlake Reinforcement Project
NCNB-V-47	LOWR LKE 60 kV	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861] & P1-3:A2:46:_MIDDLTWN 115/60kV TB 1	P6	N-1-1	>0.90	>0.90	0.8601	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90			Monitor
NCNB-V-48	MCDWLLSW 60 kV	P1-3:A2:22:_LAKEVILLE 230/60kV TB 5 & P1-3:A2:21:_LAKEVILLE 230/60kV TB 3	P6	N-1-1	0.2199	>0.90	0.2196	0.1975	0.1971	0.1979	0.8364	>0.90				Under review
NCNB-V-49	MONTCLLO 115 kV	P1-3:A2:17:_FULTON 230/115kV TB 4 & P1-3:A2:18:_FULTON 230/115kV TB 9	P6	N-1-1	0.9026	0.9168	>0.90	0.8915	0.8961	>0.90	0.9552	>0.90				Under review
NCNB-V-50	PNT ARNA 60 kV	P1-4:A2:1:_BIG RIVR SVD=v & P1-2:A2:49:_FORT BRAGG-ELK 60kV [2060] MOAS OPENED on FRT BRGG_BIG RIVR	P6	N-1-1	1.1951	1.2038	1.2042	<1.10	<1.10	<1.10	1.2142	<1.10				Under review
NCNB-V-51	SILVERDO 115 kV	P1-3:A2:18:_FULTON 230/115kV TB 9 & P1-3:A2:17:_FULTON 230/115kV TB 4	P6	N-1-1	0.9002	0.9149	>0.90	0.8897	0.8943	>0.90	0.9528	>0.90				Under review
NCNB-V-52	SNTA RSA 115 kV	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630]	P6	N-1-1	0.895	0.9016	0.8881	0.8884	0.884	0.8864	0.9422	>0.90				Add VAR support
NCNB-V-53	SONOMA 115 kV	P1-2:A2:35:_LAKEVILLE-SONOMA #1 115kV [2063] & P1-2:A2:36:_LAKEVILLE-SONOMA #2 115kV [2070]	P6	N-1-1	0.9169	0.9218	0.9136	>0.90	>0.90	>0.90	>0.90	>0.90				Action Plan/ Radialize
NCNB-V-54	ALTO 60 kV	P7-1:A6:6:_IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 Lines &	P7	N-2	0.8687	0.857	>0.90	0.8702	0.8371	>0.90	0.9565	>0.90				Ignacio - Alto Voltage Conversion
NCNB-V-55	MONROE2 115 kV	P7-1:A2:14:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 Lines &	P7	N-2	0.8921	0.8983	0.8845	0.8852	0.8803	0.8826	0.94	0.9906				Add VAR support
NCNB-V-56	SAUSALTO 60 kV	P7-1:A6:2:_LAKEVILLE-IGNACIO #1 & IGNACIO-SOBRANTE Lines &	P7	N-2	>0.90	>0.90	>0.90	>0.90	0.8947	>0.90	>0.90	>0.90				Monitor
NCNB-V-57	SONOMA 115 kV	P7-1:A2:15:_LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 Lines &	P7	N-2	0.9169	0.9218	0.9136	0.9317	0.9207	0.9289	>0.90	>0.90				Action Plan/ Radialize

ID	Contingency	Category	Category Description	Transient Stability Performance - Number of Voltage and Frequency Violations										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	N/A	N/A	N/A		
NCNB-TS-01	Geyser # 9 - Lakeville 230 kV (Lakeville - SMUD GEO 230 kV)	P1-2	T-line			18									Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-02	Geyser # 9 - Lakeville 230 kV (Lakeville - SMUD GEO 230 kV)	P1-2	T-line				20								Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-03	Geyser # 9 - Lakeville 230 kV (Lakeville - SMUD GEO 230 kV)	P1-2	T-line					20							Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-04	Geyser # 9 - Lakeville 230 kV (Lakeville - SMUD GEO 230 kV)	P1-2	T-line		18										Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-05	Geyser # 9 - Lakeville 230 kV (Lakeville - SMUD GEO 230 kV)	P1-2	T-line	20											Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-06	Ignacio 230/115.00 BANK # 6	P1-3	Transformer			8									Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-07	Ignacio 230/115.00 BANK # 6	P1-3	Transformer		13										Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-08	Ignacio 230/115.00 BANK # 6	P1-3	Transformer					11							Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-09	Ignacio 230/115.00 BANK # 6	P1-3	Transformer	3											Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-10	Ignacio 230/115.00 BANK # 6	P1-3	Transformer				11								Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-11	BUS FAULT AT 31220 EGLE RCK 115.00	P2-2	Bus section		16										Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-12	BUS FAULT AT 31220 EGLE RCK 115.00	P2-2	Bus section				7								Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-13	BUS FAULT AT 31220 EGLE RCK 115.00	P2-2	Bus section	16											Reassess with actual fault clearing times and SLG fault impedances where applicable

ID	Contingency	Category	Category Description	Transient Stability Performance - Number of Voltage and Frequency Violations										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	N/A	N/A	N/A		
NCNB-TS-14	BUS FAULT AT 31220 EGLE RCK 115.00	P2-2	Bus section			5									Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-15	BUS FAULT AT 31220 EGLE RCK 115.00	P2-2	Bus section					7							Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-16	NON-BUS-TIE BREAKER CB532 FAULT AT 30430 FULTON 230.00	P2-3	Circuit breaker	7											Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-17	NON-BUS-TIE BREAKER CB532 FAULT AT 30430 FULTON 230.00	P2-3	Circuit breaker			5									Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-18	NON-BUS-TIE BREAKER CB532 FAULT AT 30430 FULTON 230.00	P2-3	Circuit breaker					7							Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-19	NON-BUS-TIE BREAKER CB532 FAULT AT 30430 FULTON 230.00	P2-3	Circuit breaker		5										Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-20	NON-BUS-TIE BREAKER CB532 FAULT AT 30430 FULTON 230.00	P2-3	Circuit breaker				7								Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-21	BUS-TIE BREAKER CB102 FAULT AT 31200 MENDOCNO 115.00	P2-4	Bus tie-breaker		3										Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-22	BUS-TIE BREAKER CB102 FAULT AT 31200 MENDOCNO 115.00	P2-4	Bus tie-breaker				5								Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-23	BUS-TIE BREAKER CB102 FAULT AT 31200 MENDOCNO 115.00	P2-4	Bus tie-breaker			3									Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-24	BUS-TIE BREAKER CB102 FAULT AT 31200 MENDOCNO 115.00	P2-4	ection/stuck breaker					5							Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-25	BUS-TIE BREAKER CB102 FAULT AT 31200 MENDOCNO 115.00	P2-4	Bus tie-breaker	5											Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-26	:Geyser11 Unit 1 (Bus #31412) Stuck Breaker	P4-1	Stuck breaker					4							Reassess with actual fault clearing times and SLG fault impedances where applicable

ID	Contingency	Category	Category Description	Transient Stability Performance - Number of Voltage and Frequency Violations										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	N/A	N/A	N/A		
NCNB-TS-27	:Geyser11 Unit 1 (Bus #31412) Stuck Breaker	P4-1	Stuck breaker	4											Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-28	:Geyser11 Unit 1 (Bus #31412) Stuck Breaker	P4-1	Stuck breaker				4								Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-29	:Geyser11 Unit 1 (Bus #31412) Stuck Breaker	P4-1	Stuck breaker			2									Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-30	:Geyser11 Unit 1 (Bus #31412) Stuck Breaker	P4-1	Stuck breaker		2										Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-31	:Geysers 9 -Lakeville 230 kV Line (30397-30435)	P4-2	line/stuck breaker				20								Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-32	:Geysers 9 -Lakeville 230 kV Line (30397-30435)	P4-2	line/stuck breaker					20							Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-33	:Geysers 9 -Lakeville 230 kV Line (30397-30435)	P4-2	line/stuck breaker			18									Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-34	:Geysers 9 -Lakeville 230 kV Line (30397-30435)	P4-2	line/stuck breaker	20											Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-35	:Geysers 9 -Lakeville 230 kV Line (30397-30435)	P4-2	line/stuck breaker		18										Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-36	:Ignacio 230/ 115 kV No. 6 Transformer (32568)	P4-3	former/stuck breaker				97								Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-37	:Ignacio 230/ 115 kV No. 6 Transformer (32568)	P4-3	former/stuck breaker			107									Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-38	:Ignacio 230/ 115 kV No. 6 Transformer (32568)	P4-3	former/stuck breaker	109											Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-39	:Ignacio 230/ 115 kV No. 6 Transformer (32568)	P4-3	former/stuck breaker		107										Reassess with actual fault clearing times and SLG fault impedances where applicable

ID	Contingency	Category	Category Description	Transient Stability Performance - Number of Voltage and Frequency Violations										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	N/A	N/A	N/A	N/A	N/A		
NCNB-TS-40	:Ignacio 230/ 115 kV No. 6 Transformer (32568)	P4-3	former/stuck breaker					93							Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-41	:BUS FAULT AT 31220 EGLE RCK 115.00	P4-5	ection/stuck breaker					108							Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-42	:BUS FAULT AT 31220 EGLE RCK 115.00	P4-5	ection/stuck breaker				136								Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-43	:BUS FAULT AT 31220 EGLE RCK 115.00	P4-5	ection/stuck br	167											Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-44	:BUS FAULT AT 31220 EGLE RCK 115.00	P4-5	ection/stuck breaker		167										Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-45	:BUS FAULT AT 31220 EGLE RCK 115.00	P4-5	ection/stuck breaker			138									Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-46	:NON-BUS-TIE BREAKER CB532 FAULT AT 30430 FULTON	P4-6	ection/bus tie-breaker				87								Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-47	:NON-BUS-TIE BREAKER CB532 FAULT AT 30430 FULTON	P4-6	ection/bus tie-breaker		79										Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-48	:NON-BUS-TIE BREAKER CB532 FAULT AT 30430 FULTON	P4-6	ection/bus tie-breaker			79									Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-49	:NON-BUS-TIE BREAKER CB532 FAULT AT 30430 FULTON	P4-6	ection/stuck breaker					31							Reassess with actual fault clearing times and SLG fault impedances where applicable
NCNB-TS-50	:NON-BUS-TIE BREAKER CB532 FAULT AT 30430 FULTON	P4-6	ection/bus tie-b	71											Reassess with actual fault clearing times and SLG fault impedances where applicable

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1														

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1												

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUM-T-SENS-01	GRANITE-HPLND JT 60 kV 1 1	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861] &	P1-2	T-line	103.02	91.16	34.38	71.55	<100	108.01	101.37	38.06	36.24		Approved Clear Lake Reinforcement Project. Interim: Redispatch Geysers, Potter Valley gens
HUM-T-SENS-02	MOLINO-TRNTN_JC 60 kV 1 1	P1-2:A2:62:_FULTON-LAGUNA-COTATI-SNMALDFL 60kV [6911] &	P1-2	T-line	87.27	76.19	85.96	60.95	50.57	95.9	79.03	100.54	85.85		Monitor line loading due to long lead time
HUM-T-SENS-03	PETLMA A-LKVLE JT 60 kV 1 1	P1-2:A2:66:_LAKEVILLE-PETALUMA C 60kV [7350] &	P1-2	T-line	100.53	86.04	94.6	63.89	54.66	109.76	92.8	113.99	98.92		Reconductor/replace limiting equipment at Petaluma A station
HUM-T-SENS-04	LAKEVLE-LKVLE JT 60 kV 1 1	P1-2:A2:66:_LAKEVILLE-PETALUMA C 60kV [7350] &	P1-2	T-line	94.14	80.57	88.59	59.83	51.23	102.78	86.9	106.74	92.63		Reconductor the Lakeville #2 60 kV Line to address without BTM sensitivity overloads
HUM-T-SENS-05	GRANITE-HPLND JT 60 kV 1 1	P2-1:A2:55:_KONOCTI-EAGLE ROCK 60kV [6861] (KONOCTI6-EGLE RCK) &	P2-1	Open-ended lin	103.02	91.16	34.38	71.55	56.33	108.01	101.37	38.06	36.24		Approved Clear Lake Reinforcement Project. Redispatch Geysers, Potter Valley gens
HUM-T-SENS-06	NAPA-TULCY JT 60 kV 1 1	P2-1:A2:86:_TULUCAY-NAPA #2 60kV [8190] (TULUCAY-BSLT TAP) &	P2-1	Open-ended lin	123.06	<100	<100	81.33	<100	129.02	<100	105.99	<100		Interim: Action Plan. Upgrade and increase capacity of the approved Napa-Tulucay 60 kV Reconductoing project
HUM-T-SENS-07	IGNACO B-WOODACRE 60 kV 1 1	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT) &	P2-1	Open-ended lin	80.87	71.67	82.92	44.67	32.27	111.54	74.44	143.13	82.77		Ignacio-Bolinas-Stafford area 115 Voltage Conversion. Reconductor Ignacio-Bolinas #2 60 kV line to address without BTM sensitivity overloads
HUM-T-SENS-08	STAF_JCT-TOCA_JCT 60 kV 1 1	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT) &	P2-1	Open-ended lin	82.03	72.5	85.75	42.68	30.07	118.29	75.53	162.12	85.57		Ignacio-Bolinas-Stafford area 115 Voltage Conversion. Reconductor Ignacio-Bolinas #2 60 kV line to address without BTM sensitivity overloads
HUM-T-SENS-09	STAFFORD-STAF_JCT 60 kV 1 1	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT) &	P2-1	Open-ended lin	55.05	48.71	57.61	28.68	20.17	78.72	50.75	102.91	57.49		Ignacio-Bolinas-Stafford area 115 Voltage Conversion. Reconductor Ignacio-Bolinas #2 60 kV line to address without BTM sensitivity overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUM-T-SENS-10	OLEMA-BOLINAS 60 kV 1 1	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT) &	P2-1	Open-ended line	NonConv	NonConv	NonConv	105.58	74.69	NonConv	NonConv	NonConv	NonConv		Ignacio-Bolinas-Stafford area 115 Voltage Conversion. Reconductor Ignacio-Bolinas #2 60 kV line/Drop load
HUM-T-SENS-11	GRANITE-HPLND JT 60 kV 1 1	P2-3:A2:27:_EGLE RCK - MA 115kV & EAGLE ROCK-CORTINA line &	P2-3	Circuit breaker	106.23	95.63	96.62	74.79	62.13	112.35	104.84	107.3	96.7		Approved Clear Lake Reinforcement Project. Redispatch Geysers, Potter Valley gens to address sensitivity scenario overloads
HUM-T-SENS-12	MOLINO-TRNTN_JC 60 kV 1 1	P2-3:A2:61:_LAGUNA - 1D 60kV & FULTON-LAGUNATP-COTATI-SNMA TAP line &	P2-3	Circuit breaker	87.27	76.19	85.96	60.95	<100	95.9	79.03	100.54	<100		Monitor line loading for sensitivity scenario overloads due to long lead time
HUM-T-SENS-13	PETLMA A-LKVLE JT 60 kV 1 1	P2-3:A2:66:_LAKEVILLE - 1D 60kV & LAKEVILLE-PETALUMA C line &	P2-3	Circuit breaker	94.09	80.31	88.25	59.69	51.22	102.71	86.7	106.38	92.37		Reconductor or replace limiting equipment at Petaluma A station to address without BTM sensitivity overloads
HUM-T-SENS-14	WILLITS-LYTNVLE 60 kV 1 1	P2-3:A2:39:_MENDOCNO - MA 60kV & MENDOCINO-PHILO JCT-HOPLAND line &	P2-3	Circuit breaker	NConv	NConv	96.43	NConv	59.14	NConv	NConv	NConv	96.44		Add a new line. Interim: Open Gerbreville-Laytonville line at Willits or Bridgeville depending on whether Humboldt or Geysers feeds load.
HUM-T-SENS-15	KEKAWAKA-LYTNVLE 60 kV 1 1	P2-3:A2:39:_MENDOCNO - MA 60kV & MENDOCINO-PHILO JCT-HOPLAND line &	P2-3	Circuit breaker	NConv	NConv	116.58	NConv	72.51	NConv	NConv	NConv	116.6		Add a new line. Interim: Open Gerbreville-Laytonville 60 kV Line and radialize and feed load via Humboldt
HUM-T-SENS-16	LAKEVILLE-VACA-DIX 230 kV 1 1	P2-4:A2:3:_LAKEVILLE 230kV - Section 2E & 2D &	P2-4	Bus-tie	94.8	<100	<100	64.32	<100	103.15	<100	<100	<100		Upgrade the Approved Vaca Dixon-Lakeville reconductoring project to address without BTM sensitivity overloads
HUM-T-SENS-17	TULUCAY-VACA-DIX 230 kV 1 1	P2-4:A2:1:_LAKEVILLE 230kV - Section 1E & 2E &	P2-4	Bus-tie	93.84	<100	<100	69.94	<100	100.42	<100	<100	<100		Upgrade the Approved Vaca Dixon-Lakeville reconductoring project to address without BTM sensitivity overloads
HUM-T-SENS-18	PENNGRVE-CORONA 115 kV 1 1	P2-4:A2:7:_FULTON 115kV - Section 2D & 1D &	P2-4	Bus-tie	104.78	98.23	105.96	71.44	59.16	110.5	105.08	119.45	106.82		Reconductor Penngrove-Corona 115 kV line sections

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUM-T-SENS-19	CORONA-LAKEVILLE 115 kV 1 1	P2-4:A2:7:_FULTON 115kV - Section 2D & 1D &	P2-4	Bus-tie	99.1	92.85	99.95	67.72	<100	104.46	99.4	112.77	100.75		Reconductor
HUM-T-SENS-20	GRANITE-HPLND JT 60 kV 1 1	P3: P1-1:A2:19:_POTTRVLY 2kV Gen Unit 1 & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P3	L-1/G-1	102.85	<100	<100	<100	<100	108.18	101.84	<100	<100		Upgrade approved Clear Lake Reinforcement Project to address sensitivity overloads. Redispatch Geysers, Potter Valley gens
HUM-T-SENS-21	PETLMA A-LKVLE JT 60 kV 1 1	P3: P1-1:A2:9:_GEYSER11 14kV Gen Unit 1 & P1-2:A2:66:_LAKEVILLE-PETALUMA C 60kV [7350]	P3	L-1/G-1	<100	<100	<100	<100	<100	112.35	<100	116.2	101.09		Reconductor/Replace limiting equipment at Petaluma A station
HUM-T-SENS-22	PENNGRVE-CORONA 115 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	95.13	81.34	50.33	57.02	41.22	103.27	89.19	60.55	51.46		Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
HUM-T-SENS-23	CORONA-LAKEVILLE 115 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100		Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
HUM-T-SENS-24	MLNO JCT-LAGUNATP 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	99.28	79.39	50.92	55.18	47.93	110.12	89.44	60.74	49.85		Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
HUM-T-SENS-25	COTATI-PETC_JCT 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	157.37	129.09	90.66	92.33	76.25	174.37	142.89	110.64	97.72		Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
HUM-T-SENS-26	PETLMA A-LKVLE JT 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	110.55	91.04	64.65	65.2	53.76	122.2	100.62	78.58	69.47		Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
HUM-T-SENS-27	LAKEVILLE-LKVLE JT 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	103.51	85.25	60.57	61.06	50.4	114.42	94.21	73.61	65.08		Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
HUM-T-SENS-28	COTATI-SNMA TAP 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	98.87	78.32	49.92	55.09	47.75	109.71	89.6	59.49	55.06		Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads
HUM-T-SENS-29	SNMA TAP-LAGUNATP 60 kV 1 1	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P5-5	Relay	109.17	88.44	56.44	64.48	54.32	120.17	99.81	66.76	55.02		Action Plan. Upgrade protection to achieve redundancy for addressing sensitivity overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUM-T-SENS-30	TULUCAY-VACA-DIX 230 kV 1 1	P6: P1-2:A2:9:_VACA-LAKEVILLE #1 230kV [5840] & P1-2:A2:3:_GEYSR18-LAKEVILLE-GEYSR20-SNTAFE-GEYSR13 230kV [4781]	P6	N-1-1	<100	<100	<100	<100	<100	<100	100.01	<100	<100	<100	Approved Vaca Dixon-Lakeville reconductoring project
HUM-T-SENS-31	KEKAWAKA-LYTNVLE 60 kV 1 1	P6: P1-2:A2:24:_CORTINA-MENDOCINO #1 115kV [1330] & P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	100.81	99.19	Monitor. reduce generation at Humboldt Bay to address sensitivity overloads/SPS
HUM-T-SENS-32	INDIN VL-LUCERNJ1 115 kV 1 1	P6: P1-2:A2:13:_EAGLE ROCK-REDBUD 115kV [1480] & P1-2:A2:12:_EAGLE ROCK-CORTINA 115kV [1470]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	NConv	<100	Monitor due to long lead time of sensitivity overloads/SPS
HUM-T-SENS-33	INDIN VL-CORTINA 115 kV 1 1	P1-2:A2:13:_EAGLE ROCK-REDBUD 115kV [1480] & P1-2:A2:12:_EAGLE ROCK-CORTINA 115kV [1470]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	NConv	<100	Monitor due to long lead time of sensitivity overloads/SPS
HUM-T-SENS-34	FULTON-MONROE2 115 kV 1 1	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:34:_CORONA-LAKEVILLE 115kV [4311]	P6	N-1-1	108.14	102.56	109.28	<100	<100	114.35	109.86	123.53	109.14		Interim: Gen dispatch/Action Plan/SPS. Reconductor parallel lines
HUM-T-SENS-35	MONROE1-SNTA RSA 115 kV 1 1	P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630] & P1-2:A2:34:_CORONA-LAKEVILLE 115kV [4311]	P6	N-1-1	99.23	<100	100.7	<100	<100	104.79	101.41	113.31	100.6		Gen redispatch/Action Plan to address sensitivity overloads. SPS
HUM-T-SENS-36	BELLVUE-PENNGRVE 115 kV 1 1	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630]	P6	N-1-1	99.9	<100	101.96	<100	<100	105.32	100.15	115.05	101.87		Reconductor/SPS. Action Plan
HUM-T-SENS-37	PENNGRVE-CORONA 115 kV 1 1	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630]	P6	N-1-1	104.66	<100	106.79	<100	<100	110.42	105.03	120.4	106.69		Reconductor. Action Plan/SPS
HUM-T-SENS-38	CORONA-LAKEVLE 115 kV 1 1	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630]	P6	N-1-1	98.99	<100	100.72	<100	<100	104.38	99.35	113.64	100.63		Reconductor/SPS. Gen redispatch. Action Plan
HUM-T-SENS-39	MENDOCNO-UKIAH JT 60 kV 1 1	P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE & P1-2:A2:14:_MENDOCINO-UKIAH 115kV [2420] MOAS OPENED on MENDOCNO_CALPELLA	P6	N-1-1	109.26	100.07	98.69	<100	<100	114.77	106.36	108.15	<100		Gen redispatch/Action Plan or SPS to address sensitivity overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUM-T-SENS-40	MENDOCNO-UPPR LKE 60 kV 1 1	P1-2:A2:54:_CLEAR LAKE-HOPLAND 60kV [6390] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	NonConv	NonConv	<100	150.02	100.78	NonConv	NonConv	<100	<100		Load transfer/Action Plan. Reconductor/SPS
HUM-T-SENS-41	PHLO JCT-HPLND JT 60 kV 1 1	P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE & P1-2:A2:14:_MENDOCINO-UKIAH 115kV [2420] MOAS OPENED on MENDOCNO_CALPELLA	P6	N-1-1	108.42	<100	<100	<100	<100	113.45	104.92	107.99	<100		Action Plan/SPS to also address sensitivity overloads
HUM-T-SENS-42	UKIAH JT-PHLO JCT 60 kV 1 1	P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE & P1-2:A2:14:_MENDOCINO-UKIAH 115kV [2420] MOAS OPENED on MENDOCNO_CALPELLA	P6	N-1-1	109.32	100.13	98.75	<100	<100	114.84	106.42	108.22	<100		Action Plan/SPS to also address sensitivity overloads
HUM-T-SENS-43	UPPR LKE-HARTLEY 60 kV 1 1	P1-2:A2:54:_CLEAR LAKE-HOPLAND 60kV [6390] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	NonConv	NonConv	<100	140.49	<100	NonConv	NonConv	<100	<100		Action Plan/SPS to also address sensitivity overloads
HUM-T-SENS-44	HARTLEY-CLER LKE 60 kV 1 1	P1-2:A2:54:_CLEAR LAKE-HOPLAND 60kV [6390] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	NonConv	NonConv	<100	107.84	<100	NonConv	NonConv	<100	<100		Action Plan/SPS to also address sensitivity overloads
HUM-T-SENS-45	CLER LKE-GRANITE 60 kV 1 1	P1-2:A2:44:_MENDOCINO-HARTLEY 60kV [7510] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	NonConv	155.44	<100	110.2	<100	NonConv	NonConv	<100	<100		Action Plan/SPS to also address sensitivity overloads
HUM-T-SENS-46	CLER LKE-KONOCTI6 60 kV 1 1	P1-2:A2:13:_EAGLE ROCK-REDBUD 115kV [1480] & P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE	P6	N-1-1	116.13	106.58	120.02	<100	101.62	117.78	110.89	128.89	119.87		Action Plan/SPS to also address sensitivity overloads
HUM-T-SENS-47	GRANITE-HPLND JT 60 kV 1 1	P1-2:A2:44:_MENDOCINO-HARTLEY 60kV [7510] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	NonConv	NonConv	<100	113.71	<100	NonConv	NonConv	<100	<100		Action Plan/SPS to also address sensitivity overloads
HUM-T-SENS-48	GRANITE-HPLND JT 60 kV 1 1	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861] & P1-2:A2:71:_HOMSTKTP-MIDDLTWN #1 115kV [0]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	101.76	<100		Action Plan/SPS to address sensitivity overloads

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUM-T-SENS-49	HPLND JT-HPLND JT 115 kV 2 1	P1-2:A2:14:_MENDOCINO-UKIAH 115kV [2420] MOAS OPENED on MENDOCNO_CALPELLA & P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE	P6	N-1-1	155.41	NonConv	NonConv	126.15	113.81	160.99	153.51	164.19	152.25		Action Plan. Reverse Power Relay will trip. Load drop if overload persists post Hopland bank tripping via existing Reverse Power Relay activation
HUM-T-SENS-50	HPLND JT-CLVRDLJT 60 kV 1 1	P1-3:A2:33:_FULTON 115/60kV TB 2 & P1-3:A2:32:_FULTON 115/60kV TB 1	P6	N-1-1	219.32	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv		Reconductor/SPS. Action Plan.
HUM-T-SENS-51	MOLINO-MLNO JCT 60 kV 1 1	P1-3:A2:33:_FULTON 115/60kV TB 2 & P1-3:A2:32:_FULTON 115/60kV TB 1	P6	N-1-1	114.04	108.94	116.24	<100	<100	119.23	109.89	124.42	115.29		Action Plan/SPS to also address sensitivity overloads
HUM-T-SENS-52	MLNO JCT-FULTON 60 kV 1 1	P1-3:A2:22:_LAKEVILLE 230/60kV TB 5 & P1-3:A2:21:_LAKEVILLE 230/60kV TB 3	P6	N-1-1	NonConv	NonConv	NonConv	106.47	<100	NonConv	NonConv	NonConv	NonConv		Add new transformer at Lakeville/ Action Plan (Drop load)
HUM-T-SENS-53	MLNO JCT-LAGUNATP 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv		Reconductor/SPS. Action Plan
HUM-T-SENS-54	CLVRDLJTGYRJCT1 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	149.99	NonConv	NonConv	NonConv	NonConv		Reconductor/SPS. Action Plan
HUM-T-SENS-55	GYRJCT1-FTCHMTNP 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	149.01	NonConv	NonConv	NonConv	NonConv		Reconductor/SPS. Action Plan
HUM-T-SENS-56	FULTON-FTCHMTNP 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	<100	<100	NonConv	<100	NonConv	<100	<100	<100		Reconductor/SPS. Action Plan
HUM-T-SENS-57	COTATI-PETC_JCT 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv		Reconductor/SPS. Action Plan
HUM-T-SENS-58	COTATI-SNMA TAP 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv		Reconductor/SPS. Action Plan
HUM-T-SENS-59	MCDWLLSW-LAKEVILLE 60 kV 1 1	P1-3:A2:22:_LAKEVILLE 230/60kV TB 5 & P1-3:A2:21:_LAKEVILLE 230/60kV TB 3	P6	N-1-1	133.24	<100	132.52	<100	<100	132.23	132.34	131.86	131.35		Add new transformer at Lakeville/Reconductor/SPS. Action Plan/Drop load
HUM-T-SENS-60	PETC_JCT-PETLMA A 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv		Reconductor/SPS. Action Plan
HUM-T-SENS-61	PETLMA A-LKVL JT 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv		Reconductor/SPS. Action Plan
HUM-T-SENS-62	SNMA TAP-LAGUNATP 60 kV 1 1	P1-3:A2:22:_LAKEVILLE 230/60kV TB 5 & P1-3:A2:21:_LAKEVILLE 230/60kV TB 3	P6	N-1-1	NonConv	NonConv	NonConv	157.48	116.08	NonConv	NonConv	NonConv	NonConv		Add new transformer at Lakeville/ Action Plan (Drop load)
HUM-T-SENS-63	LAKEVILLE-LKVL JT 60 kV 1 1	P1-3:A2:32:_FULTON 115/60kV TB 1 & P1-3:A2:33:_FULTON 115/60kV TB 2	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv		Reconductor/SPS. Action Plan

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUM-T-SENS-64	IGNACIO- LS GLLNS 115 kV 3 1	P1-2:A6:15:_IGNACIO-SAN RAFAEL #1 115kV [1850] & P1-2:A6:28:_IGNACIO-SAN RAFL #2 115kV [0]	P6	N-1-1	<100	<100	105.24	<100	<100	<100	<100	120.43	105.19		Monitor. Reconductor/SPS. Action Plan
HUM-T-SENS-65	IGNACIO-SAN RAFL 115 kV 1 1	P1-2:A6:28:_IGNACIO-SAN RAFL #2 115kV [0] & P1-2:A6:14:_IGNACIO-SAN RAFAEL #3 115kV [1860] MOAS OPENED on IGNACIO_LS GLLNS	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100		Action Plan. SPS
HUM-T-SENS-66	IGNACIO-SAN RAFL 115 kV 2 1	P1-2:A6:15:_IGNACIO-SAN RAFAEL #1 115kV [1850] & P1-2:A6:14:_IGNACIO-SAN RAFAEL #3 115kV [1860] MOAS OPENED on IGNACIO_LS GLLNS	P6	N-1-1	<100	<100	119.78	<100	<100	<100	<100	137.35	119.71		Upgrade Ignacio-Alto Voltage Conversion project with higher rated conductors
HUM-T-SENS-67	LS GLLNS-SAN RAFL 115 kV 3 1	P1-2:A6:15:_IGNACIO-SAN RAFAEL #1 115kV [1850] & P1-2:A6:28:_IGNACIO-SAN RAFL #2 115kV [0]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	102.12	<100		Monitor. Action Plan to address sensitivity overloads
HUM-T-SENS-68	SAN RAFL-Greenbrae 115 kV 1 1	P1-3:A6:9:_IGNACIO 115/60kV TB 1 & P1-3:A6:8:_IGNACIO 115/60kV TB 3	P6	N-1-1	<100	<100	122.51	<100	<100	<100	<100	144.43	122.43		Monitor. Ignacio-Alto Voltage Conversion project. Action Plan
HUM-T-SENS-69	IG JCT-SAN_RFLJ 60 kV 1 1	P1-2:A6:23:_IGNACIO-ALTO-SAUSALITO #2 60kV [7170] & P1-2:A6:24:_IGNACIO-ALTO-SAUSALITO #1 60kV [7160]	P6	N-1-1	128.1	118.23	<100	<100	<100	140.7	124.51	<100	<100		Ignacio-Alto Voltage Conversion project/SPS. Action Plan
HUM-T-SENS-70	SAN_RFLJ-GREENBRE 60 kV 1 1	P1-2:A6:24:_IGNACIO-ALTO-SAUSALITO #1 60kV [7160] & P1-2:A6:23:_IGNACIO-ALTO-SAUSALITO #2 60kV [7170]	P6	N-1-1	127.18	117.43	<100	<100	<100	139.74	123.66	<100	<100		Action Plan. SPS to also address sensitivity overloads
HUM-T-SENS-71	GREENBRE-ALTO 60 kV 1 1	P6: P1-3:A6:8:_IGNACIO 115/60kV TB 3 & P1-3:A6:9:_IGNACIO 115/60kV TB 1	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	107.85	<100		Monitor. Action Plan/SPS to address long term sensitivity overload
HUM-T-SENS-72	BELLVUE-PENNGRVE 115 kV 1 1	P7-1:A2:14:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 Lines &	P7	N-2 (DCTL)	99.9	93.56	101.96	68.16	56.26	105.26	100.15	114.03	101.87		Reconductor. Action Plan
HUM-T-SENS-73	PENNGRVE-CORONA 115 kV 1 1	P7-1:A2:14:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 Lines &	P7	N-2 (DCTL)	104.66	98.19	106.79	71.43	59.17	110.35	105.03	119.33	106.7		Reconductor. Action Plan
HUM-T-SENS-74	CORONA-LAKEVILLE 115 kV 1 1	P7-1:A2:14:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 Lines &	P7	N-2 (DCTL)	98.99	92.81	100.72	67.72	<100	104.33	99.35	112.66	100.63		Action Plan. Reconductor
HUM-T-SENS-75	HPLND JT-CLVRDLJT 60 kV 1 1	P7-1:A2:6:_GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO Lines &	P7	N-2 (DCTL)	80.52	99.86	100.81	80.46	87.52	83.13	90.02	95.08	97.19		Monitor line loading due to long lead line.

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
HUM-T-SENS-76	MOLINO-TRNTN_JC 60 kV 1 1	P7-1:A2:24:_FULTON-SANTA ROSA #1 & FULTON-MOLINO-COTATI Lines &	P7	N-2 (DCTL)	<100	<100	85.94	<100	<100	<100	<100	100.51	85.83		Monitor line loading due to long lead line for sensitivity scenarion overloads
HUM-T-SENS-77	COTATI-PETC_JCT 60 kV 1 1	P7-1:A2:10:_FULTON-IGNACIO #1 & FULTON-LAKEVILLE Lines &	P7	N-2 (DCTL)	75.27	51.87	68.74	16.8	20.05	91.6	65.04	102.55	77.22		Monitor line loading due to long lead line for sensitivity scenarion overloads
HUM-T-SENS-78	IGNACIO-LS GLLNS 115 kV 3 1	P7-1:A6:23:_Ignacio - San Rafael #1 & #2 Lines &	P7	N-2 (DCTL)	<100	<100	105.24	<100	<100	<100	<100	120.43	105.19		Monitor. Reconductor. Action Plan
HUM-T-SENS-79	IG JCT-SAN_RFLJ 60 kV 1 1	P7-1:A6:6:_IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 Lines &	P7	N-2 (DCTL)	128.15	118.23	<100	78.87	57.76	140.64	124.51	<100	<100		Upgrade Ignacio-Alto Voltage Conversion project to also address sensitivity scenario overloads
HUM-T-SENS-80	SAN_RFLJ-GREENBRE 60 kV 1 1	P7-1:A6:6:_IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 Lines &	P7	N-2 (DCTL)	127.28	117.43	<100	78.34	57.35	139.68	123.66	<100	<100		Upgrade Ignacio-Alto Voltage Conversion project to also address sensitivity scenario overloads
HUM-T-SENS-81	IGNACIO-SAN RAFL 115 kV 2 1	P7-1:A6:14:_Ignacio-San Rafael #1 & Las Gallinas-San Rafael #3 115kV Lines &	P7	N-2 (DCTL)	<100	<100	95.12	<100	<100	<100	<100	108.92	95.07		Monitor. Upgrade Ignacio-Alto Voltage Conversion project to also address sensitivity scenario overloads

Study Area: **PG&E North Coast & North Bay**

Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
NCNB-VD-SENS-01	LOWR LKE 60 kV	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P1-2	T-line	15.609	13.956	<5.0	10.326	5.947	16.398	15.218	<5.0	<5.0		Under review
NCNB-VD-SENS-02	EGLE RCK 60 kV	P1-3:A2:29:_EGLE RCK 115/60kV TB 1	P1-3	Transformer	18.196	16.456	5.68	12.34	6.813	19.074	17.871	5.643	5.522		Under review
NCNB-VD-SENS-03	BIG RIVR 60 kV	P1-4:A2:1:_BIG RIVR SVD=v	P1-4	Shunt device	<5.0	-5.359	-5.051	-6.604	<5.0	<5.0	-5.037	<5.0	<5.0		Action Plan/ Radialize
NCNB-VD-SENS-04	LOWR LKE 60 kV	P2-1:A2:55:_KONOCTI-EAGLE ROCK 60kV [6861] (KONOCTI6-EGLE RCK)	P2-1	Open-ended line	15.609	13.956	<5.0	10.326	5.947	16.398	15.218	<5.0	<5.0		Under review
NCNB-VD-SENS-05	NOVATO 60 kV	P2-1:A6:20:_IGNACIO-ALTO 60kV [7150] (IGNACO A-IG JCT)	P2-1	Open-ended line	14.104	13.151	N/A	8.065	<5.0	15.238	14.08	N/A	N/A		Under review
NCNB-VD-SENS-06	STAFFORD 60 kV	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT)	P2-1	Open-ended line	NonConv	NonConv	NonConv	15.843	8.131	NonConv	NonConv	NonConv	NonConv		Under review
NCNB-VD-SENS-07	WOODACRE 60 kV	P2-1:A6:24:_IGNACIO-BOLINAS #1 60kV [7140] (IGNACO B-WOODACRE)	P2-1	Open-ended line	12.269	11.202	12.117	7.391	<5.0	13.603	11.521	13.957	12.106		Under review
NCNB-VD-SENS-08	EGLE RCK 60 kV	P2-2:A2:24:_EGLE RCK 115kV Section MA	P2-2	Bus	<10.0	<10.0	<10.0	<10.0	<10.0	NonConv	NonConv	<10.0	<10.0		Under review
NCNB-VD-SENS-09	LOWR LKE 60 kV	P2-2:A2:58:_EGLE RCK 60kV Section 1D	P2-2	Bus	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0		Under review
NCNB-VD-SENS-10	EGLE RCK 60 kV	P2-3:A2:29:_EGLE RCK - MA 115kV & EGGLE RCK-FULTON-SILVERDO line	P2-3	Circuit breaker	NonConv	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0		Under review
NCNB-VD-SENS-11	WILLITS 60 kV	P2-3:A2:39:_MENDOCNO - MA 60kV & MENDOCINO-PHILO JCT-HOPLAND line	P2-3	Circuit breaker	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	NonConv	10.836		Open Gerbreville-Laytonville line at Willits or Bridgeville depending on whether Humboldt or Geysers feeds load.
NCNB-VD-SENS-12	LOWR LKE 60 kV	P2-3:A2:27:_EGLE RCK - MA 115kV & EAGLE ROCK-CORTINA line	P2-3	Circuit breaker	<10.0	14.269	16.912	11.321	6.025	<10.0	<10.0	20.412	17.315		Under review
NCNB-VD-SENS-13	SNTA RSA 115 kV	P2-4:A2:7:_FULTON 115kV - Section 2D & 1D	P2-4	Bus-tie	10.981	9.453	10.576	7.851	<10.0	11.134	9.937	11.274	11.388		Under review
NCNB-VD-SENS-14	SONOMA 115 kV	P2-4:A2:10:_LAKEVILLE 115kV - Section 1D & 2D	P2-4	Bus-tie	11.553	10.194	11.361	<10.0	<10.0	13.356	11.016	14.609	11.305		Under review
NCNB-VD-SENS-15	CALISTGA 60 kV	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Relay failure	12.158	10.585	<10.0	6.231	<10.0	13.499	11.166	<10.0	<10.0		Under review
NCNB-VD-SENS-16	FULTON 115 kV	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Relay failure	12.899	10.696	<10.0	9.276	6.429	13.364	11.104	<10.0	<10.0		Under review

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
NCNB-V-SENS-01	CALPELLA 115 kV	Base Case	P0	Normal	1.0556	<1.05	<1.05	1.051	<1.05	1.0511	1.0537	<1.05	1.0573		Under review
NCNB-V-SENS-02	INDIN VL 115 kV	Base Case	P0	Normal	1.0577	1.054	<1.05	1.0633	1.0503	1.0512	1.0529	<1.05	1.0613		Under review
NCNB-V-SENS-03	LUCERNE 115 kV	Base Case	P0	Normal	1.0559	<1.05	<1.05	1.0585	<1.05	<1.05	1.0521	<1.05	1.0585		Under review
NCNB-V-SENS-04	MENDOCNO 115 kV	Base Case	P0	Normal	1.0622	<1.05	<1.05	1.0562	<1.05	1.0577	1.0604	1.053	1.0638		Under review
NCNB-V-SENS-05	SKAGGS 115 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	1.0502	<1.05	<1.05	<1.05	<1.05		Under review
NCNB-V-SENS-06	EGLERCK 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	1.0515	<1.05	<1.05	<1.05	<1.05	1.0528		Under review
NCNB-V-SENS-07	FTCHMTNP 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	1.0501	<1.05	<1.05	<1.05	<1.05	<1.05		Under review
NCNB-V-SENS-08	FULTON 60 kV	Base Case	P0	Normal	1.0509	1.0527	1.0532	1.0562	1.0531	1.0507	1.0507	1.0524	1.0541		Under review
NCNB-V-SENS-09	IGNACO B 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	1.0512	<1.05	<1.05	<1.05	<1.05		Under review

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
NCNB-V-SENS-10	MIRABEL 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	1.0525	<1.05	<1.05	<1.05	<1.05		Under review
NCNB-V-SENS-11	NOVATO 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	1.051	<1.05	<1.05	<1.05	<1.05		Under review
NCNB-V-SENS-12	SAUSALTO 60 kV	Base Case	P0	Normal	>0.95	>0.95	>0.95	>0.95	>0.95	>0.95	0.946	>0.95	>0.95		Under review
NCNB-V-SENS-13	WOHLER 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	1.0516	<1.05	<1.05	<1.05	<1.05		Under review
NCNB-V-SENS-14	WOODACRE 60 kV	Base Case	P0	Normal	<1.05	<1.05	<1.05	<1.05	1.0502	<1.05	<1.05	<1.05	<1.05		Under review
NCNB-V-SENS-15	LOWR LKE 60 kV	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861] &	P1-2	T-line	0.8468	0.8626	>0.90	0.9147	0.9632	0.8331	0.8483	>0.90	>0.90		Clearlake Reinforcement Project
NCNB-V-SENS-16	EGLE RCK 60 kV	P1-3:A2:29:_EGLE RCK 115/60kV TB 1 &	P1-3	Transformer	0.8677	0.8813	0.9914	0.9281	0.9704	0.8557	0.8683	0.9929	0.9976		Clearlake Reinforcement Project
NCNB-V-SENS-17	BIG RIVR 60 kV	P1-4:A2:1:_BIG RIVR SVD=v &	P1-4	Shunt device	>0.90	1.0886	1.0854	1.1009	<1.10	<1.10	1.0854	<1.10	<1.10		Action Plan
NCNB-V-SENS-18	LOWR LKE 60 kV	P2-1:A2:55:_KONOCTI-EAGLE ROCK 60kV [6861] (KONOCTI6-EGLE RCK) &	P2-1	Open-ended line	0.8468	0.8626	>0.90	0.9147	0.9632	0.8331	0.8483	>0.90	>0.90		Clearlake Reinforcement Project

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
NCNB-V-SENS-19	NOVATO 60 kV	P2-1:A6:20:_IGNACIO-ALTO 60kV [7150] (IGNACO A-IG JCT) &	P2-1	Open-ended line	0.8762	0.8641	Cont not found	0.9572		0.8591	0.8519	Cont not found	Cont not found		Ignacio - Alto Voltage Conversion
NCNB-V-SENS-20	TOCALOMA 60 kV	P2-1:A6:23:_IGNACIO-BOLINAS #2 60kV [7180] (IGNACO B-STAF_JCT) &	P2-1	Open-ended line	0.7021	0.7205	0.6847	0.8836	0.9722	0.5291	0.7044	0.3078	0.686		Under review
NCNB-V-SENS-21	WOODACRE 60 kV	P2-1:A6:24:_IGNACIO-BOLINAS #1 60kV [7140] (IGNACO B-WOODACRE) &	P2-1	Open-ended line	0.8861	0.8756	0.8832	0.9586		0.8663	0.8694	0.8568	0.8838		Under review
NCNB-V-SENS-22	EGLERCK 60 kV	P2-2:A2:24:_EGLE RCK 115kV Section MA &	P2-2	Bus fault	>0.90	>0.90	>0.90	>0.90	>0.90	0.8457	0.8592	>0.90	>0.90		Clearlake Reinforcement Project
NCNB-V-SENS-23	LOWR LKE 60 kV	P2-2:A2:58:_EGLE RCK 60kV Section 1D &	P2-2	Bus fault	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90		Under review
NCNB-V-SENS-24	COVELO6 60 kV	P2-3:A2:39:_MENDOCNO - MA 60kV & MENDOCINO-PHILO JCT-HOPLAND line &	P2-3	Circuit breaker	-2.807	-2.7898	0.8768	-1.8993	0.877	-2.9843	-2.7969	-1.8565	0.8767		Under review
NCNB-V-SENS-25	LOWR LKE 60 kV	P2-3:A2:27:_EGLE RCK - MA 115kV & EAGLE ROCK-CORTINA line &	P2-3	Circuit breaker	>0.90	0.8595	0.8635	0.9047	0.9624	>0.90	>0.90	0.8284	0.8616		Under review
NCNB-V-SENS-26	MONROE2 115 kV	P2-4:A2:7:_FULTON 115kV - Section 2D & 1D &	P2-4	Bus-tie	0.891	0.8979	0.8916	0.94	0.9907	0.8838	0.8899	0.8775	0.8842		Add VAR support
NCNB-V-SENS-27	SONOMA 115 kV	P2-4:A2:10:_LAKEVILLE 115kV - Section 1D & 2D &	P2-4	Bus-tie	0.9054	0.9113	0.9044	<1.10	>0.90	0.8819	0.9007	0.8654	0.9055		Under review

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
NCNB-V-SENS-28	KONOCTI6 60 kV	P1-1:A2:9:_GEYSER11 14kV Gen Unit 1 & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P3	L-1/G-1	0.8629	0.8767	>0.90	0.9246	>0.90	0.8497	0.8633	>0.90	>0.90		Clearlake Reinforcement Project
NCNB-V-SENS-29	LOWR LKE 60 kV	P1-1:A2:9:_GEYSER11 14kV Gen Unit 1 & P1-3:A2:29:_EGLE RCK 115/60kV TB 1	P3	L-1/G-1	0.8444	0.8603	>0.90	0.9127	>0.90	0.8282	0.8455	>0.90	>0.90		Clearlake Reinforcement Project
NCNB-V-SENS-30	CALISTGA 60 kV	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P6	N-1-1	0.8577	0.882	>0.90	0.9478	>0.90	0.838	0.8695	>0.90	>0.90		Under review
NCNB-V-SENS-31	FULTON 115 kV	P5-5:A2:1:_Fulton 230 kV BAAH Bus #1 (failure of non-redundent relay) &	P6	N-1-1	0.8885	0.9016	>0.90	0.9388	0.9835	0.8789	0.8957	>0.90	>0.90		Under review
NCNB-V-SENS-32	ALTO 60 kV	P1-2:A6:23:_IGNACIO-ALTO-SAUSALITO #2 60kV [7170] & P1-2:A6:24:_IGNACIO-ALTO-SAUSALITO #1 60kV [7160]	P6	N-1-1	0.8689	0.857	>0.90	>0.90	>0.90	0.845	0.8448	>0.90	>0.90		Under review
NCNB-V-SENS-33	ANNAPOLS 60 kV	P1-3:A2:33:_FULTON 115/60kV TB 2 & P1-3:A2:32:_FULTON 115/60kV TB 1	P6	N-1-1	NonConv	NonConv	NonConv	NonConv	0.6302	NonConv	NonConv	NonConv	NonConv		Corrective Action Plan/Under review
NCNB-V-SENS-34	BELLVUE 115 kV	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630]	P6	N-1-1	0.9151	0.9206	0.9085	0.9554	>0.90	0.9085	0.9143	0.8969	0.9093		Monitor
NCNB-V-SENS-35	BIG RIVR 60 kV	P1-2:A2:49:_FORT BRAGG-ELK 60kV [2060] MOAS OPENED on FRT BRGG_BIG RIVR & P1-4:A2:1:_BIG RIVR SVD=v	P6	N-1-1	1.2669	1.2812	1.2809	1.2867	<1.10	1.2618	1.2667	1.2769	1.2743		Under review
NCNB-V-SENS-36	BOLINAS 60 kV	P1-3:A6:8:_IGNACIO 115/60kV TB 3 & P1-3:A6:9:_IGNACIO 115/60kV TB 1	P6	N-1-1	>0.90	>0.90	0.8924	>0.90	>0.90	>0.90	>0.90	0.8443	0.8931		Monitor

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
NCNB-V-SENS-37	CALPELLA 115 kV	P1-2:A2:18:_CLOVRDLE-MPE TAP-GEYERS56 115kV [1650] MOAS OPENED on MPE TAP_MPE & P1-2:A2:14:_MENDOCINO-UKIAH 115kV [2420] MOAS OPENED on MENDOCNO_CALPELLA	P6	N-1-1	0.7756	0.818	0.8079	0.8574	0.9207	0.7633	0.7861	0.7764	0.8071		Under review
NCNB-V-SENS-38	CLER LKE 60 kV	P1-2:A2:54:_CLEAR LAKE-HOPLAND 60kV [6390] & P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861]	P6	N-1-1	0.2779	0.3203	>0.90	0.7291	0.8872	0.2688	0.2832	>0.90	>0.90		Clearlake Reinforcement Project
NCNB-V-SENS-39	DUNBAR 60 kV	P1-3:A2:21:_LAKEVILLE 230/60kV TB 3 & P1-3:A2:22:_LAKEVILLE 230/60kV TB 5	P6	N-1-1	0.1966	>0.90	0.1926	0.8284	>0.90	0.1803	0.2048	0.1633	0.1901		Under review
NCNB-V-SENS-40	EGLE RCK 60 kV	P1-2:A2:54:_CLEAR LAKE-HOPLAND 60kV [6390] & P1-3:A2:29:_EGLE RCK 115/60kV TB 1	P6	N-1-1	NonConv	NonConv	0.965	0.6864	0.8706	NonConv	NonConv	0.9619	0.9651		Clearlake Reinforcement Project
NCNB-V-SENS-41	FRT BRGG 60 kV	P1-2:A2:50:_FORT BRAGG-ELK 60kV [2060] MOAS OPENED on BIG RIVR_ELK & P1-4:A2:1:_BIG RIVR SVD=v	P6	N-1-1	1.1224	1.1359	1.1296	1.1475	<1.10	1.1177	1.1256	1.117	1.1229		Under review
NCNB-V-SENS-42	GARCIA 60 kV	P1-2:A2:43:_MENDOCINO-PHILO JCT-HOPLAND 60kV [7520] & P1-4:A2:1:_BIG RIVR SVD=v	P6	N-1-1	1.1164	1.139	1.131	1.1738	<1.10	1.1071	1.1224	1.1107	1.1296		Under review
NCNB-V-SENS-43	GRANITE 60 kV	P1-2:A2:44:_MENDOCINO-HARTLEY 60kV [7510] & P1-3:A2:29:_EGLE RCK 115/60kV TB 1	P6	N-1-1	0.8657	0.8849	>0.90	0.9444	>0.90	0.842	0.8683	>0.90	>0.90		Clearlake Reinforcement Project/Under review
NCNB-V-SENS-44	HOMEPROC 115 kV	P1-2:A2:12:_EAGLE ROCK-CORTINA 115kV [1470] & P1-2:A2:23:_EAGLE ROCK-CORTINA 115kV [1470] (2)	P6	N-1-1	>0.90	>0.90	0.8908	>0.90	>0.90	>0.90	>0.90	0.8842	0.8968		Monitor

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
NCNB-V-SENS-45	IGNACO A 60 kV	P1-3:A6:9:_IGNACIO 115/60kV TB 1 & P1-3:A6:8:_IGNACIO 115/60kV TB 3	P6	N-1-1	>0.90	>0.90	0.909	>0.90	>0.90	>0.90	>0.90	>0.90	0.8638	0.9097	Monitor
NCNB-V-SENS-46	LOWR LKE 60 kV	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861] & P1-3:A2:26:_HPLND JT 115/60kV TB 2	P6	N-1-1	0.7913	0.8244	>0.90	0.8795	>0.90	0.7745	0.7965	>0.90	>0.90	Clearlake Reinforcement Project	
NCNB-V-SENS-47	LOWR LKE 60 kV	P1-2:A2:58:_KONOCTI-EAGLE ROCK 60kV [6861] & P1-3:A2:46:_MIDDLTWN 115/60kV TB 1	P6	N-1-1	>0.90	>0.90	0.8601	>0.90	>0.90	>0.90	>0.90	0.8425	0.8684	Monitor	
NCNB-V-SENS-48	MCDWLLSW 60 kV	P1-3:A2:22:_LAKEVILE 230/60kV TB 5 & P1-3:A2:21:_LAKEVILE 230/60kV TB 3	P6	N-1-1	NonConv	NonConv	NonConv	0.8364	>0.90	NonConv	NonConv	NonConv	NonConv	Under review	
NCNB-V-SENS-49	MONTCLLO 115 kV	P1-3:A2:17:_FULTON 230/115kV TB 4 & P1-3:A2:18:_FULTON 230/115kV TB 9	P6	N-1-1	0.9026	0.9168	>0.90	0.9552	>0.90	0.8911	0.9072	>0.90	>0.90	Under review	
NCNB-V-SENS-50	PNT ARNA 60 kV	P1-4:A2:1:_BIG RIVR SVD=v & P1-2:A2:49:_FORT BRAGG-ELK 60kV [2060] MOAS OPENED on FRT BRGG_BIG RIVR	P6	N-1-1	1.1951	1.2038	1.2042	1.2142	<1.10	1.1884	1.1937	1.2032	1.2025	Under review	
NCNB-V-SENS-51	SILVERDO 115 kV	P1-3:A2:18:_FULTON 230/115kV TB 9 & P1-3:A2:17:_FULTON 230/115kV TB 4	P6	N-1-1	0.9002	0.9149	>0.90	0.9528	>0.90	0.8893	0.9053	>0.90	>0.90	Under review	
NCNB-V-SENS-52	SNTA RSA 115 kV	P1-2:A2:27:_FULTON-SANTA ROSA #1 115kV [1620] & P1-2:A2:28:_FULTON-SANTA ROSA #2 115kV [1630]	P6	N-1-1	0.895	0.9016	0.8881	0.9422	>0.90	0.8876	0.8939	0.8743	0.8889	Add VAR support	
NCNB-V-SENS-53	SONOMA 115 kV	P1-2:A2:35:_LAKEVILLE-SONOMA #1 115kV [2063] & P1-2:A2:36:_LAKEVILLE-SONOMA #2 115kV [2070]	P6	N-1-1	0.9169	0.9218	0.9136	>0.90	>0.90	0.8945	0.912	0.8774	0.9147	Action Plan/ Radialize	

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2026 SP No BTM-PV	2026 Retirement of QF Generations	N/A	
NCNB-V-SENS-54	ALTO 60 kV	P7-1:A6:6:_IGNACIO-ALTO-SAUSALITO #2 & IGNACIO-ALTO-SAUSALITO #1 Lines &	P7	N-2 (DCTL)	0.8687	0.857	>0.90	0.9565	>0.90	0.8453	0.8448	>0.90	>0.90		Ignacio - Alto Voltage Conversion
NCNB-V-SENS-55	MONROE2 115 kV	P7-1:A2:14:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 Lines &	P7	N-2 (DCTL)	0.8921	0.8983	0.8845	0.94	0.9906	0.885	0.8903	0.8784	0.8853		Add VAR support
NCNB-V-SENS-56	SAUSALTO 60 kV	P7-1:A6:2:_LAKEVILLE-IGNACIO #1 & IGNACIO-SOBRANTE Lines &	P7	N-2 (DCTL)	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.8947	0.9656			Monitor
NCNB-V-SENS-57	SONOMA 115 kV	P7-1:A2:15:_LAKEVILLE-SONOMA #1 & LAKEVILLE-SONOMA #2 Lines &	P7	N-2 (DCTL)	0.9169	0.9218	0.9136	>0.90	>0.90	0.8952	0.912	0.8773	0.9147		Action Plan/ Radialize



ID	Contingency	Category	Category Description	Transient Stability Performance										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-TS-1														
X-TS-2														
X-TS-3														
X-TS-4														
X-TS-5														
X-TS-6														
X-TS-7														
X-TS-8														
X-TS-9														
X-TS-10														
X-TS-11														
X-TS-12														
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X-TS-24														
X-TS-25														
X-TS-26														
X-TS-27														
X-TS-28														
X-TS-29														
X-TS-30														
X-TS-31														

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1														

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1												

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations	
1	31722 GLENN 60.0 31733 CAPYSWCH 60.0 3	Normal	P0	Normal	110	111	118	<100	<100	116	113	111	124	117	Short Term: Limit Load at Anita Substation, Long Term: Anita Substation Project
2	31733 CAPYSWCH 60.0 31731 CAPAYJCT 60.0 3	Normal	P0	Normal	110	111	118	<100	<100	116	113	111	124	117	Load Cap at Anita Substation; Transfer load to near by distribution substation
3	31735 CHICO JT 60.0 31738 ANITA 60.0 3	Normal	P0	Normal	119	123	130	<100	<100	124	126	123	136	130	Load Cap at Anita Substation; Transfer load to near by distribution substation
4	31464 COTWDPGE 115 30104 COTWD_E2 230 1	P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P1	Single Contingency	<100	<100	<100	<100	101	<100	<100	<100	<100	<100	Mitigation under review
5	31602 COLEMAN 60.0 31606 CLMN JCT 60.0 1	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P1	Single Contingency	148	154	<100	<100	<100	160	158	154	<100	<100	Short Term: SPS, Long Term: ReconductorProject
6	31604 COTTONWD 60.0 31607 RED B JT 60.0 1	P1-2:A3:72:_COLEMAN-RED BLUFF 60kV [0]	P1	Single Contingency	<100	<100	<100	<100	<100	102	102	<100	<100	<100	Sensitivity under review
7	31606 CLMN JCT 60.0 31608 RED BLFF 60.0 1	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P1	Single Contingency	105	110	<100	<100	<100	113	113	110	<100	<100	Short Term: SPS, Long Term: ReconductorProject
8	31607 RED B JT 60.0 31608 RED BLFF 60.0 1	P1-2:A3:72:_COLEMAN-RED BLUFF 60kV [0]	P1	Single Contingency	<100	<100	<100	<100	<100	102	102	<100	<100	<100	Sensitivity under review
9	30108 BRNY_FST 230 30185 PIT 1 230 1	P2-4:A3:4:_ROUND MT 230kV - Section 1E & 1D	P2	Single Contingency	<100	<100	<100	101	<100	<100	<100	<100	<100	<100	Generation re-dispatch
10	31459 OREGNTRL 115 31469 SPI_AND 115 1	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency	<100	<100	<100	<100	126	<100	<100	<100	<100	<100	Generation re-dispatch
11	31464 COTWDPGE 115 30104 COTWD_E2 230 1	P2-2:A3:35:_COTWDPGE 115kV Section 2F	P2	Single Contingency	<100	<100	<100	<100	101	<100	<100	<100	<100	<100	Generation re-dispatch
12	31464 COTWDPGE 115 31466 JESSUPJ1 115 1	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency	<100	<100	<100	<100	111	<100	<100	<100	<100	<100	Generation re-dispatch
13	31466 JESSUPJ1 115 31469 SPI_AND 115 1	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency	<100	<100	<100	<100	104	<100	<100	<100	<100	<100	Generation re-dispatch
14	31468 CASCADE 115 31459 OREGNTRL 115 1	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency	<100	<100	<100	<100	121	<100	<100	<100	<100	<100	Generation re-dispatch
15	31480 WYANDTTE 115 31516 WYANDJT2 115 1	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	159	119	160	<100	<100	160	163	160	NConv	NConv	Long Term: Cascade - Benton 60 kV Line Project and New Bridgeville - Gaberville 115 kV Line Project

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations	
16	31497 NDAME J 115 31498 SYCAMORE 115 1	P2-3:A3:50:_ BUTTE - MD 115kV & BUTTE-CHICO B-TBLE MTN line	P2	Single Contingency	112	106	<100	<100	<100	118	111	106	<100	<100	Short Term: SPS, Long Term: ReconnectorProject
17	31500 BUTTE 115 31504 TBLE MTN 115 2	P2-4:A3:26:_ TBLE MTN 115kV - Section 2E & 1E	P2	Single Contingency	<100	<100	<100	<100	<100	<100	<100	<100	107	<100	Sensitivity under review
18	31501 CHICOTP1 115 31504 TBLE MTN 115 1	P2-4:A3:25:_ TBLE MTN 115kV - Section 2E & 2D	P2	Single Contingency	<100	<100	<100	<100	<100	<100	<100	<100	109	<100	Sensitivity under review
19	31556 TRINITY 60.0 31564 FRNCHGLH 60.0 1	P2-4:A3:8:_COTWDPGE 115kV - Section 2D & 1D	P2	Single Contingency	<100	147	133	138	183	<100	148	151	135	136	Short Term: NVLY Action Plan, Long Term: Cascade - Benton 60 kV Line Project
20	31564 FRNCHGLH 60.0 31566 KESWICK 60.0 1	P2-4:A3:8:_COTWDPGE 115kV - Section 2D & 1D	P2	Single Contingency	<100	144	129	137	181	<100	145	148	131	133	Short Term: NVLY Action Plan, Long Term: Cascade - Benton 60 kV Line Project
21	31566 KESWICK 60.0 31582 STLLWATR 60.0 1	P2-4:A3:8:_COTWDPGE 115kV - Section 2D & 1D	P2	Single Contingency	<100	160	143	155	206	<100	160	165	145	147	Short Term: NVLY Action Plan, Long Term: Cascade - Benton 60 kV Line Project
22	31570 BENTON 60.0 31572 GIRVAN 60.0 1	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency	<100	<100	<100	<100	126	<100	<100	<100	<100	<100	Generation re-dispatch
23	31572 GIRVAN 60.0 31574 ANDERSON 60.0 1	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency	<100	<100	<100	<100	125	<100	<100	<100	<100	<100	Generation re-dispatch
24	31574 ANDERSON 60.0 31604 COTTONWD 60.0 1	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency	<100	<100	<100	<100	111	<100	<100	<100	<100	100	Generation re-dispatch
25	31576 WNTU PMS 60.0 31570 BENTON 60.0 1	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency	<100	111	<100	169	257	<100	108	<100	<100	<100	Short Term: SPS, Long Term: ReconnectorProject
26	31576 WNTU PMS 60.0 31578 LOMS JCT 60.0 1	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency	<100	<100	<100	<100	122	<100	<100	<100	<100	<100	Generation re-dispatch
27	31580 CASCADE 60.0 31581 OREGNTRL 60.0 1	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency	<100	<100	<100	232	358	<100	<100	<100	<100	<100	Generation re-dispatch
28	31580 CASCADE 60.0 31582 STLLWATR 60.0 1	P2-4:A3:8:_COTWDPGE 115kV - Section 2D & 1D	P2	Single Contingency	<100	127	112	129	173	<100	127	131	112	115	Short Term: NVLY Action Plan, Long Term: Cascade - Benton 60 kV Line Project
29	31581 OREGNTRL 60.0 31578 LOMS JCT 60.0 1	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency	<100	<100	<100	228	354	<100	<100	<100	<100	<100	Generation re-dispatch

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations	
30	31604 COTTONWD 60.0 31607 RED B JT 60.0 1	P2-2:A3:61:_COLEMAN 60kV Section 1D	P2	Single Contingency	144	150	<100	<100	<100	156	153	150	<100	<100	Short Term: Interim NVLY Area Summer Action Plan, Long Term: Cottonwood - Red Bluff No. 2 60 kV Line Project
31	31607 RED B JT 60.0 31608 RED BLFF 60.0 1	P2-2:A3:61:_COLEMAN 60kV Section 1D	P2	Single Contingency	144	150	<100	<100	<100	156	153	150	<100	<100	Short Term: Interim NVLY Area Summer Action Plan, Long Term: Cottonwood - Red Bluff No. 2 60 kV Line Project
32	31482 PALERMO 115 31516 WYANDJT2 115 2	P2-1:A3:14:_CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2-1	Single Contingency	NConv	NConv	NConv	NConv	143	NConv	NConv	NConv	NConv	NConv	Mitigation under review
33	31486 CARIBOU 115 31488 GRIZ JCT 115 1	P2-1:A3:14:_CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2-1	Single Contingency	NConv	NConv	NConv	NConv	112	NConv	NConv	NConv	NConv	NConv	Mitigation under review
34	31488 GRIZ JCT 115 31512 BIG BEND 115 1	P2-1:A3:14:_CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2-1	Single Contingency	NConv	NConv	NConv	NConv	134	NConv	NConv	NConv	NConv	NConv	Mitigation under review
35	31516 WYANDJT2 115 31512 BIG BEND 115 2	P2-1:A3:14:_CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2-1	Single Contingency	NConv	NConv	NConv	NConv	143	NConv	NConv	NConv	NConv	NConv	Mitigation under review
36	31604 COTTONWD 60.0 31607 RED B JT 60.0 1	P2-1:A3:91:_COLEMAN-RED BLUFF 60kV [6440] (COLEMAN-CLMN JCT)	P2-1	Single Contingency	144	149	<100	<100	<100	155	153	150	<100	<100	Mitigation under review
37	31607 RED B JT 60.0 31608 RED BLFF 60.0 1	P2-1:A3:91:_COLEMAN-RED BLUFF 60kV [6440] (COLEMAN-CLMN JCT)	P2-1	Single Contingency	144	149	<100	<100	<100	155	153	150	<100	<100	Mitigation under review
38	30108 BRNY_FST 230 30185 PIT 1 230 1	P1-1:A3:76:_COLUSGT1 18kV & COLUSGT2 18kV & COLUSST1 18kV Gen Units & P1-2:A3:15:_CARBERRY SW STA-ROUND MTN 230kV [5410]	P3	Multiple Contingency	<100	<100	<100	100	<100	<100	<100	<100	<100	<100	Generation re-dispatch
39	30110 GLENN 230 31722 GLENN 60.0 2	P1-1:A3:56:_BLCKBUTT 9kV Gen Unit 1 & P1-3:A3:81:_GLENN 230/60kV TB 1	P3	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	<100	100	<100	Mitigation under review
40	31464 COTWD PGE 115 30104 COTWD_E2 230 1	P1-1:A3:10:_PIT 4 14kV Gen Unit 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P3	Multiple Contingency	<100	<100	<100	100	<100	<100	<100	<100	<100	<100	Generation re-dispatch
41	31482 PALERMO 115 31516 WYANDJT2 115 2	P1-1:A3:37:_CRBU 1 12kV Gen Unit 1 & P1-3:A3:22:_CARIBOU 230/230kV TB 11	P3	Multiple Contingency	NConv	<100	<100	<100	<100	NConv	<100	NConv	<100	<100	Mitigation under review
42	31482 PALERMO 115 31516 WYANDJT2 115 2	P1-1:A3:39:_CRESTA 12kV Gen Unit 2 & P1-3:A3:22:_CARIBOU 230/230kV TB 11	P3	Multiple Contingency	<100	<100	NConv	<100	<100	<100	<100	<100	NConv	NConv	Mitigation under review
43	31486 CARIBOU 115 31488 GRIZ JCT 115 1	P1-1:A3:39:_CRESTA 12kV Gen Unit 2 & P1-3:A3:22:_CARIBOU 230/230kV TB 11	P3	Multiple Contingency	<100	<100	NConv	<100	<100	<100	<100	<100	<100	NConv	Mitigation under review
44	31488 GRIZ JCT 115 31492 GRIZZLY1 115 1	P1-1:A3:37:_CRBU 1 12kV Gen Unit 1 & P1-3:A3:22:_CARIBOU 230/230kV TB 11	P3	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	NConv	<100	<100	Mitigation under review

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
45	31488 GRIZ JCT 115 31512 BIG BEND 115 1	P1-1:A3:39:_CRESTA 12kV Gen Unit 2 & P1-3:A3:22:_CARIBOU 230/230kV TB 11	P3	Multiple Contingency	<100	<100	NConv	<100	<100	<100	<100	<100	<100	NConv	NConv	Mitigation under review
46	31516 WYANDJT2 115 31512 BIG BEND 115 2	P1-1:A3:37:_CRBU 1 12kV Gen Unit 1 & P1-3:A3:22:_CARIBOU 230/230kV TB 11	P3	Multiple Contingency	NConv	<100	<100	<100	<100	<100	NConv	<100	NConv	<100	<100	Mitigation under review
47	31516 WYANDJT2 115 31512 BIG BEND 115 2	P1-1:A3:39:_CRESTA 12kV Gen Unit 2 & P1-3:A3:22:_CARIBOU 230/230kV TB 11	P3	Multiple Contingency	<100	<100	NConv	<100	<100	<100	<100	<100	<100	NConv	NConv	Mitigation under review
48	31602 COLEMAN 60.0 31606 CLMN JCT 60.0 1	P1-1:A3:1:_SPIAND2 13kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P3	Multiple Contingency	148	154	<100	<100	<100	160	158	154	<100	<100	<100	Mitigation under review
49	31604 COTTONWD 60.0 31607 RED B JT 60.0 1	P1-1:A3:1:_SPIAND2 13kV Gen Unit 1 & P1-2:A3:72:_COLEMAN-RED BLUFF 60kV [0]	P3	Multiple Contingency	<100	<100	<100	<100	<100	102	102	<100	<100	<100	<100	Mitigation under review
50	31606 CLMN JCT 60.0 31608 RED BLFF 60.0 1	P1-1:A3:1:_SPIAND2 13kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P3	Multiple Contingency	105	110	<100	<100	<100	113	113	110	<100	<100	<100	Mitigation under review
51	31607 RED B JT 60.0 31608 RED BLFF 60.0 1	P1-1:A3:1:_SPIAND2 13kV Gen Unit 1 & P1-2:A3:72:_COLEMAN-RED BLUFF 60kV [0]	P3	Multiple Contingency	<100	<100	<100	<100	<100	102	102	<100	<100	<100	<100	Mitigation under review
52	31611 RASN JNT 60.0 31603 CANAL TP 60.0 2	P1-1:A3:76:_COLUSGT1 18kV & COLUSGT2 18kV & COLUSST1 18kV Gen Units & P1-2:A3:100:_COTWD_F-NewBus #1 230kV [0]	P3	Multiple Contingency	<100	<100	101	<100	<100	<100	<100	<100	101	101	<100	Mitigation under review
53	30105 COTWD_E 230 30245 ROUND MT 230 3	P1-2:A3:3:_ROUND MTN-COTTONWOOD #2 230kV [5640] & P1-3:A3:1:_ROUND MT 500/230kV TB 1	P6	Multiple Contingency	100	100	100	100	<100	100	100	100	100	100	<100	Mitigation under review potential SPS
54	30108 BRNY_FST 230 30185 PIT 1 230 1	P1-2:A3:31:_TBL MT E-THERMLTO 230kV [0] & P1-2:A3:15:_CARBERRY SW STA-ROUND MTN 230kV [5410]	P6	Multiple Contingency	<100	<100	<100	100	<100	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
55	30108 BRNY_FST 230 30185 PIT 1 230 1	P1-2:A3:62:_COTTONWOOD-BENTON #1 60kV [6640] & P1-2:A3:15:_CARBERRY SW STA-ROUND MTN 230kV [5410]	P6	Multiple Contingency	<100	<100	<100	<100	100	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
57	30110 GLENN 230 31722 GLENN 60.0 2	P1-4:A3:1:_CORNING SVD=v & P1-3:A3:81:_GLENN 230/60kV TB 1	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	<100	Mitigation under review potential SPS
58	30300 TBL MT D 230 30325 PALERMO 230 1	P1-2:A3:29:_TBL MT D-TBL MT E 230kV [0] & P1-2:A3:28:_TABLE MTN-RIO OSO 230kV [5700]	P6	Multiple Contingency	<100	<100	104	105	111	<100	<100	<100	<100	<100	104	Mitigation under review potential SPS

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
59	30300 TBL MT D 230 30330 RIO OSO 230 1	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-2:A3:22:_CARIBOU-TABLE MTN 230kV [4440]	P6	Multiple Contingency	NConv	<100	<100	<100	<100	<100	NConv	<100	<100	<100	<100	Mitigation under review potential SPS
60	30303 TBL MT E 230 38621 HYATT2 230 2	P1-2:A3:22:_CARIBOU-TABLE MTN 230kV [4440] & P1-3:A3:22:_CARIBOU 230/230kV TB 11	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	<100	NConv	<100	<100	Sensitivity under review
61	30303 TBL MT E 230 38621 HYATT2 230 2	P1-2:A3:79:_PEACHTON-PEASE 60kV [0] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	NConv	<100	<100	<100	<100	Sensitivity under review
62	31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0 1	P1-2:A3:35:_HUMBOLDT-TRINITY 115kV [1820] & P1-2:A3:36:_WILDWOOD-COTWDPGE #1 115kV [1110]	P6	Multiple Contingency	<100	101	<100	102	<100	<100	101	102	<100	<100	<100	Mitigation under review potential SPS
63	31459 OREGNTRL 115 31469 SPI_AND 115 1	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency	<100	<100	<100	<100	127	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
64	31459 OREGNTRL 115 31469 SPI_AND 115 1	P1-3:A3:5:_COTWD_E 230/60kV TB 3 & P1-3:A3:4:_COTWD_E2 230/60kV TB 2	P6	Multiple Contingency	120	107	<100	<100	<100	<100	<100	116	108	<100	<100	Mitigation under review potential SPS
65	31464 COTWDPGE 115 30104 COTWD_E2 230 1	P1-2:A3:66:_MTN GATE JCT-CASCADE 60kV [7640] & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency	<100	<100	<100	100	105	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
66	31464 COTWDPGE 115 31466 JESSUPJ1 115 1	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency	<100	<100	<100	<100	112	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
67	31464 COTWDPGE 115 31466 JESSUPJ1 115 1	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	114	<100	<100	<100	<100	<100	<100	108	<100	<100	<100	Mitigation under review potential SPS
68	31466 JESSUPJ1 115 31469 SPI_AND 115 1	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency	<100	<100	<100	<100	105	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
69	31468 CASCADE 115 31459 OREGNTRL 115 1	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency	<100	<100	<100	<100	122	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
70	31468 CASCADE 115 31459 OREGNTRL 115 1	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	108	<100	<100	<100	<100	<100	<100	103	<100	<100	<100	Mitigation under review potential SPS
71	31482 PALERMO 115 31506 HONC JT1 115 1	P1-2:A3:29:_TBL MT D-TBL MT E 230kV [0] & P1-2:A3:28:_TABLE MTN-RIO OSO 230kV [5700]	P6	Multiple Contingency	<100	<100	<100	106	<100	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
72	31482 PALERMO 115 31516 WYANDJT2 115 2	P1-2:A3:22:_CARIBOU-TABLE MTN 230kV [4440] & P1-2:A3:54:_PALERMO-WYANDOTTE 115kV [4315]	P6	Multiple Contingency	125	<100	129	<100	<100	130	<100	<100	139	129	129	Mitigation under review potential SPS

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
73	31486 CARIBOU 115 31488 GRIZJCT 115 1	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:37:_CRBU 1 12kV Gen Unit 1	P6	Multiple Contingency	NConv	<100	NConv	<100	<100	<100	NConv	<100	<100	NConv	NConv	Mitigation under review potential SPS
74	31488 GRIZJCT 115 31512 BIG BEND 115 1	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:37:_CRBU 1 12kV Gen Unit 1	P6	Multiple Contingency	NConv	<100	NConv	<100	<100	<100	NConv	<100	NConv	NConv	NConv	Mitigation under review potential SPS
75	31500 BUTTE 115 31504 TBLE MTN 115 2	P1-2:A3:49:_SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115kV [4314] & P1-2:A3:51:_BUTTE-CHICO B-TBLE MTN 115kV [3910]	P6	Multiple Contingency	125	119	<100	<100	<100	132	125	119	<100	<100		Mitigation under review potential SPS
76	31501 CHICOTP1 115 31504 TBLE MTN 115 1	P1-2:A3:49:_SYCAMORE CREEK-NOTRE DAME-TABLE MTN 115kV [4314] & P1-2:A3:52:_TABLE MTN-BUTTE #2 115kV [3920]	P6	Multiple Contingency	126	121	<100	<100	<100	132	125	121	<100	<100		Mitigation under review potential SPS
77	31516 WYANDJT2 115 31512 BIG BEND 115 2	P1-1:A3:37:_CRBU 1 12kV Gen Unit 1 & P1-3:A3:22:_CARIBOU 230/230kV TB 11	P6	Multiple Contingency	NConv	<100	<100	<100	<100	NConv	<100	NConv	<100	<100		Mitigation under review potential SPS
78	31516 WYANDJT2 115 31512 BIG BEND 115 2	P1-1:A3:39:_CRESTA 12kV Gen Unit 2 & P1-3:A3:22:_CARIBOU 230/230kV TB 11	P6	Multiple Contingency	100	100	NConv	100	97	100	100	100	NConv	NConv		Mitigation under review potential SPS
79	31553 BIG BAR 60.0 31093 HYPOMJT 60.0 1	P1-2:A3:35:_HUMBOLDT-TRINITY 115kV [1820] & P1-2:A3:36:_WILDWOOD-COTWDPGE #1 115kV [1110]	P6	Multiple Contingency	<100	101	<100	101	<100	<100	101	102	<100	<100		Mitigation under review potential SPS
80	31555 TAP 65 60.0 31553 BIG BAR 60.0 1	P1-2:A3:35:_HUMBOLDT-TRINITY 115kV [1820] & P1-2:A3:36:_WILDWOOD-COTWDPGE #1 115kV [1110]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	100	<100	<100		Sensitivity under review
81	31556 TRINITY 60.0 31564 FRNCHGLH 60.0 1	P1-2:A3:37:_TRINITY-COTTONWOOD 115kV [4040] & P1-2:A3:36:_WILDWOOD-COTWDPGE #1 115kV [1110]	P6	Multiple Contingency	<100	<100	<100	<100	191	<100	<100	<100	<100	<100		Mitigation under review potential SPS
82	31556 TRINITY 60.0 31564 FRNCHGLH 60.0 1	P1-2:A3:39:_CASCADE-COTTONWOOD 115kV [1240] & P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310]	P6	Multiple Contingency	<100	<100	<100	<100	<100	100	104	<100	<100	<100		Mitigation under review potential SPS
83	31564 FRNCHGLH 60.0 31566 KESWICK 60.0 1	P1-2:A3:37:_TRINITY-COTTONWOOD 115kV [4040] & P1-2:A3:36:_WILDWOOD-COTWDPGE #1 115kV [1110]	P6	Multiple Contingency	<100	<100	<100	<100	189	<100	<100	<100	<100	<100		Mitigation under review potential SPS

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
84	31564 FRNCHGLH 60.0 31566 KESWICK 60.0 1	P1-2:A3:39:_CASCADE-COTTONWOOD 115kV [1240] & P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	100	<100	<100	<100	Mitigation under review potential SPS
85	31564 FRNCHGLH 60.0 31566 KESWICK 60.0 1	P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310] & P1-3:A3:41:_CASCADE 115/60kV TB 1	P6	Multiple Contingency	107	<100	<100	<100	<100	<100	119	<100	<100	<100	<100	Mitigation under review potential SPS
86	31566 KESWICK 60.0 31582 STILLWATR 60.0 1	P1-2:A3:37:_TRINITY-COTTONWOOD 115kV [4040] & P1-2:A3:36:_WILDWOOD-COTWDPGE #1 115kV [1110]	P6	Multiple Contingency	<100	100	101	101	216	<100	100	101	101	101	101	Mitigation under review potential SPS
87	31566 KESWICK 60.0 31582 STILLWATR 60.0 1	P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310] & P1-3:A3:41:_CASCADE 115/60kV TB 1	P6	Multiple Contingency	111	<100	<100	<100	<100	<100	123	<100	<100	<100	<100	Mitigation under review potential SPS
88	31570 BENTON 60.0 31572 GIRVAN 60.0 1	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency	<100	<100	<100	<100	127	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
89	31570 BENTON 60.0 31572 GIRVAN 60.0 1	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	106	<100	<100	<100	<100	<100	NConv	100	<100	<100	<100	Mitigation under review potential SPS
90	31572 GIRVAN 60.0 31574 ANDERSON 60.0 1	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency	<100	<100	<100	<100	127	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
91	31572 GIRVAN 60.0 31574 ANDERSON 60.0 1	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	NConv	<100	<100	<100	<100	Mitigation under review potential SPS
92	31574 ANDERSON 60.0 31604 COTTONWD 60.0 1	P1-2:A3:39:_CASCADE-COTTONWOOD 115kV [1240] & P1-2:A3:63:_COTTONWOOD-BENTON #2 60kV [6650]	P6	Multiple Contingency	118	101	<100	<100	<100	127	105	101	100	<100	<100	Mitigation under review potential SPS
93	31574 ANDERSON 60.0 31604 COTTONWD 60.0 1	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency	<100	<100	<100	<100	112	<100	<100	<100	<100	<100	101	Mitigation under review potential SPS
94	31576 WNTU PMS 60.0 31570 BENTON 60.0 1	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency	<100	112	<100	171	260	<100	109	<100	<100	<100	<100	Mitigation under review potential SPS
95	31576 WNTU PMS 60.0 31570 BENTON 60.0 1	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	178	155	<100	<100	<100	<100	NConv	169	156	<100	<100	Mitigation under review potential SPS
96	31578 LOMS JCT 60.0 31592 DESCHUTS 60.0 1	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	<100	NConv	<100	<100	<100	<100	<100	NConv	NConv	<100	<100	Mitigation under review potential SPS

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
97	31578 LOMS JCT 60.0 31592 DESCHUTS 60.0 1	P1-2:A3:79:_PEACHTON-PEASE 60kV [0] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	NConv	<100	<100	<100	<100	Mitigation under review potential SPS
98	31580 CASCADE 60.0 31581 OREGNTRL 60.0 1	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency	<100	173	<100	235	361	<100	169	122	<100	<100	<100	Mitigation under review potential SPS
99	31581 OREGNTRL 60.0 31578 LOMS JCT 60.0 1	P1-2:A3:79:_PEACHTON-PEASE 60kV [0] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	NConv	<100	<100	<100	<100	Mitigation under review potential SPS
100	31581 OREGNTRL 60.0 31578 LOMS JCT 60.0 1	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency	<100	167	<100	231	357	<100	163	125	<100	<100	<100	Mitigation under review potential SPS
101	31583 Q720TP 60.0 31596 SOUTH 60.0 1	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	<100	NConv	<100	<100	<100	<100	NConv	NConv	<100	<100	<100	Mitigation under review potential SPS
102	31583 Q720TP 60.0 31596 SOUTH 60.0 1	P1-2:A3:79:_PEACHTON-PEASE 60kV [0] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	NConv	<100	<100	<100	<100	Mitigation under review potential SPS
103	31592 DESCHUTS 60.0 31594 VOLTA 60.0 1	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	<100	NConv	<100	<100	<100	<100	NConv	NConv	<100	<100	<100	Mitigation under review potential SPS
104	31592 DESCHUTS 60.0 31594 VOLTA 60.0 1	P1-2:A3:79:_PEACHTON-PEASE 60kV [0] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	NConv	<100	<100	<100	<100	Mitigation under review potential SPS
105	31594 VOLTA 60.0 31583 Q720TP 60.0 1	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	<100	NConv	<100	<100	<100	<100	NConv	NConv	<100	<100	<100	Mitigation under review potential SPS
106	31594 VOLTA 60.0 31583 Q720TP 60.0 1	P1-2:A3:79:_PEACHTON-PEASE 60kV [0] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	NConv	<100	<100	<100	<100	Mitigation under review potential SPS
107	31596 SOUTH 60.0 31600 INSKIP 60.0 1	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	<100	NConv	<100	<100	<100	<100	NConv	NConv	<100	<100	<100	Mitigation under review potential SPS
108	31596 SOUTH 60.0 31600 INSKIP 60.0 1	P1-2:A3:77:_PIT #1-HAT CREEK #2-BURNEY 60kV [0] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	NConv	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
109	31600 INSKIP 60.0 31602 COLEMAN 60.0 1	P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0] & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P6	Multiple Contingency	<100	NConv	<100	<100	<100	<100	<100	NConv	NConv	<100	<100	Mitigation under review potential SPS
110	31600 INSKIP 60.0 31602 COLEMAN 60.0 1	P1-2:A3:77:_PIT #1-HAT CREEK #2-BURNEY 60kV [0] & P1-2:A3:71:_COTTONWD-COLEMAN 60kV [0]	P6	Multiple Contingency	NConv	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
111	31602 COLEMAN 60.0 31606 CLMN JCT 60.0 1	P1-1:A3:1:_SPIAND2 13kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P6	Multiple Contingency	148	154	<100	<100	<100	160	158	154	<100	<100	Mitigation under review potential SPS	
112	31604 COTTONWD 60.0 31607 RED B JT 60.0 1	P1-1:A3:1:_SPIAND2 13kV Gen Unit 1 & P1-2:A3:72:_COLEMAN-RED BLUFF 60kV [0]	P6	Multiple Contingency	96	99	<100	<100	<100	102	102	99	<100	<100	Mitigation under review potential SPS	
113	31606 CLMN JCT 60.0 31608 RED BLFF 60.0 1	P1-1:A3:1:_SPIAND2 13kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P6	Multiple Contingency	105	110	<100	<100	<100	113	113	110	<100	<100	Mitigation under review potential SPS	
114	31607 RED B JT 60.0 31608 RED BLFF 60.0 1	P1-1:A3:1:_SPIAND2 13kV Gen Unit 1 & P1-2:A3:72:_COLEMAN-RED BLUFF 60kV [0]	P6	Multiple Contingency	96	99	<100	<100	<100	102	102	99	<100	<100	Mitigation under review potential SPS	
115	31611 RASN JNT 60.0 31603 CANAL TP 60.0 2	P1-1:A3:76:_COLUSGT1 18kV & COLUSGT2 18kV & COLUSST1 18kV Gen Units & P1-2:A3:100:_COTWD_F-NewBus #1 230kV [0]	P6	Multiple Contingency	<100	<100	101	<100	<100	<100	<100	<100	101	101	Mitigation under review potential SPS	
116	31677 GRS F JT 60.0 31689 ELIZ TWN 60.0 1	P1-2:A3:45:_CARIBOU-PALERMO 115kV [0] & P1-2:A3:22:_CARIBOU-TABLE MTN 230kV [4440]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	NConv	<100	<100	Sensitivity under review	
117	31677 GRS F JT 60.0 31689 ELIZ TWN 60.0 1	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:37:_CRBU 1 12kV Gen Unit 1	P6	Multiple Contingency	<100	<100	<100	<100	<100	NConv	<100	<100	NConv	<100	Sensitivity under review	
118	31683 EST Q1 60.0 31689 ELIZ TWN 60.0 1	P1-2:A3:45:_CARIBOU-PALERMO 115kV [0] & P1-2:A3:22:_CARIBOU-TABLE MTN 230kV [4440]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	NConv	<100	<100	Sensitivity under review	
119	31683 EST Q1 60.0 31689 ELIZ TWN 60.0 1	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:37:_CRBU 1 12kV Gen Unit 1	P6	Multiple Contingency	<100	<100	<100	<100	<100	NConv	<100	<100	NConv	<100	Sensitivity under review	
120	31688 SPI 60.0 38056 PLMS-SRA 60.0 1	P1-2:A3:45:_CARIBOU-PALERMO 115kV [0] & P1-2:A3:22:_CARIBOU-TABLE MTN 230kV [4440]	P6	Multiple Contingency	NConv	<100	NConv	<100	<100	NConv	<100	NConv	NConv	NConv	Sensitivity under review	
121	31690 CARIBOU 60.0 31677 GRS F JT 60.0 1	P1-2:A3:45:_CARIBOU-PALERMO 115kV [0] & P1-2:A3:22:_CARIBOU-TABLE MTN 230kV [4440]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	NConv	<100	<100	Sensitivity under review	

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
122	31690 CARIBOU 60.0 31677 GRS F JT 60.0 1	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:37:_CRBU 1 12kV Gen Unit 1	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	NConv	<100	<100	<100	<100	Sensitivity under review
123	32200 PEASE 115 31506 HONC JT1 115 1	P1-2:A3:29:_TBL MT D-TBL MT E 230kV [0] & P1-2:A3:28:_TABLE MTN-RIO OSO 230kV [5700]	P6	Multiple Contingency	<100	<100	<100	106	<100	<100	<100	<100	<100	<100	<100	Mitigation under review potential SPS
124	45087 DELTA 115 31468 CASCADE 115 1	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	NConv	<100	<100	<100	<100	Sensitivity under review
125	31500 BUTTE 115 31501 CHICOTP1 115 1	P7-1:A3:4_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	P7	Multiple Contingency	110	107	<100	<100	<100	116	110	107	<100	<100	Mitigation under review	
126	31501 CHICOTP1 115 31504 TBLE MTN 115 1	P7-1:A3:4_Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	P7	Multiple Contingency	126	121	<100	<100	<100	132	125	121	<100	<100	Mitigation under review	
127	31602 COLEMAN 60.0 31606 CLMN JCT 60.0 1	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency	147	153	<100	<100	<100	159	157	153	<100	<100	Mitigation under review	
128	31606 CLMN JCT 60.0 31608 RED BLFF 60.0 1	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency	105	110	<100	<100	<100	113	113	110	<100	<100	Mitigation under review	

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
1	CANAL TP 60 kV	P1-1:A3:8:_NEO REDB 14kV Gen Unit 1	P1	Single Contingency	10.1	8.9					10.3	9.2	8.9			Explore potential mitigation
2	CR CANAL 60 kV	P1-1:A3:8:_NEO REDB 14kV Gen Unit 1	P1	Single Contingency	10.1	8.9		5.0			10.4	9.2	8.9			North Valley Action Plan
3	NEO REDT 60 kV	P1-1:A3:8:_NEO REDB 14kV Gen Unit 1	P1	Single Contingency	10.1	8.9		5.0			10.4	9.3	9.0			Explore potential mitigation
4	RASN JNT 60 kV	P1-1:A3:8:_NEO REDB 14kV Gen Unit 1	P1	Single Contingency	10.1	8.9					10.3	9.2	8.9			Explore potential mitigation
5	RED BLFF 60 kV	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P1	Single Contingency	11.1	11.8					12.1	12.3	11.8			Explore potential mitigation
6	TYLER 60 kV	P1-1:A3:8:_NEO REDB 14kV Gen Unit 1	P1	Single Contingency	10.1	8.9					10.3	9.2	8.9			Explore potential mitigation
7	ANDERSON 60 kV	P2-3:A3:72:_COTTONWD - MA 60kV & COTTONWD-RED BLFF line	P2	Single Contingency	24.4						25.8		21.4			Explore potential mitigation
8	ANDERSON 60 kV	P2-3:A3:74:_COTTONWD - MA 60kV & COTTONWOOD #1 line	P2	Single Contingency		21.2						24.8				Explore potential mitigation
9	BIG BEND 115 kV	P2-2:A3:24:_TBL MT D 230kV Section 1D	P2	Single Contingency									Voltage Collapse	Voltage Collapse	Voltage Collapse	Explore potential mitigation
10	BIG BEND 115 kV	P2-4:A3:22:_TBL MT D Section 1D & TBL MT E Section 1E 230kV	P2	Single Contingency	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	11.2		Voltage Collapse	Voltage Collapse				Explore potential mitigation
11	BIG MDWS 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	13.2		13.3				13.3	11.0	13.4	13.5	13.2	Explore potential mitigation
12	BUTTVLLY 115 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	12.3		12.3				12.4	11.3	12.5	12.6	12.3	Expand scope of Caribou Thermal SPS
13	CARIBOU 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	13.6		13.7				13.8	12.2	13.8	14.0	13.7	Caribou Thermal SPS
14	CARIBOU 115 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	12.4		12.4				12.5	11.4	12.6	12.7	12.4	Caribou Thermal SPS
15	CASCADE 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		9.6			15.1			9.7	14.6		8.6	Expand scope of NVLY Action Plan
16	CASCADE 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		10.2			15.9			10.3	15.4		9.2	Expand scope of NVLY Action Plan
17	CHESTER 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	13.1		13.1				13.2	9.2	13.2	13.4	13.1	Caribou Thermal SPS
18	CLMN FSH 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency	Voltage Collapse	Voltage Collapse			5.2		Voltage Collapse	Voltage Collapse	Voltage Collapse			Explore potential mitigation
19	COTTONWD 60 kV	P2-3:A3:72:_COTTONWD - MA 60kV & COTTONWD-RED BLFF line	P2	Single Contingency	25.2						26.6		22.3			Explore potential mitigation
20	COTTONWD 60 kV	P2-3:A3:74:_COTTONWD - MA 60kV & COTTONWOOD #1 line	P2	Single Contingency		22.1	6.4					25.7				Explore potential mitigation
21	COTWD_E2 230 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		13.3	9.3	5.1	19.1			13.5	20.7	9.7	18.0	Explore potential mitigation

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
22	COTWDPGE 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		11.3	7.1			16.4		11.5	18.9	7.5	16.2	Explore potential mitigation
23	DIRYVLE 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency						7.7	Voltage Collapse	Voltage Collapse				Explore potential mitigation
24	DIRYVLE 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							81.6			Explore potential mitigation
25	ELIZ TWN 60 kV	P2-2:A3:24:_TBL MT D 230kV Section 1D	P2	Single Contingency		Voltage Collapse				5.7		Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Expand scope of Caribou Thermal SPS
26	ELIZ TWN 60 kV	P2-4:A3:22:_TBL MT D Section 1D & TBL MT E Section 1E 230kV	P2	Single Contingency	Voltage Collapse		Voltage Collapse	Voltage Collapse			Voltage Collapse					Expand scope of Caribou Thermal SPS
27	EST QNCY 60 kV	P2-2:A3:24:_TBL MT D 230kV Section 1D	P2	Single Contingency		Voltage Collapse				6.2	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Explore potential mitigation
28	EST QNCY 60 kV	P2-4:A3:22:_TBL MT D Section 1D & TBL MT E Section 1E 230kV	P2	Single Contingency	Voltage Collapse		Voltage Collapse	Voltage Collapse								Explore potential mitigation
29	FRNCHGLH 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		8.6						8.7	13.3		9.2	North Valley Action Plan
30	FRNCHGLH 60 kV	P2-4:A3:8:_COTWDPGE 115kV - Section 2D & 1D	P2	Single Contingency					7.6	15.6						North Valley Action Plan
31	FRSTGLEN 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		6.4				11.3		6.5	10.4		7.5	Explore potential mitigation
32	GANSNER 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	13.9		14.0				14.0	12.4	14.1	14.2	13.9	North Valley Action Plan
33	GERBER 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency						10.6	Voltage Collapse	Voltage Collapse				Explore potential mitigation
34	GERBER 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse			Explore potential mitigation
35	GIRVAN 60 kV	P2-2:A3:62:_COTTONWD 60kV Section 1D	P2	Single Contingency	9.6	9.7					10.3	10.1	9.8		5.0	Explore potential mitigation
36	GRBR JCT 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency						10.5	Voltage Collapse	Voltage Collapse				Explore potential mitigation
37	GRBR JCT 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							91.9			Explore potential mitigation
38	GRIZZLY1 115 kV	P2-4:A3:22:_TBL MT D Section 1D & TBL MT E Section 1E 230kV	P2	Single Contingency	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse		5.2	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Expand Scope of Caribou Thermal SPS
39	GRYS FLT 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	13.8		13.9				13.9	12.4	14.0	14.1	13.9	Caribou Thermal SPS
40	HMLTN BR 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	12.7		12.8				12.9	9.9	12.9	13.0	12.7	North Valley Action Plan
41	HOWELLS 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	13.8		13.9				13.9	12.4	14.0	14.1	13.9	Caribou Thermal SPS

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
42	JESSUP 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		10.9	6.1			15.9		11.1	17.8	6.4	14.3	Explore potential mitigation
43	KESWICK 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		9.3				14.7		9.4	14.2		8.9	NVLY Action Plan
44	LP FB SP 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency						10.5	Voltage Collapse	Voltage Collapse				Explore potential mitigation
45	LP FB SP 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse			Explore potential mitigation
46	LS MLNSJ 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency						7.7	Voltage Collapse	Voltage Collapse				Explore potential mitigation
47	LS MLNSJ 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse			Explore potential mitigation
48	MTN GATE 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		9.7				15.3		9.9	14.8		8.7	Explore potential mitigation
49	OREGNTRL 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		7.3				11.5		7.4	12.0		7.9	Expand Scope of NVLY Action Plan
50	OREGNTRL 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		10.3				15.9		10.5	15.8		10.1	Expand Scope of NVLY Action Plan
51	PANRAMA 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		11.0	6.7			16.1		11.1	18.9	7.1	16.2	Explore potential mitigation
52	PLMS JCT 60 kV	P2-2:A3:24:_TBL MT D 230kV Section 1D	P2	Single Contingency			Voltage Collapse			6.2	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Explore potential mitigation
53	PLMS JCT 60 kV	P2-4:A3:22:_TBL MT D Section 1D & TBL MT E Section 1E 230kV	P2	Single Contingency	Voltage Collapse		Voltage Collapse	Voltage Collapse								Explore potential mitigation
54	PPL 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		9.8				15.3		9.9	14.9		8.7	North Valley Action Plan
55	RED BLFF 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency						9.2		Voltage Collapse				Explore potential mitigation
56	RED BLFF 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse			Explore potential mitigation
57	RED BLFF 60 kV	P2-3:A3:74:_COTTONWD - MA 60kV & COTTONWOOD #1 line	P2	Single Contingency							Voltage Collapse					Explore potential mitigation
58	SMPSN-AN 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		10.9	6.7			16.1		11.1	18.9	7.1	16.2	Explore potential mitigation
59	SPANSHCK 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	13.9		13.9				14.0	12.4	14.1	14.2	13.9	Caribou Thermal SPS
60	SPI 60 kV	P2-2:A3:24:_TBL MT D 230kV Section 1D	P2	Single Contingency			Voltage Collapse			6.2	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Explore potential mitigation
61	SPI 60 kV	P2-4:A3:22:_TBL MT D Section 1D & TBL MT E Section 1E 230kV	P2	Single Contingency	Voltage Collapse		Voltage Collapse	Voltage Collapse								Explore potential mitigation

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
62	SPIAND2 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		10.8				15.7		11.0	17.5		13.7	Explore potential mitigation
63	STLLWATR 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency						15.1			14.6			NVLY Action Plan
64	TAP 65 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency						11.3			11.9			Explore potential mitigation
65	TRINITY 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency						11.3			12.0			Explore potential mitigation
66	TRINITY 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency						11.7			12.3			Explore potential mitigation
67	TYLERJT 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency						10.5	Voltage Collapse	Voltage Collapse				Explore potential mitigation
68	TYLERJT 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse				Voltage Collapse			91.8			Explore potential mitigation
69	ULTR WSD 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	12.3		12.4				12.5		12.4	12.6	12.3	North Valley Action Plan
70	VINA 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency						7.7	Voltage Collapse	Voltage Collapse				Explore potential mitigation
71	VINA 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							82.5			Explore potential mitigation
72	WESTWOOD 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	12.3		12.3				12.4		12.4	12.6	12.3	North Valley Action Plan
73	WHEELBR 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		10.9				16.1		11.1	18.9		16.2	Explore potential mitigation
74	WILDWOOD 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency						12.7			12.8		10.0	Explore potential mitigation
75	WYANDTTE 115 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	Voltage Collapse	Voltage Collapse	Voltage Collapse				Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Explore potential mitigation
76	BIG BEND 115 kV	P2-1:A3:14:_CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2-1	Single Contingency	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse		10.6	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Explore potential mitigation
77	CANAL TP 60 kV	P2-1:A3:95:_NEO REDT-RASN JNT 60kV [0] No Fault	P2-1	Single Contingency	9.9	8.7					10.2	9.0	8.8			Explore potential mitigation
78	CR CANAL 60 kV	P2-1:A3:95:_NEO REDT-RASN JNT 60kV [0] No Fault	P2-1	Single Contingency	9.9	8.7					10.2	9.1	8.8			North Valley Action Plan
79	DIRYVLE 60 kV	P2-1:A3:91:_COLEMAN-RED BLUFF 60kV [6440] (COLEMAN-CLMN JCT)	P2-1	Single Contingency	10.1	10.6					11.0	10.9	10.7			Explore potential mitigation
80	ELIZ TWN 60 kV	P2-1:A3:14:_CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2-1	Single Contingency	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse		5.7	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Expand Scope of Caribou Thermal SPS
81	EST Q1 60 kV	P2-1:A3:14:_CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2-1	Single Contingency	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse		6.2	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Explore potential mitigation

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations	
82	EST QNCY 60 kV	P2-1:A3:14:_CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2-1	Single Contingency	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	6.2	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Explore potential mitigation
83	GRIZ JCT 115 kV	P2-1:A3:14:_CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2-1	Single Contingency	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	5.1	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Expand Scope of Caribou Thermal SPS
84	LS ML JT 60 kV	P2-1:A3:91:_COLEMAN-RED BLUFF 60kV [6440] (COLEMAN-CLMN JCT)	P2-1	Single Contingency	10.2	10.8				11.1	11.1	10.8			Explore potential mitigation
85	PLMS JCT 60 kV	P2-1:A3:14:_CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2-1	Single Contingency	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	6.2	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Explore potential mitigation
86	RASN JNT 60 kV	P2-1:A3:95:_NEO REDT-RASN JNT 60kV [0] No Fault	P2-1	Single Contingency	9.9	8.7				10.2	9.0	8.8			Explore potential mitigation
87	SPI 60 kV	P2-1:A3:14:_CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2-1	Single Contingency	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	6.2	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Explore potential mitigation
88	TYLER 60 kV	P2-1:A3:95:_NEO REDT-RASN JNT 60kV [0] No Fault	P2-1	Single Contingency	9.9	8.7				10.2	9.0	8.8			Explore potential mitigation
89	VINA 60 kV	P2-1:A3:91:_COLEMAN-RED BLUFF 60kV [6440] (COLEMAN-CLMN JCT)	P2-1	Single Contingency	10.3	10.8				11.2	11.1	10.9			Explore potential mitigation
90	RED BLFF 60 kV	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency	10.9	11.6				11.9	12.0	11.6			Explore potential mitigation

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
1	DIRYVLE 60 kV	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P1	Single Contingency	0.89	0.89					0.88	0.88	0.89			Explore potential mitigation
2	LS ML JT 60 kV	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P1	Single Contingency	0.88	0.87					0.87	0.87	0.87			Short Term: Coleman Thermal SPS, Long Term: Red Bluff Area Substation Project
3	LS MLNSJ 60 kV	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P1	Single Contingency	0.88	0.87					0.87	0.87	0.87			Explore potential mitigation
4	RED BLFF 60 kV	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P1	Single Contingency	0.87	0.86					0.86	0.85	0.86			Explore potential mitigation
5	VINA 60 kV	P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P1	Single Contingency	0.88	0.87					0.87	0.86	0.87			Short Term: Coleman Thermal SPS, Long Term: Red Bluff Area Substation Project
6	HAT CRK1 60kV	P1-3:A3:59:_HAT CRK1 6.6/60kV TB 1		Single Contingency				1.10								Install reactive device
7	HAT CRK2 60 kV	P1-3:A3:59:_HAT CRK1 6.6/60kV TB 1		Single Contingency				1.10								Install reactive device
8	PIT 1 60 kV	P1-3:A3:59:_HAT CRK1 6.6/60kV TB 1		Single Contingency				1.10								Install reactive device
9	ANDERSON 60 kV	P2-3:A3:72:_COTTONWD - MA 60kV & COTTONWD-RED BLFF line	P2	Single Contingency	0.78						0.76		0.81			North Valley Action Plan
10	ANDERSON 60 kV	P2-3:A3:74:_COTTONWD - MA 60kV & COTTONWOOD #1 line	P2	Single Contingency		0.81						0.77				North Valley Action Plan
11	ANTLER 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		0.89			0.85			0.89	0.84			North Valley Action Plan
12	BIG MDWS 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	0.88		0.88				0.88		0.88	0.88	0.88	Expand Scope of Caribou Thermal SPS
13	CARIBOU 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	0.88		0.88				0.88		0.88	0.88	0.88	Expand Scope of Caribou Thermal SPS
14	CASCADE 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency					0.86				0.86			Expand Scope of NVLY Action Plan
15	CASCADE 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency					0.85			0.90	0.85			Expand Scope of NVLY Action Plan
16	CHESTER 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	0.85		0.85				0.85		0.85	0.85	0.85	Expand Scope of Caribou Thermal SPS
17	CLMN FSH 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency	Voltage Collapse	Voltage Collapse					Voltage Collapse	Voltage Collapse	Voltage Collapse			Explore potential mitigation
18	CLMN TAP 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency	Voltage Collapse	Voltage Collapse					Voltage Collapse	Voltage Collapse	Voltage Collapse			Explore potential mitigation
19	COTTONWD 60 kV	P2-3:A3:72:_COTTONWD - MA 60kV & COTTONWD-RED BLFF line	P2	Single Contingency	0.78						0.77		0.81			Explore potential mitigation
20	COTTONWD 60 kV	P2-3:A3:74:_COTTONWD - MA 60kV & COTTONWOOD #1 line	P2	Single Contingency		0.82						0.78				Explore potential mitigation

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
21	COTWD_E2 230 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		0.85	0.90			0.81		0.84	0.77	0.89	0.81	Explore potential mitigation
22	COTWDPGE 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		0.88				0.84		0.88	0.81		0.84	Explore potential mitigation
23	DIRYVLE 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency							Voltage Collapse	Voltage Collapse				Explore potential mitigation
24	DIRYVLE 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse			Explore potential mitigation
25	FRNCHGLH 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency									0.87			Expand Scope of North Valley Action Plan
26	FRNCHGLH 60 kV	P2-4:A3:8:_COTWDPGE 115kV - Section 2D & 1D	P2	Single Contingency						0.85						Expand Scope of North Valley Action Plan
27	FRSTGLEN 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency						0.88						Explore potential mitigation
28	GANSNER 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	0.87		0.87				0.87	0.89	0.87	0.87	0.87	Expand Scope of North Valley Action Plan
29	GERBER 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency							Voltage Collapse	Voltage Collapse				Explore potential mitigation
30	GERBER 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse			Explore potential mitigation
31	GERBER 60 kV	P2-3:A3:73:_COTTONWD - MA 60kV & COTTONWOOD #2 line	P2	Single Contingency												Explore potential mitigation
32	GRYS FLT 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	0.88		0.88				0.87	0.90	0.88	0.87	0.88	Expand Scope of Caribou Thermal SPS
33	HMLTN BR 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	0.88		0.88				0.88		0.88	0.88	0.88	Expand Scope of North Valley Action Plan
34	HOWELLS 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	0.88		0.88				0.87	0.90	0.88	0.87	0.88	Expand Scope of Caribou Thermal SPS
35	JESSUP 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		0.89				0.85		0.89	0.82		0.86	Explore potential mitigation
36	KESWICK 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency						0.86			0.86			Expand Scope of North Valley Action Plan
37	LP FB SP 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency							Voltage Collapse	Voltage Collapse				Explore potential mitigation
38	LP FB SP 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse			Explore potential mitigation
39	LS ML JT 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency							Voltage Collapse	Voltage Collapse				Short Term: Coleman Thermal SPS, Long Term: Red Bluff Area Substation Project
40	LS ML JT 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse			Short Term: Coleman Thermal SPS, Long Term: Red Bluff Area Substation Project

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations	
41	LS MLNSJ 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency							Voltage Collapse	Voltage Collapse			Explore potential mitigation
42	LS MLNSJ 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse		Explore potential mitigation
43	MTN GATE 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		0.89			0.85		0.89	0.84			North Valley Action Plan
44	OREGNTRL 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency								0.89			Expand Scope of North Valley Action Plan
45	OREGNTRL 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		0.90			0.85		0.90	0.84			Explore potential mitigation
46	PANRAMA 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		0.89			0.85		0.89	0.80		0.84	Explore potential mitigation
47	PPL 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		0.89			0.85		0.89	0.84			North Valley Action Plan
48	RED BLFF 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency							Voltage Collapse				Explore potential mitigation
49	RED BLFF 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse		Explore potential mitigation
50	RED BLFF 60 kV	P2-3:A3:74:_COTTONWD - MA 60kV & COTTONWOOD #1 line	P2	Single Contingency							Voltage Collapse				Explore potential mitigation
51	RWSN J2 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency							Voltage Collapse				Explore potential mitigation
52	RWSN J2 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse		Explore potential mitigation
53	RWSN J2 60 kV	P2-3:A3:73:_COTTONWD - MA 60kV & COTTONWOOD #2 line	P2	Single Contingency											Explore potential mitigation
54	RWSN J2 60 kV	P2-3:A3:74:_COTTONWD - MA 60kV & COTTONWOOD #1 line	P2	Single Contingency							Voltage Collapse				Explore potential mitigation
55	SMPSN-AN 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		0.89			0.85		0.89	0.80		0.84	Explore potential mitigation
56	SPANSHCK 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	0.87		0.87			0.87	0.90	0.87	0.87	0.87	Expand Scope of Caribou Thermal SPS
57	SPI_AND 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		0.89			0.85		0.89	0.82		0.87	Expand Scope of North Valley Action Plan
58	SPIAND2 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency		0.89			0.85		0.89	0.83		0.87	Expand Scope of North Valley Action Plan
59	STLLWATR 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency					0.86			0.85			Expand Scope of North Valley Action Plan
60	TAP 65 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency					0.88			0.89			Explore potential mitigation
61	TRINITY 60 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency					0.88			0.89			Explore potential mitigation

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
62	TYLERJT 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency							Voltage Collapse	Voltage Collapse				Explore potential mitigation
63	TYLERJT 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse			Explore potential mitigation
64	ULTR WSD 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	0.88		0.88				0.88		0.88	0.88	0.88	Explore potential mitigation
65	VINA 60 kV	P2-2:A3:63:_COTTONWD 60kV Section MA	P2	Single Contingency							Voltage Collapse	Voltage Collapse				Short Term: Coleman Thermal SPS, Long Term: Red Bluff Area Substation Project
66	VINA 60 kV	P2-3:A3:71:_COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	Voltage Collapse	Voltage Collapse							Voltage Collapse			Short Term: Coleman Thermal SPS, Long Term: Red Bluff Area Substation Project
67	WESTWOOD 60 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	0.88		0.88				0.88		0.88	0.88	0.88	Explore potential mitigation
68	WHEELBR 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency						0.85		0.89	0.80		0.84	Explore potential mitigation
69	WILDWOOD 115 kV	P2-4:A3:18:_COTWD_F2 Section 2F & COTWD_E2 Section 2E 230kV	P2	Single Contingency						0.87			0.88			Explore potential mitigation
70	WYANDTTE 115 kV	P2-3:A3:44:_PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	Voltage Collapse	0.64	Voltage Collapse				Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	Voltage Collapse	North Valley Action Plan
71	CLMN JCT 60 kV	P2-1:A3:91:_COLEMAN-RED BLUFF 60kV [6440] (COLEMAN-CLMN JCT)	P2-1	Single Contingency	0.89	0.89					0.88	0.88	0.89			Explore potential mitigation
72	DIRVLE 60 kV	P2-1:A3:91:_COLEMAN-RED BLUFF 60kV [6440] (COLEMAN-CLMN JCT)	P2-1	Single Contingency	0.87	0.86					0.86	0.86	0.86			Explore potential mitigation
73	LS MLNSJ 60 kV	P2-1:A3:91:_COLEMAN-RED BLUFF 60kV [6440] (COLEMAN-CLMN JCT)	P2-1	Single Contingency	0.86	0.85					0.85	0.85	0.85			Explore potential mitigation
74	VINA 60 kV	P2-1:A3:91:_COLEMAN-RED BLUFF 60kV [6440] (COLEMAN-CLMN JCT)	P2-1	Single Contingency	0.86	0.85					0.84	0.84	0.84			Short Term: Coleman Thermal SPS, Long Term: Red Bluff Area Substation Project
75	HAT CRK2 60 kV	P2-1:A3:105:_HAT CREEK #1-PIT #1 60kV [7020] (PIT 1-HAT CRK1)	P2-1	Single Contingency					1.1006							Install reactive device
76	PIT 1 60 kV	P2-1:A3:105:_HAT CREEK #1-PIT #1 60kV [7020] (PIT 1-HAT CRK1)	P2-1	Single Contingency					1.1013							Install reactive device
77	AMERESCO 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P3	Multiple Contingency	0.88						0.87					Explore potential mitigation
78	AMERESCOTAP 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P3	Multiple Contingency	0.88						0.87					Explore potential mitigation
79	BTTE CRK 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P3	Multiple Contingency	0.87						0.85					Explore potential mitigation

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
80	CLARK RD 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P3	Multiple Contingency	0.88						0.86					Explore potential mitigation
81	CLMN JCT 60 kV	P1-1:A3:69:_COLEMAN 7kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P3	Multiple Contingency	0.90	0.89					0.89	0.89	0.89			Explore potential mitigation
82	CNTRVLE 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P3	Multiple Contingency	0.87						0.86					Explore potential mitigation
83	DE SABLA 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P3	Multiple Contingency	0.87						0.85					Explore potential mitigation
84	DIRYVLE 60 kV	P1-1:A3:45:_VOLTA1-2 9kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P3	Multiple Contingency	0.89	0.88					0.88	0.88	0.88			Explore potential mitigation
85	DRHM JCA 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P3	Multiple Contingency	0.88						0.87					Explore potential mitigation
86	DRHMSW45 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P3	Multiple Contingency	0.88						0.87					Explore potential mitigation
87	LS MLNSJ 60 kV	P1-1:A3:45:_VOLTA1-2 9kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P3	Multiple Contingency	0.88	0.87					0.87	0.86	0.87			Explore potential mitigation
88	MCNE JCT 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P3	Multiple Contingency	0.89						0.88					Explore potential mitigation
89	RED BLFF 60 kV	P1-1:A3:45:_VOLTA1-2 9kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P3	Multiple Contingency	0.87	0.86					0.85	0.85	0.86			Explore potential mitigation
90	TBLE MTN 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P3	Multiple Contingency	0.90						0.88					Explore potential mitigation
91	TRES VIS 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P3	Multiple Contingency	0.90						0.89					Explore potential mitigation
92	VINA 60 kV	P1-1:A3:45:_VOLTA1-2 9kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P3	Multiple Contingency	0.88	0.86					0.86	0.86	0.86			Short Term: Coleman Thermal SPS, Long Term: Red Bluff Area Substation Project
93	AMERESCO 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P6	Multiple Contingency	0.88						0.87					Explore potential mitigation

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
94	ANDERSON 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.85	0.87					0.85	0.87			North Valley Action Plan	
95	ANTLER 60 kV	P1-2:A3:39:_CASCADE-COTTONWOOD 115kV [1240] & P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310]	P6	Multiple Contingency	0.79	0.76			0.85	0.76	0.69	0.75			North Valley Action Plan	
96	ANTLER 60 kV	P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310] & P1-3:A3:41:_CASCADE 115/60kV TB 1	P6	Multiple Contingency	0.65			0.88		0.60					North Valley Action Plan	
97	APT ORVC 60 kV	P1-2:A3:80:_PALERMO-OROVILLE #2 60kV [7740] & P1-3:A3:33:_PALERMO 230/230kV TB 1	P6	Multiple Contingency	0.87	0.89	0.89				0.86	0.88	0.90	0.88	0.89	Explore potential mitigation
98	BENTON 60 kV	P1-3:A3:5:_COTWD_E 230/60kV TB 3 & P1-3:A3:4:_COTWD_E2 230/60kV TB 2	P6	Multiple Contingency	0.87	0.89						0.87	0.88		Explore potential mitigation	
99	BIG MDWS 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:50:_HAMIL.BR 2kV Gen Unit 1	P6	Multiple Contingency									0.89		Expand Scope of Caribou Thermal SPS	
100	BTTE CRK 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P6	Multiple Contingency	0.87						0.85				Explore potential mitigation	
101	CARIBOU 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:50:_HAMIL.BR 2kV Gen Unit 1	P6	Multiple Contingency									0.90		Expand Scope of Caribou Thermal SPS	
102	CASCADE 60 kV	P1-2:A3:39:_CASCADE-COTTONWOOD 115kV [1240] & P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310]	P6	Multiple Contingency	0.81	0.78			0.86	0.78	0.71	0.77			Expand Scope of NVLY Action Plan	
103	CASCADE 60 kV	P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310] & P1-3:A3:41:_CASCADE 115/60kV TB 1	P6	Multiple Contingency	0.68			0.89		0.63					Expand Scope of NVLY Action Plan	
104	CHESTER 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:50:_HAMIL.BR 2kV Gen Unit 1	P6	Multiple Contingency									0.87		Expand Scope of Caribou Thermal SPS	
105	CLARK RD 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P6	Multiple Contingency	0.88						0.86				Explore potential mitigation	
106	CLMN FSH 60 kV	P1-3:A3:5:_COTWD_E 230/60kV TB 3 & P1-3:A3:4:_COTWD_E2 230/60kV TB 2	P6	Multiple Contingency	0.86	0.88					0.86	0.88			Explore potential mitigation	

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
107	CNTRVLE 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P6	Multiple Contingency	0.87						0.86					Explore potential mitigation
108	COLEMAN 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.86	0.88						0.86	0.88			Explore potential mitigation
109	COTTONWD 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.86	0.88						0.86	0.87			Explore potential mitigation
110	COWCK TP 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.90											Explore potential mitigation
111	DE SABLA 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P6	Multiple Contingency	0.87						0.85					Explore potential mitigation
112	DESCHUTS 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.89							0.89				Expand Scope of NVLY Action Plan
113	DIRYVLE 60 kV	P1-1:A3:45:_VOLTA1-2 9kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P6	Multiple Contingency	0.89	0.88					0.88	0.88	0.88			Explore potential mitigation
114	DRHM JCA 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P6	Multiple Contingency	0.88						0.87					Explore potential mitigation
115	DRHMSW45 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P6	Multiple Contingency	0.88						0.87					Explore potential mitigation
116	ELIZ TWN 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:51:_HAMIL.BR 2kV Gen Unit 2	P6	Multiple Contingency										0.88		Expand Scope of Caribou Thermal SPS
117	EST QNCY 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:50:_HAMIL.BR 2kV Gen Unit 1	P6	Multiple Contingency										0.87		Explore potential mitigation
118	FRNCHGLH 60 kV	P1-2:A3:37:_TRINITY-COTTONWOOD 115kV [4040] & P1-2:A3:36:_WILDWOOD-COTWDPGE #1 115kV [1110]	P6	Multiple Contingency					0.86							Expand Scope of NVLY Action Plan
119	FRNCHGLH 60 kV	P1-2:A3:39:_CASCADE-COTTONWOOD 115kV [1240] & P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310]	P6	Multiple Contingency		0.87					0.89	0.83	0.87			Expand Scope of NVLY Action Plan

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations		
120	FRSTGLEN 115 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency						0.89						Explore potential mitigation
121	GANSNER 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:50:_HAMIL.BR 2kV Gen Unit 1	P6	Multiple Contingency									0.88		Expand Scope of NVLY Action Plan	
122	GERBER 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.81	0.83					0.81	0.83			Explore potential mitigation	
123	GRYS FLT 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:51:_HAMIL.BR 2kV Gen Unit 2	P6	Multiple Contingency									0.89		Expand Scope of Caribou Thermal SPS	
124	HMLTN BR 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:50:_HAMIL.BR 2kV Gen Unit 1	P6	Multiple Contingency									0.89		Expand Scope of NVLY Action Plan	
125	HOWELLS 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:50:_HAMIL.BR 2kV Gen Unit 1	P6	Multiple Contingency									0.89		Expand Scope of Caribou Thermal SPS	
126	INSKIP 60 kV	P1-3:A3:5:_COTWD_E 230/60kV TB 3 & P1-3:A3:4:_COTWD_E2 230/60kV TB 2	P6	Multiple Contingency	0.88						0.88				Explore potential mitigation	
127	JESSUP 115 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency		0.89			0.85		0.89	0.82		0.86	Explore potential mitigation	
128	KESWICK 60 kV	P1-2:A3:39:_CASCADE-COTTONWOOD 115kV [1240] & P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310]	P6	Multiple Contingency	0.84	0.81			0.88	0.82	0.75	0.80			Expand Scope of NVLY Action Plan	
129	LS MLNSJ 60 kV	P1-1:A3:45:_VOLTA1-2 9kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P6	Multiple Contingency	0.88	0.87				0.87	0.86	0.87			Explore potential mitigation	
130	LSNA PCC 60 kV	P1-2:A3:80:_PALERMO-OROVILLE #2 60kV [7740] & P1-3:A3:33:_PALERMO 230/230kV TB 1	P6	Multiple Contingency	0.87	0.89	0.89			0.86	0.88	0.90	0.88	0.89	Explore potential mitigation	
131	MCNE JCT 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P6	Multiple Contingency	0.89					0.88					Explore potential mitigation	
132	MTN GATE 60 kV	P1-2:A3:39:_CASCADE-COTTONWOOD 115kV [1240] & P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310]	P6	Multiple Contingency	0.80	0.76			0.85	0.77	0.70	0.75			North Valley Action Plan	

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations	
133	OREGNTRL 60 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency								0.89			Expand Scope of NVLY Action Plan
134	OREGNTRL 115 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency		0.90			0.85		0.90	0.84			Expand Scope of NVLY Action Plan
135	OROVILLE 60 kV	P1-2:A3:80:_PALERMO-OROVILLE #2 60kV [7740] & P1-3:A3:33:_PALERMO 230/230kV TB 1	P6	Multiple Contingency	0.86	0.89	0.89			0.85	0.87	0.89	0.87	0.89	Explore potential mitigation
136	PALERMO 60 kV	P1-2:A3:80:_PALERMO-OROVILLE #2 60kV [7740] & P1-3:A3:33:_PALERMO 230/230kV TB 1	P6	Multiple Contingency	0.89					0.88	0.90		0.90		Explore potential mitigation
137	PANRAMA 115 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency		0.89			0.85		0.89	0.80		0.84	Explore potential mitigation
138	PPL 60 kV	P1-2:A3:39:_CASCADE-COTTONWOOD 115kV [1240] & P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310]	P6	Multiple Contingency	0.79	0.76			0.85	0.76	0.69	0.75			North Valley Action Plan
139	PPL 60 kV	P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310] & P1-3:A3:41:_CASCADE 115/60kV TB 1	P6	Multiple Contingency	0.65			0.88		0.60					North Valley Action Plan
140	Q720TP 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.90						0.90				Expand Scope of NVLY Action Plan
141	RED B JT 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.79	0.81					0.79	0.81			Explore potential mitigation
142	RED BLFF 60 kV	P1-1:A3:45:_VOLTA1-2 9kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P6	Multiple Contingency	0.87	0.86				0.85	0.85	0.86			Explore potential mitigation
143	SMPSN-AN 115 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency		0.89			0.85		0.89	0.80		0.84	Explore potential mitigation
144	SOUTH 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.89						0.89				Explore potential mitigation
145	SPANSHCK 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:50:_HAMIL.BR 2kV Gen Unit 1	P6	Multiple Contingency									0.89		Expand Scope of Caribou Thermal SPS

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations	
146	SPI 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:50:_HAMIL.BR 2kV Gen Unit 1	P6	Multiple Contingency									0.87		Expand Scope of NVLY Action Plan
147	SPI_AND 115 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency		0.89				0.85		0.89	0.83	0.86	Expand Scope of NVLY Action Plan
148	SPIAND2 115 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency		0.89				0.85		0.89	0.83	0.86	Expand Scope of NVLY Action Plan
149	STLLWATR 60 kV	P1-2:A3:39:_CASCADE-COTTONWOOD 115kV [1240] & P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310]	P6	Multiple Contingency	0.82	0.78				0.86	0.79	0.72	0.77		Expand Scope of NVLY Action Plan
150	STLLWATR 60 kV	P1-2:A3:64:_BENTON-DESCHUTS-CASCADE 60kV [6310] & P1-3:A3:41:_CASCADE 115/60kV TB 1	P6	Multiple Contingency	0.68			0.90		0.63					Expand Scope of NVLY Action Plan
151	TAP 65 60 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency						0.89		0.89			Explore potential mitigation
152	TBLE MTN 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P6	Multiple Contingency	0.90						0.88				Explore potential mitigation
153	TKO TAP 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.90										Explore potential mitigation
154	TRES VIS 60 kV	P1-1:A3:66:_DE SABLA 7kV Gen Unit 1 & P1-3:A3:31:_TBL MT2M 230/230kV TB 1	P6	Multiple Contingency							0.89				Explore potential mitigation
155	TRINITY 60 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency						0.89		0.89			Explore potential mitigation
156	TYLERJT 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.83	0.85						0.83	0.85		Explore potential mitigation
157	ULTR WSD 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:51:_HAMIL.BR 2kV Gen Unit 2	P6	Multiple Contingency									0.89		Explore potential mitigation
158	VINA 60 kV	P1-1:A3:45:_VOLTA1-2 9kV Gen Unit 1 & P1-2:A3:73:_COTTONWD-RED BLFF 60kV [6440]	P6	Multiple Contingency	0.88	0.86					0.86	0.86	0.86		Short Term: Coleman Thermal SPS, Long Term: Red Bluff Area Substation Project

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2018 SP No BTM-PV	2026 Retirement of QF Generations	
159	WESTWOOD 60 kV	P1-3:A3:22:_CARIBOU 230/230kV TB 11 & P1-1:A3:51:_HAMIL.BR 2kV Gen Unit 2	P6	Multiple Contingency									0.89		Explore potential mitigation
160	WHEELBR 115 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency		0.89			0.85			0.89	0.80	0.84	Explore potential mitigation
161	WHITMORE 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.90										Explore potential mitigation
162	WILDWOOD 115 kV	P1-3:A3:3:_COTWD_E2 230/115kV TB 1 & P1-3:A3:6:_COTWD_F2 230/115kV TB 4	P6	Multiple Contingency					0.87				0.88		Explore potential mitigation
163	WNTU PMS 60 kV	P1-3:A3:4:_COTWD_E2 230/60kV TB 2 & P1-3:A3:5:_COTWD_E 230/60kV TB 3	P6	Multiple Contingency	0.89							0.89			Expand Scope of NVLY Action Plan
164	PIT 1 60 kV	P1-2:A3:59:_PIT #1-MCARTHUR 60kV [7790] & P1-2:A3:76:_HAT CREEK #1-PIT #1 60kV [7020]	P6	Multiple Contingency			1.1003						1.1001	1.1	Install reactive device
165	DIRYVLE 60 kV	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency	0.90	0.89					0.88	0.88	0.89		Explore potential mitigation
166	LS MLNSJ 60 kV	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency	0.88	0.88					0.87	0.87	0.88		Explore potential mitigation
167	RED BLFF 60 kV	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency	0.87	0.86					0.86	0.86	0.86		Explore potential mitigation
168	VINA 60 kV	P7-1:A3:1_Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency	0.88	0.87					0.87	0.87	0.87		Short Term: Coleman Thermal SPS, Long Term: Red Bluff Area Substation Project
169	PIT 1 60 kV	P7-1:A3:30_HAT CREEK1-PIT1 and PIT1-HAT CREEK No2-BURNEY	P7	Multiple Contingency				1.1013							Install reactive device

ID	Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	Select..	Select..	Select..	Select..	Select..		
1	COTTONWD-RED BLFF 60kV [6440]	P1	Single Contingency			1									Under review with PTO .
2	PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency			22									Under review with PTO .
3	COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency				23								Under review with PTO .
4	TBL MT D Section 1D & TBL MT E Section 1E 230kV	P2	Single Contingency				2								Under review with PTO .
5	CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2	Single Contingency					15							Under review with PTO .
6	COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency	59											Under review with PTO .
7	COLEMAN 60kV Section 1D	P2	Single Contingency					3							Under review with PTO .
8	COLEMAN 60kV Section 1D	P2	Single Contingency	3											Under review with PTO .
9	COLEMAN 60kV Section 1D	P2	Single Contingency			1									Under review with PTO .
10	COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency		57										Under review with PTO .
11	COLEMAN 60kV Section 1D	P2	Single Contingency				3								Under review with PTO .
12	TBL MT D Section 1D & TBL MT E Section 1E 230kV	P2	Single Contingency		24										Under review with PTO .
13	COLEMAN 60kV Section 1D	P2	Single Contingency		1										Under review with PTO .
14	PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency				14								Under review with PTO .
15	CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2	Single Contingency			43									Under review with PTO .
16	CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2	Single Contingency	7											Under review with PTO .
17	COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency			5									Under review with PTO .
18	TBL MT D Section 1D & TBL MT E Section 1E 230kV	P2	Single Contingency					34							Under review with PTO .
19	CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2	Single Contingency		7										Under review with PTO .
20	COTTONWD - MA 60kV & COTTONWD-COLEMAN line	P2	Single Contingency					21							Under review with PTO .
21	PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency					14							Under review with PTO .
22	PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency	25											Under review with PTO .



ID	Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	Select..	Select..	Select..	Select..	Select..		
23	CARIBOU-TABLE MTN 230kV [4440] (BELDENTP-TBL MT D)	P2	Single Contingency				5								Under review with PTO .
24	PALERMO - 1D 115kV & PALERMO-WYANDOTTE line	P2	Single Contingency		23										Under review with PTO .
25	TBL MT D Section 1D & TBL MT E Section 1E 230kV	P2	Single Contingency	24											Under review with PTO .
26	TBL MT D Section 1D & TBL MT E Section 1E 230kV	P2	Single Contingency			57									Under review with PTO .
27	Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency			9									Under review with PTO .
28	Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency		8										Under review with PTO .
29	Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency				10								Under review with PTO .
30	Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency					6							Under review with PTO .
31	Cottonwood-Benton No.1 and Cottonwood-Red Bluff 60 kV Lines	P7	Multiple Contingency	10											Under review with PTO .

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1														

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1												

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-T-1	Vaca-Plainfield 60 kV line	Normal	P0	Normal	102	NA	NA	40	NA	107	NA	NA	NA	NA	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-T-2	Nicolaus - Marysville 60 kV Line (Plumas-East Nicolaus)	Normal	P0	Normal	65	79	102	28	29	69	78	79	106	101	Reconductor
CVLY-T-3	Cortina 230/115/60 kV Transformer No. 1	CORTINA 230/115kV TB 4	P1	N-1	105	104	101	58	46	116	102	110	100	115	Existing operating procedure
CVLY-T-4	Cortina 60 kV Line No. 2	CORTINA #1 60kV	P1	N-1	94	85	88	39	34	101	85	85	97	89	Preferred resource
CVLY-T-5	Vaca 115/60 kV transformer #5	VACA-DIX 115/60kV TB 9	P1	N-1	115	NA	NA	66	NA	119	NA	NA	NA	NA	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-T-6	East Nicolaus 115/60 kV Transformer No. 2	E.NICOLS 115/60kV TB 3	P1	N-1	73	81	96	32	31	78	82	81	104	96	Preferred resource
CVLY-T-7	East Nicolaus 115/60 kV Transformer No. 3	E.NICOLS 115/60kV TB 2	P1	N-1	73	81	96	32	31	78	82	81	104	96	Preferred resource
CVLY-T-8	Placer - Del Mar 60 kV Line (Penryn-Sierra Pine)	PLACER-DEL MAR 60kV	P1	N-1	93	81	92	37	29	102	83	81	106	92	Preferred resource
CVLY-T-9	Valley Springs - Martell 60 kV Line No. 1	VALLEY SPRINGS-CLAY 60kV	P1	N-1	119	111	111	71	58	124	116	110	119	111	Disable automatics
CVLY-T-10	Manteca 115/60 kV Transformer No. 3	KASSON 115/60kV TB 1	P1	N-1	174	165	178	93	78	180	178	165	191	178	Short Term : Action Plan; Long Term : Kasson SPS
CVLY-T-11	Manteca - Louise 60 kV Line	KASSON 115/60kV TB 1	P1	N-1	126	121	136	72	63	131	131	121	148	135	Short Term : Action Plan; Long Term : Kasson SPS
CVLY-T-12	Kasson - Louise 60 kV Line	KASSON 115/60kV TB 1	P1	N-1	94	91	107	48	40	98	96	91	117	106	Short Term : Action Plan; Long Term : Kasson SPS
CVLY-T-13	Missouri Flat - Gold Hill 115 kV No. 1 Line	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	90	68	79	22	17	114	74	69	101	78	Transfer trip to open other end
CVLY-T-14	Dixon-Vaca #2 60 kV	DIXON-VACA #1 60kV [6730] (VACA-DXN-VACA-JT1)	P2-1	Line section w/o fault	112	NA	NA	72	NA	116	NA	NA	NA	NA	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-T-15	Drum - Rio Oso 115 kV No. 2 Line	DRUM-HIGGINS 115kV [4393] (CHCGO PK-HIGGINS)	P2-1	Line section w/o fault	113	112	100	105	47	116	111	109	100	98	Drum operating procedure
CVLY-T-16	Drum - Rio Oso 115 kV No. 1 Line	DRUM-HIGGINS 115kV [4393] (CHCGO PK-HIGGINS)	P2-1	Line section w/o fault	102	103	90	103	44	103	102	100	87	88	Drum operating procedure
CVLY-T-17	Eldorado - Missouri Flat 115 kV No. 2 Line	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	200	153	174	60	47	252	165	154	221	173	Transfer trip to open other end

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-T-18	Eldorado - Missouri Flat 115 kV No. 1 Line	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	179	135	155	43	34	225	147	136	200	155	Transfer trip to open other end
CVLY-T-19	Valley Springs - Martell 60 kV Line No. 1	VALLEY SPRINGS-CLAY 60kV [8264] (CLAY-BUENA_TP)	P2-1	Line section w/o fault	120	111	112	71	59	124	116	118	119	111	Disable automatics
CVLY-T-20	Stagg - Hammer 60 kV Line No. 1	HAMMER-COUNTRY CLUB 60kV [7010] (CNTRY CB-UOP)	P2-1	Line section w/o fault	119	42	57	57	20	122	44	43	60	56	Short Term : Action Plan; Long Term : Missouri Flat-Gold Hill 115 kV line project.
CVLY-T-21	Lockeford - Industrial 60 kV Line	LOCKEFORD-LODI #2 60kV [7440] (LOCKEFRD-VICTOR)	P2-1	Line section w/o fault	100	78	NA	69	68	101	79	77	NA	NA	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-T-22	Brighton - Davis 115 kV Line	RIO OSO 115kV - Section 1D & 2D	P2	Bus-tie breaker	119	39	31	51	38	129	36	40	38	39	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-T-23	Cortina 230/115/60 kV Transformer No. 1	CORTINA 230kV - Ring R2 & R3	P2	Non-bus-tie breaker	107	91	99	44	60	100	91	110	106	115	Existing operating procedure
CVLY-T-24	Cortina 60 kV Line No. 2	CORTINA - MA 60kV & CORTINA #1 line	P2	Non-bus-tie breaker	94	84	88	39	34	100	84	84	97	88	Preferred resource
CVLY-T-25	Bogue - Rio Oso 115 kV Line	RIO OSO 230kV - Section 2D & 1D	P2	Bus-tie breaker	122	107	55	52	36	128	101	101	56	55	Short Term : Action Plan; Long Term : South of Palermo 115 kV Reinforcement Project
CVLY-T-26	Drum - Rio Oso 115 kV No. 1 Line	DRUM 115kV - Ring R4 & R3	P2	Non-bus-tie breaker	184	187	104	206	42	188	186	187	102	101	Drum operating procedure
CVLY-T-27	Drum 115/60 kV Transformer No. 1	DRUM 115kV - Ring R4 & R3	P2	Non-bus-tie breaker	144	149	55	179	20	149	147	149	53	52	Drum operating procedure
CVLY-T-28	Stanislaus-Melones-Manteca 115 kV Line No. 1	TESLA 115kV - Section 2D & 1D	P2	Bus-tie breaker	98	36	57	Diverge	131	118	52	46	83	57	Short Term : Action Plan; Long Term : Vierra 115 kV Looping Project
CVLY-T-29	Riverbank Jct - Manteca 115 kV Line	TESLA 115kV - Section 2D & 1D	P2	Bus-tie breaker	126	52	74	Diverge	116	145	68	62	101	74	Short Term : Action Plan; Long Term : Vierra 115 kV Looping Project
CVLY-T-30	Bellota-Riverbank-Melones 115 kV Line	TESLA 115kV - Section 2D & 1D	P2	Bus-tie breaker	107	19	31	Diverge	109	136	28	28	75	43	Short Term : Action Plan; Long Term : Vierra 115 kV Looping Project
CVLY-T-31	Stagg - Hammer 60 kV Line No. 1	CNTRY CB 60kV Section 1E	P2	Bus	119	42	57	57	21	122	45	43	60	56	Short Term : Action Plan; Long Term : Stagg – Hammer 60 kV Line project.

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
CVLY-T-32	Hammer - Country Club 60 kV	STAGG 60kV - Section ME & MD	P2	Bus-tie breaker	<90	133	<90	<90	<90	<90	<90	182	132	<90	<90	Operating solution
CVLY-T-33	Lockeford No. 1 60 kV Line	STAGG 60kV - Section ME & MD	P2	Bus-tie breaker	<90	108	<90	<90	<90	<90	<90	193	108	<90	<90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-T-34	Manteca - Louise 60 kV Line	KASSON 115kV Section 1D	P2	Bus	128	122	137	73	63	133	132	122	150	137	Short Term : Action Plan; Long Term : Kasson SPS	
CVLY-T-35	Kasson - Louise 60 kV Line	KASSON - 1D 115kV & SCHULTE SW STA-KASSON-MANTECA line	P2	Non-bus-tie breaker	95	94	109	49	41	100	98	94	119	109	Short Term : Action Plan; Long Term : Kasson SPS	
CVLY-T-36	Stanislaus - Melones Sw 115 kV Line	TESLA 115kV - Section 2D & 1D	P2	Bus-tie breaker	127	52	74	Diverge	116	145	69	62	102	74	Short Term : Action Plan; Long Term : Vierra 115 kV Looping Project	
CVLY-T-37	Brighton - Davis 115 kV Line	WOODLAND 14kV Gen Unit 1 & WEST SACRAMENTO-BRIGHTON 115kV [4110]	P3	G-1/N-1	99	<90	<90	<90	<90	103	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project	
CVLY-T-38	Vaca Dixon 230/115 kV Transformer No. 3	WOLFSKIL 14kV Gen Unit 1 & VACA-DIX 230/115kV TB 4	P3	G-1/N-1	100	<90	<90	<90	<90	104	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project	
CVLY-T-39	Vaca Dixon 230/115 kV Transformer No. 4	WOLFSKIL 14kV Gen Unit 1 & VACA-DIX 230/115kV TB 3	P3	G-1/N-1	100	<90	<90	<90	<90	104	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project	
CVLY-T-40	Cortina 230/115/60 kV Transformer No. 1	WADHAM 9kV Gen Unit 1 & CORTINA 230/115kV TB 4	P3	G-1/N-1	122	111	115	<90	<90	132	113	111	125	107	Existing operating procedure	
CVLY-T-41	Vaca 115/60 kV transformer #5	WOLFSKIL 14kV Gen Unit 1 & VACA-DIX 115/60kV TB 9	P3	G-1/N-1	115	<90	<90	<90	<90	119	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project	
CVLY-T-42	Pease - Rio Oso 115 kV Line	WOODLAND 14kV Gen Unit 1 & PALERMO-NICOLAUS 115kV [3210]	P3	G-1/N-1	<90	90	<90	<90	<90	100	<90	<90	<90	<90	Short Term : Action Plan; Long Term : South of Palermo 115 kV Reinforcement Project	
CVLY-T-43	Drum - Higgins 115 kV Line	DTCHFLT1 11kV Gen Unit 1 & CHI.PARK 12kV Gen Unit 1	P3	G-1/N-1	99	100	<90	<90	<90	101	100	100	<90	<90	Drum operating procedure	
CVLY-T-44	Stockton 'A' - Weber 60 kV Line No. 1	COG.NTNL 14kV Gen Unit 1 & STOCKTON A-WEBER #2 60kV [8130]	P3	G-1/N-1	102	<90	<90	<90	<90	105	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Stockton 'A' –Weber 60 kV Line Nos. 1 and 2 Reconductor Project	
CVLY-T-45	Manteca 115/60 kV Transformer No. 3	GWFTRCY3 14kV Gen Unit 1 & KASSON 115/60kV TB 1	P3	G-1/N-1	174	166	178	<90	<90	180	178	166	192	178	Short Term : Action Plan; Long Term : Kasson SPS	
CVLY-T-46	Manteca - Louise 60 kV Line	GWFTRCY3 14kV Gen Unit 1 & KASSON 115/60kV TB 1	P3	G-1/N-1	127	<90	137	<90	<90	133	132	120	149	136	Short Term : Action Plan; Long Term : Kasson SPS	

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-T-47	Kasson - Louise 60 kV Line	GWFTRCY3 14kV Gen Unit 1 & KASSON 115/60kV TB 1	P3	G-1/N-1	95	92	107	<90	<90	99	97	92	118	107	Short Term : Action Plan; Long Term : Kasson SPS
CVLY-T-48	Cortina 230/115/60 kV Transformer No. 1	Cortina 115kV BAAH Bus #2 (failure of non-redundant relay)	P5	Non-redundant relay (bus)	<90	<90	<90	<90	<90	<90	<90	110	<90	<90	Existing operating procedure
CVLY-T-49	RIO OSO-SPI JCT 115 kV	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5	Non-redundant relay (bus)	129	109	50	41	33	142	114	121	54	52	Short Term : Action Plan; Long Term : Rio Oso – Atlantic 230 kV Line Project
CVLY-T-50	Lincoln - Pleasant Grove 115 kV Line	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5	Non-redundant relay (bus)	134	112	83	44	36	148	117	124	92	97	Short Term : Action Plan; Long Term : Rio Oso – Atlantic 230 kV Line Project
CVLY-T-51	Tesla - Tracy 115 kV Line	Schulte 115kV BAAH Bus #1 (failure of non-redundant relay)	P5	Non-redundant relay (bus)	103	70	77	34	23	108	75	73	84	78	Short Term : Action Plan; Long Term : Vierra 115 kV Looping Project
CVLY-T-52	Birds Landing - Contra Costa PP 230 kV Line	LAMBIE SW STA-BIRDS LANDING SW STA 230kV [5820] & BIRDS LANDING SW STA-CONTRA COSTA SUB 230kV [6161]	P6	N-1/N-1	<90	<90	<90	99	100	<90	<90	<90	<90	<90	Reduce generation in Birds Landing area following the first contingency.
CVLY-T-53	Woodland-Davis 115 kV line	WEST SACRAMENTO-DAVIS 115kV [4120] & BRIGHTN-DAVIS-BRKR SLG 115kV [0]	P6	N-1/N-1	128	<90	<90	<90	<90	138	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-T-54	Brighton 230/115 kV Transformer No. 9	WDLND_BM-WOODLD-DAVIS 115kV [4210] & BRIGHTON 230/115kV TB 10	P6	N-1/N-1	95	<90	<90	<90	<90	100	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-T-55	Brighton - Davis 115 kV Line	WDLND_BM-WOODLD-DAVIS 115kV [4210] & WEST SACRAMENTO-DAVIS 115kV [4120]	P6	N-1/N-1	122	<90	<90	<90	<90	130	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-T-56	Vaca Dixon 230/115 kV Transformer No. 3	VACA-DIX 230/115kV TB 4 & WOLFSKIL 14kV Gen Unit 1	P6	N-1/N-1	109	96	100	<90	<90	115	100	100	103	100	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-T-57	Vaca Dixon 230/115 kV Transformer No. 4	VACA-DIX 230/115kV TB 3 & WOLFSKIL 14kV Gen Unit 1	P6	N-1/N-1	109	96	100	<90	<90	115	100	100	103	100	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-T-58	Gold Hill 230/115 kV Transformer No. 1	GOLDHILL 230/115kV TB 2 & DRUM-HIGGINS 115kV [4393]	P6	N-1/N-1	100	92	<90	<90	<90	109	96	93	<90	<90	Short Term : Action Plan; Long Term : Atlantic-Placer 115 kV line project.
CVLY-T-59	Gold Hill 230/115 kV Transformer No. 2	GOLDHILL 230/115kV TB 1 & DRUM-HIGGINS 115kV [4393]	P6	N-1/N-1	100	92	<90	<90	<90	110	96	93	<90	<90	Short Term : Action Plan; Long Term : Atlantic-Placer 115 kV line project.

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
CVLY-T-60	Missouri Flat - Gold Hill 115 kV No. 1 Line	MISSOURI FLAT-GOLD HILL #2 115kV [2670] & GOLD HILL-CLARKSVILLE 115kV [9430]	P6	N-1/N-1	116	<90	<90	<90	<90	<90	127	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Missouri Flat-Gold Hill 115 kV line project.
CVLY-T-61	Cortina 230/115/60 kV Transformer No. 1	CORTINA 115/60kV TB 5 & WADHAM 9kV Gen Unit 1	P6	N-1/N-1	122	111	115	<90	<90	132	113	116	125	121	Existing operating procedure	
CVLY-T-62	Vaca 115/60 kV transformer #5	VACA-DIX 115/60kV TB 9 & DIXON-VACA #2 60kV [6740]	P6	N-1/N-1	137	<90	<90	<90	<90	142	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project	
CVLY-T-63	Rio Oso 230/115 kV Bank No. 1	RIO OSO-BRIGHTON 230kV [5600] & RIO OSO 230/115kV TB 2	P6	N-1/N-1	102	<90	<90	<90	<90	103	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Rio Oso 230/115 kV Transformer Upgrades Project	
CVLY-T-64	Rio Oso 230/115 kV Bank No. 2	RIO OSO 230/115kV TB 1 & RIO OSO-BRIGHTON 230kV [5600]	P6	N-1/N-1	100	<90	<90	<90	<90	100	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Rio Oso 230/115 kV Transformer Upgrades Project	
CVLY-T-65	Drum - Rio Oso 115 kV No. 1 Line	DRUM-RIO OSO #2 115kV [1431] & PLACER HIGGINS 115kV [1412]	P6	N-1/N-1	159	168	172	191	<90	156	167	171	103	104	Drum operating procedure	
CVLY-T-66	Drum - Rio Oso 115 kV No. 2 Line	DRUM-RIO OSO #1 115kV [4393] & PLACER HIGGINS 115kV [1412]	P6	N-1/N-1	100	100	<90	203	<90	100	100	98	<90	<90	Drum operating procedure	
CVLY-T-67	RIO OSO-SPI JCT 115 kV	RIO OSO-ATLANTIC 230kV [5590] & ATLANTIC-GOLD HILL 230kV [4330]	P6	N-1/N-1	97	<90	<90	<90	<90	108	<90	92	<90	<90	Short Term : Action Plan; Long Term : Rio Oso – Atlantic 230 kV Line Project	
CVLY-T-68	Drum - Higgins 115 kV Line	GOLDHILL 230/115kV TB 1 & GOLDHILL 230/115kV TB 2	P6	N-1/N-1	<90	91	100	<90	<90	95	<90	<90	<90	100	Drum operating procedure	
CVLY-T-69	Drum 115/60 kV Transformer No. 1	DRUM-RIO OSO #2 115kV [1431] & PLACER HIGGINS 115kV [1412]	P6	N-1/N-1	144	148	146	178	<90	151	147	148	<90	<90	Drum operating procedure	
CVLY-T-70	Table Mountain-Pease 60 kV Line (Peachton-Gridley)	WEST SACRAMENTO-BRIGHTON 115kV [4110] & PEAS RG 60/60kV TB 1	P6	N-1/N-1	101	<90	<90	<90	<90	96	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Pease 115/60 kV Transformer Addition and Bus Upgrade project.	
CVLY-T-71	East Nicolaus 115/60 kV Transformer No. 2	RIO OSO-NICOLAUS 115kV [3440] & E.NICOLS 115/60kV TB 3	P6	N-1/N-1	<90	<90	118	<90	<90	<90	<90	<90	127	118	Replace transformer	
CVLY-T-72	East Nicolaus 115/60 kV Transformer No. 3	RIO OSO-NICOLAUS 115kV [3440] & E.NICOLS 115/60kV TB 2	P6	N-1/N-1	<90	<90	118	<90	<90	<90	<90	<90	127	118	Replace transformer	
CVLY-T-73	Lincoln - Pleasant Grove 115 kV Line	RIO OSO-ATLANTIC 230kV [5590] & ATLANTIC-GOLD HILL 230kV [4330]	P6	N-1/N-1	101	<90	<90	<90	<90	112	<90	94	<90	<90	Short Term : Action Plan; Long Term : Rio Oso – Atlantic 230 kV Line Project	
CVLY-T-74	Drum - Grass Valley - Weimar 60 kV Line	RIO OSO-WEST SACRAMENTO 115kV [3450] & COLGATE-GRASS VALLEY 60kV [6490]	P6	N-1/N-1	101	<90	<90	<90	<90	103	<90	<90	98	<90	Drum operating procedure	

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
CVLY-T-75	Placer 115/60 kV Transformer No. 1	PLACER 115/60kV TB 2 & HALSEY 60/6.6kV TB 1	P6	N-1/N-1	<90	<90	<90	<90	<90	<90	101	<90	<90	104	<90	Short Term : Action Plan; Long Term : Pease 115/60 kV Transformer Addition and Bus Upgrade project.
CVLY-T-76	Placer - Del Mar 60 kV Line (Penryn-Sierra Pine)	ATLANTC SVD=v & PLACER-DEL MAR 60kV [7800] (Placer-Penryn Sec)	P6	N-1/N-1	<90	<90	<90	<90	<90	<90	95	<90	<90	100	<90	Preferred resource
CVLY-T-77	Schulte - Kasson - Manteca 115 kV Line	TESLA-TRACY 115kV [4020] & SCHULTE SW STA-LAMMERS 115kV [3993]	P6	N-1/N-1	120	<90	<90	<90	<90	<90	126	91	<90	98	92	Short Term : Action Plan; Long Term : Vierra 115 kV Looping Project
CVLY-T-78	Vierra - Tracy - Kasson 115 kV Line	SCHULTE SW STA-LAMMERS 115kV [3993] & SCHULTE SW STA-KASSON-MANTECA 115kV [7472]	P6	N-1/N-1	115	<90	<90	<90	<90	<90	121	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Vierra 115 kV Looping Project
CVLY-T-79	Tesla - Tracy 115 kV Line	SCHULTE SW STA-LAMMERS 115kV [3993] & SCHULTE SW STA-KASSON-MANTECA 115kV [7472]	P6	N-1/N-1	117	<90	<90	<90	<90	<90	123	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Vierra 115 kV Looping Project
CVLY-T-80	Stagg - Country Club 60 kV Line No. 1	STAGG-COUNTRY CLUB #2 60kV [8090] & STAGG-HAMMER 60kV [8100]	P6	N-1/N-1	135	<90	<90	<90	<90	<90	141	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Stagg – Hammer 60 kV Line project.
CVLY-T-81	Stagg - Country Club 60 kV Line No. 2	STAGG-COUNTRY CLUB #1 60kV [8080] & STAGG-HAMMER 60kV [8100]	P6	N-1/N-1	135	<90	<90	<90	<90	<90	141	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Stagg – Hammer 60 kV Line project.
CVLY-T-82	Stagg - Hammer 60 kV Line No. 1	STAGG-COUNTRY CLUB #1 60kV [8080] & STAGG-COUNTRY CLUB #2 60kV [8090]	P6	N-1/N-1	136	<90	<90	<90	<90	<90	142	<90	<90	<90	<90	Short Term : Action Plan; Long Term : Stagg – Hammer 60 kV Line project.
CVLY-T-83	Hammer - Country Club 60 kV	STAGG-COUNTRY CLUB #1 60kV [8080] & STAGG-COUNTRY CLUB #2 60kV [8090]	P6	N-1/N-1	96	<90	92	<90	<90	<90	101	<90	<90	98	91	Operating solution
CVLY-T-84	Lockeford 230/60 kV Transformer No. 2	HAMMER-COUNTRY CLUB 60kV [7010] & LOCKFORD 230/60kV TB 3	P6	N-1/N-1	97	102	<90	<90	<90	<90	94	104	102	<90	<90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-T-85	Lockeford 230/60 kV Transformer No. 3	HAMMER-COUNTRY CLUB 60kV [7010] & LOCKFORD 230/60kV TB 2	P6	N-1/N-1	97	102	<90	<90	<90	<90	94	104	102	<90	<90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-T-86	Lockeford - Lodi 60 kV Line No. 1	LOCKEFORD-INDUSTRIAL 60kV [7420] & LOCKEFORD-LODI #2 60kV [7440]	P6	N-1/N-1	115	108	NA	96	NA	NA	117	110	108	NA	NA	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-T-87	Lockeford - Lodi 60 kV Line No. 2	LODI-INDUSTRIAL 60kV [6755] & LOCKEFORD-INDUSTRIAL 60kV [7420]	P6	N-1/N-1	121	116	NA	NA	110	122	117	116	NA	NA	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-T-88	Lockeford - Lodi 60 kV Line No. 3	LOCKEFORD-INDUSTRIAL 60kV [7420] & LOCKEFORD-LODI #2 60kV [7440]	P6	N-1/N-1	149	140	NA	128	127	151	143	140	NA	NA	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-T-89	Lockeford - Industrial 60 kV Line	LOCKEFORD-LODI #2 60kV [7440] & LODI-INDUSTRIAL 60kV [6755]	P6	N-1/N-1	109	105	NA	102	105	109	105	104	NA	NA	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-T-90	Kasson 115/60 kV Transformer No. 1	MANTECA-VIERRA 115kV [2190] & SCHULTE SW STA-KASSON-MANTECA 115kV [7472]	P6	N-1/N-1	99	<90	94	<90	<90	99	<90	<90	100	96	Short Term : Action Plan; Long Term : Kasson SPS
CVLY-T-91	Lodi - Industrial 60 kV Line	LOCKEFORD-LODI #2 60kV [7440] & LOCKEFORD-INDUSTRIAL 60kV [7420]	P6	N-1/N-1	115	111	NA	108	109	116	111	110	NA	NA	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-T-92	Delevan-Cortina 230 kV Line	Delevan-Vaca Dixon No.2 230 kV Line & Delevan-Vaca Dixon No.3 230 kV Line	P7	DCTL	70	107	68	42	48	72	72	69	69	71	Preferred resource
CVLY-T-93	Brighton - Davis 115 kV Line	Rio Oso-West Sacramento 115 kV Line & West Sacramento-Brighton 115 kV Line	P7	DCTL	97	40	35	41	41	105	38	39	41	39	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-T-94	Pease - Rio Oso 115 kV Line	Colgate-Rio Oso 230 kV Line & Table Mountain-Rio Oso 230 kV Line	P7	DCTL	105	119	61	23	50	114	107	107	61	52	Short Term : Action Plan; Long Term : South of Palermo 115 kV Reinforcement Project
CVLY-T-95	Bogue - Rio Oso 115 kV Line	Colgate-Rio Oso 230 kV Line & Table Mountain-Rio Oso 230 kV Line	P7	DCTL	106	112	55	38	39	112	103	102	54	55	Short Term : Action Plan; Long Term : South of Palermo 115 kV Reinforcement Project
CVLY-T-96	RIO OSO-SPI JCT 115 kV	Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	95	114	60	52	52	98	111	111	62	61	Short Term : Action Plan; Long Term : Rio Oso – Atlantic 230 kV Line Project
CVLY-T-97	Drum - Higgins 115 kV Line	Atlantic-Gold Hill 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	106	117	83	75	42	110	112	107	83	80	Drum operating procedure
CVLY-T-98	Lincoln - Pleasant Grove 115 kV Line	Rio Oso-Atlantic 230 kV Line & Rio Oso-Gold Hill 230 kV Line	P7	DCTL	98	117	83	55	56	101	114	114	92	97	Short Term : Action Plan; Long Term : Rio Oso – Atlantic 230 kV Line Project
CVLY-T-99	Valley Springs - Martell 60 kV Line No. 1	VALLEY SPRINGS-CLAY 60kV [8252] & VALLEY SPRINGS #2 60kV [8231]	P7	DCTL	119	110	111	71	58	124	116	110	119	111	Disable automatics

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CVLY-T-100	Stagg - Hammer 60 kV Line No. 1	STAGG-COUNTRY CLUB #1 60kV [8080] & STAGG-COUNTRY CLUB #2 60kV [8090]	P7	DCTL	150	54	71	71	26	156	57	55	75	71	Short Term : Action Plan; Long Term : Stagg – Hammer 60 kV Line project.
CVLY-T-101	Hammer - Country Club 60 kV	STAGG-COUNTRY CLUB #1 60kV [8080] & STAGG-COUNTRY CLUB #2 60kV [8090]	P7	DCTL	106	67	101	51	28	111	70	68	107	100	Operating solution

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-VD-1	BANTA 60 kV	KASSON 115/60kV TB 1	P1	N-1	5.9	5.5	6.5	2.1	0.7	6.2	6.0	5.5	7.2	6.5	Short Term : Action Plan; Long Term : Kasson SPS
CVLY-VD-2	BARRY 60 kV	RIO OSO-NICOLAUS 115kV	P1	N-1	4.8	7.8	6.9	1.0	-2.1	5.1	8.6	7.8	8.8	7.7	Nicolaus 60 kV voltage support
CVLY-VD-3	CALVO 60 kV	KASSON 115/60kV TB 1	P1	N-1	5.2	4.9	5.8	1.8	0.6	5.5	5.3	4.8	6.4	5.8	Short Term : Action Plan; Long Term : Kasson SPS
CVLY-VD-4	CARBONA 60 kV	KASSON 115/60kV TB 1	P1	N-1	6.0	5.6	6.6	2.1	0.7	6.3	6.1	5.6	7.4	6.6	Short Term : Action Plan; Long Term : Kasson SPS
CVLY-VD-5	CATLETT 60 kV	RIO OSO-NICOLAUS 115kV	P1	N-1	4.7	7.7	6.8	1.0	-2.1	5.0	8.5	7.8	8.7	7.6	Nicolaus 60 kV voltage support
CVLY-VD-6	COLONY 60 kV	LOCKEFORD-BELLOTA 230kV	P1	N-1	10.2	1.7	0.2	1.4	1.2	11.2	0.9	1.4	0.3	0.3	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-7	CORT_D 115 kV	CORTINA 230/115kV TB 4	P1	N-1	0.2	2.5	1.0	-1.9	1.1	0.1	1.1	5.3	1.7	5.3	Cortina area voltage support
CVLY-VD-8	DEEPWATR 115 kV	WEST SACRAMENTO-BRIGHTON 115kV	P1	N-1	6.7	2.3	0.6	-0.6	0.5	7.6	1.8	2.1	2.1	2.0	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-9	DIST1500 60 kV	RIO OSO-NICOLAUS 115kV	P1	N-1	4.7	7.6	6.8	1.0	-2.1	5.0	8.4	7.7	8.6	7.6	Nicolaus 60 kV voltage support
CVLY-VD-10	DIST2047 60 kV	CORTINA #1 60kV	P1	N-1	7.3	6.5	6.8	2.8	1.5	8.0	6.5	6.5	7.7	6.9	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-11	E.MRYSVE 115 kV	RIO OSO-NICOLAUS 115kV	P1	N-1	2.6	5.3	6.1	0.6	-1.3	2.8	5.0	4.6	7.1	6.2	Nicolaus 60 kV voltage support
CVLY-VD-12	E.NICOLS 60 kV	RIO OSO-NICOLAUS 115kV	P1	N-1	4.7	7.6	6.8	1.0	-2.1	5.0	8.4	7.7	8.6	7.6	Nicolaus 60 kV voltage support
CVLY-VD-13	GRSS VLY 60 kV	COLGATE-GRASS VALLEY 60kV	P1	N-1	4.9	3.7	4.9	3.1	5.0	5.1	4.7	4.4	5.7	4.8	Short Term : Action Plan; Long Term : Preferred resource.
CVLY-VD-14	LODI 60 kV	LOCKEFORD-BELLOTA 230kV	P1	N-1	10.4	1.7	0.4	1.4	1.1	11.4	0.9	1.4	0.2	0.3	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-15	LYOTH-SP 60 kV	KASSON 115/60kV TB 1	P1	N-1	5.9	5.5	6.5	2.1	0.7	6.2	6.0	5.5	7.2	6.5	Short Term : Action Plan; Long Term : Kasson SPS
CVLY-VD-16	MARTELL 60 kV	VALLEY SPRINGS-MARTELL #1 60kV	P1	N-1	5.1	4.5	4.6	2.7	1.5	5.2	4.9	7.2	5.0	4.7	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-17	MONDAVI 60 kV	LOCKEFORD-BELLOTA 230kV	P1	N-1	10.4	1.7	0.4	1.4	1.1	11.4	0.9	1.4	0.2	0.3	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-18	NEW HOPE 60 kV	LOCKEFORD-BELLOTA 230kV	P1	N-1	10.6	1.7	0.4	1.4	1.2	11.6	0.9	1.4	0.3	0.3	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-19	PENRYN 60 kV	PLACER-DEL MAR 60kV	P1	N-1	8.1	3.4	3.3	-0.7	-6.0	9.3	3.0	2.8	4.3	3.3	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-VD-20	PLUMAS 60 kV	RIO OSO-NICOLAUS 115kV	P1	N-1	4.8	7.9	7.1	1.0	-2.1	5.1	8.7	7.9	9.0	7.9	Nicolaus 60 kV voltage support
CVLY-VD-21	PNE GRVE 60 kV	WEST PNT 12kV Gen Unit 1	P1	N-1	5.4	3.3	3.2	3.0	-1.6	5.7	3.3	3.2	3.4	3.1	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-22	POST 115 kV	WEST SACRAMENTO-BRIGHTON 115kV	P1	N-1	6.5	2.2	0.6	-0.6	0.6	7.4	1.8	2.0	2.2	2.0	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-23	SCHMLBCH 115 kV	VACA-SUISUN 115kV	P1	N-1	4.4	5.4	4.5	1.4	0.7	4.6	4.9	4.9	4.8	4.6	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-24	SUISUN 115 kV	VACA-SUISUN 115kV	P1	N-1	4.7	5.7	4.8	1.5	0.7	4.9	5.2	5.2	5.1	4.9	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-25	TUDOR 60 kV	RIO OSO-NICOLAUS 115kV	P1	N-1	4.7	7.7	6.9	1.0	-2.1	5.1	8.5	7.8	8.7	7.7	Nicolaus 60 kV voltage support
CVLY-VD-26	VICTOR 60 kV	LOCKEFORD-BELLOTA 230kV	P1	N-1	10.2	1.7	0.1	1.4	1.2	11.2	0.9	1.4	0.3	0.3	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-27	W.SCRMNO 115 kV	WEST SACRAMENTO-BRIGHTON 115kV	P1	N-1	6.5	2.2	0.5	-0.7	0.6	7.4	1.8	2.0	2.1	1.9	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-28	WEST PNT 60 kV	WEST PNT 12kV Gen Unit 1	P1	N-1	6.7	4.3	4.3	3.9	-1.7	6.9	4.4	4.2	4.5	4.2	Short Term : Action Plan; Long Term : West Point – Valley Springs 60 kV Line project.
CVLY-VD-29	WHEATLND 60 kV	RIO OSO-NICOLAUS 115kV	P1	N-1	4.9	8.1	7.2	1.0	-2.1	5.2	8.9	8.1	9.2	8.1	Nicolaus 60 kV voltage support
CVLY-VD-30	WILKINS 60 kV	CORTINA #1 60kV	P1	N-1	7.3	6.5	6.8	2.8	1.5	8.0	6.5	6.5	7.7	6.9	Cortina area voltage support
CVLY-VD-31	BRKR SLG 115 kV	BRIGHTN - ME 115kV & BRIGHTN-DAVIS-BRKR SLG line	P2	Non-bus-tie breaker	9.5	2.7	1.5	0.7	-0.1	11.2	2.1	2.4	2.1	2.1	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-32	CAMPUS 115 kV	BRIGHTN - ME 115kV & BRIGHTN-DAVIS-BRKR SLG line	P2	Non-bus-tie breaker	8.7	1.8	0.9	0.6	0.0	10.2	1.4	1.6	1.5	1.5	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-33	CNTRY CB 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	13.3	91.2	0.0	0.3	7.8	17.7	92.1	91.8	0.6	0.7	Operating action plan
CVLY-VD-34	COLONY 60 kV	LOCKFORD 230kV - Ring R3 & R2	P2	Non-bus-tie breaker	18.9	3.5	4.8	1.5	1.2	21.2	11.8	3.0	5.7	5.5	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-35	CORT_D 115 kV	CORTINA 230kV - Ring R2 & R3	P2	Non-bus-tie breaker	11.9	11.1	13.6	4.8	7.4	12.1	12.4	14.6	12.3	16.6	Cortina area voltage support
CVLY-VD-36	DAVIS 115 kV	BRIGHTN - ME 115kV & BRIGHTN-DAVIS-BRKR SLG line	P2	Non-bus-tie breaker	8.6	1.9	0.9	0.6	0.0	10.2	1.5	1.7	1.6	1.6	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-VD-37	DEEPWATR 115 kV	BRIGHTN - ME 115kV & BRIGHTN-DAVIS-BRKR SLG line	P2	Non-bus-tie breaker	9.5	3.3	1.4	0.4	0.5	11.3	2.6	3.0	3.0	2.8	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-38	EIGHT MI 230 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	15.1	2.2	3.9	2.3	-0.7	18.0	5.7	5.2	2.9	3.1	Operating action plan
CVLY-VD-39	ENCINAL 60 kV	PEASE - MA 60kV & PEASE-HARTER line	P2	Non-bus-tie breaker	9.5	12.5	10.9	4.4	4.2	9.7	11.1	11.4	11.3	10.7	Pease 60 kV voltage support
CVLY-VD-40	HAMMER 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	13.5	90.5	0.0	0.3	7.7	18.0	91.4	91.2	0.6	0.7	Operating action plan
CVLY-VD-41	KNIGHTLD 115 kV	RIO OSO 115kV - Section 1D & 2D	P2	Bus-tie breaker	6.1	9.6	8.5	3.8	0.0	7.3	9.8	11.2	10.5	11.5	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-VD-42	LIVE OAK 60 kV	PEASE - MA 60kV & PEASE-HARTER line	P2	Non-bus-tie breaker	9.0	11.9	10.4	4.1	4.0	9.2	10.5	10.8	10.7	10.1	Pease 60 kV voltage support
CVLY-VD-43	METTLER 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	13.7	88.0	0.0	0.3	7.4	18.4	88.8	88.6	0.6	0.7	Operating action plan
CVLY-VD-44	MSHR 60V 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	14.1	73.1	0.0	0.3	6.1	18.9	73.6	73.6	0.6	0.7	Operating action plan
CVLY-VD-45	NEW HOPE 60 kV	LOCKFORD 230kV - Ring R3 & R2	P2	Non-bus-tie breaker	19.6	3.6	8.7	1.5	1.2	22.0	12.1	3.0	9.7	9.4	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-46	POST 115 kV	BRIGHTN - ME 115kV & BRIGHTN-DAVIS-BRKR SLG line	P2	Non-bus-tie breaker	9.4	3.2	1.3	0.5	0.5	11.1	2.7	2.9	2.8	2.7	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-47	SEBASTIA 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	13.6	91.9	0.0	0.3	8.1	18.2	92.6	92.6	0.6	0.7	Operating action plan
CVLY-VD-48	STAGG 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	13.1	91.7	0.0	0.3	7.9	17.5	92.7	92.4	0.6	0.7	Operating action plan
CVLY-VD-49	TERMNOUS 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	13.5	91.9	0.0	0.3	8.0	18.1	92.7	92.6	0.6	0.7	Operating action plan
CVLY-VD-50	UOP 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	13.3	91.0	0.0	0.3	7.7	17.8	92.0	91.7	0.6	0.7	Operating action plan
CVLY-VD-51	VICTOR 60 kV	LOCKFORD 230kV - Ring R3 & R2	P2	Non-bus-tie breaker	18.8	3.5	0.3	1.5	1.2	21.0	11.7	3.0	0.5	0.5	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-52	W.SCRMNO 115 kV	BRIGHTN - ME 115kV & BRIGHTN-DAVIS-BRKR SLG line	P2	Non-bus-tie breaker	9.4	3.2	1.3	0.3	0.5	11.1	2.6	2.9	2.9	2.8	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-53	WOODLD 115 kV	RIO OSO 115kV - Section 1D & 2D	P2	Bus-tie breaker	6.2	8.4	7.4	3.2	0.1	7.4	8.6	10.0	9.3	10.3	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-VD-54	ZAMORA 115 kV	RIO OSO 115kV - Section 1D & 2D	P2	Bus-tie breaker	6.1	9.6	8.5	3.8	0.0	7.3	9.8	11.2	10.5	11.6	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-VD-55	AM FORST 60 kV	VALLEY SPRINGS-MARTELL #1 60kV [8240] (VLLY SPS-AMFOR_SW)	P2-1	Line section w/o fault	5.4	4.9	5.0	3.0	1.8	5.5	5.3	7.7	5.3	5.1	Transfer trip to open other end
CVLY-VD-56	APPLE HL 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	14.6	7.7	9.7	1.2	0.7	22.3	8.7	7.9	14.7	9.6	Transfer trip to open other end
CVLY-VD-57	BRUNSWCK 115 kV	DRUM-RIO OSO #2 115kV [1430] (DRUM-BRUNSWCKP)	P2-1	Line section w/o fault	5.4	3.2	3.6	2.2	1.5	5.8	3.2	3.4	3.6	3.5	Transfer trip to open other end
CVLY-VD-58	CLAY 60 kV	VALLEY SPRINGS-CLAY 60kV [8264] (CLAY-BUENA_TP)	P2-1	Line section w/o fault	5.4	5.2	5.1	3.7	3.0	5.6	5.3	4.0	5.4	5.1	Transfer trip to open other end
CVLY-VD-59	CRWS LDG 60 kV	SALADO-NEWMAN #2 60kV [7870] (PATTERSN-CRWS LDJ)	P2-1	Line section w/o fault	5.9	5.4	6.1	-0.2	0.0	6.4	5.7	5.9	7.1	6.1	Transfer trip to open other end
CVLY-VD-60	DMND SPR 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	22.6	13.5	16.4	2.9	1.6	33.4	15.1	13.7	23.8	16.2	Transfer trip to open other end
CVLY-VD-61	ELDORAD 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	16.8	9.1	11.5	1.6	0.9	25.4	10.3	9.3	17.1	11.2	Transfer trip to open other end
CVLY-VD-62	ENCINAL 60 kV	ENCL TAP-PEASE 60kV [0] No Fault	P2-1	Line section w/o fault	9.5	12.6	11.0	4.4	4.3	9.7	11.2	11.4	11.4	10.7	Transfer trip to open other end
CVLY-VD-63	FORST HL 60 kV	WEIMAR #1 60kV [7560] (ENVRO_HY-FORST HL)	P2-1	Line section w/o fault	5.8	5.6	5.7	2.7	2.3	5.8	5.6	5.6	5.8	5.7	Transfer trip to open other end
CVLY-VD-64	INE PRSN 60 kV	VALLEY SPRINGS-CLAY 60kV [8264] (CLAY-BUENA_TP)	P2-1	Line section w/o fault	5.1	4.9	4.8	3.5	2.8	5.3	5.0	3.8	5.1	4.8	Transfer trip to open other end
CVLY-VD-65	LIVE OAK 60 kV	ENCL TAP-PEASE 60kV [0] No Fault	P2-1	Line section w/o fault	9.1	12.0	10.4	4.2	4.0	9.2	10.6	10.9	10.8	10.2	Transfer trip to open other end

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-VD-66	MARTELL 60 kV	VALLEY SPRINGS-MARTELL #1 60kV [8240] (VLLY SPS-AMFOR_SW)	P2-1	Line section w/o fault	5.4	4.8	4.9	3.0	1.7	5.5	5.2	7.7	5.3	5.0	Transfer trip to open other end
CVLY-VD-67	METTLER 60 kV	HAMMER-COUNTRY CLUB 60kV [7010] (HMMR JCT-MORADAJT)	P2-1	Line section w/o fault	0.0	5.5	0.0	0.0	0.8	0.0	6.2	5.7	0.0	0.0	Transfer trip to open other end
CVLY-VD-68	NEWMAN 60 kV	SALADO-NEWMAN #2 60kV [7870] (PATTERSN-CRWS LDJ)	P2-1	Line section w/o fault	4.6	4.2	4.7	0.0	0.1	5.0	4.5	4.8	5.6	4.7	Transfer trip to open other end
CVLY-VD-69	PLCRVLB2 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	21.8	12.8	15.7	2.6	1.5	32.3	14.4	13.0	22.9	15.5	Transfer trip to open other end
CVLY-VD-70	PLCRVLB3 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	21.8	12.8	15.7	2.6	1.5	32.3	14.4	13.0	22.9	15.5	Transfer trip to open other end
CVLY-VD-71	RIPON 115 kV	RIVERBANK JCT SW STA-MANTECA 115kV [3841] (RPN JNCN-MANTECA)	P2-1	Line section w/o fault	4.9	4.5	5.3	0.1	0.6	5.2	4.9	5.1	5.8	5.6	Transfer trip to open other end
CVLY-VD-72	SCHMLBCH 115 kV	VACA-SUISUN 115kV [4070] (WEC-SUISUN)	P2-1	Line section w/o fault	4.4	5.2	4.4	1.4	0.6	4.6	4.8	4.8	4.7	4.5	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-VD-73	SHPRING 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	24.0	14.6	17.7	3.5	1.7	35.0	16.3	14.8	25.3	17.5	Transfer trip to open other end
CVLY-VD-74	SPICAMIN 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	14.6	7.7	9.7	1.2	0.7	22.3	8.7	7.9	14.7	9.6	Transfer trip to open other end
CVLY-VD-75	SUISUN 115 kV	VACA-SUISUN 115kV [4070] (WEC-SUISUN)	P2-1	Line section w/o fault	4.6	5.5	4.7	1.4	0.7	4.8	5.1	5.0	5.0	4.8	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-VD-76	TRAVIS 60 kV	DIXON-VACA #1 60kV [6730] (VACA-DXN-VACA-JT1)	P2-1	Line section w/o fault	5.9	<5.0	<5.0	<5.0	<5.0	6.0	<5.0	<5.0	<5.0	<5.0	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-VD-77	TRVS_HPT 60 kV	DIXON-VACA #1 60kV [6730] (VACA-DXN-VACA-JT1)	P2-1	Line section w/o fault	5.9	<5.0	<5.0	<5.0	<5.0	6.0	<5.0	<5.0	<5.0	<5.0	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
CVLY-VD-78	DEL MAR 60 kV	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	12.7	<10.0	<10.0	<10.0	<10.0	<10.0	15.8	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-VD-79	PLSNT GR 115 kV	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	9.8	<10.0	<10.0	<10.0	<10.0	<10.0	12.1	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-VD-80	ROCKLIN 60 kV	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	12.5	<10.0	<10.0	<10.0	<10.0	<10.0	15.5	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-VD-81	SIERRAPI 60 kV	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	12.7	<10.0	<10.0	<10.0	<10.0	<10.0	15.8	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-VD-82	TAYLOR 60 kV	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	12.4	<10.0	<10.0	<10.0	<10.0	<10.0	15.4	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-VD-83	BELL PGE 115 kV	Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	10.5	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Atlantic-Placer 115 kV line project.
CVLY-VD-84	COLONY 60 kV	BRIGHTON-BELLOTA 230kV [4420] & LOCKEFORD-BELLOTA 230kV [4990]	P7	DCTL	13.4	<10.0	<10.0	<10.0	<10.0	<10.0	15.1	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-85	EIGHT MI 230 kV	EIGHT MILE ROAD-TESLA 230kV [4660] & STAGG-TESLA 230kV [5680]	P7	DCTL	12.9	<10.0	<10.0	<10.0	<10.0	<10.0	14.9	5.6	<10.0	<10.0	<10.0	Operating action plan
CVLY-VD-86	ENCINAL 60 kV	Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	12.0	Increase Pease 60 kV generation
CVLY-VD-87	LIVE OAK 60 kV	Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	11.7	Increase Pease 60 kV generation
CVLY-VD-88	LODI 60 kV	BRIGHTON-BELLOTA 230kV [4420] & LOCKEFORD-BELLOTA 230kV [4990]	P7	DCTL	13.7	<10.0	<10.0	<10.0	<10.0	<10.0	15.4	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-89	MONDAVI 60 kV	BRIGHTON-BELLOTA 230kV [4420] & LOCKEFORD-BELLOTA 230kV [4990]	P7	DCTL	13.7	<10.0	<10.0	<10.0	<10.0	<10.0	15.4	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-90	MRYSVLE 60 kV	Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	13.0	Increase Pease 60 kV generation
CVLY-VD-91	MRYSVLE 60 kV	Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	13.0	Increase Pease 60 kV generation

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
CVLY-VD-92	NEW HOPE 60 kV	BRIGHTON-BELLOTA 230kV [4420] & LOCKEFORD-BELLOTA 230kV [4990]	P7	DCTL	13.9	<10.0	<10.0	<10.0	<10.0	<10.0	15.7	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-VD-93	PEASE 115 kV	Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	14.3	Increase Pease 60 kV generation
CVLY-VD-94	PLACER 115 kV	Placer-Gold Hill No. 1 115 kV Line and Placer-Gold Hill No. 2 115 kV Line	P7	DCTL	10.1	<10.0	<10.0	<10.0	<10.0	<10.0	11.0	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Atlantic-Placer 115 kV line project.
CVLY-VD-95	VICTOR 60 kV	BRIGHTON-BELLOTA 230kV [4420] & LOCKEFORD-BELLOTA 230kV [4990]	P7	DCTL	13.4	<10.0	<10.0	<10.0	<10.0	<10.0	15.0	<10.0	<10.0	<10.0	<10.0	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-V-1	ALTA-CGE 60 kV	Base Case	P0	Normal	1.04	<1.05	<1.05	1.06	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	Check voltage settings in the area
CVLY-V-2	AMERIGAS 115 kV	Base Case	P0	Normal	1.04	1.00	1.03	1.06	1.05	1.04	1.02	1.01	1.03	1.02	Cortina area voltage support
CVLY-V-3	B.BTHNY- 60 kV	Base Case	P0	Normal	1.04	<1.05	<1.05	1.06	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	Check voltage settings in the area
CVLY-V-4	BRNSWALT 115 kV	Base Case	P0	Normal	1.02	<1.05	<1.05	1.06	<1.05	1.02	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-5	BRNSWCKP 115 kV	Base Case	P0	Normal	1.02	<1.05	<1.05	1.06	<1.05	1.01	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-6	BRUNSWCK 115 kV	Base Case	P0	Normal	1.01	<1.05	<1.05	1.06	<1.05	1.01	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-7	CHCGO PK 115 kV	Base Case	P0	Normal	1.03	<1.05	<1.05	1.07	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-8	CHLLNGEA 60 kV	Base Case	P0	Normal	1.02	<1.05	<1.05	1.06	<1.05	1.02	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-9	COLGATE 60 kV	Base Case	P0	Normal	1.03	<1.05	<1.05	1.06	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-10	CORDELIA 115 kV	Base Case	P0	Normal	1.02	0.99	1.01	1.06	1.05	1.02	1.00	1.00	1.01	1.01	Cortina area voltage support
CVLY-V-11	CORT_D 115 kV	Base Case	P0	Normal	1.06	1.05	1.06	1.07	1.06	1.06	1.07	1.05	1.05	1.05	Cortina area voltage support
CVLY-V-12	CORTINA 115 kV	Base Case	P0	Normal	1.06	1.05	1.06	1.07	1.06	1.06	1.07	1.05	1.05	1.05	Cortina area voltage support
CVLY-V-13	CPM 115 kV	Base Case	P0	Normal	1.02	<1.05	<1.05	1.06	<1.05	1.02	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-14	DIMOND_1 115 kV	Base Case	P0	Normal	1.02	<1.05	<1.05	1.06	<1.05	1.02	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-15	DOBBINS 60 kV	Base Case	P0	Normal	1.02	1.03	1.03	1.06	1.06	1.02	1.03	1.03	1.04	1.04	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-16	DONNELLS 115 kV	Base Case	P0	Normal	1.05	1.06	1.05	1.06	1.02	1.05	1.05	1.05	1.05	1.05	Check generator voltage setting
CVLY-V-17	DRUM 115 kV	Base Case	P0	Normal	1.04	1.05	1.05	1.07	1.06	1.04	1.05	1.05	1.05	1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-18	DTCH FL1 115 kV	Base Case	P0	Normal	1.04	0.00	0.00	1.07	0.00	1.03	0.00	0.00	0.00	0.00	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
CVLY-V-19	DTCH FL2 115 kV	Base Case	P0	Normal	1.04	1.05	1.05	1.07	1.06	1.04	1.05	1.05	1.05	1.05	1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-20	GOLDHILL 115 kV	Base Case	P0	Normal	1.03	1.04	1.04	1.06	1.08	1.02	1.05	1.04	1.05	1.04	1.04	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-21	HERDLYN 60 kV	Base Case	P0	Normal	1.04	<1.05	<1.05	1.06	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	Check voltage settings in the area
CVLY-V-22	HORSHE2 115 kV	Base Case	P0	Normal	1.02	<1.05	<1.05	1.06	0.00	1.01	<1.05	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-23	MADISON 115 kV	Base Case	P0	Normal	1.02	0.99	1.01	1.06	1.05	1.02	1.01	1.00	1.01	1.01	1.01	Cortina area voltage support
CVLY-V-24	MAINE-PR 60 kV	Base Case	P0	Normal	1.03	<1.05	<1.05	1.06	<1.05	1.02	<1.05	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-V-25	MIZOU_T1 115 kV	Base Case	P0	Normal	1.02	<1.05	<1.05	1.06	<1.05	1.01	<1.05	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-26	PUTH CRK 115 kV	Base Case	P0	Normal	1.04	1.00	1.03	1.06	1.05	1.04	1.02	1.01	1.02	1.02	1.02	Cortina area voltage support
CVLY-V-27	SOUTH BY 60 kV	Base Case	P0	Normal	1.04	<1.05	<1.05	1.06	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	Check voltage settings in the area
CVLY-V-28	TOSCO-PP 60 kV	Base Case	P0	Normal	1.04	<1.05	<1.05	1.06	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	Check voltage settings in the area
CVLY-V-29	VACA-CB 115 kV	Base Case	P0	Normal	1.06	<1.05	<1.05	1.08	<1.05	1.06	<1.05	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-V-30	VACA-DXN 60 kV	Base Case	P0	Normal	1.04	<1.05	<1.05	1.06	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-V-31	VACAVLL1 115 kV	Base Case	P0	Normal	1.04	1.00	1.03	1.06	1.05	1.04	1.02	1.01	1.02	1.02	1.02	Cortina area voltage support
CVLY-V-32	VACAVLL2 115 kV	Base Case	P0	Normal	1.03	1.00	1.02	1.06	1.05	1.03	1.02	1.01	1.02	1.02	1.02	Cortina area voltage support
CVLY-V-33	WEST SDE 60 kV	Base Case	P0	Normal	1.04	<1.05	<1.05	1.06	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	Check voltage settings in the area
CVLY-V-34	CLSA CRS 60 kV	Base Case	P0	Normal	0.92	0.93	0.94	0.99	1.00	0.91	0.94	0.93	0.92	0.93	0.93	Cortina area voltage support
CVLY-V-35	COLUSA 60 kV	Base Case	P0	Normal	0.92	0.92	0.93	0.99	1.00	0.91	0.93	0.93	0.91	0.93	0.93	Cortina area voltage support
CVLY-V-36	CRTNA M 230 kV	Base Case	P0	Normal	0.96	0.94	0.96	0.98	0.97	0.96	0.96	0.94	0.95	0.95	0.95	Cortina area voltage support
CVLY-V-37	DELEVAN 60 kV	Base Case	P0	Normal	0.94	0.94	0.95	1.00	1.01	0.93	0.95	0.94	0.93	0.95	0.95	Cortina area voltage support
CVLY-V-38	DUNNIGAN 60 kV	Base Case	P0	Normal	0.94	0.94	0.95	0.99	1.00	0.93	0.95	0.94	0.94	0.95	0.95	Cortina area voltage support
CVLY-V-39	MAXTAP 60 kV	Base Case	P0	Normal	0.94	0.94	0.95	1.00	1.01	0.93	0.95	0.94	0.93	0.95	0.95	Cortina area voltage support
CVLY-V-40	MAXWELL 60 kV	Base Case	P0	Normal	0.94	0.94	0.95	1.00	1.01	0.93	0.95	0.94	0.93	0.95	0.95	Cortina area voltage support
CVLY-V-41	PEAS RG 60 kV	Base Case	P0	Normal	0.95	0.96	0.97	0.99	1.01	0.94	0.97	0.96	0.97	0.97	0.97	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-V-42	PLAINFLD 60 kV	Base Case	P0	Normal	0.89	>0.95	>0.95	1.01	>0.95	0.88	>0.95	>0.95	>0.95	>0.95	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-V-43	WILSONAV 60 kV	Base Case	P0	Normal	0.92	0.92	0.93	0.99	1.00	0.91	0.93	0.93	0.91	0.93	Cortina area voltage support
CVLY-V-44	COLUSA 60 kV	CORTINA 115/60kV TB 5	P1	N-1	0.95	0.92	0.95	1.01	1.03	0.94	0.95	0.89	0.93	0.89	Cortina area voltage support
CVLY-V-45	DIST2047 60 kV	CORTINA #1 60kV	P1	N-1	0.89	0.90	0.91	0.98	1.00	0.88	0.91	0.90	0.89	0.90	Cortina area voltage support
CVLY-V-46	LODI 60 kV	LOCKEFORD-BELLOTA 230kV	P1	N-1	0.90	1.00	1.01	1.01	1.01	0.89	1.01	1.01	1.02	1.02	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-47	MONDAVI 60 kV	LOCKEFORD-BELLOTA 230kV	P1	N-1	0.90	1.00	1.01	1.01	1.01	0.89	1.01	1.01	1.02	1.02	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-48	NEW HOPE 60 kV	LOCKEFORD-BELLOTA 230kV	P1	N-1	0.89	0.99	1.00	1.01	1.01	0.88	1.00	1.00	1.01	1.01	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-49	PLAINFLD 60 kV	VACA-DIX 115/60kV TB 9	P1	N-1	0.87	>0.90	>0.90	1.00	>0.90	0.86	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-V-50	WILKINS 60 kV	CORTINA #1 60kV	P1	N-1	0.89	0.90	0.91	0.98	1.00	0.88	0.91	0.90	0.89	0.90	Cortina area voltage support
CVLY-V-51	APPLE HL 115 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.93	1.02	1.01	1.05	1.08	0.90	1.02	1.02	1.01	1.01	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-52	CLRKSULE 115 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.92	1.02	1.01	1.05	1.08	0.89	1.01	1.02	1.01	1.01	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-53	CNTRY CB 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.90	1.04	1.04	1.04	1.05	0.86	1.04	1.04	1.04	1.04	Operating action plan
CVLY-V-54	COLONY 60 kV	LOCKFORD 230kV - Ring R3 & R2	P2	Non-bus-tie breaker	0.83	1.00	0.98	1.02	1.02	0.81	0.91	1.01	0.97	0.98	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-55	COLUSA 60 kV	CORTINA 60kV Section MD	P2	Bus	0.93	0.92	0.92	0.97	0.98	0.91	0.92	0.89	0.92	0.88	Cortina area voltage support
CVLY-V-56	CORT_D 115 kV	CORTINA 230kV - Ring R2 & R3	P2	Non-bus-tie breaker	0.94	0.94	0.93	1.02	0.99	0.94	0.94	0.90	0.93	0.89	Cortina area voltage support
CVLY-V-57	DAVIS 115 kV	BRIGHTN - ME 115kV & BRIGHTN-DAVIS-BRKR SLG line	P2	Non-bus-tie breaker	0.91	0.99	1.01	1.02	1.04	0.89	1.00	0.99	1.00	1.00	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-V-58	DEL MAR 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.89	1.00	0.99	1.04	1.09	0.86	0.99	0.99	0.99	0.99	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-V-59	DIST2047 60 kV	CORTINA - MA 60kV & CORTINA #1 line	P2	Non-bus-tie breaker	0.89	0.91	0.91	0.98	1.00	0.89	0.92	0.91	0.89	0.91	Cortina area voltage support
CVLY-V-60	DMND SPR 115 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.91	1.01	1.00	1.04	1.08	0.88	1.01	1.01	1.00	1.00	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-61	DUNNIGAN 60 kV	CORTINA 230kV - Ring R2 & R3	P2	Non-bus-tie breaker	0.95	0.94	0.94	0.97	0.98	0.94	0.94	0.92	0.94	0.90	Cortina area voltage support
CVLY-V-62	EIGHT MI 230 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.83	0.97	0.95	0.99	1.03	0.80	0.94	0.94	0.97	0.97	Operating action plan
CVLY-V-63	ELDORAD 115 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.93	1.02	1.01	1.05	1.08	0.90	1.02	1.02	1.01	1.01	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-64	ENCINAL 60 kV	PEASE - MA 60kV & PEASE-HARTER line	P2	Non-bus-tie breaker	0.91	0.89	0.91	0.99	0.99	0.90	0.91	0.91	0.91	0.91	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-65	FLINT 115 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.92	1.01	1.00	1.05	1.07	0.90	1.01	1.01	1.01	1.00	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-66	HAMMER 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.89	1.03	1.03	1.04	1.05	0.85	1.04	1.04	1.03	1.03	Operating action plan
CVLY-V-67	LIVE OAK 60 kV	PEASE - MA 60kV & PEASE-HARTER line	P2	Non-bus-tie breaker	0.91	0.89	0.91	0.99	0.99	0.90	0.91	0.91	0.91	0.91	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-68	LODI 60 kV	LOCKFORD 230kV - Ring R3 & R2	P2	Non-bus-tie breaker	0.82	0.99	0.90	1.01	1.01	0.79	0.90	1.00	0.90	0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-69	MAXWELL 60 kV	CORTINA 230kV - Ring R2 & R3	P2	Non-bus-tie breaker	0.95	0.94	0.94	0.97	0.99	0.93	0.94	0.92	0.94	0.90	Cortina area voltage support
CVLY-V-70	METTLER 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.88	1.02	1.02	1.03	1.05	0.83	1.02	1.03	1.02	1.02	Operating action plan
CVLY-V-71	MONDAVI 60 kV	LOCKFORD 230kV - Ring R3 & R2	P2	Non-bus-tie breaker	0.82	0.99	0.90	1.01	1.01	0.79	0.90	1.00	0.90	0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-72	MSHR 60V 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.86	1.02	1.00	1.02	1.05	0.81	1.02	1.02	1.00	1.00	Operating action plan
CVLY-V-73	NEW HOPE 60 kV	LOCKFORD 230kV - Ring R3 & R2	P2	Non-bus-tie breaker	0.80	0.97	0.92	1.01	1.01	0.77	0.89	0.98	0.91	0.92	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-V-74	PLAINFLD 60 kV	VACA-DIX 230kV - Section 1E & 1F	P2	Bus-tie breaker	0.86	>0.90	>0.90	1.00	>0.90	0.85	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-V-75	PLCRVLB2 115 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.92	1.01	1.00	1.04	1.08	0.88	1.01	1.01	1.00	1.00	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-76	PLCRVLB3 115 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.91	1.01	1.00	1.04	1.08	0.88	1.01	1.01	1.00	1.00	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-77	PLSNT GR 115 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.92	1.01	1.00	1.03	1.05	0.89	1.01	1.00	1.01	1.00	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-78	ROCKLIN 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.91	1.01	1.00	1.04	1.09	0.88	1.01	1.01	1.00	1.00	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-79	SEBASTIA 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.88	1.01	1.02	1.02	1.03	0.84	1.02	1.02	1.02	1.02	Operating action plan
CVLY-V-80	SHPRING 115 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.92	1.01	1.00	1.04	1.08	0.89	1.01	1.01	1.01	1.00	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-81	SIERRAPI 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.89	1.00	0.99	1.04	1.09	0.86	0.99	0.99	0.99	0.99	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-82	SPICAMIN 115 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.93	1.02	1.01	1.05	1.08	0.90	1.02	1.02	1.01	1.01	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-83	STAGG 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.91	1.04	1.04	1.04	1.05	0.87	1.04	1.05	1.04	1.04	Operating action plan
CVLY-V-84	TAYLOR 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.91	1.01	1.00	1.04	1.09	0.88	1.01	1.01	1.01	1.00	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-85	TERMNOUS 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.88	1.02	1.02	1.02	1.04	0.84	1.02	1.03	1.02	1.02	Operating action plan
CVLY-V-86	UOP 60 kV	TESLA E 230kV - Section 2E & 1E	P2	Bus-tie breaker	0.90	1.04	1.04	1.04	1.05	0.86	1.04	1.04	1.04	1.04	Operating action plan
CVLY-V-87	VICTOR 60 kV	LOCKFORD 230kV - Ring R3 & R2	P2	Non-bus-tie breaker	0.84	1.00	1.03	1.03	1.02	0.81	0.92	1.01	1.03	1.03	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-88	WILKINS 60 kV	CORTINA - MA 60kV & CORTINA #1 line	P2	Non-bus-tie breaker	0.89	0.91	0.91	0.98	1.00	0.89	0.92	0.91	0.89	0.91	Cortina area voltage support

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
CVLY-V-89	APPLE HL 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	0.87	0.95	0.93	1.04	1.07	0.78	0.95	0.95	0.88	0.93	Transfer trip to open other end
CVLY-V-90	DMND SPR 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	0.78	0.89	0.85	1.02	1.06	0.66	0.88	0.88	0.78	0.86	Transfer trip to open other end
CVLY-V-91	ELDORAD 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	0.85	0.94	0.91	1.04	1.07	0.75	0.93	0.93	0.86	0.91	Transfer trip to open other end
CVLY-V-92	PLCRVLB2 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	0.79	0.90	0.86	1.02	1.06	0.67	0.88	0.89	0.79	0.86	Transfer trip to open other end
CVLY-V-93	PLCRVLB3 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	0.78	0.89	0.86	1.02	1.06	0.67	0.88	0.89	0.79	0.86	Transfer trip to open other end
CVLY-V-94	SHPRING 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	0.77	0.88	0.84	1.02	1.06	0.65	0.87	0.87	0.77	0.85	Transfer trip to open other end
CVLY-V-95	SPICAMIN 115 kV	MISSOURI FLAT-GOLD HILL #2 115kV [2670] (GOLDHILL-SHPRING2)	P2-1	Line section w/o fault	0.87	0.95	0.93	1.04	1.07	0.78	0.95	0.95	0.88	0.93	Transfer trip to open other end
CVLY-V-96	ARBUCKLE 60 kV	WADHAM 9kV Gen Unit 1 & CORTINA 115/60kV TB 5	P3	G-1/N-1	>0.90	0.89	>0.90	>0.90	>0.90	0.90	>0.90	>0.90	>0.90	>0.90	Cortina area voltage support
CVLY-V-97	DRAKE 60 kV	WADHAM 9kV Gen Unit 1 & CORTINA 115/60kV TB 5	P3	G-1/N-1	>0.90	0.88	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	Cortina area voltage support
CVLY-V-98	DUNNIGAN 60 kV	WADHAM 9kV Gen Unit 1 & CORTINA 115/60kV TB 5	P3	G-1/N-1	>0.90	0.87	>0.90	>0.90	>0.90	>0.90	0.90	>0.90	>0.90	>0.90	Cortina area voltage support
CVLY-V-99	ENCINAL 60 kV	GRNLEAF2 14kV Gen Unit 1 & PEAS RG 60/60kV TB 1	P3	G-1/N-1	>0.90	>0.90	>0.90	0.84	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Pease 115/60 kV Transformer Addition and Bus Upgrade project.
CVLY-V-100	GRSS VLY 60 kV	ROLLINSF 7kV Gen Unit 1 & COLGATE-GRASS VALLEY 60kV [6490]	P3	G-1/N-1	0.91	0.93	0.92	0.98	1.00	0.90	0.92	0.93	0.91	0.92	Short Term : Action Plan; Long Term : Pease 115/60 kV Transformer Addition and Bus Upgrade project.
CVLY-V-101	HARINTON 60 kV	WADHAM 9kV Gen Unit 1 & CORTINA 115/60kV TB 5	P3	G-1/N-1	>0.90	0.89	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	Cortina area voltage support

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
CVLY-V-102	HARTER 60 kV	GRNLEAF2 14kV Gen Unit 1 & PEAS RG 60/60kV TB 1	P3	G-1/N-1	>0.90	>0.90	>0.90	0.82	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Pease 115/60 kV Transformer Addition and Bus Upgrade project.
CVLY-V-103	LIVE OAK 60 kV	GRNLEAF2 14kV Gen Unit 1 & PEAS RG 60/60kV TB 1	P3	G-1/N-1	>0.90	>0.90	>0.90	0.85	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Pease 115/60 kV Transformer Addition and Bus Upgrade project.
CVLY-V-104	MAXWELL 60 kV	WADHAM 9kV Gen Unit 1 & CORTINA 115/60kV TB 5	P3	G-1/N-1	>0.90	0.87	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.90	>0.90	Cortina area voltage support
CVLY-V-105	MERIDIAN 60 kV	WADHAM 9kV Gen Unit 1 & CORTINA 115/60kV TB 5	P3	G-1/N-1	>0.90	0.88	>0.90	>0.90	>0.90	0.90	>0.90	>0.90	>0.90	>0.90	>0.90	Cortina area voltage support
CVLY-V-106	MRYSVILLE 60 kV	GRNLEAF2 14kV Gen Unit 1 & PEAS RG 60/60kV TB 1	P3	G-1/N-1	>0.90	>0.90	>0.90	0.82	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Pease 115/60 kV Transformer Addition and Bus Upgrade project.
CVLY-V-107	DEL MAR 60 kV	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.84	1.05	1.03	1.04	1.07	0.81	1.04	1.03	1.03	1.03	1.03	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-108	PLSNT GR 115 kV	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.89	1.03	1.03	1.03	1.03	0.86	1.03	1.02	1.03	1.03	1.03	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-109	ROCKLIN 60 kV	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.86	1.06	1.04	1.04	1.06	0.82	1.05	1.04	1.04	1.04	1.04	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-110	SIERRAPI 60 kV	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.84	1.05	1.03	1.04	1.07	0.81	1.04	1.03	1.03	1.03	1.03	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-111	TAYLOR 60 kV	Atlantic 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.86	1.06	1.04	1.04	1.06	0.82	1.05	1.04	1.04	1.04	1.04	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-112	BELL PGE 115 kV	PLACER-GOLD HILL #1 115kV [3340] & DRUM-HIGGINS 115kV [4393]	P6	N-1/N-1	0.89	>0.90	>0.90	>0.90	>0.90	0.87	>0.90	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-113	BRUNSWCK 115 kV	BRIGHTON 230/115kV TB 9 & BRIGHTON 230/115kV TB 10	P6	N-1/N-1	>0.90	>0.90	>0.90	>0.90	>0.90	0.86	>0.90	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
CVLY-V-114	COLONY 60 kV	LOCKFORD 230/60kV TB 3 & LOCKEFORD-BELLOTA 230kV [4990]	P6	N-1/N-1	0.83	>0.90	>0.90	>0.90	>0.90	>0.90	0.87	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-115	DEL MAR 60 kV	RIO OSO-ATLANTIC 230kV [5590] & ATLANTIC-GOLD HILL 230kV [4330]	P6	N-1/N-1	0.85	>0.90	>0.90	>0.90	>0.90	>0.90	0.82	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-116	DIST2047 60 kV	CORTINA #1 60kV [0] & CORTINA-VACA 230kV [4540]	P6	N-1/N-1	0.88	0.89	0.89	>0.90	>0.90	>0.90	0.87	0.89	0.87	0.88	0.87	Cortina area voltage support
CVLY-V-117	E.MRYSVE 115 kV	BRIGHTON 230/115kV TB 9 & BRIGHTON 230/115kV TB 10	P6	N-1/N-1	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.87	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-118	EIGHT MI 230 kV	STAGG-TESLA 230kV [5680] & EIGHT MILE ROAD-TESLA 230kV [4660]	P6	N-1/N-1	0.85	>0.90	>0.90	>0.90	>0.90	>0.90	0.84	>0.90	>0.90	>0.90	>0.90	Operating action plan
CVLY-V-119	FLINT 115 kV	PLACER-GOLD HILL #1 115kV [3340] & DRUM-HIGGINS 115kV [4393]	P6	N-1/N-1	0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.88	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-120	HIGGINS 115 kV	PLACER-GOLD HILL #1 115kV [3340] & DRUM-HIGGINS 115kV [4393]	P6	N-1/N-1	0.88	>0.90	>0.90	>0.90	>0.90	>0.90	0.86	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-121	LINCLN 115 kV	BRIGHTON 230/115kV TB 9 & BRIGHTON 230/115kV TB 10	P6	N-1/N-1	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.83	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-122	LODI 60 kV	LOCKFORD 230/60kV TB 3 & LOCKEFORD-BELLOTA 230kV [4990]	P6	N-1/N-1	0.82	>0.90	>0.90	>0.90	>0.90	>0.90	0.85	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-123	MERIDIAN 60 kV	WADHAM 9kV Gen Unit 1 & CORTINA 115/60kV TB 5	P6	N-1/N-1	>0.90	0.88	>0.90	>0.90	>0.90	>0.90	0.90	>0.90	0.88	0.90	0.88	Cortina area voltage support
CVLY-V-124	METTLER 60 kV	STAGG-TESLA 230kV [5680] & EIGHT MILE ROAD-TESLA 230kV [4660]	P6	N-1/N-1	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.88	>0.90	>0.90	>0.90	>0.90	Operating action plan
CVLY-V-125	MONDAVI 60 kV	LOCKFORD 230/60kV TB 2 & LOCKEFORD-BELLOTA 230kV [4990]	P6	N-1/N-1	0.82	>0.90	>0.90	>0.90	>0.90	>0.90	0.85	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-126	MSHR 60V 60 kV	STAGG-TESLA 230kV [5680] & EIGHT MILE ROAD-TESLA 230kV [4660]	P6	N-1/N-1	0.89	>0.90	>0.90	>0.90	>0.90	>0.90	0.86	>0.90	>0.90	>0.90	>0.90	Operating action plan
CVLY-V-127	NEW HOPE 60 kV	LOCKFORD 230/60kV TB 3 & LOCKEFORD-BELLOTA 230kV [4990]	P6	N-1/N-1	0.80	>0.90	>0.90	>0.90	>0.90	>0.90	0.84	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-128	OLIVHRST 115 kV	BRIGHTON 230/115kV TB 9 & BRIGHTON 230/115kV TB 10	P6	N-1/N-1	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.83	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
CVLY-V-129	PEASE 115 kV	PALERMO-PEASE 115kV [3220] & PEASE-RIO OSO 115kV [3270]	P6	N-1/N-1	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.88	>0.90	>0.90	>0.90	0.86	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-130	PLACER 115 kV	PLACER-GOLD HILL #1 115kV [3340] & DRUM-HIGGINS 115kV [4393]	P6	N-1/N-1	0.89	>0.90	>0.90	>0.90	>0.90	>0.90	0.87	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-131	PLAINFLD 60 kV	VACA-DIX 230/115kV TB 3 & VACA-DIX 115/60kV TB 9	P6	N-1/N-1	0.85	>0.90	>0.90	>0.90	>0.90	>0.90	0.84	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-V-132	PLSNT GR 115 kV	RIO OSO-ATLANTIC 230kV [5590] & ATLANTIC-GOLD HILL 230kV [4330]	P6	N-1/N-1	0.89	>0.90	>0.90	>0.90	>0.90	>0.90	0.86	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-133	PLUMAS 60 kV	BRIGHTON 230/115kV TB 9 & BRIGHTON 230/115kV TB 10	P6	N-1/N-1	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.88	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-134	ROCKLIN 60 kV	RIO OSO-ATLANTIC 230kV [5590] & ATLANTIC-GOLD HILL 230kV [4330]	P6	N-1/N-1	0.87	>0.90	>0.90	>0.90	>0.90	>0.90	0.83	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-135	SIERRAPI 60 kV	ATLANTIC-GOLD HILL 230kV [4330] & RIO OSO-ATLANTIC 230kV [5590]	P6	N-1/N-1	0.85	>0.90	>0.90	>0.90	>0.90	>0.90	0.82	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-136	TAYLOR 60 kV	RIO OSO-ATLANTIC 230kV [5590] & ATLANTIC-GOLD HILL 230kV [4330]	P6	N-1/N-1	0.87	>0.90	>0.90	>0.90	>0.90	>0.90	0.83	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-137	VICTOR 60 kV	LOCKFORD 230/60kV TB 3 & LOCKEFORD-BELLOTA 230kV [4990]	P6	N-1/N-1	0.84	>0.90	>0.90	>0.90	>0.90	>0.90	0.87	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-138	COLONY 60 kV	BRIGHTON-BELLOTA 230kV [4420] & LOCKEFORD-BELLOTA 230kV [4990]	P7	DCTL	0.89	>0.90	>0.90	>0.90	>0.90	>0.90	0.87	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-139	EIGHT MI 230 kV	EIGHT MILE ROAD-TESLA 230kV [4660] & STAGG-TESLA 230kV [5680]	P7	DCTL	0.85	>0.90	>0.90	>0.90	>0.90	>0.90	0.83	>0.90	>0.90	>0.90	>0.90	Operating action plan
CVLY-V-140	LODI 60 kV	BRIGHTON-BELLOTA 230kV [4420] & LOCKEFORD-BELLOTA 230kV [4990]	P7	DCTL	0.87	>0.90	>0.90	>0.90	>0.90	>0.90	0.85	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-141	MONDAVI 60 kV	BRIGHTON-BELLOTA 230kV [4420] & LOCKEFORD-BELLOTA 230kV [4990]	P7	DCTL	0.87	>0.90	>0.90	>0.90	>0.90	>0.90	0.85	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-142	NEW HOPE 60 kV	BRIGHTON-BELLOTA 230kV [4420] & LOCKEFORD-BELLOTA 230kV [4990]	P7	DCTL	0.86	>0.90	>0.90	>0.90	>0.90	>0.90	0.84	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
CVLY-V-143	PEASE 115 kV	Palermo-Pease 115 kV Line amd Pease-Rio Oso 115 kV Line	P7	DCTL	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	0.86	Short Term : Action Plan; Long Term : Rio Oso Area 230 kV Voltage Support Project
CVLY-V-144	PLAINFLD 60 kV	Vaca-Peabody 230 kV Line & Vaca-Lambie Sw Sta 230 kV Line	P7	DCTL	0.88	>0.90	>0.90	>0.90	>0.90	>0.90	0.87	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Vaca – Davis Voltage Conversion Project
CVLY-V-145	VICTOR 60 kV	BRIGHTON-BELLOTA 230kV [4420] & LOCKEFORD-BELLOTA 230kV [4990]	P7	DCTL	0.89	>0.90	>0.90	>0.90	>0.90	>0.90	0.87	>0.90	>0.90	>0.90	>0.90	Short Term : Action Plan; Long Term : Lockeford-Lodi Area 230 kV Development project.
CVLY-V-146	Diverge	BELLOTA 230kV - Section 1E & 2E	P2	Bus-tie breaker	diverge	diverge	diverge	-	-	diverge	diverge	diverge	diverge	diverge	diverge	Bellota 230 kV bus upgrade
CVLY-V-147	Diverge	STAGG-D Section 1D & STAGG-E Section 1E 230kV	P2	Bus-tie breaker	-	diverge	-	-	-	-	diverge	diverge	-	-	-	Short Term : Action Plan; Long Term : Preferred resource.
CVLY-V-148	Diverge	GOLDHILL 230kV - Section 2D & 1D	P2	Bus-tie breaker	diverge	diverge	-	-	-	diverge	diverge	diverge	diverge	-	-	Short Term : Action Plan; Long Term : Atlantic-Placer 115 kV line project.

ID	Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	Select..	Select..	Select..	Select..	Select..	
CVLY-SP-TS-1	GWF Tracy 3Ø fault with normal clearing.	P1-1	G-1	1	1	1	1	1						Under review with PTO .
CVLY-SP-TS-2	Rio Oso-Atlantic 230 kV line 3Ø fault with normal clearing.	P1-2	L-1	0	0	0	0	0						No violation
CVLY-SP-TS-3	Vaca Dixon 500/230 kV bank 3Ø fault with normal clearing.	P1-3	T-1	4	2	3	12	4						Under review with PTO .
CVLY-SP-TS-4	Vaca Dixon 230 kV SVD 3Ø fault with normal clearing.	P1-4	SVD-1	3	5	4	17	2						Under review with PTO .
CVLY-SP-TS-5	Rio Oso 230 kV SLG fault with normal clearing.	P2-2	Bus	1	1	1	1	1						Under review with PTO .
CVLY-SP-TS-6	Brighton 115 kV breaker SLG fault with normal clearing.	P2-3	Non-bus-tie breaker	0	0	0	0	0						No violation
CVLY-SP-TS-7	Monta Vista 230 kV breaker SLG fault with normal clearing.	P2-4	Bus-tie breaker	13	5	25	25	6						Under review with PTO .
CVLY-SP-TS-8	Ralston 3Ø fault with normal clearing with GWF Tracy offline in the base case.	P3-1	G-1/G-1	9	3	23	21	2						Under review with PTO .
CVLY-SP-TS-9	Rio Oso-Atlantic 230 kV 3Ø fault with normal clearing with GWF Tracy offline in the base case.	P3-2	G-1/L-1	11	9	9	11	11						Under review with PTO .
CVLY-SP-TS-10	Vaca Dixon 500/230 kV bank 3Ø fault with normal clearing with GWF Tracy offline in the base case.	P3-3	G-1/T-1	25	15	15	15	13						Under review with PTO .
CVLY-SP-TS-11	Vaca Dixon 230 kV SVD 3Ø fault with normal clearing with GWF Tracy offline in the base case.	P3-4	G-1/SVD-1	163	143	157	124	79						Under review with PTO .
CVLY-SP-TS-12	GWF Tracy SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-1	Stuck Breaker (Gen)	38	30	29	1	2						Under review with PTO .
CVLY-SP-TS-13	Rio Oso-Atlantic 230 kV line SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-2	Stuck Breaker (Line)	11	9	9	11	11						Under review with PTO .
CVLY-SP-TS-14	Vaca Dixon 500/230 kV SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-3	Stuck Breaker (Tran)	50	26	30	11	15						Under review with PTO .

ID	Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	Select..	Select..	Select..	Select..	Select..		
CVLY-SP-TS-15	Vaca Dixon SVD SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-4	Stuck Breaker (SVD)	2	4	3	5	2							Under review with PTO .
CVLY-SP-TS-16	Brighton 115 kV breaker SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-5	Stuck Breaker (Bus)	25	15	15	15	13							Under review with PTO .
CVLY-SP-TS-17	Gold Hill 230 kV breaker SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-6	Stuck Breaker (Bus-tie)	163	143	157	124	79							Under review with PTO .
CVLY-SP-TS-18	GWF Tracy SLG fault with delayed clearing.	P5-1	Non-redundant relay (Gen)	1	1	1	1	1							Under review with PTO .
CVLY-SP-TS-19	GWTracy-Schulte 115 kV Line SLG fault with delayed clearing.	P5-2	Non-redundant relay (Line)	4	4	4	4	5							Under review with PTO .
CVLY-SP-TS-20	Rio Oso 230/115 kV transformer SLG fault with delayed clearing.	P5-3	Non-redundant relay (Tran)	211		447	11	203							Under review with PTO .
CVLY-SP-TS-21	Metcalf SVD SLG fault with delayed clearing.	P5-4	Non-redundant relay (SVD)	18	6	3	3	0							Under review with PTO .
CVLY-SP-TS-22	Schulte 115 kV bus #1 SLG fault with delayed clearing.	P5-5	Non-redundant relay (Bus)	9	9	9	9	9							Under review with PTO .
CVLY-SP-TS-23	Drum-Higgins 115 kV Line 3Ø fault with normal clearing with the Drum-Rio Oso kV #2 115 kVLine out in base case.	P6-1	L-1/N-1	7	5	5	7	7							Under review with PTO .
CVLY-SP-TS-24	Brighton 230/115kV Transformer #9 3Ø fault with normal clearing with the Brighton 230/115kV Transformer #10 out in base case.	P6-2	T-1/N-1	1	1	1	0	1							Under review with PTO .
CVLY-SP-TS-25	W.Sac-Brighton 115kV Line 3Ø fault with normal clearing with the W. Sac SVD out in base case.	P6-3	SVD-1/N-1	3	1	1	3	3							Under review with PTO .



ID	Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	Select..	Select..	Select..	Select..	Select..	
CVLY-SP-TS-26	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines SLG fault with normal clearing.	P7-1	DCTL	0	0	0	0	0						No violation

Single Contingency Load Drop

ID	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.



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load		
GBA-T-1	Oleum-Christie 115kV Line	CHRISTIE-SOBRANTE 115kV [1260]	P1	N-1	109	107	54	91	45	46	89	73		Short Term : Action Plan ; Long Term : North Tower 115 kV Looping Project
GBA-T-2	Newark-Dixon Landing 115kV Line	PIERCY-METCALF 115kV [4318]	P1	N-1	112	105	NA	85	58	NA	85	67		Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-3	Piercy-Metcalf 115 kV Line	NEWARK-DIXON LANDING 115kV [2990]	P1	N-1	103	98	63	84	65	49	77	61		Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-4	Evergreen-Almaden 60 kV Line	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	124	113	88	108	107	60	96	74		Short Term : Action Plan; Long Term : Monta Vista-Los Gatos-Evergreen 60 kV Project
GBA-T-5	Newark-Applied Materials 115kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	155	135	141	132	128	121	117	81		Short Term : Action Plan; Long Term : Monta Vista 230 kV Bus Upgrade Project
GBA-T-6	Oleum-Christie 115kV Line	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	110	108	53	93	44	45	89	74		Short Term : Action Plan ; Long Term : North Tower 115 kV Looping Project
GBA-T-7	Oakland D - Oakland L 115kV Cable	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	113	107	104	122	119	113	104	90		Increase generation in the Oakland Area
GBA-T-8	Oakland C - Oakland L #1 115kV Cable	CLARMNT - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #2 line	P2	Non-bus-tie breaker	100	92	91	109	105	100	88	74		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-9	Oakland C - Oakland X #2 115kV Cable	CLARMNT - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #2 line	P2	Non-bus-tie breaker	101	95	93	110	106	102	99	89		Increase generation in the Oakland Area
GBA-T-10	Pittsburg 230/115kV Transformer #13	PITSBG D - 2D 230kV & PITSBG D-TBC_PT1 #1 line	P2	Non-bus-tie breaker	103	106	57	89	82	45	4	70		Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-11	Martinez-Sobrante 115kV Line	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	105	95	<90	71	<90	<90	95	54		Increase generation in Pittsburg 115 kV
GBA-T-12	Sobrante-Grizzly-Claremont #2 115kV Line (Hillside-Grizzly JCT)	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	106	78	77	83	63	60	95	69		Increase generation in the Oakland Area
GBA-T-13	Oleum-Martinez 115kV Line	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	238	222	179	224	174	169	207	186		SPS or system upgrade
GBA-T-14	Moraga-Claremont #1 115kV Line	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	114	104	109	98	98	97	104	76		Increase generation in the Oakland Area
GBA-T-15	Moraga-Claremont #2 115kV Line	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	114	104	109	98	99	97	105	76		Increase generation in the Oakland Area
GBA-T-16	Moraga-Oakland X #1 115kV Line	MORAGA 115kV - Section 1D & 1E	P2	Bus-tie breaker	103	95	99	111	112	113	99	88		Short Term : Action Plan ; Long Term : Preferred resource

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
GBA-T-17	Moraga-Oakland X #2 115kV Line	MORAGA 115kV - Section 1D & 1E	P2	Bus-tie breaker	109	101	105	112	114	114	99	88			Increase generation in the Oakland Area
GBA-T-18	Moraga-Oakland X #3 115kV Line	MORAGA 115kV - Section 1D & 2D	P2	Bus-tie breaker	133	129	138	138	152	155	122	88			Increase generation in the Oakland Area
GBA-T-19	Moraga-Oakland X #4 115kV Line	MORAGA 115kV - Section 1D & 2D	P2	Bus-tie breaker	133	129	138	138	152	155	122	88			Increase generation in the Oakland Area
GBA-T-20	Moraga-Oakland J 115kV Line	SN LNDRO 115kV - Section 1E & 2E	P2	Bus-tie breaker	101	78	78	92	82	75	90	69			Short Term: Action plan - Open Grant-J line at Oakland J following RCEC outage Long Term: Reconductor Moraga-Oakland J 115 kV Line
GBA-T-21	Sobrante-Moraga 115kV Line	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	132	86	87	110	78	80	115	76			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-22	Moraga-San Leandro #1 115kV Line	MORAGA 115kV - Section 2D & 2E	P2	Bus-tie breaker	111	64	57	104	65	53	94	57			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-23	Moraga-San Leandro #2 115kV Line	MORAGA 115kV - Section 1D & 1E	P2	Bus-tie breaker	129	85	84	120	85	77	108	74			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-24	Potrero-Larkin #1 (AY-1) 115kV Cable	LARKIN E Section 1E & LARKIN F Section 1F 115kV	P2	Non-bus-tie breaker	147	144	146	149	149	145	128	89			Larkin bus upgrade
GBA-T-25	San Mateo-Belmont 115kV Line	RVNSWD D 115kV - Section 1D & 2D	P2	Bus-tie breaker	101	96	97	96	92	89	90	88			Short Term: Action Plan Long Term: South of San Mateo Capacity Increase Project
GBA-T-26	Ravenswood-Palo Alto #2 115kV Line	RVNSWD E Section 1E & RVNSWD D Section 1D 115kV	P2	Non-bus-tie breaker	104	100	105	93	94	94	98	105			Palo Alto interim SPS
GBA-T-27	Cooley Landing-Palo Alto 115kV Line	RVNSWD E 115kV - Section 1E & 2E	P2	Bus-tie breaker	113	110	115	84	86	86	110	109			Palo Alto interim SPS
GBA-T-28	Ravenswood-Cooley Landing #1 115kV Line	RVNSWD E 115kV - Section 1E & 2E	P2	Bus-tie breaker	161	117	124	134	114	113	150	100			Palo Alto interim SPS
GBA-T-29	San Mateo-Bair 60kV Line	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	127	117	54	115	113	49	110	90			Short Term: Action Plan Long Term: San Mateo-Bair 60 kV Line Reconductor Project
GBA-T-30	Bair 115/60kV Transformer #1	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	147	137	149	148	148	150	130	93			Review Stanford 60 kV system configuration
GBA-T-31	Bair-Cooley Landing #2 60kV Line	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	140	131	141	119	116	115	122	92			Review Stanford 60 kV system configuration
GBA-T-32	Eastshore 230/115kV Transformer #1	E. SHORE 230kV - Middle Breaker Bay 3	P2	Non-bus-tie breaker	84	103	103	90	102	100	52	95			Replace transformer

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
GBA-T-33	Newark-Lawrence 115kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	250	220	227	174	169	159	192	136			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-T-34	Newark-Applied Materials 115kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	197	172	180	150	146	138	150	106			Short Term : Action Plan; Long Term : Monta Vista 230 kV Bus Upgrade Project
GBA-T-35	Newark-Dixon Landing 115kV Line	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	113	106	72	86	83	57	85	68			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-36	Newark-Kifer 115kV Line	BUS-TIE BREAKER 392 FAULT AT NRS 115.00	P2	Non-bus-tie breaker	122	129	142	98	101	98	96	111			Reconductor
GBA-T-37	Lawrence - Monta Vista 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	177	154	163	123	120	113	133	92			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-T-38	Britton-Monta Vista 115 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	110	95	100	92	90	84	82	56			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-T-39	Applied Materials-Britton 115 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	152	133	139	127	123	117	114	78			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-T-40	Trimble-San Jose 'B' 115 kV Line	BUS-TIE BREAKER 392 FAULT AT NRS 115.00	P2	Non-bus-tie breaker	110	135	144	78	79	109	73	98			Reconductor
GBA-T-41	Markham No. 1 115 kV Tap	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	62	87	101	61	65	68	72	57			Reconductor
GBA-T-42	Swift-Metcalf 115 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	103	95	77	87	87	61	77	60			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-43	Metcalf 230/115 kV Trans No. 1	METCALF 230kV - Section 2D & 2E	P2	Bus-tie breaker	113	64	NA	111	75	NA	104	55			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-44	Metcalf 230/115 kV Trans No. 4	METCALF 230kV - Section 1D & 1E	P2	Bus-tie breaker	101	63	NA	107	74	NA	94	54			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-45	Metcalf 230/115 kV Trans No. 2	METCALF 230kV - Section 1D & 2D	P2	Bus-tie breaker	117	91	99	113	83	79	103	50			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-46	Metcalf 230/115 kV Trans No. 3	METCALF 230kV - Section 1D & 2D	P2	Bus-tie breaker	113	90	97	110	82	78	103	50			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
GBA-T-47	Piercy-Metcalf 115 kV Line	NEWARK F 115kV - Section 1F & 2F	P2	Bus-tie breaker	107	99	70	84	70	54	78	61			Action Plan before Evergreen-Mabury Voltage Conversion
GBA-T-48	Evergreen-Almaden 60 kV Line	LOS GATS 60kV Section 1A	P2	Bus	124	113	88	108	107	60	96	74			Short Term : Action Plan; Long Term : Monta Vista-Los Gatos-Evergreen 60 kV Project
GBA-T-49	Oleum-Christie 115kV Line	UNION CH 9kV Gen Unit 1 & CHRISTIE-SOBRANTE 115kV [1260]	P3	G-1/N-1	129	128	<90	<90	<90	<90	109	<90			Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project
GBA-T-50	Pittsburg 230/115kV Transformer #12	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 13	P3	G-1/N-1	111	100	<90	<90	<90	<90	<90	<90			Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-51	Pittsburg 230/115kV Transformer #13	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 12	P3	G-1/N-1	129	116	<90	<90	<90	<90	<90	<90			Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-52	Moraga-Clairemont #1 115kV Line	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & MORAGA-CLAREMONT #2 115kV [2710]	P3	G-1/N-1	105	98	100	<90	<90	<90	<90	<90			Increase generation in the Oakland Area
GBA-T-53	Moraga-Clairemont #2 115kV Line	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & MORAGA-CLAREMONT #1 115kV [2700]	P3	G-1/N-1	105	98	100	<90	<90	<90	<90	<90			Increase generation in the Oakland Area
GBA-T-54	Newark-Dixon Landing 115kV Line	DEC STG1 24kV & DEC CTG1 18kV & DEC CTG2 18kV & DEC CTG3 18kV Gen Units & PIERCY-METCALF 115kV [4318]	P3	G-1/N-1	<90	106	<90	<90	<90	<90	<90	<90			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-55	Piercy-Metcalf 115 kV Line	DEC STG1 24kV & DEC CTG1 18kV & DEC CTG2 18kV & DEC CTG3 18kV Gen Units & NEWARK-DIXON LANDING 115kV [2990]	P3	G-1/N-1	104	98	<90	<90	<90	<90	<90	<90			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-56	San Mateo-Belmont 115kV Line	Ravenswood 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	99	97	99	94	91	86	89	114			Redundant bus relay
GBA-T-57	San Mateo 115/60kV Transformer #8	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	99	93	102	105	106	107	88	77			Redundant bus relay
GBA-T-58	San Mateo-Hillsdale JCT 60kV Line	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	186	174	194	183	188	191	165	158			Redundant bus relay
GBA-T-59	San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	212	199	221	175	180	183	188	153			Redundant bus relay
GBA-T-60	San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	202	190	210	198	204	207	180	147			Redundant bus relay
GBA-T-61	Jefferson-Hillsdale JCT 60kV Line	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	156	148	161	146	150	152	141	132			Redundant bus relay

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
GBA-T-62	Los Altos-Loyola 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	diverge	40	25		Redundant bus relay
GBA-T-63	Loyola-Monta Vista 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	diverge	70	53		Redundant bus relay
GBA-T-64	Monta Vista 230/60 kV Trans No. 5	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	diverge	267	170		Redundant bus relay
GBA-T-65	Monta Vista 115/60 kV Trans No. 6	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	diverge	118	87		Redundant bus relay
GBA-T-66	Monta Vista-Permanente 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	diverge	58	46		Redundant bus relay
GBA-T-67	Monta Vista-Los Gatos 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	diverge	50	31		Redundant bus relay
GBA-T-68	Oleum-Christie 115kV Line	CHRISTIE-SOBRENTE 115kV [1260] & UNION CH 9kV Gen Unit 1	P6	N-1/N-1	130	128	93	<90	<90	<90	109	94			Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project
GBA-T-69	Christie-Sobrante (Oleum-Sobrante) 115kV Line	SOBRANTE-G #1 115kV [3720] & SOBRANTE-G #2 115kV [3730]	P6	N-1/N-1	134	124	102	<90	<90	<90	117	93			SPS or system upgrade
GBA-T-70	Sobrante-El Cerrito STA G #1 115kV Lin	SOBRANTE-G #2 115kV [3730] & CHRISTIE-SOBRENTE 115kV [1260]	P6	N-1/N-1	100	95	<90	<90	<90	<90	92	<90			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-71	Sobrante-El Cerrito STA G #2 115kV Line	SOBRANTE-G #1 115kV [3720] & CHRISTIE-SOBRENTE 115kV [1260]	P6	N-1/N-1	103	95	<90	<90	<90	<90	92	<90			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-72	Oakland D - Oakland L 115kV Cable	C-X #2 115kV [9962] & C-X #3 115kV [9925]	P6	N-1/N-1	114	107	104	<90	<90	<90	104	90			Increase generation in the Oakland Area
GBA-T-73	Oakland C - Oakland L #1 115kV Cable	K-D #1 115kV [9966] & PITTSBURG-LOS MEDANOS #2 115kV [9993]	P6	N-1/N-1	100	92	91	<90	<90	<90	<90	<90			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-74	Oakland C - Oakland X #2 115kV Cable	C-X #3 115kV [9925] & D-L #1 115kV [9963]	P6	N-1/N-1	114	107	104	<90	<90	<90	104	90			Increase generation in the Oakland Area
GBA-T-75	Pittsburg 230/115kV Transformer #12	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 13	P6	N-1/N-1	111	100	<90	<90	<90	<90	<90	<90			Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-76	Pittsburg 230/115kV Transformer #13	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 12	P6	N-1/N-1	129	116	<90	<90	<90	<90	<90	<90			Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-77	Martinez-Oleum 115kV Line	SOBRANTE-G #2 115kV [3730] & SOBRANTE-G #1 115kV [3720]	P6	N-1/N-1	117	108	<90	<90	<90	<90	100	97			Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project
GBA-T-78	Moraga-Clairemont #1 115kV Line	C-X #3 115kV [9925] & C-X #2 115kV [9962]	P6	N-1/N-1	111	104	106	<90	<90	<90	101	<90			Increase generation in the Oakland Area
GBA-T-79	Moraga-Clairemont #2 115kV Line	C-X #2 115kV [9962] & C-X #3 115kV [9925]	P6	N-1/N-1	111	104	106	<90	<90	<90	102	<90			Increase generation in the Oakland Area

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load		
GBA-T-80	Moraga-Oakland X #1 115kV Line	MORAGA-OAKLAND #2 115kV [2730] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	<90	<90	<90	99	<90		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-81	Moraga-Oakland X #2 115kV Line	MORAGA-OAKLAND #1 115kV [2720] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	<90	<90	<90	99	<90		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-82	Moraga-Oakland X #3 115kV Line	MORAGA-OAKLAND #1 115kV [2720] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	<90	<90	<90	99	<90		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-83	Moraga-Oakland X #4 115kV Line	MORAGA-OAKLAND #1 115kV [2720] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	<90	<90	<90	99	<90		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-84	Moraga-San Leandro #1 115kV Line	MORAGA-SAN LEANDRO #2 115kV [2780] & MORAGA-SAN LEANDRO #3 115kV [2790]	P6	N-1/N-1	128	<90	<90	<90	<90	<90	107	<90		Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-85	Moraga-San Leandro #2 115kV Line	MORAGA-SAN LEANDRO #1 115kV [2770] & MORAGA-SAN LEANDRO #3 115kV [2790]	P6	N-1/N-1	129	<90	<90	<90	<90	<90	108	<90		Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-86	Moraga-San Leandro #3 115kV Line	MORAGA-SAN LEANDRO #1 115kV [2770] & MORAGA-SAN LEANDRO #2 115kV [2780]	P6	N-1/N-1	103	<90	<90	<90	<90	<90	<90	<90		Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-87	Potrero-Mission (AX) 115kV Cable	A-Y #1 (UNDERGROUND IDLE) 115kV [9952] & A-Y #2 115kV [9953]	P6	N-1/N-1	113	108	111	111	110	110	100	<90		TBC runback scheme modification
GBA-T-88	Martin-Sneath Lane 60kV Line	MILLBRAE-SANMATEO #1 115kV [0] & MARTIN-MILLBRAE #1 115kV [2230]	P6	N-1/N-1	123	114	119	105	114	114	122	<90		Review Stanford 60 kV system configuration
GBA-T-89	San Mateo-Belmont 115kV Line	RAVENSWD 230/115kV TB 2 & RAVENSWD 230/115kV TB 1	P6	N-1/N-1	102	100	101	100	100	96	97	100		Action plan or explore potential mitigation
GBA-T-90	Ravenswood-Palo Alto #1 115kV Line	RVNSWD E-PLO ALTO #2 115kV [0] & RVNSWD D-CLY LND #1 115kV [0]	P6	N-1/N-1	105	102	107	94	95	96	99	108		Palo Alto interim SPS
GBA-T-91	Ravenswood-Palo Alto #2 115kV Line	RVNSWD E-PLO ALTO #1 115kV [0] & RVNSWD D-CLY LND #1 115kV [0]	P6	N-1/N-1	105	102	106	94	95	95	99	108		Palo Alto interim SPS
GBA-T-92	Cooley Landing-Palo Alto 115kV Line	RVNSWD E-PLO ALTO #2 115kV [0] & RVNSWD E-PLO ALTO #1 115kV [0]	P6	N-1/N-1	112	109	113	<90	<90	<90	108	108		Palo Alto interim SPS
GBA-T-93	Ravenswood-Cooley Landing #1 115kV Line	RVNSWD E-PLO ALTO #1 115kV [0] & RVNSWD E-PLO ALTO #2 115kV [0]	P6	N-1/N-1	130	94	98	108	<90	<90	121	<90		Short Term : Action Plan ; Long Term : Ravenswood – Cooley Landing 115 kV Line Reconductor Project
GBA-T-94	Millbrae-Sneath Lane 60kV Line	MARTIN-SNEATH LANE 60kV [7210] & HLLSDLJT-HLF MNBY 60kV [0]	P6	N-1/N-1	90	<90	91	99	100	105	<90	<90		Action plan or explore potential mitigation
GBA-T-95	San Mateo 115/60kV Transformer #8	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	99	93	102	105	106	107	<90	<90		Review Stanford 60 kV system configuration
GBA-T-96	San Mateo-Hillsdale JCT 60kV Line	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	186	174	194	182	186	190	165	158		Review Stanford 60 kV system configuration

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
GBA-T-97	San Mateo-Bair 60kV Line	RVNSWD E-CLY LND2 #2 115kV [0] & CLY LND 115/60kV TB 1	P6	N-1/N-1	126	116	<90	114	113	<90	110	<90			San Mateo-Bair 60 kV Line Reconductor Project
GBA-T-98	San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	212	198	221	174	178	182	188	152			Review Stanford 60 kV system configuration
GBA-T-99	San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	202	189	210	197	201	206	180	146			Review Stanford 60 kV system configuration
GBA-T-100	Jefferson-Hillsdale JCT 60kV Line	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	156	148	161	144	148	150	141	131			Review Stanford 60 kV system configuration
GBA-T-101	Bair 115/60kV Transformer #1	CLY LND 115/60kV TB 1 & RVNSWD E-CLY LND2 #2 115kV [0]	P6	N-1/N-1	147	137	149	148	147	150	129	92			Review Stanford 60 kV system configuration
GBA-T-102	Bair-Cooley Landing #1 60kV Line	RVNSWD E-CLY LND2 #2 115kV [0] & CLY LND 115/60kV TB 1	P6	N-1/N-1	126	114	123	119	117	115	109	92			Review Stanford 60 kV system configuration
GBA-T-103	Bair-Cooley Landing #2 60kV Line	CLY LND 115/60kV TB 1 & RVNSWD E-CLY LND2 #2 115kV [0]	P6	N-1/N-1	115	110	116	<90	<90	<90	100	<90			Review Stanford 60 kV system configuration
GBA-T-104	Eastshore 230/115kV Transformer #1	EASTSHORE-SAN MATEO 230kV [4650] & E. SHORE 230/115kV TB 2	P6	N-1/N-1	<90	100	100	<90	<90	<90	<90	95			Replace transformer
GBA-T-105	Eastshore 230/115kV Transformer #2	EASTSHORE-SAN MATEO 230kV [4650] & E. SHORE 230/115kV TB 1	P6	N-1/N-1	<90	100	100	<90	<90	<90	<90	94			Replace transformer
GBA-T-106	Dumbarton-Newark 115kV Line	EASTSHORE-SAN MATEO 230kV [4650] & PITTSBURG-EASTSHORE 230kV [5462]	P6	N-1/N-1	100	<90	<90	<90	<90	<90	<90	<90			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-107	Newark-Dixon Landing 115kV Line	METCALF SVD=v & PIERCY-METCALF 115kV [4318]	P6	N-1/N-1	<90	106	<90	<90	<90	<90	<90	<90			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-108	Newark-Milpitas #2 115kV Line	NEWARK-MILPITAS #1 115kV [3080] & SWIFT-METCALF 115kV [3900]	P6	N-1/N-1	112	106	114	<90	<90	<90	<90	<90			Action plan or rerate
GBA-T-109	Newark-Milpitas #1 115kV Line	NEWARK-MILPITAS #2 115kV [3080] & SWIFT-METCALF 115kV [3900]	P6	N-1/N-1	135	127	137	<90	<90	<90	103	<90			Action plan or rerate
GBA-T-110	Trimble-San Jose 'B' 115 kV Line	LOS ESTEROS-NORTECH 115kV [4032] & EL PATIO-SAN JOSE A 115kV [1520]	P6	N-1/N-1	93	100	100	<90	<90	<90	100	<90			Reconductor
GBA-T-111	Dixon Landing-McKee 115 kV Line	PIERCY-METCALF 115kV [4318] & NEWARK-DIXON LANDING 115kV [2990]	P6	N-1/N-1	<90	<90	113	<90	<90	<90	<90	<90			Action plan or rerate
GBA-T-112	Mabury-Jennings J. 115 kV Line	NEWARK-DIXON LANDING 115kV [2990] & PIERCY-METCALF 115kV [4318]	P6	N-1/N-1	<90	<90	137	<90	<90	<90	<90	<90			Action plan or rerate
GBA-T-113	Metcalfe-Llagas 115 kV Line	METCALF-MORGAN HILL 115kV [2570] & LLAGAS-GILROY-GILROY F-GILROYPK 115kV [2151]	P6	N-1/N-1	109	<90	<90	<90	<90	<90	<90	<90			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
GBA-T-114	Piercy-Metcalf 115 kV Line	METCALF SVD=v & NEWARK-DIXON LANDING 115kV [2990]	P6	N-1/N-1	105	100	<90	<90	<90	<90	<90	<90			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-115	Evergreen 115/60 kV Transformer No. 1	ALMADEN SVD=v & MONTA VISTA-LOS GATOS 60kV [7610]	P6	N-1/N-1	101	91	<90	<90	<90	<90	<90	<90			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-116	Evergreen-Almaden 60 kV Line	ALMADEN SVD=v & MONTA VISTA-LOS GATOS 60kV [7610]	P6	N-1/N-1	132	120	93	<90	<90	<90	100	<90			Short Term : Action Plan; Long Term : Monta Vista-Los Gatos-Evergreen 60 kV Project
GBA-T-117	Oleum-Christie 115kV Line	Christie-Sobrante 115 kV and Martinez-Sobrante 115 kV lines	P7	DCTL	109	107	93	91	78	74	89	73			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-118	Christie-Sobrante (Oleum-Sobrante) 115kV Line	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	134	123	102	119	96	92	118	93			SPS or system upgrade
GBA-T-119	Martinez-Oleum 115kV Line	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	112	108	90	92	74	74	99	97			Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project
GBA-T-120	Oleum-Martinez 115kV Line	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	104	100	83	102	82	82	92	90			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-121	Moraga-San Leandro #1 115kV Line	Moraga-Oakland J 115 kV and Moraga-San Leandro No. 3 115 kV lines	P7	DCTL	115	69	69	108	70	64	98	61			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-122	Moraga-San Leandro #2 115kV Line	Moraga-Oakland J 115 kV and Moraga-San Leandro No. 3 115 kV lines	P7	DCTL	117	70	70	110	71	65	99	61			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-123	Moraga-San Leandro #3 115kV Line	Moraga-San Leandro Nos. 1 & 2 115 kV lines	P7	DCTL	103	69	69	97	70	64	86	60			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-124	Ravenswood-Palo Alto #2 115kV Line	Ravenswood-Palo Alto No. 1 115 kV and Cooley Landing-Palo Alto 115 kV lines	P7	DCTL	94	91	95	83	84	84	91	108			Palo Alto interim SPS
GBA-T-125	Cooley Landing-Palo Alto 115kV Line	Ravenswood-Palo Alto Nos. 1 & 2 115 kV lines	P7	DCTL	112	109	113	83	84	85	108	108			Palo Alto interim SPS
GBA-T-126	Ravenswood-Cooley Landing #1 115kV Line	Ravenswood-Palo Alto Nos. 1 & 2 115 kV lines	P7	DCTL	130	94	98	108	89	90	121	83			Short Term : Action Plan ; Long Term : Ravenswood – Cooley Landing 115 kV Line Reconductor Project
GBA-T-127	San Mateo 115/60kV Transformer #8	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	97	91	100	103	105	106	86	77			Review Stanford 60 kV system configuration
GBA-T-128	San Mateo-Hillsdale JCT 60kV Line	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	187	176	194	185	188	191	166	158			Review Stanford 60 kV system configuration

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load		
GBA-T-129	San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	213	201	221	177	180	183	189	153		Review Stanford 60 kV system configuration
GBA-T-130	San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	203	192	211	201	204	207	181	147		Review Stanford 60 kV system configuration
GBA-T-131	Jefferson-Hillsdale JCT 60kV Line	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	157	150	162	148	150	152	142	132		Review Stanford 60 kV system configuration
GBA-T-132	Newark-Dixon Landing 115kV Line	Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	113	106	43	86	53	36	85	68		Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-133	Piercy-Metcalf 115 kV Line	Newark - Dixon Landing & Newark - Milpitas #1 115 kV Lines	P7	DCTL	104	98	63	84	65	49	77	61		Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load		
GBA-VD-1	EMBRCDRD 230 kV	H-Z #2 230kV [9982]	P1	N-1	4.1	5.1	4.3	5.1	2.0	4.3	4.2	5.6		Short Term : Action Plan ; Long Term : Martin 230 kV Bus Extension Project
GBA-VD-2	GILROY F 115 kV	METCALF-MORGAN HILL 115kV [2570]	P1	N-1	<5.0	<5.0	<5.0	6.3	<5.0	<5.0	5.3	<5.0		Short Term : Action Plan ; Long Term : Morgan Hill Reinforcement Project
GBA-VD-3	LLAGAS 115 kV	METCALF-MORGAN HILL 115kV [2570]	P1	N-1	<5.0	<5.0	<5.0	6.3	<5.0	<5.0	5.3	<5.0		Short Term : Action Plan ; Long Term : Morgan Hill Reinforcement Project
GBA-VD-4	LOS GATS 60 kV	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	4.6	5.1	3.5	3.8	3.7	3.5	4.1	2.8		Short Term : Action Plan; Long Term : Monta Vista – Los Gatos – Evergreen 60 kV Project
GBA-VD-5	MGRN HIL 115 kV	METCALF-MORGAN HILL 115kV [2570]	P1	N-1	<5.0	<5.0	<5.0	8.5	<5.0	<5.0	7.2	<5.0		Short Term : Action Plan ; Long Term : Morgan Hill Reinforcement Project
GBA-VD-6	ALHAMBRA 115 kV	MARTINEZ-SOBRANTE 115kV [2270] (MARTNZ D-ALHAMTP1)	P2-1	Line section w/o fault	4.2	4.0	5.8	4.1	5.7	5.8	3.8	1.0		Transfer trip to open other end
GBA-VD-7	EMBRCDRD 230 kV	H-Z #2 230kV [9982] (MARTIN C-EMBRCDRD)	P2-1	Line section w/o fault	4.1	5.1	<5.0	5.1	2.0	<5.0	4.2	5.6		Short Term : Action Plan ; Long Term : Martin 230 kV Bus Extension Project
GBA-VD-8	PACIFICA 60 kV	SNANDRES-MLLBRETP 60kV [0] No Fault	P2-1	Line section w/o fault	0.3	0.2	0.2	0.3	0.4	0.5	5.3	4.7		Transfer trip to open other end
GBA-VD-9	SN BRNOT 60 kV	SNANDRES-MLLBRETP 60kV [0] No Fault	P2-1	Line section w/o fault	0.3	0.2	0.2	0.3	0.5	0.6	5.4	4.8		Transfer trip to open other end
GBA-VD-10	SNANDRES 60 kV	SNANDRES-MLLBRETP 60kV [0] No Fault	P2-1	Line section w/o fault	-0.5	-0.7	-0.5	-5.8	0.5	0.6	6.2	5.5		Transfer trip to open other end
GBA-VD-11	SNTH LNE 60 kV	SNANDRES-MLLBRETP 60kV [0] No Fault	P2-1	Line section w/o fault	0.3	0.2	0.2	0.3	0.4	0.5	5.3	4.6		Transfer trip to open other end
GBA-VD-12	APP MAT 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	16.3	12.8	13.9	13.0	12.9	11.9	10.4	2.8		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-13	BRITTN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	16.8	13.2	14.4	13.4	13.3	12.3	10.7	2.9		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-14	LAWRENCE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	14.6	11.4	12.5	11.6	11.5	10.6	9.3	2.5		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-15	LOCKHD 1 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	11.6	8.8	9.7	8.9	9.0	8.2	7.2	1.9		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-16	LOCKHD 2 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	12.6	9.7	10.6	9.8	9.8	9.0	7.8	2.1		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-17	LOS ALTS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	25.2	20.1	21.8	20.5	20.3	18.7	16.4	4.0		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-18	LOS GATS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	25.8	20.4	21.9	20.9	20.6	18.7	16.7	4.0		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-19	LOYOLA 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	25.0	19.9	21.6	20.3	20.1	18.5	16.3	4.0		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load		
GBA-VD-20	MOFT.FLD 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	11.5	8.8	9.7	8.9	9.0	8.2	7.1	1.9		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-21	MT EDEN 115 kV	EASTSHRE 115kV - Section 1D & 1E	P2	Bus-tie breaker	10.0	8.4	8.5	8.9	8.2	8.0	5.3	3.5		Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-VD-22	MT VIEW 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.1	19.6	18.4	18.2	16.8	14.8	3.7		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-23	PERMNTE 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	24.5	19.6	21.2	20.0	19.7	18.2	16.1	4.0		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-24	PHILLIPS 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	15.6	12.2	13.3	12.4	12.3	11.3	9.9	2.7		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-25	STELLING 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.0	19.5	18.3	18.1	16.8	14.8	3.7		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-26	WHISMAN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.1	19.6	18.4	18.2	16.8	14.8	3.7		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-27	WOLFE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.0	19.5	18.4	18.2	16.8	14.8	3.7		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-VD-28	CAROLNDS 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	10.7	9.9	11.5	11.2	11.6	12.4	9.5	5.5		Redundant bus relay
GBA-VD-29	CRYSTLSG 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	17.8	16.9	19.1	18.9	19.7	20.7	16.1	10.5		Redundant bus relay
GBA-VD-30	EMRLD LE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	17.7	16.9	19.0	18.8	19.7	20.6	16.0	10.5		Redundant bus relay
GBA-VD-31	GRANT 115 kV	East Shore 230 kV BAAH Bus #2 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	10.0	7.6	7.7	8.9	7.4	7.3	4.7	3.2		Redundant bus relay
GBA-VD-32	HLF MNBY 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	9.5	8.7	10.3	10.1	10.6	11.4	8.2	3.7		Redundant bus relay
GBA-VD-33	LAS PLGS 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	17.9	17.1	19.3	19.0	19.9	20.9	16.2	10.6		Redundant bus relay
GBA-VD-34	LOS ALTS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	76.7	75.3	76.5	76.4	76.1	76.3	18.8	2.1		Redundant bus relay
GBA-VD-35	LOS GATS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	78.3	77.0	77.9	78.1	77.8	77.5	19.1	2.1		Redundant bus relay
GBA-VD-36	LOYOLA 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	75.2	73.8	75.0	74.9	74.6	74.8	18.6	2.1		Redundant bus relay

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load		
GBA-VD-37	MT EDEN 115 kV	East Shore 230 kV BAAH Bus #2 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	10.0	8.4	8.5	8.9	8.2	8.0	4.7	3.5		Redundant bus relay
GBA-VD-38	MT VIEW 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	85.2	84.1	85.0	84.8	84.4	84.3	21.5	0.8		Redundant bus relay
GBA-VD-39	PERMNTE 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	71.1	69.6	70.3	70.9	70.5	70.4	18.4	2.1		Redundant bus relay
GBA-VD-40	RALSTON 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	17.8	16.9	19.1	18.9	19.7	20.7	16.1	10.5		Redundant bus relay
GBA-VD-41	STANFORD 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	18.4	17.4	19.7	19.5	20.4	21.4	16.6	10.9		Redundant bus relay
GBA-VD-42	STELLING 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	84.9	83.7	84.6	84.4	84.1	84.0	21.4	0.8		Redundant bus relay
GBA-VD-43	WATRSLED 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	14.8	13.8	15.8	15.6	16.2	17.1	13.2	8.4		Redundant bus relay
GBA-VD-44	WHISMAN 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	85.2	84.0	85.0	84.7	84.4	84.3	21.5	0.8		Redundant bus relay
GBA-VD-45	WOLFE 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	84.9	83.7	84.6	84.4	84.1	84.0	21.4	0.8		Redundant bus relay
GBA-VD-46	WOODSIDE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	17.9	17.0	19.3	19.0	19.9	20.8	16.1	10.6		Redundant bus relay
GBA-VD-47	CAROLNDS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	10.7	10.6	11.3	12.2	11.6	12.4	9.6	5.5		Review Stanford 60 kV system configuration
GBA-VD-48	CRYSTLSG 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.2	17.9	19.3	20.0	19.8	20.7	16.6	10.6		Review Stanford 60 kV system configuration
GBA-VD-49	EMRLD LE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.1	17.8	19.2	20.0	19.7	20.6	16.6	10.6		Review Stanford 60 kV system configuration
GBA-VD-50	HLF MNBY 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	9.5	9.4	10.2	11.2	10.6	11.4	8.3	3.2		Review Stanford 60 kV system configuration
GBA-VD-51	LAS PLGS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.3	18.0	19.4	20.2	19.9	20.9	16.7	10.6		Review Stanford 60 kV system configuration
GBA-VD-52	RALSTON 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.1	17.9	19.2	20.0	19.7	20.7	16.6	10.6		Review Stanford 60 kV system configuration
GBA-VD-53	STANFORD 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.7	18.5	19.9	20.7	20.4	21.4	17.1	10.9		Review Stanford 60 kV system configuration

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load		
GBA-VD-54	WATRSHEDED 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	14.9	14.8	15.8	16.7	16.3	17.1	13.6	8.4		Review Stanford 60 kV system configuration
GBA-VD-55	WOODSIDE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.3	18.0	19.4	20.2	19.9	20.8	16.7	10.6		Review Stanford 60 kV system configuration



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
GBA-V-1	ALTAMONT 60 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.06	1.06	1.05	1.07	1.06			Under review with PTO
GBA-V-2	BAILY J1 115 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.05	1.04	1.05	1.05	1.06			Under review with PTO
GBA-V-3	BAILY J2 115 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.05	1.04	1.05	1.05	1.06			Under review with PTO
GBA-V-4	BAILY J3 115 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.05	1.04	1.05	1.05	1.06			Under review with PTO
GBA-V-5	CHRISTIE 60 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.06			Under review with PTO
GBA-V-6	CYTE PMP 115 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.05	1.05	1.05	1.05	1.06			Under review with PTO
GBA-V-7	DYERWND 60 kV	Base Case	P0	Normal	1.05	1.04	1.05	1.06	1.06	1.06	1.07	1.07			Under review with PTO
GBA-V-8	EDENVALE 115 kV	Base Case	P0	Normal	1.04	1.03	1.04	1.04	1.04	1.04	1.05	1.06			Under review with PTO
GBA-V-9	EDNVL J1 115 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.04	1.04	1.04	1.05	1.06			Under review with PTO
GBA-V-10	EDNVL J3 115 kV	Base Case	P0	Normal	1.04	1.03	1.04	1.04	1.04	1.04	1.05	1.06			Under review with PTO
GBA-V-11	FRANKLIN 60 kV	Base Case	P0	Normal	1.03	1.03	1.04	1.03	1.03	1.03	1.04	1.06			Under review with PTO
GBA-V-12	IBM-BALY 115 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.05	1.04	1.05	1.05	1.06			Under review with PTO
GBA-V-13	IBM-HR J 115 kV	Base Case	P0	Normal	1.04	1.03	1.04	1.04	1.04	1.04	1.04	1.06			Under review with PTO
GBA-V-14	IBM-HRRS 115 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.04	1.04	1.04	1.05	1.06			Under review with PTO
GBA-V-15	LMEC 115 kV	Base Case	P0	Normal	1.05	1.05	1.05	1.05	1.05	1.06	1.04	1.03			Under review with PTO
GBA-V-16	LOS ALTS 60 kV	Base Case	P0	Normal	1.01	1.02	1.02	1.02	1.02	1.03	1.03	1.06			Under review with PTO
GBA-V-17	LOYOLA 60 kV	Base Case	P0	Normal	1.02	1.03	1.03	1.03	1.03	1.03	1.04	1.06			Under review with PTO
GBA-V-18	MARTIN 60 kV	Base Case	P0	Normal	1.05	1.05	1.05	1.12	1.05	1.05	0.97	0.97			Under review with PTO
GBA-V-19	MNTA VSA 60 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.04	1.04	1.05	1.05	1.06			Under review with PTO
GBA-V-20	MTCALF D 115 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.05	1.05	1.05	1.05	1.06			Under review with PTO
GBA-V-21	MTCALF E 115 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.05	1.05	1.05	1.05	1.06			Under review with PTO
GBA-V-22	PACIFICA 60 kV	Base Case	P0	Normal	1.03	1.03	1.03	1.06	1.02	1.02	0.99	1.00			Under review with PTO
GBA-V-23	PACIFJCT 60 kV	Base Case	P0	Normal	1.03	1.03	1.03	1.06	1.02	1.03	0.99	1.00			Under review with PTO
GBA-V-24	PCBRICK 60 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.06			Under review with PTO
GBA-V-25	PERMNTE 60 kV	Base Case	P0	Normal	1.03	1.04	1.04	1.04	1.04	1.05	1.05	1.06			Under review with PTO
GBA-V-26	PRT CSTA 60 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.06			Under review with PTO
GBA-V-27	SEQUOIA 60 kV	Base Case	P0	Normal	1.03	1.03	1.04	1.03	1.03	1.03	1.04	1.06			Under review with PTO
GBA-V-28	SN BRNOT 60 kV	Base Case	P0	Normal	1.03	1.03	1.03	1.06	1.02	1.03	0.99	1.00			Under review with PTO
GBA-V-29	SNANDRES 60 kV	Base Case	P0	Normal	1.03	1.03	1.03	1.06	1.02	1.03	1.00	1.01			Under review with PTO
GBA-V-30	SNTH LNE 60 kV	Base Case	P0	Normal	1.03	1.03	1.03	1.06	1.02	1.03	0.99	1.00			Under review with PTO
GBA-V-31	UNIN CHM 60 kV	Base Case	P0	Normal	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.06			Under review with PTO
GBA-V-32	MARTIN 60 kV	SN BRNOT-SNTH LNE 60kV [0] No Fault	P2-1	Line section w/o fault	1.05	1.06	1.05	1.14	1.05	1.05	0.97	1.11			Transfer trip to open other end
GBA-V-33	MLLBRETP 60 kV	MILLBRAE-MLLBRETP 60kV [0] No Fault	P2-1	Line section w/o fault	1.04	1.04	1.03	1.11	1.02	1.02	0.94	0.96			Transfer trip to open other end
GBA-V-34	PACIFICA 60 kV	SN BRNOT-SNTH LNE 60kV [0] No Fault	P2-1	Line section w/o fault	1.04	1.04	1.04	1.12	1.02	1.02	0.99	1.07			Transfer trip to open other end
GBA-V-35	PACIFJCT 60 kV	SN BRNOT-SNTH LNE 60kV [0] No Fault	P2-1	Line section w/o fault	1.04	1.04	1.04	1.12	1.02	1.03	0.99	1.07			Transfer trip to open other end

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
GBA-V-36	SN BRNOT 60 kV	SN BRNOT-SNTH LNE 60kV [0] No Fault	P2-1	Line section w/o fault	1.04	1.04	1.04	1.12	1.02	1.02	0.99	1.07			Transfer trip to open other end
GBA-V-37	SNANDRES 60 kV	MILLBRAE-MLLBRETP 60kV [0] No Fault	P2-1	Line section w/o fault	1.04	1.04	1.03	1.11	1.02	1.02	0.94	0.96			Transfer trip to open other end
GBA-V-38	SNTH LNE 60 kV	SN BRNOT-SNTH LNE 60kV [0] No Fault	P2-1	Line section w/o fault	1.04	1.04	1.04	1.12	1.02	1.03	0.99	1.07			Transfer trip to open other end
GBA-V-39	APP MAT 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.85	0.88	0.87	0.88	0.89	0.90	0.92	1.00			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-40	BRITTN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.84	0.88	0.87	0.88	0.88	0.89	0.91	1.00			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-41	LAWRENCE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.86	0.90	0.89	0.90	0.90	0.91	0.93	1.01			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-42	LOS ALTS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.76	0.82	0.80	0.82	0.82	0.84	0.87	1.02			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-43	LOS GATS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.74	0.80	0.80	0.80	0.80	0.84	0.85	1.01			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-44	LOYOLA 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.77	0.83	0.81	0.83	0.83	0.85	0.87	1.02			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-45	MT VIEW 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.81	0.83	0.83	0.85	0.87	0.99			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-46	PERMNTE 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.79	0.84	0.83	0.84	0.84	0.86	0.89	1.02			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-47	PHILLIPS 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.85	0.89	0.88	0.89	0.89	0.91	0.92	1.00			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-48	STELLING 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.82	0.83	0.83	0.85	0.87	0.99			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-49	WHISMAN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.81	0.83	0.83	0.85	0.87	0.99			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-50	WOLFE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.82	0.83	0.83	0.85	0.87	0.99			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-V-51	CRYSTLSG 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.84	0.85	0.83	0.84	0.83	0.82	0.87	0.93			Redundant bus relay
GBA-V-52	EMRLD LE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.85	0.86	0.84	0.84	0.83	0.83	0.87	0.93			Redundant bus relay
GBA-V-53	LAS PLGS 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.84	0.85	0.82	0.83	0.82	0.81	0.86	0.93			Redundant bus relay
GBA-V-54	LOS ALTS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.25	0.27	0.25	0.26	0.26	0.26	0.84	1.03			Redundant bus relay
GBA-V-55	LOS GATS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.22	0.24	0.24	0.23	0.23	0.25	0.83	1.03			Redundant bus relay

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load				
GBA-V-56	LOYOLA 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.27	0.29	0.28	0.28	0.28	0.28	0.28	0.85	1.04			Redundant bus relay
GBA-V-57	MT VIEW 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.15	0.17	0.16	0.16	0.17	0.17	0.17	0.80	1.02			Redundant bus relay
GBA-V-58	PERMNTE 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.32	0.34	0.34	0.33	0.34	0.34	0.34	0.86	1.04			Redundant bus relay
GBA-V-59	RALSTON 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.84	0.86	0.83	0.84	0.83	0.82	0.87	0.87	0.93			Redundant bus relay
GBA-V-60	STANFORD 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.82	0.84	0.81	0.82	0.81	0.80	0.85	0.85	0.91			Redundant bus relay
GBA-V-61	STELLING 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.16	0.17	0.17	0.17	0.17	0.18	0.18	0.81	1.02			Redundant bus relay
GBA-V-62	WATRSLED 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.88	0.89	0.87	0.88	0.87	0.86	0.90	0.90	0.95			Redundant bus relay
GBA-V-63	WHISMAN 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.15	0.17	0.16	0.16	0.17	0.17	0.17	0.80	1.02			Redundant bus relay
GBA-V-64	WOLFE 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.16	0.17	0.16	0.17	0.17	0.18	0.18	0.80	1.02			Redundant bus relay
GBA-V-65	WOODSIDE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	0.84	0.85	0.83	0.83	0.82	0.81	0.86	0.86	0.93			Redundant bus relay
GBA-V-66	CRYSTLGS 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.86	0.83	0.84	0.84	0.82	0.87	0.87	>0.9			Review Stanford 60 kV system configuration
GBA-V-67	EMRLD LE 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.85	0.86	0.84	0.85	0.84	0.83	0.87	0.87	>0.9			Review Stanford 60 kV system configuration
GBA-V-68	LAS PLGS 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.85	0.82	0.83	0.83	0.82	0.86	0.86	>0.9			Review Stanford 60 kV system configuration
GBA-V-69	MILLBRAE 60 kV	MARTIN-MILLBRAE #1 115kV [2230] & MILLBRAE-SANMATEO #1 115kV [0]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	>0.9			Review Stanford 60 kV system configuration
GBA-V-70	MILLBRAE 115 kV	MARTIN-MILLBRAE #1 115kV [2230] & MILLBRAE-SANMATEO #1 115kV [0]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	>0.9			Review Stanford 60 kV system configuration
GBA-V-71	RALSTON 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.86	0.83	0.84	0.84	0.82	0.87	0.87	>0.9			Review Stanford 60 kV system configuration
GBA-V-72	SANPAULA 115 kV	MILLBRAE-SANMATEO #1 115kV [0] & MARTIN-MILLBRAE #1 115kV [2230]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	>0.9			Review Stanford 60 kV system configuration
GBA-V-73	SNANDRES 60 kV	MARTIN-MILLBRAE #1 115kV [2230] & MILLBRAE-SANMATEO #1 115kV [0]	P6	N-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	>0.9			Review Stanford 60 kV system configuration
GBA-V-74	STANFORD 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.82	0.84	0.81	0.82	0.82	0.81	0.85	0.85	>0.9			Review Stanford 60 kV system configuration
GBA-V-75	WATRSLED 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.88	0.89	0.87	0.88	0.87	0.86	0.90	0.90	>0.9			Review Stanford 60 kV system configuration
GBA-V-76	WOODSIDE 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.85	0.83	0.84	0.83	0.82	0.87	0.87	>0.9			Review Stanford 60 kV system configuration

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
GBA-V-77	CAROLNDS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.92	0.92	0.91	0.91	0.91	0.90	0.94	0.98			Review Stanford 60 kV system configuration
GBA-V-78	CRYSTLSG 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.84	0.85	0.83	0.83	0.83	0.82	0.86	0.93			Review Stanford 60 kV system configuration
GBA-V-79	EMRLD LE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.84	0.85	0.84	0.83	0.83	0.83	0.87	0.93			Review Stanford 60 kV system configuration
GBA-V-80	LAS PLGS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.83	0.84	0.82	0.82	0.82	0.81	0.86	0.93			Review Stanford 60 kV system configuration
GBA-V-81	RALSTON 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.84	0.85	0.83	0.83	0.83	0.82	0.86	0.93			Review Stanford 60 kV system configuration
GBA-V-82	STANFORD 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.82	0.83	0.81	0.81	0.81	0.80	0.85	0.91			Review Stanford 60 kV system configuration
GBA-V-83	WATRSLED 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.88	0.88	0.87	0.86	0.87	0.86	0.90	0.95			Review Stanford 60 kV system configuration
GBA-V-84	WOODSIDE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.83	0.84	0.82	0.82	0.82	0.81	0.86	0.93			Review Stanford 60 kV system configuration

ID	Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	Select..	Select..	Select..	Select..	Select..	
GBA-SP-TS-1	Delta Energy Center 3Ø fault with normal clearing.	P1-1		6	6	7	6	6						Under review with PTO .
GBA-SP-TS-2	Lone Tree-Cayetano 230 kV line 3Ø fault with normal clearing.	P1-2		0	0	0	0	0						No violation
GBA-SP-TS-3	Tesla 230/115 kV bank 3Ø fault with normal clearing.	P1-3		0	0	0	0	0						No violation
GBA-SP-TS-4	Metcalf 230 kV 3Ø fault with normal clearing.	P1-4		0	0	0	0	0						No violation
GBA-SP-TS-5	Metcalf 230 kV SLG fault with normal clearing.	P2-2a		0	0	0	0	0						No violation
GBA-SP-TS-6	Pittsburg 230 kV SLG fault with normal clearing.	P2-2b		1	2	2	2	2						Under review with PTO .
GBA-SP-TS-7	Newark 230 kV SLG fault with normal clearing.	P2-2c		2	2	2	4	4						Under review with PTO .
GBA-SP-TS-8	Llagas 115 kV breaker SLG fault with normal clearing.	P2-3		9	9	9	11	11						Under review with PTO .
GBA-SP-TS-9	Monta Vista 230 kV breaker SLG fault with normal clearing.	P2-4		31	58	63	43	0						Under review with PTO .
GBA-SP-TS-10	LMEC 3Ø fault with normal clearing with DEC offline in the base case.	P3-1		0	0	0	0	0						No violation
GBA-SP-TS-11	Newark-Dixon Landing 115 kV 3Ø fault with normal clearing with DEC offline in the base case.	P3-2		0	0	0	0	0						No violation
GBA-SP-TS-12	Pittsburg 230/115 kV Bank 3Ø fault with normal clearing with DEC offline in the base case.	P3-3		0	0	1	2	1						Under review with PTO .
GBA-SP-TS-13	Newark SVD 3Ø fault with normal clearing with DEC offline in the base case.	P3-4		0	0	0	0	0						No violation
GBA-SP-TS-14	DEC SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-1		164	173	218	36	289						Under review with PTO .
GBA-SP-TS-15	Lone Tree-Cayetano 230 kV line SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-2		3	3	3	3	3						Under review with PTO .

ID	Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	Select..	Select..	Select..	Select..	Select..	
GBA-SP-TS-16	Tesla 230/115 kV bank SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-3		5	7	7	5	5						Under review with PTO .
GBA-SP-TS-17	Metcalf SVD SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-4		0	0	0	0	0						No violation
GBA-SP-TS-18	Lagas 115 kV SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-5		9	9	9	11	11						Under review with PTO .
GBA-SP-TS-19	Monta Vista 230 kV breaker SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-6		31	58	63	43	0						Under review with PTO .
GBA-SP-TS-20	DEC SLG fault with delayed clearing.	P5-1		4	4	4	4	4						Under review with PTO .
GBA-SP-TS-21	Pittsburg-Tesla #1 230kV Line SLG fault with delayed clearing.	P5-2		4	2	2	4	4						Under review with PTO .
GBA-SP-TS-22	Pittsburg 230/115 kV transformer SLG fault with delayed clearing.	P5-3		107	107	184	101	149						Under review with PTO .
GBA-SP-TS-23	Metcalf SVD SLG fault with delayed clearing.	P5-4		0	7	0	0	0						Under review with PTO .
GBA-SP-TS-24	Los Esteros #1 230 kV SLG fault with delayed clearing.	P5-5		4	4	4	0	0						Under review with PTO .
GBA-SP-TS-25	Los Esteros #2 230 kV SLG fault with delayed clearing.	P5-5a		0	0	0	0	0						No violation
GBA-SP-TS-26	Martin #1 230 kV SLG fault with delayed clearing.	P5-5b		0	0	4	3	0						Under review with PTO .
GBA-SP-TS-27	Martin #2 230 kV SLG fault with delayed clearing.	P5-5c		6	29	12	10	6						Under review with PTO .
GBA-SP-TS-28	Pittsburg-San Ramon 230kV Line 3Ø fault with normal clearing with the San Ramon-Moraga 230kV Line out in base case.	P6-1-1		12	12	12	11	4						Under review with PTO .

ID	Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	Select..	Select..	Select..	Select..	Select..	
GBA-SP-TS-29	Cooley Landing 115/60kV Transformer #1 3Ø fault with Ravenswood-Cooley Landing #2 115kV Line out in base case.	P6-1-2		0	0	0	0	0						No violation
GBA-SP-TS-30	Newark SVD 3Ø fault with normal clearing with the Newark-Dixon Landing 115kV Line out in base case.	P6-1-3		0	0	0	0	0						No violation
GBA-SP-TS-31	Ravenswood-Cooley Landing #2 115kV Line 3Ø fault with normal clearing with the Cooley Landing 115/60kV Transformer #1 out in base case.	P6-2-1		0	0	0	0	0						No violation
GBA-SP-TS-32	Jefferson 230/60kV Transformer #2 3Ø fault with normal clearing with the Jefferson 230/60kV Transformer #1 out in base case.	P6-2-2		0	0	0	0	0						No violation
GBA-SP-TS-33	Newark SVD 3Ø fault with normal clearing with the Tesla 230/115 kV bank out in base case.	P6-2-3		0	0	0	0	0						No violation
GBA-SP-TS-34	Newark-Dixon Landing 115kV Line 3Ø fault with normal clearing with the Newark SVD out in base case.	P6-3-1		0	0	0	0	0						No violation
GBA-SP-TS-35	Tesla 230/115 kV bank 3Ø fault with normal clearing with the Newark SVD out in base case.	P6-3-2		0	0	0	0	0						No violation
GBA-SP-TS-36	Metcalf SVD 3Ø fault with normal clearing with the Newark SVD out in base case.	P6-3-3		0	0	0	0	0						No violation
GBA-SP-TS-37	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines SLG fault with normal clearing.	P7-1		13	11	10	13	13						Under review with PTO .

Single Contingency Load Drop

ID	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.



ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
GBA-SP-SS-1	Kirker	106	102	111								Under review with PTO

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
GBA-T-1	Oleum-Christie 115kV Line	CHRISTIE-SOBRANTE 115kV [1260]	P1	N-1	109	107	54	110	110	107	58	74	Short Term : Action Plan ; Long Term : North Tower 115 kV Looping Project	
GBA-T-2	Newark-Dixon Landing 115kV Line	PIERCY-METCALF 115kV [4318]	P1	N-1	112	105	NA	117	110	105	NA	NA	Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project	
GBA-T-3	Monta Vista-Wolfe 115 kV Line	STELLING-MONTA VISTA 115kV [1000]	P1	N-1	93	86	91	98	91	86	101	91	Monitor BTM-PV development in the area.	
GBA-T-4	Piercy-Metcalf 115 kV Line	NEWARK-DIXON LANDING 115kV [2990]	P1	N-1	103	98	63	109	103	98	70	63	Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project	
GBA-T-5	Evergreen 115/60 kV Transformer No. 1	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	95	87	77	102	89	87	88	77	Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project	
GBA-T-6	Evergreen-Almaden 60 kV Line	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	124	113	88	134	117	113	101	88	Short Term : Action Plan; Long Term : Monta Vista-Los Gatos-Evergreen 60 kV Project	
GBA-T-7	Contra Costa-Brentwood 230kV Line	C.COSTA 230kV - Section 2F & 2E	P2	Bus-tie breaker	68	75	65	68	66	104	60	65	Contra Costa area generation redispatch	
GBA-T-8	Newark-Applied Materials 115kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	155	135	141	164	150	135	163	140	Short Term : Action Plan; Long Term : Monta Vista 230 kV Bus Upgrade Project	
GBA-T-9	North Dublin-Cayetano 230kV Cable	C.COSTA 230kV - Section 2F & 1F	P2	Bus-tie breaker	79	81	86	81	91	103	89	88	Contra Costa area generation redispatch	
GBA-T-10	Las Positas-Newark 230kV Line	C.COSTA 230kV - Section 2F & 2E	P2	Bus-tie breaker	87	96	99	89	108	117	98	101	Contra Costa area generation redispatch	
GBA-T-11	Cayetano-Lone Tree (USWP-Cayetano) 230kV Line	C.COSTA 230kV - Section 2F & 1F	P2	Bus-tie breaker	83	86	92	86	96	108	96	94	Contra Costa area generation redispatch	
GBA-T-12	Oleum-Christie 115kV Line	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	110	108	53	112	111	108	56	82	Short Term : Action Plan ; Long Term : North Tower 115 kV Looping Project	
GBA-T-13	Oakland D - Oakland L 115kV Cable	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	113	107	104	100	101	93	110	90	Increase generation in the Oakland Area	
GBA-T-14	Oakland C - Oakland L #1 115kV Cable	CLARMNT - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #2 line	P2	Non-bus-tie breaker	100	92	91	103	98	91	98	91	Short Term : Action Plan ; Long Term : Preferred resource	

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
GBA-T-15	Oakland C - Oakland X #2 115kV Cable	CLARMNT - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #2 line	P2	Non-bus-tie breaker	101	95	93	91	90	83	100	82		Increase generation in the Oakland Area
GBA-T-16	Grant-Oakland J 115 kV Line	MORAGA 115kV - Section 1E & 2E	P2	Bus-tie breaker	NA	98	98	NA	106	98	106	98		Upgrade conductor : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-17	Pittsburg 230/115kV Transformer #13	PITSBG D - 2D 230kV & PITSBG D-TBC_PT1 #1 line	P2	Non-bus-tie breaker	103	106	57	112	96	101	59	57		Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-18	Martinez-Sobrante 115kV Line	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	105	95	<90	104	107	96	0	0		Increase generation in Pittsburg 115 kV
GBA-T-19	Sobrante-Grizzly-Claremont #2 115kV Line (Hillside-Grizzly JCT)	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	106	78	77	103	75	70	83	74		Increase generation in the Oakland Area
GBA-T-20	Oleum-Martinez 115kV Line	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	238	222	179	247	239	222	197	255		SPS or system upgrade
GBA-T-21	Moraga-Claremont #1 115kV Line	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	114	104	109	103	106	99	117	112		Increase generation in the Oakland Area
GBA-T-22	Moraga-Claremont #2 115kV Line	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	114	104	109	103	106	99	118	110		Increase generation in the Oakland Area
GBA-T-23	Moraga-Oakland X #1 115kV Line	MORAGA 115kV - Section 1D & 1E	P2	Bus-tie breaker	103	95	99	95	92	85	107	94		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-24	Moraga-Oakland X #2 115kV Line	MORAGA 115kV - Section 1D & 1E	P2	Bus-tie breaker	109	101	105	95	97	89	114	95		Increase generation in the Oakland Area
GBA-T-25	Moraga-Oakland X #3 115kV Line	MORAGA 115kV - Section 1D & 2D	P2	Bus-tie breaker	133	129	138	113	130	119	151	138		Increase generation in the Oakland Area
GBA-T-26	Moraga-Oakland X #4 115kV Line	MORAGA 115kV - Section 1D & 2D	P2	Bus-tie breaker	133	129	138	113	130	119	151	138		Increase generation in the Oakland Area
GBA-T-27	Moraga-Oakland J 115kV Line	SN LNDRO 115kV - Section 1E & 2E	P2	Bus-tie breaker	101	78	78	105	87	83	82	79		Short Term: Action plan - Open Grant-J line at Oakland J following RCEC outage Long Term: Reconductor Moraga-Oakland J 115 kV Line
GBA-T-28	Sobrante-Moraga 115kV Line	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	132	86	87	129	93	84	97	104		Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
GBA-T-29	Moraga-San Leandro #1 115kV Line	MORAGA 115kV - Section 2D & 2E	P2	Bus-tie breaker	111	64	57	115	70	67	60	57		Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-30	Moraga-San Leandro #2 115kV Line	MORAGA 115kV - Section 1D & 1E	P2	Bus-tie breaker	129	85	84	134	93	88	89	84		Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-31	Potrero-Larkin #1 (AY-1) 115kV Cable	LARKIN E Section 1E & LARKIN F Section 1F 115kV	P2	Bus-tie breaker	147	144	146	150	148	144	152	145		Larkin bus upgrade
GBA-T-32	San Mateo-Belmont 115kV Line	RVNSWD D 115kV - Section 1D & 2D	P2	Bus-tie breaker	101	96	97	104	102	96	103	97		Short Term: Action Plan Long Term: South of San Mateo Capacity Increase Project
GBA-T-33	Ravenswood-Palo Alto #2 115kV Line	RVNSWD E Section 1E & RVNSWD D Section 1D 115kV	P2	Non-bus-tie breaker	104	100	105	105	103	100	108	105		Palo Alto interim SPS
GBA-T-34	Cooley Landing-Palo Alto 115kV Line	RVNSWD E 115kV - Section 1E & 2E	P2	Bus-tie breaker	113	110	115	114	111	111	116	115		Palo Alto interim SPS
GBA-T-35	Ravenswood-Cooley Landing #1 115kV Line	RVNSWD E 115kV - Section 1E & 2E	P2	Bus-tie breaker	161	117	124	165	122	117	130	124		Palo Alto interim SPS
GBA-T-36	San Mateo-Bair 60kV Line	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	127	117	54	133	127	117	60	55		Short Term: Action Plan Long Term: San Mateo-Bair 60 kV Line Reconductor Project
GBA-T-37	Bair 115/60kV Transformer #1	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	147	137	149	155	147	137	166	151		Review Stanford 60 kV system configuration
GBA-T-38	Bair-Cooley Landing #2 60kV Line	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	140	131	141	149	142	131	158	144		Review Stanford 60 kV system configuration
GBA-T-39	Eastshore 230/115kV Transformer #1	E. SHORE 230kV - Middle Breaker Bay 3	P2	Non-bus-tie breaker	84	103	103	89	110	109	111	102		Replace transformer
GBA-T-40	Newark-Lawrence 115kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	250	220	227	263	244	220	260	227		Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-T-41	Newark-Applied Materials 115kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	197	172	180	207	192	173	207	179		Short Term : Action Plan; Long Term : Monta Vista 230 kV Bus Upgrade Project
GBA-T-42	Newark-Dixon Landing 115kV Line	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	113	106	72	118	111	106	80	72		Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-43	Newark-Kifer 115kV Line	BUS-TIE BREAKER 392 FAULT AT NRS 115.00	P2	Bus-tie breaker	122	129	142	129	133	132	145	144		Reconductor

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-T-44	Monta Vista-Wolfe 115 kV Line	MNTA VSA 115kV - Middle Breaker Bay 4	P2	Non-bus-tie breaker	93	86	91	98	91	86	101	91			Monitor BTM-PV development in the area.
GBA-T-45	Lawrence - Monta Vista 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	177	154	163	189	172	154	190	163			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-T-46	Britton-Monta Vista 115 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	110	95	100	118	106	96	117	100			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-T-47	Applied Materials-Britton 115 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	152	133	139	161	148	133	161	139			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed
GBA-T-48	Trimble-San Jose 'B' 115 kV Line	BUS-TIE BREAKER 392 FAULT AT NRS 115.00	P2	Bus-tie breaker	110	135	144	130	140	142	144	145			Reconductor
GBA-T-49	El Patio-San Jose Sta. 'A' 115 kV Line	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	93	84	92	99	86	80	104	94			Preferred resource
GBA-T-50	San Jose Sta 'A'-'B' 115 kV Line	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	92	83	91	99	85	78	104	94			Preferred resource
GBA-T-51	Markham No. 1 115 kV Tap	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	62	87	101	98	90	87	111	101			Reconductor
GBA-T-52	Swift-Metcalf 115 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	103	95	77	105	100	95	86	77			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-53	Metcalf 230/115 kV Trans No. 1	METCALF 230kV - Section 2D & 2E	P2	Bus-tie breaker	113	64	NA	123	67	63	NA	NA			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-54	Metcalf 230/115 kV Trans No. 4	METCALF 230kV - Section 1D & 1E	P2	Bus-tie breaker	101	63	NA	112	66	62	NA	NA			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-55	Metcalf 230/115 kV Trans No. 2	METCALF 230kV - Section 1D & 2D	P2	Bus-tie breaker	117	91	99	127	94	88	108	100			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-56	Metcalf 230/115 kV Trans No. 3	METCALF 230kV - Section 1D & 2D	P2	Bus-tie breaker	113	90	97	123	93	87	107	99			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-57	Piercy-Metcalf 115 kV Line	NEWARK F 115kV - Section 1F & 2F	P2	Bus-tie breaker	107	99	70	110	104	99	78	71			Action Plan before Evergreen-Mabury Voltage Conversion
GBA-T-58	Evergreen 115/60 kV Transformer No. 1	LOS GATS 60kV Section 1A	P2	Bus	95	87	77	102	89	87	88	77			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
GBA-T-59	Evergreen-Almaden 60 kV Line	LOS GATS 60kV Section 1A	P2	Bus	124	113	88	134	117	113	101	88		Short Term : Action Plan; Long Term : Monta Vista-Los Gatos-Evergreen 60 kV Project
GBA-T-60	Oleum-Christie 115kV Line	UNION CH 9kV Gen Unit 1 & CHRISTIE-SOBRANTE 115kV [1260]	P3	G-1/N-1	129	128	<90	131	131	128	<90	<90		Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project
GBA-T-61	Pittsburg 230/115kV Transformer #12	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 13	P3	G-1/N-1	111	100	<90	111	105	97	<90	<90		Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-62	Pittsburg 230/115kV Transformer #13	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 12	P3	G-1/N-1	129	116	<90	129	121	112	<90	<90		Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-63	Moraga-Claremont #1 115kV Line	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & MORAGA-CLAREMONT #2 115kV [2710]	P3	G-1/N-1	105	98	100	97	99	96	100	100		Increase generation in the Oakland Area
GBA-T-64	Moraga-Claremont #2 115kV Line	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & MORAGA-CLAREMONT #1 115kV [2700]	P3	G-1/N-1	105	98	100	98	99	96	100	100		Increase generation in the Oakland Area
GBA-T-65	Newark-Dixon Landing 115kV Line	DEC STG1 24kV & DEC CTG1 18kV & DEC CTG2 18kV & DEC CTG3 18kV Gen Units & PIERCY-METCALF 115kV [4318]	P3	G-1/N-1	<90	106	<90	117	111	106	<90	<90		Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-66	Piercy-Metcalf 115 kV Line	DEC STG1 24kV & DEC CTG1 18kV & DEC CTG2 18kV & DEC CTG3 18kV Gen Units & NEWARK-DIXON LANDING 115kV [2990]	P3	G-1/N-1	104	98	<90	109	103	98	<90	<90		Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-67	Evergreen 115/60 kV Transformer No. 1	DEC STG1 24kV & DEC CTG1 18kV & DEC CTG2 18kV & DEC CTG3 18kV Gen Units & MONTA VISTA-LOS GATOS 60kV [7610]	P3	G-1/N-1	<90	<90	<90	102	<90	<90	<90	<90		Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-68	Evergreen-Almaden 60 kV Line	DEC STG1 24kV & DEC CTG1 18kV & DEC CTG2 18kV & DEC CTG3 18kV Gen Units & MONTA VISTA-LOS GATOS 60kV [7610]	P3	G-1/N-1	<90	<90	<90	134	<90	<90	<90	<90		Short Term : Action Plan; Long Term : Monta Vista-Los Gatos-Evergreen 60 kV Project
GBA-T-69	San Mateo-Belmont 115kV Line	Ravenswood 230 kV BAAH Bus #2 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	99	97	99	104	105	99	106	100		Redundant bus relay
GBA-T-70	San Mateo 115/60kV Transformer #8	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	99	93	102	106	97	93	117	102		Redundant bus relay

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GBA-T-71	San Mateo-Hillsdale JCT 60kV Line	Jefferson 230 kV BAAH Bus #2 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	186	174	194	202	179	173	227	194		Redundant bus relay
GBA-T-72	San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	Jefferson 230 kV BAAH Bus #2 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	212	199	221	229	204	198	258	220		Redundant bus relay
GBA-T-73	San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	Jefferson 230 kV BAAH Bus #2 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	202	190	210	219	195	189	245	210		Redundant bus relay
GBA-T-74	Jefferson-Hillsdale JCT 60kV Line	Jefferson 230 kV BAAH Bus #2 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	156	148	161	168	152	147	185	161		Redundant bus relay
GBA-T-75	Los Altos-Loyola 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	117	diverge		Redundant bus relay
GBA-T-76	Loyola-Monta Vista 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	232	diverge		Redundant bus relay
GBA-T-77	Monta Vista 230/60 kV Trans No. 5	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	483	diverge		Redundant bus relay
GBA-T-78	Monta Vista 115/60 kV Trans No. 6	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	76	diverge		Redundant bus relay
GBA-T-79	Monta Vista-Permanente 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	111	diverge		Redundant bus relay
GBA-T-80	Monta Vista-Los Gatos 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	102	diverge		Redundant bus relay
GBA-T-81	Oleum-Christie 115kV Line	CHRISTIE-SOBRANTE 115kV [1260] & UNION CH 9kV Gen Unit 1	P6	N-1/N-1	130	128	93	132	131	128	102	100		Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project
GBA-T-82	Christie-Sobrante (Oleum-Sobrante) 115kV Line	SOBRANTE-G #1 115kV [3720] & SOBRANTE-G #2 115kV [3730]	P6	N-1/N-1	134	124	102	136	136	125	113	132		SPS or system upgrade
GBA-T-83	Sobrante-El Cerrito STA G #1 115kV Lin	SOBRANTE-G #2 115kV [3730] & CHRISTIE-SOBRANTE 115kV [1260]	P6	N-1/N-1	100	95	<90	105	102	95	91	101		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-84	Sobrante-El Cerrito STA G #2 115kV Line	SOBRANTE-G #1 115kV [3720] & CHRISTIE-SOBRANTE 115kV [1260]	P6	N-1/N-1	103	95	<90	105	104	95	91	102		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-85	Oakland D - Oakland L 115kV Cable	C-X #2 115kV [9962] & C-X #3 115kV [9925]	P6	N-1/N-1	114	107	104	94	96	0	110	0		Increase generation in the Oakland Area
GBA-T-86	Oakland C - Oakland L #1 115kV Cable	K-D #1 115kV [9966] & PITTSBURG-LOS MEDANOS #2 115kV [9993]	P6	N-1/N-1	100	92	91	103	98	91	98	91		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-87	Oakland C - Oakland X #2 115kV Cable	C-X #3 115kV [9925] & D-L #1 115kV [9963]	P6	N-1/N-1	114	107	104	94	96	<90	110	<90		Increase generation in the Oakland Area

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GBA-T-88	Pittsburg 230/115kV Transformer #12	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 13	P6	N-1/N-1	111	100	<90	111	105	100	<90	<90		Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-89	Pittsburg 230/115kV Transformer #13	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 12	P6	N-1/N-1	129	116	<90	129	121	112	<90	<90		Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-90	Martinez-Oleum 115kV Line	SOBRANTE-G #2 115kV [3730] & SOBRANTE-G #1 115kV [3720]	P6	N-1/N-1	117	108	<90	119	114	107	96	120		Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project
GBA-T-91	Moraga-Claremont #1 115kV Line	C-X #3 115kV [9925] & C-X #2 115kV [9962]	P6	N-1/N-1	111	104	106	102	102	101	114	109		Increase generation in the Oakland Area
GBA-T-92	Moraga-Claremont #2 115kV Line	C-X #2 115kV [9962] & C-X #3 115kV [9925]	P6	N-1/N-1	111	104	106	102	102	101	114	109		Increase generation in the Oakland Area
GBA-T-93	Moraga-Oakland X #1 115kV Line	MORAGA-OAKLAND #2 115kV [2730] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	95	93	<90	106	<90		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-94	Moraga-Oakland X #2 115kV Line	MORAGA-OAKLAND #1 115kV [2720] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	95	93	<90	106	<90		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-95	Moraga-Oakland X #3 115kV Line	MORAGA-OAKLAND #1 115kV [2720] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	95	93	<90	106	<90		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-96	Moraga-Oakland X #4 115kV Line	MORAGA-OAKLAND #1 115kV [2720] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	95	93	<90	106	<90		Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-97	Moraga-San Leandro #1 115kV Line	MORAGA-SAN LEANDRO #2 115kV [2780] & MORAGA-SAN LEANDRO #3 115kV [2790]	P6	N-1/N-1	128	<90	<90	133	93	<90	<90	<90		Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-98	Moraga-San Leandro #2 115kV Line	MORAGA-SAN LEANDRO #1 115kV [2770] & MORAGA-SAN LEANDRO #3 115kV [2790]	P6	N-1/N-1	129	<90	<90	133	93	<90	<90	<90		Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-99	Moraga-San Leandro #3 115kV Line	MORAGA-SAN LEANDRO #1 115kV [2770] & MORAGA-SAN LEANDRO #2 115kV [2780]	P6	N-1/N-1	103	<90	<90	107	<90	<90	<90	<90		Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-100	Potrero-Mission (AX) 115kV Cable	A-Y #1 (UNDERGROUND IDLE) 115kV [9952] & A-Y #2 115kV [9953]	P6	N-1/N-1	113	108	111	113	110	108	115	111		TBC runback scheme modification

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GBA-T-101	Martin-Sneath Lane 60kV Line	MILLBRAE-SANMATEO #1 115kV [0] & MARTIN-MILLBRAE #1 115kV [2230]	P6	N-1/N-1	123	114	119	129	124	114	133	119		Review Stanford 60 kV system configuration
GBA-T-102	San Mateo-Belmont 115kV Line	RAVENSWD 230/115kV TB 2 & RAVENSWD 230/115kV TB 1	P6	N-1/N-1	102	100	101	105	104	100	105	101		Action plan or explore potential mitigation
GBA-T-103	Ravenswood-Palo Alto #1 115kV Line	RVNSWD E-PLO ALTO #2 115kV [0] & RVNSWD D-CLY LND #1 115kV [0]	P6	N-1/N-1	105	102	107	107	104	102	110	107		Palo Alto interim SPS
GBA-T-104	Ravenswood-Palo Alto #2 115kV Line	RVNSWD E-PLO ALTO #1 115kV [0] & RVNSWD D-CLY LND #1 115kV [0]	P6	N-1/N-1	105	102	106	107	104	102	110	107		Palo Alto interim SPS
GBA-T-105	Cooley Landing-Palo Alto 115kV Line	RVNSWD E-PLO ALTO #2 115kV [0] & RVNSWD E-PLO ALTO #1 115kV [0]	P6	N-1/N-1	112	109	113	112	109	109	114	113		Palo Alto interim SPS
GBA-T-106	Ravenswood-Cooley Landing #1 115kV Line	RVNSWD E-PLO ALTO #1 115kV [0] & RVNSWD E-PLO ALTO #2 115kV [0]	P6	N-1/N-1	130	94	98	132	96	93	101	98		Short Term : Action Plan ; Long Term : Ravenswood – Cooley Landing 115 kV Line Reconductor Project
GBA-T-107	Millbrae-Sneath Lane 60kV Line	MARTIN-SNEATH LANE 60kV [7210] & HLLSDLJT-HLF MNBV 60kV [0]	P6	N-1/N-1	90	<90	91	93	93	<90	105	91		Action plan or explore potential mitigation
GBA-T-108	San Mateo 115/60kV Transformer #8	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	99	93	102	106	97	93	117	102		Review Stanford 60 kV system configuration
GBA-T-109	San Mateo-Hillsdale JCT 60kV Line	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	186	174	194	200	178	173	225	194		Review Stanford 60 kV system configuration
GBA-T-110	San Mateo-Bair 60kV Line	RVNSWD E-CLY LND2 #2 115kV [0] & CLY LND 115/60kV TB 1	P6	N-1/N-1	126	116	<90	133	126	116	<90	<90		San Mateo-Bair 60 kV Line Reconductor Project
GBA-T-111	San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	212	198	221	227	203	198	255	220		Review Stanford 60 kV system configuration
GBA-T-112	San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	202	189	210	217	194	189	243	210		Review Stanford 60 kV system configuration
GBA-T-113	Jefferson-Hillsdale JCT 60kV Line	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	156	148	161	166	150	147	183	161		Review Stanford 60 kV system configuration
GBA-T-114	Bair 115/60kV Transformer #1	CLY LND 115/60kV TB 1 & RVNSWD E-CLY LND2 #2 115kV [0]	P6	N-1/N-1	147	137	149	155	147	137	165	151		Review Stanford 60 kV system configuration
GBA-T-115	Bair-Cooley Landing #1 60kV Line	RVNSWD E-CLY LND2 #2 115kV [0] & CLY LND 115/60kV TB 1	P6	N-1/N-1	126	114	123	134	122	114	138	125		Review Stanford 60 kV system configuration
GBA-T-116	Bair-Cooley Landing #2 60kV Line	CLY LND 115/60kV TB 1 & RVNSWD E-CLY LND2 #2 115kV [0]	P6	N-1/N-1	115	110	116	121	119	110	128	118		Review Stanford 60 kV system configuration
GBA-T-117	Eastshore 230/115kV Transformer #1	EASTSHORE-SAN MATEO 230kV [4650] & E. SHORE 230/115kV TB 2	P6	N-1/N-1	<90	100	100	<90	100	100	100	100		Replace transformer
GBA-T-118	Eastshore 230/115kV Transformer #2	EASTSHORE-SAN MATEO 230kV [4650] & E. SHORE 230/115kV TB 1	P6	N-1/N-1	<90	100	100	<90	100	100	100	100		Replace transformer
GBA-T-119	Dumbarton-Newark 115kV Line	EASTSHORE-SAN MATEO 230kV [4650] & PITTSBURG-EASTSHORE 230kV [5462]	P6	N-1/N-1	100	<90	<90	100	<90	<90	<90	<90		Short Term : Action Plan ; Long Term : Preferred resource

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GBA-T-120	Newark-Dixon Landing 115kV Line	METCALF SVD=v & PIERCY-METCALF 115kV [4318]	P6	N-1/N-1	<90	106	<90	118	111	106	90	<90	Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project	
GBA-T-121	Newark-Milpitas #2 115kV Line	NEWARK-MILPITAS #1 115kV [3080] & SWIFT-METCALF 115kV [3900]	P6	N-1/N-1	112	106	114	117	112	106	126	114	Action plan or rerate	
GBA-T-122	Newark-Milpitas #1 115kV Line	NEWARK-MILPITAS #2 115kV [3080] & SWIFT-METCALF 115kV [3900]	P6	N-1/N-1	135	127	137	141	134	127	152	137	Action plan or rerate	
GBA-T-123	Monta Vista-Wolfe 115 kV Line	MONTAVIS SVD=v & STELLING-MONTA VISTA 115kV [1000]	P6	N-1/N-1	95	<90	93	100	92	<90	103	93	Monitor BTM-PV development in the area.	
GBA-T-124	Trimble-San Jose 'B' 115 kV Line	LOS ESTEROS-NORTECH 115kV [4032] & EL PATIO-SAN JOSE A 115kV [1520]	P6	N-1/N-1	93	100	100	100	100	101	100	101	Reconductor	
GBA-T-125	Swift-Metcalf 115 kV Line	NEWARK-MILPITAS #1 115kV [3070] MOAS OPENED on NEWARK F_BARTRC_J & NEWARK-MILPITAS #2 115kV [3080]	P6	N-1/N-1	99	94	<90	103	99	94	<90	<90	Preferred resource	
GBA-T-126	Mckee-Piercy 115 kV Line	EVRGRN 2-MABURY 115kV [6840] & NEWARK-DIXON LANDING 115kV [2990]	P6	N-1/N-1	<90	<90	91	<90	<90	<90	101	91	Preferred resource	
GBA-T-127	Dixon Landing-McKee 115 kV Line	PIERCY-METCALF 115kV [4318] & NEWARK-DIXON LANDING 115kV [2990]	P6	N-1/N-1	<90	<90	113	<90	<90	<90	128	113	Action plan or rerate	
GBA-T-128	Mabury-Jennings J. 115 kV Line	NEWARK-DIXON LANDING 115kV [2990] & PIERCY-METCALF 115kV [4318]	P6	N-1/N-1	<90	<90	137	<90	<90	<90	153	137	Action plan or rerate	
GBA-T-129	Markham No. 2 115 kV Tap	SAN JOSE B-STONE-EVERGREEN 115kV [1550] & METCALF-EVERGREEN #1 115kV [2520]	P6	N-1/N-1	90	<90	<90	103	<90	<90	<90	<90	Preferred resource	
GBA-T-130	Metcalf-Morgan Hill 115 kV Line	LLAGAS-GILROY-GILROY F-GILROYPK 115kV [2151] & MTCALF D-LLAGAS 115kV [0]	P6	N-1/N-1	94	<90	<90	102	<90	<90	<90	<90	Preferred resource	
GBA-T-131	Metcalf-Llagas 115 kV Line	METCALF-MORGAN HILL 115kV [2570] & LLAGAS-GILROY-GILROY F-GILROYPK 115kV [2151]	P6	N-1/N-1	109	<90	<90	118	<90	<90	<90	<90	Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project	
GBA-T-132	Piercy-Metcalf 115 kV Line	METCALF SVD=v & NEWARK-DIXON LANDING 115kV [2990]	P6	N-1/N-1	105	100	<90	110	104	100	90	<90	Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project	

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
GBA-T-133	Evergreen 115/60 kV Transformer No. 1	ALMADEN SVD=v & MONTA VISTA-LOS GATOS 60kV [7610]	P6	N-1/N-1	101	91	<90	107	94	91	93	<90	Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project	
GBA-T-134	Evergreen-Almaden 60 kV Line	ALMADEN SVD=v & MONTA VISTA-LOS GATOS 60kV [7610]	P6	N-1/N-1	132	120	93	142	124	120	107	93	Short Term : Action Plan; Long Term : Monta Vista-Los Gatos-Evergreen 60 kV Project	
GBA-T-135	Oleum-Christie 115kV Line	Christie-Sobrante 115 kV and Martinez-Sobrante 115 kV lines	P7	DCTL	109	107	93	110	110	107	102	100	Short Term : Action Plan ; Long Term : Preferred resource	
GBA-T-136	Christie-Sobrante (Oleum-Sobrante) 115kV Line	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	134	123	102	137	136	125	113	132	SPS or system upgrade	
GBA-T-137	Martinez-Oleum 115kV Line	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	112	108	90	118	111	107	96	119	Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project	
GBA-T-138	Oleum-Martinez 115kV Line	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	104	100	83	109	103	99	89	110	Short Term : Action Plan ; Long Term : Preferred resource	
GBA-T-139	Moraga-San Leandro #1 115kV Line	Moraga-Oakland J 115 kV and Moraga-San Leandro No. 3 115 kV lines	P7	DCTL	115	69	69	119	76	72	73	69	Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project	
GBA-T-140	Moraga-San Leandro #2 115kV Line	Moraga-Oakland J 115 kV and Moraga-San Leandro No. 3 115 kV lines	P7	DCTL	117	70	70	120	77	73	74	70	Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project	
GBA-T-141	Moraga-San Leandro #3 115kV Line	Moraga-San Leandro Nos. 1 & 2 115 kV lines	P7	DCTL	103	69	69	107	76	72	73	69	Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project	
GBA-T-142	Cooley Landing-Palo Alto 115kV Line	Ravenswood-Palo Alto Nos. 1 & 2 115 kV lines	P7	DCTL	112	109	113	112	109	109	114	113	Palo Alto interim SPS	
GBA-T-143	Ravenswood-Cooley Landing #1 115kV Line	Ravenswood-Palo Alto Nos. 1 & 2 115 kV lines	P7	DCTL	130	94	98	132	96	93	101	98	Short Term : Action Plan ; Long Term : Ravenswood – Cooley Landing 115 kV Line Reconductor Project	
GBA-T-144	San Mateo 115/60kV Transformer #8	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	97	91	100	104	95	92	116	101	Review Stanford 60 kV system configuration	
GBA-T-145	San Mateo-Hillsdale JCT 60kV Line	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	187	176	194	203	181	176	230	197	Review Stanford 60 kV system configuration	

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-T-146	San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	213	201	221	231	206	202	261	225			Review Stanford 60 kV system configuration
GBA-T-147	San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	203	192	211	221	197	192	249	214			Review Stanford 60 kV system configuration
GBA-T-148	Jefferson-Hillsdale JCT 60kV Line	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	157	150	162	169	153	150	188	165			Review Stanford 60 kV system configuration
GBA-T-149	Jefferson-Stanford #1 60kV Line	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	93	92	94	96	93	93	101	96			Review Stanford 60 kV system configuration
GBA-T-150	Newark-Dixon Landing 115kV Line	Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	113	106	43	118	111	106	49	43			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-151	Piercy-Metcalf 115 kV Line	Newark - Dixon Landing & Newark - Milpitas #1 115 kV Lines	P7	DCTL	104	98	63	109	103	98	70	63			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
GBA-VD-1	EMBRCDRD 230 kV	H-Z #2 230kV [9982]	P1	N-1	4.1	5.1	4.3	4.1	4.1	5.1	4.2	5.3	Short Term : Action Plan ; Long Term : Martin 230 kV Bus Extension Project	
GBA-VD-2	LOS GATS 60 kV	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	4.6	5.1	3.5	5.7	5.3	5.1	4.2	3.5	Short Term : Action Plan; Long Term : Monta Vista – Los Gatos – Evergreen 60 kV Project	
GBA-VD-3	ALHAMBRA 115 kV	MARTINEZ-SOBRANTE 115kV [2270] (MARTNZ D-ALHAMTP1)	P2-1	Line section w/o fault	4.2	4.0	5.8	4.3	4.1	4.1	6.0	5.8	Transfer trip to open other end	
GBA-VD-4	EMBRCDRD 230 kV	H-Z #2 230kV [9982] (MARTIN C-EMBRCDRD)	P2-1	Line section w/o fault	4.1	5.1	<5.0	4.1	4.1	5.1	0.0	0.0	Short Term : Action Plan ; Long Term : Martin 230 kV Bus Extension Project	
GBA-VD-5	APP MAT 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	16.3	12.8	13.9	17.0	15.3	13.0	17.0	13.8	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd	
GBA-VD-6	BRITTN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	16.8	13.2	14.4	17.6	15.8	13.5	17.6	14.3	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd	
GBA-VD-7	LAWRENCE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	14.6	11.4	12.5	15.2	13.7	11.7	15.2	12.3	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd	
GBA-VD-8	LOCKHD 1 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	11.6	8.8	9.7	11.9	10.7	9.1	11.9	9.6	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd	
GBA-VD-9	LOCKHD 2 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	12.6	9.7	10.6	13.0	11.7	9.9	13.0	10.5	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd	
GBA-VD-10	LOS ALTS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	25.2	20.1	21.8	26.6	23.8	20.4	26.7	21.7	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd	
GBA-VD-11	LOS GATS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	25.8	20.4	21.9	27.4	24.3	20.8	26.8	21.7	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd	
GBA-VD-12	LOYOLA 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	25.0	19.9	21.6	26.4	23.5	20.2	26.4	21.5	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd	
GBA-VD-13	MOFT.FLD 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	11.5	8.8	9.7	11.9	10.7	9.1	11.9	9.6	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd	
GBA-VD-14	MT EDEN 115 kV	EASTSHRE 115kV - Section 1D & 1E	P2	Bus-tie breaker	10.0	8.4	8.5	10.1	9.0	8.6	9.3	8.5	Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project	
GBA-VD-15	MT VIEW 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.1	19.6	23.7	21.4	18.4	23.7	19.5	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd	
GBA-VD-16	PERMNTE 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	24.5	19.6	21.2	25.8	23.1	19.9	25.7	21.0	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd	

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
GBA-VD-17	PHILLIPS 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	15.6	12.2	13.3	16.2	14.6	12.4	16.2	13.2	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed	
GBA-VD-18	STELLING 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.0	19.5	23.6	21.3	18.3	23.6	19.4	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed	
GBA-VD-19	WHISMAN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.1	19.6	23.7	21.3	18.4	23.7	19.4	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed	
GBA-VD-20	WOLFE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.0	19.5	23.7	21.3	18.3	23.7	19.4	Action Plan before Monta Vista 230 kV Bus Upgrade Project is completed	
GBA-VD-21	CAROLNDS 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	10.7	9.9	11.5	11.4	10.0	9.9	13.8	11.5	Redundant bus relay	
GBA-VD-22	CRYSTLSG 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	17.8	16.9	19.1	19.4	17.3	16.7	23.0	19.1	Redundant bus relay	
GBA-VD-23	EMRLD LE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	17.7	16.9	19.0	19.3	17.3	16.6	22.9	19.0	Redundant bus relay	
GBA-VD-24	GRANT 115 kV	East Shore 230 kV BAAH Bus #2 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	10.0	7.6	7.7	10.1	8.2	7.9	8.4	7.7	Redundant bus relay	
GBA-VD-25	HLF MNBY 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	9.5	8.7	10.3	10.3	8.8	8.7	12.8	10.3	Redundant bus relay	
GBA-VD-26	LAS PLGS 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	17.9	17.1	19.3	19.6	17.5	16.8	23.2	19.3	Redundant bus relay	
GBA-VD-27	LOS ALTS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	76.7	75.3	76.5	77.1	75.7	75.2	77.5	76.6	Redundant bus relay	
GBA-VD-28	LOS GATS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	78.3	77.0	77.9	78.5	77.3	76.9	79.0	77.9	Redundant bus relay	
GBA-VD-29	LOYOLA 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	75.2	73.8	75.0	75.6	74.1	73.6	76.0	75.0	Redundant bus relay	

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
GBA-VD-30	MT EDEN 115 kV	East Shore 230 kV BAAH Bus #2 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	10.0	8.4	8.5	10.1	9.1	8.7	9.3	8.5		Redundant bus relay
GBA-VD-31	MT VIEW 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	85.2	84.1	85.0	85.5	84.7	84.0	85.9	85.0		Redundant bus relay
GBA-VD-32	PERMNTE 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	71.1	69.6	70.3	71.2	70.3	69.5	70.9	70.3		Redundant bus relay
GBA-VD-33	RALSTON 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	17.8	16.9	19.1	19.4	17.3	16.7	23.0	19.1		Redundant bus relay
GBA-VD-34	STANFORD 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	18.4	17.4	19.7	20.0	17.9	17.2	23.8	19.7		Redundant bus relay
GBA-VD-35	STELLING 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	84.9	83.7	84.6	85.2	84.3	83.6	85.6	84.6		Redundant bus relay
GBA-VD-36	WATRSLED 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	14.8	13.8	15.8	16.0	14.2	13.8	19.0	15.8		Redundant bus relay
GBA-VD-37	WHISMAN 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	85.2	84.0	85.0	85.5	84.7	84.0	85.9	85.0		Redundant bus relay
GBA-VD-38	WOLFE 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	84.9	83.7	84.6	85.2	84.4	83.7	85.6	84.7		Redundant bus relay
GBA-VD-39	WOODSIDE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundant relay)	P5-5	Non-redundant relay (bus)	17.9	17.0	19.3	19.5	17.4	16.8	23.2	19.2		Redundant bus relay
GBA-VD-40	CAROLNDS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	10.7	10.6	11.3	12.1	10.7	10.8	14.6	12.6		Review Stanford 60 kV system configuration
GBA-VD-41	CRYSTLSG 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.2	17.9	19.3	20.2	18.2	18.1	24.0	20.7		Review Stanford 60 kV system configuration
GBA-VD-42	EMRLD LE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.1	17.8	19.2	20.1	18.1	18.1	23.9	20.7		Review Stanford 60 kV system configuration

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-VD-43	HILLSDLE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	7.7	7.8	8.2	8.8	7.8	8.0	10.8	9.3			Review Stanford 60 kV system configuration
GBA-VD-44	HLF MNBY 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	9.5	9.4	10.2	11.1	9.6	9.6	13.6	11.4			Review Stanford 60 kV system configuration
GBA-VD-45	LAS PLGS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.3	18.0	19.4	20.4	18.3	18.3	24.3	20.9			Review Stanford 60 kV system configuration
GBA-VD-46	RALSTON 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.1	17.9	19.2	20.2	18.2	18.1	24.0	20.7			Review Stanford 60 kV system configuration
GBA-VD-47	STANFORD 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.7	18.5	19.9	20.9	18.8	18.7	24.9	21.4			Review Stanford 60 kV system configuration
GBA-VD-48	WATRSHED 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	14.9	14.8	15.8	16.8	15.0	15.0	20.0	17.2			Review Stanford 60 kV system configuration
GBA-VD-49	WOODSIDE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.3	18.0	19.4	20.4	18.3	18.2	24.3	20.9			Review Stanford 60 kV system configuration

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-V-1	MARTIN 60 kV	SN BRNOT-SNTH LNE 60kV [0] No Fault	P2-1	Line section w/o fault	1.05	1.06	1.05	1.05	1.05	1.06	1.05	1.06			Transfer trip to open other end
GBA-V-2	APP MAT 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.85	0.88	0.87	0.84	0.85	0.88	0.84	0.87			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-3	BRITTN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.84	0.88	0.87	0.83	0.85	0.88	0.83	0.87			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-4	LAWRENCE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.86	0.90	0.89	0.85	0.87	0.90	0.86	0.89			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-5	LOS ALTS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.76	0.82	0.80	0.74	0.78	0.82	0.74	0.80			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-6	LOS GATS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.74	0.80	0.80	0.72	0.76	0.80	0.74	0.80			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-7	LOYOLA 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.77	0.83	0.81	0.75	0.79	0.82	0.75	0.81			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-8	MT VIEW 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.81	0.76	0.79	0.82	0.77	0.82			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-9	PERMNTE 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.79	0.84	0.83	0.77	0.80	0.84	0.78	0.83			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-10	PHILLIPS 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.85	0.89	0.88	0.84	0.86	0.89	0.85	0.88			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-11	STELLING 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.82	0.77	0.79	0.83	0.77	0.82			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-12	WHISMAN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.81	0.76	0.79	0.82	0.77	0.82			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-13	WOLFE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.82	0.77	0.79	0.83	0.77	0.82			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-V-14	CRYSTLSG 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.84	0.85	0.83	0.82	0.85	0.86	0.79	0.83			Redundant bus relay
GBA-V-15	EMRLD LE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.85	0.86	0.84	0.83	0.85	0.86	0.79	0.84			Redundant bus relay
GBA-V-16	LAS PLGS 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.84	0.85	0.82	0.81	0.84	0.85	0.78	0.83			Redundant bus relay
GBA-V-17	LOS ALTS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.25	0.27	0.25	0.24	0.26	0.27	0.23	0.25			Redundant bus relay
GBA-V-18	LOS GATS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.22	0.24	0.24	0.21	0.23	0.24	0.22	0.24			Redundant bus relay
GBA-V-19	LOYOLA 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.27	0.29	0.28	0.26	0.28	0.29	0.26	0.28			Redundant bus relay
GBA-V-20	MT VIEW 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.15	0.17	0.16	0.15	0.16	0.17	0.14	0.16			Redundant bus relay
GBA-V-21	PERMNTE 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.32	0.34	0.34	0.32	0.33	0.34	0.33	0.34			Redundant bus relay
GBA-V-22	RALSTON 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.84	0.86	0.83	0.82	0.85	0.86	0.79	0.83			Redundant bus relay
GBA-V-23	STANFORD 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.82	0.84	0.81	0.80	0.83	0.84	0.77	0.82			Redundant bus relay
GBA-V-24	STELLING 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.16	0.17	0.17	0.15	0.16	0.17	0.15	0.17			Redundant bus relay
GBA-V-25	WATRSLED 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.88	0.89	0.87	0.86	0.88	0.89	0.83	0.87			Redundant bus relay

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-V-26	WHISMAN 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.15	0.17	0.16	0.15	0.16	0.17	0.15	0.16			Redundant bus relay
GBA-V-27	WOLFE 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.16	0.17	0.16	0.15	0.16	0.17	0.15	0.16			Redundant bus relay
GBA-V-28	WOODSIDE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redundant relay (bus)	0.84	0.85	0.83	0.82	0.84	0.85	0.78	0.83			Redundant bus relay
GBA-V-29	CRYSTLSG 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.86	0.83	0.83	0.85	0.86	0.80	0.83			Review Stanford 60 kV system configuration
GBA-V-30	EMRLD LE 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.85	0.86	0.84	0.83	0.86	0.86	0.80	0.84			Review Stanford 60 kV system configuration
GBA-V-31	LAS PLGS 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.85	0.82	0.82	0.84	0.85	0.79	0.83			Review Stanford 60 kV system configuration
GBA-V-32	RALSTON 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.86	0.83	0.83	0.85	0.86	0.80	0.83			Review Stanford 60 kV system configuration
GBA-V-33	SNANDRES 60 kV	MARTIN-MILLBRAE #1 115kV [2230] & MILLBRAE-SANMATEO #1 115kV [0]	P6	N-1/N-1	>0.9	>0.9	>0.9	0.00	0.00	0.00	0.00	0.00			Review Stanford 60 kV system configuration
GBA-V-34	STANFORD 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.82	0.84	0.81	0.81	0.83	0.84	0.78	0.82			Review Stanford 60 kV system configuration
GBA-V-35	WATRSLED 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.88	0.89	0.87	0.87	0.89	0.89	0.84	0.87			Review Stanford 60 kV system configuration
GBA-V-36	WOODSIDE 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.85	0.83	0.82	0.85	0.85	0.79	0.83			Review Stanford 60 kV system configuration
GBA-V-37	CAROLNDS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.92	0.92	0.91	0.90	0.92	0.92	0.88	0.90			Review Stanford 60 kV system configuration
GBA-V-38	CRYSTLSG 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.84	0.85	0.83	0.81	0.84	0.84	0.78	0.82			Review Stanford 60 kV system configuration
GBA-V-39	EMRLD LE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.84	0.85	0.84	0.82	0.84	0.85	0.78	0.82			Review Stanford 60 kV system configuration
GBA-V-40	LAS PLGS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.83	0.84	0.82	0.81	0.83	0.83	0.77	0.81			Review Stanford 60 kV system configuration
GBA-V-41	RALSTON 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.84	0.85	0.83	0.81	0.84	0.84	0.78	0.82			Review Stanford 60 kV system configuration
GBA-V-42	STANFORD 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.82	0.83	0.81	0.80	0.82	0.82	0.76	0.80			Review Stanford 60 kV system configuration

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-V-43	WATRSHEd 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.88	0.88	0.87	0.86	0.88	0.88	0.82	0.86			Review Stanford 60 kV system configuration
GBA-V-44	WOODSIDE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.83	0.84	0.82	0.81	0.83	0.84	0.77	0.81			Review Stanford 60 kV system configuration



ID	Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)									Potential Mitigation Solutions	
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..		
	Included in baseline result.													

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	

Included in baseline result.



ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	

Included in baseline result.

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions					
					2018 SP All Local Gen OFF	2021 SP All Local Gen OFF	2026 SP All Local Gen OFF	2021 SP All Local Gen OFF, No AEEE	2026 SP All Local Gen OFF, No BTM-PV	2018 SP Oakland Gen ON, Alameda Gen OFF	2021 SP Oakland Gen ON, Alameda Gen OFF	2026 SP Oakland Gen ON, Alameda Gen OFF	2021 SP Oakland Gen ON, Alameda Gen OFF, No AEEE	2026 SP Oakland Gen ON, Alameda Gen OFF, No BTM-PV		2018 SP All Local Gen ON	2021 SP All Local Gen ON	2026 SP All Local Gen ON	2021 SP All Local Gen ON, No AEEE	2026 SP All Local Gen ON, No BTM-PV
GBA-EBS-T-1	Oakland D - Oakland L 115kV Cable	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	113	107	104	117	110	29	24	22	31	27	20	21	23	17	21	Existing local generation, preferred resources or bus upgrade
GBA-EBS-T-2	Oakland C - Oakland L #1 115kV Cable	CLARMNT 115kV Section 1D	P2	Bus	100	92	91	99	98	98	90	89	96	96	97	90	95	96	99	Existing local generation, preferred resources or bus upgrade
GBA-EBS-T-3	Oakland C - Oakland X #2 115kV Cable	CLARMNT - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #2 line	P2	Non-bus-tie breaker	101	95	93	102	100	48	42	41	49	48	30	24	23	31	29	Existing local generation, preferred resources or bus upgrade
GBA-EBS-T-4	Grant-Oakland J 115 kV Line	MORAGA 115kV - Section 1E & 2E	P2	Bus-tie breaker	NA	98	98	106	106	NA	98	98	106	106	NA	98	98	106	106	Upgrade conductor : East Shore-Oakland J 115 kV Reconductoring Project
GBA-EBS-T-5	Moraga-Claremont #1 115kV Line	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	114	104	109	116	117	71	59	64	71	73	56	44	50	57	58	Existing local generation, preferred resources or bus upgrade
GBA-EBS-T-6	Moraga-Claremont #2 115kV Line	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	114	104	109	117	118	71	59	64	72	73	56	45	50	57	58	Existing local generation, preferred resources or bus upgrade
GBA-EBS-T-7	Moraga-Oakland X #1 115kV Line	CLARMNT 115kV - Section 1D & 2D	P2	Bus-tie breaker	103	95	95	103	103	57	50	50	57	57	41	34	34	41	41	Existing local generation, preferred resources or bus upgrade
GBA-EBS-T-8	Moraga-Oakland X #2 115kV Line	MORAGA 115kV - Section 1D & 1E	P2	Bus-tie breaker	109	101	105	112	114	63	54	57	64	66	48	39	43	49	51	Existing local generation, preferred resources or bus upgrade
GBA-EBS-T-9	Moraga-Oakland X #3 115kV Line	MORAGA 115kV - Section 1D & 2D	P2	Bus-tie breaker	133	129	138	147	151	85	76	84	92	96	69	60	69	76	80	Existing local generation, preferred resources or bus upgrade
GBA-EBS-T-10	Moraga-Oakland X #4 115kV Line	MORAGA 115kV - Section 1D & 2D	P2	Bus-tie breaker	133	129	138	147	151	85	76	84	92	96	69	60	69	76	80	Existing local generation, preferred resources or bus upgrade
GBA-EBS-T-11	Moraga-Oakland J 115kV Line	SN LNDRO 115kV - Section 1E & 2E	P2	Bus-tie breaker	101	78	78	85	82	100	84	84	91	88	100	86	86	92	90	Existing local generation, preferred resources or bus upgrade
GBA-EBS-T-12	Oakland D - Oakland L 115kV Cable	C-X #2 115kV [9962] & C-X #3 115kV [9925]	P6	N-1/N-1	114	107	104	117	110	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	Existing local generation, preferred resources or bus upgrade
GBA-EBS-T-13	Oakland C - Oakland L #1 115kV Cable	K-D #1 115kV [9966] & PITTSBURG-LOS MEDANOS #2 115kV [9993]	P6	N-1/N-1	100	0	0	99	98	98	<95	<95	97	96	98	<95	<95	96	96	Existing local generation or preferred resources
GBA-EBS-T-14	Oakland C - Oakland X #2 115kV Cable	C-X #3 115kV [9925] & D-L #1 115kV [9963]	P6	N-1/N-1	114	107	104	117	110	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	Existing local generation, preferred resources or SPS for load drop of small amount following the first contingency

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)															Potential Mitigation Solutions	
					2018 SP All Local Gen OFF	2021 SP All Local Gen OFF	2026 SP All Local Gen OFF	2021 SP All Local Gen OFF, No AAEE	2026 SP All Local Gen OFF, No BTM-PV	2018 SP Oakland Gen ON, Alameda Gen OFF	2021 SP Oakland Gen ON, Alameda Gen OFF	2026 SP Oakland Gen ON, Alameda Gen OFF	2021 SP Oakland Gen ON, Alameda Gen OFF, No AAEE	2026 SP Oakland Gen ON, Alameda Gen OFF, No BTM-PV	2018 SP All Local Gen ON	2021 SP All Local Gen ON	2026 SP All Local Gen ON	2021 SP All Local Gen ON, No AAEE	2026 SP All Local Gen ON, No BTM-PV		
GBA-EBS-T-15	Moraga-Claremont #1 115kV Line	C-X #2 115kV [9962] & C-X #3 115kV [9925]	P6	N-1/N-1	111	101	106	113	112	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	Existing local generation, preferred resources or SPS for load drop of small amount following the first contingency
GBA-EBS-T-16	Moraga-Claremont #1 115kV Line	MORAGA-CLAREMONT #2 115kV [2710] & C-L #1 115kV [9961]	P6	N-1/N-1	98	<95	99	100	101	106	103	112	112	121	110	107	116	116	125	Reduce local generation following the first contingency	
GBA-EBS-T-17	Moraga-Claremont #2 115kV Line	C-X #2 115kV [9962] & C-X #3 115kV [9925]	P6	N-1/N-1	111	101	106	114	112	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	Existing local generation, preferred resources or SPS for load drop of small amount following the first contingency
GBA-EBS-T-18	Moraga-Claremont #2 115kV Line	MORAGA-CLAREMONT #1 115kV [2700] & C-L #1 115kV [9961]	P6	N-1/N-1	98	<95	99	100	101	106	104	112	112	121	110	107	116	116	125	Reduce local generation following the first contingency	
GBA-EBS-T-19	Moraga-Oakland X #1 115kV Line	D-L #1 115kV [9963] & MORAGA-OAKLAND #2 115kV [2730]	P6	N-1/N-1	106	100	99	107	106	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	Existing local generation or preferred resources
GBA-EBS-T-20	Moraga-Oakland X #2 115kV Line	D-L #1 115kV [9963] & MORAGA-OAKLAND #1 115kV [2720]	P6	N-1/N-1	106	100	99	107	106	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	Existing local generation or preferred resources
GBA-EBS-T-21	Moraga-Oakland X #3 115kV Line	D-L #1 115kV [9963] & MORAGA-OAKLAND #1 115kV [2720]	P6	N-1/N-1	106	100	99	107	106	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	Existing local generation or preferred resources
GBA-EBS-T-22	Moraga-Oakland X #4 115kV Line	D-L #1 115kV [9963] & MORAGA-OAKLAND #1 115kV [2720]	P6	N-1/N-1	106	100	99	107	106	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	<95	Existing local generation or preferred resources

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %														Potential Mitigation Solutions		
					2018 SP All Local Gen OFF	2021 SP All Local Gen OFF	2026 SP All Local Gen OFF	2021 SP All Local Gen OFF, No AAEE	2026 SP All Local Gen OFF, No BTM-PV	2018 SP Oakland Gen ON, Alameda Gen OFF	2021 SP Oakland Gen ON, Alameda Gen OFF	2026 SP Oakland Gen ON, Alameda Gen OFF	2021 SP Oakland Gen ON, Alameda Gen OFF, No AAEE	2026 SP Oakland Gen ON, Alameda Gen OFF, No BTM-PV	2018 SP All Local Gen ON	2021 SP All Local Gen ON	2026 SP All Local Gen ON	2021 SP All Local Gen ON, No AAEE		2026 SP All Local Gen ON, No BTM-PV	
	No violations.																				



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions							
					2018 SP All Local Gen OFF	2021 SP All Local Gen OFF	2026 SP All Local Gen OFF	2021 SP All Local Gen OFF, No AAEE	2026 SP All Local Gen OFF, No BTM-PV	2018 SP Oakland Gen ON, Alameda Gen OFF	2021 SP Oakland Gen ON, Alameda Gen OFF	2026 SP Oakland Gen ON, Alameda Gen OFF	2021 SP Oakland Gen ON, Alameda Gen OFF, No AAEE	2026 SP Oakland Gen ON, Alameda Gen OFF, No BTM-PV		2018 SP All Local Gen ON	2021 SP All Local Gen ON	2026 SP All Local Gen ON	2021 SP All Local Gen ON, No AAEE	2026 SP All Local Gen ON, No BTM-PV		
	No violations.																					

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Fresno-T-1	34533 Q272 70.0 34540 HENRITTA 70.0 1 1	Base Case	P0	Base Case	26.90	27.27	26.97	96.43	0.43	26.79	27.17	102.28	26.70	26.92	Sensitivity Under Review
Fresno-T-2	30810 GREGG 230 30821 HELMS PP1 230 1 1	P1-2:A14:8:_HELMS-GREGG #2 230kV [4880]	P1	Single Contingency	92.45	<100	<100	NConv	<100	92.60	<100	<100	<100	<100	Drop Helms
Fresno-T-3	30810 GREGG 230 30823 HELMS PP3 230 2 1	P1-2:A14:7:_HELMS-GREGG #1 230kV [4870]	P1	Single Contingency	92.45	<100	<100	NConv	<100	92.60	<100	<100	<100	<100	Drop Helms
Fresno-T-4	30821 HELMS PP1 230 34997 E1_PGE 230 1 1	P1-2:A14:124:_HELMS PP3-E1_PGE #2 230kV [0]	P1	Single Contingency	<100	93.07	93.07	<100	70.30	<100	137.22	93.10	93.12	93.08	Sensitivity Under Review
Fresno-T-5	30823 HELMS PP3 230 34997 E1_PGE 230 2 1	P1-2:A14:123:_HELMS PP1-E1_PGE #1 230kV [0]	P1	Single Contingency	<100	93.07	93.08	<100	70.30	<100	137.22	93.10	93.12	93.08	Sensitivity Under Review
Fresno-T-6	34169 TORND J 70.0 34574 COLNGA 1 70.0 1 1	P2-1:A14:146:_JAYNE SW STA-COALINGA 70kV [8670] (WESTLNDSS_SS-JACALITO)	P2-1	Single Contingency	94.64	70.27	66.25	37.26	56.49	102.54	72.64	84.65	69.23	44.00	Sensitivity Under Review
Fresno-T-7	34206 CANAL 70.0 34220 ORTIGA 70.0 1 1	P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS)	P2-1	Single Contingency	98.94	<100	<100	32.78	<100	103.11	<100	<100	<100	<100	Short Term radialize; Long Term:Oro Loma 70 kV Area Reinforcement
Fresno-T-8	34220 ORTIGA 70.0 34222 MRCYSPRS 70.0 1 1	P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS)	P2-1	Single Contingency	124.58	<100	<100	40.63	<100	129.91	<100	<100	<100	<100	Short Term radialize; Long Term:Oro Loma 70 kV Area Reinforcement
Fresno-T-9	34409 PNDLJ2 115 34416 BULLARD 115 1 1	P2-1:A14:58:_HERNDON-BULLARD #1 115kV [1760] (HERNDON-PNDLJ1)	P2-1	Single Contingency	115.07	101.52	111.99	37.67	31.56	120.90	108.79	101.65	123.02	112.05	Under Review
Fresno-T-10	30805 BORDEN 230 30810 GREGG 230 1 1	P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D	P2	Single Contingency	121.59	39.03	40.78	20.44	50.34	120.27	59.48	47.58	37.47	39.83	Northern Fresno 115kV Area reinforcement project
Fresno-T-11	30821 HELMS PP1 230 34997 E1_PGE 230 1 1	P2-3:A14:150:_E1_PGE 230kV - Middle Breaker Bay 2	P2	Single Contingency	<100	93.24	93.23	<100	70.56	<100	137.83	93.27	93.26	93.23	Borden 230 kV Voltage Support
Fresno-T-12	30823 HELMS PP3 230 34997 E1_PGE 230 2 1	P2-3:A14:149:_E1_PGE 230kV - Middle Breaker Bay 1	P2	Single Contingency	<100	93.24	93.24	<100	70.56	<100	137.83	93.27	93.26	93.23	Under Review
Fresno-T-13	34104 ATWATER 115 34106 CASTLE 115 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	97.70	42.14	NConv	33.02	NConv	96.57	88.94	45.09	42.55	Gregg-Herndon no2 230 kV Breaker Upgrade.m
Fresno-T-14	34104 ATWATER 115 34110 ATWATR J 115 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	42.45	32.71	NConv	8.96	NConv	36.18	30.68	35.24	33.71	Northern Fresno 115 kV Area Reinforcement
Fresno-T-15	34105 CERTANJ1 115 34100 CHWCHLLA 115 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	17.23	15.55	NConv	52.17	NConv	20.91	3.54	11.35	15.20	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-16	34105 CERTANJ1 115 34100 CHWCHLLA 115 1 1	P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D	P2	Single Contingency	94.08	14.49	12.22	12.33	51.74	106.95	29.67	14.30	6.40	8.69	Sensitivity Under Review
Fresno-T-17	34105 CERTANJ1 115 34121 SHARON T 115 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	17.41	15.73	NConv	51.84	NConv	21.01	3.93	11.57	15.37	Wilson 115kV area reinforcent or Cressy N. Merced

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Fresno-T-18	34105 CERTANJ1 115 34121 SHARON T 115 1 1	P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D	P2	Single Contingency	93.49	14.82	12.58	12.25	51.41	106.27	29.78	14.60	6.92	9.14	Sensitivity Under Review
Fresno-T-19	34106 CASTLE 115 34138 EL CAPTN 115 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	97.69	42.13	NConv	33.10	NConv	96.56	88.92	45.08	42.54	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-20	34110 ATWATR J 115 34144 MERCED 115 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	11.90	14.98	NConv	4.00	NConv	6.66	3.28	16.95	15.81	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-21	34112 EXCHEQUR 115 34116 LE GRAND 115 1 1	P2-3:A13:44:_EXCHEQUR - 1D 70kV & MERCED FALLS-EXCHEQUER line	P2	Single Contingency	68.46	66.42	67.14	43.71	41.50	110.35	110.43	65.86	69.37	67.13	Sensitivity Under Review
Fresno-T-22	34112 EXCHEQUR 115 34116 LE GRAND 115 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	23.90	27.01	NConv	30.99	NConv	52.75	21.17	26.67	28.30	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-23	34112 EXCHEQUR 115 34232 EXCHEQUR 70.0 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	18.30	17.33	NConv	4.17	NConv	23.30	19.05	18.35	16.85	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-24	34121 SHARON T 115 34128 OAKH_JCT 115 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	22.08	20.21	NConv	47.78	NConv	26.09	6.03	16.08	19.85	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-25	34123 K1-JCT 115 34358 KERCKHF2 115 2 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	32.80	33.38	NConv	17.27	NConv	36.58	23.17	34.47	33.23	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-26	34128 OAKH_JCT 115 34123 K1-JCT 115 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	32.79	33.38	NConv	17.47	NConv	36.58	23.16	34.47	33.22	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-27	34134 WILSON A 115 34144 MERCED 115 1 1	P2-2:A13:13:_WILSON B 115kV Section 2D	P2	Single Contingency	109.22	62.96	61.02	25.31	<100	108.29	63.44	61.26	64.66	60.32	Action Plan.Cressey - North Merced 115 kV Line Addition (North Merced 230 kV bank) mitigates future years. Propose operating solution in the interim.
Fresno-T-28	34136 WILSON B 115 34144 MERCED 115 2 1	P2-2:A13:12:_WILSON A 115kV Section 1D	P2	Single Contingency	105.70	81.49	69.80	18.53	<100	101.44	77.97	73.74	74.70	70.12	Action Plan.Cressey - North Merced 115 kV Line Addition (North Merced 230 kV bank) mitigates future years. Propose operating solution in the interim. mitigates future years. Propose operating solution in the interim.
Fresno-T-29	34144 MERCED 115 34146 MERCED M 115 2 1	P2-3:A13:15:_LE GR - MA 115kV & LE GR-CHOWCHILLA line	P2	Single Contingency	80.59	81.05	81.00	<100	73.02	<100	<100	100.03	80.29	81.00	Sensitivity Under Review
Fresno-T-30	34144 MERCED 115 34146 MERCED M 115 2 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	54.47	49.74	NConv	34.67	NConv	68.70	74.26	49.96	48.14	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-31	34150 NEWHALL 115 34154 DAIRYLND 115 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	18.67	20.38	NConv	4.20	NConv	2.06	14.25	24.81	19.84	Wilson 115kV area reinforcent or Cressy N. Merced

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Fresno-T-32	34156 MENDOTA 115 34153 GILLTAP 115 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	31.83	32.45	NConv	15.95	NConv	21.05	28.47	35.68	32.02	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-33	34200 ORO LOMA 70.0 34162 ORO LOMA 115 2 1	P2-4:A13:13:_PANOCHE 230kV - Section 1E & 2E	P2	Single Contingency	<100	72.21	58.20	<100	58.62	<100	95.83	128.95	46.04	44.95	Sensitivity Under Review
Fresno-T-34	34202 MERCED 70.0 34146 MERCED M 115 2 1	P2-2:A13:10:_LE GR 115kV Section MA	P2	Single Contingency	78.78	79.58	79.53	97.68	71.12	123.07	125.71	97.43	78.87	79.53	Exchequer gen dispatch SCD
Fresno-T-35	34202 MERCED 70.0 34146 MERCED M 115 2 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	57.11	51.78	NConv	34.76	NConv	71.49	77.45	52.17	50.20	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-36	34202 MERCED 70.0 34230 MRCDFLLS 70.0 1 1	P2-2:A13:10:_LE GR 115kV Section MA	P2	Single Contingency	79.04	80.22	80.16	65.02	72.32	150.25	155.33	79.37	79.28	80.16	Exchequer gen dispatch, SCD
Fresno-T-37	34202 MERCED 70.0 34230 MRCDFLLS 70.0 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	45.75	39.09	NConv	22.40	NConv	67.10	49.60	39.37	36.84	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-38	34252 MADERA 70.0 34256 BORDEN 70.0 2 1	P2-2:A13:32:_BORDEN 70kV Section MD	P2	Single Contingency	111.89	107.12	107.09	50.53	47.53	114.59	110.92	107.39	113.18	107.14	Madera SPS
Fresno-T-40	34321 MCSWAINJ 70.0 34232 EXCHEQR 70.0 1 1	P2-2:A13:10:_LE GR 115kV Section MA	P2	Single Contingency	99.69	100.38	100.37	77.04	67.55	195.36	200.47	99.80	100.36	100.37	Madera SPS
Fresno-T-41	34252 MADERA 70.0 34256 BORDEN 70.0 2 1	P2-3:A13:46:_BORDEN - MD 70kV & BORDEN-COPPERMINE line	P2	Single Contingency	111.89	107.12	107.09	50.53	47.53	114.59	110.92	107.39	113.18	107.14	Madera SPS
Fresno-T-42	34321 MCSWAINJ 70.0 34232 EXCHEQR 70.0 1 1	P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV	P2	Single Contingency	NConv	57.99	51.43	NConv	15.14	NConv	83.24	62.20	52.29	49.16	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-43	34366 SANGER 115 34359 AIRWAYJ2 115 1 1	P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D	P2	Single Contingency	101.09	76.95	84.99	33.44	37.06	107.22	75.69	78.25	93.48	83.70	Northern Fresno 115kV Area reinforcement project
Fresno-T-44	34366 SANGER 115 34370 MC CALL 115 3 1	P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D	P2	Single Contingency	96.03	<100	<100	33.67	<100	101.15	<100	<100	<100	<100	Sensitivity Under Review
Fresno-T-45	34408 BARTON 115 34412 HERNDON 115 1 1	P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D	P2	Single Contingency	118.85	63.18	73.73	27.13	19.92	124.78	64.67	59.66	86.33	85.70	Northern Fresno Project
Fresno-T-46	34409 PNDLJ2 115 34416 BULLARD 115 1 1	P2-2:A14:46:_HERNDON 115kV Section 1D	P2	Single Contingency	115.12	101.48	111.96	37.73	31.55	120.92	108.73	101.60	122.97	111.99	Sensitivity Under Review
Fresno-T-47	34410 MANCHSTR 115 34412 HERNDON 115 1 1	P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D	P2	Single Contingency	120.28	66.41	75.54	29.30	21.52	125.79	68.59	63.02	87.21	86.78	Northern Fresno Project
Fresno-T-48	34418 KINGSBRG 115 34428 CONTADNA 115 1 1	P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D	P2	Single Contingency	95.20	71.68	76.81	69.29	33.30	100.41	61.25	79.97	89.15	87.98	Northern Fresno Project
Fresno-T-49	34429 GWF_HEP 115 34428 CONTADNA 115 1 1	P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D	P2	Single Contingency	98.63	74.91	79.75	72.93	36.79	103.87	64.73	83.23	92.10	90.93	Northern Fresno Project
Fresno-T-50	34559 HURONJ 70.0 34560 CALFLAX 70.0 1 1	P2-4:A13:12:_PANOCHE1 Section 1D & PANOCHE2 Section 2D 115kV	P2	Single Contingency	121.64	4.04	23.66	107.53	44.52	13.97	5.55	127.20	34.05	37.41	Northern Fresno Project

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Fresno-T-51	34561 Q526TP 70.0 34566 PLSNTVLY 70.0 1 1	P2-4:A13:12:_PANOCHE1 Section 1D & PANOCHE2 Section 2D 115kV	P2	Single Contingency	59.05	20.38	1.49	92.13	21.91	20.51	20.87	119.28	5.90	13.19	Sensitivity Under Review
Fresno-T-52	34562 SCHLNDLR 70.0 34567 FIVEPOINTSSS 70.0 1 1	P2-4:A13:12:_PANOCHE1 Section 1D & PANOCHE2 Section 2D 115kV	P2	Single Contingency	85.68	10.95	15.38	96.86	32.35	3.17	9.65	103.71	23.39	27.98	Sensitivity Under Review
Fresno-T-53	34567 FIVEPOINTSSS 70.0 34560 CALFLAX 70.0 1 1	P2-4:A13:12:_PANOCHE1 Section 1D & PANOCHE2 Section 2D 115kV	P2	Single Contingency	85.46	20.68	10.99	107.35	32.75	13.42	19.48	139.94	17.44	21.80	Sensitivity Under Review
Fresno-T-54	34169 TORND0 J 70.0 34574 COLNGA 1 70.0 1 1	P1-1:A14:55:_WESTLNDS 0kV Gen Unit 1 and P1-2:A14:98:_GATES-JAYNE SW STA 70kV [8652]	P3	Multiple Contingency	94.28	<100	<100	<100	<100	100.06	<100	<100	<100	<100	Under Review
Fresno-T-55	30796 STOREY 1 230 30800 WILSON 230 1 1	P5-5:A14:2:_Gregg 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5.5	Multiple Contingency	NConv	22.80	21.26	49.96	46.68	NConv	36.58	34.79	17.73	17.85	Series Reactor at Wilson, Wilson 115kV Area reinforcement, Borden Voltage Support Project fixes later years
Fresno-T-56	30796 STOREY 1 230 30810 GREGG 230 1 1	P5-5:A14:2:_Gregg 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5.5	Multiple Contingency	NConv	<100	<100	49.03	<100	NConv	<100	<100	<100	<100	Series Reactor at Wilson, Wilson 115kV Area reinforcement, Borden Voltage Support Project fixes later years
Fresno-T-57	30515 WARNERVL 230 30800 WILSON 230 1 2	P1-2:A13:17:_TRANQLTYSS-KEARNEY 230kV [0] and P1-2:A13:88:_MELONES-NMERCED #1 230kV [0]	P6	Multiple Contingency	<100	<100	<100	<100	100.03	<100	<100	<100	<100	<100	Drop Additional Pump
Fresno-T-58	30810 GREGG 230 30835 HERNDON 230 1 1	P1-2:A14:10:_GREGG-HERNDON #2 230kV [4840] and P1-2:A14:11:_GREGG-ASHLAN 230kV [4820]	P6	Multiple Contingency	100.01	<100	<100	<100	<100	100.01	<100	<100	<100	<100	Northern Fresno Project
Fresno-T-59	30810 GREGG 230 30835 HERNDON 230 2 1	P1-2:A14:9:_GREGG-HERNDON #1 230kV [4830] and P1-2:A14:11:_GREGG-ASHLAN 230kV [4820]	P6	Multiple Contingency	100.01	<100	<100	<100	<100	100.01	<100	<100	<100	<100	Northern Fresno
Fresno-T-60	30821 HELMS PP1 230 34997 E1_PGE 230 1 1	P1-2:A13:23:_BORDEN-GREGG 230kV [4400] and P1-2:A14:124:_HELMS PP3-E1_PGE #2 230kV [0]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	100.41	<100	<100	<100	Sensitivity Under Review
Fresno-T-61	30821 HELMS PP1 230 34997 E1_PGE 230 1 1	P1-4:A14:22:_E2_PGE SVD=v and P1-2:A14:124:_HELMS PP3-E1_PGE #2 230kV [0]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	100.46	<100	<100	<100	Sensitivity Under Review
Fresno-T-62	30823 HELMS PP3 230 34997 E1_PGE 230 2 1	P1-4:A14:22:_E2_PGE SVD=v and P1-2:A14:123:_HELMS PP1-E1_PGE #1 230kV [0]	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	100.46	<100	<100	<100	Sensitivity Under Review

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
Fresno-T-63	34105 CERTANJ1 115 34100 CHWCHLLA 115 1 1	P1-3:A13:8:_WILSON 230/115kV TB 2 and P1-3:A13:7:_WILSON 230/115kV TB 1	P6	Multiple Contingency	101.24	<100	<100	<100	<100	<100	100.18	<100	<100	<100	<100	Under Review
Fresno-T-64	34112 EXCHEQUR 115 34116 LE GRAND 115 1 1	P1-3:A13:16:_MERCED 115/70kV TB 2 and P1-3:A13:17:_EXCHEQUR 70/115kV TB 1	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	100.69	99.99	<100	<100	<100	Sensitivity Under Review
Fresno-T-65	34116 LE GRAND 115 34134 WILSON A 115 1 1	P1-2:A14:32:_KERCKHOFF-CLOVIS-SANGER #2 115kV [1900] and P1-2:A14:30:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890]	P6	Multiple Contingency	<100	<100	<100	100.57	<100	<100	65.35	<100	<100	<100	<100	Sensitivity Under Review
Fresno-T-66	34116 LE GRAND 115 34134 WILSON A 115 1 1	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	148.69	<100	<100	<100	<100	<100	157.40	<100	<100	<100	<100	Wilson-Le Grand 115kV reconductoring Project
Fresno-T-67	34118 LE GRNDJ 115 34136 WILSON B 115 1 1	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	100.58	<100	<100	<100	<100	<100	109.91	<100	<100	<100	<100	Wilson-Le Grand 115kV reconductoring Project
Fresno-T-68	34118 LE GRNDJ 115 34168 EL NIDO 115 1 1	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	100.27	<100	<100	<100	<100	<100	109.55	<100	<100	<100	<100	Wilson-Le Grand 115kV reconductoring Project
Fresno-T-69	34121 SHARON T 115 34128 OAKH_JCT 115 1 1	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	91.93	<100	<100	<100	<100	<100	99.37	<100	<100	<100	<100	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-70	34134 WILSON A 115 34144 MERCED 115 1 1	P1-2:A13:39:_WILSON-MERCED #2 115kV [4190] and P1-2:A13:38:_EL CAPITAN-WILSON 115kV [1510]	P6	Multiple Contingency	103.55	<100	<100	<100	<100	<100	108.44	<100	<100	<100	<100	Wilson 115kV area reinforcent fixes later years
Fresno-T-71	34136 WILSON B 115 34138 EL CAPTN 115 1 1	P1-2:A13:36:_WILSON-ATWATER #2 115kV [4160] and P1-2:A13:27:_ATWATER-LIVNGSTN-MERCED 115kV [1030]	P6	Multiple Contingency	105.72	<100	<100	<100	<100	<100	110.43	<100	<100	<100	<100	Wilson 115kV area reinforcent fixes later years
Fresno-T-72	34136 WILSON B 115 34144 MERCED 115 2 1	P1-2:A13:37:_WILSON-MERCED #1 115kV [4180] and P1-2:A13:38:_EL CAPITAN-WILSON 115kV [1510]	P6	Multiple Contingency	110.59	<100	<100	<100	<100	<100	115.24	<100	<100	<100	<100	Wilson 115kV area reinforcent fixes later years
Fresno-T-73	34151 Q648SS 115 34161 DFSTP 115 1 1	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	104.02	<100	<100	<100	<100	<100	111.74	<100	<100	<100	<100	Wilson 115kV area reinforcent fixes later years

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Fresno-T-74	34155 PANOCHE1 115 34350 KAMM 115 1 1	P1-2:A13:76:_PANOCHE2-EXCELSIORSS 115kV [3231] and P1-3:A14:15:_GATES 230/70kV TB 5	P6	Multiple Contingency	110.97	<100	93.92	98.67	<100	<100	<100	90.16	106.75	121.65	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-75	34155 PANOCHE1 115 34350 KAMM 115 1 1	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A14:109:_EXCELSIORSS-PANOCHE2 115kV [3231]	P6	Multiple Contingency	109.91	<100	93.92	100.30	<100	112.00	<100	90.62	102.98	119.13	Wilson 115kV area reinforcent or Cressy N. Merced
Fresno-T-76	34159 PANOCHEJ 115 34160 HAMMONDS 115 1 1	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	115.93	<100	<100	<100	<100	124.11	<100	<100	<100	<100	Oro Loma Reconductoring Project; SOL Interim
Fresno-T-77	34160 HAMMONDS 115 34161 DFSTP 115 1 1	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	106.37	<100	<100	<100	<100	114.10	<100	<100	<100	<100	Oro Loma Reconductoring Project; SOL Interim
Fresno-T-78	34162 ORO LOMA 115 34151 Q648SS 115 1 1	P1-3:A13:8:_WILSON 230/115kV TB 2 and P1-3:A13:7:_WILSON 230/115kV TB 1	P6	Multiple Contingency	108.49	<100	<100	<100	<100	116.27	<100	<100	<100	<100	Oro Loma Reconductoring Project; SOL Interim
Fresno-T-79	34162 ORO LOMA 115 34168 EL NIDO 115 1 1	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	126.46	<100	<100	<100	<100	136.40	<100	<100	<100	<100	Oro Loma Reconductoring Project; SOL Interim
Fresno-T-80	34169 TORND J 70.0 34174 PENZIR J 70.0 1 1	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-3:A14:25:_SCHINDLR 115/70kV TB 1	P6	Multiple Contingency	106.82	<100	93.86	<100	<100	NConv	<100	<100	106.37	<100	Under Review
Fresno-T-81	34169 TORND J 70.0 34574 COLNGA 1 70.0 1 1	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-3:A14:25:_SCHINDLR 115/70kV TB 1	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	<100	<100	NConv	Under Review
Fresno-T-82	34200 ORO LOMA 70.0 34162 ORO LOMA 115 2 1	P1-2:A13:52:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] and P1-3:A13:27:_MERCY S1 230/70kV TB 1	P6	Multiple Contingency	<100	99.56	100.22	<100	<100	<100	99.92	<100	100.60	100.03	Under Review/ Replace limiting equipment
Fresno-T-83	34237 CANANDGA 70.0 34255 TRIGO J 70.0 1 1	P1-2:A13:60:_BORDEN-MADERA #2 70kV [8520] and P1-2:A13:61:_BORDEN-MADERA #1 70kV [8710]	P6	Multiple Contingency	96.94	92.91	94.16	<100	<100	99.71	95.40	<100	100.31	94.06	Madera SPS
Fresno-T-84	34240 GLASS 70.0 34237 CANANDGA 70.0 1 1	P1-2:A13:60:_BORDEN-MADERA #2 70kV [8520] and P1-2:A13:61:_BORDEN-MADERA #1 70kV [8710]	P6	Multiple Contingency	105.47	100.90	101.42	<100	<100	108.21	104.27	<100	107.59	101.31	Madera SPS
Fresno-T-85	34240 GLASS 70.0 34256 BORDEN 70.0 1 1	P1-2:A13:60:_BORDEN-MADERA #2 70kV [8520] and P1-2:A13:61:_BORDEN-MADERA #1 70kV [8710]	P6	Multiple Contingency	113.31	108.31	108.25	<100	<100	116.04	112.39	<100	114.45	108.13	Madera SPS
Fresno-T-86	34252 MADERA 70.0 34256 BORDEN 70.0 2 1	P1-2:A13:59:_BORDEN-GLASS 70kV [8510] and P1-2:A13:61:_BORDEN-MADERA #1 70kV [8710]	P6	Multiple Contingency	111.92	107.10	107.04	<100	<100	115.15	111.05	<100	113.04	106.94	Madera SPS

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Fresno-T-87	34256 BORDEN 70.0 34252 MADERA 70.0 1 1	P1-2:A13:59:_BORDEN-GLASS 70kV [8510] and P1-2:A13:60:_BORDEN-MADERA #2 70kV [8520]	P6	Multiple Contingency	112.73	107.80	107.73	<100	<100	115.42	111.82	<100	113.83	107.62	Madera SPS
Fresno-T-88	34350 KAMM 115 34352 CANTUA 115 1 1	P1-2:A14:109:_EXCELSIORSS-PANOCHER 115kV [3231] and P1-3:A14:15:_GATES 230/70kV TB 5	P6	Multiple Contingency	101.15	<100	<100	96.24	<100	<100	<100	<100	97.44	111.47	Under Review, Operations sees some issue also
Fresno-T-89	34358 KERCKHF2 115 34360 WWARD JT 115 1 1	P1-2:A13:29:_CHOWCHILLA-KERCKHOFF 115kV [1252] and P1-2:A14:32:_KERCKHOFF-CLOVIS-SANGER #2 115kV [1900]	P6	Multiple Contingency	<100	<100	<100	<100	<100	100.75	<100	<100	<100	<100	Sensitivity Under Review
Fresno-T-90	34365 CLOVISJ2 115 34358 KERCKHF2 115 1 1	P1-2:A13:29:_CHOWCHILLA-KERCKHOFF 115kV [1252] and P1-2:A14:30:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890]	P6	Multiple Contingency	<100	<100	<100	<100	<100	100.01	<100	<100	<100	<100	Sensitivity Under Review
Fresno-T-91	34561 Q526TP 70.0 34566 PLSNTVLY 70.0 1 1	P1-2:A14:117:_SCHLNDLR-FIVEPOINTSSS #1 70kV [0] and P1-3:A14:15:_GATES 230/70kV TB 5	P6	Multiple Contingency	<100	<100	<100	<100	<100	95.92	<100	<100	90.34	124.21	Sensitivity Under Review
Fresno-T-92	34562 SCHLNDLR 70.0 34561 Q526TP 70.0 1 1	P1-2:A14:117:_SCHLNDLR-FIVEPOINTSSS #1 70kV [0] and P1-3:A14:15:_GATES 230/70kV TB 5	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	<100	<100	115.06	Sensitivity Under Review
Fresno-T-93	34562 SCHLNDLR 70.0 34567 FIVEPOINTSSS 70.0 1 1	P1-2:A14:103:_SCHINDLER-COALINGA #2 70kV [9150] and P1-3:A14:15:_GATES 230/70kV TB 5	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	<100	<100	100.21	Sensitivity Under Review
Fresno-T-94	34566 PLSNTVLY 70.0 34570 COLNGA 2 70.0 1 1	P1-2:A14:117:_SCHLNDLR-FIVEPOINTSSS #1 70kV [0] and P1-3:A14:15:_GATES 230/70kV TB 5	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	<100	<100	103.04	Sensitivity Under Review
Fresno-T-95	34567 FIVEPOINTSSS 70.0 34560 CALFLAX 70.0 1 1	P1-2:A14:103:_SCHINDLER-COALINGA #2 70kV [9150] and P1-3:A14:15:_GATES 230/70kV TB 5	P6	Multiple Contingency	<100	<100	<100	<100	<100	<100	<100	<100	<100	101.21	Sensitivity Under Review
Fresno-T-96	34998 E2_PGE 115 34997 E1_PGE 230 1 1	P1-2:A14:121:_GREGG-E1_PGE #1 230kV [0] and P1-2:A14:122:_GREGG-E1_PGE #2 230kV [0]	P6	Multiple Contingency	<100	99.80	99.80	<100	<100	<100	100.02	<100	99.80	99.80	Sensitivity Under Review
Fresno-T-97	36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-3:A14:25:_SCHINDLR 115/70kV TB 1	P6	Multiple Contingency	140.92	<100	120.79	<100	<100	111.25	<100	183.16	156.47	NConv	Under Review/ Estrella Project helps mitigate
Fresno-T-98	30875 MC CALL 230 30876 MCCALL1M 115 1 1	P1-3:A14:17:_MC CALL 230/115kV TB 2 and P1-3:A14:18:_MC CALL 230/115kV TB 3	P6	Multiple Contingency	100.00	<100	90.03	<100	<100	100.00	<100	<100	100.01	100.01	Under Review

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Fresno-T-99	30875 MC CALL 230 30878 MCCALL3M 115 3 1	P1-3:A14:16:_MC CALL 230/115kV TB 1 and P1-3:A14:17:_MC CALL 230/115kV TB 2	P6	Multiple Contingency	99.99	<100	90.01	<100	<100	100.00	<100	<100	100.01	100.01	Under Review
Fresno-T-100	30875 MC CALL 230 30878 MCCALL3M 115 3 1	P1-3:A14:16:_MC CALL 230/115kV TB 1 and P1-3:A14:17:_MC CALL 230/115kV TB 2	P6	Multiple Contingency	99.99	<100	90.01	<100	<100	100.00	<100	<100	100.01	100.01	Under Review
Fresno-T-101	34112 EXCHEQR 115 34116 LE GRAND 115 1 1	P1-3:A13:8:_WILSON 230/115kV TB 2 and P1-3:A13:17:_EXCHEQR 70/115kV TB 1	P6	Multiple Contingency	101.46	<100	<100	<100	<100	102.80	<100	<100	<100	<100	Northern Fresno 115kV Area reinforcement project fixes later years
Fresno-T-102	34134 WILSON A 115 34104 ATWATER 115 1 1	P1-2:A13:38:_EL CAPITAN-WILSON 115kV [1510] and P1-2:A13:27:_ATWATER-LIVNGSTN-MERCED 115kV [1030]	P6	Multiple Contingency	128.11	<100	<100	<100	<100	133.96	<100	<100	<100	<100	Wilson 115kV area reinforcent
Fresno-T-103	34417 KINGS J2 115 34418 KINGSBRG 115 1 1	P1-2:A14:54:_MCCALL-KINGSBURG #2 115kV [2301] and P1-2:A14:55:_GWF-KINGSBURG 115kV [1743]	P6	Multiple Contingency	94.55	<100	94.14	<100	<100	100.00	<100	<100	100.15	97.00	Sensitivity Under Review
Fresno-T-104	34998 E2_PGE 115 34997 E1_PGE 230 2 1	P1-2:A14:121:_GREGG-E1_PGE #1 230kV [0] and P1-2:A14:122:_GREGG-E1_PGE #2 230kV [0]	P6	Multiple Contingency	<100	99.80	99.80	<100	<100	<100	100.02	<100	99.80	99.80	Sensitivity Under Review
Fresno-T-105	30823 HELMS PP3 230 34997 E1_PGE 230 2 1	P7-1:A14:39:_HELMS PP1-E1_PGE #1 230kV [0] & HELMS PP1-E1_PGE #1 230kV [0]	P7	Multiple Contingency	<100	93.07	93.08	<100	70.30	<100	137.22	93.10	93.12	93.08	Sensitivity Under Review
Fresno-T-106	34105 CERTANJ1 115 34100 CHWCHLLA 115 1 1	P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900]	P7	Multiple Contingency	95.70	<100	<100	95.61	<100	145.58	<100	<100	<100	<100	Sensitivity Under Review
Fresno-T-107	34105 CERTANJ1 115 34100 CHWCHLLA 115 1 1	P7-1:A14:40:_E2_PGE-KERCKHF2 #1 115kV [0] & E2_PGE-KERCKHF2 #2 115kV [0]	P7	Multiple Contingency	<100	96.05	96.24	<100	95.63	<100	151.08	88.63	96.22	96.24	Sensitivity Under Review
Fresno-T-108	34105 CERTANJ1 115 34121 SHARON T 115 1 1	P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900]	P7	Multiple Contingency	95.30	<100	<100	95.20	<100	144.88	<100	<100	<100	<100	Sensitivity Under Review
Fresno-T-109	34105 CERTANJ1 115 34121 SHARON T 115 1 1	P7-1:A14:40:_E2_PGE-KERCKHF2 #1 115kV [0] & E2_PGE-KERCKHF2 #2 115kV [0]	P7	Multiple Contingency	<100	95.63	95.82	<100	95.23	<100	150.34	88.24	95.80	95.82	Sensitivity Under Review

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Fresno-T-110	34116 LE GRAND 115 34134 WILSON A 115 1 1	P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900]	P7	Multiple Contingency	63.32	<100	<100	105.28	<100	107.06	<100	<100	<100	<100	Wilson-Le Grand 115kV reconductoring Project
Fresno-T-111	34121 SHARON T 115 34128 OAKH_JCT 115 1 1	P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900]	P7	Multiple Contingency	99.90	<100	<100	99.87	<100	149.49	<100	<100	<100	<100	Check FRTSPS, drop another pump
Fresno-T-112	34121 SHARON T 115 34128 OAKH_JCT 115 1 1	P7-1:A14:40:_E2_PGE-KERCKHF2 #1 115kV [0] & E2_PGE-KERCKHF2 #2 115kV [0]	P7	Multiple Contingency	<100	99.93	99.92	<100	99.93	<100	155.20	92.53	99.91	99.92	FRTSPS, check Gen Drop
Fresno-T-113	34123 K1-JCT 115 34358 KERCKHF2 115 2 1	P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900]	P7	Multiple Contingency	77.30	<100	<100	62.25	<100	105.73	<100	<100	<100	<100	Sensitivity Under Review
Fresno-T-114	34123 K1-JCT 115 34358 KERCKHF2 115 2 1	P7-1:A14:40:_E2_PGE-KERCKHF2 #1 115kV [0] & E2_PGE-KERCKHF2 #2 115kV [0]	P7	Multiple Contingency	<100	74.83	76.20	<100	61.63	<100	106.00	70.90	79.31	76.20	Sensitivity Under Review
Fresno-T-115	34128 OAKH_JCT 115 34123 K1-JCT 115 1 1	P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900]	P7	Multiple Contingency	77.29	<100	<100	62.23	<100	105.72	<100	<100	<100	<100	Sensitivity Under Review
Fresno-T-116	34128 OAKH_JCT 115 34123 K1-JCT 115 1 1	P7-1:A14:40:_E2_PGE-KERCKHF2 #1 115kV [0] & E2_PGE-KERCKHF2 #2 115kV [0]	P7	Multiple Contingency	<100	74.82	76.20	<100	61.61	<100	106.00	70.89	79.30	76.20	Sensitivity Under Review
Fresno-T-117	34348 SHEPHERD 115 34998 E2_PGE 115 1 1	P7-1:A14:38:_GREGG-E1_PGE #1 230kV [0] & GREGG-E1_PGE #2 230kV [0]	P7	Multiple Contingency	<100	88.61	87.33	<100	38.08	<100	118.53	89.51	87.08	85.38	Drop additional pump/ Revise Norther Fresno Project
Fresno-T-118	34414 WOODWARD 115 34348 SHEPHERD 115 1 1	P7-1:A14:38:_GREGG-E1_PGE #1 230kV [0] & GREGG-E1_PGE #2 230kV [0]	P7	Multiple Contingency	<100	79.96	78.18	<100	40.54	<100	108.93	80.89	77.96	76.22	Drop additional pump/ Revise Norther Fresno Project
Fresno-T-119	34998 E2_PGE 115 34365 CLOVISJ2 115 1 1	P7-1:A14:38:_GREGG-E1_PGE #1 230kV [0] & GREGG-E1_PGE #2 230kV [0]	P7	Multiple Contingency	<100	69.45	70.66	<100	49.00	<100	101.53	67.80	71.81	72.24	Sensitivity Under Review
Fresno-T-120	34998 E2_PGE 115 34997 E1_PGE 230 1 1	P7-1:A14:38:_GREGG-E1_PGE #1 230kV [0] & GREGG-E1_PGE #2 230kV [0]	P7	Multiple Contingency	<100	99.80	99.80	<100	76.99	<100	142.32	99.80	99.80	99.80	Drop additional pump/ Revise Norther Fresno Project
Fresno-T-121	34998 E2_PGE 115 34997 E1_PGE 230 2 1	P7-1:A14:38:_GREGG-E1_PGE #1 230kV [0] & GREGG-E1_PGE #2 230kV [0]	P7	Multiple Contingency	<100	99.80	99.80	<100	76.99	<100	142.32	99.80	99.80	99.80	Drop additional pump/ Revise Norther Fresno Project

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Fresno-V-1	ALPAUGH 115 kV	Base Case	P0	Base Case	1.0308	1.0181	1.0384	1.0592	1.0221	1.0305	1.0175	1.0442	1.0379	1.0384	Under Review
Fresno-V-2	ANGIOLA 70 kV	Base Case	P0	Base Case	1.0217	1.0239	1.0176	1.0404	1.0519	1.0191	1.0223	1.0375	1.0096	1.0133	Under Review
Fresno-V-3	ATWELL_JCT 115 kV	Base Case	P0	Base Case	1.0327	1.0243	1.0418	1.0575	1.027	1.0324	1.0238	1.0465	1.0415	1.0418	Under Review
Fresno-V-4	BOSWELL 70 kV	Base Case	P0	Base Case	1.0295	1.0325	1.0273	1.0432	1.0537	1.0272	1.031	1.0461	1.0206	1.0232	Under Review
Fresno-V-5	CORCORAN 70 kV	Base Case	P0	Base Case	1.034	1.0374	1.0324	1.0458	1.0561	1.0317	1.036	1.0513	1.0263	1.0291	Under Review
Fresno-V-6	DINUBA 70 kV	Base Case	P0	Base Case	1.0281	1.0426	1.0403	1.0456	1.0534	1.0256	1.0403	1.0343	1.036	1.0375	Under Review
Fresno-V-7	DUNLAP 70 kV	Base Case	P0	Base Case	0.9971	1.0112	1.0128	1.0366	1.0514	0.9939	1.0081	1.005	1.0069	1.0104	Under Review
Fresno-V-8	GATES 115 kV	Base Case	P0	Base Case	1.0989	1.0992	1.099	1.0813	1.0908	1.0982	1.0994	1.0967	1.0982	1.0987	Under Review
Fresno-V-9	GIFFEN 70 kV	Base Case	P0	Base Case	1.0256	1.0269	1.0325	1.0508	1.0288	1.025	1.0263	1.0502	1.0313	1.0313	Under Review
Fresno-V-10	JGBSWLL 70 kV	Base Case	P0	Base Case	1.0286	1.0315	1.0261	1.0428	1.0534	1.0262	1.0299	1.0449	1.0194	1.0219	Under Review
Fresno-V-11	NRTHFORK 70 kV	Base Case	P0	Base Case	1.0354	1.0389	1.0366	1.0597	1.0482	1.033	1.0382	1.0383	1.0324	1.0289	Under Review
Fresno-V-12	OLIVE_SS 115 kV	Base Case	P0	Base Case	1.0331	1.023	1.0415	1.0601	1.0249	1.0329	1.0224	1.0477	1.0411	1.0414	Under Review
Fresno-V-13	OROSI 70 kV	Base Case	P0	Base Case	1.0153	1.0276	1.0293	1.0425	1.0553	1.0127	1.0254	1.0215	1.0248	1.027	Under Review
Fresno-V-14	Q679 70 kV	Base Case	P0	Base Case	1.0256	1.0269	1.0325	1.0508	1.0288	1.025	1.0263	1.0502	1.0312	1.0313	Under Review
Fresno-V-15	QUEBEC 115 kV	Base Case	P0	Base Case	1.0276	1.0126	1.036	1.0563	1.0166	1.0273	1.0116	1.0398	1.0355	1.0359	Under Review
Fresno-V-16	REEDLEY 70 kV	Base Case	P0	Base Case	1.0308	1.0422	1.044	1.047	1.0551	1.0286	1.0403	1.0362	1.0403	1.0417	Under Review
Fresno-V-17	SANDCRK 70 kV	Base Case	P0	Base Case	1.0029	1.0165	1.0179	1.0385	1.0525	0.9998	1.0137	1.0102	1.0122	1.0155	Under Review
Fresno-V-18	SJNO2 70 kV	Base Case	P0	Base Case	1.035	1.0383	1.036	1.0569	1.045	1.0327	1.0376	1.0377	1.032	1.0291	Under Review
Fresno-V-19	SJNO3 70 kV	Base Case	P0	Base Case	1.0358	1.0395	1.0371	1.0624	1.0514	1.0333	1.0388	1.0389	1.0328	1.0286	Under Review
Fresno-V-20	STONCRRL 70 kV	Base Case	P0	Base Case	1.0073	1.0199	1.0212	1.0398	1.0537	1.0045	1.0177	1.0137	1.0162	1.0189	Under Review
Fresno-V-21	TVY VLLY 70 kV	Base Case	P0	Base Case	1.0243	1.0362	1.0378	1.0449	1.0545	1.0219	1.0343	1.0302	1.0335	1.0355	Under Review
Fresno-V-22	WHITERIVER_P 115 kV	Base Case	P0	Base Case	1.0334	1.0233	1.0417	1.0598	1.0249	1.0331	1.0227	1.0478	1.0413	1.0416	Under Review
Fresno-V-23	GATES 115 kV	P1-3:A14:1:_GATES 500/230kV TB 11	P1	Single Contingency	1.1033	1.1041	1.1054	1.086	1.0999	1.102	1.1022	1.1018	1.1041	1.1047	Under Review

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Fresno-V-24	CANAL 70 kV	P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS)	P2-1	Single Contingency	0.9008	1.0049	1.0048	1.0119	1.0439	0.8912	1.002	0.9997	1.0028	1.0044	Oro Loma 70kV Reinforcement Project
Fresno-V-25	CHEVPIPE 70 kV	P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS)	P2-1	Single Contingency	0.8888	0.9951	0.9954	1.0077	1.0429	0.8788	0.9915	0.9898	0.9931	0.995	Oro Loma 70kV Reinforcement Project
Fresno-V-26	LIVNGSTN 70 kV	P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS)	P2-1	Single Contingency	0.9003	1.0053	1.0049	1.0127	1.0452	0.8903	1.0021	1	1.0025	1.0045	Oro Loma 70kV Reinforcement Project
Fresno-V-27	SNTA NLA 70 kV	P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS)	P2-1	Single Contingency	0.8888	0.9951	0.9954	1.0077	1.0429	0.8788	0.9916	0.9898	0.9931	0.995	Oro Loma 70kV Reinforcement Project
Fresno-V-28	BULLARD 115 kV	P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D	P2	Single Contingency	0.9124	0.9429	0.9332	0.634	1.0253	0.8964	0.9344	0.9415	0.9201	0.9314	Drop Pumps
Fresno-V-29	DUNLAP 70 kV	P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D	P2	Single Contingency	0.9067	0.97	0.9651	1.0062	1.0312	0.8873	0.9614	0.9585	0.948	0.9544	Drop Pumps
Fresno-V-30	HERNDON 230 kV	P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D	P2	Single Contingency	0.9072	0.9343	0.9264	0.6214	0.9958	0.8931	0.9276	0.9329	0.9157	0.9247	Drop Pumps
Fresno-V-31	PNDLJ1 115 kV	P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D	P2	Single Contingency	0.915	0.9452	0.9356	0.6342	1.0246	0.8992	0.9369	0.9437	0.9228	0.9337	Drop Pumps
Fresno-V-32	PNEDLE 115 kV	P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D	P2	Single Contingency	0.914	0.9444	0.9346	0.6339	1.0247	0.8982	0.936	0.9429	0.9218	0.9328	Drop Pumps
Fresno-V-33	SANDCRK 70 kV	P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D	P2	Single Contingency	0.9131	0.9755	0.9704	1.0082	1.0323	0.8939	0.9673	0.9641	0.9536	0.9598	Drop Pumps
Fresno-V-34	STONCRRL 70 kV	P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D	P2	Single Contingency	0.918	0.9791	0.974	1.0096	1.0336	0.8993	0.9715	0.9677	0.9579	0.9634	Drop Pumps
Fresno-V-35	CHWCHLLA 115 kV	P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111] and P1-1:A14:6:_KERCKHOF 14kV Gen Unit 1	P3	Multiple Contingency	0.89	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	0.8846	0.89	Under Review
Fresno-V-36	MARIPOS2 70 kV	P1-3:A13:17:_EXCHEOUR 70/115kV TB 1 and P1-1:A13:14:_MCSWAIN 4kV Gen Unit 1	P3	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	0.8963	>0.9	>0.9	0.8997	>0.9	Under Review
Fresno-V-37	SHARON 115 kV	P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111] and P1-1:A14:6:_KERCKHOF 14kV Gen Unit 1	P3	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8969	>0.9	Under Review

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
Fresno-V-38	ATWATER 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	0.887	>0.9	>0.9	>0.9	>0.9	>0.9	0.8559	>0.9	>0.9	>0.9	>0.9	Under Review
Fresno-V-39	ATWATR J 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	0.8884	>0.9	>0.9	>0.9	>0.9	>0.9	0.8574	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-40	BER VLLY 70 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-3:A13:17:_EXCHEOUR 70/115kV TB 1	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.877	>0.9	Sensitivity Under Review
Fresno-V-41	BRCEBG J 70 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8641	>0.9	Sensitivity Under Review
Fresno-V-42	CAL AVE 115 kV	P1-2:A14:45:_SANGER-CALIFORNIA AVE 115kV [9130] and P1-2:A14:47:_MCCALL-WEST FRESNO #2 115kV [2370]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8949	0.8961	0.8873	>0.9	>0.9	Sensitivity Under Review
Fresno-V-43	CASTLE 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	0.8878	>0.9	>0.9	>0.9	>0.9	>0.9	0.8567	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-44	CERTAN T 115 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8981	>0.9	Sensitivity Under Review
Fresno-V-45	CERTANJ1 115 kV	P1-1:A14:6:_KERCKHOF 14kV Gen Unit 1 and P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111]	P6	Multiple Contingency	>0.9	>0.9	0.8905	>0.9	>0.9	>0.9	>0.9	>0.9	0.885	0.8904	>0.9	Under Review
Fresno-V-46	CERTANJ2 115 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8981	>0.9	Sensitivity Under Review
Fresno-V-47	CERTTEED 115 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8972	>0.9	Sensitivity Under Review
Fresno-V-48	CHWCGN 115 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8974	>0.9	Sensitivity Under Review
Fresno-V-49	CHWCGNJT 115 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8975	>0.9	Sensitivity Under Review

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Fresno-V-50	CHWCHLA2 115 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8974	>0.9	Sensitivity Under Review
Fresno-V-51	CHWCHLLA 115 kV	P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111] and P1-3:A14:23:_KERCKHF2 115/13.8kV TB 1	P6	Multiple Contingency	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	0.8846	0.89	>0.9	Sensitivity Under Review
Fresno-V-52	COLNGA 1 70 kV	P1-2:A14:102:_JAYNE SW STA-COALINGA 70kV [8670] and P1-2:A14:71:_COALINGA #1-COALINGA #2 70kV [0]	P6	Multiple Contingency	0.8604	>0.9	>0.9	>0.9	>0.9	0.8462	>0.9	>0.9	>0.9	>0.9	Estrella mitigates future years
Fresno-V-53	CRESSEY 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	0.8829	>0.9	>0.9	>0.9	>0.9	0.8515	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-54	DANISHCM 115 kV	P1-2:A14:45:_SANGER-CALIFORNIA AVE 115kV [9130] and P1-2:A14:47:_MCCALL-WEST FRESNO #2 115kV [2370]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.895	>0.9	>0.9	Sensitivity Under Review
Fresno-V-55	EL CAPTN 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	0.8902	>0.9	>0.9	>0.9	>0.9	0.8594	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-56	EL NIDO 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	0.8935	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-57	EXCHEOUR 115 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8556	>0.9	Sensitivity Under Review
Fresno-V-58	GALLO 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	0.8811	>0.9	>0.9	>0.9	>0.9	0.8496	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-59	GATES 115 kV	P1-3:A14:13:_HENRIETA 230/70kV TB 4 and P1-3:A14:1:_GATES 500/230kV TB 11	P6	Multiple Contingency	1.1061	1.1073	1.1086	>0.9	1.1023	1.1049	1.1064	1.1076	1.1079	>0.9	Under Review
Fresno-V-60	HENRIETA 230 kV	P1-2:A14:12:_GREGG-HENRIETA-MUSTANGSS 230kV [0] and P1-2:A14:18:_MC CALL-MUSTANGSS 230kV [0]	P6	Multiple Contingency	>0.9	>0.9	0.8905	0.8465	0.855	0.8937	0.8996	0.8862	0.8902	>0.9	Under Review

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
Fresno-V-61	INDN FLT 70 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8544	>0.9	Sensitivity Under Review
Fresno-V-62	JACALITO 70 kV	P1-2:A14:98:_GATES-JAYNE SW STA 70kV [8652] and P1-2:A14:71:_COALINGA #1-COALINGA #2 70kV [0]	P6	Multiple Contingency	0.8646	>0.9	>0.9	>0.9	>0.9	0.8488	>0.9	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-63	JR WOOD 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	0.8861	>0.9	>0.9	>0.9	>0.9	0.8549	>0.9	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-64	JRWD GEN 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	0.8863	>0.9	>0.9	>0.9	>0.9	0.8552	>0.9	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-65	LE GRNDJ 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	0.8864	>0.9	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-66	LIVNGSTN 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	0.8812	>0.9	>0.9	>0.9	>0.9	0.8497	>0.9	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-67	MARIPOS2 70 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.841	>0.9	Sensitivity Under Review
Fresno-V-68	MC SWAIN 70 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8981	>0.9	Sensitivity Under Review
Fresno-V-69	MCSWAINJ 70 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8981	>0.9	Sensitivity Under Review
Fresno-V-70	MERCED 115 kV	P1-3:A13:8:_WILSON 230/115kV TB 2 and P1-3:A13:7:_WILSON 230/115kV TB 1	P6	Multiple Contingency	0.8983	>0.9	>0.9	>0.9	>0.9	0.869	>0.9	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment or Cressy N. Merced
Fresno-V-71	MRCDFLLS 70 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8982	>0.9	Sensitivity Under Review

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
Fresno-V-72	Q633 70 kV	P1-2:A14:71:_COALINGA #1-COALINGA #2 70kV [0] and P1-2:A14:98:_GATES-JAYNE SW STA 70kV [8652]	P6	Multiple Contingency	0.8687	>0.9	>0.9	>0.9	>0.9	>0.9	0.8539	>0.9	>0.9	>0.9	>0.9	Wilson 115kV area reinforcment &Cressy N. Merced
Fresno-V-73	SAXONCRK 70 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8634	>0.9	Sensitivity Under Review
Fresno-V-74	SHARON 115 kV	P1-1:A14:6:_KERCKHOF 14kV Gen Unit 1 and P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8969	>0.9	>0.9	Sensitivity Under Review
Fresno-V-75	SHARON T 115 kV	P1-1:A14:6:_KERCKHOF 14kV Gen Unit 1 and P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8972	>0.9	>0.9	Sensitivity Under Review
Fresno-V-76	WESTLNDS_SS 70 kV	P1-2:A14:98:_GATES-JAYNE SW STA 70kV [8652] and P1-2:A14:71:_COALINGA #1-COALINGA #2 70kV [0]	P6	Multiple Contingency	0.8683	>0.9	>0.9	>0.9	>0.9	>0.9	0.8526	>0.9	>0.9	>0.9	>0.9	Oro Loma 70kV Reinforcement Project
Fresno-V-77	WILSON A 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8748	>0.9	>0.9	>0.9	>0.9	Sensitivity Under Review
Fresno-V-78	WILSON B 115 kV	P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8744	>0.9	>0.9	>0.9	>0.9	Sensitivity Under Review
Fresno-V-79	WST FRSO 115 kV	P1-2:A14:45:_SANGER-CALIFORNIA AVE 115kV [9130] and P1-2:A14:47:_MCCALL-WEST FRESNO #2 115kV [2370]	P6	Multiple Contingency	0.8927	>0.9	0.8975	>0.9	>0.9	>0.9	0.8855	0.8867	0.8779	0.8953	>0.9	load growth, Under Review
Fresno-V-80	YOSEMITE 70 kV	P1-2:A13:57:_EXCHEQUER-MARIPOSA 70kV [8640] and P1-3:A13:17:_EXCHEQUER 70/115kV TB 1	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8978	>0.9	>0.9	>0.9	>0.9	Sensitivity Under Review
Fresno-V-81	YOSEMITE 70 kV	P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560]	P6	Multiple Contingency	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.8499	>0.9	Sensitivity Under Review

ID	Contingency	Category	Category Description	Transient Stability Performance(Voltage and frequency violations)										Potential Mitigation Solutions
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	Select..	Select..	Select..	Select..	Select..	
Fresno-TS-1	Gates 500/230 kV Transformer No. 11	P1	Single Contingency	3	2	2	3	2	N/A	N/A	N/A	N/A	N/A	Under review
Fresno-TS-2	BUS 2 FAULT AT 30835 HERNDON 230.00	P2	Single Contingency	4	2	2	4	4	N/A	N/A	N/A	N/A	N/A	Under review
Fresno-TS-3	BUS FAULT AT 30875 MC CALL 230.00	P2	Single Contingency	21	19	19	21	21	N/A	N/A	N/A	N/A	N/A	Under review
Fresno-TS-4	BUS-TIE BREAKER 202 FAULT AT PANOCHE 115.00	P2	Single Contingency	14	8	14	10	10	N/A	N/A	N/A	N/A	N/A	Under review
Fresno-TS-5	NON-BUS-TIE BREAKER CB1122 FAULT AT 30465 MENDOTA 115.00	P2	Single Contingency	26	26	26	17	17	N/A	N/A	N/A	N/A	N/A	Under review
Fresno-TS-6	BUS FAULT AT 30875 MC CALL 230.00	P2	Single Contingency	21	19	19	21	21	N/A	N/A	N/A	N/A	N/A	Under review
Fresno-TS-7	HELMS 1 18.00 Generator ID 1	P4	Single Contingency	2	0	0	4	0	N/A	N/A	N/A	N/A	N/A	Northern Fresno 115kV Area reinforcement Project fixes later years
Fresno-TS-8	Gates 230kV bus section	P4	Single Contingency	33	51	4	175	33	N/A	N/A	N/A	N/A	N/A	Under review
Fresno-TS-9	Herndon - Kearney & Herndon - Ashlan 230 kV Lines	P7	Multiple Contingency	7	5	5	8	8	N/A	N/A	N/A	N/A	N/A	Under review

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1														

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1												

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-1	34860 TAFT A 70.0 34919 TX_BV_HL 70.0 1 1	Base Case	P0	Base Case	97.50	98.26	98.27	80.74	78.86	99.82	102.03	98.83	102.84	98.87	Sensitivity Under Review
Kern-T-2	30948 ELKHIL_G 230 30970 MIDWAY 230 1 1	P1-2:A15:16:_ELKHIL_G-MIDWAY #2 230kV [0] and 450.2	P1	Single Contingency	<100%	69.01	68.58	<100%	18.35	<100%	69.11	69.24	77.84	100.65	Generation redispatch
Kern-T-3	30948 ELKHIL_G 230 30970 MIDWAY 230 2 1	P1-2:A15:15:_ELKHIL_G-MIDWAY #1 230kV [0] and 450.2	P1	Single Contingency	<100%	69.01	68.58	<100%	18.35	<100%	69.11	69.24	77.84	100.65	Generation redispatch
Kern-T-4	34742 SEMITRPJ 115 34746 GANSO 115 1 1	P1-2:A15:42:_Semitropic-Midway #1 115 kV Line and 136.6	P1	Single Contingency	<100%	<100%	87.21	<100%	<100%	<100%	<100%	<100%	91.21	102.99	Sensitivity Under Review
Kern-T-5	34724 KRN OL J 115 34798 KERNWATR 115 1 1	P2-1:A15:56:_PTRL JCT-LIVE OAK 115kV [0] No Fault and 125.7	P2-1	Single Contingency	87.80	<100%	<100%	23.44	<100%	107.30	<100%	<100%	<100%	<100%	Short Term: Ap-KR-15: Curtail load at Magunden Long Term: Kern 115kV Area Reinforcement
Kern-T-6	34726 PTRL JCT 115 34719 POSOMTJT 115 1 1	P2-1:A15:69:_KERN PWR-KERNWATR 115kV [0] No Fault and 125.7	P2-1	Single Contingency	83.77	<100%	<100%	26.79	<100%	101.24	<100%	<100%	<100%	<100%	Short Term: AP-KR-12: Curtail 5MW@ KernWater; curtail 20MW @ Kern Oil, Operations sees this overloading, in 7450 Procedure, check case Long Term: Kern 115kV Area Reinforcement
Kern-T-7	34728 LIVE OAK 115 34752 KERN PWR 115 1 1	P2-1:A15:69:_KERN PWR-KERNWATR 115kV [0] No Fault and 82	P2-1	Single Contingency	87.42	<100%	<100%	2.20	<100%	114.36	<100%	<100%	<100%	<100%	Under Review
Kern-T-8	34752 KERN PWR 115 34798 KERNWATR 115 1 1	P2-1:A15:56:_PTRL JCT-LIVE OAK 115kV [0] No Fault and 125.7	P2-1	Single Contingency	90.91	<100%	<100%	26.53	<100%	110.43	<100%	<100%	<100%	<100%	Under Review
Kern-T-9	30945 KERN PP 230 30943 STCKDLJ2 230 1 1	P2-4:A15:8:_MIDWAY 230kV - Section 2E & 2F and 637	P2	Single Contingency	104.07	<100%	<100%	10.89	<100%	116.28	<100%	<100%	<100%	<100%	Short Term: Curtail pumping load on the Midway - Wheeler Ridge 230kV Lines Long Term: Midway - Kern #2 line
Kern-T-10	30945 KERN PP 230 30944 BKRSFDJ2 230 1 1	P2-3:A15:5:_KERN PP - 1D 230kV & STCKDLEA-STCKDLJ1 #1 line and 478	P2	Single Contingency	91.23	<100%	<100%	25.13	<100%	105.63	<100%	<100%	<100%	<100%	Short Term:Curtail pumping load on the Midway - Wheeler Ridge 230kV Lines Long Term: Midway - Kern #2 line
Kern-T-11	30948 ELKHIL_G 230 30970 MIDWAY 230 1 1	P2-4:A15:4:_MIDWAY 230kV - Section 2F & 2E and 450.2	P2	Single Contingency	<100%	70.09	69.62	<100%	18.31	<100%	70.21	70.24	78.89	101.77	Gen-Redispatch
Kern-T-12	30948 ELKHIL_G 230 30970 MIDWAY 230 2 1	P2-2:A15:13:_MIDWAY 230kV Section 1F and 450.2	P2	Single Contingency	<100%	69.09	68.45	<100%	18.36	<100%	69.18	69.48	77.73	100.54	Gen-Redispatch

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-13	30970 MIDWAY 230 30943 STCKDLJ2 230 1 1	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and 658	P2	Single Contingency	93.02	<100%	<100%	7.99	<100%	103.70	<100%	<100%	<100%	<100%	Gen-Redispatch
Kern-T-14	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P2-4:A15:6:_MIDWAY 230kV - Section 1E & 1D and 1262	P2	Single Contingency	100.15	99.49	99.32	100.44	0.88	100.27	99.54	99.50	99.45	99.72	Gen-Redispatch
Kern-T-15	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P2-4:A15:8:_MIDWAY 230kV - Section 2D & 1D and 1262	P2	Single Contingency	<100%	100.31	100.17	<100%	0.88	<100%	100.39	100.25	100.14	99.75	Gen-Redispatch
Kern-T-16	30970 MIDWAY 230 30946 LAPALOMA 230 2 1	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and 1262	P2	Single Contingency	100.85	<100%	<100%	100.98	<100%	101.09	<100%	<100%	<100%	<100%	Gen-Redispatch
Kern-T-17	34706 WESTPARK 115 34752 KERN PWR 115 1 1	P2-3:A15:62:_KERN PWR - 2E 115kV & KRN OL J-MAGUNDEN #1 line and 125.1	P2	Single Contingency	112.12	<100%	<100%	40.09	<100%	117.53	<100%	<100%	<100%	<100%	Kern PP 115 kV Area Reinforcement
Kern-T-18	34709 7STNDRD 115 34752 KERN PWR 115 1 1	P2-2:A15:36:_KERN PWR 115kV Section 2E	P2	Single Contingency	91.30	<100%	<100%	1.30	<100%	119.68	<100%	<100%	<100%	<100%	Short Term: Curtail load at 7th Standard, Lerdo and Famoso subs Long Term: Kern 115kV Area Reinforcement
Kern-T-19	34716 LRDO JCT 115 34709 7STNDRD 115 1 1	P2-2:A15:36:_KERN PWR 115kV Section 2E	P2	Single Contingency	74.38	<100%	<100%	4.46	<100%	100.08	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-20	34724 KRN OL J 115 34798 KERNWATR 115 1 1	P2-2:A15:27:_LIVE OAK 115kV Section 1D and	P2	Single Contingency	87.78	<100%	<100%	23.32	<100%	107.33	<100%	<100%	<100%	<100%	Short Term: Ap-KR-15: Curtail load at Magunden Long Term: Kern 115kV Area Reinforcement
Kern-T-21	34749 TPMNTP1 115 34750 TUPMAN 115 1 1	P2-2:A15:48:_MIDWAY 115kV Section 2E and 88	P2	Single Contingency	122.27	<100%	131.27	59.10	<100%	127.46	<100%	<100%	147.05	138.63	Under Review/Replace limiting switching at Tupman
Kern-T-22	34751 TPMNTP2 115 34750 TUPMAN 115 1 1	P2-4:A15:18:_MIDWAY 115kV - Section 2E & 1E and 88	P2	Single Contingency	<100%	<100%	101.10	<100%	<100%	<100%	<100%	<100%	109.04	101.70	Under Review/Replace limiting switching at Tupman
Kern-T-23	34752 KERN PWR 115 30945 KERN PP 230 5 1	P2-4:A15:12:_KERN PWR 115kV - Section 2D & 2E and 352.6	P2	Single Contingency	<100%	76.31	86.46	<100%	31.86	<100%	80.29	65.28	93.69	102.75	Short Term: Curtail load at Tevis and Stockdale by remotely open Tevis CB152 and CB162, and Stockdale CB112 and CB122 via SCADA. Long Term: Kern 230kV Area Reinforcement (Kern Bank SPS)
Kern-T-24	34752 KERN PWR 115 34798 KERNWATR 115 1 1	P2-2:A15:27:_LIVE OAK 115kV Section 1D and 125.7	P2	Single Contingency	90.89	<100%	<100%	26.42	<100%	110.46	<100%	<100%	<100%	<100%	Short Term: Curtail load at Magunden. Long Term: Kern 115kV Area Reinforcement

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-25	34774 MIDWAY 115 30970 MIDWAY 230 2 1	P2-4:A15:6:_MIDWAY 230kV - Section 1E & 1D and 398.4	P2	Single Contingency	75.06	76.61	89.45	24.02	41.83	84.55	78.14	48.92	98.54	134.23	Generation redispatch
Kern-T-26	34774 MIDWAY 115 30970 MIDWAY 230 3 1	P2-4:A15:8:_MIDWAY 230kV - Section 2D & 1D and 420	P2	Single Contingency	<100%	74.17	82.97	<100%	41.23	<100%	75.63	46.30	91.76	126.44	Generation redispatch
Kern-T-27	34774 MIDWAY 115 34780 CYMRIC 115 1 1	P2-3:A15:85:_MIDWAY - 2D 115kV & TPMNTP1-TUPMAN #1 line and 120	P2	Single Contingency	<100%	<100%	27.06	<100%	<100%	<100%	<100%	<100%	29.17	99.95	Generation redispatch
Kern-T-28	34777 FELLOWSG 115 34800 SANTA FE SUB 115 1 1	P2-3:A15:145:_TAFT 115kV - Ring R2 & R1 and 82.9	P2	Single Contingency	46.58	<100%	<100%	107.63	<100%	45.79	<100%	<100%	<100%	<100%	Generation redispatch
Kern-T-29	34779 MIDSUN 115 34777 FELLOWSG 115 1 1	P2-3:A15:145:_TAFT 115kV - Ring R2 & R1 and 82.9	P2	Single Contingency	31.79	<100%	<100%	100.83	<100%	41.77	<100%	<100%	<100%	<100%	Generation redispatch
Kern-T-30	34780 CYMRIC 115 34781 TEXCO_NM 115 1 1	P2-2:A15:47:_MIDWAY 115kV Section 2D and 120	P2	Single Contingency	<100%	25.36	27.18	<100%	34.67	<100%	27.63	30.43	29.29	99.95	Generation redispatch
Kern-T-31	38600 BUENAVJ1 230 30970 MIDWAY 230 1 1	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and 329	P2	Single Contingency	107.28	<100%	<100%	82.04	<100%	108.35	<100%	<100%	<100%	<100%	Under Review
Kern-T-32	38605 BUENAVJ2 230 30970 MIDWAY 230 1 1	P2-2:A15:13:_MIDWAY 230kV Section 1D and 329	P2	Single Contingency	106.05	<100%	<100%	81.46	<100%	106.82	<100%	<100%	<100%	<100%	Under Review
Kern-T-33	38605 BUENAVJ2 230 30970 MIDWAY 230 1 1	P2-4:A15:6:_MIDWAY 230kV - Section 1E & 1D and 329	P2	Single Contingency	106.25	70.18	72.94	81.95	51.89	107.10	71.70	59.84	75.74	82.73	Under Review
Kern-T-34	30948 ELKHIL_G 230 30970 MIDWAY 230 1 1	P1-1:A15:66:_TEXSUNST 18kV Gen Unit 1 and P1-2:A15:16:_ELKHIL_G-MIDWAY #2 230kV [0]	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	100.06	Dec gen Elkhills
Kern-T-35	30948 ELKHIL_G 230 30970 MIDWAY 230 2 1	P1-1:A15:66:_TEXSUNST 18kV Gen Unit 1 and P1-2:A15:15:_ELKHIL_G-MIDWAY #1 230kV [0]	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	100.06	Dec gen Elkhills
Kern-T-36	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P1-1:A15:45:_MT POSO 14kV Gen Unit 1 and P1-2:A15:17:_MIDWAY-LAPALOMA #2 230kV [0]	P3	Multiple Contingency (G-1, N-1)	99.75	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	La Paloma Gen re-dispatch
Kern-T-37	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P1-1:A15:81:_WHLR RD1 13kV Gen Unit 2 and P1-2:A15:17:_MIDWAY-LAPALOMA #2 230kV [0]	P3	Multiple Contingency (G-1, N-1)	99.71	<100%	<100%	99.80	<100%	99.78	<100%	<100%	<100%	<100%	La Paloma Gen re-dispatch
Kern-T-38	30970 MIDWAY 230 30946 LAPALOMA 230 2 1	P1-1:A15:39:_DEXEL + 14kV Gen Unit 1 and P1-2:A15:16:_MIDWAY-LAPALOMA #1 230kV [0]	P3	Multiple Contingency (G-1, N-1)	99.74	<100%	<100%	99.76	<100%	99.82	<100%	<100%	<100%	<100%	La Paloma Gen re-dispatch
Kern-T-39	34706 WESTPARK 115 34752 KERN PWR 115 1 1	P1-1:A15:59:_PSE-BEAR 14kV Gen Unit 1 and P1-2:A15:42:_WESTPARK-KERN PWR #2 115kV [0]	P3	Multiple Contingency (G-1, N-1)	96.04	<100%	<100%	<100%	<100%	99.57	<100%	<100%	<100%	<100%	Sensitivity Under Review

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
Kern-T-40	34706 WESTPARK 115 34752 KERN PWR 115 2 1	P1-1:A15:59:_PSE-BEAR 14kV Gen Unit 1 and P1-2:A15:41:_WESTPARK-KERN PWR #1 115kV [0]	P3	Multiple Contingency (G-1, N-1)	96.04	<100%	<100%	<100%	<100%	<100%	99.57	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-41	34724 KRN OL J 115 34798 KERNWATR 115 1 1	P1-1:A15:42:_OILDALE 14kV Gen Unit 1 and P1-2:A15:49:_Live Oak-Kern Oil 115kV	P3	Multiple Contingency(G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	105.37	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-42	34728 LIVE OAK 115 34752 KERN PWR 115 1 1	P1-1:A15:56:_PSE-LVOK 9kV Gen Unit 1 and P1-2:A15:48:_Kern Oil-Witco 115kV Line	P3	Multiple Contingency(G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	107.12	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-43	34742 SEMITRPJ 115 34746 GANSO 115 1 1	P1-1:A15:15:_Q557 0kV Gen Unit 1 and P1-2:A15:42:_Semitropic-Midway #1 115 kV Line	P3	Multiple Contingency(G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	105.08	Sensitivity Under Review
Kern-T-44	34752 KERN PWR 115 34798 KERNWATR 115 1 1	P1-1:A15:42:_OILDALE 14kV Gen Unit 1 and P1-2:A15:49:_Live Oak-Kern Oil 115kV	P3	Multiple Contingency(G-1, N-1)	92.54	<100%	<100%	<100%	<100%	<100%	108.50	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-45	34774 MIDWAY 115 34780 CYMRIC 115 1 1	P1-1:A15:32:_FELLOWS 21kV Gen Unit QF and P1-2:A15:28:_MIDWAY-TAFT #1 115kV [0]	P3	Multiple Contingency(G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	110.08	Sensitivity Under Review
Kern-T-46	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P1-4:A15:8:_Q620C2 and P1-2:A15:21:_MIDWAY-LAPALOMA #2 230kV [0]	P3	Multiple Contingency(G-1, N-1)	<100%	99.42	99.27	<100%	<100%	<100%	99.45	99.50	99.35	99.30	Sensitivity Under Review	
Kern-T-47	34776 TAFT 115 34860 TAFT A 70.0 2 1	P1-1:A15:42:_BADGERCK 14kV Gen Unit 1 and P1-3:A15:60:_TAFT 115/70kV TB 1	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	100.51	<100%	<100%	<100%	<100%	<100%	<100%	100.19	<100%	Short Term: Curtail load at Elk Hills and Texaco BV Hills Long Term: bank replacement
Kern-T-48	34780 CYMRIC 115 34781 TEXCO_NM 115 1 1	P1-1:A15:32:_FELLOWS 21kV Gen Unit QF and P1-2:A15:28:_MIDWAY-TAFT #1 115kV [0]	P3	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	110.09	Sensitivity Under Review
Kern-T-49	34776 TAFT 115 34860 TAFT A 70.0 2 1	P1-1:A15:6:_Q356 35kV Gen Unit 1 and P1-3:A15:60:_TAFT 115/70kV TB 1	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	93.35	<100%	<100%	<100%	<100%	<100%	<100%	102.57	105.90	Short Term: Curtail load at Elk Hills and Texaco BV Hills Long Term: bank replacement
Kern-T-50	34780 CYMRIC 115 34781 TEXCO_NM 115 1 1	P1-1:A15:32:_FELLOWS 21kV Gen Unit QF and P1-2:A15:28:_MIDWAY-TAFT #1 115kV [0]	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	110.09	Sensitivity Under Review
Kern-T-51	34774 MIDWAY 115 34780 CYMRIC 115 1 1	P1-1:A15:32:_FELLOWS 21kV Gen Unit QF and P1-2:A15:28:_MIDWAY-TAFT #1 115kV [0]	P3	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	110.08	Sensitivity Under Review

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
Kern-T-52	30900 GATES 230 30970 MIDWAY 230 1 1	P1-3:A15:3:_MIDWAY 500/230kV TB 13 and P1-3:A15:2:_MIDWAY 500/230kV TB 12	P6	Multiple Contingency	<100%	<100%	99.97	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-53	30945 KERN PP 230 30944 BKRSFDJ2 230 1 1	P1-2:A15:9:_Midway-Kern #1 230kV Line and P1-2:A15:10:_Midway-Kern #3 230kV Line	P6	Multiple Contingency	91.62	<100%	<100%	<100%	<100%	99.91	<100%	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-54	30948 ELKHIL_G 230 30970 MIDWAY 230 1 1	P1-2:A15:69:_KERNRDGE-TEMBLOR #1 115kV [0] and P1-2:A15:16:_ELKHIL_G-MIDWAY #2 230kV [0]	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	100.16	Sensitivity Under Review
Kern-T-55	30948 ELKHIL_G 230 30970 MIDWAY 230 2 1	P1-2:A15:69:_KERNRDGE-TEMBLOR #1 115kV [0] and P1-2:A15:15:_ELKHIL_G-MIDWAY #1 230kV [0]	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	100.16	Sensitivity Under Review
Kern-T-56	30970 MIDWAY 230 30942 STCKDLJ1 230 1 1	P1-2:A15:10:_Midway-Kern #3 230kV Line and P1-2:A15:11:_Midway-Kern #4 230kV Line	P6	Multiple Contingency	99.91	<100%	<100%	<100%	<100%	100.04	<100%	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-57	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P1-4:A15:8:_REGULUS and P1-2:A15:17:_MIDWAY-LAPALOMA #2 230kV [0]	P6	Multiple Contingency	99.72	<100%	<100%	99.81	<100%	99.79	<100%	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-58	30970 MIDWAY 230 30946 LAPALOMA 230 2 1	P1-4:A15:8:_REGULUS and P1-2:A15:16:_MIDWAY-LAPALOMA #1 230kV [0]	P6	Multiple Contingency	99.72	<100%	<100%	99.81	<100%	99.79	<100%	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-59	34706 WESTPARK 115 34752 KERN PWR 115 1 1	P1-2:A15:42:_WESTPARK-KERN PWR #2 115kV [0] and P1-2:A15:51:_Kern-Magunden-Witco 115kV Line	P6	Multiple Contingency	111.81	<100%	<100%	<100%	<100%	117.14	<100%	<100%	<100%	<100%	<100%	Normally open CB122 at Magunden and disable restore function, Mountain Bear INC gen
Kern-T-60	34706 WESTPARK 115 34752 KERN PWR 115 2 1	P1-2:A15:41:_WESTPARK-KERN PWR #1 115kV [0] and P1-2:A15:51:_Kern-Magunden-Witco 115kV Line	P6	Multiple Contingency	111.81	<100%	<100%	<100%	<100%	117.14	<100%	<100%	<100%	<100%	<100%	Normally open CB122 at Magunden and disable restore function Mountain Bear INC gen
Kern-T-61	34726 PTRL JCT 115 34719 POSOMTJT 115 1 1	P1-2:A15:43:_7TH STANDARD-KERN 115kV [1981] and P1-2:A15:48:_Kern Oil-Witco 115kV Line	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	100.52	<100%	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-62	34726 PTRL JCT 115 34728 LIVE OAK 115 1 1	P1-2:A15:43:_7TH STANDARD-KERN 115kV [1981] and P1-2:A15:48:_Kern Oil-Witco 115kV Line	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	100.51	<100%	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-63	34728 LIVE OAK 115 34752 KERN PWR 115 1 1	P1-2:A15:48:_Kern Oil-Witco 115kV Line and P1-2:A15:43:_7TH STANDARD-KERN 115kV [1981]	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	111.39	<100%	<100%	<100%	<100%	<100%	Sensitivity Under Review

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
Kern-T-64	34742 SEMITRPJ 115 34704 SEMITROPIC_D 115 1 1	P1-2:A15:42:_Semitropic-Midway #1 115 kV Line and P1-2:A15:51:_Lerdo-Kern Oil-7th Standard 115kV Line	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	100.81	Sensitivity Under Review
Kern-T-65	34742 SEMITRPJ 115 34746 GANSO 115 1 1	P1-2:A15:51:_Lerdo-Kern Oil-7th Standard 115kV Line and P1-2:A15:42:_Semitropic-Midway #1 115 kV Line	P6	Multiple Contingency	<100%	<100%	94.88	<100%	<100%	<100%	<100%	<100%	<100%	99.62	113.33	Sensitivity Under Review
Kern-T-66	34746 GANSO 115 34774 MIDWAY 115 1 1	P1-2:A15:42:_Semitropic-Midway #1 115 kV Line and P1-2:A15:51:_Lerdo-Kern Oil-7th Standard 115kV Line	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	89.85	101.11	Sensitivity Under Review
Kern-T-67	34752 KERN PWR 115 30945 KERN PP 230 4 1	P1-3:A15:6:_KERN PP 230/115kV TB 5 and P1-3:A15:4:_KERN PP 230/115kV TB 3	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	127.55	Sensitivity Under Review
Kern-T-68	34752 KERN PWR 115 34798 KERNWATR 115 1 1	P1-3:A15:41:_GODN_BER 115/13.8kV TB 1 and P1-2:A15:49:_Live Oak-Kern Oil 115kV	P6	Multiple Contingency	92.29	<100%	<100%	<100%	<100%	108.25	<100%	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-69	34774 MIDWAY 115 30970 MIDWAY 230 1 1	P1-3:A15:17:_MIDWAY 230/115kV TB 2 and P1-3:A15:18:_MIDWAY 230/115kV TB 3	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	118.59	Sensitivity Under Review
Kern-T-70	34774 MIDWAY 115 30970 MIDWAY 230 2 1	P1-3:A15:16:_MIDWAY 230/115kV TB 1 and P1-3:A15:18:_MIDWAY 230/115kV TB 3	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	118.59	Sensitivity Under Review
Kern-T-71	34774 MIDWAY 115 30970 MIDWAY 230 3 1	P1-3:A15:16:_MIDWAY 230/115kV TB 1 and P1-3:A15:17:_MIDWAY 230/115kV TB 2	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	115.18	Sensitivity Under Review
Kern-T-72	34776 TAFT 115 34860 TAFT A 70.0 2 1	P1-3:A15:60:_TAFT 115/70kV TB 1 and P1-3:A15:88:_Q356 70/34.5kV TB 1	P6	Multiple Contingency	<100%	<100%	93.36	<100%	<100%	<100%	<100%	<100%	<100%	102.60	105.88	Sensitivity Under Review
Kern-T-73	34776 TAFT 115 34860 TAFT A 70.0 2 1	P1-3:A15:65:_WILDWOOD2 115/34.5kV TB 1, Loosing Solar Units and P1-3:A15:60:_TAFT 115/70kV TB 1	P6	Multiple Contingency	<100%	<100%	100.52	<100%	<100%	<100%	<100%	<100%	<100%	100.19	<100%	Sensitivity Under Review
Kern-T-74	34918 KERN PW2 70.0 34914 KERN PW1 70.0 1 1	P1-2:A15:73:_Kern-Old River #1 70kV and P1-3:A15:43:_KERN PWR 115/70kV TB 1	P6	Multiple Contingency	<100%	100.18	<100%	<100%	<100%	<100%	100.48	<100%	<100%	<100%	<100%	Short Term: Curtail load at Tevis, Stckdale, Westpark and Magunden Long Term: Kern 230kV Area Reinforcement (Kern Bank SPS)

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-75	30945 KERN PP 230 30942 STCKDLJ1 230 1 1	P7-1:A15:12:_Midway-Kern No. 3 & Midway-Kern No. 4 230 kV Lines and 478	P7	Multiple Contingency (common structure)	91.43	<100%	<100%	28.28	<100%	105.58	<100%	<100%	<100%	<100%	Replace the Limiting element, Midway-Kern PP Nos.1,3, and 4 230 kV Lines Capacity Increase
Kern-T-76	30945 KERN PP 230 30944 BKRSFDJ2 230 1 1	P7-1:A15:12:_Midway-Kern No. 3 & Midway-Kern No. 4 230 kV Lines and 478	P7	Multiple Contingency (common structure)	91.09	<100%	<100%	27.23	<100%	105.12	<100%	<100%	<100%	<100%	Replace the Limiting element, Midway-Kern PP Nos.1,3, and 4 230 kV Lines Capacity Increase
Kern-T-77	30970 MIDWAY 230 30942 STCKDLJ1 230 1 1	P7-1:A15:12:_Midway-Kern No. 3 & Midway-Kern No. 4 230 kV Lines and 591.2	P7	Multiple Contingency (common structure)	105.93	<100%	<100%	15.27	<100%	117.58	<100%	<100%	<100%	<100%	Replace the Limiting element, Midway-Kern PP Nos.1,3, and 4 230 kV Lines Capacity Increase

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-VD-1	BAKRSFLD 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	14.622	16.027	4.691	4.583	1.447	15.303	17.085	13.984	5.127	4.825	Voltage Support Project fixes later years, monitor interim
Kern-VD-2	BUENAVJ2 230 kV	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and	P2	Single Contingency	10.046	No Violation	No Violation	6.627	No Violation	10.43	No Violation	No Violation	No Violation	No Violation	Voltage Support Project fixes later years, monitor interim
Kern-VD-3	CARNATIO 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	15.114	16.399	5.884	5.115	2.067	15.728	17.338	14.307	6.1	5.976	Voltage Support Project fixes later years, monitor interim
Kern-VD-4	CAWELO B 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	16.687	18.122	No Violation	5.691	2.065	17.413	19.219	16.024	No Violation	No Violation	Voltage Support Project fixes later years, monitor interim
Kern-VD-5	EISEN 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	14.696	16.111	4.713	4.604	1.453	15.381	17.175	14.055	5.151	4.848	Voltage Support Project fixes later years, monitor interim
Kern-VD-6	FAMOSO 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	17.191	18.69	No Violation	5.747	2.076	17.966	19.85	16.514	No Violation	No Violation	Voltage Support Project fixes later years, monitor interim
Kern-VD-7	GRMWY_SM 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	12.758	14.225	2.431	3.159	No Violation	13.467	15.381	12.087	3.103	2.607	Voltage Support Project fixes later years, monitor interim
Kern-VD-8	KERN PW2 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	16.23	17.61	6.332	5.63	No Violation	16.911	18.647	15.582	6.621	6.44	Voltage Support Project fixes later years, monitor interim
Kern-VD-9	KRN CNYN 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	11.747	13.162	1.868	2.813	No Violation	12.416	14.23	11.118	2.573	2.047	Voltage Support Project fixes later years, monitor interim
Kern-VD-10	KRN OL J 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	16.556	17.976	No Violation	5.673	No Violation	17.27	19.056	15.898	No Violation	No Violation	Voltage Support Project fixes later years, monitor interim
Kern-VD-11	MC FRLND 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	17.613	19.163	No Violation	5.798	No Violation	18.427	20.374	16.924	No Violation	No Violation	Voltage Support Project fixes later years, monitor interim
Kern-VD-12	PANAMA 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	13.7	14.842	5.381	4.468	No Violation	14.231	15.645	12.657	5.529	5.454	Voltage Support Project fixes later years, monitor interim
Kern-VD-13	UNIONJCT 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	13.231	14.329	5.177	4.282	No Violation	13.736	15.091	12.148	5.317	5.248	Voltage Support Project fixes later years, monitor interim
Kern-VD-14	WELLFILD 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	12.794	14.267	2.437	3.16	No Violation	13.506	15.424	12.121	3.111	2.614	Voltage Support Project fixes later years, monitor interim
Kern-VD-15	WHLR RJ2 230 kV	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and	P2	Single Contingency	8.686	No Violation	No Violation	5.692	No Violation	9.057	No Violation	No Violation	No Violation	No Violation	Voltage Support Project fixes later years, monitor interim

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-V-1	7STNDRD 115 kV	Base Case	P0	Base Case	1.0408	1.048	1.0467	1.0513	1.0507	1.035	1.0469	1.0479	1.0445	1.0424	Tap changer if available/High voltage project
Kern-V-2	ATWELL_ISL 115 kV	Base Case	P0	Base Case	1.0326	1.0243	1.0418	1.0575	1.0269	1.0316	1.0236	1.0311	1.0404	1.039	Tap changer if available/High voltage project
Kern-V-3	CAWELO C 115 kV	Base Case	P0	Base Case	1.0474	1.0512	1.0476	1.0556	1.0438	1.022	1.0505	1.0509	1.0462	1.0426	Tap changer if available/High voltage project
Kern-V-4	CUYAMA 70 kV	Base Case	P0	Base Case	1.0307	1.0322	1.0385	1.059	1.0333	1.0306	1.0303	1.0447	1.0409	1.0325	Tap changer if available/High voltage project
Kern-V-5	DEXZEL 115 kV	Base Case	P0	Base Case	1.0431	1.0499	1.0498	1.0516	1.0459	1.0381	1.0489	1.0492	1.0482	1.0449	Tap changer if available/High voltage project
Kern-V-6	DISCOVER 115 kV	Base Case	P0	Base Case	1.0442	1.0504	1.0501	1.0514	1.0435	1.0402	1.0496	1.0498	1.0487	1.0457	Tap changer if available/High voltage project
Kern-V-7	DSCVRYTP 115 kV	Base Case	P0	Base Case	1.0432	1.0503	1.0499	1.0514	1.0461	1.0386	1.0494	1.0495	1.0483	1.0452	Tap changer if available/High voltage project
Kern-V-8	GANSO 115 kV	Base Case	P0	Base Case	1.0432	1.0424	1.0529	1.0422	1.0441	1.0423	1.0419	1.0417	1.0515	1.0506	Tap changer if available/High voltage project
Kern-V-9	GODN_BER 115 kV	Base Case	P0	Base Case	1.0435	1.0511	1.0504	1.0515	1.0473	1.0392	1.0501	1.0502	1.0488	1.0457	Tap changer if available/High voltage project
Kern-V-10	GOSE LKE 115 kV	Base Case	P0	Base Case	1.0339	1.0358	1.0426	1.0501	1.0371	1.0332	1.0352	1.046	1.0412	1.0399	Tap changer if available/High voltage project
Kern-V-11	KERN OIL 115 kV	Base Case	P0	Base Case	1.0428	1.0496	1.0496	1.0514	1.046	1.0377	1.0486	1.0489	1.0479	1.0447	Tap changer if available/High voltage project
Kern-V-12	KERN PWR 115 kV	Base Case	P0	Base Case	1.0472	1.0558	1.056	1.0523	1.0542	1.0446	1.0548	1.0544	1.0543	1.0521	Tap changer if available/High voltage project
Kern-V-13	KERNWATR 115 kV	Base Case	P0	Base Case	1.046	1.0549	1.055	1.052	1.0533	1.0432	1.0538	1.0536	1.0532	1.0509	Tap changer if available/High voltage project
Kern-V-14	KRN OL J 115 kV	Base Case	P0	Base Case	1.0431	1.0515	1.0511	1.051	1.0482	1.0392	1.0506	1.0506	1.0494	1.0467	Tap changer if available/High voltage project
Kern-V-15	KRN OLJ2 115 kV	Base Case	P0	Base Case	<1.05	<1.05	1.0516	<1.05	<1.05	<1.05	<1.05	<1.05	1.0499	1.0472	Tap changer if available/High voltage project
Kern-V-16	KRNFRNTT 115 kV	Base Case	P0	Base Case	1.0411	1.0482	1.0482	1.0501	1.0453	1.0363	1.0471	1.0474	1.0466	1.0432	Tap changer if available/High voltage project
Kern-V-17	LERDO 115 kV	Base Case	P0	Base Case	1.0405	1.0457	1.0439	1.0519	1.0443	1.023	1.0448	1.0454	1.0422	1.0389	Tap changer if available/High voltage project
Kern-V-18	LIVE OAK 115 kV	Base Case	P0	Base Case	1.0459	1.053	1.0531	1.0526	1.0491	1.0423	1.0521	1.0521	1.0516	1.0473	Tap changer if available/High voltage project

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-V-19	LRDO JCT 115 kV	Base Case	P0	Base Case	1.042	1.0483	1.0475	1.0517	1.0459	1.033	1.0473	1.0479	1.0457	1.0426	Tap changer if available/High voltage project
Kern-V-20	MIDWAY 115 kV	Base Case	P0	Base Case	1.0552	1.0578	1.0606	1.0502	1.0499	1.0543	1.0573	1.0554	1.0593	1.0586	Tap changer if available/High voltage project
Kern-V-21	OGLE JCT 115 kV	Base Case	P0	Base Case	1.0475	1.0513	1.0481	1.0557	1.0439	1.0221	1.0506	1.051	1.0467	1.0429	Tap changer if available/High voltage project
Kern-V-23	POSOMTJT 115 kV	Base Case	P0	Base Case	1.0427	1.0497	1.0496	1.0512	1.0463	1.0378	1.0486	1.0489	1.048	1.0446	Tap changer if available/High voltage project
Kern-V-24	PTRL JCT 115 kV	Base Case	P0	Base Case	1.0433	1.0504	1.0504	1.0515	1.047	1.0388	1.0494	1.0497	1.0488	1.0452	Tap changer if available/High voltage project
Kern-V-25	Q356 70 kV	Base Case	P0	Base Case	1.0388	1.04	1.0457	1.0622	1.0352	1.0387	1.0385	1.0522	1.0479	1.0397	Tap changer if available/High voltage project
Kern-V-27	Q482 115 kV	Base Case	P0	Base Case	1.0327	1.0243	1.0418	1.0575	1.0269	1.0316	1.0236	1.0311	1.0404	1.039	Tap changer if available/High voltage project
Kern-V-28	Q557 115 kV	Base Case	P0	Base Case	1.0334	1.0232	1.0416	1.0598	1.0248	1.0323	1.0226	1.0303	1.0403	1.0389	Tap changer if available/High voltage project
Kern-V-29	Q622BSS 115 kV	Base Case	P0	Base Case	1.0417	1.037	1.0322	1.0513	1.0256	1.0407	1.036	1.0366	1.0304	1.0278	Tap changer if available/High voltage project
Kern-V-31	RASMUSEN 115 kV	Base Case	P0	Base Case	1.0442	1.0504	1.0501	1.0514	1.0435	1.0402	1.0496	1.0498	1.0487	1.0457	Tap changer if available/High voltage project
Kern-V-32	RIOBRVTM 115 kV	Base Case	P0	Base Case	1.0508	1.0535	1.056	1.0478	1.0485	1.0498	1.053	1.0511	1.0542	1.0538	Tap changer if available/High voltage project
Kern-V-33	ROSEDAL 115 kV	Base Case	P0	Base Case	1.0477	1.0563	1.0564	1.053	1.0552	1.0451	1.0552	1.0549	1.0546	1.0525	Tap changer if available/High voltage project
Kern-V-34	S_KERN 70 kV	Base Case	P0	Base Case	1.04	1.0337	1.0274	1.067	1.042	1.0364	1.0322	1.0487	1.0296	1.0291	Tap changer if available/High voltage project
Kern-V-37	STOCKDLE 115 kV	Base Case	P0	Base Case	1.0417	1.0511	1.0507	1.05	1.0539	1.039	1.0498	1.0496	1.0485	1.0468	Tap changer if available/High voltage project
Kern-V-38	TAFT A 70 kV	Base Case	P0	Base Case	<1.05	1.0504	1.0546	1.0469	1.0388	1.0498	1.0498	1.0448	1.0504	1.0486	Tap changer if available/High voltage project
Kern-V-40	TEVIS 115 kV	Base Case	P0	Base Case	1.0406	1.0498	1.0492	1.0495	1.0539	1.0378	1.0486	1.0484	1.0468	1.0452	Tap changer if available/High voltage project
Kern-V-41	TEVIS2 115 kV	Base Case	P0	Base Case	1.0394	1.0498	1.0494	1.046	1.0539	1.0369	1.0485	1.0484	1.0471	1.0455	Tap changer if available/High voltage project
Kern-V-42	TEVISJ1 115 kV	Base Case	P0	Base Case	1.0423	1.0513	1.051	1.0502	1.0539	1.0396	1.0501	1.0499	1.0488	1.047	Tap changer if available/High voltage project

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-V-43	TEVISJ2 115 kV	Base Case	P0	Base Case	1.0411	1.0513	1.0511	1.0468	1.0539	1.0387	1.0501	1.0499	1.0489	1.0472	Tap changer if available/High voltage project
Kern-V-44	TX_ROSDL 115 kV	Base Case	P0	Base Case	1.0477	1.0564	1.0564	1.0531	1.0552	1.0451	1.0553	1.0549	1.0547	1.0525	Tap changer if available/High voltage project
Kern-V-45	WESTPARK 115 kV	Base Case	P0	Base Case	1.0438	1.0518	1.0518	1.0509	1.0529	1.0413	1.0506	1.0506	1.0499	1.0471	Tap changer if available/High voltage project
Kern-V-46	WHEELR_J 115 kV	Base Case	P0	Base Case	<1.05	1.051	1.0514	<1.05	1.0498	<1.05	1.0499	1.0499	1.0497	1.0471	Tap changer if available/High voltage project
Kern-V-47	WILDWOOD2 115 kV	Base Case	P0	Base Case	1.0353	1.0371	1.0438	1.0516	1.0371	1.0346	1.0366	1.0482	1.0424	1.0412	Tap changer if available/High voltage project
Kern-V-48	BAKRSFLD 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.889	0.869	0.9777	0.9921	1.0221	0.8794	0.8567	0.886	0.9798	0.979	Voltage Support Project fixes later years, monitor interim
Kern-V-49	BUENAVJ2 230 kV	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and	P2	Single Contingency	0.9029	> 0.9	> 0.9	0.9382	> 0.9	0.8982	> 0.9	> 0.9	> 0.9	> 0.9	Voltage Support Project fixes later years, monitor interim
Kern-V-50	BUENAVT2 230 kV	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and	P2	Single Contingency	0.9027	> 0.9	> 0.9	0.938	> 0.9	0.8979	> 0.9	> 0.9	> 0.9	> 0.9	Voltage Support Project fixes later years, monitor interim
Kern-V-51	CARNAT T 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8869	0.8694	0.9683	0.9892	1.0195	0.8778	0.8586	0.886	0.9702	0.9699	Voltage Support Project fixes later years, monitor interim
Kern-V-52	CARNAT T 70 kV	P2-2:A15:74:_KERN PW2 70kV Section 1D and	P2	Single Contingency	>0.9	> 0.9	> 0.9	>0.9	> 0.9	>0.9	> 0.9	> 0.9	> 0.9	> 0.9	Voltage Support Project fixes later years, monitor interim
Kern-V-53	CARNATIO 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8865	0.869	0.968	0.9888	1.0191	0.8773	0.8581	0.8856	0.9699	0.9696	Voltage Support Project fixes later years, monitor interim
Kern-V-54	CAWELO B 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8622	0.8432	> 0.9	0.9802	1.0151	0.8518	0.8306	0.8607	1.0485	1.0458	Voltage Support Project fixes later years, monitor interim
Kern-V-55	CAWLOB T 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8624	0.8434	1.0502	0.9804	1.0153	0.852	0.8308	0.861	1.0485	1.0459	Voltage Support Project fixes later years, monitor interim
Kern-V-56	EISEN 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8839	0.8639	0.9731	0.9876	1.0177	0.8743	0.8514	0.881	0.9752	0.9744	Voltage Support Project fixes later years, monitor interim
Kern-V-57	EISENTP 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8868	0.8668	0.9757	0.9901	1.0202	0.8772	0.8544	0.8838	0.9778	0.977	Voltage Support Project fixes later years, monitor interim
Kern-V-58	FAMOSO 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8377	0.818	> 0.9	0.972	1.0118	0.8263	0.8042	0.8362	> 0.9	> 0.9	Voltage Support Project fixes later years, monitor interim
Kern-V-59	FRUITTAP 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8877	0.8681	0.9765	0.9914	1.0217	0.8782	0.8559	0.8851	0.9785	0.9778	Voltage Support Project fixes later years, monitor interim
Kern-V-60	GRMMWY T 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8686	0.8467	0.9625	0.9833	1.0163	0.8586	0.8314	0.8644	0.9656	0.9636	Voltage Support Project fixes later years, monitor interim

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-V-61	GRMWY_SM 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8671	0.8452	0.9614	0.9819	1.015	0.8571	0.8297	0.8629	0.9645	0.9625	Voltage Support Project fixes later years, monitor interim
Kern-V-62	KERN PW2 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8835	0.8652	0.9725	0.989	1.0203	0.874	0.8536	0.8821	0.9742	0.974	Voltage Support Project fixes later years, monitor interim
Kern-V-63	KRN CNYN 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.9063	0.8831	0.9925	1.0025	1.0295	0.8968	0.8698	0.9	0.9959	0.9939	Voltage Support Project fixes later years, monitor interim
Kern-V-64	KRN OL J 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8683	0.8496	>0.9	0.9828	1.0166	0.8582	0.8372	0.8669	>0.9	>0.9	Voltage Support Project fixes later years, monitor interim
Kern-V-65	MAGNDN J 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8993	0.8769	0.9869	0.999	1.0271	0.8897	0.8635	0.8939	0.99	0.988	Voltage Support Project fixes later years, monitor interim
Kern-V-66	MAGUNDEN 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.897	0.8753	0.985	0.9974	1.026	0.8874	0.8622	0.8923	0.9876	0.9861	Voltage Support Project fixes later years, monitor interim
Kern-V-67	MC FRLND 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8147	0.7944	1.0418	0.9634	1.0069	0.8024	0.7797	0.8131	1.0401	1.038	Voltage Support Project fixes later years, monitor interim
Kern-V-68	MCFRLD T 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8353	0.8155	1.044	0.9711	1.0114	0.8238	0.8017	0.8338	1.0424	1.0403	Voltage Support Project fixes later years, monitor interim
Kern-V-69	PANAMA 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8927	0.8764	0.9639	0.9903	1.0194	0.884	0.8668	0.8926	0.9659	0.9656	Voltage Support Project fixes later years, monitor interim
Kern-V-70	PANMJCT2 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.888	0.8707	0.9674	0.9894	1.0195	0.8789	0.8601	0.8872	0.9693	0.969	Voltage Support Project fixes later years, monitor interim
Kern-V-71	RIOBRVQF 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.904	0.8811	0.9908	1.0016	1.0289	0.8945	0.8678	0.8981	0.994	0.9918	Voltage Support Project fixes later years, monitor interim
Kern-V-72	UNIONJCT 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8973	0.8813	0.9657	0.992	1.02	0.8889	0.8721	0.8973	0.9678	0.9674	Voltage Support Project fixes later years, monitor interim
Kern-V-73	WEEDPATCH_SF 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8778	0.8557	0.9699	0.9882	1.0198	0.8679	0.841	0.8732	0.973	0.971	Voltage Support Project fixes later years, monitor interim
Kern-V-74	WELLFILD 70 kV	P2-2:A15:73:_KERN PW2 70kV Section 1D and	P2	Single Contingency	0.8643	0.8424	0.9589	0.9816	1.0154	0.8543	0.827	0.8602	0.962	0.96	Voltage Support Project fixes later years, monitor interim
Kern-V-75	WHLR RT2 230 kV	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and	P2	Single Contingency	0.9045	>0.9	>0.9	0.9396	>0.9	0.8998	>0.9	>0.9	>0.9	>0.9	Voltage Support Project fixes later years, monitor interim
Kern-V-76	WND GPT2 230 kV	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and	P2	Single Contingency	0.9044	>0.9	>0.9	0.9395	>0.9	0.8997	>0.9	>0.9	>0.9	>0.9	Voltage Support Project fixes later years, monitor interim
Kern-V-77	KERNRDGE 115 kV	P1-2:A15:33:_Midway-Temblor 115kV Line and P1-4:A15:2:_TEMBLOR	P2	Single Contingency	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.8771	> 0.9	Sensitivity Under Review
Kern-V-78	TEMBLOR 115 kV	P1-2:A15:33:_Midway-Temblor 115kV Line and P1-4:A15:2:_TEMBLOR	P2	Single Contingency	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	0.8832	> 0.9	Sensitivity Under Review

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1														

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1												

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load		
1	30760 COBURN 230 36075 COBURN 60.0 2 1	P1-3:A19:8:_COBURN 230/60kV TB 1	P1		<100	<100	<100	<100	<100	135.91	<100	<100		Under review
2	36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P1		<100	<100	<100	151.1	<100	<100	<100	NConv		Generation mitigation
3	36354 SAN MIGL 70.0 36356 PSA RBL5 70.0 1 1	P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P1		<100	NConv	<100	<100	NConv	<100	<100	NConv		Under review
4	36254 SN LS OB 115 36266 SNTA MRA 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	227	<100	<100	223.5	<100	<100	NConv		Under review
5	36260 SISQUOC 115 36286 PALMR 115 1 1	P2-3:A20:39:_DIVVIDE - MA 115kV & DIVVIDE-PURSMJA1 #1 line	P2		<100	<100	112.25	<100	<100	<100	<100	<100		Divide and Mesa SPS or consider adding a second 230/115kV bank at Morro Bay and re-conductoring of the Midway-Temblor 115kV path.
6	36260 SISQUOC 115 36286 PALMR 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	138.8	<100	<100	144.7	<100	<100	NConv		Under review
7	36264 S.YNZ JT 115 36288 ZACA 115 1 1	P2-3:A20:39:_DIVVIDE - MA 115kV & DIVVIDE-PURSMJA1 #1 line	P2		<100	<100	101.96	<100	<100	<100	<100	<100		Divide and Mesa SPS or consider adding a second 230/115kV bank at Morro Bay and re-conductoring of the Midway-Temblor 115kV path.
8	36264 S.YNZ JT 115 36288 ZACA 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	137.8	<100	<100	142.9	<100	<100	NConv		Under review
9	36266 SNTA MRA 115 36269 FRWAYTP 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	129.6	<100	<100	126.6	<100	<100	NConv		Under review
10	36286 PALMR 115 36287 AECCEORPT 115 1 1	P2-3:A20:39:_DIVVIDE - MA 115kV & DIVVIDE-PURSMJA1 #1 line	P2		<100	<100	108.42	<100	<100	<100	<100	<100		Divide and Mesa SPS or consider adding a second 230/115kV bank at Morro Bay and re-conductoring of the Midway-Temblor 115kV path.
11	36286 PALMR 115 36287 AECCEORPT 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	135.7	<100	<100	140.8	<100	<100	NConv		Under review
12	36287 AECCEORPT 115 36288 ZACA 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	123.5	<100	<100	128.7	<100	<100	NConv		Divide and Mesa SPS or consider adding a second 230/115kV bank at Morro Bay and re-conductoring of the Midway-Temblor 115kV path.
13	36048 B.VSTA J 60.0 36050 FIRESTNE 60.0 1 1	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		124.52	114.39	114.91	<100	<100	<100	<100	<100		Under review
14	36050 FIRESTNE 60.0 36052 SPNCE J2 60.0 1 1	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		123.06	113.14	113.38	<100	<100	<100	<100	<100		Under review
15	36051 SPNCE J1 60.0 36053 SPENCE 60.0 1 1	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		184.04	171.23	171.16	<100	<100	<100	126.36	<100		Under review

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
16	36052 SPNCE J2 60.0 36053 SPENCE 60.0 1 1	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		130.83	120.28	120.54	<100	<100	<100	<100	<100			Under review
17	36354 SAN MIGL 70.0 36356 PSA RBL 70.0 1 1	P1-1:A20:8:_UNION OL 14kV Gen Unit 1 & P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P3		<100	<100	<100	<100	176.12	<100	<100	<100			Generation mitigation
18	30760 COBURN 230 36075 COBURN 60.0 2 1	P1-2:A19:54:_King City-Coburn #1 60 kV & P1-3:A19:8:_COBURN 230/60kV TB 1	P6		<100	<100	<100	104.76	<100	100.01	<100	103.95			Mitigation under review potential SPS
19	30900 GATES 230 30905 TEMPLETN 230 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100			Sensitivity case
20	30905 TEMPLETN 230 30915 MORROBAY 230 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100			Sensitivity case
21	30915 MORROBAY 230 30930 MESA PGE 230 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:35:_Templeton-Atascadero 70kV Line	P6		<100	<100	<100	<100	<100	<100	<100	<100			Sensitivity case
22	35907 PAUL SWT 115 36218 M 115 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100			Sensitivity case
23	35910 CRZY_HRS 115 35913 NTVD SW2 115 1 1	P1-2:A19:20:_Moss Landing-Salinas #1 115kV Line & P1-2:A19:21:_Moss Landing-Salinas #2 115kV Line	P6		<100	118.72	<100	<100	<100	<100	<100	<100			Mitigation under review potential SPS
24	35913 NTVD SW2 115 35920 SALINAS 115 1 1	P1-2:A19:20:_Moss Landing-Salinas #1 115kV Line & P1-2:A19:21:_Moss Landing-Salinas #2 115kV Line	P6		<100	104.33	<100	<100	<100	<100	<100	<100			Mitigation under review potential SPS
25	36008 GREN VLY 60.0 35901 GRN VLY1 115 1 1	P1-3:A19:15:_SALINAS 115/60kV TB 2 & P1-3:A19:16:_SALINAS 115/60kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	248.3	<100		Mitigation under review potential SPS
26	36011 CIC JCT 60.0 36013 ERTA JCT 60.0 1 1	P1-3:A19:15:_SALINAS 115/60kV TB 2 & P1-3:A19:16:_SALINAS 115/60kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	187.6	<100		Mitigation under review potential SPS
27	36012 WTSNVLE 60.0 36014 GRANT JT 60.0 1 1	P1-3:A19:15:_SALINAS 115/60kV TB 2 & P1-3:A19:16:_SALINAS 115/60kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	237.6	<100		Mitigation under review potential SPS
28	36018 BRIGTANO 60.0 36022 LGNSTAP 60.0 1 1	P1-3:A19:15:_SALINAS 115/60kV TB 2 & P1-3:A19:16:_SALINAS 115/60kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	234.6	<100		Mitigation under review potential SPS
29	36022 LGNSTAP 60.0 36025 SALINAS2 60.0 1 1	P1-3:A19:15:_SALINAS 115/60kV TB 2 & P1-3:A19:16:_SALINAS 115/60kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	236.2	<100		Mitigation under review potential SPS

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load		
30	36075 COBURN 60.0 36076 BA FOOD1 60.0 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		Sensitivity case
31	36076 BA FOOD1 60.0 36077 BA FOOD2 60.0 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		Sensitivity case
32	36252 MORRO BY 115 36303 GLDTRJC1 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:28d:_Cabrillo-Santa Ynez Sw. Sta. 115 kV	P6		<100	<100	<100	<100	<100	<100	<100	<100		Sensitivity case
33	36252 MORRO BY 115 36304 GLDTRJC2 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:28d:_Cabrillo-Santa Ynez Sw. Sta. 115 kV	P6		<100	<100	<100	<100	<100	<100	<100	<100		Sensitivity case
34	36253 FTHILTP1 115 36254 SN LS OB 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:28d:_Cabrillo-Santa Ynez Sw. Sta. 115 kV	P6		<100	<100	<100	<100	<100	<100	<100	<100		Sensitivity case
35	36254 SN LS OB 115 34796 CARRIZO 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-3:A20:3:_MORROBAY 230/115kV TB 6	P6		<100	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
36	36254 SN LS OB 115 36266 SNTA MRA 115 1 1	P1-2:A20:14:_DIABLOCN-MESA PGE #1 230kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	189.07	140.46		Mitigation under review potential SPS
37	36254 SN LS OB 115 36266 SNTA MRA 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:33:_Divide-Cabrillo #1 115kV Line	P6		<100	<100	<100	<100	<100	<100	<100	<100		Sensitivity case
38	36254 SN LS OB 115 36278 OCEANO 115 1 1	P1-2:A20:14:_DIABLOCN-MESA PGE #1 230kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	144.08	105.71		Mitigation under review potential SPS
39	36254 SN LS OB 115 36278 OCEANO 115 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
40	36256 MESA_PGE 115 30930 MESA PGE 230 2 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:35:_Templeton-Atascadero 70kV Line	P6		<100	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
41	36256 MESA_PGE 115 36268 DIVVIDE 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
42	36256 MESA_PGE 115 36280 UNION OL 115 1 1	P1-2:A20:12:_MORROBAY-DIABLOCN #1 230kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	148.39	123.36		Mitigation under review potential SPS

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load		
43	36256 MESA_PGE 115 36280 UNION OL 115 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-3:A20:9:_SN LS OB 115/70kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	<100		Sensitivity case
44	36260 SISQUOC 115 36286 PALMR 115 1 1	P1-2:A20:27:_MESA_PGE-DIVVIDE #1 115kV [0] & P1-2:A20:28:_MESA_PGE-DIVVIDE #2 115kV [0]	P6		211.58	193.19	<100	158.41	<100	<100	164.85	142.3		Mitigation under review potential SPS
45	36264 S.YNZ JT 115 36288 ZACA 115 1 1	P1-2:A20:27:_MESA_PGE-DIVVIDE #1 115kV [0] & P1-2:A20:28:_MESA_PGE-DIVVIDE #2 115kV [0]	P6		231.55	193.8	<100	158.56	165.54	<100	180.79	140.97		Mitigation under review potential SPS
46	36266 SNTA MRA 115 36269 FRWAYTP 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:33:_Divide-Cabrillo #1 115kV Line	P6		<100	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
47	36268 DIVVIDE 115 36300 PURSMAJ2 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
48	36269 FRWAYTP 115 36260 SISQUOC 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
49	36278 OCEANO 115 36280 UNION OL 115 1 1	P1-2:A20:12:_MORROBAY-DIABLOCN #1 230kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	149.22	123.18		Mitigation under review potential SPS
50	36278 OCEANO 115 36280 UNION OL 115 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-3:A20:9:_SN LS OB 115/70kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
51	36286 PALMR 115 36287 AECCEORPT 115 1 1	P1-2:A20:28:_MESA_PGE-DIVVIDE #2 115kV [0] & P1-2:A20:27:_MESA_PGE-DIVVIDE #1 115kV [0]	P6		<100	189.03	<100	<100	160.4	<100	<100	139.88		Mitigation under review potential SPS
52	36286 PALMR 115 36288 ZACA 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-3:A20:3:_MORROBAY 230/115kV TB 6	P6		<100	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
53	36286 PALMR 115 36288 ZACA 115 1 1	P1-2:A20:24:_MESA_PGE-DIVVIDE #1 115kV [0] & P1-2:A20:25:_MESA_PGE-DIVVIDE #2 115kV [0]	P6		207.38	<100	<100	<100	<100	<100	161.54	<100		Mitigation under review potential SPS
54	36287 AECCEORPT 115 36288 ZACA 115 1 1	P1-2:A20:27:_MESA_PGE-DIVVIDE #1 115kV [0] & P1-2:A20:28:_MESA_PGE-DIVVIDE #2 115kV [0]	P6		<100	173.35	<100	142.19	148.03	<100	<100	125.32		Mitigation under review potential SPS
55	36310 TEMPLT7 70.0 36316 TEMPL J2 70.0 1 1	P1-2:A20:11:_TEMPLETN-MORROBAY #1 230kV [0] & P1-2:A20:10:_GATES-TEMPLETN #1 230kV [5934]	P6		<100	<100	<100	132.98	<100	<100	<100	<100		Mitigation under review potential SPS

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load		
56	36310 TEMPL7 70.0 36316 TEMPL J2 70.0 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:26:_Callender Sw Sta Mesa 115kV Line	P6		<100	<100	<100	<100	<100	<100	<100	<100		Sensitivity case
57	36315 TEMPL J 70.0 36356 PSA RBL 70.0 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-3:A20:3:_MORROBAY 230/115kV TB 6	P6		<100	<100	<100	<100	<100	<100	<100	<100		Sensitivity case
58	36316 TEMPL J2 70.0 36358 ATASCDRO 70.0 1 1	P1-2:A20:11:_TEMPLETN-MORROBAY #1 230kV [0] & P1-2:A20:10:_GATES-TEMPLETN #1 230kV [5934]	P6		155.91	<100	<100	132.79	<100	<100	<100	<100		Mitigation under review potential SPS
59	36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P1-2:A20:18:_Temblor-San Luis Obispo 115 kV & P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P6		<100	<100	<100	<100	<100	<100	237.53	<100		Mitigation under review potential SPS
60	36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P1-2:A20:48:_Estrella-Paso Robles 70 kV & P1-3:A20:14:_Estrella 230/70 kV Transformer	P6		<100	<100	100.81	<100	<100	<100	<100	<100		Mitigation under review potential SPS
61	36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P1-3:A20:16:_Estrella 230/70 kV Transformer & P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P6		<100	252.13	<100	<100	<100	<100	<100	123.92		Mitigation under review potential SPS
62	36358 ATASCDRO 70.0 36362 CACOS J2 70.0 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:26:_Callender Sw Sta Mesa 115kV Line	P6		<100	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
63	36358 ATASCDRO 70.0 36376 SN LS OB 70.0 1 1	P1-2:A20:11:_TEMPLETN-MORROBAY #1 230kV [0] & P1-2:A20:10:_GATES-TEMPLETN #1 230kV [5934]	P6		183.03	<100	<100	159.63	<100	<100	<100	<100		Mitigation under review potential SPS
64	36362 CACOS J2 70.0 36364 CAYUCOS 70.0 1 1	P1-2:A20:11:_TEMPLETN-MORROBAY #1 230kV [0] & P1-2:A20:10:_GATES-TEMPLETN #1 230kV [5934]	P6		142.68	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
65	36364 CAYUCOS 70.0 36370 BAYWOOD 70.0 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		Sensitivity case
66	38031 LOMPCJ1 115 36294 CABRILLO 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		Sensitivity case
67	36316 TEMPL J2 70.0 36358 ATASCDRO 70.0 1 1	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		NConv	NConv	<100	NConv	<100	<100	<100	<100		Mitigation under review
68	36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		NConv	<100	<100	NConv	<100	<100	237.38	<100		Mitigation under review
69	36354 SAN MIGL 70.0 36356 PSA RBL 70.0 1 1	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		NConv	<100	<100	NConv	<100	<100	176.09	<100		Mitigation under review

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
70	36358 ATASCDRO 70.0 36362 CACOS J2 70.0 1 1	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		NConv	NConv	<100	NConv	<100	<100	<100	<100			Mitigation under review
71	36362 CACOS J2 70.0 36364 CAYUCOS 70.0 1 1	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		NConv	NConv	<100	NConv	<100	<100	<100	<100			Mitigation under review
72	36372 MUSTNG J 70.0 36376 SN LS OB 70.0 1 1	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		NConv	<100	<100	NConv	<100	<100	<100	<100			Mitigation under review
73	36378 DIVIDE 70.0 36380 VAFB SSA 70.0 1 1	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		<100	NConv	<100	<100	NConv	<100	<100	<100			Mitigation under review
74	36378 DIVIDE 70.0 36380 VAFB SSA 70.0 1 1	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7		<100	<100	<100	<100	<100	<100	<100	<100			Mitigation under review
75	36380 VAFB SSA 70.0 36384 VAFB A-1	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		<100	NConv	<100	<100	NConv	<100	<100	<100			Mitigation under review
76	36380 VAFB SSA 70.0 36384 VAFB A-1	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7		<100	<100	<100	<100	<100	<100	<100	<100			Sensitivity case
77	38031 LOMPCJ1 115 36294 CABRILLO 115 1 1	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7		<100	<100	<100	<100	<100	<100	<100	<100			Sensitivity case

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
1	AGRILINK 60 kV	P1-3:A19:14:_GRN VLY1 115/60kV TB 1	P1		13.0			11.6				10.9			Under review
2	BRIGTANO 60 kV	P1-3:A19:14:_GRN VLY1 115/60kV TB 1	P1		8.7			7.8				7.2			Under review
3	CICJCT 60 kV	P1-3:A19:14:_GRN VLY1 115/60kV TB 1	P1		13.1			11.8				11.0			Under review
4	PSA RBLS 70 kV	P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P1		Voltage Collapse			Voltage Collapse				Voltage Collapse			Under review
5	SAN MIGL 70 kV	P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P1		Voltage Collapse			Voltage Collapse				Voltage Collapse			Under review
6	WTSNVILLE 60 kV	P1-3:A19:14:_GRN VLY1 115/60kV TB 1	P1		12.8			11.5				10.8			Under review
7	ERTA 60 kV	P2-3:A19:5:_GRN VLY1 - 1D 115kV & GRN VLY1-ROB ROY #1 line	P2		14.1			12.7				11.9			Action Plan. Watsonville 115 kV Voltage Conversion Project
8	FAIRWAY 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	10.6		Voltage Collapse	10.4		Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
9	GAREY 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	9.6		Voltage Collapse	9.5		Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
10	LOMPCJ&1 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	11.7		Voltage Collapse	11.7		Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
11	MANVILLE 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	11.8		Voltage Collapse	11.7		Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
12	PALMR 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	10.0		Voltage Collapse	9.9		Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
13	PURISIMA 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	11.7		Voltage Collapse	11.7		Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
14	S.M.ASSO 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2				10.1					10.0			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
15	SISQUOC 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	9.6		Voltage Collapse	9.5		Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
16	SNTA YNZ 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	10.8		Voltage Collapse	10.8		Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
17	SNTAMRTP 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	10.5		Voltage Collapse	10.4		Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
18	SURF 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	11.4		Voltage Collapse	11.3		Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
19	VAFB A-N 70 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	11.9		Voltage Collapse	11.9		Voltage Collapse			Under review
20	WTSNVILLE 60 kV	P2-3:A19:5:_GRN VLY1 - 1D 115kV & GRN VLY1-ROB ROY #1 line	P2		13.3			11.9			11.1				Action Plan. Watsonville 115 kV Voltage Conversion Project
21	ZACA 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	10.4		Voltage Collapse	10.3		Voltage Collapse			Under review
22	AGRILINK 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1		13.0			11.7			10.9				Action Plan. Watsonville 115 kV Voltage Conversion Project
23	BNA VSTA 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		12.6	11.6	11.6	6.5	6.1	5.6	8.2				Action Plan. Install shunt capacitor
24	CIC JCT 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1		13.2			11.8			11.0				Under review
25	ERTA 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1		13.7			12.3			11.5				Action Plan. Watsonville 115 kV Voltage Conversion Project
26	FIRESTNE 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		10.0	9.1	9.1	5.1			6.4				Action Plan. Install shunt capacitor
27	FRSHXPRS 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		12.8	11.7	11.7	6.6	6.2	5.7	8.3				Action Plan. Install shunt capacitor
28	WTSNVILLE 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1		12.9			11.5			10.8				Action Plan. Watsonville 115 kV Voltage Conversion Project
29	ZACA 115 kV	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:33:_Divide-Cabrillo #1 115kV Line	P6												Sensitivity case

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load				
30	ZACA 115 kV	P1-2:A20:25:_MESA_PGE-DIVVIDE #2 115kV [0] & P1-2:A20:24:_MESA_PGE-DIVVIDE #1 115kV [0]	P6		20.3	9.8		9.3	10.0			14.8				Under review
31	PSA RBLS 70 kV	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		Voltage Collapse			Voltage Collapse				Voltage Collapse				Under review
32	PURISIMA 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
33	PURISIMA 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							28.2				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
34	S.M.ASSO 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
35	S.M.ASSO 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							27.7				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
36	S.YNZ JT 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
37	S.YNZ JT 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							28.6				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
38	SAN MIGL 70 kV	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		Voltage Collapse			Voltage Collapse				Voltage Collapse				Under review
39	SISQUOC 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
40	SISQUOC 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							27.5				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
41	SNTAMRTP 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
42	SNTAMRTP 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							27.5			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
43	SURF 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
44	SURF 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							28.7			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
45	UNION OL 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
46	UNION OL 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							23.6			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
47	VAFB A-N 70 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse						Under review
48	VAFB A-N 70 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							26.2			Under review
49	ZACA 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
50	ZACA 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							28.4			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load				
1	SISQUOC 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse				Voltage Collapse			Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conducting of the Midway-Temblor 115kV path.
2	SNTA MRA 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse				Voltage Collapse			Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conducting of the Midway-Temblor 115kV path.
3	SURF 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	0.90			Voltage Collapse	0.89		Voltage Collapse			Action Plan/Divide SPS. Midway-Andrew 230 kV Project
4	VAFB A-N 70 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse				Voltage Collapse			Voltage Collapse			Under review
5	WTSNVLE 60 kV	P2-3:A19:5:_GRN VLY1 - 1D 115kV & GRN VLY1-ROB ROY #1 line	P2													Action Plan. Watsonville 115 kV Voltage Conversion Project
6	ZACA 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse							Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conducting of the Midway-Temblor 115kV path.
7	AGRILINK 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1													
8	BNA VSTA 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		0.87	0.88	0.88									Under review
9	ERTA 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1													Mitigation under investigation
10	FIRESTNE 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		0.89		0.90									Action Plan. Watsonville UVLS/Watsonville 115 kV Voltage Conversion Project
11	FREXP JT 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		0.87	0.88	0.88									Load transfer
12	FRSHXPRS 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		0.87	0.88	0.88									Action Plan. Watsonville UVLS/Watsonville 115 kV Voltage Conversion Project
13	ZACA 115 kV	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:33:_Divide-Cabrillo #1 115kV Line	P6													
14	ZACA 115 kV	P1-2:A20:25:_MESA_PGE-DIVVIDE #2 115kV [0] & P1-2:A20:24:_MESA_PGE-DIVVIDE #1 115kV [0]	P6		0.80					0.90		0.86				Add a second 230/115kV bank at Morro Bay and to re-conducting of the Midway-Temblor 115kV path.
15	M 115 kV	P1-2:A19:9:_Green Valley-Paul Sweet 115kV Line & P1-4:A19:2:_M	P6			1.11	1.11			1.10	1.11					Add reactive deice
16	PAUL SWT 115 kV	P1-2:A19:9:_Green Valley-Paul Sweet 115kV Line & P1-4:A19:2:_M	P6			1.11	1.11			1.10	1.11					Add reactive deice

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load				
17	BUELLTON 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse			Voltage Collapse	Voltage Collapse						Action Plan/Divide SPS. Midway-Andrew 230 kV Project
18	BUELLTON 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							0.73				Action Plan/Divide SPS. Midway-Andrew 230 kV Project
19	CABRILLO 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse			Voltage Collapse	Voltage Collapse						Action Plan/Divide SPS. Midway-Andrew 230 kV Project
20	CABRILLO 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							0.73				Action Plan/Divide SPS. Midway-Andrew 230 kV Project
21	DIABLOCN 230 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		Voltage Collapse	Voltage Collapse			Voltage Collapse	Voltage Collapse		0.83				Explore potential mitigation
22	DIVIDE 70 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse			Voltage Collapse	Voltage Collapse						Action Plan/Divide SPS. Midway-Andrew 230 kV Project
23	DIVIDE 70 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse	Voltage Collapse						0.76				Action Plan/Divide SPS. Midway-Andrew 230 kV Project
24	DIVVIDE 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse			Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
25	DIVVIDE 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							0.75				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
26	FAIRWAY 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse			Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
27	FAIRWAY 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse			0.76				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
28	FOOTHILL 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7				0.70		0.67	0.68						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
29	FOOTHILL 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7			0.70										Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
30	FRWAYTP 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse			Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load				
31	FRWAYTP 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							0.76				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
32	GAREY 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
33	GAREY 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							0.75				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
34	GOLDTREE 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7				0.71		0.67	0.68						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
35	GOLDTREE 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7			0.71										Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
36	LOMPCJ&1 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7				Voltage Collapse		Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
37	LOMPCJ&1 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							0.74				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
38	MANVILLE 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		Voltage Collapse	Voltage Collapse		Voltage Collapse	Voltage Collapse							Action Plan/Divide SPS. Midway-Andrew 230 kV Project
39	MANVILLE 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							0.74				Action Plan/Divide SPS. Midway-Andrew 230 kV Project
40	MESA PGE 230 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse							Expand Scope of Mesa Undervoltage SPS
41	MESA PGE 230 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							0.71				Expand Scope of Mesa Undervoltage SPS
42	MESA_PGE 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
43	MESA_PGE 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse							0.76				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %								Potential Mitigation Solutions		
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Winter Peak	2021 Winter Peak	2026 Winter Peak	2018 Spring Off-Peak	2021 Summer Light Load			
44	MORRO BY 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		0.83	0.83		0.79	0.80						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
45	OCEANO 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse						Action Plan. Estrella 230 kV Project/ Cayucos Project
46	OCEANO 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse						0.81				Action Plan. Estrella 230 kV Project/ Cayucos Project
47	PALMR 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
48	PALMR 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse						0.75				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
49	PSA RBLS 70 kV	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		Voltage Collapse			Voltage Collapse			0.15				Action Plan. Estrella 230 kV Project/ Cayucos Project
50	PURISIMA 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse		Voltage Collapse	Voltage Collapse						Action Plan/Divide SPS. Midway-Andrew 230 kV Project
51	PURISIMA 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse						0.74				Action Plan/Divide SPS. Midway-Andrew 230 kV Project

ID	Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions	
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	Select..	Select..	Select..	Select..	Select..		
1	Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5					89								Under review with PTO .
2	Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5		100											Under review with PTO .
3	Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5						90							Under review with PTO .
4	Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5			113										Under review with PTO .
5	Salinas 115kV BAAH Bus #2 (failure of non-redundent relay)	P5				39									Under review with PTO .
6	Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		90											Under review with PTO .
7	Mesa-Divide #1 and #2 115 kV Lines	P7		30											Under review with PTO .
8	Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7					12								Under review with PTO .
9	Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7				2									Under review with PTO .
10	Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7			97										Under review with PTO .
11	Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7						2							Under review with PTO .
12	Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		94											Under review with PTO .
13	Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		14											Under review with PTO .
14	Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			101										Under review with PTO .

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1														

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1												

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
1	30760 COBURN 230 36075 COBURN 60.0 2 1	P1-3:A19:8:_COBURN 230/60kV TB 1	P1		<100	<100	<100	<100	<100	<100	<100	<100		Under review
2	36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P1		<100	<100	<100	<100	<100	<100	NConv	<100		Under review
3	36354 SAN MIGL 70.0 36356 PSA RBL 70.0 1 1	P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P1		<100	NConv	<100	<100	<100	<100	<100	NConv		Under review
4	36254 SN LS OB 115 36266 SNTA MRA 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	227	<100	<100	NConv	NConv	<100	<100		Under review
5	36260 SISQUOC 115 36286 PALMR 115 1 1	P2-3:A20:39:_DIVVIDE - MA 115kV & DIVVIDE-PURSM AJ1 #1 line	P2		<100	<100	112	<100	<100	<100	118	112		adding a second 230/115kV bank at Morro Bay and re-conductoring of the Midway-Temblor 115kV path.
6	36260 SISQUOC 115 36286 PALMR 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	139	<100	<100	NConv	NConv	<100	<100		Under review
7	36264 S.YNZ JT 115 36288 ZACA 115 1 1	P2-3:A20:39:_DIVVIDE - MA 115kV & DIVVIDE-PURSM AJ1 #1 line	P2		<100	<100	102	<100	<100	<100	107	102		adding a second 230/115kV bank at Morro Bay and re-conductoring of the Midway-Temblor 115kV path.
8	36264 S.YNZ JT 115 36288 ZACA 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	138	<100	<100	NConv	NConv	<100	<100		Under review
9	36266 SNTA MRA 115 36269 FRWAYTP 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	130	<100	<100	NConv	NConv	<100	<100		Under review
10	36286 PALMR 115 36287 AECCEOR TP 115 1 1	P2-3:A20:39:_DIVVIDE - MA 115kV & DIVVIDE-PURSM AJ1 #1 line	P2		<100	<100	108	<100	<100	<100	114	109		adding a second 230/115kV bank at Morro Bay and re-conductoring of the Midway-Temblor 115kV path.
11	36286 PALMR 115 36287 AECCEOR TP 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	136	<100	<100	NConv	NConv	<100	<100		Under review
12	36287 AECCEOR TP 115 36288 ZACA 115 1 1	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2		<100	124	<100	<100	NConv	NConv	<100	<100		Under review
13	36048 B.VSTA J 60.0 36050 FIRESTNE 60.0 1 1	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		125	114	115	129	124	114	132	115		Under review
14	36050 FIRESTNE 60.0 36052 SPNCE J2 60.0 1 1	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		123	113	113	128	123	113	130	114		Under review
15	36051 SPNCE J1 60.0 36053 SPENCE 60.0 1 1	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		184	171	171	190	182	171	191	172		Under review
16	36052 SPNCE J2 60.0 36053 SPENCE 60.0 1 1	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		131	120	121	136	131	120	138	121		Under review

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
17	36354 SAN MIGL 70.0 36356 PSA RBL5 70.0 1 1	P1-1:A20:8:_UNION OL 14kV Gen Unit 1 & P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P3		<100	<100	<100	<100	<100	<100	<100	<100		
18	30760 COBURN 230 36075 COBURN 60.0 2 1	P1-2:A19:54:_King City-Coburn #1 60 kV & P1-3:A19:8:_COBURN 230/60kV TB 1	P6		<100	<100	<100	<100	<100	<100	<100	<100		
19	30900 GATES 230 30905 TEMPLETN 230 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
20	30905 TEMPLETN 230 30915 MORROBAY 230 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
21	30915 MORROBAY 230 30930 MESA PGE 230 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:35:_Templeton-Atascadero 70kV Line	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
22	35907 PAUL SWT 115 36218 M 115 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
23	35910 CRZY_HRS 115 35913 NTVD SW2 115 1 1	P1-2:A19:20:_Moss Landing-Salinas #1 115kV Line & P1-2:A19:21:_Moss Landing-Salinas #2 115kV Line	P6		<100	119	<100	<100	125	119	<100	<100		Mitigation under review potential SPS
24	35913 NTVD SW2 115 35920 SALINAS 115 1 1	P1-2:A19:20:_Moss Landing-Salinas #1 115kV Line & P1-2:A19:21:_Moss Landing-Salinas #2 115kV Line	P6		<100	104	<100	<100	110	104	<100	<100		Mitigation under review potential SPS
25	36008 GREN VLY 60.0 35901 GRN VLY1 115 1 1	P1-3:A19:15:_SALINAS 115/60kV TB 2 & P1-3:A19:16:_SALINAS 115/60kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	<100		
26	36011 CIC JCT 60.0 36013 ERTA JCT 60.0 1 1	P1-3:A19:15:_SALINAS 115/60kV TB 2 & P1-3:A19:16:_SALINAS 115/60kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	<100		
27	36012 WTSNVLE 60.0 36014 GRANT JT 60.0 1 1	P1-3:A19:15:_SALINAS 115/60kV TB 2 & P1-3:A19:16:_SALINAS 115/60kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	<100		
28	36018 BRIGTANO 60.0 36022 LGNSTAP 60.0 1 1	P1-3:A19:15:_SALINAS 115/60kV TB 2 & P1-3:A19:16:_SALINAS 115/60kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	<100		
29	36022 LGNSTAP 60.0 36025 SALINAS2 60.0 1 1	P1-3:A19:15:_SALINAS 115/60kV TB 2 & P1-3:A19:16:_SALINAS 115/60kV TB 3	P6		<100	<100	<100	<100	<100	<100	<100	<100		

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
30	36075 COBURN 60.0 36076 BA FOOD1 60.0 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
31	36076 BA FOOD1 60.0 36077 BA FOOD2 60.0 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
32	36252 MORRO BY 115 36303 GLDTRJC1 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:28d:_Cabrillo-Santa Ynez Sw. Sta. 115 kV	P6		<100	<100	<100	107	<100	<100	<100	<100		Mitigation under review potential SPS
33	36252 MORRO BY 115 36304 GLDTRJC2 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:28d:_Cabrillo-Santa Ynez Sw. Sta. 115 kV	P6		<100	<100	<100	105	<100	<100	<100	<100		Mitigation under review potential SPS
34	36253 FTHILTP1 115 36254 SN LS OB 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:28d:_Cabrillo-Santa Ynez Sw. Sta. 115 kV	P6		<100	<100	<100	100	<100	<100	<100	<100		Mitigation under review potential SPS
35	36254 SN LS OB 115 34796 CARRIZO 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-3:A20:3:_MORROBAY 230/115kV TB 6	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
36	36254 SN LS OB 115 36266 SNTA MRA 115 1 1	P1-2:A20:14:_DIABLOCN-MESA PGE #1 230kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		
37	36254 SN LS OB 115 36266 SNTA MRA 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:33:_Divide-Cabrillo #1 115kV Line	P6		<100	<100	<100	386	<100	<100	<100	<100		Mitigation under review potential SPS
38	36254 SN LS OB 115 36278 OCEANO 115 1 1	P1-2:A20:14:_DIABLOCN-MESA PGE #1 230kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		
39	36254 SN LS OB 115 36278 OCEANO 115 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
40	36256 MESA_PGE 115 30930 MESA PGE 230 2 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:35:_Templeton-Atascadero 70kV Line	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
41	36256 MESA_PGE 115 36268 DIVVIDE 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0]	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
42	36256 MESA_PGE 115 36280 UNION OL 115 1 1	P1-2:A20:12:_MORROBAY-DIABLOCN #1 230kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
43	36256 MESA_PGE 115 36280 UNION OL 115 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-3:A20:9:_SN LS OB 115/70kV TB 3	P6		<100	<100	<100	127	<100	<100	<100	<100		Mitigation under review potential SPS
44	36260 SISQUOC 115 36286 PALMR 115 1 1	P1-2:A20:27:_MESA_PGE-DIVVIDE #1 115kV [0] & P1-2:A20:28:_MESA_PGE-DIVVIDE #2 115kV [0]	P6		212	193	<100	<100	202	193	<100	<100		Mitigation under review potential SPS
45	36264 S.YNZ JT 115 36288 ZACA 115 1 1	P1-2:A20:27:_MESA_PGE-DIVVIDE #1 115kV [0] & P1-2:A20:28:_MESA_PGE-DIVVIDE #2 115kV [0]	P6		232	194	<100	<100	203	193	<100	<100		Mitigation under review potential SPS
46	36266 SNTA MRA 115 36269 FRWAYTP 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:33:_Divide-Cabrillo #1 115kV Line	P6		<100	<100	<100	201	<100	<100	<100	<100		Mitigation under review potential SPS
47	36268 DIVVIDE 115 36300 PURSMAJ2 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0]	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
48	36269 FRWAYTP 115 36260 SISQUOC 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0]	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
49	36278 OCEANO 115 36280 UNION OL 115 1 1	P1-2:A20:12:_MORROBAY-DIABLOCN #1 230kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	<100	<100	<100	<100	<100		
50	36278 OCEANO 115 36280 UNION OL 115 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-3:A20:9:_SN LS OB 115/70kV TB 3	P6		<100	<100	<100	125	<100	<100	<100	<100		Mitigation under review potential SPS
51	36286 PALMR 115 36287 AECCEORTP 115 1 1	P1-2:A20:28:_MESA_PGE-DIVVIDE #2 115kV [0] & P1-2:A20:27:_MESA_PGE-DIVVIDE #1 115kV [0]	P6		<100	189	<100	<100	197	189	<100	<100		Mitigation under review potential SPS
52	36286 PALMR 115 36288 ZACA 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-3:A20:3:_MORROBAY 230/115kV TB 6	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
53	36286 PALMR 115 36288 ZACA 115 1 1	P1-2:A20:24:_MESA_PGE-DIVVIDE #1 115kV [0] & P1-2:A20:25:_MESA_PGE-DIVVIDE #2 115kV [0]	P6		207	<100	<100	<100	<100	<100	<100	<100		Mitigation under review potential SPS
54	36287 AECCEORTP 115 36288 ZACA 115 1 1	P1-2:A20:27:_MESA_PGE-DIVVIDE #1 115kV [0] & P1-2:A20:28:_MESA_PGE-DIVVIDE #2 115kV [0]	P6		<100	173	<100	<100	182	173	<100	<100		Mitigation under review potential SPS
55	36310 TEMPLT7 70.0 36316 TEMPL J2 70.0 1 1	P1-2:A20:11:_TEMPLETN-MORROBAY #1 230kV [0] & P1-2:A20:10:_GATES-TEMPLETN #1 230kV [5934]	P6		<100	<100	<100	<100	<100	<100	<100	<100		

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations		
56	36310 TEMPL7 70.0 36316 TEMPL J2 70.0 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:26:_Callender Sw Sta Mesa 115kV Line	P6		<100	<100	<100	188	<100	<100	<100	<100		Mitigation under review potential SPS
57	36315 TEMPL J 70.0 36356 PSA RBL5 70.0 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-3:A20:3:_MORROBAY 230/115kV TB 6	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
58	36316 TEMPL J2 70.0 36358 ATASCDRO 70.0 1 1	P1-2:A20:11:_TEMPLETN-MORROBAY #1 230kV [0] & P1-2:A20:10:_GATES-TEMPLETN #1 230kV [5934]	P6		156	<100	<100	154	<100	<100	<100	<100		Mitigation under review potential SPS
59	36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P1-2:A20:18:_Temblor-San Luis Obispo 115 kV & P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P6		<100	<100	<100	<100	<100	<100	<100	<100		
60	36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P1-2:A20:48:_Estrella-Paso Robles 70 kV & P1-3:A20:14:_Estrella 230/70 kV Transformer	P6		<100	<100	101	<100	<100	<100	109	101		Mitigation under review potential SPS
61	36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P1-3:A20:16:_Estrella 230/70 kV Transformer & P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P6		<100	252	<100	<100	<100	252	<100	<100		Mitigation under review potential SPS
62	36358 ATASCDRO 70.0 36362 CACOS J2 70.0 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:26:_Callender Sw Sta Mesa 115kV Line	P6		<100	<100	<100	194	<100	<100	<100	<100		Mitigation under review potential SPS
63	36358 ATASCDRO 70.0 36376 SN LS OB 70.0 1 1	P1-2:A20:11:_TEMPLETN-MORROBAY #1 230kV [0] & P1-2:A20:10:_GATES-TEMPLETN #1 230kV [5934]	P6		183	<100	<100	184	<100	<100	<100	<100		Mitigation under review potential SPS
64	36362 CACOS J2 70.0 36364 CAYUCOS 70.0 1 1	P1-2:A20:11:_TEMPLETN-MORROBAY #1 230kV [0] & P1-2:A20:10:_GATES-TEMPLETN #1 230kV [5934]	P6		143	<100	<100	142	<100	<100	<100	<100		Mitigation under review potential SPS
65	36364 CAYUCOS 70.0 36370 BAYWOOD 70.0 1 1	P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0] & P1-2:A20:13:_MORROBAY-MESA PGE #1 230kV [0]	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
66	38031 LOMPCJ1 115 36294 CABRILLO 115 1 1	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:19:_SN LS OB-SNTA MRA #1 115kV [0]	P6		<100	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review potential SPS
67	36316 TEMPL J2 70.0 36358 ATASCDRO 70.0 1 1	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		NConv	NConv	<100	NConv	NConv	NConv	<100	<100		Mitigation under review
68	36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		NConv	<100	<100	NConv	<100	<100	<100	<100		Mitigation under review

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
69	36354 SAN MIGL 70.0 36356 PSA RBL 70.0 1 1	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		NConv	<100	<100	NConv	<100	<100	<100	<100			Mitigation under review
70	36358 ATASCDRO 70.0 36362 CACOS J2 70.0 1 1	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		NConv	NConv	<100	NConv	NConv	NConv	<100	<100			Mitigation under review
71	36362 CACOS J2 70.0 36364 CAYUCOS 70.0 1 1	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		NConv	NConv	<100	NConv	NConv	NConv	<100	<100			Mitigation under review
72	36372 MUSTNG J 70.0 36376 SN LSOB 70.0 1 1	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		NConv	<100	<100	NConv	<100	<100	<100	<100			Mitigation under review
73	36378 DIVIDE 70.0 36380 VAFB SSA 70.0 1 1	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		<100	NConv	<100	<100	NConv	NConv	<100	<100			Mitigation under review
74	36378 DIVIDE 70.0 36380 VAFB SSA 70.0 1 1	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7		<100	<100	<100	NConv	<100	<100	<100	<100			Mitigation under review
75	36380 VAFB SSA 70.0 36384 VAFB A-1	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		<100	NConv	<100	<100	NConv	NConv	<100	<100			Mitigation under review
76	36380 VAFB SSA 70.0 36384 VAFB A-1	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7		<100	<100	<100	NConv	<100	<100	<100	<100			Mitigation under review
77	38031 LOMPCJ1 115 36294 CABRILLO 115 1 1	P7-1:A20:6:_Mesa-Divide #1 and #2 115 kV Lines	P7		<100	<100	<100	NConv	<100	<100	<100	<100			Mitigation under review

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations				
1	AGRILINK 60 kV	P1-3:A19:14:_GRN VLY1 115/60kV TB 1	P1		13.0			13.7								Under review
2	BRIGTANO 60 kV	P1-3:A19:14:_GRN VLY1 115/60kV TB 1	P1		8.7			9.2								Under review
3	CIC JCT 60 kV	P1-3:A19:14:_GRN VLY1 115/60kV TB 1	P1		13.1			13.8								Under review
4	PSA RBL5 70 kV	P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P1		Voltage Collapse			Voltage Collapse								Under review
5	SAN MIGL 70 kV	P1-2:A20:34:_Templeton-Paso Robles 70kV Line	P1		Voltage Collapse			Voltage Collapse								Under review
6	WTSNVLL 60 kV	P1-3:A19:14:_GRN VLY1 115/60kV TB 1	P1		12.8			13.5								Under review
7	ERTA 60 kV	P2-3:A19:5:_GRN VLY1 - 1D 115kV & GRN VLY1-ROB ROY #1 line	P2		14.1			14.9								Action Plan. Watsonville 115 kV Voltage Conversion Project
8	FAIRWAY 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	10.6		Voltage Collapse	Voltage Collapse	11.6	10.7				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
9	GAREY 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	9.6		Voltage Collapse	Voltage Collapse	10.6	9.7				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
10	LOMPCJ&1 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	11.7		Voltage Collapse	Voltage Collapse	12.8	11.9				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
11	MANVILLE 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	11.8		Voltage Collapse	Voltage Collapse	12.8	11.9				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
12	PALMR 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	10.0		Voltage Collapse	Voltage Collapse	11.0	10.1				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
13	PURISIMA 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	11.7		Voltage Collapse	Voltage Collapse	12.8	11.8				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
14	S.M.ASSO 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2				10.1				11.0	10.2			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
15	SISQUOC 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	9.6		Voltage Collapse	Voltage Collapse	10.6	9.7			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
16	SNTA YNZ 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	10.8		Voltage Collapse	Voltage Collapse	11.9	10.9			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
17	SNTAMRTP 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	10.5		Voltage Collapse	Voltage Collapse	11.6	10.7			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
18	SURF 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	11.4		Voltage Collapse	Voltage Collapse	12.5	11.5			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
19	VAFB A-N 70 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	11.9		Voltage Collapse	Voltage Collapse	13.0	12.0			Under review
20	WTSNVILLE 60 kV	P2-3:A19:5:_GRN VLY1 - 1D 115kV & GRN VLY1-ROB ROY #1 line	P2		13.3			14.0							Action Plan. Watsonville 115 kV Voltage Conversion Project
21	ZACA 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	10.4		Voltage Collapse	Voltage Collapse	11.4	10.5			Under review
22	AGRILINK 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1		13.0			13.7							Action Plan. Watsonville 115 kV Voltage Conversion Project
23	BNA VSTA 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		12.6	11.6	11.6	13.1	12.6	11.6	13.2	11.6			Action Plan. Install shunt capacitor
24	CIC JCT 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1		13.2			13.9							Under review
25	ERTA 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1		13.7			14.5							Action Plan. Watsonville 115 kV Voltage Conversion Project
26	FIRESTNE 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		10.0	9.1	9.1	10.3	9.9	9.1	10.4	9.2			Action Plan. Install shunt capacitor
27	FRSHXPRS 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		12.8	11.7	11.7	13.2	12.7	11.7	13.3	11.8			Action Plan. Install shunt capacitor
28	WTSNVILLE 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1		12.9			13.6							Action Plan. Watsonville 115 kV Voltage Conversion Project

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations				
29	ZACA 115 kV	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:33:_Divide-Cabrillo #1 115kV Line	P6					Voltage Collapse								Under review
30	ZACA 115 kV	P1-2:A20:25:_MESA_PGE-DIVVIDE #2 115kV [0] & P1-2:A20:24:_MESA_PGE-DIVVIDE #1 115kV [0]	P6		20.3	9.8			10.2	9.7						Under review
31	PSA RBLS 70 kV	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		Voltage Collapse			Voltage Collapse								Under review
32	PURISIMA 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse			Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
33	PURISIMA 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse			Voltage Collapse								Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
34	S.M.ASSO 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse			Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
35	S.M.ASSO 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse			Voltage Collapse								Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
36	S.YNZ JT 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse			Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
37	S.YNZ JT 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse			Voltage Collapse								Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
38	SAN MIGL 70 kV	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		Voltage Collapse			Voltage Collapse								Under review

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations				
39	SISQUOC 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
40	SISQUOC 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse			Voltage Collapse								Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
41	SNTAMRTP 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
42	SNTAMRTP 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse			Voltage Collapse								Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
43	SURF 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse					Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
44	SURF 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse			Voltage Collapse	Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
45	UNION OL 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
46	UNION OL 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse			Voltage Collapse								Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
47	VAFB A-N 70 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse					Voltage Collapse					Under review
48	VAFB A-N 70 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse			Voltage Collapse	Voltage Collapse							Under review
49	ZACA 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions		
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations					
50	ZACA 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse								Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
1	SISQUOC 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse				Voltage Collapse	Voltage Collapse				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
2	SNTA MRA 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse				Voltage Collapse	Voltage Collapse				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
3	SURF 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse	0.90			Voltage Collapse	Voltage Collapse	0.88	0.90		Action Plan/Divide SPS. Midway-Andrew 230 kV Project
4	VAFB A-N 70 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse				Voltage Collapse	Voltage Collapse				Under review
5	WTSNVILLE 60 kV	P2-3:A19:5:_GRN VLY1 - 1D 115kV & GRN VLY1-ROB ROY #1 line	P2					0.90							Action Plan. Watsonville 115 kV Voltage Conversion Project
6	ZACA 115 kV	P2-4:A20:5:_MESA 115 kV CB 102 - Section 2D & 1D	P2			Voltage Collapse				Voltage Collapse	Voltage Collapse	Voltage Collapse			Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
7	AGRILINK 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1					0.90							Action Plan. Watsonville 115 kV Voltage Conversion Project
8	BNA VSTA 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		0.87	0.88	0.88	0.86	0.87	0.88	0.86	0.88			Under review
9	ERTA 60 kV	P2-1:A19:28:_GREN VLY-ERTA JCT 60kV [0] No Fault	P2-1					0.90							Mitigation under investigation
10	FIRESTNE 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		0.89		0.90	0.89	0.90		0.88	0.90			Action Plan. Watsonville UVLS/Watsonville 115 kV Voltage Conversion Project
11	FREXP JT 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		0.87	0.88	0.88	0.86	0.87	0.88	0.86	0.88			Under review
12	FRSHXPRS 60 kV	P2-1:A19:33:_SALINAS1-FREXP JT 60kV [0] No Fault	P2-1		0.87	0.88	0.88	0.86	0.87	0.88	0.86	0.88			Action Plan. Watsonville UVLS/Watsonville 115 kV Voltage Conversion Project
13	ZACA 115 kV	P1-2:A20:22:_Mesa-Santa Maria 115kV Line & P1-2:A20:33:_Divide-Cabrillo #1 115kV Line	P6					0.15							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
14	ZACA 115 kV	P1-2:A20:25:_MESA_PGE-DIVVIDE #2 115kV [0] & P1-2:A20:24:_MESA_PGE-DIVVIDE #1 115kV [0]	P6		0.80				0.90						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
15	M 115 kV	P1-2:A19:9:_Green Valley-Paul Sweet 115kV Line & P1-4:A19:2:_M	P6			1.1121	1.1096			1.1129	1.112	1.0934	1.1074		Add reactive deice
16	PAUL SWT 115 kV	P1-2:A19:9:_Green Valley-Paul Sweet 115kV Line & P1-4:A19:2:_M	P6			1.1117	1.1093			1.1126	1.1117	1.0931	1.107		Add reactive deice

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations				
17	BUELLTON 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Action Plan/Divide SPS. Midway-Andrew 230 kV Project
18	BUELLTON 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse							Action Plan/Divide SPS. Midway-Andrew 230 kV Project
19	CABRILLO 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Action Plan/Divide SPS. Midway-Andrew 230 kV Project
20	CABRILLO 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse							Action Plan/Divide SPS. Midway-Andrew 230 kV Project
21	DIABLOCN 230 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		Voltage Collapse	Voltage Collapse			Voltage Collapse	Voltage Collapse	Voltage Collapse					Explore potential mitigation
22	DIVIDE 70 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Action Plan/Divide SPS. Midway-Andrew 230 kV Project
23	DIVIDE 70 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse	Voltage Collapse			Voltage Collapse							Action Plan/Divide SPS. Midway-Andrew 230 kV Project
24	DIVVIDE 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
25	DIVVIDE 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
26	FAIRWAY 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
27	FAIRWAY 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
28	FOOTHILL 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			0.70				Voltage Collapse	0.71					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
29	FOOTHILL 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		0.70				0.69							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
30	FRWAYTP 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
31	FRWAYTP 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations				
32	GAREY 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
33	GAREY 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
34	GOLDTREE 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			0.71				0.72	0.72					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
35	GOLDTREE 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		0.71				0.70							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
36	LOMPCJ&1 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse					Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
37	LOMPCJ&1 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse	Voltage Collapse						Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
38	MANVILLE 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		Voltage Collapse	Voltage Collapse					Voltage Collapse					Action Plan/Divide SPS. Midway-Andrew 230 kV Project
39	MANVILLE 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse	Voltage Collapse						Action Plan/Divide SPS. Midway-Andrew 230 kV Project
40	MESA PGE 230 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Expand Scope of Mesa Undervoltage SPS
41	MESA PGE 230 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse							Expand Scope of Mesa Undervoltage SPS
42	MESA_PGE 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
43	MESA_PGE 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse		Voltage Collapse					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
44	MORRO BY 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7		0.83	0.83			0.82	0.84	0.83					Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
45	OCEANO 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse					Action Plan. Estrella 230 kV Project/ Cayucos Project
46	OCEANO 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse				Voltage Collapse							Action Plan. Estrella 230 kV Project/ Cayucos Project

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %									Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
47	PALMR 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse				Voltage Collapse	Voltage Collapse				Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
48	PALMR 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse			Voltage Collapse							Add a second 230/115kV bank at Morro Bay and to re-conductoring of the Midway-Temblor 115kV path.
49	PSA RBLS 70 kV	P7-1:A20:2:_Templeton-Atascadero & Templeton-Paso Robles 70 kV Lines	P7		Voltage Collapse			Voltage Collapse							Action Plan. Estrella 230 kV Project/ Cayucos Project
50	PURISIMA 115 kV	P7-1:A20:16:_Morro Bay-Mesa and Morro Bay-Diablo 230 kV Lines	P7			Voltage Collapse			Voltage Collapse	Voltage Collapse					Action Plan/Divide SPS. Midway-Andrew 230 kV Project
51	PURISIMA 115 kV	P7-1:A20:17:_Morro Bay-Mesa and Diablo-Mesa 230 kV Lines	P7		Voltage Collapse			Voltage Collapse							Action Plan/Divide SPS. Midway-Andrew 230 kV Project

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1														

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1												

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Off-Peak with Maximum PV Output	2021 SP Heavy Renewable & Min Gas Gen	Select..		
Bulk-T-1	Line 24804 DEVERS 230 kV to 24942 SBLR 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					123.28		128.37			Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Bulk-T-2	Line 24132 SANBRDNO 230 kV to 24942 SBLR 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					123.28		128.37			Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Bulk-T-3	Line 24944 Vista2LR 230 kV to 24901 VSTA 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					118.24		123.28			Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Bulk-T-4	Line 24804 DEVERS 230 kV to 24944 Vista2LR 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					118.24		123.28			Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Bulk-T-5	Line 24941 EICascoLR 230 kV to 25666 EL CASCO 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					103.05		107.14			Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Bulk-T-6	Line 24804 DEVERS 230 kV to 24941 EICascoLR 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					103.05		107.14			Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Bulk-T-7	Transformer Devers 500/230 kV ck 1T	Line ALBERHIL 500.0 to VALLEYSC 500.0 Circuit 1 AND Tran DEVERS 500.00 to DEVERS 230.00 Circuit 2DEVERS2T 13.80	P6	L-1, T-1								117.87		Congestion Management, Expansion of Colorado River Corridor SPS
Bulk-T-8	Transformer Devers 500/230 kV ck 2T	Line ALBERHIL 500.0 to VALLEYSC 500.0 Circuit 1 AND Tran DEVERS 500.00 to DEVERS 230.00 Circuit 1DEVERS 1T 13.80	P6	L-1, T-1								116.22		Congestion Management, Expansion of Colorado River Corridor SPS
Bulk-T-9	Line 24086 LUGO 500 kV to 26105 VICTORVILLE 500 kV	Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 AND Line MOHAVE 500.0 to ELDORDO 500.0 Circuit 1	P6	L-1-1					100.34			103.64		Preferred Resources, Increase line rating
Bulk-T-10	Line 30060 MIDWAY 500 kV to 29402 WIRLWIND 500 kV	Line MIDWAY 500 to VINCENT 500 Circuit 1 AND Line MIDWAY 500 to VINCENT 500 Circuit 2	P7	L-2					149.57	147.85	108.45			Path 26 SPS
Bulk-T-11	Line 24132 SANBRDNO 230 kV to 24942 SBLR 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2					145.69		151.02			West of Devers SPS, Congestion Management and Curtailment

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Off-Peak with Maximum PV Output	2021 SP Heavy Renewable & Min Gas Gen	Select..		
Bulk-T-12	Line 24804 DEVERS 230 kV to 24942 SBLR 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2					145.69		151.02			West of Devers SPS, Congestion Management and Curtailment
Bulk-T-13	Line 24804 DEVERS 230 kV to 24944 Vista2LR 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2					140.45		145.70			West of Devers SPS, Congestion Management and Curtailment
Bulk-T-14	Line 24944 Vista2LR 230 kV to 24901 VSTA 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2					140.45		145.70			West of Devers SPS, Congestion Management and Curtailment
Bulk-T-15	Line 24804 DEVERS 230 kV to 24941 EICascoLR 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2					121.01		125.28			West of Devers SPS, Congestion Management and Curtailment
Bulk-T-16	Line 24941 EICascoLR 230 kV to 25666 EL CASCO 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2					121.01		125.28			West of Devers SPS, Congestion Management and Curtailment
Bulk-T-17	Line 25666 EL CASCO 230 kV to 24132 SANBRDNO 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2							102.16			West of Devers SPS, Congestion Management and Curtailment

Study Area: **SCE Bulk**

Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %								Potential Mitigation Solutions
					Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-VD-1													
X-VD-2													
X-VD-3													
X-VD-4													
X-VD-5													
X-VD-6													
X-VD-7													
X-VD-8													
X-VD-9													
X-VD-10													
X-VD-11													
X-VD-12													
X-VD-13													
X-VD-14													
X-VD-15													
X-VD-16													
X-VD-17													
X-VD-18													
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X-VD-21													
X-VD-22													
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X-VD-25													
X-VD-26													
X-VD-27													
X-VD-28													
X-VD-29													
X-VD-30													
X-VD-31													
X-VD-32													
X-VD-33													
X-VD-34													
X-VD-35													

Study Area: **SCE Bulk**

High/Low Voltage



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)								Potential Mitigation Solutions
					Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-V-1													
X-V-2													
X-V-3													
X-V-4													
X-V-5													
X-V-6													
X-V-7													
X-V-8													
X-V-9													
X-V-10													
X-V-11													
X-V-12													
X-V-13													
X-V-14													
X-V-15													
X-V-16													
X-V-17													
X-V-18													
X-V-19													

Study Area: **SCE Bulk**

Transient Stability



ID	Contingency	Category	Category Description	Transient Stability Performance							Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-TS-1											
X-TS-2											
X-TS-3											
X-TS-4											
X-TS-5											
X-TS-6											
X-TS-7											
X-TS-8											
X-TS-9											
X-TS-10											
X-TS-11											
X-TS-12											
X-TS-13											
X-TS-14											
X-TS-15											
X-TS-16											
X-TS-17											
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X-TS-24											
X-TS-25											
X-TS-26											
X-TS-27											
X-TS-28											
X-TS-29											
X-TS-30											
X-TS-31											

Study Area: **SCE Bulk**



Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)								Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1												

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1										

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Off-Peak	2018 Summer Peak	2021 Summer Light Load	2021 Summer Peak	2026 Summer Peak	2021 SP with High Load	2018 SP with No BTM PV	2026 SP with No BTM PV	2021 SP Heavy Renewable & Min Gas Gen	2021 Summer Peak with Low Hydro		
BC&T-T-1	RECTOR-BIG CRK3 230kV 1 or 2	RECTOR-BIG CRK3 230kV 1 or 2	P1	N-1	<100		<100									Congestion Management
BC&T-T-2	MAGUNDEN-VESTAL 230kV 1 or 2	MAGUNDEN-VESTAL 230kV 1 or 2 (with RAS)	P1	N-1		<100		<100	<100	<100	<100	<100	<100	101.00		Operating Procedure
BC&T-T-3	MAGUNDEN-PASTORIA 230kV 1 or 2 or 3	N-2 MAGUNDEN-PASTORIA 230kV 1 or 2 or 3 (with RAS)	P7	N-2	<100		<100									BC RAS- Edmonston pump trip
BC&T-T-4	PASTORIA-WARNETAP 230kV 1	MAGUNDEN-ANTELOPE 230kV 1 or 2 and BAILEY-PASTORIA 230kV 1 (with RAS)	P6	N-1-1	<100		<100									Pastoria RAS- PEF generation trip
BC&T-T-5	PASTORIA-WARNETAP 230kV 2	MAGUNDEN-ANTELOPE 230kV 1 or 2 and PARDEE-BAILEY 230kV 2 (with RAS)	P6	N-1-1	<100		<100									
BC&T-T-6	MAGUNDEN-VESTAL 230kV 1 or 2	MAGUNDEN-VESTAL 230 kV 2 or 1 and BIG CRK3-RECTOR 230 kV 1 or 2 (with RAS)	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	<100	(a) ACCC line upgrade (b) PGE - SCE connection substation (c) Operating Procedure (d) PGE - SCE connection line
BC&T-T-7	MAGUNDEN-VESTAL 230kV 1 or 2	MAGUNDEN-VESTAL 230 kV 2 or 1 and MAGUNDEN-SPRINGVL 230 kV 1 or 2 (with RAS)	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	116.44	
BC&T-T-8	MAGUNDEN-VESTAL 230kV 1 or 2	MAGUNDEN-SPRINGVL 230 kV 1 or 2 and MAGUNDEN-VESTAL 230 kV 2 or 1 (with RAS)	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	116.44	
BC&T-T-9	MAGUNDEN-VESTAL 230kV 1 or 2	MAGUNDEN-VESTAL 230 kV 2 or 1 and SPRINGVL-RECTOR 230 kV 1 (with RAS)	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	111.40	
BC&T-T-10	MAGUNDEN-VESTAL 230kV 1 or 2	MAGUNDEN-VESTAL 230 kV 2 and PASTORIA-PSTRIA 230 kV 1 (with RAS)	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	<100	
BC&T-T-11	MAGUNDEN-VESTAL 230kV 1 or 2	MAGUNDEN-VESTAL 230 kV 2 or 1 and BIG CRK1-RECTOR 230 kV 1 (with RAS)	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	<100	
BC&T-T-12	MAGUNDEN-VESTAL 230kV 1 or 2	MAGUNDEN-VESTAL 230 kV 2 or 1 and BIG CRK3-RECTOR 230 kV 1 or 2 (with RAS)	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	<100	
BC&T-T-13	MAGUNDEN-VESTAL 230kV 1 or 2	SPRINGVL-RECTOR 230 kV 1 and MAGUNDEN-VESTAL 230 kV 2 or 1 (with RAS)	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	111.40	
BC&T-T-14	MAGUNDEN-VESTAL 230kV 1 or 2	N-2 MAGUNDEN-SPRINGVL 230 kV 1 and 2 (with RAS)	P7	N-2		<100		<100	<100	<100	<100	<100	<100	<100	103.35	
BC&T-T-15	MAGUNDEN-SPRINGVL 230 kV 1 or 2	N-2 MAGUNDEN-VESTAL 230kV 1 and 2 (with RAS)	P7	N-2		<100		<100	<100	<100	<100	<100	<100	<100	103.36	

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Off-Peak	2018 Summer Peak	2021 Summer Light Load	2021 Summer Peak	2026 Summer Peak	2021 SP with High Load	2018 SP with No BTM PV	2026 SP with No BTM PV	2021 SP Heavy Renewable & Min Gas Gen	2021 Summer Peak with Low Hydro		
BC&T-T-16	MAGUNDEN-VESTAL 230kV 1 or 2	MAGUNDEN-VESTAL 230 kV 2 or 1 and Gen WELLGEN 13.8 Unit ID 1 (with RAS)	P3	N-1/G-1		<100		<100	<100	<100	<100	<100	<100	<100	102.47	
BC&T-T-17	RECTOR-VESTAL 230 kV 1 or 2	RECTOR-VESTAL 230 kV 2 or 1 and Gen B CRK2-1 13.8 Unit ID 1 or 2	P3	N-1/G-1		<100		<100	<100	<100	<100	<100	<100	<100	101.40	
BC&T-T-18	RECTOR-VESTAL 230 kV 1 or 2	RECTOR-VESTAL 230 kV 2 or 1 and SPRINGVL-RECTOR 230 kV 1	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	100.60	
BC&T-T-19	RECTOR-VESTAL 230 kV 1 or 2	MAGUNDEN-SPRINGVL 230 kV 2 and RECTOR-VESTAL 230 kV 1 or 2	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	120.80	
BC&T-T-20	RECTOR-VESTAL 230 kV 1 or 2	RECTOR-VESTAL 230 kV 2 or 1 and MAGUNDEN-SPRINGVL 230 kV 1	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	124.30	
BC&T-T-21	RECTOR-VESTAL 230 kV 1 or 2	MAGUNDEN-SPRINGVL 230 kV 1 and RECTOR-VESTAL 230 kV 1 or 2	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	124.30	
BC&T-T-22	MAGUNDEN-SPRINGVL 230 kV 2	RECTOR-VESTAL 230 kV 2 or 1 and MAGUNDEN-SPRINGVL 230 kV 1	P6	N-1-1		<100		<100	<100	<100	<100	<100	<100	<100	108.80	
BC&T-T-21																
BC&T-T-22																
BC&T-T-23																
BC&T-T-24																
BC&T-T-25																
BC&T-T-26																
BC&T-T-27																
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BC&T-T-29																
BC&T-T-30																
BC&T-T-31																
BC&T-T-32																
BC&T-T-33																
BC&T-T-34																
BC&T-T-35																

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Off-Peak	2018 Summer Peak	2021 Summer Light Load	2021 Summer Peak	2026 Summer Peak	2021 SP with High Load	2018 SP with No BTM PV	2026 SP with No BTM PV	2021 SP Heavy Renewable & Min Gas Gen	2021 Summer Peak with Low Hydro	
BC&T-VD-1	BAILEY 230kV	PARDEE-BAILEY 230kV and BAILEY-PASTORIA 230kV	P6	N-1-1		14%		13%	15.80%	8.90%	9.90%	9.60%	7%	12.60%	Antelope/Bailey OP 46
X-VD-2															
X-VD-3															
X-VD-4															
X-VD-5															
X-VD-6															
X-VD-7															
X-VD-8															
X-VD-9															
X-VD-10															
X-VD-11															
X-VD-12															
X-VD-13															
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X-VD-29															
X-VD-30															
X-VD-31															
X-VD-32															
X-VD-33															
X-VD-34															
X-VD-35															

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Off-Peak	2018 Summer Peak	2021 Summer Light Load	2021 Summer Peak	2026 Summer Peak	2021 SP with High Load	2018 SP with No BTM PV	2026 SP with No BTM PV	2021 SP Heavy Renewable & Min Gas Gen	2021 Summer Peak with Low Hydro	
BC&T-V-1	BAILEY 230kV	PARDEE-BAILEY 230kV and BAILEY-PASTORIA 230kV	P6	N-1-1	0.9	0.79	0.84	0.78	0.745	0.84	0.84	0.82	0.84	0.78	Antelope/Bailey OP 46
BC&T-V-2															
X-V-3															
X-V-4															
X-V-5															
X-V-6															
X-V-7															
X-V-8															
X-V-9															
X-V-10															
X-V-11															
X-V-12															
X-V-13															
X-V-14															
X-V-15															
X-V-16															
X-V-17															
X-V-18															
X-V-19															



ID	Contingency	Category	Category Description	Transient Stability Performance										Potential Mitigation Solutions
				2018 Summer Off-Peak	2018 Summer Peak	2021 Summer Light Load	2021 Summer Peak	2026 Summer Peak	2021 SP with High Load	2018 SP with No BTM PV	2026 SP with No BTM PV	2021 SP Heavy Renewable & Min Gas Gen	2021 Summer Peak with Low Hydro	
BC&T-TS-1	Big Creek 1-Big Creek 2 230 kV line	P5	N-1	local area instability	local area instability	local area instability	local area instability	local area instability	local area instability	local area instability	local area instability	local area instability	local area instability	Protection Project- OD of 12/31/2017
BC&T-TS-2	Big Creek 3 (Bus) NRBD	P5	N>2	local area instability		local area instability								Congestion Management
X-TS-3														
X-TS-4														
X-TS-5														
X-TS-6														
X-TS-7														
X-TS-8														
X-TS-9														
X-TS-10														
X-TS-11														
X-TS-12														
X-TS-13														
X-TS-14														
X-TS-15														
X-TS-16														
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X-TS-26														
X-TS-27														
X-TS-28														
X-TS-29														
X-TS-30														
X-TS-31														

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1														

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1												

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)							Potential Mitigation Solutions	
					2018 Summer Peak	2018 Summer Off-Peak	2021 Summer Peak	2021 Summer Light Load	2026 Summer Peak	N/A	N/A		N/A
NOL-T-1	Inyo 115kV Phase Shifter	Control-Inyokern 115kV line	P1	N-1	<100	100.00	<100	109.00	<100				Congestion management
NOL-T-1	Lugo 500/230kV Transformer No. 1	Lugo 500/230kV Transformer No. 2	P1	T-1	<100	111.00	<100	116.00	<100				Utilize High Desert Power Plant (HDPP) RAS to curtail generation
NOL-T-2	Lugo 500/230kV Transformer No. 2	Lugo 500/230kV Transformer No. 1	P1	T-1	<100	111.00	<100	116.00	<100				
NOL-T-3	Lugo-Victor No. 1, 2, 3, or 4 230kV line	Any two of Lugo-Victor No. 1, 2, 3, or 4 230kV lines	P6/P7	N-1-1/N-2	<100	111.00	<100	119.00	<100				
NOL-T-4	Kramer 230/115kV Transformers No.1 or 2	Kramer-Victor No. 1 and 2 230kV lines	P7	N-2	101.00	Divergent	102.00	109.00	100.00				Utilize existing Mohave Desert RAS to curtail generation
NOL-T-5	Kramer-Roadway 115kV line	Kramer-Victor No. 1 and 2 230kV lines	P7	N-2	131.00	163.00	132.00	159.00	129.00				Utilize existing Mohave RAS to curtail generation
NOL-T-6	Kramer-Victor 115kV line	Kramer-Victor No. 1 and 2 230kV lines	P7	N-2	129.00	162.00	130.00	158.00	127.00				
NOL-T-7	Roadway-Victor 115kV line	Kramer-Victor No. 1 and 2 230kV lines	P7	N-2	105.00	136.00	105.00	135.00	103.00				
NOL-T-8	Inyo 115kV Phase Shifter	Kramer-Victor No. 1 and 2 230kV lines	P7	N-2	<100	151.00	<100	168.00	<100				
NOL-T-9	Control-Inyo 115kV line	Kramer-Victor No. 1 and 2 230kV lines	P7	N-2	<100	113.00	<100	130.00	<100				
NOL-T-10	Case divergence	Lugo No. 1 and No. 2 500/230kV transformer banks	P6	T-1-1	Divergent	Divergent	Divergent	Divergent	Divergent				Utilize existing HDPP and Mohave Desert RAS
NOL-T-11	Inyo 115kV Phase Shifter	Lugo No. 1 and No. 2 500/230kV transformer banks	P6	T-1-1	<100	117.00	<100	131.00	<100				
NOL-T-12	Case divergence	Kramer-Cool Water 115kV and Kramer-Tortilla 115kV lines	P6	N-1-1	Divergent	Convergent	Divergent	Convergent	Divergent				Utilize SCE's Operating Procedure 127, separating Kramer 115kV system from the Cool Water 115kV system.
NOL-T-13	Case divergence	Inyokern-Kramer No. 1 115kV and Inyokern-Tap 701 115kV lines	P6	N-1-1	Divergent	Divergent	Divergent	Divergent	Divergent				New operating procedure to curtail generation as part of system adjustment between contingencies
NOL-T-14	Case divergence	Inyokern-Kramer No. 1 115kV and Kramer-Inyokern-Randsburg No. 3 115kV lines	P6	N-1-1	Divergent	Divergent	Divergent	Divergent	Divergent				
NOL-T-15	Case divergence under off-peak or light load conditions	Control-Coso-Inyokern115kV and Control-Inyokern 115kV lines	P6	N-1-1	<100	Divergent	<100	Divergent	<100				Utilize existing Bishop RAS to curtail generation in the Bishop area
NOL-T-16	Case divergence	Kramer 115kV North or South Bus Section Bus Fault Delayed Fault Clearing - this removes 9 line segments and two Kramer 230/115kV banks	P5.5	Delayed bus fault clearing	Divergent	Divergent	Divergent	Divergent	Divergent				This is to be investigated further with SCE Planning and System Protection to validate the delayed clearing time, as well as potential impacted line and transformer trippings. Investigate installation of back-up relays.



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)							Potential Mitigation Solutions	
					2018 Summer Peak	2018 Summer Off-Peak	2021 Summer Peak	2021 Summer Light Load	2026 Summer Peak	N/A	N/A		N/A
NOL-T-17	Case divergence	Lugo 230kV East or West Bus Delayed Fault Clearing - this removes five lines and two 500/230kV transformers	P5.5	Delayed bus fault clearing	Divergent	Divergent	Divergent	Divergent	Divergent				This is to be investigated further with SCE Planning and System Protection to validate the delayed clearing time, as well as potential impacted line and transformer trippings. Investigate installation of back-up relays.



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %							Potential Mitigation Solutions	
					2018 Summer Peak	2018 Summer Off-Peak	2021 Summer Peak	2021 Summer Light Load	2026 Summer Peak	Select..	Select..		Select..
NOL-VD-1	Various buses between Control and Silver Peak 55kV	35-CYCLE 1-Phase Fault at Control 115 kV Bus, Bus Differential Relay Failure : Control 115 kV North East Bus	P5.5	Delayed clearing fault, Multiple contingency	<10%	10.2 - 13.9		11.4 - 19.1	Divergent				This is to be investigated further with SCE Planning and System Protection to validate the delayed clearing time, as well as potential impacted line and transformer trippings. Investigate installation of backup relays.
NOL-VD-2	Various buses between Control and Silver Peak 55kV	35-CYCLE 1-Phase Fault at Control 115 kV Bus, Bus Differential Relay Failure : Control 115 kV North West Bus	P5.5	Multiple contingency	Cool Water 115kV: 10.8	5.6 - 13.9		11.4 - 19.1	Divergent				
NOL-VD-3	Various buses between Control and Silver Peak 55kV	35-CYCLE 1-Phase Fault at Control 115 kV Bus, Bus Differential Relay Failure : Control 115 kV Southeast or Southwest Bus	P5.5	Multiple contingency				11.4 - 19.1	Divergent				
NOL-VD-4	Case divergent	SLG fault with delayed 30-cycle delayed clearing at Kramer 115kV North (or South) bus with bus differential relay failure	P5.5	Multiple contingency	Divergent	Divergent	Divergent	Divergent	Divergent				
NOL-VD-5	Case divergent	Kramer-Randsburg-Inyokern 115kV, followed by Kramer-Inyokern 115kV line, without RAS	P6.1.1	N-1-1		Divergent		Divergent					New operating procedure to curtail generation as part of system adjustment between contingencies
NOL-VD-6	Case divergent	Lugo 500/230kV transformer No. 1, followed by N-1 of transformer No. 2 (or vice versa)	P6.2.2	T-1-1	Divergent	Divergent	Divergent	Divergent	Divergent				Safety Net using High Desert Power Plant (HDPP) RAS and Mohave Desert RAS to curtail generation
NOL-VD-7	Case divergent	Cool Water - Kramer 115kV, followed by Kramer - Tortilla 115kV line	P6.1.1	N-1-1	Divergent		Divergent	Seven buses > 10.0	Divergent				Utilize SCE's Operating Procedure 127, separating Kramer 115kV system from the Cool Water 115kV system between contingencies

Study Area: **SCE North of Lugo**

High/Low Voltage



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)								Potential Mitigation Solutions
					Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-V-1													
X-V-2													
X-V-3													
X-V-4													
X-V-5													
X-V-6													
X-V-7													
X-V-8													
X-V-9													
X-V-10													
X-V-11													
X-V-12													
X-V-13													
X-V-14													
X-V-15													
X-V-16													
X-V-17													
X-V-18													
X-V-19													

ID	Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions	
				2018 Summer Peak	2018 Summer Off-Peak	2021 Summer Peak	2021 Summer Light Load	2026 Summer Peak	Select..		
NOL-TS-1	Control-Casa Diablo 115 kV (Fault 20% from Control)	P4.2	Stuck Breaker	Undamping voltage oscillations at and north of Randsburg 115kV bus.	Undamping voltage oscillations at and north of Randsburg 115kV bus.	Undamping voltage oscillations at and north of Randsburg 115kV bus.	Undamping voltage oscillations at and north of Randsburg 115kV bus.	Undamping voltage oscillations at and north of Randsburg 115kV bus.			Work with SCE Planning and Protection Engineering to consider local breaker failure backup (LBFB) protection scheme.
NOL-TS-2	Kramer-Cool Water 115 kV (Fault 20% from Kramer)	P4.2	Stuck Breaker	No voltage recovery to 80% for two buses near persistent fault (Coolwater and Tortilla 115kV)	No voltage recovery to 80% for two buses near persistent fault (Coolwater and Tortilla 115kV)	No voltage recovery to 80% for two buses near persistent fault (Coolwater and Tortilla 115kV)	No voltage recovery to 80% for two buses near persistent fault (Coolwater and Tortilla 115kV)	No voltage recovery to 80% for two buses near persistent fault (Coolwater and Tortilla 115kV)			
NOL-TS-3	Cool Water-SEGS-Tortilla 115 kV (Fault 20% from Tortilla)	P4.2	Stuck Breaker	Undamping voltage oscillations north of Lugo area	Undamping voltage oscillations north of Lugo area	Undamping voltage oscillations north of Lugo area	Undamping voltage oscillations north of Lugo area	Undamping voltage oscillations north of Lugo area			
NOL-TS-4	Cool Water-SEGS-Tortilla 115 kV (Fault 20% from Cool Water)	P4.2	Stuck Breaker	Undamping voltage oscillations north of Lugo area	Undamping voltage oscillations north of Lugo area	Undamping voltage oscillations north of Lugo area	Undamping voltage oscillations north of Lugo area	Undamping voltage oscillations north of Lugo area			
NOL-TS-5	Kramer-Inyokern-Randsburg No. 1 115 kV (Fault 20% from Kramer)	P4.2	Stuck Breaker	No Voltage Recovery to acceptable limit for some buses (i.e., Downs 115kV 37% voltage dip)	No Voltage Recovery to acceptable limit for some buses in the Inyokern area	No Voltage Recovery to acceptable limit for some buses in the Inyokern area	No Voltage Recovery to acceptable limit for some buses in the Inyokern area	No Voltage Recovery to acceptable limit for some buses in the Inyokern area			
NOL-TS-6	Kramer-Tortilla 115 kV (Fault 20% from Kramer)	P4.2	Stuck Breaker	No Voltage Recovery to acceptable limit for some buses locally	No Voltage Recovery to acceptable limit for some buses locally	No Voltage Recovery to acceptable limit for some buses locally	No Voltage Recovery to acceptable limit for some buses locally	No Voltage Recovery to acceptable limit for some buses locally			
NOL-TS-7	Lugo 230 kV E Bus	P5.5	Delayed Fault Clearing	Unstable north of Lugo area	Unstable north of Lugo area	Unstable north of Lugo area	Unstable north of Lugo area	Unstable north of Lugo area			Work with SCE Planning and Protection Engineering to consider back-up relay protection.
NOL-TS-8	Lugo 230 kV W Bus	P5.5	Delayed Fault Clearing	Unstable north of Lugo area	Unstable north of Lugo area	Unstable north of Lugo area	Unstable north of Lugo area	Unstable north of Lugo area			
NOL-TS-9	Kramer-Inyokern-Randsburg No. 1 & 3 115 kV_noRAS	P6.1.1	Normal Clearing	Angular oscillations (negative damping) north of Kramer area	Angular oscillations (negative damping) north of Kramer area	Angular oscillations (negative damping) north of Kramer area	Angular oscillations (negative damping) north of Kramer area	Angular oscillations (negative damping) north of Kramer area			New operating procedure to curtail generation as part of system adjustment between contingencies
NOL-TS-10	Lugo-500/230 kV Transformer Banks no RAS	P6.2.2	Normal Clearing	Undamping local area voltage oscillations	Undamping local area voltage oscillations	Undamping local area voltage oscillations	Undamping local area voltage oscillations	Undamping local area voltage oscillations			Utilize RAS to curtail local generation (see results below)
NOL-TS-11	Lugo-500/230 kV Transformer Banks with RAS	P6.2.2	Normal Clearing	Positive damping, stable	Positive damping, stable	Positive damping, stable	Positive damping, stable	Positive damping, stable			

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Study Area: **SCE North of Lugo**

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)						
				Select..	Select..	Select..	Select..	Select..	Select..	Select..
X-SLD-1										

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

	Potential Mitigation Solutions
Select..	



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1										

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)						Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2021 SP Heavy Renewable & Min Gas Gen		
EOL-T-1	19012 MEAD S 230 189040 BOB SS 230 1 1	Tran ELDORDO 500.00 to ELDORDO2 230.00 Circuit 5ELDOR 5T 13.80	P1	N-1	NotCnv	<90	<90	<90	<90	<90	175.36	Ivanpah RAS: trip generator following T-1 outage to mitigate the overload.
EOL-T-2	24086 LUGO 500 26105 VICTORVL 500 1 1	Line ELDORDO 500.0 to LUGO 500.0 Circuit 1	P1	N-1	98.42	96.55	<90	<90	<90	<90	101.99	Utilizing Lugo - Victorville RAS, Operating Procedure and Congestion Management is sufficient through 2021; line upgrade needed for future years
EOL-T-3	24086 LUGO 500 26105 VICTORVL 500 1 1	Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 & Line LUGO 500.0 to MOHAVE 500.0 Circuit 1	P6	N-1-1	116.74	126.90	127.37	<90	<90	<90	134.21	Utilizing Lugo - Victorville RAS, Operating Procedure and Congestion Management is sufficient through 2021; line upgrade needed for future years
EOL-T-4	24086 LUGO 500 26105 VICTORVL 500 1 1	Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 & Line MOHAVE 500.0 to ELDORDO 500.0 Circuit 1	P6	N-1-1	118.45	128.27	128.55	<90	<90	<90	135.64	Utilizing Lugo - Victorville RAS, Operating Procedure and Congestion Management is sufficient through 2021; line upgrade needed for future years
EOL-T-5	24086 LUGO 500 26105 VICTORVL 500 1 1	Line ELDORDO 500.0 to LUGO 500.0 Circuit 1 & Line DELANEY 500.0 to COLRIVER 500.0 Circuit 1	P6	N-1-1	<90	101.06	102.34	<90	<90	<90	106.76	Utilizing Lugo - Victorville RAS, Operating Procedure and Congestion Management is sufficient through 2021; line upgrade needed for future years
EOL-T-6	24086 LUGO 500 26105 VICTORVL 500 1 1	Lugo - Mohave 500 kV line and Eldorado - Lugo 500 kV line (with planned Victorville SPS)	P6	N-1-1	115.07	126.26	125.20	<90	<90	<90	Error under investigation	Utilizing Lugo - Victorville RAS, Operating Procedure and Congestion Management is sufficient through 2021; line upgrade needed for future years
EOL-T-7	24647 IVANPAH 230 24648 IVANPAH 115 1 1	Line IVANPAH 115.0 to MTN PASS 115.0 Circuit 1 & Tran IVANPAH 230.00 to IVANPAH 115.00 Circuit 2 0.00	P6	N-1-1	<90	<90	<90	110.83	<90	<90	113.54	Congestion management
EOL-T-8	24647 IVANPAH 230 24648 IVANPAH 115 2 1	Line IVANPAH 115.0 to MTN PASS 115.0 Circuit 1 & Tran IVANPAH 230.00 to IVANPAH 115.00 Circuit 1 0.00	P6	N-1-1	<90	<90	<90	110.83	<90	<90	113.54	Congestion management

Study Area: **SCE East of Lugo**

Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %						Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2021 SP Heavy Renewable & Min Gas Gen	



ID	Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Summer Light Load	2021 SP Heavy Renewable & Min Gas Gen	
X-TS-1	Eld-Cima-Pisgah-1PHfault @ Eldorado	P4.2	Stuck breaker	Cima & Pisgah 230kV transient voltage dip > 30%, voltage fails to recover	Cima & Pisgah 230kV transient voltage dip > 30%, voltage fails to recover	Cima 230kV transient voltage dip>30%, voltage fails to recover	Cima & Pisgah 230kV transient voltage dip > 30%, voltage fails to recover	Cima & Pisgah 230kV transient voltage dip > 30%, voltage fails to recover	Cima 230kV transient voltage dip>30%, voltage fails to recover	Install Local Breaker Failure Back-up (LBFB) at Pisgah 230kV bus
X-TS-2	Lugo-Pisgah-1PHfault @ Lugo	P4.2	Stuck breaker	Pisgah 230kV transient voltage dip > 30%, voltage fails to recover	N/A	N/A	Pisgah 230kV transient voltage dip > 30%, voltage fails to recover	N/A	N/A	Install Local Breaker Failure Back-up (LBFB) at Pisgah 230kV bus
X-TS-3	CALCITE-Pisgah-1PHfault @ CALCITE	P4.2	Stuck breaker	N/A	Pisgah 230kV transient voltage dip > 30%, voltage fails to recover	Pisgah 230kV transient voltage dip > 30%, voltage fails to recover	N/A	Pisgah 230kV transient voltage dip > 30%, voltage fails to recover	Pisgah 230kV transient voltage dip > 30%, voltage fails to recover	Install Local Breaker Failure Back-up (LBFB) at Pisgah 230kV bus
X-TS-6										
X-TS-7										
X-TS-8										
X-TS-9										
X-TS-10										
X-TS-11										
X-TS-12										
X-TS-13										
X-TS-14										
X-TS-15										
X-TS-16										
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X-TS-24										
X-TS-25										
X-TS-26										
X-TS-27										
X-TS-28										
X-TS-29										
X-TS-30										
X-TS-31										

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Study Area: **SCE East of Lugo**

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)						
				Select..	Select..	Select..	Select..	Select..	Select..	Select..
X-SLD-1										

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

	Potential Mitigation Solutions
Select..	



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1										

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2021 SP Heavy Renewable & Min Gas Gen	Select..	Select..		
Eastern-T-1	Line 24804 DEVERS 230 kV to 24942 SBLR 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					127.62					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Eastern-T-2	Line 24132 SANBRDNO 230 kV to 24942 SBLR 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					127.62					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Eastern-T-3	Line 24804 DEVERS 230 kV to 24944 Vista2LR 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					122.54					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Eastern-T-4	Line 24944 Vista2LR 230 kV to 24901 VSTA 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					122.54					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Eastern-T-5	Line 24804 DEVERS 230 kV to 24941 EICascoLR 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					106.53					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Eastern-T-6	Line 24941 EICascoLR 230 kV to 25666 EL CASCO 230 kV	Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P1	L-1					106.53					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Eastern-T-7	Line 24804 DEVERS 230 kV to 24942 SBLR 230 kV	Line DEVERS-Vista2LR-VSTA 230.0 Circuit 1 AND Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P6	L-1-1					165.41					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Eastern-T-8	Line 24132 SANBRDNO 230 kV to 24942 SBLR 230 kV	Line DEVERS-Vista2LR-VSTA 230.0 Circuit 1 AND Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P6	L-1-1					165.41					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Eastern-T-9	Line 24804 DEVERS 230 kV to 24944 Vista2LR 230 kV	Line DEVERS-EICascoLR-EL CASCO 230.0 Circuit 1 AND Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P6	L-1-1					148.90					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Eastern-T-10	Line 24944 Vista2LR 230 kV to 24901 VSTA 230 kV	Line DEVERS-EICascoLR-EL CASCO 230.0 Circuit 1 AND Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P6	L-1-1					148.90					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Eastern-T-11	Line 24804 DEVERS 230 kV to 24941 EICascoLR 230 kV	Line DEVERS-Vista2LR-VSTA 230.0 Circuit 1 AND Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P6	L-1-1					136.71					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment
Eastern-T-12	Line 24941 EICascoLR 230 kV to 25666 EL CASCO 230 kV	Line DEVERS-Vista2LR-VSTA 230.0 Circuit 1 AND Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P6	L-1-1					136.71					Inland Empire SPS, West of Devers SPS, Congestion Management and Curtailment

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2021 SP Heavy Renewable & Min Gas Gen	Select..	Select..		
Eastern-T-13	Transformer Devers 500/230 kV ck 1T	Line ALBERHIL 500.0 to VALLEYSC 500.0 Circuit 1 AND Tran DEVERS 500.00 to DEVERS 230.00 Circuit 2 DEVERS2T 13.80	P6	L-1							130.10			Congestion Management, Expansion of Colorado River Corridor SPS
Eastern-T-14	Transformer Devers 500/230 kV ck 2T	Line ALBERHIL 500.0 to VALLEYSC 500.0 Circuit 1 AND Tran DEVERS 500.00 to DEVERS 230.00 Circuit 1 DEVERS 1T 13.80	P6	L-1							127.76			Congestion Management, Expansion of Colorado River Corridor SPS
Eastern-T-15	Line 25666 EL CASCO 230 kV to 24132 SANBRDNO 230 kV	Line DEVERS-Vista2LR-VSTA 230.0 Circuit 1 AND Line SERRANO 500.0 to VALLEYSC 500.0 Circuit 1	P6	L-1-1				113.78						West of Devers SPS, Congestion Management and Curtailment
Eastern-T-16	Line 24804 DEVERS 230 kV to 24942 SBLR 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2	117.31			150.00						West of Devers SPS, Congestion Management and Curtailment
Eastern-T-17	Line 24132 SANBRDNO 230 kV to 24942 SBLR 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2	117.31			149.99						West of Devers SPS, Congestion Management and Curtailment
Eastern-T-18	Line 24944 Vista2LR 230 kV to 24901 VSTA 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2	123.59			144.74						West of Devers SPS, Congestion Management and Curtailment
Eastern-T-19	Line 24804 DEVERS 230 kV to 24944 Vista2LR 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2	123.59			144.74						West of Devers SPS, Congestion Management and Curtailment
Eastern-T-20	Line 24941 EICascoLR 230 kV to 25666 EL CASCO 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2	101.84			124.47						West of Devers SPS, Congestion Management and Curtailment
Eastern-T-21	Line 24804 DEVERS 230 kV to 24941 EICascoLR 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2	101.84			124.47						West of Devers SPS, Congestion Management and Curtailment
Eastern-T-22	Line 25666 EL CASCO 230 kV to 24132 SANBRDNO 230 kV	Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 1 AND Line DEVERS 500.0 to VALLEYSC 500.0 Circuit 2	P7	L-2				101.36						West of Devers SPS, Congestion Management and Curtailment



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %							Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2021 SP Heavy Renewable & Min Gas Gen	Select..		Select..



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)							Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2021 SP Heavy Renewable & Min Gas Gen	Select..		Select..



ID	Contingency	Category	Category Description	Transient Stability Performance								Potential Mitigation Solutions
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2021 SP Heavy Renewable & Min Gas Gen	Select..	Select..	
Eastern-TS-1	3-Phase Line Fault on Eagle Mountain - Iron Mountain 230 kV line at Iron Mountain End	P1		Unstable	Unstable	Unstable			Unstable			Install Pilot Relay
Eastern-TS-2	Eagle Mountain SLG Fault with stuck breaker CB407 at Eagle Mountain, no LBFB and fault not cleared	P4		Unstable	Unstable	Unstable			Unstable			Install LBFB, Further Investigation
Eastern-TS-3	Eagle Mountain SLG Fault with stuck breaker CB405 at Eagle Mountain, no LBFB and fault not cleared	P4		Unstable	Unstable	Unstable			Unstable			Install LBFB, Further Investigation

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)								Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1												

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1										

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	S1- 2021SP High CEC Load	S2- 2018SP No BTM PV	S3 - 2021SP No BTM PV	S4 - 2021 SP Heavy Renewable & Min Gas Gen	S5 - 2018 SP All Redondo Units On		
METRO-T-1	MIRALOMA 500/230 KV #4	MIRALOMA – SERRANO 500 KV #2 & LUGO – RANCHOVST 500 KV	P6	L-1/L-1	124.31	<100	<100	<100	<100	<100	<100	130.49	<100	<100	127.70	System adjustments after initial or second contingency including looping-in the Rancho Vista-Serrano line into Mira Loma.
METRO-T-2	MIRALOMA 500/230 KV #1 OR #2	MIRALOMA 500/230 KV #2 OR #1 & MIRALOMA – SERRANO 500 KV #2	P6	T-1/L-1	110.79	<100	<100	<100	<100	<100	<100	115.10	<100	<100	112.60	System adjustments after initial or second contingency including looping-in the Rancho Vista-Serrano line into Mira Loma.
METRO-T-3	SERRANO 500/230 KV #1, #2, OR #3	TWO SERRANO 500/230 KV TRANSFORMERS	P6	T-1/T-1	121.70	108.93	101.99	<100	<100	113.53	118.56	108.84	110.96	127.30	1. Energize available spare single phase transformers (approx. 24 hrs.); perform system adjustments per existing operating procedures until spares can be energized. 2. Install live 3-phase spare AA bank	
METRO-T-4	MIRALOMA-SERRANO 500 KV #2	LUGO-RANCHOVST 500 KV & PALOVRDE-COLRIVER 500 KV	P6	L-1/L-1	102.03	<100	<100	<100	<100	<100	<100	105.58	<100	<100	105.10	Dispatch generation in LA Basin or loop-in Rancho Vista-Serrano line into Mira Loma after initial or second contingency.
METRO-T-5	LA FRESA-REDONDO #1 OR #2 230 KV	REDONDO-LIGHTHIPE & LA FRESA-REDONDO #1 OR #2 230 KV	P6	L-1/L-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	116.10	Reduce local generation after initial contingency

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	S1- 2021SP High CEC Load	S2- 2018SP No BTM PV	S3 - 2021SP No BTM PV	S4 - 2021 SP Heavy Renewable & Min Gas Gen	S5 - 2018 SP All Redondo Units On		
METRO-T-6	REDONDO-LIGHTHIPE 230 KV	LA FRESA-REDONDO #1 & #2 230 KV	P7	L-2	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	134.40	Limit local generation temporarily (for the duration of planned construction outage)
METRO-T-7	LIGHTHIPE-HINSON 230 KV	LA FRESA-REDONDO #1 & #2 230 KV	P7	L-2	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102.70	Limit local generation temporarily (for the duration of planned construction outage)

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	S1-2021SP High CEC Load	S2-2018SP No BTM PV	S3 - 2021SP No BTM PV	S4 - 2021 SP Heavy Renewable & Min Gas Gen	S5 - 2018 SP All Redondo Units On		

No high/low voltage deviations identified.

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	S1- 2021SP High CEC Load	S2- 2018SP No BTM PV	S3 - 2021SP No BTM PV	S4 - 2021 SP Heavy Renewable & Min Gas Gen	S5 - 2018 SP All Redondo Units On	

No high/low voltages identified.



ID	Contingency	Category	Category Description	Transient Stability Performance										Potential Mitigation Solutions
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	S1- 2021SP High CEC Load	S2- 2018SP No BTM PV	S3 - 2021SP No BTM PV	S4 - 2021 SP Heavy Renewable & Min Gas Gen	S5 - 2018 SP All Redondo Units On	
X-TS-1														
X-TS-2														
X-TS-3														

No transient stability issues identified.

Study Area: **SCE Metro**



Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)								Potential Mitigation Solutions	
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..		
X-SLD-1													

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1												

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP with no Behind-the-meter PV	2021 SP CEC High Load	2021 SP Heavy Renewable & Min Gas Gen	2026 SP with no Behind-the-meter PV	2026 SP with Heavy Northbound Flow via North of SONGS		
SDBK-T-1	21025 ELCENTSW 230 22356 IMPRLVLY 230 1 1 (S-Line)	P1L_SWPL2_TL50002 N.GILA 500 to IMPRLVLY 500 Ckt 1	P1	L-1							100.09					rely on the CAISO electricity market and operation procedure to manage the reliability of its controlled transmission grid
SDBK-T-2		P1G_OT_OTAYMESA - G-1 and P1L_SWPL2_TL50002 N.GILA 500 to IMPRLVLY 500 Ckt 1	P3	G-1/L-1	102.80						118.05					
SDBK-T-3		P1G_TDM_TDM - G-1 and P1L_SWPL2_TL50002 N.GILA 500 to IMPRLVLY 500 Ckt 1	P3	G-1/L-1	123.59	106.96					139.22	119.81		108.23		
SDBK-T-4		P1L_SPL3_TL50003 OCOTILLO-SUNCREST w/o SPS and P1L_SWPL2_TL50002 N.GILA 500 to IMPRLVLY 500 Ckt 1	P6	L-1-1				108.99								
SDBK-T-5		P1L_SWPL1_TL50001 MIGUEL-ECO w/o SPS and P1L_SWPL2_TL50002 N.GILA 500 to IMPRLVLY 500 Ckt 1	P6	L-1-1				117.31								
SDBK-T-6	22356 IMPRLVLY 230 22361 IV BK80 MP 500 1 1	P1T_50021_Xfmer IMPRLVLY 500 to IV BK82 MP 500 Ckt 1 0.00	P1	T-1										105.13	develop an Operation Procedure (OP) for a thirty-minute emergency rating to eliminate the overload by shedding generation	
SDBK-T-7		P1T_50022_Xfmer IMPRLVLY 500 to IV BK81 MP 500 Ckt 1 0.00	P1	T-1										105.35		
SDBK-T-8		P4CB_IV-8022_IV 8022 50002 & BK81 CB	P2/P4	Breaker Fault/Stuck Breaker								107.94	102.14	108.21		
SDBK-T-9		P1T_50021_Xfmer IMPRLVLY 500 to IV BK82 MP 500 Ckt 1 0.00 and P1T_50022_Xfmer IMPRLVLY 500 to IV BK81 MP 500 Ckt 1 0.00	P6	T-1-1	162.89	185.83	186.29	216.47			164.69	187.96	228.36	205.62		253.44
SDBK-T-10	22356 IMPRLVLY 230 22362 IV 500 BK82	P4CB_IV-8022_IV 8022 50002 & BK81 CB	P2/P4	Breaker Fault/Stuck Breaker								106.05	100.33	106.31		
SDBK-T-11	22356 IMPRLVLY 230 22362 IV 500 BK82 or BK81	P1T_50020_Xfmer IMPRLVLY 500 to IV BK80 followed by P1T_50022_Xfmer IMPRLVLY 500 IV BK81 or BK82	P6	T-1-1		111.36	111.95	129.87				112.65	136.87	123.53	152.54	
SDBK-T-12	22356 IMPRLVLY 230 22358 IV PFC 230 BK #1 and #2	P1L_SPL3_TL50003 OCOTILLO-SUNCREST w/o SPS and P1L_SWPL1+SPS_TL50001 MIGUEL-ECO with SPS	P6	L-1-1	101.38						109.79				prepare the system for the 2nd contingency by reducing import level	

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP with no Behind-the-meter PV	2021 SP CEC High Load	2021 SP Heavy Renewable & Min Gas Gen	2026 SP with no Behind-the-meter PV	2026 SP with Heavy Northbound Flow via North of SONGS		
SDBK-T-13	22358 IV PFC 230 20118 ROA-230 230 1 1	P1L_SPL3_TL50003 OCOTILLO-SUNCREST w/o SPS and P1L_SWPL1+SPS_TL50001 MIGUEL-ECO with SPS	P6	L-1-1							107.60					contingency by reducing import level via San Diego Import Transmission (SDIT) and adjusting the IV phase shifting transformers as system adjustment, while maintaining high generation support in the IV area to avoid the S-line overload for the outage of North Gila-Imperial Valley 500 kV line (TL50002)
SDBK-T-14	23310 OCOTILLO 500 22885 SUNCREST 500 1 1 (TL50003)	P1L_23014_Line OTAYMESA 230 to TJI-230 230 Ckt 1 and P1L_SWPL1_TL50001 MIGUEL-ECO w/o SPS	P6	L-1-1							100.29		102.16			
SDBK-T-15		P1L_23107_Line IV PFC 230 to ROA-230 230 Ckt 1 and P1L_SWPL1_TL50001 MIGUEL-ECO w/o SPS	P6	L-1-1								105.16		102.99		
SDBK-T-16	22382 SYCAMORE 230 228860 SUNCREST 230 Ckt #2 or #1	22382 SYCAMORE 230 228860 SUNCREST 230 Ckt #1 or #2	P1	L-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	rely on operation procedure to open OCO-SCR 500 kV line (TL50003) as needed even Suncrest-Sycamore 230 kV line TL23055 or TL23054 is not overloaded, in order to prepare the system for next contingency in SWPL (TL50001 or TL50004)
SDBK-T-17		P1ML_23960_ML SYCAMORE TP2 230 to SUNCREST 230 Ckt #2 or #1 followed by P1L_SWPL1+SPS_TL50001 MIGUEL-ECO with SPS	P6	L-1-1	130.46	130.90	128.23				139.73	138.25	141.24	145.80	124.26	Avoid this N-1-1 contingency by opening Suncrest-Sycamore 230 kV line TL23055 or TL23054 for the first contingency of Suncrest-Sycamore 230 kV Ckt #1 or Ckt #2
SDBK-T-18	22382 SYCAMORE 230 22886 SUNCREST 230 Ckt #1 or #2	P1L_23108_Line OTAYMESA 230 to TJI-230 230 Ckt 1 and P1L_SWPL1_TL50001 MIGUEL-ECO w/o SPS	P6	L-1-1	101.85						110.25	104.57	112.03	104.88		prepare the system for the 2nd contingency by reducing import level via San Diego Import Transmission (SDIT) as system adjust, while maintaining high generation support in the IV area as needed to prevent the S-line overload for the outage of North Gila-Imperial Valley 500 kV line (TL50002)

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP with no Behind-the-meter PV	2021 SP CEC High Load	2021 SP Heavy Renewable & Min Gas Gen	2026 SP with no Behind-the-meter PV	2026 SP with Heavy Northbound Flow via North of SONGS		
SDBK-T-19		P1L_SWPL1_TL50001 MIGUEL-ECO w/o SPS and P1ML_23960_ML SYCAMORE 230 to SUNCREST 230 Ckt #2 or Ckt #1	P6	L-1-1	161.57	162.01	158.70	101.06			173.47	171.47	182.76	181.69	155.41	enable a new SPS to open OCO-SCR 500 kV line (TL50003) for the single outage of Suncrest-Sycamore 230 kV line TL23055 or TL23054, along with the system adjustment prepared for the N-1-1 contingency of TL50001 and TL50003
SDBK-T-20		P1T_50026_Xfmer SUNCREST 500 to SUNCREST 500 BK81 or BK80	P1	T-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	rely on Operation procedure to open SCR-BK81 or SCR-BK 80 as needed even it is not overloaded, in order to prepare the system for next contingency in SWPL (TL50001 or TL50004)
SDBK-T-21	22886 SUNCREST 230 22885 SUNCREST 500 BK80 or BK81	P1L_SWPL1_TL50001 MIGUEL-ECO w/o SPS and P1T_50026_Xfmer SUNCREST 500 to SUNCREST 500 BK81 or BK80	P6	L-1/T-1	147.01	146.83	144.72				151.60	151.57	154.04	155.04	140.57	enable a new SPS to open SCR-BK81 or SCR-BK80, along with the system adjustment prepared for the N-1-1 contingency of TL50001 and TL50003
SDBK-T-22		P1T_50026_Xfmer SUNCREST 500 to SUNCREST 500 BK81 or BK80 and P1L_SWPL1+SPS_TL50001 MIGUEL-ECO with SPS	P6	T-1/L-1	123.55	123.26	122.33				131.46	130.92	134.58	134.65	120.20	Avoid this N-1-1 contingency by opening SCR-BK81 or SCR-BK80 after the first contingency of SCR-BK80 or SCR-BK81
SDBK-T-23		P1G_OT_OTAYMESA - G-1 and P1L_SPL3_TL50003 OCOTILLO-SUNCREST w/o SPS	P3	G-1/L-1							102.72	102.53	105.13	110.30		prepare the system for the 2nd contingency by reducing import level via San Diego Import Transmission (SDIT) and adjusting the IV phase shifting transformers as system adjustment, while maintaining high generation support in the IV area after the first contingency to avoid the S-line overload for the outage of North
SDBK-T-24		P1G_OT_OTAYMESA - G-1 and P1L_SPL3+SPS_TL50003 OCOTILLO-SUNCREST with SPS	P3	G-1/L-1									100.23			
SDBK-T-25	22930 ECO 500 22468 MIGUEL 500 1 (TL50001)	P1L_23107_Line IV PFC 230 to ROA-230 230 Ckt 1 and P1L_SPL3_TL50003 OCOTILLO-SUNCREST w/o SPS	P6	L-1-1	107.07	101.43					114.87	106.91	114.35	105.19		
SDBK-T-26		P1L_23014_Line OTAYMESA 230 to TJI-230 230 Ckt 1 and P1L_SPL3_TL50003 OCOTILLO-SUNCREST w/o SPS	P6	L-1-1	103.11	101.28					110.80	106.73	114.12	106.08		

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions		
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP with no Behind-the-meter PV	2021 SP CEC High Load	2021 SP Heavy Renewable & Min Gas Gen	2026 SP with no Behind-the-meter PV	2026 SP with Heavy Northbound Flow via North of SONGS			
SDBK-T-27		P1L_23107_Line IV PFC 230 to ROA-230 230 Ckt 1 and P1L_SPL3+SPS_TL50003 OCOTILLO-SUNCREST with SPS	P6	L-1-1							101.09						Gila-Imperial Valley 500 kV line (TL50002)
SDBK-T-28		P1L_SPL231_SUNCREST-SYCAMORE 230kV #1 and P1L_SPL232_SUNCREST-SYCAMORE 230kV #2	P6	L-1-1								101.39					
SDBK-T-29		P1T_50024_Xfmer MIGUEL 500 to MIGUEL 230 BK81 or BK80	P1	T-1							101.77	103.25	106.29	107.19			implement a new SPS open Miguel BK81 or BK80,
SDBK-T-30	22464 MIGUEL 230 22468 MIGUEL 500 BK80 or BK81	P1L_SPL3_TL50003 OCOTILLO-SUNCREST w/o SPS and P1T_50024_Xfmer MIGUEL 500 to MIGUEL 230 BK81 or BK80	P6	T-1/L-1	143.17	146.41	145.25				152.87	153.75	158.71	160.30	138.95		enable a new SPS to open Miguel BK81 or BK80, along with the system adjustment prepared for the N-1-1 contingency of TL50001 and TL50003
SDBK-T-31	22464 MIGUEL 230 22468 MIGUEL 500 BK80 and BK81	P1L_23107_Line IV PFC 230 to ROA-230 230 Ckt 1 and P1L_SPL3_TL50003 OCOTILLO-SUNCREST w/o SPS	P6	L-1-1	101.27						106.75	100.69	104.69				prepare the system for the 2nd contingency by reducing import level via San Diego Import Transmission (SDIT) as system adjustment, while maintaining high generation support in the IV area after the first contingency to avoid the S-line overload for the outage of North Gila-Imperial Valley 500 kV line (TL50002)
SDBK-T-32	22609 OTAYMESA 230 20149 TJI-230 230 1 1	P1L_SPL3_TL50003 OCOTILLO-SUNCREST w/o SPS and P1L_SWPL1+SPS_TL50001 MIGUEL-ECO with SPS	P6	L-1-1	115.02						124.20	107.41			101.76		prepare the system for the 2nd contingency by reducing import level via San Diego Import Transmission (SDIT) and adjusting the IV phase shifting transformers as system adjustment, while maintaining high generation support in the IV area after the first contingency to avoid the S-
SDBK-T-33		P1L_SWPL1_TL50001 MIGUEL-ECO w/o SPS and P1L_SPL3+SPS_TL50003 OCOTILLO-SUNCREST with SPS	P6	L-1-1								106.95					
SDBK-T-34	22596 OLD TOWN 230 22504 MISSION 230 1 1	P1ML_23008_Line SILVERGT-OTTAP-OLDTOWN-MS 230 Ckt 1 and P1ML_23920_ML OT-MLMS3TAP-BB-MIGUEL 230 Ckt 1	P6	L-1-1	101.66						103.58						rely on OP as an interim solution until the 2nd Miguel-Bay Blvd 230 kV line in service
SDBK-T-35		P4CB_SX-28T_SYCAMORE 230 kV 28T CB	P2/P4	Breaker Fault/Stuck Breaker							104.46						

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP with no Behind-the-meter PV	2021 SP CEC High Load	2021 SP Heavy Renewable & Min Gas Gen	2026 SP with no Behind-the-meter PV	2026 SP with Heavy Northbound Flow via North of SONGS		
SDBK-T-36	22261 PEN 230 22832 SYCAMORE 230 1 1	P1L_4502_Line PALOVRDE 500 to COLRIVER 500 Ckt 1 and P1ML_23940_ML PENSQTOS TP1 230 to SYCAMORE 230 Ckt 1	P6	L-1-1	115.58						118.01					reset SX-PEN 230 kV line (TL23051) directional relay if this is limited by the directional relay to rating identified in Transmission Registry/TMC1015a
SDBK-T-37		P1ML_23920_ML OT-MLMS3TAP-BB-MIGUEL 230 Ckt 1 and P1ML_23940_ML PENSQTOS TP1 230 to SYCAMORE 230 Ckt 1	P6	L-1-1	117.34			100.36			117.98					
SDBK-T-38		P7_23001/SX-PQ_SA-MS + SX-PQ 230 kV	P7	Common structure	107.25						106.19					
SDBK-T-39		P7_23003/230YY_SA-EA 230 kV ckt 1 and 2	P7	Common structure				112.82								
SDBK-T-40		P7_SX-PQ/13811_SX-PQ 230 + CC-NCM-SH 138 kV	P7	Common structure	104.04						104.08					
SDBK-T-41		P7_SX-PQ/13820_SX-PQ 230 + SX-CC 138 kV	P7	Common structure	106.41						106.47					
SDBK-T-42	22232 ENCINA 230 22716 SANLUSRY 230 2 1	P1L_23006_Line PEN 230 to SANLUSRY SC 230 Ckt 1 and P1L_23022_Line SANLUSRY 230 to ENCINA 230 Ckt 1	P6	L-1-1				102.01							lower the northbound flow via north of SONGS switchyard after the first contingency	
SDBK-T-43		P1L_23021_Line SANLUSRY SC 230 to MISSION 230 Ckt 1 and P1L_23022_Line SANLUSRY 230 to ENCINA 230 Ckt 1	P6	L-1-1				118.08						109.31		
SDBK-T-44		P1L_23022_Line SANLUSRY 230 to ENCINA 230 Ckt 1 and P1L_23050_Line PEN 230.0 to SYCAMORE 230.0 Circuit 1	P6	L-1-1				103.83								
SDBK-T-45		P1L_23022_Line SANLUSRY 230 to ENCINA 230 Ckt 1 and P1L_SWPL2_TL50002 N.GILA 500 to IMPRLVLY 500 Ckt 1	P6	L-1-1				113.50								
SDBK-T-46	22430 SILVERGT 230 22596 OLD	P1ML_23008_Line SILVERGT-OTTAP-OLDTOWN-MS 230 Ckt 1 and P1ML_23940_ML PENSQTOS TP1 230 to SYCAMORE 230 Ckt 1	P6	L-1-1										108.59	lower the northbound flow via north of SONGS switchyard after the first	
SDBK-T-47		P1ML_23008_Line SILVERGT-OTTAP-OLDTOWN-MS 230 Ckt 1 followed by P1L_23010_Line MIGUEL 230 to MISSION 230 Ckt #2 or #1	P6	L-1-1										106.31		

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions		
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP with no Behind-the-meter PV	2021 SP CEC High Load	2021 SP Heavy Renewable & Min Gas Gen	2026 SP with no Behind-the-meter PV	2026 SP with Heavy Northbound Flow via North of SONGS			
SDBK-T-48	TOWN 230 1 1	P1L_23007_Line SILVERGT 230 to OLD TOWN 230 Ckt 1 and P1L_23010_Line MIGUEL 230 to MISSION 230 Ckt #1 or #2	P6	L-1-1											106.78	SONGS switchyard after the first contingency	
SDBK-T-49		P1L_23007_Line SILVERGT 230 to OLD TOWN 230 Ckt 1 and P1ML_23940_ML PENSQTOS TP1 230 to SYCAMORE 230 Ckt 1	P6	L-1-1													108.98
SDBK-T-50	22716 SANLUSRY 230 22232 ENCINA 230 Ckt #1 or #2	P1L_23002_Line ENCINA 230 to SANLUSRY 230 Ckt #2 or #1 followed by P1L_23021_Line SANLUSRY SC 230 to MISSION 230 Ckt 1	P6	L-1-1							118.26					109.48	lower the northbound flow via north of SONGS switchyard after the first contingency
SDBK-T-51		P1L_23002_Line ENCINA 230 to SANLUSRY 230 Ckt #2 or #1 followed by P1L_SWPL2_TL50002 N.GILA 500 to IMPRLVLY 500 Ckt 1	P6	L-1-1								113.83					
SDBK-T-52	22716 SANLUSRY 230 24131 S.ONOFRE 230 1 1	P1L_23024_Line SANLUSRY 230 to S.ONOFRE 230 Ckt 2 and P1L_23025_Line SANLUSRY 230 to S.ONOFRE 230 Ckt 3	P6	L-1-1								106.25					
SDBK-T-53		P7_23002/23010_SA-SO 2 + SO-SA 3 230 kV	P7	Common structure									106.20				
SDBK-T-54	22710 SANLUSRY SC 230 22504 MISSION 230 1 1	P1L_23002_Line ENCINA 230 to SANLUSRY 230 Ckt 2 and P1L_23022_Line SANLUSRY 230 to ENCINA 230 Ckt 1	P6	L-1-1								139.54				130.97	This requires further review after the construction of the Sycamore-Penasquitos 230 kV line project is authorized by CPUC
SDBK-T-55		P1L_23020_Line PENSQTOS 230 to OLD TOWN 230 Ckt 1 and P1L_SWPL2_TL50002 N.GILA 500 to IMPRLVLY 500 Ckt 1	P6	L-1-1									107.13				
SDBK-T-56		P1L_23050_Line PEN 230.0 to SYCAMORE 230.0 Circuit 1 and P1L_SWPL2_TL50002 N.GILA 500 to IMPRLVLY 500 Ckt 1	P6	L-1-1									108.45				

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions		
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP with no Behind-the-meter PV	2021 SP CEC High Load	2021 SP Heavy Renewable & Min Gas Gen	2026 SP with no Behind-the-meter PV	2026 SP with Heavy Northbound Flow via North of SONGS			
SDBK-T-57		P1L_23101_Line ELCENTSW 230 to IMPRLVLY 230 Ckt 1 and P1L_SWPL2_TL50002 N.GILA 500 to IMPRLVLY 500 Ckt 1	P6	L-1-1					105.32								
SDBK-T-58		P7_23003/230YY_SA-EA 230 kV ckt 1 and 2	P7	Common structure					139.50							130.92	
SDBK-T-59	22464 MIGUEL 230 22504 MISSION 230 1 1 [with SX-PQ 230 kV line project delayed]	P1L_23011_Line MIGUEL 230 to MISSION 230 Ckt 2 -AND- P1ML_23920_ML OT-MLMS3TAP-BB-MIGUEL 230 Ckt 1	P6	L-1-1	123.07						127.67						rely on congestion management and operation procedure to redispatch generation until SX-PQ 230 kV line in service
SDBK-T-60		P1L_23009_Line SILVERGT 230 to BAY BLVD 230 Ckt 1 -AND- P1L_23011_Line MIGUEL 230 to MISSION 230 Ckt 2	P6	L-1-1	110.22						113.78						
SDBK-T-61		P7_23042A/13824_ML-BB 230 kV + TY-JM-ML 138 kV	P7	Common structure	100.03							103.92					
SDBK-T-62	22464 MIGUEL 230 22504 MISSION 230 2 1 [with SX-PQ 230 kV line project delayed]	P1L_23010_Line MIGUEL 230 to MISSION 230 Ckt 1 -AND- P1ML_23920_ML OT-MLMS3TAP-BB-MIGUEL 230 Ckt 1	P6	L-1-1	122.6						127.18						rely on operation procedure to redispatch generation until SX-PQ 230 kV line in service
SDBK-T-63		P1L_23009_Line SILVERGT 230 to BAY BLVD 230 Ckt 1 -AND- P1L_23010_Line MIGUEL 230 to MISSION 230 Ckt 1	P6	L-1-1	109.79							113.34					
SDBK-T-64	22596 OLD TOWN 230 22504 MISSION 230 1 1 [with SX-PQ 230 kV line project delayed]	P1L_23013_Line OLDTWNT 230 to MISSION 230 Ckt 1 -AND- P1ML_23920_ML OT-MLMS3TAP-BB-MIGUEL 230 Ckt 1	P6	L-1-1	153.55						160.86						rely on operation procedure re-dispatching generation and implement a temporary SPS shedding load as needed in the Old Town area until SX-PQ 230 kV line in service
SDBK-T-65		P1L_23009_Line SILVERGT 230 to BAY BLVD 230 Ckt 1 -AND- P1L_23013_Line OLDTWNT 230 to MISSION 230 Ckt 1	P6	L-1-1	121.47							126.32					
SDBK-T-66	22597 OLDTWNT 230 22504 MISSION 230 1 1 [with SX-PQ 230 kV line project delayed]	P1L_23012_Line OLD TOWN 230 to MISSION 230 Ckt 1 -AND- P1ML_23920_ML OT-MLMS3TAP-BB-MIGUEL 230 Ckt 1	P6	L-1-1	143.02						149.83						
SDBK-T-67		P1L_23009_Line SILVERGT 230 to BAY BLVD 230 Ckt 1 -AND- P1L_23012_Line OLD TOWN 230 to MISSION 230 Ckt 1	P6	L-1-1	113.08							117.6					

2016-2017 ISO Reliability Assessment - Preliminary Study Results

Study Area: **San Diego Bulk Transmission**

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP with no Behind-the-meter PV	2021 SP CEC High Load	2021 SP Heavy Renewable & Min Gas Gen	2026 SP with no Behind-the-meter PV	2026 SP with Heavy Northbound Flow via North of SONGS		
SDBK-T-68	delayed]	P1L_23012_Line OLD TOWN 230 to MISSION 230 Ckt 1 -AND- P1L_23009_Line SILVERGT 230 to BAY BLVD 230 Ckt 1	P6	L-1-1	112.95						117.47					
SDBK-T-69	22771 BAY BLVD 230 22466 MLMS3TAP 230 1 1 [with SX-PQ 230 kV line project delayed]	P4CB_MS-5T_MISSION 230 kV 5T CB	P2/P4	Breaker Fault/Stuck Breaker	111.5						115.72					rely on congestion management and operation procedure to redispatch generation until SX-PQ 230 kV line in service
SDBK-T-70		P1L_23010_Line MIGUEL 230 to MISSION 230 Ckt 1 -AND- P1L_23011_Line MIGUEL 230 to MISSION 230 Ckt 2	P6	L-1-1	111.57						115.75					
SDBK-T-71		P7_23022/23023_ML-MS 230 kV #1	P7	Common structure	111.5						115.72					

Study Area: **San Diego Bulk Transmission**

Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %								Potential Mitigation Solutions
					Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-VD-1													
X-VD-2													
X-VD-3													
X-VD-4													
X-VD-5													
X-VD-6													
X-VD-7													
X-VD-8													
X-VD-9													
X-VD-10													
X-VD-11													
X-VD-12													
X-VD-13													
X-VD-14													
X-VD-15													
X-VD-16													
X-VD-17													
X-VD-18													
X-VD-19													
X-VD-20													
X-VD-21													
X-VD-22													
X-VD-23													
X-VD-24													
X-VD-25													
X-VD-26													
X-VD-27													
X-VD-28													
X-VD-29													
X-VD-30													
X-VD-31													
X-VD-32													
X-VD-33													
X-VD-34													
X-VD-35													

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)								Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1												

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

Study Area: **San Diego Bulk Transmission**



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1										

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Peak with no Behind-the-meter PV	2021 SP Heavy Renewable & Min Gas Gen	2026 Summer Peak with no Behind-the-meter PV		
SD-T-1	22324 GLENCLIF 69.0 22328 GLNCLFTP 69.0 1 1	Base Case	P0	Base Case									124.71	Radial Line, Further Investigation
SD-T-2	22612 OTAYLAKE 69.0 22080 BORDERTP 69.0 1 1	Base Case	P0	Base Case									109.89	Radial Line, Further Investigation
SD-T-3	22324 GLENCLIF 69.0 22328 GLNCLFTP 69.0 1 1	TL06957_TL06957 LOVELAND-BARRETT ck 1	P1	L-1									130.18	Radial Line, Further Investigation
SD-T-4	22612 OTAYLAKE 69.0 22080 BORDERTP 69.0 1 1	50003_OCOTILLO - SUNCREST ck 1	P1	L-1									111.28	Radial Line, Further Investigation
SD-T-5	22808 STUARTTP 69.0 22400 LASPULGS 69.0 1 1	TL23006_TL23006 SANLUSRY - SONGS ck 1	P1	L-1				101.98						Upgrade Talega Tap - Stuart Tap 69 kV, as previously approved, in 2018, SPS to trip TL 695 in the interim
SD-T-6	22324 GLENCLIF 69.0 22328 GLNCLFTP 69.0 1 1	Bus_LL69_Loveland 69kV Bus	P2	Loss of Bus									142.62	Crestwood SPS
SD-T-7	22064 BLDCRKTP 69.0 22168 DESCANSO 69.0 1 1	Bus_LL69_Loveland 69kV Bus	P2	Loss of Bus				101.15	119.41					Crestwood SPS
SD-T-8	22064 BLDCRKTP 69.0 22736 SANTYSBL 69.0 1 1	Bus_LL69_Loveland 69kV Bus	P2	Loss of Bus				100.8	119.1					Crestwood SPS
SD-T-9	22841 LAGNA NL TAP 138 22396 LAGNA NL 138 1 1	Bus_PI138E_Pico 138kV E Bus	P2	Loss of Bus	113.06						118.6			SOCRE project as previously approved in transmission plan, Operation Procedure in the interim
SD-T-10	22306 GARFIELD 69.0 22208 EL CAJON 69.0 1 1	Bus_MY69N_Murray 69kV N Bus	P2	Loss of Bus	104.11	103.68	99.44				113.4	107.9	115.04	Operation procedure/ SPS for Load Shedding in Murray
SD-T-11	22160 DEL MAR 69.0 22164 DELMARTP 69.0 1 1	Bus_DM69E_Del Mar 69kV E Bus	P2	Loss of Bus	107.13						112.74			Load redistribution in 2021 and 2026 cases, Operation Procedure/SPS in the interim to shed load in del Mar
SD-T-12	22020 AVOCADO 69.0 22508 MNSRATTP 69.0 1 1	Bus_MN69_Monserate 69kV S Bus	P2	Loss of Bus	92.06			109.73			91.69			Operation Procedure/SPS to shed load in Monserate
SD-T-13	22664 POMERADO 69.0 22828 SYCAMORE 69.0 2 1	Bus_SX69S_Sycamore 69kV S Bus	P2	Loss of Bus	104.02		92.36				108.5	90.32	101.88	Operation Procedure/SPS to shed load in Pomerado
SD-T-14	22644 PENSQTOS 69.0 22164 DELMARTP 69.0 1 1	Bus_PQ69SE_Penasquitos 69kV SE Bus	P2	Loss of Bus	104.23						107.98			Operation Procedure/SPS to shed load in TOREYPNS
SD-T-15	22040 BARRETT 69.0 22104 CAMERON 69.0 1 1	Bus_DE69_Descanso 69kV Bus	P2	Loss of Bus				96.53	107.58					Crestwood SPS

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Peak with no Behind-the-meter PV	2021 SP Heavy Renewable & Min Gas Gen	2026 Summer Peak with no Behind-the-meter PV	
SD-T-16	22588 OCNSDETP 69.0 22808 STUARTTP 69.0 1 1	SPS8.2_69kV TL695A at TA	P2	Loss of Bus			91.59					107.11	Operation Procedure/ SPS to open the line
SD-T-17	22740 SANYSYRO 69.0 22616 OTAYLKTP 69.0 1 1	Bus_OY69E_Otay 69kV E Bus	P2	Loss of Bus	105.45	96.76	96.49			104.66	97.01	93.85	Operation Procedure/SPS to shed load in SANYSYRO
SD-T-18	22200 DUNHILTP 69.0 22188 DOUBLTTP 69.0 1 1	Bus_PQ69SE_Penasquitos 69kV SE Bus	P2	Loss of Bus	100.88					104.29			Operation Procedure/SPS to shed load in TOREYPNS
SD-T-19	22188 DOUBLTTP 69.0 22164 DELMARTP 69.0 1 1	Bus_PQ69SE_Penasquitos 69kV SE Bus	P2	Loss of Bus	100.88					104.29			Operation Procedure/SPS to shed load in TOREYPNS
SD-T-20	22040 BARRETT 69.0 22416 LOVELAND 69.0 1 1	Bus_DE69_Descanso 69kV Bus	P2	Loss of Bus				91.45	104.25				Crestwood SPS
SD-T-21	22046 BASILONE 69.0 22848 TALEGATP 69.0 1 1	SPS3.8_500kV TL50001 (IV-ECO-ML) GEN DROP SPS	P2	Loss of Bus	95.46					102.86			Upgrade Talega Tap - Stuart Tap 69 kV, as previously approved, in 2018, SPS to trip TL 695 in the interim
SD-T-22	22046 BASILONE 69.0 22848 TALEGATP 69.0 1 1	TL0690C_TL0690C OCNSDETP-STUARTTP ck 1	P2.1	L-1	110.69			99.03		119.57			Upgrade Talega Tap - Stuart Tap 69 kV, as previously approved, in 2018, SPS to trip TL 695 in the interim
SD-T-23	22768 BAY BLVD 69.0 22516 MONTGMRY 69.0 1 1	TL0642A_TL0642A MONTGYTP-BAY BLVD ck 1	P2.1	L-1		107.93	108.47				111.53	119.54	Upgrade Montgomery-Bay Blvd/ Operation Procedure to radialize Montgomery substation pre-contingency
SD-T-24	22020 AVOCADO 69.0 22508 MNSRATTP 69.0 1 1	TL0698B_TL0698B MONSRATE-MNSRATTP ck 1	P2.1	L-1				111.45					Upgrade the Avocado-Monsrate tap segment/ Operation Procedure to radialize Avocado substation pre-contingency
SD-T-25	22040 BARRETT 69.0 22104 CAMERON 69.0 1 1	TL0629C_TL0629C CRESTWD-GLNCLFTP ck 1	P2.1	L-1				99.99	107.2				Crestwood SPS
SD-T-26	22040 BARRETT 69.0 22416 LOVELAND 69.0 1 1	TL0629C_TL0629C CRESTWD-GLNCLFTP ck 1	P2.1	L-1				94.88	103.89				Crestwood SPS
SD-T-27	22740 SANYSYRO 69.0 22616 OTAYLKTP 69.0 1 1	TL0649A_TL0649A OTAY-OTAYLKTP ck 1	P2.1	L-1	102.91	94.94	94.67			99.95	94.46		Border SPS
SD-T-28	22324 GLENCLIF 69.0 22328 GLNCLFTP 69.0 1 1	TL06957 LOVELAND-BARRETT ck 1 AND KUMEYAAY_1	P3	G-1, N-1								139.07	Radial Line, Further Investigation

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Peak with no Behind-the-meter PV	2021 SP Heavy Renewable & Min Gas Gen	2026 Summer Peak with no Behind-the-meter PV		
SD-T-29	22046 BASILONE 69.0 22848 TALEGATP 69.0 1 1	50002 N.GILA-IMPRLVLY ck 1 AND IVGEN1	P3	G-1, N-1	105.65						115.13		Upgrade Talega Tap - Stuart Tap 69 kV, as previously approved, in 2018, SPS to trip TL 695 in the interim	
SD-T-30	22612 OTAYLAKE 69.0 22080 BORDERTP 69.0 1 1	50005_IMPRLVLY - OCOTILLO ck 1 AND ML-SC_MIGUEL SYN CON 1 & 2	P3	G-1, N-1								112.93	Radial Line, Further Investigation	
SD-T-31	22168 DESCANSO 69.0 22328 GLNCLFTP 69.0 1 1	TL06957 LOVELAND-BARRETT ck 1 AND KUMEYAAY_1	P3	G-1, N-1								109.7	Preferred Resources, DG and Operation Procedure	
SD-T-32	22208 EL CAJON 69.0 22408 LOSCOCHS 69.0 1 1	OPEN GRANITE-LOS COCHES-MIGUEL AND Switch on Non-coincident Peak Load at JM/EC/GA AND EC GEN1	P3	G-1, N-1	96.37			94.27			100.17		Load redistribution in 2021 and 2026 cases, Operation Procedure/SPS in the interim to shed load in Granite	
SD-T-33	22808 STUARTTP 69.0 22400 LASPULGS 69.0 1 1	SA-1T_SANLUSRY 230 kV 1T CB	P4	L-2				148.05					Upgrade Talega Tap - Stuart Tap 69 kV, as previously approved, in 2018, SPS to trip TL 695 in the interim	
SD-T-34	22612 OTAYLAKE 69.0 22080 BORDERTP 69.0 1 1	ML7013_ML 7013 CB - BK 80&81	P4	T-1,T-1								111.53	Radial Line, Further Investigation	
SD-T-35	22064 BLDCRKTP 69.0 22736 SANTYSBL 69.0 1 1	TL6914NW MIGUEL-LOVELAND ck 1 AND TL0678 LOSCOCHS-ALPINE ck 1	P6	L-1-1		160.62	160.23				167.03	228.87	Operation Procedure to open Loveland-Alpine after 1st contingency	
SD-T-36	22064 BLDCRKTP 69.0 22168 DESCANSO 69.0 1 1	TL6914NW MIGUEL-LOVELAND ck 1 AND TL0678 LOSCOCHS-ALPINE ck 1	P6	L-1-1		160.86	160.38				167.27	228.82	Operation Procedure to open Loveland-Alpine after 1st contingency	
SD-T-37	22420 SILVERGT 69.0 22548 NATNLCTY 69.0 1 1	TL23026 SILVERGT - BAY BLVD ck 1 AND TL0603A NSM-SW ck 1	P6	L-1-1		142.97	141.76				146.54	153.02	Operation Procedure to open the Line after 1st contingency	
SD-T-38	22548 NATNLCTY 69.0 22820 SWEETWTR 69.0 1 1	TL23026 SILVERGT - BAY BLVD ck 1 AND TL0603A NSM-SW ck 1	P6	L-1-1		141.43	140.26				144.99	152.08	Operation Procedure to open the Line after 1st contingency	
SD-T-39	22324 GLENCLIF 69.0 22328 GLNCLFTP 69.0 1 1	TL06904 LOVELAND-ALPINE ck 1 AND TL6914NW MIGUEL-LOVELAND ck 1	P6	L-1-1								151.05	Operation Procedure to radialize Loveland Substation after 1st contingency	
SD-T-40	22820 SWEETWTR 69.0 22520 MONTGYTP 69.0 1 1	TL23026 SILVERGT - BAY BLVD ck 1 AND TL0644 BAY BLVD - SWEETWTR ck 1	P6	L-1-1	112.3	129.45	127.52	100.38			115.18	133.42	141.79	Operation Procedure, Open the Line after 1st contingency
SD-T-41	22856 TOREYPNS 69.0 22864 UCM 69.0 1 1	TL06905 GENESEE -PENSQTOS ck 2 AND TL06959 MIRASNTO-PENSQTOS ck 1	P6	L-1-1	137.41	134.72	113.91	95.02			140.87	139.79	122.4	Operation Procedure, radialize Genesee substation after 1st contingency

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Peak with no Behind-the-meter PV	2021 SP Heavy Renewable & Min Gas Gen	2026 Summer Peak with no Behind-the-meter PV	
SD-T-42	22644 PENSQTOS 69.0 22444 MESA RIM 69.0 2 1	TL06916 SYCAMORE-SCRIPPS ck 1 AND LD_MRM OPEN 675 PEAK MRM/MR/SS	P6	L-1-1	104.46	113.3	116.83	101.7	136.34	112.21	114.09	129.73	Operation Procedure, re-configure systems after 1st contingency, load shed after second contingency, monitor non-coincident peak load growth
SD-T-43	22316 GENESEE 69.0 22644 PENSQTOS 69.0 2 1	TL069 TOREYPNS to UCM ck 1 AND TL06959 MIRASNT0-PENSQTOS ck 1	P6	L-1-1	132.13	129.11	108.89	90.91		135.49	134.04	117.07	Operation Procedure, radialize Genesee and UCM substation after 1st contingency
SD-T-44	22768 BAY BLVD 69.0 22820 SWEETWTR 69.0 1 1	TL23026 SILVERGT - BAY BLVD ck 1 AND TL0642 MONTGMRY-SWEETWTRW-BAY BLVD ck 1	P6	L-1-1	131.54	108.2	106.6	117.37		134.98	111.54	118.61	Operation Procedure to open Sweetwater-NationalCity-NAVSTMTR line after 1st contingency
SD-T-45	22331 MIRASNT0 69.0 22644 PENSQTOS 69.0 1 1	TL06905 GENESEE -PENSQTOS ck 2 AND TL069 TOREYPNS to UCM ck 1	P6	L-1-1	130.67	127.91	108.16	90.15		133.93	132.72	116.15	Operation Procedure, radialize Genesee and UCM substation after 1st contingency
SD-T-46	22841 LAGNA NL TAP 138 22396 LAGNA NL 138 1 1	13816/13831_CP-PI + TA-RMV 138kV w/non-coincd peak	P6	L-1-1	125.99			127.85		130.74			SOCRE project as previously approved in transmission plan, Operation Procedure in the interim
SD-T-47	22252 ENCNITAS 69.0 22160 DEL MAR 69.0 1 1	TL0616A B C: Lkhodges-BERNARDO-RSF ck 1 AND TL06952 NORTHCTY-PENSQTOS 69 ck 1	P6	L-1-1	119.4					128.93			Artesen 230/69 kV Transformer to mitigate for long term, Operation Procedure in the interim to radialize NorthCity and R.SNTTP substation
SD-T-48	22708 SANLUSRY 69.0 22582 OCEAN RANCH 69.0 1 1	LD_ME OPEN 693 PEAK ME/SM AND TL693 SANLUSRY to MELROSE ck 1	P6	L-1-1			117.52					128.42	Operation Procedure, preferred resources and to re-configure systems after 1st contingency, monitor non-coincident peak load growth
SD-T-49	22440 MELROSE 69.0 22708 SANLUSRY 69.0 1 1	TL69XX OCEAN RANCH to SANLUSRY ck 1 AND LD_ME OPEN 693 PEAK ME/SM	P6	L-1-1			116.67					127.77	Operation Procedure, preferred resources and to re-configure systems after 1st contingency, monitor non-coincident peak load growth
SD-T-50	22884 WARNERS 69.0 22688 RINCON 69.0 1 1	TL0681 ASH-FE-VC ck 1 AND TL0683 RINCON-LILAC ck 1	P6	L-1-1	100.4	103.56	93.63			127.11	107.37	124.08	Operation Procedure to radialize Rincon substation after first contingency

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Peak with no Behind-the-meter PV	2021 SP Heavy Renewable & Min Gas Gen	2026 Summer Peak with no Behind-the-meter PV		
SD-T-51	22112 CAPSTRNO 138 22656 PICO 138 1 1	TL13833 CAPSTRNO-TRABUCO ck 1 AND TL13838 R.MSNVJO-MARGARTA ck 1	P6	L-1-1	120.46				106.33		125.57			SOCRE project as previously approved in transmission plan, Operation Procedure in the interim
SD-T-52	22664 POMERADO 69.0 22828 SYCAMORE 69.0 2 1	TL23051 SYCAMORE - ARTESN ck 1 AND TL06915 POMERADO -SYCAMORE ck 1	P6	L-1-1		107.22	111.67					111.2	124.43	Operation Procedure to radialize Pomerado after the 1st contingency
SD-T-53	22664 POMERADO 69.0 22828 SYCAMORE 69.0 1 1	TL23051 SYCAMORE - ARTESN ck 1 AND TL06924 POMERADO -SYCAMORE ck 2	P6	L-1-1		107.22	111.67					111.2	124.43	Operation Procedure to radialize Pomerado after the 1st contingency
SD-T-54	22736 SANTYSBL 69.0 22152 CREELMAN 69.0 1 1	TL0635 CREELMAN - LOSCOCHS ck 1 AND TL06917 CREELMAN-SYCAMORE ck 1	P6	L-1-1	95.8	103.57	96.49				108.94	110.46	121.51	Operation Procedure to radialize Pomerado substation after first contingency
SD-T-55	22416 LOVELAND 69.0 22168 DESCANSO 69.0 1 1	TL6914NW MIGUEL-LOVELAND ck 1 AND TL0678 LOSCOCHS-ALPINE ck 1	P6	L-1-1		95.4	95.77					98.58	120.05	Operation Procedure to radialize Pomerado substation after first contingency
SD-T-56	22696 ROSE CYN 69.0 22140 CLARMTTP 69.0 1 1	TL0663 KEARNY -MISSION ck 1 AND TL0676 MESAHTGTS-MISSION ck 1	P6	L-1-1	92.76	93.6	104.32					97.64	119.48	Upgrade Relay Rating on Rose Cyn end
SD-T-57	22556 NAVSTMTR 69.0 22824 SWTWTRTP 69.0 1 1	TL23026 SILVERGT - BAY BLVD ck 1 AND TL06949 SILVERGT-NATNLCTY 69 ck 1	P6	L-1-1	107.85				118.67		107.17			Operation Procedure, Open the Line after 1st contingency
SD-T-58	22272 ESCO 69.0 22876 WARCYNTP 69.0 1 1	TL0633 BERNARDO-R.CARMEL ck 1 AND TL06913 POWAY-POMERADO ck 1	P6	L-1-1	114						116.45			Poway-Pomerado Line 2, Operation Procedure in the interim
SD-T-59	22524 MORHILTP 69.0 22440 MELROSE 69.0 1 1	TL0698 MN-AV-PA ck 1 AND TL06912 PENDLETN-SANLUSRY ck 1	P6	L-1-1	104.99	95.29	99.24				114.32	98.87	113.65	Re-configuration of systems in 2021 and 26 reduces load in the affected area to mitigate, Operation Procedure to radialize Pendleton and Avocado in the interim
SD-T-60	22440 MELROSE 69.0 22708 SANLUSRY 69.0 2 1	TL0684 ESCNDIDO-SANMRCOS ck 1 AND LD_ME OPEN 680A PEAK ME	P6	L-1-1	105.54						113.69			Operation Procedure to radialize San Marcos, re-distribution of load in 2021 and 2026 cases

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Peak with no Behind-the-meter PV	2021 SP Heavy Renewable & Min Gas Gen	2026 Summer Peak with no Behind-the-meter PV	
SD-T-61	22484 MIRAMAR1 69.0 22296 FENTONTP 69.0 1 1	TL06916 SYCAMORE-SCRIPPS ck 1 AND LD_MRM OPEN 675 PEAK MRM/MR/SS	P6	L-1-1	99.81	106.94	105.46	99.07		104.44	107.36	113.52	Operation Procedure, re-configure systems after 1st contingency, load shed after second contingency, monitor non-coincident peak load growth
SD-T-62	22192 DOUBLTTP 138 22300 FRIARS 138 1 1	TL23013 PENSQTOS - OT ck 1 AND SX - PQ 230 ck 1	P6	L-1-1	107.62			113.48		105.8			Mission-PQ line to mitigate, Operation Procedure to re-dispatch Generation in the interim
SD-T-63	22768 BAY BLVD 69.0 22520 MONTGYTP 69.0 1 1	TL0641 SOUTHBAY - MONTGMRY ck 1 AND TL0644 BAY BLVD - SWEETWTR ck 1	P6	L-1-1		101.1	101.69				104.45	111.66	Operation Procedure to radialize Montgomery after 1st contingency
SD-T-64	22668 POWAY 69.0 22876 WARCYNTP 69.0 1 1	TL0633 BERNARDO-R.CARMEL ck 1 AND TL06913 POWAY-POMERADO ck 1	P6	L-1-1	108.65					111.08			Poway-Pomerado Line 2, Operation Procedure in the interim
SD-T-65	22480 MIRAMAR 69.0 22296 FENTONTP 69.0 1 1	TL06916 SYCAMORE-SCRIPPS ck 1 AND LD_MRM OPEN 675 PEAK MRM/MR/SS	P6	L-1-1	97.16	104.9	102.8	96.58		101.77	105.25	110.83	Operation Procedure, re-configure systems after 1st contingency, load shed after second contingency, monitor non-coincident peak load growth
SD-T-66	22040 BARRETT 69.0 22104 CAMERON 69.0 1 1	TL0629 CW-DE-GC ck 1 AND TL0678 LOSCOCHS-ALPINE ck 1	P6	L-1-1					110.62				Crestwood SPS
SD-T-67	22208 EL CAJON 69.0 22408 LOSCOCHS 69.0 1 1	TL0624 EL CAJON-JAMACHA ck 1 AND LD_GR OPEN 632 PK JM/EC/GA	P6	L-1-1	103.31					110.39			Operation Procedure to radialize Granite in the interim, re-configure of load in 2021 and 2026 cases
SD-T-68	22256 ESCNDIDO 69.0 22724 SANMRCOS 69.0 1 1	TL23011 PEN 230 - SANLUSRY SC ck1 AND TL23030 ESCNDIDO-TALEGA ck 1	P6	L-1-1				109.06					Escondido-San Marcos Ck 2, as previously approved, in 2018, Operation Procedure in the interim
SD-T-69	22476 MIGUELTP 69.0 22456 MIGUEL 69.0 1 1	TL23042 BAY BLVD-OTAYMESA-MIGUEL AND TL0621 PARADISE-MIGUEL ck 1	P6	L-1-1	105.52					108.95			Escondido-San Marcos Ck 2, as previously approved, in 2018, Operation Procedure in the interim
SD-T-70	22160 DEL MAR 69.0 22644 PENSQTOS 69.0 2 1	TL0610 DEL MAR-PENSQTOS ck 1 AND TL06952 NORTHCTY-PENSQTOS 69 ck 1	P6	L-1-1		103.19	95.72				107.3	108.78	Operation Procedure to radialize North City and Encinitas after 1st contingency

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Peak with no Behind-the-meter PV	2021 SP Heavy Renewable & Min Gas Gen	2026 Summer Peak with no Behind-the-meter PV	
SD-T-71	22331 MIRASNT0 69.0 22316 GENESEE 69.0 1 1	TL06905 GENESEE -PENSQTOS ck 2 AND TL069 TOREYPNS to UCM ck 1	P6	L-1-1	102.21	104.81	90.3			104.33	108.73		Operation Procedure, radialize Genesee and UCM substation after 1st contingency
SD-T-72	22644 PENSQTOS 69.0 22164 DELMARTP 69.0 1 1	TL0662 PENSQTOS -TOREYPNS ck 1 AND TL06959 MIRASNT0-PENSQTOS ck 1	P6	L-1-1	104.3	96.36				108.04	99.99		Operation procedure to radialize TOREYPNS and MIRASNT0 after 1st contingency
SD-T-73	22656 PICO 138 22860 TRABUCO 138 1 1	13816/13831_CP-PI + TA-RMV 138kV w/non- coincd peak	P6	L-1-1	103.3			104.62		107.58			SOCRE project as previously approved in transmission plan, Operation Procedure in the interim
SD-T-74	22040 BARRETT 69.0 22416 LOVELAND 69.0 1 1	TL0629 CW-DE-GC ck 1 AND TL0678 LOSCOCHS-ALPINE ck 1	P6	L-1-1					107.25				Crestwood SPS
SD-T-75	22442 MELRSETP 69.0 22724 SANMRCOS 69.0 1 1	TL0684 ESCNDIDO-SANMRCOS ck 1 AND LD_ME OPEN 693 PEAK ME/SM	P6	L-1-1	99.21			99.49		106.78			Escondido-San Marcos Ck 2, as previously approved, in 2018, Operation Procedure in the interim
SD-T-76	22160 DEL MAR 69.0 22644 PENSQTOS 69.0 1 1	TL0667 DEL MAR-PENSQTOS ck 2 AND TL06952 NORTHCTY-PENSQTOS 69 ck 1	P6	L-1-1		100.72	93.44				104.76	106.28	Operation Procedure to radialize North City and Encinitas after 1st contingency
SD-T-77	22844 TALEGA 230 22840 TALEGA 138 1 1	TA BK 61 230/138 AND TA BK 63 230/138	P6	T-1,T-1	100.44					105.9			Operation Procedure as an interim solution until SOCRE project in service
SD-T-78	22840 TALEGA 138 22656 PICO 138 1 1	TL13846 TA TAP33 TALEGA-SM-PICO ck 1 AND TL13838 R.MSNVJO-MARGARTA ck 1	P6	L-1-1	100.97					105.68			SOCRE project as previously approved in transmission plan, Operation Procedure in the interim
SD-T-79	22200 DUNHILTP 69.0 22188 DOUBLTTP 69.0 1 1	TL0662 PENSQTOS -TOREYPNS ck 1 AND TL06959 MIRASNT0-PENSQTOS ck 1	P6	L-1-1	101.03	101.32				104.44	105.14		Operation procedure to radialize TOREYPNS and MIRASNT0 after 1st contingency
SD-T-80	22188 DOUBLTTP 69.0 22164 DELMARTP 69.0 1 1	TL0662 PENSQTOS -TOREYPNS ck 1 AND TL06959 MIRASNT0-PENSQTOS ck 1	P6	L-1-1	101.03	101.32				104.44	105.14		Operation procedure to radialize TOREYPNS and MIRASNT0 after 1st contingency
SD-T-81	22656 PICO 138 22842 TA TAP33 138 1 1	13831/13836_TA-RMV + TA-PI 138kV w/non- coincd peak	P6	L-1-1	100.1			101.28		104.47			SOCRE project as previously approved in transmission plan, Operation Procedure in the interim



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Peak with no Behind-the-meter PV	2021 SP Heavy Renewable & Min Gas Gen	2026 Summer Peak with no Behind-the-meter PV		
SD-T-82	22604 OTAY 69.0 22616 OTAYLKTP 69.0 1 1	TL0623 IB-OY-SYO ck 1 AND TL06910 SALT CREEK - BORDER ck 1	P6	L-1-1	102.2	100.92	103.99					96.05		Border SPS
SD-T-83	22768 BAY BLVD 69.0 22516 MONTGMRY 69.0 1 1	TL23026 SILVERGT - BAY BLVD ck 1 AND TL0644 BAY BLVD - SWEETWTR ck 1	P6	L-1-1		94.18	92.89					97.19	103.92	Operation Procedure, Open the Line after 1st contingency, monitor load growth
SD-T-84	22844 TALEGA 230 22840 TALEGA 138 3 1	TA BK 61 230/138 AND TA BK 63 230/138	P6	T-1,T-1	98.55						103.91			Operation Procedure as an interim solution until SOCRE project in service
SD-T-85	22840 TALEGA 138 22842 TA TAP33 138 1 1	13831/13836_TA-RMV + TA-PI 138kV w/non-coincd peak	P6	L-1-1	98.82			99.93			103.14			SOCRE project as previously approved in transmission plan, Operation Procedure in the interim
SD-T-86	22316 GENESEE 69.0 22864 UCM 69.0 1 1	TL0662 PENSQTOS -TOREYPNS ck 1 AND TL0666 PQ-DB-DH-TP ck 1	P6	L-1-1	97.56	99.32					100.61	103.08		Operation procedure to radialize TOREYPNS after 1st contingency
SD-T-87	22548 NATNLCTY 69.0 22824 SWTWTRTP 69.0 1 1	TL23026 SILVERGT - BAY BLVD ck 1 AND TL0658 SAMPSON-DIVISION ck 1	P6	L-1-1	103.04						102.84			Operation Procedure, Open the Line after 1st contingency
SD-T-88	22668 POWAY 69.0 22664 POMERADO 69.0 2 1	TL23051 SYCAMORE - ARTESN ck 1 AND TL06913 POWAY-POMERADO ck 1	P6	L-1-1			91.05						101.78	Operation procedure to radialize R. Carmel after 1st contingency, higher emergency rating
SD-T-89	22256 ESCNDIDO 69.0 22272 ESCO 69.0 1 1	TL0633 BERNARDO-R.CARMEL ck 1 AND TL06913 POWAY-POMERADO ck 1	P6	L-1-1	97.54						101.56			Poway-Pomerado Line 2, Operation Procedure in the interim
SD-T-90	22556 NAVSTMTR 69.0 22820 SWEETWTR 69.0 1 1	TL23026 SILVERGT - BAY BLVD ck 1 AND TL0603B/D NSM-SW ck 1	P6	L-1-1		93.2	93.82					95.56	100.9	Operation Procedure, Open the Line after 1st contingency, monitor load growth
SD-T-91	22582 OCEAN RANCH 69.0 22440 MELROSE 69.0 1 1	LD_ME OPEN 693 PEAK ME/SM AND TL693 SANLUSRY to MELROSE ck 1	P6	L-1-1									100.36	Operation Procedure, monitor load growth
SD-T-92	22680 R.SNTAFE 69.0 22685 R.SNTTP1 69.0 1 1	TL0660 ENCINITAS-DEL MAR ck 1 AND TL06952 NORTHCTY-PENSQTOS 69 ck 1	P6	L-1-1	94.5						100.16			Operation Procedure, monitor load growth
SD-T-93	22840 TALEGA 138 22720 SANMATEO 138 1 1	13831/13836_TA-RMV + TA-PI 138kV w/non-coincd peak	P6	L-1-1		91.29	95		94.03		91.1	102.66		Operation Procedure, monitor load growth
SD-T-94	22808 STUARTTP 69.0 22400 LASPULGS 69.0 1 1	TL23007 TALEGA - SONGS ck 1 AND TL23052 TALEGA - S.ONOFRE ck 2	P7	L-2	184.04						197.86			Upgrade Talega Tap - Stuart Tap 69 kV, as previously approved, in 2018, SPS to trip TL 695 in the interim

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Peak with no Behind-the-meter PV	2021 SP Heavy Renewable & Min Gas Gen	2026 Summer Peak with no Behind-the-meter PV		
SD-T-95	22046 BASILONE 69.0 22848 TALEGATP 69.0 1 1	TL23007 TALEGA - SONGS ck 1 AND TL23052 TALEGA - S.ONOFRE ck 2	P7	L-2	140.13						148.58			Upgrade Talega Tap - Stuart Tap 69 kV, as previously approved, in 2018, SPS to trip TL 695 in the interim
SD-T-96	22368 JAP MESA 69.0 22400 LASPULGS 69.0 1 1	TL23007 TALEGA - SONGS ck 1 AND TL23052 TALEGA - S.ONOFRE ck 2	P7	L-2	128.77						138.19			Upgrade Talega Tap - Stuart Tap 69 kV, as previously approved, in 2018, SPS to trip TL 695 in the interim
SD-T-97	22046 BASILONE 69.0 22368 JAP MESA 69.0 1 1	TL23007 TALEGA - SONGS ck 1 AND TL23052 TALEGA - S.ONOFRE ck 2	P7	L-2	124.53						133.96			Upgrade Talega Tap - Stuart Tap 69 kV, as previously approved, in 2018, SPS to trip TL 695 in the interim
SD-T-98	22324 GLENCLIF 69.0 22328 GLNCLFTP 69.0 1 1	13824/6914NEW_JM-TC-ML60 138kV+ ML-LL 69 kV	P7	L-2								129.74		Radial Line, Further Investigation
SD-T-99	22612 OTAYLAKE 69.0 22080 BORDERTP 69.0 1 1	23054/23055_SX-SUNCREST ckt 1&2 230kv	P7	L-2								111.33		Radial Line, Further Investigation
SD-T-100	22306 GARFIELD 69.0 22208 EL CAJON 69.0 1 1	TL0618 MISSION-MURRAY ck 1 AND TL0619 MISSION-MURRAY ck 2	P7	L-2	104.13	103.68	99.44				113.4	107.91	115.04	preferred resources, operation procedure with higher emergency rating
SD-T-101	22160 DEL MAR 69.0 22164 DELMARTP 69.0 1 1	TL0610 DEL MAR-PENSQTOS ck 1 AND TL0667 DEL MAR-PENSQTOS ck 2	P7	L-2	107.15						112.76			Del Mar - North City line, as previously approved, in 2018, Operation Procedure in the interim to radialize Del Mar
SD-T-102	22588 OCNSDETP 69.0 22808 STUARTTP 69.0 1 1	TL23007 TALEGA - SONGS ck 1 AND TL23052 CAPSTRNO - S.ONOFRE ck 1	P7	L-2			91.59						107.11	Operation Procedure to open the line, monitor load growth
SD-T-103	22644 PENSQTOS 69.0 22164 DELMARTP 69.0 1 1	662/6905_PQ-TP + PQ-GE	P7	L-2	96.64						100.12	92.97		Operation Procedure, monitor load growth



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %								Potential Mitigation Solutions	
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Peak with no Behind-the-meter PV	2021 SP Heavy Renewable & Min Gas Gen	2026 Summer Peak with no Behind-the-meter PV		
SD-VD-1	22040 BARRETT 69 kV	TL06957_TL06957 LOVELAND-BARRETT ck 1	P1	L-1						-6.31			6.219	Turn on Reactor at Kumewaay
SD-VD-2	22104 CAMERON 69 kV	TL06923_TL06923 BARRETT -CAMERON ck 1	P1	L-1						-5.769				Turn on Reactor at Kumewaay
SD-VD-3	22680 R.SNTAFE 69 kV	TL0616A_TL0616A BERNARDO-R.SNTAFE ck 1	P1	L-1								5.438		Monitor Load Growth
SD-VD-4	22903 KUMEYAAY 69 kV	TL06958_TL06958 CRESTWOOD-CAMERON ck 1	P1	L-1					-5.077					Turn on Reactor at Kumewaay
SD-VD-5	22902 CRESTWD 69 kV	TL06958_TL06958 CRESTWOOD-CAMERON ck 1	P1	L-1					-5.072					Turn on Reactor at Kumewaay
SD-VD-6	22870 VALCNTR 69 kV	TL0681 ASH-FE-VC ck 1 AND TL0683 RINCON-LILAC ck 1	P6	L-1-1		10.624					15.486		10.626	Operation Procedure to radialize Rincon substation after first contingency
SD-VD-7	22688 RINCON 69 kV	TL0681 ASH-FE-VC ck 1 AND TL0683 RINCON-LILAC ck 1	P6	L-1-1		10.545					15.341		10.527	Operation Procedure to radialize Rincon substation after first contingency



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)							Potential Mitigation Solutions		
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 Summer Peak with no Behind-the-meter PV	2021 SP Heavy Renewable & Min Gas Gen		2026 Summer Peak with no Behind-the-meter PV	
SD-V-1	22903 KUMEYAAY 69 kV	TL6958_TL6958 CW-CM	P1	L-1						1.1163				Turn on Reactor at Kumewaay
SD-V-2	22902 CRESTWD 69 kV	TL6958_TL6958 CW-CM	P1	L-1						1.1153				Turn on Reactor at Kumewaay
SD-V-3	22104 CAMERON 69 kV	TL06923_TL06923 BARRETT -CAMERON ck 1	P1	L-1						1.114				Turn on Reactor at Kumewaay
SD-V-4	22040 BARRETT 69 kV	TL06957_TL06957 LOVELAND-BARRETT ck 1	P1	L-1						1.1121				Turn on Reactor at Kumewaay
SD-V-5	22324 GLENCLIF 69 kV	TL6958_TL6958 CW-CM	P1	L-1						1.1061				Turn on Reactor at Kumewaay
SD-V-6	22328 GLNCLFTP 69 kV	TL6958_TL6958 CW-CM	P1	L-1						1.1061				Turn on Reactor at Kumewaay
SD-V-7	22688 RINCON 69 kV	TL0681 ASH-FE-VC ck 1 AND TL0683 RINCON-LILAC ck 1	P6	L-1-1		0.907					0.8757		0.9077	Operation Procedure to radialize Rincon substation after first contingency
SD-V-8	22870 VALCNTR 69 kV	TL0681 ASH-FE-VC ck 1 AND TL0683 RINCON-LILAC ck 1	P6	L-1-1		0.9001					0.867		0.8992	Operation Procedure to radialize Rincon substation after first contingency
SD-V-9	22736 SANTYSBL 69 kV	TL0635 CREELMAN - LOSCOCHS ck 1 AND TL06917 CREELMAN-SYCAMORE ck 1	P6	L-1-1								0.8944		Operation Procedure to radialize Pomerado substation after first contingency
SD-V-10	22152 CREELMAN 69 kV	TL0635 CREELMAN - LOSCOCHS ck 1 AND TL06917 CREELMAN-SYCAMORE ck 1	P6	L-1-1		0.8695						0.8481	0.8932	Operation Procedure to radialize Pomerado substation after first contingency



ID	Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)								Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1												

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1										

No single source substation with more than 100 MW Load

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)						Potential Mitigation Solutions	Notes
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2021 SOP Heavy Renewable & Min Gas Gen		
VEA-T-1	18003 AMARGOSA 230 189001 AMARGOSA 138 1 1	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to MEAD S 230.0 Circuit 1	P6	N-1-1	107.50	N/A	N/A	<90	N/A	N/A	Existing UVLS or operational action plan (Switching after N-1)	
VEA-T-1b	18003 AMARGOSA 230 189001 AMARGOSA 138 1 1	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	N/A	123.77	123.37	N/A	<90	<90	Existing UVLS or operational action plan (Switching after N-1)	
VEA-T-2	18003 AMARGOSA 230 189001 AMARGOSA 138 1 1	Line NWEST 230.0 to DESERT VIEW 230.0 Circuit 1 & Line Line PAHRUMP 230.0 to MEAD S 230.0 Circuit 1	P6	N-1-1	106.82	N/A	N/A	<90	N/A	N/A	Existing UVLS or operational action plan (Switching after N-1)	
VEA-T-2b	18003 AMARGOSA 230 189001 AMARGOSA 138 1 1	Line NWEST 230.0 to DESERT VIEW 230.0 Circuit 1 & Line Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	N/A	120.87	121.92	N/A	<90	<90	Existing UVLS or operational action plan (Switching after N-1)	
VEA-T-3	18084 NWEST 138 18102 SNOW MTN 138 1 1	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to MEAD S 230.0 Circuit 1	P6	N-1-1	104.80	N/A	N/A	<90	N/A	N/A	Existing UVLS or operational action plan (Switching after N-1)	
VEA-T-3b	18084 NWEST 138 18102 SNOW MTN 138 1 1	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	N/A	135.37	135.75	N/A	<90	<90	Existing UVLS or operational action plan (Switching after N-1)	
VEA-T-4	18045 CANYON 138 18102 SNOW MTN 138 1 1	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to MEAD S 230.0 Circuit 1	P6	N-1-1	110.40	N/A	N/A	<90	N/A	N/A	Existing UVLS or operational action plan (Switching after N-1)	
VEA-T-4b	18045 CANYON 138 18102 SNOW MTN 138 1 1	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	N/A	133.93	133.82	N/A	<90	<90	Existing UVLS or operational action plan (Switching after N-1)	
VEA-T-5	18091 RADAR138 18073 IS TAP 138 189101 MERCRYSW 138 1 1	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to MEAD S 230.0 Circuit 1	P6	N-1-1	102.07	N/A	N/A	<90	N/A	N/A	Existing UVLS or operational action plan (Switching after N-1)	
VEA-T-5b	18091 RADAR138 18073 IS TAP 138 189101 MERCRYSW 138 1 1	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	N/A	125.58	121.49	N/A	<90	<90	Existing UVLS or operational action plan (Switching after N-1)	
VEA-T-6	18045 CANYON 138 18798 SIL FLG 138 18050 COLDCREK 138 18091 RADAR 138	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to MEAD S 230.0 Circuit 1	P6	N-1-1	115.96	N/A	N/A	<90	N/A	N/A	Existing UVLS or operational action plan (Switching after N-1)	
VEA-T-6b	18045 CANYON 138 18798 SIL FLG 138 18050 COLDCREK 138 18091 RADAR 138	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	N/A	132.57	132.41	N/A	<90	<90	Existing UVLS or operational action plan (Switching after N-1)	



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %						Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2021 SOP Heavy Renewable & Min Gas Gen	
VEA-VD-1	CHARLSTN-THSNDAIR-GAMEBIRD 138kV	Line GAMEBIRD 138.0 to PAHRUMP 138.0 Circuit 1	P1	N-1	5.744	<5	<5	5.873	<5	<5	New planned Vista - Charleston 138kV Line
VEA-VD-2	INNOVATION 230kV	Line NWEST 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	18.535	22.916	20.22	14.762	-11.815	13.362	Existing UVLS or operational action plan (Switching after N-1)
VEA-VD-3	PAHRUMP 230kV	Line NWEST 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	18.155	18.86	20.018	14.554	-12.357	12.975	Existing UVLS or operational action plan (Switching after N-1)
VEA-VD-4	DESERT VIEW 230kV	Line NWEST 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	18.594	22.989	20.285	14.809	-11.853	13.404	Existing UVLS or operational action plan (Switching after N-1)
VEA-VD-5	JACKASSF 138kV	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	<10	18.251	12.641	<10	<10	<10	Existing UVLS or operational action plan (Switching after N-1)
VEA-VD-6	LTHRPWLS 138kV	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	<10	18.752	12.906	<10	<10	<10	Existing UVLS or operational action plan (Switching after N-1)
VEA-VD-7	MERCERYSW 138kV	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	<10	17.104	11.896	<10	<10	<10	Existing UVLS or operational action plan (Switching after N-1)



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)						Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Summer Off-Peak	2021 Summer Light Load	2021 SOP Heavy Renewable & Min Gas Gen	
VEA-V-1	DESERT VIEW 230kV	Line NWEST 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to MEAD S 230.0 Circuit 1	P6	N-1-1	0.8453	N/A	N/A	0.8973	N/A	N/A	Existing UVLS or operational action plan (Switching after N-1)
VEA-V-1b	DESERT VIEW 230kV	Line NWEST 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	N/A	0.768	0.8151	N/A	1.1823	0.9	Existing UVLS or operational action plan (Switching after N-1)
VEA-V-2	INNOVATION-MERCRYSW-PAHRUMP-SANDY 138kV AREA	Line INNOVATION 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	>0.9	0.82	0.87	N/A	>0.9	>0.9	Existing UVLS or operational action plan (Switching after N-1)
VEA-V-3	INNOVATION-MERCRYSW-PAHRUMP-SANDY 138kV AREA	Line NWEST 230.0 to DESERT VIEW 230.0 Circuit 1 & Line PAHRUMP 230.0 to BOB SS 230.0 Circuit 1	P6	N-1-1	>0.9	0.83	0.89	>0.9	>0.9	>0.9	Existing UVLS or operational action plan (Switching after N-1)
X-V-4	CHARLSTN-THSNDAIR-GAMEBIRD-SANDY 138kV	Line GAMEBIRD 138.0 to PAHRUMP 138.0 Circuit 1 & Line CHARLSTN 138.0 to VISTA 138.0 Circuit 1	P6	N-1-1	NA	0.83	>0.9	N/A	>0.9	>0.9	Existing UVLS or operational action plan (Switching after N-1)
X-V-7											
X-V-8											
X-V-9											
X-V-10											
X-V-11											
X-V-12											
X-V-13											
X-V-14											
X-V-15											
X-V-16											
X-V-17											
X-V-18											
X-V-19											

ID	Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	
X-TS-1										
X-TS-2										
X-TS-3										
X-TS-4										
X-TS-5										
X-TS-6										
X-TS-7										
X-TS-8										
X-TS-9										
X-TS-10										
X-TS-11										
X-TS-12										
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X-TS-26										
X-TS-27										
X-TS-28										
X-TS-29										
X-TS-30										
X-TS-31										

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)								Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1												

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



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1										

No single source substation with more than 100 MW Load