2022-2023 ISO Reliability Assessment - Study Results
Study Area: PG&E Greater Bay Area
Thermal Overloads

California ISO

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
AMES-Mountain View 115 kV	P2-4:A17:5:_MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	144	15	26	88	16	74	22	15	118	89	14	<100	Project: Monta Vista bus upgrade
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	144	157	42	49	Diverge	Diverge	148	Diverge	<100	Install redundent battery supply
AMES-Whisman 115 kV	P2-4:A17:5:_MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	150	2	23	83	50	72	35	1	117	84	4	<100	Project: Monta Vista bus upgrade
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	135	140	36	46	Diverge	Diverge	137	Diverge	<100	Install redundent battery supply
	TESLA-METCALF 500kV & MOSSLAND-LOSBANOS 500kV	P6	N-1-1	<100	<100	103	<100	82	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
AWSGILROYSS-LLAGAS 115 kV	METCALF-MORGAN HILL 115KV & METCALF-EL PATIO #2 115KV	P6	N-1-1	119	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Morgan Hill-Green Valley project
AWSGILROYSS-LLAGAS 115 kV Line No 1	METCALF-MORGAN HILL 115KV [2570] & GREENVALLEY-MRGN	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	137	Continue to monitor
Bahia - Moraga 230 kV	P5-5A:A8:2:_C.COSTAPP 230KV BUS 1&2(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	92	96	67	65	57	53	55	38	102	89	101	<100	Install redundent relay
	P5-5C:A8:2:_CONTRA COSTA PP 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	89	93	64	63	57	51	54	36	100	87	97	<100	Install redundent battery supply
Bair 115/60kV Transformer #1	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	217	214	206	222	222	201	212	207	190	222	211	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	202	177	177	221	225	202	211	192	Diverge	220	170	<100	Install redundent battery supply
Bair-Belmont 115kV Line	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	143	147	147	118	121	99	105	118	128	118	145	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	138	137	137	117	118	99	105	112	Diverge	117	135	<100	Install redundent battery supply
Bair-Cooley Landing #1 60kV Line	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	352	353	344	343	338	276	302	307	308	343	349	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	337	322	319	343	339	275	302	292	Diverge	344	313	<100	Install redundent battery supply
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	234	223	222	238	235	158	174	168	Diverge	239	218	<100	Install redundent battery supply
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	83	75	73	101	96	71	65	62	Diverge	100	74	<100	Install redundent battery supply
Bair-Cooley Landing #2 60kV Line	Base Case	Base	P0	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	294	301	299	264	278	186	196	211	266	264	297	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	286	274	278	264	279	186	196	204	Diverge	264	267	<100	Install redundent battery supply
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	277	260	251	306	317	237	245	231	Diverge	306	254	<100	Install redundent battery supply
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	103	101	107	71	70	50	55	73	Diverge	72	100	<100	Install redundent battery supply
	CLY LND2 115/60KV TB 2 & CLY LND 115/60KV TB 1	P6	N-1-1	152	153	206	<100	<100	<100	<100	<100	<100	<100	153	<100	Operating solution
Cayetano-Lone Tree (Lone Tree-USWP) 230kV Line	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2	Bus/Breaker	111	111	104	44	46	48	52	61	73	58	110	<100	Line capacity increase, flow control or generation redispatch
	P2-4:A8:13:_C.COSTAPPF 230KV - SECTION 2F & 1F	P2	Bus/Breaker	100	93	92	22	36	35	38	52	57	38	91	<100	Project: Contra Costa lines reconfiguratiaon
	P2-2:A16:10:_NEWARK D 230KV SECTION 1D	P2	Bus/Breaker	99	103	102	37	46	42	50	60	65	51	101	<100	Line capacity increase, flow control or Newark bus upgrade
	P2-4:A16:17:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Bus/Breaker	95	103	105	34	45	39	49	61	61	47	101	<100	Line capacity increase, flow control or Newark bus upgrade
	P2-4:A16:7:_NEWARK E 230KV - SECTION 1E & 2E	P2	Bus/Breaker	93	94	101	31	36	36	39	59	56	45	92	<100	Line capacity increase, flow control or Newark bus upgrade
	P1-1:A8:18:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS & P1-2:A8:13:_CONTRA COSTA-LAS POSITAS 230KV [4510]	P3	G-1/N-1	100	100	103	<100	<100	<100	<100	<100	<100	<100	100	<100	Line capacity increase, flow control or Newark bus upgrade
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	68	65	58	61	Diverge	Diverge	76	Diverge	<100	Install redundent battery supply
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	113	113	106	45	47	49	55	62	75	59	112	<100	Install redundent battery supply
	P5-5A:A8:4:_MORAGA 230KV BUS #1 &2(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	111	111	104	44	46	48	52	61	73	58	110	<100	Install redundent relay
	CONTRA COSTA-LAS POSITAS 230KV & COLLNSVL-PITSBG F #1 230KV	P6	N-1-1	<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
	P7-1:A8:4_Contra Costa-Moraga Nos. 1 & 2 230 kV lines	P7	DCTL	105	104	100	40	41	44	48	59	64	52	103	<100	Line capacity increase, flow control or generation redispatch
	P7-1:A16:5_Tesla-Newark No.1 and Tesla-Ravenswood 230 kV lines	P7	DCTL	102	105	103	48	50	46	53	60	72	58	104	<100	Line capacity increase, flow control or generation redispatch
	P7-1:A16:7_Tesla - Newark No.2 and Metcalf - Los Esteros 230 kV	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Line capacity increase, flow control or generation redispatch
	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2	Bus/Breaker	111	111	104	47	50	50	54	62	86	62	109	<100	Line capacity increase, flow control or generation redispatch

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Cayetano-Lone Tree (USWP-Cayetano) 230kV Line	P2-4:A8:13:_C.COSTAPPF 230KV - SECTION 2F & 1F	P2	Bus/Breaker	100	93	92	27	41	37	40	54	70	41	90	<100	Project: Contra Costa lines reconfiguratiaon
	P2-2:A16:10:_NEWARK D 230KV SECTION 1D	P2	Bus/Breaker	99	103	102	41	50	44	52	61	77	54	101	<100	Line capacity increase, flow control or Newark bus upgrade
	P2-4:A16:17:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Bus/Breaker	95	103	105	38	49	42	50	63	74	51	101	<100	Line capacity increase, flow control or Newark bus upgrade
	P2-4:A16:7:_NEWARK E 230KV - SECTION 1E & 2E	P2	Bus/Breaker	93	94	101	35	40	39	41	60	68	49	92	<100	Line capacity increase, flow control or Newark bus upgrade
	P1-1:A8:18:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS & P1-2:A8:13:_CONTRA COSTA-LAS POSITAS 230KV [4510]	P3	G-1/N-1	100	100	103	<100	<100	<100	<100	<100	<100	<100	99	<100	Line capacity increase, flow control or Newark bus upgrade
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	71	69	60	63	Diverge	Diverge	80	Diverge	<100	Install redundent battery supply
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	113	113	106	49	51	51	57	64	87	63	111	<100	Install redundent battery supply
	P5-5A:A8:4:_MORAGA 230KV BUS #1 &2(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	111	111	104	47	50	50	54	62	86	62	109	<100	Install redundent relay
	CONTRA COSTA-LAS POSITAS 230KV & COLLNSVL-PITSBG F #1 230KV	P6	N-1-1	<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
	P7-1:A8:4_Contra Costa-Moraga Nos. 1 & 2 230 kV lines	P7	DCTL	105	104	100	44	46	46	50	60	76	56	103	<100	Line capacity increase, flow control or generation redispatch
	P7-1:A16:5_Tesla-Newark No.1 and Tesla-Ravenswood 230 kV lines	P7	DCTL	102	105	103	51	54	48	54	62	85	61	104	<100	Line capacity increase, flow control or generation redispatch
Christie-Sobrante (Oleum-Sobrante) 115kV Line	P7-1:A7:3_Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	124	107	46	106	44	82	89	51	89	109	107	<100	Project: Sobrante-Christie reconductor
Claremont K - Oakland D #1 115kV Cable	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	86	86	114	64	74	54	47	88	78	69	104	<100	Install redundent battery supply
	K-D #2 115KV [9967] & MORAGA-OAKLAND J 115KV [2760]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	Project: Oakland Clean Energy Initiative
	P1-2:A7:24:_K-D #2 115KV [9967] & P1-2:A7:6:_MORAGA-OAKLAND #2 115KV [2730]	P6	N-1-1	58	64	101	46	50	35	26	74	43	46	68	<100	Project: Oakland Clean Energy Initiative
Claremont K - Oakland D #2 115kV Cable	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	84	84	111	63	72	52	46	85	76	68	101	<100	Install redundent battery supply
	K-D #1 115KV [9966] & MORAGA-OAKLAND J 115KV [2760]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Project: Oakland Clean Energy Initiative
Claremont-East Portal 115kV section	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	99	99	133	74	82	48	43	79	86	80	119	<100	Install redundent battery supply
	SOBRANTE-MORAGA 115KV [3742] & SOBRANTE-GRIZZLY-CLA	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
CLY LNDG-BLHVNTP2 60 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	116	114	113	120	102	88	94	96	103	121	113	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	111	103	104	120	103	88	93	90	Diverge	121	102	<100	Install redundent battery supply
COLLNSVL-PITSBG E #1 230 kV	P1-1:A8:18:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS & P1-2:A8:85:_COLLNSVL-PITSBG F #1 230KV [0]	P3	G-1/N-1	<100	<100	122	<100	<100	<100	<100	<100	<100	<100	0	<100	Operating solution
COLLNSVL-PITSBG E 230 kV	Base Case	P0	Base Case	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor
	P1-2:A8:85:_COLLNSVL-PITSBG F #1 230KV [0]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	117	Continue to monitor
COLLNSVL-PITSBG F #1 230 kV	P1-1:A8:18:_DEC STG1 18.00KV & DEC CTG1 18.00KV & DEC CTG2 18.00KV & DEC CTG3 18.00KV GEN UNITS & P1-2:A8:86:_COLLNSVL-PITSBG E #1 230KV [0]	P3	G-1/N-1	<100	<100	121	<100	<100	<100	<100	<100	<100	<100	0	<100	Operating solution
COLLNSVL-PITSBG F 230 kV	P1-2:A8:86:_COLLNSVL-PITSBG E #1 230KV [0]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	117	Continue to monitor
Contra Costa-Las Positas 230kV Line	P2-4:A8:12:_C.COSTAPPE 230KV - SECTION 2E & 1E	P2	Bus/Breaker	112	34	34	32	2	61	38	38	68	52	23	<100	Project: Contra Costa lines reconfiguratiaon
Cooley Landing 115/60kV Transformer #1	P1-3:A10:12:_CLY LND2 115/60KV TB 2	P1-3	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor
Cooley Landing 115/60kV Transformer #2	P1-3:A10:13:_CLY LND 115/60KV TB 1	P1-3	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor
Cooley Landing-Palo Alto 115kV Line	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	102	99	89	122	119	76	74	68	104	122	97	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	97	90	84	121	120	77	73	65	85	121	87	<100	Install redundent battery supply
	RAVENSWOOD-COOLEY LANDING #1 115KV [3390] & RAVENSV	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	131	Continue to monitor
	P7-1:A10:20_Ravenswood-Cooley Landing Nos. 1 & 2 115 kV lines	P7	DCTL	79	81	106	61	55	48	53	69	66	61	84	<100	Continue to monitor
Cooley Landing-Stanford 60kV Line (Cooley Landing-SRI)	Base Case	Base	P0	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	116	Continue to monitor
Dixon Landing-McKee 115 kV Line	P1-2:A18:42:_PIERCY-METCALF 115KV [4318]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	90	67	94	57	Diverge	Diverge	93	Diverge	<100	Install redundent battery supply
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	79	52	82	43	Diverge	79	81	Diverge	<100	Install redundent battery supply
Eastshore 230/115kV Transformer #1	P1-3:A16:2:_E. SHORE 230/115KV TB 2	P1-3	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Continue to monitor
	E. SHORE 230/115KV TB 2 & EASTSHORE-SAN MATEO 230KV [4	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	142	Continue to monitor
Eastshore 230/115kV Transformer #2	P2-3:A16:6:_E. SHORE 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	108	66	85	43	22	50	42	56	33	45	68	101	Project: East Shore lines reconfiguration
	E. SHORE 230/115KV TB 1 & EASTSHORE-SAN MATEO 230KV [4	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	142	Continue to monitor

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Eastshore-San Mateo 230kV Line	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	105	103	102	67	57	59	61	72	Diverge	72	105	<100	Install redundent battery supply
	P5-5C:A16:11:_EASTSHORE 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	84	72	102	26	19	32	37	53	14	31	74	<100	Install redundent battery supply
	P7-1:A10:2_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	P7	DCTL	90	85	105	43	38	42	45	62	67	50	87	Diverge	Continue to monitor
	P7-1:A16:6_Newark-Ravenswood 230 kV and Tesla-Ravenswood 2	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Diverge	Continue to monitor
EGBERT S1-EGBERTSWSTA 230 kV	P5-5C:A9:2:_MARTIN (SF H) 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	93	Diverge	Diverge	49	38	61	65	68	60	49	Diverge	<100	Install redundent battery supply
	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	69	Diverge	Diverge	45	37	36	44	Diverge	52	44	Diverge	<100	Install redundent battery supply
EGBERT S2-EGBERTSWSTA 230 kV	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	106	Diverge	Diverge	65	56	51	61	Diverge	77	65	Diverge	<100	Install redundent battery supply
	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	106	Diverge	Diverge	<100	<100	<100	<100	Diverge	<100	<100	Diverge	<100	Install redundent battery supply
EGBERT S3-MARTIN S4 230 kV	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	94	Diverge	Diverge	56	53	49	52	Diverge	65	57	Diverge	<100	Install redundent battery supply
EGBERTSWSTA-EGBERT S3 230 kV	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	94	Diverge	Diverge	56	53	49	52	Diverge	65	57	Diverge	<100	Install redundent battery supply
El Patio-San Jose Sta. 'A' 115 kV Line	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	98	123	59	80	86	80	105	42	100	68	126	<100	Install redundent battery supply
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	87	109	50	66	81	66	101	31	95	54	112	<100	Install redundent relay
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	87	109	50	66	81	66	101	31	95	54	112	<100	Install redundent relay
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	86	113	Diverge	60	75	61	90	46	Diverge	55	114	<100	Install redundent battery supply
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	86	113	Diverge	60	75	61	90	46	Diverge	55	114	<100	Install redundent battery supply
	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	93	116	50	74	84	73	105	30	96	60	118	<100	Project: San Jose area HVDC
	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	93	116	50	74	84	73	105	30	96	60	118	<100	Project: San Jose area HVDC
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	89	111	53	69	83	69	104	34	97	57	113	<100	Project: San Jose area HVDC
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	89	111	53	69	83	69	104	34	97	57	113	<100	Project: San Jose area HVDC
EMBRCDRD-EGBERT S1 230 kV	P5-5C:A9:2:_MARTIN (SF H) 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	94	Diverge	Diverge	46	42	55	60	65	62	46	Diverge	<100	Install redundent battery supply
	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	73	Diverge	Diverge	44	41	36	42	Diverge	52	45	Diverge	<100	Install redundent battery supply
EMBRCDRD-EGBERT S1 230 kV Line No 1	SAN MATEO-MARTIN 230KV [9980] & POTRERO-TBC_POT1 #1	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
Evergreen-Almaden 60 kV Line	P1-2:A17:34:_MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	121	121	151	81	85	81	79	109	84	82	123	<100	Disable automatics
	P1-2:A17:34:_MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	121	121	152	81	85	81	79	109	84	82	123	<100	Disable automatics
EVERGREN-EVRGRN 1 115 kV	P1-2:A17:34:_MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	77	77	101	55	56	53	53	72	50	55	79	<100	Continue to monitor
FACEBOOKJCT2-FACEBOOKBH 60 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	55	53	40	66	118	52	49	43	42	66	54	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	53	48	40	65	118	52	49	41	Diverge	65	48	<100	Install redundent battery supply
FMC-San Jose 'B' 115 kV Line	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	139	<100	<100	102	<100	105	<100	<100	150	98	<100	<100	Project: SVP bus tie breaker upgrade
FMC-SANJOSEB 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	<100	<100	Diverge	<100	<100	<100	<100	80	<100	<100	<100	<100	Install redundent battery supply
Grant-Eastshore #1 115kV Line	P2-4:A8:34:_MORAGA.E 115KV - SECTION 2E & 1E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Continue to monitor
Grant-Eastshore #2 115kV Line	P2-4:A8:34:_MORAGA.E 115KV - SECTION 2E & 1E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110	Continue to monitor
Grant-Oakland J 115 kV Line	P2-4:A8:34:_MORAGA.E 115KV - SECTION 2E & 1E	P2	Bus/Breaker	92	93	109	67	59	47	51	61	70	68	94	<100	Continue to monitor
GREENVALLEY-MOSSLNSW 115 kV	P7-1:A18:18_Metcalf - Morgan Hill & Metcalf - Llagas 115 kV Lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor
GREENVALLEY-MRGN HIL 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	<100	Diverge	Diverge	<100	128	<100	103	Diverge	<100	<100	Diverge	<100	Install redundent battery supply
	P7-1:A18:18_Metcalf - Morgan Hill & Metcalf - Llagas 115 kV Lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Continue to monitor
Jefferson-Hillsdale JCT 60kV Line	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	154	155	213	151	103	113	126	158	98	153	157	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	96	111	84	122	103	76	84	78	Diverge	108	112	<100	Install redundent battery supply
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	90	102	82	109	90	79	88	87	Diverge	97	103	<100	Install redundent battery supply
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	89	102	80	108	90	79	88	86	Diverge	96	102	<100	Install redundent battery supply

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	89	102	80	108	90	79	88	86	Diverge	96	102	<100	Install redundent battery supply
Jefferson-Las Pulgas 60kV Line (Jefferson-Woodside)	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	116	Continue to monitor
Jefferson-Martin 230kV Cable	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	108	Diverge	Diverge	64	60	59	59	Diverge	82	65	Diverge	<100	Install redundent battery supply
Jefferson-Martin 230kV Line	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	107	Diverge	Diverge	64	57	56	59	Diverge	80	64	Diverge	<100	Install redundent battery supply
	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	107	Diverge	Diverge	64	57	56	59	Diverge	80	65	Diverge	<100	Install redundent battery supply
	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	107	Diverge	Diverge	63	56	55	59	Diverge	79	65	Diverge	<100	Install redundent battery supply
Jefferson-Stanford #1 60kV Line	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Install redundent relay
Kifer-Duane 115 kV Line	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	105	47	104	46	Diverge	Diverge	107	Diverge	<100	Install redundent battery supply
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	106	62	60	78	45	82	51	47	96	79	70	<100	Install redundent battery supply
Kifer-FMC 115 kV Line	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	190	<100	<100	143	<100	157	<100	<100	208	136	<100	<100	Project: SVP bus tie breaker upgrade
	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	117	<100	<100	88	<100	91	<100	<100	127	84	<100	<100	Project: SVP bus tie breaker upgrade
	SVP2-2:2:_NRS 300 115 kV bus	P2	Bus/Breaker	38	88	121	41	41	44	94	110	53	32	89	<100	Mitigation under review by SVP
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	83	64	79	37	Diverge	Diverge	85	Diverge	<100	Install redundent battery supply
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	134	104	136	63	Diverge	Diverge	138	Diverge	<100	Install redundent battery supply
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	138	132	50	83	114	87	90	22	117	83	147	<100	Install redundent battery supply
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	47	83	102	62	49	58	101	99	69	45	85	<100	Install redundent battery supply
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	42	79	Diverge	35	36	35	70	111	Diverge	29	70	<100	Install redundent battery supply
	SSS 230/230KV TB 1 & LOS ESTEROS-NORTECH 115KV	P6	N-1-1	<100	122	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Project: San Jose area HVDC
Lakewood Bus Tie	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	125	139	152	65	23	72	76	134	107	65	163	<100	Install redundent battery supply
Lakewood-Clayton 115kV Line	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	120	133	137	64	4	64	68	126	103	65	154	<100	Install redundent battery supply
Las Positas-Newark 230kV Line	P2-4:A8:12:_C.COSTAPPE 230KV - SECTION 2E & 1E	P2	Bus/Breaker	155	17	19	26	18	57	28	28	97	60	7	<100	Project: Contra Costa lines reconfiguratiaon
	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2	Bus/Breaker	110	106	97	34	54	37	41	50	87	53	104	<100	Project: Collinsville 500/230 kV station
	P2-4:A8:41:_C.COSTAPPE SECTION 2E & C.COSTAPPF SECTION 2F 230KV	P2	Bus/Breaker	108	78	77	28	32	34	25	39	76	47	73	<100	Project: Contra Costa lines reconfiguratiaon
	P2-4:A16:7:_NEWARK E 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Line capacity increase, flow control or generation redispatch
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	66	78	49	50	Diverge	Diverge	76	Diverge	<100	Install redundent battery supply
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	113	109	100	35	54	38	42	51	89	55	106	<100	Install redundent battery supply
	P5-5A:A8:4:_MORAGA 230KV BUS #1 &2(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	110	106	97	34	54	37	41	50	87	53	104	<100	Install redundent relay
	P7-1:A8:4_Contra Costa-Moraga Nos. 1 & 2 230 kV lines	P7	DCTL	103	98	92	30	48	34	37	47	76	46	95	100	Project: Collinsville 500/230 kV station
	P7-1:A16:5_Tesla-Newark No.1 and Tesla-Ravenswood 230 kV lines	P7	DCTL	100	101	96	38	61	37	41	50	88	55	99	<100	Project: Collinsville 500/230 kV station
	P7-1:A16:7_Tesla - Newark No.2 and Metcalf - Los Esteros 230 kV	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Line capacity increase, flow control or generation redispatch
LAWRENCE-PHILLIPSJCT 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	83	102	Diverge	51	63	40	50	53	Diverge	48	102	<100	Install redundent battery supply
Los Esteros-Metcalf 230 kV Line	P2-4:A16:7:_NEWARK E 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Continue to monitor
	P1-1:A18:8:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:21:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	102	<100	<100	<100	<100	<100	<100	<100	<100	105	<100	Project: San Jose area HVDC
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	103	117	Diverge	75	89	76	98	96	Diverge	70	121	<100	Install redundent battery supply
	NEWARK-NRS 230KV HVDC [0] & NEWARK E-F BUS TIE 230KV [	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor
Los Esteros-Montague 115 kV Line	LOS ESTEROS-TRIMBLE 115KV [2550] & METCALF 500 KV-SAN	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	116	Continue to monitor
	LOS ESTEROS-TRIMBLE 115KV & NORTECH-NORTHERN RECEIVING STATION 115KV	P6	N-1-1	100	114	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
	P1-2:A18:62:_NEWARK-NRS 230KV HVDC [0]	P1	N-1	<100	<100	114	<100	<100	<100	<100	113	<100	<100	<100	<100	Operating solution
	P1-2:A18:48:_LOS ESTEROS-NORTECH 115KV [4032]	P1	N-1	97	100	97	92	91	93	97	93	94	91	103	<100	Project: San Jose area HVDC
	P2-4:A16:21:_NEWARK D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	<100	<100	121	<100	<100	<100	<100	118	<100	<100	<100	<100	Operating solution

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California ISO

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
Los Esteros-Silicon Switching Station 230 kV Line	P2-3:A16:41:_NEWARK D - 2D 230KV & NEWARK-NRS 230 KV HVDC #1 LINE	P2	Bus/Breaker	<100	<100	117	<100	<100	<100	<100	115	<100	<100	<100	<100	Operating solution
	P2-3:A18:46:_LS ESTRS 115KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	97	100	97	92	91	93	97	93	94	91	103	<100	Project: San Jose area HVDC
	P2-1:A18:35:_LOS ESTEROS-NORTECH 115KV [4032] (LS ESTRS-LSESTRSRCTR)	P2	Bus/Breaker	97	100	97	92	91	93	97	93	94	91	103	<100	Project: San Jose area HVDC
	P2-1:A18:40:_LOS ESTEROS-NORTECH 115KV [4032] (LSESTRSRCTR-NORTECH)	P2	Bus/Breaker	97	100	97	92	91	93	97	93	94	91	103	<100	Project: San Jose area HVDC
	P2-2:A18:52:_NORTECH 115KV SECTION 1F	P2	Bus/Breaker	95	98	95	91	90	92	96	91	93	91	102	<100	Operating solution
	P2-4:A16:18:_NEWARK D SECTION 2D & NEWARK E SECTION 2E 230KV	P2	Bus/Breaker	88	92	117	88	88	88	89	115	81	88	90	<100	Operating solution
	P2-2:A16:11:_NEWARK D 230KV SECTION 2D	P2	Bus/Breaker	88	91	117	86	87	87	88	115	86	86	89	<100	Operating solution
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	97	95	96	93	Diverge	Diverge	94	Diverge	<100	Install redundent battery supply
	P5-5A:A18:3:_LOS ESTEROS 115KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	103	107	102	94	98	96	102	96	99	93	110	<100	Install redundent relay
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	97	103	99	94	96	95	99	95	94	92	100	<100	Install redundent battery supply
	P5-5C:A18:23:_NORTECH 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	95	98	94	90	90	92	96	91	93	90	101	<100	Install redundent battery supply
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	92	101	88	85	88	87	94	85	92	86	97	<100	Install redundent battery supply
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	72	70	Diverge	82	77	81	78	99	Diverge	79	68	<100	Install redundent battery supply
	NEWARK-NRS 230KV HVDC & NEWARK-RAVENSWOOD 230KV	P6	N-1-1	<100	<100	116	<100	<100	<100	<100	115	<100	<100	<100	<100	Operating solution
	LOS ESTEROS-NORTECH 115KV & NEWARK-RAVENSWOOD 230KV	P6	N-1-1	<100	101	100	<100	<100	<100	<100	<100	<100	<100	105	<100	Operating solution
	LOS ESTEROS-NORTECH 115KV & NEWARK-NORTHERN RECEIVING STATION #1 115KV	P6	N-1-1	102	110	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
	FMC-SAN JOSE B 115KV & LOS ESTEROS-NORTECH 115KV	P6	N-1-1	101	111	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
LS ESTRS-LSESTRSRCTR 115 kV	SVP1-3:6:_SSS-NRS 230 kV same as outage of SVP's PST or NRS T2	P1	N-1	<100	109	<100	<100	<100	<100	<100	<100	<100	<100	109	<100	Operating solution
	P1-3:A18:4:_SSS 230/230KV TB 1	P1	N-1	<100	108	<100	<100	<100	<100	<100	<100	<100	<100	108	<100	Operating solution
	P2-3:A18:2:_LS ESTRS 230KV - MIDDLE BREAKER BAY 8	P2	Bus/Breaker	<100	108	<100	<100	<100	<100	<100	<100	<100	<100	108	<100	Operating solution
	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	120	127	64	91	97	80	103	44	110	94	160	<100	Mitigation under review by SVP
	SVP2-2:4:_KRS 115 kV bus	P2	Bus/Breaker	73	104	91	50	49	46	78	57	69	49	128	<100	Mitigation under review by SVP
	P2-2:A16:11:_NEWARK D 230KV SECTION 2D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	83	<100	70	56	56	50	68	43	73	55	121	<100	Install redundent battery supply
	P5-5C:A18:8:_TRIMBLE 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	76	<100	60	50	48	47	56	40	60	55	105	<100	Install redundent battery supply
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	75	<100	56	46	48	44	70	39	68	48	118	<100	Install redundent battery supply
	P5-5C:A16:16:_NEWARK D 115 & 60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	71	<100	59	47	47	42	60	39	59	47	105	<100	Install redundent battery supply
	P5-5C:A18:12:_SAN JOSE B 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	70	<100	67	49	46	45	62	44	61	50	105	<100	Install redundent battery supply
	SSS 230/230KV TB 1 & FMC-SAN JOSE B 115KV	P6	N-1-1	<100	131	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
	SSS 230/230KV TB 1 & NEWARK-RAVENSWOOD 230KV	P6	N-1-1	<100	111	<100	<100	<100	<100	<100	<100	<100	<100	112	<100	Project: San Jose area HVDC
	SSS 230/230KV TB 1 & NEWARK-NRS 230KV HVDC [0]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	123	Continue to monitor
LSESTRSRCTR-NORTECH 115 kV	SVP1-3:6:_SSS-NRS 230 kV same as outage of SVP's PST or NRS T2	P1	N-1	<100	109	<100	<100	86	<100	91	<100	<100	<100	142	<100	Operating solution
	P1-3:A18:4:_SSS 230/230KV TB 1	P1	N-1	84	108	75	68	66	58	69	54	77	69	108	<100	Project: San Jose area HVDC
	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	120	127	64	91	97	80	103	44	110	94	160	<100	Mitigation under review by SVP
	P2-3:A18:2:_LS ESTRS 230KV - MIDDLE BREAKER BAY 8	P2	Bus/Breaker	84	108	75	68	66	58	69	54	77	69	108	<100	Project: San Jose area HVDC
	SVP2-2:4:_KRS 115 kV bus	P2	Bus/Breaker	73	104	91	50	49	46	78	57	69	49	128	<100	Mitigation under review by SVP
	P2-2:A16:11:_NEWARK D 230KV SECTION 2D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	83	91	70	56	56	50	68	43	73	55	121	<100	Install redundent battery supply
	P5-5C:A18:8:_TRIMBLE 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	76	83	60	50	48	47	56	40	60	55	105	<100	Install redundent battery supply
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	75	94	56	46	48	44	70	39	68	48	118	<100	Install redundent battery supply

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
	P5-5C:A16:16:_NEWARK D 115 & 60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	71	82	59	47	47	42	60	39	59	47	105	<100	Install redundent battery supply
	P5-5C:A18:12:_SAN JOSE B 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	70	82	67	49	46	45	62	44	61	50	105	<100	Install redundent battery supply
Martin D- Martin C 230 kV Line	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	93	Diverge	Diverge	56	50	46	52	Diverge	63	56	Diverge	<100	Install redundent battery supply
Martin-Daly City #1 115kV Line	P1-2:A10:12:_MARTIN-DALY CITY #2 115KV [2210]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor
Martin-Daly City #2 115kV Line	P1-2:A10:11:_MARTIN-DALY CITY #1 115KV [2200]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor
Martinez-Oleum 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	228	193	149	182	78	119	128	150	130	182	196	<100	Install redundent battery supply
	P5-5A:A8:5:_PITTSBURG PP 230KV (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	50	51	78	74	29	47	54	85	158	77	53	<100	Install redundent relay
Martinez-Sobrante 115kV Line	P2-2:A8:17:_SOBRANTE 230KV SECTION 1D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Continue to monitor
	P2-3:A8:12:_SOBRANTE - 1D 230KV & IGNACIO-SOBRANTE LINE	P2-3	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Continue to monitor
	P2-4:A8:8:_SOBRANTE 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Continue to monitor
	P5-5A:A8:5:_PITTSBURG PP 230KV (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	82	89	<100	105	15	66	83	<100	179	108	91	<100	Install redundent relay
	P5-5A:A8:5:_PITTSBURG PP 230KV (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	58	64	31	87	17	57	74	77	163	90	66	<100	Install redundent relay
	P5-5A:A8:7:_SOBRANTE 230KV BUS #1&2(FAILURE OF NON-RE	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110	Install redundent relay
	SOBRANTE 230/115KV TB 2 & SOBRANTE 230/115KV TB 1	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Continue to monitor
Martin-Larkin (HY-1) 115kV Cable	P5-5C:A9:6:_POTRERO (SF A) 115KV BATT(FAILURE OF NON-R	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	112	Install redundent battery supply
	A-Y #1 115KV [9952] & X-Y #1 115KV [9960]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor
Martin-Sneath Lane 60kV Line	P1-3:A10:8:_MILLBRAE 115/60KV TB 5	P1-3	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	108	Continue to monitor
Mckee-Piercy 115 kV Line	P1-2:A16:50:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	<100	<100	107	<100	<100	<100	<100	79	<100	<100	<100	<100	Continue to monitor
	P2-2:A16:41:_NEWARK F 115KV SECTION 2F	P2	Bus/Breaker	<100	<100	107	<100	<100	<100	<100	79	<100	<100	<100	<100	Continue to monitor
	P2-3:A16:12:_NEWARK F - 2F 115KV & NEWARK-NUMMI LINE	P2	Bus/Breaker	<100	<100	107	<100	<100	<100	<100	79	<100	<100	<100	<100	Continue to monitor
	P2-3:A16:14:_NEWARK F - 2F 115KV & NEWARK-TRIMBLE LINE	P2	Bus/Breaker	<100	<100	107	<100	<100	<100	<100	79	<100	<100	<100	<100	Continue to monitor
	P2-3:A16:13:_NEWARK F - 2F 115KV & NEWARK F-LOCKHD 2-APP MAT LINE	P2	Bus/Breaker	<100	<100	107	<100	<100	<100	<100	79	<100	<100	<100	<100	Continue to monitor
	P2-4:A18:24:_MTCALF D SECTION 1D & MTCALF E SECTION 1E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Continue to monitor
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	<100	<100	Diverge	<100	<100	<100	<100	77	<100	<100	<100	<100	Install redundent battery supply
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	<100	<100	109	<100	<100	<100	<100	80	<100	<100	<100	<100	Install redundent battery supply
Metcalf 230/115 kV Trans No. 1	P2-4:A18:2:_METCALF 230KV - SECTION 2D & 2E	P2	Bus/Breaker	131	143	106	113	112	106	106	103	127	100	140	<100	Metcalf 230/115 kV Transformers CB Addition
	P2-2:A18:3:_METCALF 230KV SECTION 2D	P2	Bus/Breaker	95	105	80	79	80	79	80	78	88	70	104	106	Metcalf 230/115 kV Transformers CB Addition
	METCALF 230/115KV TB 4 & METCALF 230/115KV TB 2	P6	N-1-1	100	108	<100	<100	<100	<100	<100	<100	<100	<100	<100	118	Metcalf 230/115 kV Transformers CB Addition
Metcalf 230/115 kV Trans No. 2	P2-4:A18:1:_METCALF 230KV - SECTION 1D & 1E	P2	Bus/Breaker	123	132	100	101	101	101	99	99	109	91	129	<100	Metcalf 230/115 kV Transformers CB Addition
	P2-2:A18:3:_METCALF 230KV SECTION 2D	P2	Bus/Breaker	96	107	81	80	82	80	81	79	89	71	105	108	Metcalf 230/115 kV Transformers CB Addition
	METCALF 230/115KV TB 4 & METCALF 230/115KV TB 3	P6	N-1-1	101	109	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Metcalf 230/115 kV Transformers CB Addition
	METCALF 230/115KV TB 4 & METCALF 230/115KV TB 1	P6	N-1-1	101	109	<100	<100	<100	<100	<100	<100	<100	<100	<100	120	Metcalf 230/115 kV Transformers CB Addition
Metcalf 230/115 kV Trans No. 3	P2-4:A18:2:_METCALF 230KV - SECTION 2D & 2E	P2	Bus/Breaker	130	141	106	112	111	105	105	102	125	99	139	<100	Metcalf 230/115 kV Transformers CB Addition
	P2-2:A18:3:_METCALF 230KV SECTION 2D	P2	Bus/Breaker	94	104	79	78	79	77	79	77	86	69	102	105	Metcalf 230/115 kV Transformers CB Addition
	METCALF 230/115KV TB 4 & METCALF 230/115KV TB 2	P6	N-1-1	99	107	<100	<100	<100	<100	<100	<100	<100	<100	<100	118	Metcalf 230/115 kV Transformers CB Addition
Metcalf 230/115 kV Trans No. 4	P2-4:A18:1:_METCALF 230KV - SECTION 1D & 1E	P2	Bus/Breaker	124	133	101	102	102	102	99	100	110	92	130	<100	Metcalf 230/115 kV Transformers CB Addition
	METCALF 230/115KV TB 1 & METCALF 230/115KV TB 2	P6	N-1-1	100	108	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Metcalf 230/115 kV Transformers CB Addition
Metcalf 500/230 kV Trans No. 11	METCALF 500/230KV TB 12 & METCALF 500/230KV TB 13	P6	N-1-1	101	113	<100	<100	<100	<100	<100	<100	<100	<100	<100	125	Project: San Jose area HVDC
Metcalf 500/230 kV Trans No. 12	METCALF 500/230KV TB 11 & METCALF 500/230KV TB 13	P6	N-1-1	103	116	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
Metcalf 500/230 kV Trans No. 13	METCALF 500/230KV TB 11 & METCALF 500/230KV TB 12	P6	N-1-1	105	118	<100	<100	<100	<100	<100	<100	<100	<100	<100	131	Project: San Jose area HVDC
Metcalf-Edenvale No. 1 115 kV Line	P1-2:A18:36:_METCALF-EDENVALE #2 115KV [2490]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Continue to monitor
	P1-2:A18:27:_METCALF-EL PATIO #2 115KV [2510]	P1	N-1	100	117	74	75	87	59	79	40	98	64	119	<100	Project: San Jose area HVDC
	P1-2:A18:63:_METCALF 500 KV-SAN JOSE B 115KV HVDC [0]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	Continue to monitor
	P2-4:A18:25:_MTCALF D SECTION 2D & MTCALF E SECTION 2E 115KV	P2	Bus/Breaker	124	145	96	92	108	73	96	53	120	79	148	<100	Project: San Jose area HVDC
	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	110	<100	<100	78	<100	64	<100	<100	110	71	<100	<100	Project: SVP bus tie breaker upgrade
	P2-1:A18:13:_METCALF-EL PATIO #2 115KV [2510] (EL PATIO-BAILY J3)	P2	Bus/Breaker	100	117	74	75	87	59	79	40	98	64	119	<100	Project: San Jose area HVDC
	P2-1:A18:27:_METCALF-EL PATIO #2 115KV [2510] (MTCALF D-BAILY J3)	P2	Bus/Breaker	100	117	74	75	87	59	79	40	98	64	119	<100	Project: San Jose area HVDC

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				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
Metcalf-El Patio No. 1 115 kV Line	P2-3:A18:31:_MTCALF D - 2D 115KV & METCALF-EL PATIO #2 LINE	P2	Bus/Breaker	100	118	74	75	88	59	79	41	98	64	120	<100	Project: San Jose area HVDC
	P2-2:A18:39:_MTCALF D 115KV SECTION 2D	P2	Bus/Breaker	100	122	74	75	92	59	83	41	98	64	126	<100	Project: San Jose area HVDC
	P2-4:A18:25:_MTCALF D SECTION 2D & MTCALF E SECTION 2E 115KV	P2	Bus/Breaker	87	102	67	65	75	61	81	45	84	56	103	<100	Project: San Jose area HVDC
	P2-3:A18:72:_SANJOSEB 115KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	Continue to monitor
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	110	130	87	83	93	66	82	50	107	75	133	117	Install redundent battery supply
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	102	119	78	73	89	58	80	44	101	64	121	101	Install redundent relay
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	101	124	Diverge	68	86	56	73	52	Diverge	65	126	<100	Install redundent battery supply
	P5-5A:A18:3:_LOS ESTEROS 115KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	93	110	70	68	78	55	68	38	90	61	112	<100	Install redundent relay
	P5-5C:A17:1:_MONTA VISTA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	90	106	73	70	78	54	70	41	91	59	108	<100	Install redundent battery supply
	METCALF-EL PATIO #2 115KV [2510] & METCALF 500 KV-SAN J	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor
	METCALF-EL PATIO #2 115KV & SSS 230/230KV TB 1	P6	N-1-1	118	135	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	106	123	79	79	91	62	81	43	102	68	125	107	Project: San Jose area HVDC
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	103	120	80	75	91	60	81	45	102	66	123	104	Project: San Jose area HVDC
	P7-1:A16:7_Tesla - Newark No.2 and Metcalf - Los Esteros 230 kV lines	P7	DCTL	88	104	71	68	77	53	70	40	88	58	106	<100	Project: San Jose area HVDC
Metcalf-El Patio No. 2 115 kV Line	P2-4:A18:24:_MTCALF D SECTION 1D & MTCALF E SECTION 1E 115KV	P2	Bus/Breaker	91	106	71	69	79	66	84	50	88	59	108	<100	Project: San Jose area HVDC
	P2-4:A18:24:_MTCALF D SECTION 1D & MTCALF E SECTION 1E 115KV	P2	Bus/Breaker	91	106	71	69	79	65	82	48	87	59	108	<100	Project: San Jose area HVDC
	METCALF 500 KV-SAN JOSE B 115KV HVDC [0] & METCALF-EL	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor
Metcalf-Evergreen No. 1 115 kV Line	SAN JOSE B-STONE-EVERGREEN 115KV [1550] & STONE-EVER	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	121	Continue to monitor
	STONE-EVERGREEN-METCALF 115KV & EL PATIO-SAN JOSE A 115KV	P6	N-1-1	<100	104	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
Metcalf-Evergreen No. 2 115 kV Line	SAN JOSE B-STONE-EVERGREEN 115KV [1550] & METCALF-EV	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	121	Continue to monitor
	METCALF-EVERGREEN #1 115KV & EL PATIO-SAN JOSE A 115KV	P6	N-1-1	<100	104	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
Metcalf-Hicks 230 kV Line	P2-4:A18:1:_METCALF 230KV - SECTION 1D & 1E	P2	Bus/Breaker	87	96	100	77	71	70	79	81	79	68	96	<100	Continue to monitor
	P2-4:A17:20:_MONTAVIS 230KV - SECTION 1E & 1D	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Continue to monitor
	P2-4:A17:5:_MONTAVIS 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
	MONTA VISTA-COYOTE SW STA 230KV [5090] & VASONA-METC	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	117	Continue to monitor
	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw.	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor
Metcalf-Llagas 115 kV Line	P1-1:A18:3:_GROYPKR1 13.80KV GEN UNIT 1 & P1-2:A18:37:_METCALF-MORGAN HILL 115KV [2570]	P3	G-1/N-1	228	<100	<100	<100	<100	<100	<100	<100	<100	<100	0	<100	Project: Morgan Hill-Green Valley project
Metcalf-Morgan Hill 115 kV Line	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	61	118	57	95	Diverge	Diverge	63	Diverge	<100	Install redundent battery supply
	MTCALF D-LLAGAS 115KV & LLAGAS-GILROY F-GILROYENG-GILROYPK 115KV	P6	N-1-1	158	104	102	<100	<100	<100	<100	<100	<100	<100	105	<100	Review project: Morgan Hill-Green Valley project
Millbrae-Sneath Lane 60kV Line	P1-2:A10:49:_HILLSDALE JCT-HALF MOON BAY 60KV [7060]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor
Milpitas-Swift 115 kV Line	P2-4:A16:20:_NEWARK E SECTION 1E & NEWARK F SECTION 1F 115KV	P2	Bus/Breaker	73	86	128	51	79	52	63	106	62	51	87	<100	Continue to monitor
	P2-3:A16:16:_NEWARK F - 1F 115KV & NEWARK F-ZANKER-KRS LINE	P2	Bus/Breaker	73	85	128	51	79	52	63	106	62	51	86	<100	Continue to monitor
	P2-2:A16:42:_NEWARK F 115KV SECTION 1F	P2	Bus/Breaker	73	85	128	51	79	52	63	106	62	51	86	<100	Continue to monitor
	P2-3:A16:17:_NEWARK F - 1F 115KV & NEWARK-MILPITAS #1 LINE	P2	Bus/Breaker	73	85	128	51	79	52	63	106	62	51	86	<100	Continue to monitor
	P2-3:A16:15:_NEWARK F - 1F 115KV & NEWARK F-LAWRENCE-LOCKHD 1 LINE	P2	Bus/Breaker	73	85	128	51	79	52	63	106	62	51	86	<100	Continue to monitor
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	45	79	51	83	40	Diverge	Diverge	82	Diverge	<100	Install redundent battery supply
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	73	86	129	50	79	52	63	106	62	51	87	<100	Install redundent battery supply
	NEWARK-MILPITAS #1 115KV [3070] MOAS OPENED ON NEWAR	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	144	Continue to monitor
Mission-Larkin (XY-1) 115kV Cable	A-X #1 115KV [9951] & P-X #1 115KV [9958]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Continue to monitor
Monta Vista 230/115 kV Trans No. 2	P2-4:A17:21:_MONTAVIS 230KV - SECTION 2E & 2D	P2	Bus/Breaker	<100	113	112	<100	83	<100	84	88	<100	<100	114	<100	Increase bank capacity
	P2-2:A17:6:_MONTAVIS 230KV SECTION 2E	P2	Bus/Breaker	106	72	74	94	55	83	57	61	107	77	72	<100	Project: Monta Vista bus upgrade
	MONTAVIS 230/115KV TB 3 & MONTAVIS 230/115KV TB 4	P6	N-1-1	100	114	117	<100	<100	<100	<100	<100	<100	<100	114	144	Increase bank capacity
	P2-4:A17:2:_MONTAVIS 230KV - SECTION 1D & 2D	P2	Bus/Breaker	41	107	107	26	82	32	82	88	40	21	107	<100	Increase bank capacity

2022-2023 ISO Reliability Assessment - Study Results
Study Area: **PG&E Greater Bay Area**
Thermal Overloads

California ISO

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
Monta Vista 230/115 kV Trans No. 3	MONTAVIS 230/115KV TB 2 & MONTAVIS 230/115KV TB 4	P6	N-1-1	96	109	114	<100	<100	<100	<100	<100	<100	<100	109	<100	Increase bank capacity
Monta Vista 230/115 kV Trans No. 4	MONTAVIS 230/115KV TB 3 & MONTAVIS 230/115KV TB 2	P6	N-1-1	99	115	119	<100	<100	<100	<100	<100	<100	<100	115	145	Increase bank capacity
Monta Vista-Hicks 230 kV Line	VASONA-METCALF 230KV [5932] & METCALF-MONTA VISTA #3	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	116	Continue to monitor
	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw.	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
Monta Vista-Jefferson #1 230kV Line	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	89	Diverge	Diverge	61	54	53	58	Diverge	68	62	Diverge	<100	Install redundent battery supply
	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	74	Diverge	Diverge	48	41	39	40	Diverge	54	48	Diverge	<100	Install redundent battery supply
	MONTA VISTA-JEFFERSON #2 230KV [5230] & POTRERO-TBC_	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
Monta Vista-Jefferson #2 230kV Line	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	86	Diverge	Diverge	58	51	51	55	Diverge	65	58	Diverge	<100	Install redundent battery supply
	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	83	Diverge	Diverge	55	49	44	48	Diverge	62	56	Diverge	<100	Install redundent battery supply
	MONTAVIS-JEFFERSN 230KV [0] & POTRERO-TBC_POT1 #1 115	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
Monta Vista-Saratoga 230 kV Line	HICKS-METCALF 230KV [4910] & MONTA VISTA-COYOTE SW ST	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor
Monta Vista-Wolfe 115 kV Line	P1-2:A17:25:_STELLING-MONTA VISTA 115KV [1000]	P1	N-1	116	126	138	75	103	61	68	83	84	75	128	<100	Increase line capacity
	P2-3:A17:5:_MNTA VSA 115KV - MIDDLE BREAKER BAY 4	P2	Bus/Breaker	116	126	138	75	103	61	68	83	84	75	128	<100	Increase line capacity
	P2-2:A17:25:_STELLING 115KV SECTION 1D	P2	Bus/Breaker	94	105	118	63	89	51	58	72	67	63	107	<100	Increase line capacity
	P2-4:A17:11:_STELLING 115KV - SECTION 1D & 1E	P2	Bus/Breaker	76	87	101	51	80	42	48	61	57	51	89	<100	Increase line capacity
Moraga 230/115kV Transformer #1	P2-4:A8:42:_MORAGA.D SECTION 2D & MORAGA.E SECTION 2E 115KV	P2	Bus/Breaker	103	99	79	89	69	83	88	82	113	95	109	<100	Project: Moraga 230 kV bus upgrade
	P2-4:A8:42:_MORAGA.D SECTION 2D & MORAGA.E SECTION 2E 115KV	P2	Bus/Breaker	100	96	75	90	71	83	88	78	106	95	104	<100	Project: Moraga 230 kV bus upgrade
Moraga 230/115kV Transformer #3	P2-3:A8:14:_MORAGA - 2D 230KV & CONTRA COSTA-MORAGA #2 LINE	P2	Bus/Breaker	110	106	<100	91	74	86	91	<100	108	99	112	<100	Project: Moraga 230 kV bus upgrade
	P2-2:A8:19:_MORAGA 230KV SECTION 2D	P2	Bus/Breaker	110	106	96	91	74	87	91	91	108	99	112	112	Project: Moraga 230 kV bus upgrade
	P2-3:A8:14:_MORAGA - 2D 230KV & CONTRA COSTA-MORAGA #2 LINE	P2	Bus/Breaker	109	105	<100	91	75	86	91	<100	105	99	112	<100	Project: Moraga 230 kV bus upgrade
	P2-2:A8:19:_MORAGA 230KV SECTION 2D	P2	Bus/Breaker	109	105	94	91	75	86	91	89	105	99	112	112	Project: Moraga 230 kV bus upgrade
	MORAGA 230/115KV TB 2 & MORAGA 230/115KV TB 1	P6	N-1-1	105	104	<100	99	<100	<100	100	<100	100	100	112	<100	Project: Moraga 230 kV bus upgrade
MORAGA.E-SN LNDRO 115 kV	P2-2:A8:64:_MORAGA.E 115KV SECTION 2E	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110	San Leandro RAS
	P2-4:A8:42:_MORAGA.D SECTION 2D & MORAGA.E SECTION 2E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	San Leandro RAS
	P5-5A:A16:1:_EAST SHORE 230 KV BAAH (FAILURE OF NON-RE	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	Install redundent relay
	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-RED	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	Install redundent battery supply
	MORAGA-SAN LEANDRO #1 115KV & MORAGA-SAN LEANDRO #2 115KV	P6	N-1-1	96	99	113	<100	<100	<100	<100	<100	<100	<100	99	<100	San Leandro RAS
	P7-1:A8:30_Moraga-San Leandro Nos. 1 & 2 115 kV lines	P7	DCTL	100	111	121	55	74	52	58	77	89	66	106	<100	San Leandro RAS
Moraga-Castro Valley 230kV Line	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	62	62	62	43	Diverge	Diverge	75	Diverge	<100	Install redundent battery supply
	P7-1:A8:7_Contra Costa - Las Positas 230 kV and Contra Costa-Lonetree 230 kV lines	P7	DCTL	100	87	98	22	36	40	30	48	65	46	84	<100	Project: Moraga-Castro Valley
Moraga-Lakewood 115kV Line (Lakewood Reactors)	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	337	371	419	183	77	153	161	286	298	184	437	<100	Install redundent battery supply
	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	319	351	396	173	73	192	202	358	282	174	413	<100	Install redundent battery supply
	P5-5A:A8:5:_PITTSBURG PP 230KV (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	99	103	121	134	14	92	111	133	231	133	105	<100	Install redundent relay
	P5-5A:A8:5:_PITTSBURG PP 230KV (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	93	97	114	126	13	115	139	166	218	125	99	<100	Install redundent relay
	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	57	53	31	53	25	49	51	17	114	63	46	<100	Install redundent battery supply
	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	54	50	29	50	23	61	63	21	108	59	43	<100	Install redundent battery supply
Moraga-Oakland J 115kV Line	P2-4:A16:10:_SN LNDRO 115KV - SECTION 1E & 2E	P2	Bus/Breaker	110	124	134	59	84	56	61	85	101	74	117	<100	Oakland J RAS
	P2-4:A16:9:_SN LNDRO 115KV - SECTION MD & 1D	P2	Bus/Breaker	84	99	105	45	70	43	46	67	85	59	91	<100	Oakland J RAS
	P2-4:A8:43:_MORAGA.D SECTION 1D & MORAGA.E SECTION 1E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Oakland J RAS
	P1-1:A16:5:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A7:2:_SAN LEANDRO-OAKLND J #1 115KV [3520]	P3	G-1/N-1	106	116	128	<100	<100	<100	<100	<100	<100	<100	113	<100	Oakland J RAS
	P5-5A:A16:1:_EAST SHORE 230 KV BAAH (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	98	105	121	51	59	50	55	75	70	59	102	<100	Install redundent relay
	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	98	105	121	51	59	50	55	75	70	59	102	<100	Install redundent battery supply

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				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	90	106	Diverge	45	69	45	49	71	Diverge	60	100	<100	Install redundent battery supply
	P5-5C:A16:9:_SAN LEANDRO (OAK U) 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	84	99	106	45	70	44	46	68	85	60	91	<100	Install redundent battery supply
	P5-5C:A16:11:_EASTSHORE 115KV BATT(FAILURE OF NON-RE	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	112	Install redundent battery supply
	SAN LEANDRO-OAKLND J #1 115KV & STATIN J-EDES-GRANT 115KV	P6	N-1-1	129	132	164	107	<100	<100	<100	111	102	108	132	<100	San Leandro RAS
	P7-1:A16:8_Grant-Eastshore Nos. 1 & 2 115 kV lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	112	Continue to monitor
	P7-1:A8:14_Pittsburg-San Mateo 230 kV and Pittsburg-East Shore 2	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor
Moraga-Oakland X #4 115kV Line	P2-4:A7:14:_STATIN X 115KV - SECTION 2D & 1D	P2	Bus/Breaker	<100	<100	<100	105	83	67	59	<100	99	106	114	<100	Project: Oakland Clean Energy Initiative
Moraga-San Leandro #1 115kV Line	P1-2:A16:26:_MORAGA-SAN LEANDRO #3 115KV [2790]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor
	P1-2:A16:27:_MORAGA-SAN LEANDRO #2 115KV [2780]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor
	P2-2:A8:64:_MORAGA.E 115KV SECTION 2E	P2	Bus/Breaker	91	102	113	49	70	46	51	70	82	60	97	<100	San Leandro RAS
	P2-4:A8:42:_MORAGA.D SECTION 2D & MORAGA.E SECTION 2E 115KV	P2	Bus/Breaker	81	92	106	41	63	40	44	64	70	50	86	<100	San Leandro RAS
	P2-2:A16:21:_SN LNDRO 115KV SECTION 2E	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	San Leandro RAS
	P1-1:A16:5:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:26:_MORAGA-SAN LEANDRO #3 115KV [2790]	P3	G-1/N-1	<100	102	114	<100	<100	<100	<100	<100	<100	<100	101	<100	San Leandro RAS
	P5-5A:A16:1:_EAST SHORE 230 KV BAAH (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	91	95	111	48	53	46	52	68	66	53	94	<100	Install redundent relay
	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	91	95	111	48	53	46	52	68	66	53	94	<100	Install redundent battery supply
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	83	95	Diverge	44	61	42	47	64	Diverge	54	92	<100	Install redundent battery supply
	P5-5C:A16:11:_EASTSHORE 115KV BATT(FAILURE OF NON-RE	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Install redundent relay
	MORAGA-SAN LEANDRO #3 115KV [2790] & MORAGA-SAN LEA	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	166	San Leandro RAS
	MORAGA-SAN LEANDRO #3 115KV & MORAGA-SAN LEANDRO #2 115KV	P6	N-1-1	117	122	139	<100	<100	<100	<100	<100	100	<100	122	<100	San Leandro RAS
	P7-1:A8:31_Moraga-Oakland J 115 kV and Moraga-San Leandro No. 3 115 kV lines	P7	DCTL	99	110	120	55	74	51	56	76	89	66	105	<100	San Leandro RAS
Moraga-San Leandro #2 115kV Line	P1-2:A8:41:_MORAGA-SAN LEANDRO #1 115KV [2770]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	108	Continue to monitor
	P2-4:A8:43:_MORAGA.D SECTION 1D & MORAGA.E SECTION 1E 115KV	P2	Bus/Breaker	124	130	149	68	86	64	71	94	110	81	126	<100	San Leandro RAS
	P2-2:A8:65:_MORAGA.E 115KV SECTION 1E	P2	Bus/Breaker	124	136	149	68	91	64	71	94	109	81	131	<100	San Leandro RAS
	P2-2:A16:20:_SN LNDRO 115KV SECTION 1E	P2	Bus/Breaker	120	133	145	65	88	61	68	91	106	78	127	<100	San Leandro RAS
	P1-1:A16:5:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A16:26:_MORAGA-SAN LEANDRO #3 115KV [2790]	P3	G-1/N-1	<100	103	115	<100	<100	<100	<100	<100	<100	<100	102	<100	San Leandro RAS
	P5-5A:A16:1:_EAST SHORE 230 KV BAAH (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	92	96	112	49	54	47	52	68	67	54	95	<100	Install redundent relay
	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	92	96	112	49	54	47	52	68	67	54	95	<100	Install redundent battery supply
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	84	96	Diverge	44	61	43	47	65	Diverge	55	93	<100	Install redundent battery supply
	MORAGA-SAN LEANDRO #3 115KV & MORAGA-SAN LEANDRO #1 115KV	P6	N-1-1	118	122	139	<100	<100	<100	<100	<100	100	<100	122	<100	San Leandro RAS
	P7-1:A8:31_Moraga-Oakland J 115 kV and Moraga-San Leandro No. 3 115 kV lines	P7	DCTL	100	111	121	55	75	51	57	77	90	67	106	<100	San Leandro RAS
	P7-1:A16:8_Grant-Eastshore Nos. 1 & 2 115 kV lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110	Continue to monitor
Moraga-San Leandro 115kV Line No 3	MORAGA-SAN LEANDRO #2 115KV [2780] & MORAGA-SAN LEA	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	136	Continue to monitor
Moraga-Station X 115 kV #1 Line	P2-4:A8:43:_MORAGA.D SECTION 1D & MORAGA.E SECTION 1E 115KV	P2	Bus/Breaker	78	102	39	65	66	41	37	33	59	65	86	<100	Project: Oakland Clean Energy Initiative
Moss Landing-Green Valley #1 115 kV Line	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	25	Diverge	Diverge	22	99	19	107	Diverge	Diverge	22	Diverge	<100	Install redundent battery supply
Mountain View-Monta Vista 115 kV Line	P2-2:A16:40:_NEWARK E 115KV SECTION 2Y	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor
	P7-1:A17:10_Britton-Monta Vista & Lawrence-Monta Vista 115 kV L	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
MRGN HIL-AWSGILROYSS 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	28	105	23	72	Diverge	Diverge	27	Diverge	<100	Install redundent battery supply
	LLAGAS-GILROY F-GILROYENG-GILROYPK 115KV & MTCALF D-LLAGAS 115KV	P6	N-1-1	109	118	106	<100	<100	<100	<100	<100	<100	<100	118	<100	Operating solution
	P7-1:A18:18_Metcalf - Morgan Hill & Metcalf - Llagas 115 kV Lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	Continue to monitor
MRGN HIL-AWSGILROYSS 115 kV Line No 1	MTCALF D-LLAGAS 115KV [0] & LLAGAS-GILROY F-GILROYENG	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	138	Continue to monitor
Newark 115/60kV Transformer #1	LAS POSITAS-NEWARK 230KV [4980] & CONTRA COSTA-LAS P	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Continue to monitor
	P2-4:A16:21:_NEWARK D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	<100	<100	108	<100	<100	<100	<100	84	<100	<100	<100	<100	Continue to monitor
	P2-4:A16:17:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 230KV	P2	Bus/Breaker	113	85	73	58	62	68	54	50	95	78	85	<100	Project: San Jose area HVDC
	P2-4:A16:6:_NEWARK D 230KV - SECTION 1D & 2D	P2	Bus/Breaker	93	106	<100	54	71	58	63	<100	76	66	101	<100	Project: San Jose area HVDC

2022-2023 ISO Reliability Assessment - Study Results
Study Area: PG&E Greater Bay Area
Thermal Overloads

California ISO

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
Newark 230/115kV Transformer #11	P2-4:A16:19:_NEWARK D SECTION 1D & NEWARK E SECTION 1E 115KV	P2	Bus/Breaker	88	103	80	40	70	53	65	61	70	55	98	<100	Project: San Jose area HVDC
	P1-1:A18:8:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:21:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	105	<100	<100	<100	<100	<100	<100	<100	<100	105	<100	Project: San Jose area HVDC
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	119	120	101	99	Diverge	Diverge	119	Diverge	<100	Install redundent battery supply
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	119	121	100	98	Diverge	Diverge	120	Diverge	<100	Install redundent battery supply
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	96	107	90	57	78	65	72	70	81	71	107	105	Install redundent battery supply
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	93	102	85	49	76	58	70	64	80	64	101	<100	Install redundent relay
	P5-5A:A10:2:_RAVENSWOOD 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	92	102	86	58	74	61	67	71	Diverge	69	99	<100	Install redundent relay
	P5-5A:A10:2:_RAVENSWOOD 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	91	100	85	58	74	61	66	69	Diverge	69	97	<100	Install redundent relay
	NEWARK E-F BUS TIE 230KV & TESLA-METCALF 500kV	P6	N-1-1	107	117	99	<100	<100	<100	<100	<100	94	<100	119	<100	Project: San Jose area HVDC
	NEWARK D 230/115KV TB 7 & NEWARK E-F BUS TIE 230KV	P6	N-1-1	105	119	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
	TESLA-METCALF 500kV & MOSSLAND-LOSBANOS 500kV	P6	N-1-1	95	106	104	<100	90	<100	<100	<100	86	<100	105	<100	Continue to monitor
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	93	101	85	50	76	59	69	64	79	64	101	<100	Project: San Jose area HVDC
	P7-1:A10:2_Newark-Ravenswood 230 kV and Tesla-Ravenswood 2	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Diverge	Continue to monitor
NEWARK D-NWRK_7M 13.2 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	101	102	85	84	Diverge	Diverge	101	Diverge	<100	Install redundent battery supply
NEWARK D-NWRK_7M 230/13.2 kV	NEWARK E-F BUS TIE 230KV & NEWARK E 230/115KV TB 11	P6	N-1-1	98	107	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
NEWARK E-NWRK_7M 13.2 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	101	102	85	83	Diverge	Diverge	102	Diverge	<100	Install redundent battery supply
NEWARK F-RINGWOODSWST 115 kV	SWIFT-METCALF 115KV & NEWARK-MILPITAS #1 115KV	P6	N-1-1	111	123	169	<100	<100	<100	<100	<100	<100	<100	125	<100	Increase line capacity
NEWARK F-RINGWOODSWST 115 kV Line No 1	SWIFT-METCALF 115KV [3900] & NEWARK-MILPITAS #1 115KV	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	191	Continue to monitor
Newark-Applied Materials 115kV Line	P1-2:A17:27:_BRITTON-MONTA VISTA 115KV [1170]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
Newark-Dixon Landing 115kV Line	P1-2:A18:42:_PIERCY-METCALF 115KV [4318]	P1	N-1	113	117	96	72	89	68	75	69	86	72	119	<100	Project: Metcalf-Dixon Landing reconductor
	P2-4:A18:25:_MTCALF D SECTION 2D & MTCALF E SECTION 2E 115KV	P2	Bus/Breaker	114	117	96	72	89	68	75	69	86	72	119	<100	Project: Metcalf-Dixon Landing reconductor
	P2-2:A18:43:_MTCALF E 115KV SECTION 2E	P2	Bus/Breaker	113	117	96	72	89	68	75	69	86	72	119	<100	Project: Metcalf-Dixon Landing reconductor
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	116	96	112	77	Diverge	Diverge	120	Diverge	<100	Install redundent battery supply
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	116	121	98	72	89	68	76	70	89	73	123	<100	Install redundent battery supply
	P7-1:A18:6_Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	114	118	97	72	89	68	75	70	86	72	120	<100	Project: Metcalf-Dixon Landing reconductor
Newark-Jarvis #1 115kV Line	P1-2:A16:40:_NEWARK-JARVIS #2 115KV [3030]	P1	N-1	98	101	110	60	55	64	71	79	69	60	102	<100	Continue to monitor
	NEWARK-JARVIS #2 115KV [3030] & NEWARK D SVD=V	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	131	Continue to monitor
Newark-Kifer 115kV Line	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	232	<100	<100	141	<100	154	<100	<100	243	149	<100	<100	Project: SVP bus tie breaker upgrade
	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	230	<100	<100	139	<100	153	<100	<100	242	147	<100	<100	Project: SVP bus tie breaker upgrade
	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	84	121	41	50	63	57	84	35	84	54	105	106	Mitigation under review by SVP
	SVP2-2:2:_NRS 300 115 kV bus	P2	Bus/Breaker	74	121	81	37	53	45	90	65	73	40	120	<100	Mitigation under review by SVP
	P1-1:A18:8:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:21:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	107	<100	<100	<100	<100	<100	<100	<100	<100	107	<100	Project: San Jose area HVDC
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	105	148	78	68	82	73	105	60	106	72	149	<100	Install redundent battery supply
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	93	121	65	51	76	58	92	49	96	56	122	<100	Install redundent relay
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	91	119	64	49	74	56	91	48	94	54	120	<100	Install redundent relay
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	67	101	31	36	48	40	66	16	70	36	94	<100	Install redundent battery supply
	NEWARK E-F BUS TIE 230KV & LOS ESTEROS-METCALF 230KV	P6	N-1-1	96	129	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	88	114	59	44	71	52	86	42	90	50	114	<100	Project: San Jose area HVDC
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	86	113	58	42	69	51	84	42	88	48	112	<100	Project: San Jose area HVDC
Newark-Lawerence 115kV Line	P7-1:A17:12_Newark-Applied Materials & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	104	107	90	54	71	49	49	55	76	54	108	101	Project: San Jose area HVDC
Newark-Livermore 60kV Line	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	90	100	Diverge	27	63	30	36	52	Diverge	47	96	<100	Install redundent battery supply
Newark-Los Esteros 230kV Line	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	94	103	87	94	Diverge	Diverge	97	Diverge	<100	Install redundent battery supply
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	94	103	87	94	Diverge	Diverge	97	Diverge	<100	Install redundent battery supply
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	94	103	87	94	Diverge	Diverge	97	Diverge	<100	Install redundent battery supply
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	94	103	87	94	Diverge	Diverge	96	Diverge	<100	Install redundent battery supply
	TESLA-METCALF 500kV & MOSSLAND-LOSBANOS 500kV	P6	N-1-1	92	101	100	<100	96	<100	<100	<100	93	<100	107	<100	Project: San Jose area HVDC
Newark-Milpitas #1 115kV Line	SWIFT-METCALF 115KV & NEWARK F-RINGWOODSWST #1 115KV	P6	N-1-1	102	114	157	<100	<100	<100	<100	<100	<100	<100	115	177	Increase line capacity
Newark-Newark Dist 230kV section	P1-1:A18:8:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A18:6:_LOS ESTEROS-METCALF 230KV [5353]	P3	G-1/N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	<100	Sensitivity only
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	95	104	82	88	Diverge	Diverge	97	Diverge	<100	Install redundent battery supply
Newark-Northern Receiving Station #1 115kV Line	SVP1-3:6:_SSS-NRS 230 kV same as outage of SVP's PST or NRS T2	P1	N-1	<100	103	<100	<100	58	<100	69	<100	<100	<100	88	<100	Project: San Jose area HVDC
	P1-2:A16:21:_NEWARK E-F BUS TIE 230KV [4640]	P1	N-1	80	104	53	20	60	35	65	28	70	36	100	<100	Project: San Jose area HVDC
	P1-3:A18:4:_SSS 230/230KV TB 1	P1	N-1	80	102	59	42	66	51	79	41	72	50	102	<100	Project: San Jose area HVDC
	P2-4:A16:7:_NEWARK E 230KV - SECTION 1E & 2E	P2	Bus/Breaker	81	108	46	20	61	36	66	18	73	37	103	<100	Project: San Jose area HVDC
	P2-3:A18:2:_LS ESTRS 230KV - MIDDLE BREAKER BAY 8	P2	Bus/Breaker	80	102	59	42	66	51	79	41	72	50	102	<100	Project: San Jose area HVDC
	P2-2:A16:12:_NEWARK E 230KV SECTION 1E	P2	Bus/Breaker	79	104	50	20	60	35	65	26	70	36	100	<100	Project: San Jose area HVDC
	SVP2-2:4:_KRS 115 kV bus	P2	Bus/Breaker	48	109	61	20	41	24	65	37	47	21	88	139	Mitigation under review by SVP
	P1-1:A18:8:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:21:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	134	<100	<100	<100	<100	<100	<100	<100	<100	133	<100	Project: San Jose area HVDC
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	64	75	66	83	Diverge	Diverge	67	Diverge	<100	Install redundent battery supply
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	134	181	104	81	106	90	125	72	127	91	182	<100	Install redundent battery supply
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	119	147	84	56	98	69	109	55	112	68	148	<100	Install redundent relay
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	71	112	45	28	57	36	71	15	67	31	103	<100	Install redundent battery supply
	P5-5A:A18:3:_LOS ESTEROS 115KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	69	105	47	26	49	37	68	28	61	34	103	<100	Install redundent relay
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	68	113	53	18	52	30	67	29	57	26	96	<100	Install redundent battery supply
	NEWARK-NRS 230KV HVDC [0] & SSS 230/230KV TB 1	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	Continue to monitor
	NEWARK E-F BUS TIE 230KV & LOS ESTEROS-METCALF 230KV	P6	N-1-1	121	165	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
	NEWARK E-F BUS TIE 230KV & TESLA-METCALF 500kV	P6	N-1-1	98	131	<100	<100	<100	<100	<100	<100	83	<100	130	<100	Project: San Jose area HVDC
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	113	139	77	46	92	61	102	47	105	59	139	<100	Project: San Jose area HVDC
Newark-Northern Receiving Station #2 115kV Line	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	65	124	27	36	60	42	81	31	69	39	100	<100	Mitigation under review by SVP
	SVP2-2:4:_KRS 115 kV bus	P2	Bus/Breaker	38	110	47	23	37	23	69	36	47	22	87	130	Mitigation under review by SVP
	P1-1:A18:8:_LECEFST1 13.80KV & LECEFGT1 13.80KV & LECEFGT2 13.80KV & LECEFGT3 13.80KV & LECEFGT4 13.80KV GEN UNITS & P1-2:A16:21:_NEWARK E-F BUS TIE 230KV [4640]	P3	G-1/N-1	<100	114	<100	<100	<100	<100	<100	<100	<100	<100	113	<100	Project: San Jose area HVDC
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	118	170	79	78	94	83	122	59	122	82	172	101	Install redundent battery supply
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	103	136	62	54	86	62	105	44	108	59	137	<100	Install redundent relay
	SSS 230/230KV TB 1 & LOS ESTEROS-NORTECH 115KV	P6	N-1-1	108	147	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC

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				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	95	127	53	43	79	53	95	34	100	49	127	<100	Project: San Jose area HVDC
Newark-Trimble 115kV Line	NEWARK E-F BUS TIE 230KV & LOS ESTEROS-METCALF 230KV	P6	N-1-1	<100	104	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
Nortech-NRS 115 kV Line	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	111	117	50	86	87	88	116	43	100	89	152	<100	Mitigation under review by SVP
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	72	79	55	49	44	52	74	40	61	49	111	<100	Install redundent battery supply
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	64	83	42	39	36	45	77	37	56	41	108	<100	Install redundent battery supply
	NEWARK-NRS 230KV HVDC [0] & FMC-SAN JOSE B 115KV [2021	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110	Continue to monitor
	SSS 230/230KV TB 1 & FMC-SAN JOSE B 115KV	P6	N-1-1	<100	122	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
North Dublin-Cayetano 230kV Cable	P1-2:A8:13:_CONTRA COSTA-LAS POSITAS 230KV [4510]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor
	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2	Bus/Breaker	106	106	97	44	48	54	58	67	83	58	104	<100	Project: Collinsville 500/230 kV station
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	67	67	65	68	Diverge	Diverge	75	Diverge	<100	Install redundent battery supply
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	108	107	99	45	49	55	61	69	84	59	106	<100	Install redundent battery supply
	P5-5A:A8:4:_MORAGA 230KV BUS #1 &2(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	106	106	97	44	48	54	58	67	83	58	104	<100	Install redundent relay
	P7-1:A8:4_Contra Costa-Moraga Nos. 1 & 2 230 kV lines	P7	DCTL	100	99	94	40	44	50	54	65	74	52	97	109	Project: Collinsville 500/230 kV station
NRS 230/115kV TB 1	SVP2-2:2:_NRS 300 115 kV bus	P2	Bus/Breaker	92	96	153	87	86	89	94	150	91	87	99	<100	Mitigation under review by SVP
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	96	94	94	92	Diverge	Diverge	92	Diverge	<100	Install redundent battery supply
	P5-5A:A18:3:_LOS ESTEROS 115KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	101	104	71	93	96	95	100	69	97	92	106	<100	Install redundent relay
	LOS ESTEROS-NORTECH 115KV & NEWARK-NORTHERN RECEIVING STATION #1 115KV	P6	N-1-1	100	106	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
NRS 300-KRS 115 kV	SVP2-2:3:_SRS 115 kV bus	P2	Bus/Breaker	<100	102	128	<100	72	<100	81	109	<100	<100	110	<100	Mitigation under review by SVP
	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	<100	64	104	<100	42	<100	56	91	<100	<100	74	<100	Mitigation under review by SVP
	P7-1:A18:13_Northern - Scott #1 and #2 115 kV Lines	P7	DCTL	<100	131	158	<100	90	<100	107	136	<100	<100	138	<100	Mitigation under review by SVP
NRS-Scott No. 1 115 kV Line	SVP2-2:2:_NRS 300 115 kV bus	P2	Bus/Breaker	116	149	183	88	108	93	123	159	109	93	152	<100	Mitigation under review by SVP
	SVP2-2:4:_KRS 115 kV bus	P2	Bus/Breaker	54	99	106	38	54	42	78	87	51	38	96	<100	Mitigation under review by SVP
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	82	60	82	65	Diverge	Diverge	84	Diverge	<100	Install redundent battery supply
NRS-Scott No. 2 115 kV Line	SVP2-2:1:_NRS 400 115 kV bus	P2	Bus/Breaker	100	74	115	68	48	76	65	101	92	73	84	<100	Mitigation under review by SVP
	SVP2-2:4:_KRS 115 kV bus	P2	Bus/Breaker	53	99	107	38	54	42	77	88	51	38	96	<100	Mitigation under review by SVP
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	82	59	81	64	Diverge	Diverge	83	Diverge	<100	Install redundent battery supply
Oakland C - Oakland L #1 115kV Cable	P2-4:A7:24:_STATIN X 115KV - SECTION 1D & 2D	P2	Bus/Breaker	<100	<100	113	<100	<100	<100	<100	94	<100	<100	<100	121	Project: Oakland Clean Energy Initiative
	P2-4:A8:33:_MORAGA.D 115KV - SECTION 2D & 1D	P2	Bus/Breaker	50	64	119	12	49	11	23	77	36	15	48	123	Project: Oakland Clean Energy Initiative
	P2-4:A7:8:_CLARMNT 115KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	144	142	200	103	141	84	67	155	148	116	184	<100	Install redundent battery supply
	P5-5C:A7:11:_OAKLAND X 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	70	45	54	88	94	63	42	74	94	89	105	<100	Install redundent battery supply
	K-D #2 115KV [9967] & K-D #1 115KV [9966]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	Continue to monitor
	P1-2:A7:27:_C-X #2 115KV [9962] & P1-2:A7:28:_C-X #3 115KV [9925]	P6	N-1-1	70	76	88	88	93	63	42	75	94	89	105	<100	Project: Oakland Clean Energy Initiative
Oakland C - Oakland X #2 115kV Cable	P2-4:A7:8:_CLARMNT 115KV - SECTION 2D & 1D	P2	Bus/Breaker	85	90	106	88	84	69	54	85	85	88	108	118	Project: Oakland Clean Energy Initiative
	P5-5C:A7:7:_CLAREMONT (OAKLAND K) 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	85	70	86	88	84	69	54	85	85	88	108	118	Install redundent battery supply
	C-X #3 115KV [9925] & D-L #1 115KV [9963]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	125	Project: Oakland Clean Energy Initiative
	P1-2:A7:25:_D-L #1 115KV [9963] & P1-2:A7:28:_C-X #3 115KV [9925]	P6	N-1-1	99	105	118	110	113	82	56	98	113	111	136	<100	Project: Oakland Clean Energy Initiative
Oakland D - Oakland L 115kV Cable	P2-4:A7:14:_STATIN X 115KV - SECTION 2D & 1D	P2	Bus/Breaker	117	123	144	71	77	50	31	117	71	71	96	<100	Project: Oakland Clean Energy Initiative
	P2-4:A8:33:_MORAGA.D 115KV - SECTION 2D & 1D	P2	Bus/Breaker	76	90	149	33	68	20	1	100	48	36	75	<100	Project: Oakland Clean Energy Initiative
	P2-2:A7:19:_OAK C115 115KV SECTION ME	P2	Bus/Breaker	73	76	79	80	81	53	55	64	80	80	107	<100	Project: Oakland Clean Energy Initiative
	P2-3:A7:21:_OAK C115 - ME 115KV & OAKLAND C-MARITIME LINE	P2	Bus/Breaker	73	76	79	80	81	53	55	64	80	80	107	<100	Project: Oakland Clean Energy Initiative
	P2-4:A7:11:_OAK C115 115KV - SECTION ME & 1E	P2	Bus/Breaker	72	74	76	78	79	51	53	62	77	78	105	<100	Project: Oakland Clean Energy Initiative
	P2-4:A8:43:_MORAGA.D SECTION 1D & MORAGA.E SECTION 1E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Project: Oakland Clean Energy Initiative
	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Project: Oakland Clean Energy Initiative
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	175	173	231	125	160	102	84	179	167	138	217	<100	Install redundent battery supply
	P5-5C:A7:11:_OAKLAND X 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	99	71	84	110	112	81	55	98	114	110	136	125	Install redundent battery supply
	C-X #3 115KV [9925] & C-X #2 115KV [9962]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	125	Project: Oakland Clean Energy Initiative

2022-2023 ISO Reliability Assessment - Study Results
Study Area: PG&E Greater Bay Area
Thermal Overloads

California ISO

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
	P1-2:A7:27:_C-X #2 115KV [9962] & P1-2:A7:28:_C-X #3 115KV [9925]	P6	N-1-1	99	104	119	110	112	82	55	98	114	110	136	<100	Project: Oakland Clean Energy Initiative
	P7-1:A8:28_Moraga-Oakland X Nos. 1 & 2 115 kV lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	Project: Oakland Clean Energy Initiative
Oleum - North Tower-Christie 115 kV (North tower sub to North Tower Jt2)	P2-4:A8:5:_PITSBG D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor
Oleum-Christie 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	101	30	15	79	13	55	28	22	54	79	31	<100	Install redundent battery supply
Oleum-El Cerrito STA G #1 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-RE	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Install redundent relay
	SOBRANTE-G #2 115KV [3730] & SOBRANTE-G #1 115KV [3720]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	117	Continue to monitor
	P7-1:A7:3_Sobrante-G Nos. 1 & 2 115 kV lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	118	Continue to monitor
Oleum-Martinez 115kV Line	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	228	193	149	182	78	132	142	167	131	182	196	<100	Install redundent battery supply
	P5-5A:A8:5:_PITTSBURG PP 230KV (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	51	52	78	74	29	53	61	95	158	77	53	<100	Install redundent relay
Parkway - Moraga 230 kV	P5-5A:A8:2:_C.COSTAPP 230KV BUS 1&2(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	91	95	66	67	59	62	65	45	105	87	100	<100	Install redundent relay
	P5-5C:A8:2:_CONTRA COSTA PP 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	88	92	63	65	59	60	64	43	103	85	97	<100	Install redundent battery supply
Piercy-Metcalf 115 kV Line	Base Case	P0	Normal	112	125	67	93	98	65	80	50	99	78	127	<100	Project: Metcalf-Dixon Landing reconductor
	P1-2:A16:50:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	148	152	94	92	112	76	85	69	111	93	154	113	Project: Metcalf-Dixon Landing reconductor
	P1-2:A18:11:_NEWARK-DIXON LANDING 115KV [2990]	P1	N-1	148	152	94	92	112	76	85	69	111	93	154	113	Project: Metcalf-Dixon Landing reconductor
	P1-2:A18:29:_SWIFT-METCALF 115KV [3900]	P1	N-1	109	121	75	90	95	67	83	55	96	76	123	<100	Project: Metcalf-Dixon Landing reconductor
	P1-2:A18:6:_LOS ESTEROS-METCALF 230KV [5353]	P1	N-1	106	119	72	90	93	67	83	53	95	74	121	<100	Project: Metcalf-Dixon Landing reconductor
	P1-2:A16:19:_TESLA-NEWARK #1 230KV [5720]	P1	N-1	106	118	71	88	93	66	81	53	95	76	121	<100	Project: Metcalf-Dixon Landing reconductor
	P2-2:A16:41:_NEWARK F 115KV SECTION 2F	P2	Bus/Breaker	149	152	94	92	112	77	85	69	112	93	154	113	Project: Metcalf-Dixon Landing reconductor
	P2-3:A16:12:_NEWARK F - 2F 115KV & NEWARK-NUMMI LINE	P2	Bus/Breaker	149	152	94	92	112	77	85	69	112	93	154	113	Project: Metcalf-Dixon Landing reconductor
	P2-3:A16:14:_NEWARK F - 2F 115KV & NEWARK-TRIMBLE LINE	P2	Bus/Breaker	149	152	94	92	112	77	85	69	112	93	154	113	Project: Metcalf-Dixon Landing reconductor
	P2-3:A16:13:_NEWARK F - 2F 115KV & NEWARK F-LOCKHD 2-APP MAT LINE	P2	Bus/Breaker	148	152	94	92	112	76	85	69	111	93	154	113	Project: Metcalf-Dixon Landing reconductor
	P2-4:A17:5:_MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	128	125	76	104	96	77	85	56	117	87	127	<100	Project: Metcalf-Dixon Landing reconductor
	P2-4:A18:24:_MTCALF D SECTION 1D & MTCALF E SECTION 1E 115KV	P2	Bus/Breaker	122	136	81	100	106	75	89	61	107	85	139	<100	Project: Metcalf-Dixon Landing reconductor
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	149	154	96	92	112	77	85	70	112	93	156	<100	Install redundent battery supply
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	135	160	Diverge	102	115	78	96	67	Diverge	95	161	<100	Install redundent battery supply
	P5-5C:A17:1:_MONTA VISTA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	129	147	87	110	111	80	99	64	121	91	149	103	Install redundent battery supply
	P5-5A:A17:2:_MONTA VISTA 115KV BAAH (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	117	133	79	97	101	71	89	58	108	80	135	<100	Install redundent relay
	P5-5A:A8:2:_C.COSTAPP 230KV BUS 1&2(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	113	125	75	87	91	66	81	54	95	75	127	<100	Install redundent relay
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	111	125	75	94	95	70	85	56	98	78	128	<100	Install redundent battery supply
	P7-1:A16:16_Newark-Dixon Landing 115 kV and Newark-Milpitas No. 1 115 kV lines	P7	DCTL	149	152	95	92	112	76	85	69	112	93	154	114	Project: Metcalf-Dixon Landing reconductor
	P7-1:A18:2_Newark - Dixon Landing & Newark - Milpitas #1 115 kV Lines	P7	DCTL	148	152	95	92	112	76	85	69	111	93	154	114	Project: Metcalf-Dixon Landing reconductor
	P7-1:A16:7_Tesla - Newark No.2 and Metcalf - Los Esteros 230 kV lines	P7	DCTL	115	129	78	96	100	71	88	58	105	81	132	<100	Project: Metcalf-Dixon Landing reconductor
	P7-1:A16:5_Tesla-Newark No.1 and Tesla-Ravenswood 230 kV lines	P7	DCTL	113	128	76	96	100	70	86	56	105	83	130	<100	Project: Metcalf-Dixon Landing reconductor
	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	110	123	75	92	95	68	83	55	98	77	125	<100	Project: Metcalf-Dixon Landing reconductor
Pittsburg-Eastshore 230kV Line	P2-4:A8:36:_PITSBG D SECTION 2D & PITSBG E SECTION 2E 23	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
	P1-1:A16:5:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & Base Case	P3	G-1/N-1	<100	<100	110	<100	<100	<100	<100	<100	<100	<100	0	<100	Continue to monitor
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	62	76	Diverge	28	49	25	25	75	Diverge	40	73	<100	Install redundent battery supply
	P7-1:A10:2_Newark-Ravenswood 230 kV and Tesla-Ravenswood 2	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Diverge	Continue to monitor
Pittsburg-San Mateo 230kV Line	P2-2:A16:10:_NEWARK D 230KV SECTION 1D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Continue to monitor
	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-RED	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Install redundent relay
	EASTSHORE-SAN MATEO 230KV & NEWARK-RAVENSWOOD 230KV	P6	N-1-1	<100	<100	111	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor

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				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
	P7-1:A10:2_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	P7	DCTL	71	77	106	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
	P7-1:A16:6_Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	P7	DCTL	71	77	106	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
Potrero-Larkin #1 (AY-1) 115kV Cable	H-Y #1 115KV [9956] & X-Y #1 115KV [9960]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	109	Continue to monitor
Potrero-Larkin #2 (AY-2) 115kV Cable	P2-2:A9:6:_POTRERO 115KV SECTION 2D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Continue to monitor
Potrero-Mission (AX) 115kV Cable	P2-2:A9:4:_POTRERO 115KV SECTION 1D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor
	P5-5C:A9:7:_HUNTERS POINT (SF P) 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	84	83	101	67	60	63	64	76	72	67	84	<100	Install redundent battery supply
	P5-5A:A9:2:_MARTIN 115KV BAAH (FAILURE OF NON-REDUNDE	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Install redundent relay
	P5-5C:A9:4:_LARKIN (SF Y) 115KV BATT(FAILURE OF NON-RED	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Install redundent relay
	A-P #1 115KV [9932] & X-Y #1 115KV [9960]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	118	Continue to monitor
	A-P #1 115KV & X-Y #1 115KV	P6	N-1-1	<100	<100	106	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
Radum-Vallecitos 60kV Line	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	80	91	Diverge	27	61	28	34	53	Diverge	46	88	<100	Install redundent battery supply
Ravenswood 230/115kV Transformer #1	P1-3:A10:5:_RAVENSWD 230/115KV TB 2	P1	N-1	103	88	95	73	63	71	60	73	86	78	85	103	Project: Ravenswood 230/115 kV bank
	P2-3:A10:4:_RAVENSWD 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	109	93	99	79	67	76	64	77	94	85	90	<100	Project: Ravenswood 230/115 kV bank
	RAVENSWD 230/115KV TB 2 & TESLA-METCALF 500kV	P6	N-1-1	112	<100	99	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Ravenswood 230/115 kV bank
Ravenswood 230/115kV Transformer #2	RAVENSWD 230/115KV TB 1 & SAN MATEO-BELMONT 115KV [3	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	112	Continue to monitor
	RAVENSWD 230/115KV TB 1 & TESLA-METCALF 500kV	P6	N-1-1	<100	98	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
Ravenswood-Bair #1 115kV Line	P1-2:A10:31:_BAIR-RVNSWD D-LONESTAR 115KV [0]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	106	Continue to monitor
	BAIR-RVNSWD D-LONESTAR 115KV [0] & SAN MATEO-BELMON	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	146	Continue to monitor
	BAIR-RVNSWD D-LONESTAR 115KV & SAN MATEO-BELMONT 115KV	P6	N-1-1	117	118	129	<100	<100	<100	<100	<100	<100	<100	118	<100	Increase line capacity
Ravenswood-Bair #2 115kV Line	RAVENSWOOD-BAIR #1 115KV [3380] & SAN MATEO-BELMONT	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	121	Continue to monitor
Ravenswood-Cooley Landing #1 115kV Line	P2-2:A10:17:_RVNSWD E 115KV SECTION 2E	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor
	RAVENSWOOD-PALO ALTO #1 115KV [3410] & RAVENSWOOD-(	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor
Ravenswood-Cooley Landing #2 115kV Line	P2-2:A10:23:_RVNSWD D 115KV SECTION 1Y	P2	Bus/Breaker	84	84	101	71	59	57	59	73	75	69	88	<100	Continue to monitor
	P2-2:A10:20:_CLY LND 115KV SECTION 1D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Continue to monitor
	RAVENSWOOD-COOLEY LANDING #1 115KV [3390] & RAVENSV	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110	Continue to monitor
Ravenswood-Palo Alto #1 115kV Line	P7-1:A10:20_Ravenswood-Cooley Landing Nos. 1 & 2 115 kV lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor
Ravenswood-Palo Alto #2 115kV Line	P7-1:A10:20_Ravenswood-Cooley Landing Nos. 1 & 2 115 kV lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor
RINGWOODSWST-MILPITAS 115 kV Line No 1	SWIFT-METCALF 115KV [3900] & NEWARK-MILPITAS #1 115KV	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	146	Continue to monitor
San Jose B bus tie	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	111	71	115	52	Diverge	Diverge	114	Diverge	<100	Install redundent battery supply
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	105	112	63	65	81	71	76	50	86	65	115	<100	Install redundent battery supply
San Jose 'B'-Stone-Evergreen 115 kV Line	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	90	97	108	58	63	54	58	71	67	58	99	<100	Install redundent battery supply
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	86	92	104	54	60	50	55	68	64	54	95	<100	Install redundent battery supply
	STONE-EVERGREEN-METCALF 115KV [2530] & METCALF-EVER	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	128	Continue to monitor
	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	85	89	103	56	62	52	56	71	62	56	90	<100	Continue to monitor
San Jose Sta 'A'-'B' 115 kV Line	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	102	59	92	31	Diverge	Diverge	105	Diverge	<100	Install redundent battery supply
	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	98	125	51	82	89	71	97	31	102	69	128	<100	Install redundent battery supply
	P5-5A:A18:2:_LOS ESTEROS 230 KV BAAH BUS #1&2 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	86	110	(null)	67	83	58	93	(null)	97	53	113	<100	Install redundent relay
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	84	113	Diverge	60	76	53	81	35	Diverge	54	114	<100	Install redundent battery supply
	METCALF-EL PATIO #2 115KV [2510] & METCALF-EL PATIO #1 1	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor
	LOS ESTEROS-METCALF 230KV & NEWARK E-F BUS TIE 230KV	P6	N-1-1	103	130	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: San Jose area HVDC
	P7-1:A18:17_Metcalf - Evergreen #1 and #2 115 kV Lines	P7	DCTL	92	118	40	76	88	65	96	18	97	59	119	<100	Project: San Jose area HVDC
	P7-1:A18:20_Newark - Los Esteros & Los Esteros - Metcalf 230 kV Lines	P7	DCTL	88	112	45	71	85	61	95	23	100	57	115	<100	Project: San Jose area HVDC
	P7-1:A18:16_Metcalf - El Patio No. 1 & 2 115 kV Lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor
	P1-2:A7:3:_MORAGA-OAKLAND J 115KV [2760]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
	P1-1:A16:5:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A7:3:_MORAGA-OAKLAND J 115KV [2760]	P3	G-1/N-1	<100	107	118	<100	<100	<100	<100	<100	<100	<100	103	<100	San Leandro RAS
	P5-5A:A16:1:_EAST SHORE 230 KV BAAH (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	102	110	127	52	61	50	55	76	70	61	106	<100	Install redundent relay

2022-2023 ISO Reliability Assessment - Study Results
Study Area: PG&E Greater Bay Area
Thermal Overloads

California ISO

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
San Leandro - Oakland J #1 115kV Line	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	102	110	127	52	61	50	55	76	70	61	106	<100	Install redundent battery supply
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	94	114	Diverge	44	75	47	49	74	Diverge	64	107	<100	Install redundent battery supply
	E. SHORE 230/115KV TB 1 & E. SHORE 230/115KV TB 2	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	136	Continue to monitor
	P7-1:A16:8_Grant-Eastshore Nos. 1 & 2 115 kV lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110	Continue to monitor
	P7-1:A8:14_Pittsburg-San Mateo 230 kV and Pittsburg-East Shore 2	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110	Continue to monitor
San Mateo 115/60kV Transformer #8	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	103	102	112	91	88	82	87	102	87	94	101	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	88	78	90	83	81	75	80	88	Diverge	84	75	<100	Install redundent battery supply
	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Install redundent relay
San Mateo 230/115kV Transformer #7	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDE	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Install redundent relay
San Mateo-Bair 60kV Line	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	455	465	466	399	387	294	314	338	389	399	460	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	444	436	438	398	385	292	313	327	Diverge	398	428	<100	Install redundent battery supply
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	407	401	412	368	362	300	321	344	Diverge	367	394	<100	Install redundent battery supply
	RAVENSWD 230/115KV TB 2 & RAVENSWD 230/115KV TB 1	P6	N-1-1	<100	104	109	<100	<100	<100	<100	<100	<100	<100	104	<100	Increase line capacity
	CLY LND2 115/60KV TB 2 & CLY LND 115/60KV TB 1	P6	N-1-1	165	168	224	<100	<100	<100	<100	<100	<100	<100	168	<100	Operating solution
San Mateo-Bair 60kV Line (San Carlos-Bair)	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	335	341	328	305	320	251	270	281	307	304	337	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	322	310	308	303	318	250	269	266	Diverge	303	303	<100	Install redundent battery supply
San Mateo-Belmont 115kV Line	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	354	364	376	289	275	233	247	287	309	289	361	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	347	350	361	286	268	231	245	276	Diverge	286	347	<100	Install redundent battery supply
	RAVENSWOOD-BAIR #1 115KV [3380] & BAIR-RVNSWD D-LONE	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	137	Continue to monitor
	RAVENSWD 230/115KV TB 2 & RAVENSWD 230/115KV TB 1	P6	N-1-1	117	127	139	<100	<100	<100	<100	<100	<100	<100	127	<100	Increase line capacity
	P7-1:A10:19_Ravenswood-Bair Nos. 1 & 2 115 kV lines	P7	DCTL	112	114	124	70	65	62	64	78	85	71	114	<100	Increase line capacity
San Mateo-Hillsdale JCT 60kV Line	P2-4:A17:5:_MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	31	81	107	23	66	17	77	93	53	7	82	<100	Continue to monitor
	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	147	150	230	170	117	142	160	219	96	172	152	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	75	87	43	75	75	53	54	33	Diverge	63	87	<100	Install redundent battery supply
	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	80	82	107	83	66	68	77	93	65	82	83	<100	Continue to monitor
San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	P2-4:A17:5:_MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	46	83	115	38	72	26	82	100	67	19	84	<100	Continue to monitor
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	100	113	49	53	Diverge	78	103	Diverge	<100	Install redundent battery supply
	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	166	169	257	195	132	162	184	248	108	197	172	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	98	113	66	99	94	70	73	51	Diverge	84	113	<100	Install redundent battery supply
	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	82	84	115	89	73	75	82	100	76	87	86	<100	Continue to monitor
San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	P2-4:A17:5:_MONTAVIS 230KV - SECTION 1E & 2E	P2	Bus/Breaker	53	79	105	42	68	33	73	89	69	23	80	<100	Continue to monitor
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	96	109	41	43	Diverge	77	98	Diverge	<100	Install redundent battery supply
	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	158	161	243	186	127	158	179	235	107	188	164	<100	Install redundent relay
	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	105	121	80	105	99	76	81	64	Diverge	91	122	<100	Install redundent battery supply
	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	78	80	105	83	68	67	73	89	76	82	82	<100	Continue to monitor
San Mateo-Martin #2 115kV Line	SAN MATEO-MARTIN 230KV & POTRERO-TBC_POT1 #1 115kV	P6	N-1-1	<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
SAN MATO-SANMATEO 115 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	98	98	107	88	85	78	84	98	82	91	97	<100	Install redundent relay
San Ramon-Radum 60kV Line	P1-3:A16:7:_LS PSTAS 230/60KV TB 4	P1-3	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor
Saratoga-Vasona 230 kV Line	MONTA VISTA-COYOTE SW STA 230KV [5090] & HICKS-METCAL	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	122	Continue to monitor
	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw.	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	104	Continue to monitor
Scott-Duane 115 kV Line	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	133	<100	<100	94	<100	106	<100	<100	142	94	<100	<100	Project: SVP bus tie breaker upgrade

2022-2023 ISO Reliability Assessment - Study Results
Study Area: PG&E Greater Bay Area
Thermal Overloads

California ISO

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
	P7-1:A18:13_Northern - Scott #1 and #2 115 kV Lines	P7	DCTL	61	108	113	49	57	54	97	105	64	48	108	<100	Mitigation under review by SVP
SN LNDRO-EDESJCT1 #1 1155 kV	P1-1:A16:5:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A7:2:_SAN LEANDRO-OAKLND J #1 115KV [3520]	P3	G-1/N-1	<100	107	118	<100	<100	<100	<100	<100	<100	<100	103	<100	San Leandro RAS
SN LNDRO-EDESJCT1 115 kV	P1-2:A7:3:_MORAGA-OAKLAND J 115KV [2760]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
	P5-5A:A16:1:_EAST SHORE 230 KV BAAH (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	102	110	127	52	61	50	55	76	70	61	106	<100	Install redundent relay
	P5-5C:A16:5:_EASTSHORE 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	102	110	127	52	61	50	55	76	70	61	106	<100	Install redundent battery supply
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	94	114	Diverge	44	75	47	49	74	Diverge	64	107	<100	Install redundent battery supply
	STATIN J-EDES-GRANT 115KV & MORAGA-OAKLAND J 115KV	P6	N-1-1	<100	<100	116	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
	E. SHORE 230/115KV TB 2 & E. SHORE 230/115KV TB 1	P6	N-1-1	<100	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
Sobrante 230/115kV Transformer #1	Base Case & SOBRANTE 230/115KV TB 2	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor
Sobrante 230/115kV Transformer #2	P2-4:A8:6:_PITSBG E 230KV - SECTION 1E & 2E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
Sobrante-El Cerrito STA G #1 115kV Lin	SOBRANTE-G #2 115KV [3730] & OLEUM-G #1 115KV [3150]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor
Sobrante-El Cerrito STA G #2 115kV Line	P2-3:A7:15:_EL CRRTO - 1D 115KV & OLEUM-G #1 LINE	P2-3	Non-Bus-Tie Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	112	Continue to monitor
	SOBRANTE-G #1 115KV [3720] & OLEUM-G #1 115KV [3150]	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	114	Continue to monitor
Sobrante-Grizzly-Claremont #1 115kV Line (Hillside-Grizzly JCT)	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor
	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Continue to monitor
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	108	108	141	82	89	53	48	85	95	88	127	<100	Install redundent battery supply
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	107	107	141	83	89	54	49	86	95	89	127	<100	Install redundent battery supply
	P5-5A:A8:4:_MORAGA 230KV BUS #1 &2(FAILURE OF NON-RED	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Install redundent relay
	P5-5A:A8:4:_MORAGA 230KV BUS #1 &2(FAILURE OF NON-RED	P5-5	Non-Redundant Relay	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	103	Install redundent relay
	SOBRANTE-MORAGA 115KV [3742] & SOBRANTE-GRIZZLY-CLA	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor
	SOBRANTE-MORAGA 115KV & SOBRANTE-GRIZZLY-CLAREMONT #2 115KV	P6	N-1-1	<100	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
Sobrante-Grizzly-Claremont #2 115kV Line (Hillside-Grizzly JCT)	P2-1:A8:52:_SOBRANTE-GRIZZLY-CLAREMONT #1 115KV [3740	P2-1	Line Section w/o Fault	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	102	Continue to monitor
	P2-4:A8:29:_SOBRANTE 115KV - SECTION 1D & 1E	P2-4	Bus-Tie-Breaker	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	129	129	171	97	107	63	56	103	112	104	153	<100	Install redundent battery supply
	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	129	129	170	96	105	62	55	102	112	103	153	<100	Install redundent battery supply
	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	16	24	103	13	24	9	16	55	26	4	33	<100	Install redundent battery supply
	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	15	23	102	13	23	9	16	54	21	5	31	<100	Install redundent battery supply
	SOBRANTE-MORAGA 115KV [3742] & SOBRANTE-GRIZZLY-CLA	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	120	Continue to monitor
	SOBRANTE-MORAGA 115KV & SOBRANTE-GRIZZLY-CLAREMONT #1 115KV	P6	N-1-1	<100	<100	109	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
Sobrante-Moraga 115kV Line	P2-4:A8:9:_MORAGA 230KV - SECTION 2D & 1D	P2	Bus/Breaker	<100	97	123	<100	72	<100	46	75	<100	<100	110	<100	Project: Morga-Sobrante reconductor
	P2-2:A7:14:_CLARMNT 115KV SECTION 2D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Continue to monitor
	P5-5A:A8:4:_MORAGA 230KV BUS #1 &2(FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	<100	97	123	<100	72	<100	46	75	<100	<100	110	<100	Install redundent relay
	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	<100	14	128	<100	6	<100	52	66	<100	<100	25	<100	Install redundent battery supply
	SOBRANTE-GRIZZLY-CLAREMONT #2 115KV [3750] & SOBRAN	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
	P7-1:A7:6_Sobrante-Grizzly-Claremont Nos. 1 & 2 115 kV lines	P7-1	DTCL	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	105	Continue to monitor
Sobrante-Richmond STA R #1 115kV Line	P1-2:A7:20:_SOBRANTE-R #2 115KV [3780]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	107	Continue to monitor
Sobrante-Richmond STA R #2 115kV Line	P1-2:A7:19:_SOBRANTE-R #1 115KV [3770]	P1-2	N-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	111	Continue to monitor
Stelling-Monta Vista 115 kV Line	P2-3:A17:6:_MNTA VSA 115KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	83	91	100	54	75	57	63	78	61	54	93	<100	Continue to monitor
	P1-1:A16:5:_RUSCTYECST1 18.00KV & RUSCTYECCT2 15.00KV & RUSCTYECCT1 15.00KV GEN UNITS & P1-2:A17:26:_MONTA VISTA-WOLFE 115KV [3870]	P3	G-1/N-1	<100	<100	101	<100	<100	<100	<100	<100	<100	<100	0	<100	Continue to monitor
	MONTA VISTA-WOLFE 115KV [3870] & TESLA-NEWARK #2 230K	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	Continue to monitor
	P2-4:A16:20:_NEWARK E SECTION 1E & NEWARK F SECTION 1F 115KV	P2	Bus/Breaker	112	126	135	76	99	82	94	106	88	76	127	<100	Review project: Metcalf-Dixon Landing reconductor
	P2-3:A16:16:_NEWARK F - 1F 115KV & NEWARK F-ZANKER-KRS LINE	P2	Bus/Breaker	112	125	135	76	99	82	94	106	88	76	127	<100	Review project: Metcalf-Dixon Landing reconductor
	P2-2:A16:42:_NEWARK F 115KV SECTION 1F	P2	Bus/Breaker	112	125	135	76	99	82	94	106	88	76	127	<100	Review project: Metcalf-Dixon Landing reconductor
	P2-3:A16:17:_NEWARK F - 1F 115KV & NEWARK-MILPITAS #1 LINE	P2	Bus/Breaker	112	125	135	76	99	82	94	106	88	76	127	<100	Review project: Metcalf-Dixon Landing reconductor

2022-2023 ISO Reliability Assessment - Study Results
Study Area: PG&E Greater Bay Area
Thermal Overloads

California ISO

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
Swift-Metcalf 115 kV Line	P2-3:A16:15:_NEWARK F - 1F 115KV & NEWARK F-LAWRENCE-LOCKHD 1 LINE	P2	Bus/Breaker	112	125	135	76	99	82	94	106	88	76	127	<100	Review project: Metcalf-Dixon Landing reconductor
	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	112	127	136	76	99	82	94	107	88	76	128	<100	Install redundent battery supply
	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	89	108	Diverge	71	79	70	86	70	Diverge	65	109	<100	Install redundent battery supply
	P5-5C:A17:1:_MONTA VISTA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	85	99	88	76	77	71	89	67	82	62	101	102	Install redundent battery supply
	NEWARK-MILPITAS #1 115KV [3070] MOAS OPENED ON NEWAR	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	154	Review project: Metcalf-Dixon Landing reconductor
	NEWARK F-RINGWOODSWST #1 115KV & NEWARK-MILPITAS #1 115KV	P6	N-1-1	112	125	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Review project: Metcalf-Dixon Landing reconductor
Tesla - Newark 230 kV Line No. 1	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	105	98	82	87	Diverge	Diverge	101	Diverge	<100	Install redundent battery supply
Tesla - Newark 230 kV Line No. 2	P2-2:A16:10:_NEWARK D 230KV SECTION 1D	P2-2	Bus	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	Continue to monitor
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	98	89	73	77	Diverge	Diverge	100	Diverge	<100	Install redundent battery supply
	TESLA-METCALF 500kV & TESLA-NEWARK #1 230KV	P6	N-1-1	<100	103	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Continue to monitor
	MOSSLAND-LOSBANOS 500kV & TESLA-METCALF 500kV	P6	N-1-1	<100	99	108	<100	<100	<100	<100	<100	<100	<100	99	<100	Continue to monitor
TRAN230B-EGBERT S2 230 kV	P5-5C:A10:1:_SAN MATEO 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	107	Diverge	Diverge	65	56	54	61	Diverge	79	67	Diverge	<100	Install redundent battery supply
Trimble-San Jose 'B' 115 kV Line	SVP2-4:6:_NRS 400 115 kV bus tie breaker to NRS 300 115 kV bus	P2	Bus/Breaker	117	<100	<100	67	<100	80	<100	<100	106	82	<100	<100	Project: SVP bus tie breaker upgrade
	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	144	102	144	92	Diverge	Diverge	149	Diverge	<100	Install redundent battery supply
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	152	185	65	96	110	101	116	30	129	96	178	<100	Install redundent battery supply
Vasona-Metcalf 230 kV Line	P2-4:A17:2:_MONTAVIS 230KV - SECTION 1D & 2D	P2	Bus/Breaker	107	25	31	89	14	63	18	23	101	78	26	<100	Project: Metcalf-Vasona upgrade
	HICKS-METCALF 230KV [4910] & MONTA VISTA-COYOTE SW ST	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	101	Continue to monitor
	MONTA VISTA-COYOTE SW STA 230KV & HICKS-METCALF 230KV	P6	N-1-1	113	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	Project: Metcalf-Vasona upgrade
	P7-1:A17:17_Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	103	69	74	96	55	67	54	55	93	86	69	<100	Project: Metcalf-Vasona upgrade
Whisman-Monta Vista 115 kV Line	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Diverge	Diverge	Diverge	98	97	16	19	Diverge	Diverge	100	Diverge	<100	Install redundent battery supply
	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	83	100	85	87	77	74	86	64	94	64	101	<100	Install redundent battery supply
	MTN VIEW-MONTA VISTA 115KV [2920] & BRITTON-MONTA VIS	P6	N-1-1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	115	Continue to monitor

Study Area: PG&E Greater Bay Area

High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
ALMADEN 60 kV	Basecase	P0	Normal	High	0.98	0.97	0.95	1.05	1.08	1.03	1.02	0.97	1.03	1.03	1.03	N/A	System adjustments or voltage support if needed
ALTAMONTJCT 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.05	1.05	1.07	1.06	1.06	1.05	1.01	1.05	1.01	N/A	System adjustments or voltage support if needed
AWSGILROY1 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.00	1.04	1.08	1.04	1.02	0.98	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed
AWSGILROY2 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.00	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.02	N/A	System adjustments or voltage support if needed
AWSGILROYSS 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.00	1.04	1.08	1.04	1.02	0.98	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed
BAILY J1 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.06	1.08	1.06	1.06	1.03	1.03	1.04	1.02	N/A	System adjustments or voltage support if needed
BAILY J2 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.06	1.08	1.06	1.06	1.03	1.03	1.04	1.02	N/A	System adjustments or voltage support if needed
BAILY J3 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.06	1.08	1.06	1.05	1.03	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed
BARTLP 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	1.07	1.04	1.03	1.00	1.03	1.04	1.03	N/A	System adjustments or voltage support if needed
BARTLP_J 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	1.07	1.04	1.03	1.00	1.03	1.04	1.03	N/A	System adjustments or voltage support if needed
BARTRC 115 kV	Basecase	P0	Normal	High	1.01	1.00	0.99	1.04	1.06	1.04	1.03	1.00	1.01	1.04	1.01	N/A	System adjustments or voltage support if needed
BARTRC_J 115 kV	Basecase	P0	Normal	High	1.01	1.00	0.99	1.04	1.06	1.04	1.03	1.00	1.01	1.04	1.01	N/A	System adjustments or voltage support if needed
BAYSHOR1 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.04	1.07	1.02	1.04	1.03	1.01	1.03	1.01	N/A	System adjustments or voltage support if needed
BAYSHOR2 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.04	1.07	1.02	1.04	1.03	1.01	1.04	1.01	N/A	System adjustments or voltage support if needed
BERESFRD 60 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.06	1.03	1.04	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
BIXLER 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.03	1.04	1.06	1.05	1.05	1.04	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
BOLLMAN 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.05	1.05	1.04	1.05	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
BOLLMAN1 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.05	1.05	1.05	1.05	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
BOLLMAN2 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.05	1.05	1.05	1.05	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
BURLNGME 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.05	1.03	1.03	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
BXLR_TAP 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.03	1.04	1.06	1.05	1.05	1.04	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
CALMAT60 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.00	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
CALTRAINSSF 115 kV	Basecase	P0	Normal	High	1.02	1.03	1.00	1.03	1.06	1.01	1.03	1.01	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
CAROLD1 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.07	1.03	1.03	1.01	0.97	1.05	1.04	N/A	System adjustments or voltage support if needed
CAROLD2 60 kV	Basecase	P0	Normal	High	1.01	1.01	1.00	1.04	1.08	1.03	1.03	1.01	0.96	1.04	1.02	N/A	System adjustments or voltage support if needed
CAROLNDS 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.07	1.03	1.03	1.01	0.96	1.04	1.03	N/A	System adjustments or voltage support if needed
CLAYTN 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.06	1.06	1.06	1.07	1.02	0.97	1.04	1.03	N/A	System adjustments or voltage support if needed
CLMBATAP 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.97	1.04	1.03	N/A	System adjustments or voltage support if needed
CLMBIAHS 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.96	1.04	1.03	N/A	System adjustments or voltage support if needed
CLMBIAPV 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
CLY LND 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.05	1.05	1.04	1.04	1.03	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed
CLY LND2 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.05	1.05	1.04	1.04	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
COLSTJT1 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed
COLSTJT2 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
CRYSTLSG 60 kV	Basecase	P0	Normal	High	1.01	1.01	1.00	1.04	1.08	1.03	1.03	1.01	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
CYTE PMP 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.07	1.08	1.06	1.06	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
DALY CTY 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.07	1.02	1.04	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
DCTO JCT 60 kV	Basecase	P0	Normal	High	1.02	1.01	0.99	1.05	1.05	1.03	1.02	1.00	0.97	1.04	1.03	N/A	System adjustments or voltage support if needed
DIXON LD 115 kV	Basecase	P0	Normal	High	1.01	1.00	0.99	1.04	1.05	1.03	1.03	1.01	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
DLY CTYP 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.07	1.02	1.04	1.02	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
DOW TAP1 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.98	1.05	1.04	N/A	System adjustments or voltage support if needed
DOW TAP2 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed
DYERJCT 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.05	1.05	1.07	1.06	1.06	1.05	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed
DYERWND 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.05	1.05	1.07	1.06	1.06	1.05	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed
E DUBLIN 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.01	0.99	1.05	1.04	N/A	System adjustments or voltage support if needed
EBAYMUDJ 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.05	1.06	1.07	1.07	1.01	1.02	1.03	1.04	N/A	System adjustments or voltage support if needed
EDENVALE 115 kV	Basecase	P0	Normal	High	1.02	1.02	1.02	1.06	1.08	1.06	1.05	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
EDNVL J1 115 kV	Basecase	P0	Normal	High	1.03	1.02	1.03	1.06	1.08	1.06	1.05	1.03	1.02	1.03	1.04	N/A	System adjustments or voltage support if needed
EDNVL J3 115 kV	Basecase	P0	Normal	High	1.02	1.02	1.02	1.06	1.08	1.06	1.05	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
EGBERT S2 230 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.03	1.06	1.02	1.02	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
EL PATIO 115 kV	Basecase	P0	Normal	High	1.00	0.99	1.00	1.04	1.06	1.04	1.02	1.00	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
ELPT_SJ2 115 kV	Basecase	P0	Normal	High	1.00	0.99	1.00	1.04	1.06	1.04	1.02	1.00	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
EMRLD LE 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	1.08	1.04	1.03	1.01	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
EST GRND 115 kV	Basecase	P0	Normal	High	1.02	1.03	1.00	1.03	1.06	1.01	1.03	1.01	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
EVERGREN 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	1.07	1.04	1.02	0.99	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
EVRGRN 1 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.99	1.04	1.06	1.04	1.02	1.00	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
EVRGRN J 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	1.07	1.04	1.02	0.99	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
EVRGRN&1 115 kV	Basecase	P0	Normal	High	1.03	1.02	1.02	1.06	1.08	1.06	1.05	1.04	1.04	1.03	1.04	N/A	System adjustments or voltage support if needed
EVRGRN&1 115 kV	Basecase	P0	Normal	High	1.03	1.02	1.02	1.06	1.08	1.06	1.05	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
FLOWIND1 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.06	1.04	1.04	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
FOREBAYWIND 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	1.06	1.03	1.03	1.02	1.03	1.03	1.04	N/A	System adjustments or voltage support if needed
FRICKWND 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	1.06	1.03	1.03	1.02	1.02	1.03	1.02	N/A	System adjustments or voltage support if needed
GILROY F 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed
GILROYENG 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed
GILROYENGJCT 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.04	N/A	System adjustments or voltage support if needed
GILROYPK 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.02	N/A	System adjustments or voltage support if needed
GILROYTP 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.03	1.04	N/A	System adjustments or voltage support if needed
HICKS 230 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	1.05	1.03	1.03	1.00	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
HILDAL47 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.08	1.03	1.03	1.01	1.02	1.05	1.03	N/A	System adjustments or voltage support if needed
HILDAL49 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.07	1.03	1.04	1.01	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
HILLSDLE 60 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.06	1.03	1.04	1.01	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
HLF MNBY 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.02	1.05	1.07	1.03	1.04	1.01	1.02	1.05	1.03	N/A	System adjustments or voltage support if needed
HLLSDLJT 60 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.07	1.03	1.04	1.01	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed
HNTRS PT 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.04	1.07	1.02	1.04	1.02	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
IBM-BALY 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.06	1.08	1.06	1.06	1.03	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed
IBM-HR J 115 kV	Basecase	P0	Normal	High	1.02	1.02	1.02	1.06	1.08	1.06	1.05	1.02	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
IBM-HRRS 115 kV	Basecase	P0	Normal	High	1.03	1.02	1.02	1.06	1.08	1.06	1.05	1.03	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
IMHOFF 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.05	1.05	1.05	1.05	1.03	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
IMHOFF_1 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.05	1.05	1.04	1.05	1.02	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
IMHOFF_2 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.05	1.05	1.05	1.05	1.03	1.02	1.03	1.04	N/A	System adjustments or voltage support if needed
IUKA 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.00	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed
IUKAJCT 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.00	1.02	1.03	1.03	N/A	System adjustments or voltage support if needed
JEDAMCX1 230 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.04	1.07	1.04	1.03	1.02	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
JEDAMCX2 230 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.04	1.07	1.04	1.03	1.02	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
JEFFERSN 230 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.07	1.04	1.03	1.01	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
JEFRSN_D 60 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.05	1.08	1.04	1.04	1.02	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
JEFRSN_E 60 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.05	1.08	1.04	1.04	1.02	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed
JENING J 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	1.07	1.04	1.02	0.99	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed
KIRKER 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.03	1.04	1.05	N/A	System adjustments or voltage support if needed
KIRKTAP1 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.02	1.04	1.01	N/A	System adjustments or voltage support if needed
KIRKTAP2 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed
LAKEWD-C 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.05	1.06	1.07	1.07	1.01	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
LAKEWD-M 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.05	1.06	1.07	1.07	1.01	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
LARKIN D 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	1.07	1.02	1.04	1.03	1.03	1.04	1.02	N/A	System adjustments or voltage support if needed
LARKIN E 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	1.07	1.02	1.04	1.02	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed
LARKIN F 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	1.07	1.02	1.04	1.02	1.01	1.03	1.01	N/A	System adjustments or voltage support if needed
LAS PLGS 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	1.08	1.03	1.02	1.00	1.02	1.04	1.01	N/A	System adjustments or voltage support if needed
LINDEJCT 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.01	1.03	1.01	N/A	System adjustments or voltage support if needed
LINDETP1 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
LINDETP2 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
LIVERMRE 60 kV	Basecase	P0	Normal	High	1.02	1.02	0.99	1.06	1.05	1.03	1.03	1.01	1.02	1.04	1.02	N/A	System adjustments or voltage support if needed
LIVRMR_2 60 kV	Basecase	P0	Normal	High	1.02	1.02	0.99	1.05	1.05	1.03	1.03	1.01	1.03	1.04	1.05	N/A	System adjustments or voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
LKWD_JCT 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.05	1.06	1.07	1.07	1.01	1.03	1.04	1.05	N/A	System adjustments or voltage support if needed
LLAGAS 115 kV	Basecase	P0	Normal	High	0.99	0.97	1.01	1.04	1.08	1.04	1.02	0.98	1.02	1.04	1.04	N/A	System adjustments or voltage support if needed
LMEC 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.03	1.06	1.06	1.06	1.06	1.04	1.02	1.04	1.03	N/A	System adjustments or voltage support if needed
LOS ALTS 60 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.06	1.03	1.03	1.02	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed
LOS GATS 60 kV	Basecase	P0	Normal	High	1.00	1.01	1.00	1.03	1.06	1.01	1.02	1.01	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed
LOYOLA 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.03	1.06	1.03	1.03	1.03	1.03	1.04	1.02	N/A	System adjustments or voltage support if needed
LPOSTAS 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.06	1.06	1.03	1.03	1.02	1.01	1.03	1.01	N/A	System adjustments or voltage support if needed
LSPLGS&1 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	1.07	1.03	1.02	1.00	1.02	1.03	1.01	N/A	System adjustments or voltage support if needed
LSPLGSJT 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	1.07	1.03	1.03	1.01	1.00	1.05	1.02	N/A	System adjustments or voltage support if needed
MABURY 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	1.07	1.04	1.03	1.00	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed
MABURY 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	1.07	1.04	1.02	0.99	1.04	1.05	1.05	N/A	System adjustments or voltage support if needed
MABURY J 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.99	1.04	1.06	1.04	1.03	1.00	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed
MARKHAM 115 kV	Basecase	P0	Normal	High	0.99	0.98	0.99	1.04	1.05	1.03	1.02	1.00	1.00	1.05	1.02	N/A	System adjustments or voltage support if needed
MARKHM J 115 kV	Basecase	P0	Normal	High	0.99	0.98	0.99	1.04	1.05	1.03	1.02	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed
MARTIN C 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.07	1.02	1.04	1.02	1.04	1.05	1.05	N/A	System adjustments or voltage support if needed
MCKEE 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.99	1.05	1.06	1.04	1.03	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed
MDLRVRJT 60 kV	Basecase	P0	Normal	High	1.05	1.04	1.03	1.05	1.07	1.05	1.05	1.04	1.00	1.05	1.02	N/A	System adjustments or voltage support if needed
MEDW LNE 115 kV	Basecase	P0	Normal	High	1.02	1.02	0.99	1.05	1.06	1.07	1.07	1.01	0.98	1.04	1.02	N/A	System adjustments or voltage support if needed
MILLBRAE 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	1.06	1.03	1.03	1.02	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed
MILLBRAE 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.05	1.03	1.04	1.02	1.04	1.05	1.05	N/A	System adjustments or voltage support if needed
MILPITAS 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	1.06	1.04	1.03	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed
MISSON 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	1.07	1.02	1.04	1.02	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed
MLLBRETP 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.05	1.03	1.04	1.02	0.98	1.05	1.01	N/A	System adjustments or voltage support if needed
MLLBTP97 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.07	1.03	1.03	1.01	0.99	1.05	1.01	N/A	System adjustments or voltage support if needed
MNLOJCT2 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.03	1.07	1.03	1.02	1.00	1.00	-1000.00	1.02	N/A	System adjustments or voltage support if needed
MNTA VSA 60 kV	Basecase	P0	Normal	High	1.05	1.06	1.05	1.04	1.06	1.04	1.04	1.05	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed
MONTAV&1 230 kV	Basecase	P0	Normal	High	1.02	1.03	1.01	1.04	1.06	1.04	1.03	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed
MONTAVIS 230 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.05	1.07	1.05	1.04	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed
MORGN J1 115 kV	Basecase	P0	Normal	High	1.01	1.00	1.02	1.05	1.08	1.05	1.04	1.01	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed
MORGN J2 115 kV	Basecase	P0	Normal	High	1.01	1.00	1.02	1.05	1.08	1.05	1.04	1.01	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed
MRGN HIL 115 kV	Basecase	P0	Normal	High	1.00	0.99	1.00	1.05	1.08	1.05	1.03	1.00	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed
MTCALF D 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.07	1.08	1.07	1.06	1.03	1.00	1.05	1.02	N/A	System adjustments or voltage support if needed
MTCALF E 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	1.07	1.08	1.07	1.06	1.03	0.98	1.05	1.02	N/A	System adjustments or voltage support if needed
OX_MTN60 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.02	1.04	1.07	1.03	1.04	1.01	0.99	1.05	1.02	N/A	System adjustments or voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
OXMTN_TP 60 kV	Basecase	P0	Normal	High	1.05	1.05	1.02	1.04	**1.07**	1.03	1.04	1.01	0.98	**1.05**	1.02	**N/A**	System adjustments or voltage support if needed
PACIFICA 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	**1.05**	1.03	1.03	1.01	1.02	1.03	1.03	**N/A**	System adjustments or voltage support if needed
PARKS 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	**1.06**	**1.06**	1.03	1.03	1.01	1.03	1.03	1.03	**N/A**	System adjustments or voltage support if needed
PARKS TP 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	**1.06**	**1.06**	1.03	1.03	1.01	1.05	1.04	1.05	**N/A**	System adjustments or voltage support if needed
PIERCY 115 kV	Basecase	P0	Normal	High	1.01	1.01	1.01	**1.05**	**1.07**	**1.05**	1.04	1.02	1.05	1.04	1.05	**N/A**	System adjustments or voltage support if needed
PITSBURG 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.03	**1.06**	**1.06**	**1.06**	**1.06**	1.04	1.01	1.03	1.00	**N/A**	System adjustments or voltage support if needed
POT_SVC 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	**1.07**	1.03	1.04	1.03	0.99	1.04	1.00	**N/A**	System adjustments or voltage support if needed
POTRERO 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.02	1.03	**1.07**	1.03	1.04	1.03	0.99	1.04	0.99	**N/A**	System adjustments or voltage support if needed
PRAXAIR 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	**1.06**	**1.06**	**1.06**	**1.06**	1.03	0.99	1.04	0.99	**N/A**	System adjustments or voltage support if needed
PRMNT J3 60 kV	Basecase	P0	Normal	High	**1.05**	**1.06**	1.05	1.04	**1.06**	1.04	1.04	1.05	1.02	**1.06**	1.02	**N/A**	System adjustments or voltage support if needed
Q1454 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.03	**1.07**	**1.08**	**1.07**	**1.05**	1.03	1.00	1.05	1.00	**N/A**	System adjustments or voltage support if needed
RADUM 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	**1.06**	**1.06**	1.03	1.03	1.00	0.99	1.04	0.99	**N/A**	System adjustments or voltage support if needed
RALSTON 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	**1.08**	1.03	1.03	1.01	1.03	**1.06**	1.02	**N/A**	System adjustments or voltage support if needed
RINGWOODSWST 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	**1.06**	1.04	1.03	1.00	0.99	1.04	0.99	**N/A**	System adjustments or voltage support if needed
RLSTN35 60 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.04	**1.07**	1.03	1.04	1.01	1.00	1.04	1.00	**N/A**	System adjustments or voltage support if needed
RLSTN45 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	**1.08**	1.03	1.03	1.01	1.00	1.04	1.00	**N/A**	System adjustments or voltage support if needed
RVNSWD D 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.02	1.05	**1.05**	1.04	1.04	1.03	0.99	1.04	0.99	**N/A**	System adjustments or voltage support if needed
RVNSWD E 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.02	1.05	**1.05**	1.04	1.04	1.03	0.99	1.04	0.99	**N/A**	System adjustments or voltage support if needed
S.L.A.C. 230 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	**1.07**	1.03	1.03	1.01	0.99	1.03	0.98	**N/A**	System adjustments or voltage support if needed
S.L.A.C. 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.03	**1.07**	1.03	1.02	1.00	0.99	1.03	0.98	**N/A**	System adjustments or voltage support if needed
SAN MATO 60 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	**1.05**	1.03	1.03	1.02	0.99	1.04	0.99	**N/A**	System adjustments or voltage support if needed
SAN RAMN 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.99	**1.05**	**1.06**	1.04	1.04	1.01	0.99	1.04	0.99	**N/A**	System adjustments or voltage support if needed
SANMATEO 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.03	**1.05**	1.02	1.03	1.02	0.99	1.04	0.99	**N/A**	System adjustments or voltage support if needed
SANPAULA 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.04	**1.06**	1.03	1.03	1.02	1.03	**1.06**	1.02	**N/A**	System adjustments or voltage support if needed
SARATOGA 230 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	**1.06**	1.04	1.03	1.00	1.03	**1.06**	1.03	**N/A**	System adjustments or voltage support if needed
SENTER 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	**1.07**	1.04	1.02	0.99	1.03	**1.06**	1.03	**N/A**	System adjustments or voltage support if needed
SENTER J 60 kV	Basecase	P0	Normal	High	0.99	0.98	0.98	1.05	**1.07**	1.04	1.02	0.99	1.03	**1.06**	1.03	**N/A**	System adjustments or voltage support if needed
SERRMNTE 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	**1.07**	1.02	1.04	1.02	1.03	**1.06**	1.03	**N/A**	System adjustments or voltage support if needed
SFIA 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	**1.06**	1.02	1.03	1.02	1.03	**1.06**	1.03	**N/A**	System adjustments or voltage support if needed
SFIA-MA 115 kV	Basecase	P0	Normal	High	1.02	1.03	1.00	1.03	**1.06**	1.02	1.03	1.01	1.03	**1.06**	1.03	**N/A**	System adjustments or voltage support if needed
SHAWROAD 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	**1.06**	1.03	1.04	1.02	1.02	**1.06**	1.02	**N/A**	System adjustments or voltage support if needed
SLAC TAP 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.03	**1.07**	1.03	1.02	1.00	1.00	**1.05**	1.01	**N/A**	System adjustments or voltage support if needed
SLACTAP1 230 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.04	**1.07**	1.04	1.03	1.01	0.99	1.04	1.00	**N/A**	System adjustments or voltage support if needed
SLACTAP2 230 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	**1.07**	1.04	1.03	1.01	0.99	1.04	1.00	**N/A**	System adjustments or voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
SN BRNOT 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.05	1.03	1.03	1.02	1.03	1.06	1.02	N/A	System adjustments or voltage support if needed
SNANDRES 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.05	1.03	1.04	1.02	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed
SNRAMONJ 60 kV	Basecase	P0	Normal	High	1.02	1.02	0.99	1.05	1.05	1.03	1.03	1.01	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed
SNTACLRAJCT 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	1.06	1.03	1.03	1.02	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed
SNTACLRAWIND 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.05	1.06	1.03	1.03	1.02	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed
ST TRESA 115 kV	Basecase	P0	Normal	High	1.03	1.02	1.02	1.06	1.08	1.06	1.05	1.02	1.02	1.05	1.02	N/A	System adjustments or voltage support if needed
STACK 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.98	1.04	1.06	1.04	1.03	1.00	1.01	1.05	1.02	N/A	System adjustments or voltage support if needed
STANFORD 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.03	1.07	1.02	1.02	1.00	1.01	1.05	1.01	N/A	System adjustments or voltage support if needed
STONE &1 115 kV	Basecase	P0	Normal	High	1.00	0.99	0.99	1.04	1.06	1.04	1.02	1.00	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed
STONE 115 kV	Basecase	P0	Normal	High	0.99	0.98	0.99	1.04	1.05	1.04	1.02	0.99	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed
SUNOL 60 kV	Basecase	P0	Normal	High	1.02	1.02	0.98	1.05	1.06	1.03	1.02	1.00	1.02	1.06	1.02	N/A	System adjustments or voltage support if needed
SWIFT 115 kV	Basecase	P0	Normal	High	1.00	1.00	1.00	1.05	1.06	1.05	1.04	1.00	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed
TRAN230A 230 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.04	1.07	1.04	1.03	1.02	0.98	1.04	0.98	N/A	System adjustments or voltage support if needed
TRAN230B 230 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.04	1.07	1.03	1.03	1.02	0.98	1.04	0.98	N/A	System adjustments or voltage support if needed
TRAN-60 60 kV	Basecase	P0	Normal	High	1.04	1.04	1.01	1.04	1.07	1.03	1.03	1.01	0.98	1.04	0.99	N/A	System adjustments or voltage support if needed
UAL TAP 115 kV	Basecase	P0	Normal	High	1.03	1.04	1.01	1.03	1.06	1.02	1.03	1.02	0.98	1.04	0.99	N/A	System adjustments or voltage support if needed
UNITEDSP 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.06	1.06	1.06	1.03	0.98	1.04	0.99	N/A	System adjustments or voltage support if needed
VALLCITJ 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.00	0.98	1.04	0.98	N/A	System adjustments or voltage support if needed
VALLECTS 60 kV	Basecase	P0	Normal	High	1.02	1.02	0.98	1.06	1.06	1.03	1.02	1.00	0.96	1.04	0.97	N/A	System adjustments or voltage support if needed
VASCJCT. 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.06	1.06	1.03	1.03	1.02	0.99	1.03	0.98	N/A	System adjustments or voltage support if needed
VASCO 60 kV	Basecase	P0	Normal	High	1.02	1.02	1.00	1.06	1.06	1.03	1.03	1.02	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed
VASONA 230 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	1.06	1.04	1.03	1.00	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed
VINEYARD 60 kV	Basecase	P0	Normal	High	1.03	1.02	0.98	1.06	1.06	1.03	1.03	1.00	0.99	1.04	0.99	N/A	System adjustments or voltage support if needed
W.P.BART 115 kV	Basecase	P0	Normal	High	1.04	1.04	1.02	1.06	1.05	1.05	1.06	1.03	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed
WALNUTCR 115 kV	Basecase	P0	Normal	High	1.03	1.03	1.00	1.05	1.06	1.07	1.07	1.01	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed
WATRSHED 60 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.04	1.07	1.03	1.04	1.01	0.99	1.04	1.00	N/A	System adjustments or voltage support if needed
WOODSIDE 60 kV	Basecase	P0	Normal	High	1.01	1.01	0.99	1.04	1.08	1.03	1.02	1.00	1.02	1.03	1.02	N/A	System adjustments or voltage support if needed
WTRSHDTP 60 kV	Basecase	P0	Normal	High	1.03	1.03	1.01	1.04	1.07	1.03	1.04	1.01	1.03	1.06	1.03	N/A	System adjustments or voltage support if needed
AMAZONHYWD 230 kV	P1-2:A10:1:_EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	Low	0.99	0.99	0.97	1.01	1.02	1.02	1.02	0.99	0.84	1.01	0.99	N/A	Sensitivity only
AMAZONHYWD 230 kV	P1-2:A16:13:_EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	Low	0.99	0.99	0.97	1.01	1.02	1.02	1.02	0.99	0.84	1.01	0.99	N/A	Sensitivity only
SWIFT 115 kV	P1-2:A16:55:_NEWARK F-RINGWOODSWST #1 115KV [0] & P1-2:A18:29:_SWIFT-METCALF 115KV [3900]	P6	N-1-1	Low	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: San Jose area HVDC
ALMADEN 60 kV	P1-2:A17:34:_MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	Low	0.92	0.91	0.88	1.05	1.10	1.01	0.99	0.92	0.92	1.04	0.91	0.81	Continue to monitor
LOS GATS 60 kV	P1-2:A17:34:_MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	Low	0.89	0.88	0.84	1.04	1.10	0.99	0.98	0.89	0.89	1.03	0.88	0.77	Disable automatics
MRGN HIL 115 kV	P1-2:A18:37:_METCALF-MORGAN HILL 115KV [2570]	P1	N-1	Low	0.91	0.93	0.97	1.01	1.07	1.00	1.00	0.94	0.88	1.01	0.98	N/A	Continue to monitor
AWSGILROY1 115 kV	P1-2:A18:38:_MTCALF D-LLAGAS 115KV [0]	P1	N-1	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC
AWSGILROY2 115 kV	P1-2:A18:38:_MTCALF D-LLAGAS 115KV [0]	P1	N-1	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC
GILROY F 115 kV	P1-2:A18:38:_MTCALF D-LLAGAS 115KV [0]	P1	N-1	Low	0.97	0.90	1.00	1.01	1.07	1.00	0.98	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC
LLAGAS 115 kV	P1-2:A18:38:_MTCALF D-LLAGAS 115KV [0]	P1	N-1	Low	0.97	0.90	1.00	1.01	1.07	1.01	0.98	0.93	0.94	1.01	0.98	0.89	Project: San Jose area HVDC

Study Area: PG&E Greater Bay Area

High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
GILROY F 115 kV	P1-2:A18:38:_MTCALF D-LLAGAS 115KV [0] & P1-2:A18:37:_METCALF-MORGAN HILL 115KV [2570]	P6	N-1-1	Low	>0.9	0.80	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: San Jose area HVDC
AWSGILROY1 115 kV	P1-2:A18:40:_MRGN HIL-AWSGILROYSS #1 115KV [0]	P1	N-1	Low	0.98	0.90	1.00	1.02	1.07	1.01	0.99	0.94	0.96	1.01	0.99	N/A	Project: San Jose area HVDC
AWSGILROY2 115 kV	P1-2:A18:40:_MRGN HIL-AWSGILROYSS #1 115KV [0]	P1	N-1	Low	0.98	0.90	1.00	1.02	1.07	1.01	0.99	0.94	0.96	1.01	0.99	N/A	Project: San Jose area HVDC
GILROY F 115 kV	P1-2:A18:40:_MRGN HIL-AWSGILROYSS #1 115KV [0]	P1	N-1	Low	0.98	0.90	1.01	1.02	1.07	1.01	0.99	0.94	0.96	1.01	0.99	N/A	Project: San Jose area HVDC
LLAGAS 115 kV	P1-2:A18:40:_MRGN HIL-AWSGILROYSS #1 115KV [0]	P1	N-1	Low	0.98	0.90	1.01	1.02	1.07	1.01	0.99	0.94	0.96	1.01	0.99	N/A	Project: San Jose area HVDC
LLAGAS 115 kV	P1-2:A18:40:_MRGN HIL-AWSGILROYSS #1 115KV [0] & P1-2:A18:41:_LLAGAS-GILROY F-GILROYENG-GILROYPK 115KV [0]	P6	N-1-1	Low	0.88	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Project: San Jose area HVDC
EDES 115 kV	P1-2:A7:2:_SAN LEANDRO-OAKLND J #1 115KV [3520] & P1-2:A16:29:_GRANT-STATIN J-EDES 115KV [0]	P6	N-1-1	Low	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor
STATIN J 115 kV	P1-2:A7:2:_SAN LEANDRO-OAKLND J #1 115KV [3520] & P1-2:A16:29:_GRANT-STATIN J-EDES 115KV [0]	P6	N-1-1	Low	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	N/A	Continue to monitor
GILROY F 115 kV	P2-1:A18:29:_METCALF-GREEN VALLEY 115KV [2540] (MTCALF D-MORGN J1)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.01	1.07	1.01	0.98	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC
LLAGAS 115 kV	P2-1:A18:29:_METCALF-GREEN VALLEY 115KV [2540] (MTCALF D-MORGN J1)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.89	Project: San Jose area HVDC
AWSGILROY1 115 kV	P2-1:A18:31:_GREEN VALLEY-LLAGAS 115KV [1720] (LLAGAS-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC
AWSGILROY2 115 kV	P2-1:A18:31:_GREEN VALLEY-LLAGAS 115KV [1720] (LLAGAS-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC
GILROY F 115 kV	P2-1:A18:31:_GREEN VALLEY-LLAGAS 115KV [1720] (LLAGAS-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.01	1.07	1.01	0.98	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC
LLAGAS 115 kV	P2-1:A18:31:_GREEN VALLEY-LLAGAS 115KV [1720] (LLAGAS-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.01	1.07	1.01	0.98	0.93	0.94	1.01	0.98	0.89	Project: San Jose area HVDC
GILROY F 115 kV	P2-1:A18:34:_METCALF-GREEN VALLEY 115KV [2540] (MORGN J1-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.01	1.07	1.01	0.98	0.93	0.94	1.01	0.98	0.90	Project: San Jose area HVDC
LLAGAS 115 kV	P2-1:A18:34:_METCALF-GREEN VALLEY 115KV [2540] (MORGN J1-MORGN J2)	P2	Bus/Breaker	Low	0.97	0.90	1.00	1.02	1.07	1.01	0.99	0.93	0.94	1.01	0.98	0.89	Project: San Jose area HVDC
BARTRC 115 kV	P2-2:A16:42:_NEWARK F 115KV SECTION 1F	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor
MILPITAS 115 kV	P2-2:A16:42:_NEWARK F 115KV SECTION 1F	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor
STACK 115 kV	P2-2:A16:42:_NEWARK F 115KV SECTION 1F	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.86	0.92	1.04	0.90	0.76	Continue to monitor
AWSGILROY1 115 kV	P2-2:A18:45:_MRGN HIL 115KV SECTION 1D	P2	Bus/Breaker	Low	0.98	0.90	1.00	1.02	1.07	1.01	0.99	0.94	0.97	1.01	0.99	N/A	Project: San Jose area HVDC
AWSGILROY2 115 kV	P2-2:A18:45:_MRGN HIL 115KV SECTION 1D	P2	Bus/Breaker	Low	0.98	0.90	1.00	1.02	1.07	1.01	0.99	0.94	0.97	1.01	0.99	N/A	Project: San Jose area HVDC
GILROY F 115 kV	P2-2:A18:45:_MRGN HIL 115KV SECTION 1D	P2	Bus/Breaker	Low	0.98	0.90	1.01	1.02	1.07	1.01	0.99	0.94	0.97	1.01	0.99	N/A	Project: San Jose area HVDC
LLAGAS 115 kV	P2-2:A18:45:_MRGN HIL 115KV SECTION 1D	P2	Bus/Breaker	Low	0.98	0.90	1.01	1.02	1.07	1.01	0.99	0.94	0.97	1.01	0.99	N/A	Project: San Jose area HVDC
BARTRC 115 kV	P2-3:A16:15:_NEWARK F - 1F 115KV & NEWARK F-LAWRENCE-LOCKHD 1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor
MILPITAS 115 kV	P2-3:A16:15:_NEWARK F - 1F 115KV & NEWARK F-LAWRENCE-LOCKHD 1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor
STACK 115 kV	P2-3:A16:15:_NEWARK F - 1F 115KV & NEWARK F-LAWRENCE-LOCKHD 1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.86	0.92	1.04	0.90	0.76	Continue to monitor
BARTRC 115 kV	P2-3:A16:16:_NEWARK F - 1F 115KV & NEWARK F-ZANKER-KRS LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor
MILPITAS 115 kV	P2-3:A16:16:_NEWARK F - 1F 115KV & NEWARK F-ZANKER-KRS LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor
STACK 115 kV	P2-3:A16:16:_NEWARK F - 1F 115KV & NEWARK F-ZANKER-KRS LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.86	0.92	1.04	0.90	0.76	Continue to monitor
BARTRC 115 kV	P2-3:A16:17:_NEWARK F - 1F 115KV & NEWARK-MILPITAS #1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor
MILPITAS 115 kV	P2-3:A16:17:_NEWARK F - 1F 115KV & NEWARK-MILPITAS #1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor
STACK 115 kV	P2-3:A16:17:_NEWARK F - 1F 115KV & NEWARK-MILPITAS #1 LINE	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.86	0.92	1.04	0.90	0.76	Continue to monitor
BARTRC 115 kV	P2-4:A16:20:_NEWARK E SECTION 1E & NEWARK F SECTION 1F 115KV	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor
MILPITAS 115 kV	P2-4:A16:20:_NEWARK E SECTION 1E & NEWARK F SECTION 1F 115KV	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.03	0.87	0.92	1.04	0.90	0.76	Continue to monitor
STACK 115 kV	P2-4:A16:20:_NEWARK E SECTION 1E & NEWARK F SECTION 1F 115KV	P2	Bus/Breaker	Low	0.93	0.90	0.83	1.04	1.11	1.05	1.02	0.86	0.92	1.04	0.90	0.76	Continue to monitor
CAROLNDS 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.96	0.96	0.85	0.94	1.01	0.94	0.92	0.85	0.96	0.93	0.96	0.70	Install redundent relay
CRYSTLSG 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.88	0.87	0.75	0.87	0.99	0.87	0.84	0.76	0.91	0.86	0.87	0.55	Install redundent relay
EMRLD LE 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.89	0.89	0.76	0.88	0.99	0.88	0.85	0.76	0.91	0.87	0.88	0.57	Install redundent relay

Study Area: PG&E Greater Bay Area

High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
HILLSDLE 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.98	0.98	0.89	0.97	1.02	0.97	0.95	0.89	0.97	0.96	0.97	0.77	Install redundent relay
HLF MNBY 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.99	0.99	0.87	0.96	1.03	0.95	0.93	0.84	0.97	0.95	0.98	0.70	Install redundent relay
LAS PLGS 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.87	0.87	0.74	0.88	0.99	0.87	0.84	0.74	0.90	0.87	0.86	0.54	Install redundent relay
RALSTON 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.88	0.88	0.75	0.87	0.99	0.87	0.84	0.76	0.91	0.86	0.87	0.55	Install redundent relay
STANFORD 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.87	0.87	0.74	0.87	0.98	0.86	0.83	0.74	0.90	0.86	0.86	0.54	Install redundent relay
WATRSHED 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.92	0.92	0.80	0.91	1.00	0.91	0.88	0.80	0.93	0.90	0.91	0.63	Install redundent relay
WOODSIDE 60 kV	P5-5A:A10:1:_JEFFERSON 230 KV BAAH BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.87	0.87	0.74	0.88	0.99	0.87	0.84	0.75	0.91	0.87	0.87	0.55	Install redundent relay
BAIR 115 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.80	0.77	0.74	0.85	0.85	0.86	0.85	0.79	0.79	0.85	0.77	0.69	Install redundent relay
BELMONT 115 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.85	0.83	0.80	0.90	0.90	0.90	0.89	0.84	0.84	0.90	0.83	0.75	Install redundent relay
BLLE HVN 60 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.53	0.51	0.46	0.64	0.63	0.65	0.61	0.54	0.54	0.64	0.51	0.41	Install redundent relay
GLENWOOD 60 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.49	0.47	0.41	0.61	0.60	0.62	0.58	0.49	0.50	0.61	0.47	0.35	Install redundent relay
LONESTAR 115 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.80	0.77	0.74	0.85	0.85	0.86	0.85	0.79	0.79	0.85	0.77	0.69	Install redundent relay
MENLO 60 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.49	0.47	0.40	0.61	0.60	0.61	0.58	0.49	0.50	0.61	0.46	0.35	Install redundent relay
MENLO G 60 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.49	0.47	0.40	0.61	0.60	0.61	0.58	0.49	0.50	0.61	0.46	0.35	Install redundent relay
NRTHGRUM 60 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.48	0.47	0.42	0.59	0.58	0.64	0.61	0.50	0.50	0.59	0.46	0.37	Install redundent relay
ORACLE60 60 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.79	0.77	0.73	0.85	0.84	0.85	0.84	0.78	0.79	0.85	0.77	0.68	Install redundent relay
REDWOOD 60 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.62	0.60	0.55	0.72	0.70	0.72	0.69	0.62	0.62	0.72	0.59	0.49	Install redundent relay
SAN CRLS 60 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.67	0.65	0.60	0.76	0.75	0.76	0.74	0.67	0.68	0.76	0.65	0.55	Install redundent relay
SHREDDER 115 kV	P5-5A:A10:9:_RAVENSWOOD 115 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.80	0.77	0.74	0.85	0.85	0.86	0.85	0.79	0.79	0.85	0.77	0.69	Install redundent relay
SANRAMON 230 kV	P5-5A:A8:5:_PITTSBURG PP 230KV (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.97	0.97	0.90	1.02	1.04	1.01	1.00	0.93	0.92	1.00	0.96	NConv	Install redundent relay
BAIR 115 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.76	0.70	0.69	0.85	0.86	0.87	0.84	0.76	Diverge	0.85	0.70	NConv	Install redundent battery supply
BELMONT 115 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.82	0.76	0.75	0.89	0.90	0.91	0.89	0.80	Diverge	0.89	0.75	NConv	Install redundent battery supply
BERESFRD 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.91	0.90	1.00	1.01	1.00	0.99	0.92	Diverge	1.00	0.90	NConv	Install redundent battery supply
BLLE HVN 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.51	0.47	0.43	0.64	0.64	0.65	0.60	0.51	Diverge	0.64	0.46	NConv	Install redundent battery supply
CALTRAINSSF 115 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.91	0.91	1.02	1.03	1.01	1.01	0.94	Diverge	1.02	0.90	N/A	Install redundent battery supply
EMBRCDRD 230 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.91	0.92	1.01	1.01	1.00	0.99	0.93	Diverge	1.01	0.90	N/A	Install redundent battery supply
EST GRND 115 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.91	0.91	1.02	1.03	1.01	1.01	0.94	Diverge	1.02	0.90	N/A	Install redundent battery supply
GLENWOOD 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.47	0.43	0.38	0.61	0.60	0.62	0.58	0.47	Diverge	0.60	0.42	NConv	Install redundent battery supply
MENLO 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.46	0.43	0.38	0.61	0.60	0.62	0.57	0.46	Diverge	0.60	0.42	NConv	Install redundent battery supply
MENLO G 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.46	0.43	0.38	0.61	0.60	0.62	0.57	0.46	Diverge	0.60	0.42	NConv	Install redundent battery supply
NRTHGRUM 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.46	0.43	0.39	0.58	0.58	0.65	0.60	0.47	Diverge	0.58	0.42	NConv	Install redundent battery supply
ORACLE60 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.76	0.71	0.68	0.84	0.84	0.86	0.83	0.74	Diverge	0.84	0.70	NConv	Install redundent battery supply
POTRERO 230 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.91	0.91	1.01	1.01	1.00	0.99	0.93	Diverge	1.01	0.89	N/A	Install redundent battery supply
REDWOOD 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.59	0.55	0.51	0.71	0.71	0.72	0.69	0.59	Diverge	0.71	0.53	NConv	Install redundent battery supply

Study Area: PG&E Greater Bay Area

High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
SAN CRLS 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.64	0.59	0.56	0.75	0.75	0.77	0.74	0.64	Diverge	0.75	0.58	NConv	Install redundent battery supply
SAN MATO 60 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.90	0.89	1.00	1.00	1.00	0.99	0.92	Diverge	1.00	0.89	NConv	Install redundent battery supply
SFIA-MA 115 kV	P5-5C:A10:2:_RAVENSWOOD 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.91	0.91	1.02	1.02	1.02	1.00	0.94	Diverge	1.02	0.90	N/A	Install redundent battery supply
BARTRC 115 kV	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.92	0.89	0.83	1.04	1.12	1.05	1.02	0.86	0.92	1.04	0.90	0.74	Install redundent battery supply
MILPITAS 115 kV	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.92	0.89	0.83	1.04	1.12	1.05	1.02	0.86	0.92	1.04	0.90	0.74	Install redundent battery supply
STACK 115 kV	P5-5C:A16:17:_NEWARK E&F 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.92	0.89	0.82	1.04	1.11	1.05	1.02	0.86	0.92	1.04	0.90	0.74	Install redundent battery supply
AGNEW 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.99	0.92	Diverge	1.03	1.02	1.03	1.01	0.99	Diverge	1.03	0.92	N/A	Install redundent battery supply
ALMADEN 60 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.95	0.88	Diverge	1.04	1.07	1.02	1.00	0.96	Diverge	1.03	0.88	N/A	Install redundent battery supply
AMAZONHYWD 230 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.99	0.96	Diverge	1.02	1.02	1.02	1.01	0.98	Diverge	1.01	0.96	N/A	Install redundent battery supply
BARTLP 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.90	Diverge	1.03	1.05	1.02	1.00	0.97	Diverge	1.03	0.90	N/A	Install redundent battery supply
BARTRC 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.91	Diverge	1.03	1.04	1.03	1.01	0.97	Diverge	1.02	0.91	N/A	Install redundent battery supply
CALTRAINSSJ 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.88	Diverge	1.02	1.03	1.02	0.99	0.98	Diverge	1.02	0.88	N/A	Install redundent battery supply
CP LECEF 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.99	0.92	Diverge	1.03	1.03	1.03	1.01	0.99	Diverge	1.03	0.92	N/A	Install redundent battery supply
CRYOGEN 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.89	Diverge	1.01	1.03	1.00	0.98	0.96	Diverge	1.01	0.90	N/A	Install redundent battery supply
DIXON LD 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.91	Diverge	1.03	1.04	1.02	1.00	0.97	Diverge	1.02	0.91	N/A	Install redundent battery supply
EL PATIO 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.90	Diverge	1.03	1.04	1.03	1.00	0.99	Diverge	1.03	0.90	N/A	Install redundent battery supply
EVRGRN 1 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.90	Diverge	1.03	1.04	1.03	1.01	0.99	Diverge	1.03	0.90	N/A	Install redundent battery supply
FMC 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.88	Diverge	1.02	1.03	1.02	0.99	0.98	Diverge	1.02	0.88	N/A	Install redundent battery supply
JARVIS 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.89	Diverge	1.01	1.03	1.00	0.98	0.96	Diverge	1.01	0.90	N/A	Install redundent battery supply
JV BART 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.89	Diverge	1.01	1.03	1.00	0.98	0.96	Diverge	1.01	0.90	N/A	Install redundent battery supply
LOCKHD 1 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.92	Diverge	1.02	1.02	1.02	1.00	0.99	Diverge	1.02	0.92	N/A	Install redundent battery supply
LOCKHD 2 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.92	Diverge	1.01	1.00	1.01	1.00	0.98	Diverge	1.01	0.92	N/A	Install redundent battery supply
MABURY 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.90	Diverge	1.03	1.05	1.02	1.00	0.97	Diverge	1.03	0.90	N/A	Install redundent battery supply
MABURY 60 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.89	Diverge	1.04	1.06	1.03	1.01	0.98	Diverge	1.03	0.90	N/A	Install redundent battery supply
MCKEE 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.91	Diverge	1.03	1.04	1.03	1.01	0.98	Diverge	1.03	0.91	N/A	Install redundent battery supply
MILPITAS 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.90	Diverge	1.03	1.04	1.03	1.01	0.96	Diverge	1.02	0.91	N/A	Install redundent battery supply
MOFT.FLD 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.92	Diverge	1.02	1.02	1.02	1.00	0.99	Diverge	1.02	0.92	N/A	Install redundent battery supply
MONTAGUE 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.91	Diverge	1.03	1.03	1.03	1.01	0.98	Diverge	1.02	0.91	N/A	Install redundent battery supply
MSFTSJDC 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.99	0.92	Diverge	1.03	1.03	1.03	1.01	0.99	Diverge	1.03	0.92	N/A	Install redundent battery supply
NORTECH 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.99	0.89	Diverge	1.03	1.03	1.03	1.00	0.98	Diverge	1.03	0.90	N/A	Install redundent battery supply
NWK DIST 230 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.90	Diverge	1.02	1.02	1.02	1.00	0.98	Diverge	1.01	0.90	N/A	Install redundent battery supply
SN JSE A 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.89	Diverge	1.03	1.03	1.03	1.00	0.99	Diverge	1.02	0.89	N/A	Install redundent battery supply
STACK 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.90	Diverge	1.03	1.04	1.03	1.01	0.96	Diverge	1.02	0.91	N/A	Install redundent battery supply
STONE 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	0.89	Diverge	1.03	1.04	1.03	1.00	0.98	Diverge	1.02	0.89	N/A	Install redundent battery supply

Study Area: PG&E Greater Bay Area

High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
SUNOL 60 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.99	0.95	Diverge	1.05	1.04	1.02	1.00	0.97	Diverge	1.03	0.95	N/A	Install redundent battery supply
TRIMBLE 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.90	Diverge	1.03	1.02	1.03	1.00	0.98	Diverge	1.02	0.90	N/A	Install redundent battery supply
WESTRN_D 115 kV	P5-5C:A16:7:_NEWARK 230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.98	0.91	Diverge	1.02	1.02	1.02	1.00	0.97	Diverge	1.02	0.91	N/A	Install redundent battery supply
AWSGILROY1 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	Diverge	Diverge	Diverge	0.92	0.95	0.90	0.90	Diverge	Diverge	0.88	Diverge	N/A	Install redundent battery supply
AWSGILROY2 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	Diverge	Diverge	Diverge	0.92	0.95	0.90	0.90	Diverge	Diverge	0.88	Diverge	N/A	Install redundent battery supply
GILROY F 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	Diverge	Diverge	Diverge	0.92	0.95	0.90	0.90	Diverge	Diverge	0.88	Diverge	N/A	Install redundent battery supply
LLAGAS 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	Diverge	Diverge	Diverge	0.92	0.95	0.90	0.90	Diverge	Diverge	0.88	Diverge	N/A	Install redundent battery supply
MRGN HIL 115 kV	P5-5C:A18:1:_METCALF 500-230KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	Diverge	Diverge	Diverge	0.93	0.94	0.91	0.91	Diverge	Diverge	0.89	Diverge	N/A	Install redundent battery supply
ALMADEN 60 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.88	0.84	0.88	1.00	1.04	0.98	0.95	0.95	0.83	1.00	0.83	NConv	Install redundent battery supply
AWSGILROY1 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	>0.9	0.51	0.98	>0.9	1.02	>0.9	0.83	0.72	>0.9	>0.9	0.85	NConv	Install redundent battery supply
AWSGILROY2 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	>0.9	0.51	0.98	>0.9	1.02	>0.9	0.83	0.72	>0.9	>0.9	0.85	NConv	Install redundent battery supply
BARTLP 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.93	0.91	0.90	1.02	1.03	1.00	0.99	0.95	0.91	1.02	0.90	NConv	Install redundent battery supply
CALTRAINSSJ 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.93	0.89	0.95	1.00	1.01	0.99	0.97	1.00	0.89	1.00	0.88	N/A	Install redundent battery supply
EL PATIO 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.92	0.88	0.94	1.00	1.01	0.99	0.97	0.99	0.88	1.00	0.87	N/A	Install redundent battery supply
EVRGRN 1 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.90	0.86	0.93	0.99	1.01	0.99	0.96	0.98	0.87	0.99	0.85	N/A	Install redundent battery supply
FMC 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.93	0.89	0.95	1.00	1.01	0.99	0.97	1.00	0.89	1.00	0.88	N/A	Install redundent battery supply
GILROY F 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	>0.9	>0.9	0.98	>0.9	1.02	>0.9	0.83	>0.9	>0.9	>0.9	0.86	N/A	Install redundent battery supply
LLAGAS 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	>0.9	0.50	0.98	>0.9	1.02	>0.9	0.83	0.72	>0.9	>0.9	0.85	NConv	Install redundent battery supply
MABURY 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.93	0.91	0.90	1.02	1.03	1.00	0.99	0.95	0.91	1.02	0.90	NConv	Install redundent battery supply
MABURY 60 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.90	0.86	0.91	1.00	1.03	0.99	0.96	0.97	0.86	1.00	0.85	NConv	Install redundent battery supply
MCKEE 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.93	0.91	0.89	1.02	1.02	1.00	0.99	0.94	0.91	1.02	0.90	NConv	Install redundent battery supply
MRGN HIL 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	>0.9	0.61	0.96	>0.9	1.02	>0.9	0.87	0.77	>0.9	>0.9	0.87	NConv	Install redundent battery supply
PIERCY 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.92	0.90	0.88	1.01	1.00	1.00	0.98	0.94	0.90	1.01	0.89	NConv	Install redundent battery supply
SN JSE A 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.92	0.88	0.95	1.00	1.01	0.99	0.97	0.99	0.88	1.00	0.87	N/A	Install redundent battery supply
STONE 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.90	0.86	0.92	0.99	1.00	0.98	0.96	0.97	0.86	0.99	0.85	N/A	Install redundent battery supply
SWIFT 115 kV	P5-5C:A18:19:_METCALF 115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.94	0.91	0.90	1.02	1.02	1.02	1.00	0.94	0.92	1.02	0.91	NConv	Install redundent battery supply
ALMADEN 60 kV	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.95	0.90	0.93	1.03	1.07	1.01	0.99	0.97	0.90	1.03	0.90	0.83	Install redundent battery supply
CALTRAINSSJ 115 kV	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.95	0.89	0.96	1.01	1.02	1.01	0.98	0.99	0.91	1.01	0.89	0.88	Install redundent battery supply
FMC 115 kV	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.95	0.89	0.96	1.01	1.02	1.01	0.98	0.99	0.91	1.01	0.89	0.88	Install redundent battery supply
MONTAGUE 115 kV	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.95	0.90	0.94	1.01	1.01	1.01	0.99	0.98	0.90	1.00	0.90	0.86	Install redundent battery supply
NORTECH 115 kV	P5-5C:A18:3:_LOS ESTEROS 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.96	0.89	0.95	1.00	1.00	1.00	0.96	0.98	0.92	1.00	0.88	0.87	Install redundent battery supply
CLAYTN 115 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.78	0.72	0.47	1.01	1.06	1.11	1.11	0.58	0.65	1.00	0.59	NConv	Install redundent battery supply
LAKEWD-C 115 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.81	0.76	0.53	1.01	1.06	1.10	1.10	0.63	0.69	1.00	0.64	NConv	Install redundent battery supply
LAKEWD-M 115 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.81	0.76	0.53	1.01	1.06	1.10	1.10	0.64	0.70	1.00	0.64	NConv	Install redundent battery supply

Study Area: PG&E Greater Bay Area

High/Low Voltages

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
MEDW LNE 115 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.77	0.71	0.45	1.01	1.06	1.11	1.11	0.57	0.63	1.00	0.57	NConv	Install redundent battery supply
SANRAMON 230 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.94	0.93	0.87	1.01	1.04	1.01	1.00	0.92	0.93	1.00	0.91	NConv	Install redundent battery supply
WALNUTCR 115 kV	P5-5C:A8:3:_PITTSBURG PP 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.77	0.71	0.46	1.01	1.06	1.11	1.11	0.57	0.63	1.00	0.57	NConv	Install redundent battery supply
EL CRRTO 115 kV	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.90	0.92	0.95	0.98	1.05	0.95	0.95	0.88	0.87	0.97	0.92	0.88	Install redundent battery supply
VALLY VW 115 kV	P5-5C:A8:6:_SOBRANTE 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.91	0.93	0.96	0.98	1.05	0.96	0.96	0.89	0.87	0.98	0.93	0.89	Install redundent battery supply
MORAGA.C 115 kV	P5-5C:A8:8:_MORAGA 230-115KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	>0.9	>0.9	>0.9	1.03	>0.9	1.01	>0.9	>0.9	0.89	1.02	>0.9	N/A	Install redundent battery supply
EMBRCDRD 230 kV	P5-5C:A9:2:_MARTIN (SF H) 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.97	Diverge	Diverge	0.98	1.07	0.92	0.90	0.94	1.00	0.97	Diverge	N/A	Install redundent battery supply
POTRERO 230 kV	P5-5C:A9:2:_MARTIN (SF H) 230-115-60KV BATT(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent battery supply	Low	0.96	Diverge	Diverge	0.98	1.06	0.92	0.90	0.94	1.00	0.97	Diverge	N/A	Install redundent battery supply

Study Area: PG&E Greater Bay Area

Voltage Deviation

Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)								Post Cont. Voltage Deviation % (Sensitivity Scenarios)				Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 Winter Peak	2027 Winter Peak	2032 Winter Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	2035 ATE	
AMAZONHYWD 230 kV	P1-2:A10:1:_EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	<8	<8	<8	<8	<8	<8	<8	<8	11	<8	<8	N/A	Sensitivity only
AMAZONHYWD 230 kV	P1-2:A16:13:_EASTSHORE-SAN MATEO 230KV [4650]	P1	N-1	<8	<8	<8	<8	<8	<8	<8	<8	11	<8	<8	N/A	Sensitivity only
LOS GATS 60 kV	P1-2:A17:34:_MONTA VISTA-LOS GATOS 60KV [7610]	P1	N-1	11	13	15	<8	<8	<8	<8	11	11	<8	12	23	Disable automatics
MRGN HIL 115 kV	P1-2:A18:37:_METCALF-MORGAN HILL 115KV [2570]	P1	N-1	<8	<8	<8	<8	<8	<8	<8	<8	12	<8	<8	N/A	Sensitivity only

Study Area: **PG&E Greater Bay Area**

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2027 SP High CEC Forecast	
Failure of non-redundant DC battery supplying MORAGA 230kV and 115 kV Buses	P5	Non-Redundent battery supply	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Install redundent battery supply
Failure of non-redundant DC battery supplying MISSION (SF X) 115 kV Bus	P5	Non-Redundent battery supply	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Install redundent battery supply
Failure of non-redundant DC battery supplying SAN JOSE A 115 kV Buses	P5	Non-Redundent battery supply	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Install redundent battery supply
Permanent fault on Contra Costa-Moraga Nos. CK 1 & 2 230 kV lines	P7	DCTL	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Temporary fault on Contra Costa-Moraga Nos. CK 1 & 2 230 kV lines	P7	DCTL	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Permanent fault on Tesla-Newark 230kV and Tesla-Ravenswood 230kV lines	P7	DCTL	No issue	No issue	No issue	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Temporary fault on Tesla-Newark 230kV and Tesla-Ravenswood 230kV lines	P7	DCTL	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 500/230 kV #13 Transformer 3Ø fault with normal clearing.	P1	N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Metcalf 500/230 kV #13 Transformer 3Ø fault with normal clearing with LMEC offline in the base case.	P3	G-1/N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Metcalf 500/230 kV #13 Transformer SLG fault with delayed clearing.	P5	Non-Redundent Relay	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Tesla-Newark 230 kV line 3Ø fault with normal clearing with Metcalf 500/230 kV #13 Transformer offline in the base case.	P6	N-1-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 230 kV bus 3Ø fault with normal clearing with Metcalf 500/230 kV #13 Transformer offline in the base case.	P6	N-1-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Contra Costa-Gateway 230 kV SLG fault with delayed clearing.	P5	Non-Redundent Relay	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Contra Costa-Gateway 230 kV SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
TBC SLG fault with normal clearing.	P1	N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
TBC SLG fault with normal clearing with LMEC offline in the base case.	P3	G-1/N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
TBC SLG fault with normal clearing with Tesla-Newark 230 kV line offline in the base case.	P6	N-1-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Newark 230 kV 3Ø fault with normal clearing.	P1	N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Tesla-Newark 230 kV line 3Ø fault with normal clearing with LMEC offline in the base case.	P3	G-1/N-1	No issue	No issue	No issue	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Monta Vista 230 kV SVD 3Ø fault with normal clearing.	P1	N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Monta Vista 230 kV SVD 3Ø fault with normal clearing with LMEC offline in the base case.	P3	G-1/N-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Monta Vista 230 kV SVD SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Monta Vista 230 kV SVD SLG fault with delayed clearing.	P5	Non-Redundent Relay	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required

Study Area: PG&E Greater Bay Area

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2027 SP High CEC Forecast	
Ravenswood 230 kV SVD 3Ø fault with normal clearing with Monta Vista 230 kV SVD offline in the base case.	P6	N-1-1	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	Potential WECC/NERC criteria violation	Continue to monitor
Metcalf 230 kV bus SLG fault with normal clearing.	P2	Bus/Breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 230 kV line breaker SLG fault with normal clearing.	P2	Bus/Breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 230 kV bus-tie breaker SLG fault with normal clearing.	P2	Bus/Breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 500/230 kV #13 Transformer SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 230 kV bus SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Crocket 3Ø fault with normal clearing with LMEC offline in the base case.	P3	G-1/N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
LMEC 3Ø fault with normal clearing.	P1	N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
DEC 3Ø fault with normal clearing.	P1	N-1	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required
Metcalf 115 kV bus-tie breaker SVD SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Metcalf 115 kV bus SLG fault with delayed clearing.	P5	Non-Redundent Relay	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	PTO to provide actual clearing times and fault impedances
Los Esteros SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4	Stuck breaker	No issue	No issue	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issue	No issue	Continue to monitor
Los Esteros SLG fault with delayed clearing.	P5	Non-Redundent Relay	No issue	No issue	No issue	No issue	No issue	No issue	No mitigation required

Study Area: **PG&E Greater Bay Area**

Single Contingency Load Drop

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

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

Study Area: **PG&E Greater Bay Area**

Single Source Substation with more than 100 MW Load

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

No single source substation with more than 100 MW