

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)								Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
Applied Materials-Britton 115 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	209	162	154	179	183	174	78	100	218	215	178	133	139	154	218	178	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
Bair 115/60kV Transformer #1	CLY LNDG 60kV Section 1D	P2	Bus	99	120	117	105	122	122	53	97	133	102	125	137	151	117	133	125	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	CLY LNDG - 1D 60kV & BAIR-COOLEY LANDING #2 line	P2	Non-bus-tie breaker	91	103	101	97	105	107	47	79	114	94	108	137	151	101	114	108	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	100	121	118	106	123	124	54	97	134	103	126	137	151	118	134	126	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	CLY LND 115/60kV TB 1 & CLY LND2 115/60kV TB 2	P6	N-1-1	141	167	162	162	182	183	<90	122	186	147	176	137	151	162	186	177	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
Bair-Cooley Landing #1 60kV Line	CLY LNDG - 1D 60kV & BAIR-COOLEY LANDING #2 line	P2	Non-bus-tie breaker	111	128	129	81	92	96	56	96	142	115	136	129	124	129	142	136	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	BAIR-COOLEY LANDING #1 60kV [6200] (BLHVNTP1-CLY LNDG)	P2	Line section w/o fault	87	93	95	83	91	98	46	67	103	89	101	95	92	95	103	101	Sensitivity only
	CLY LNDG 60kV Section 1D	P2	Bus	87	96	98	85	93	98	46	67	106	90	104	98	89	98	106	104	Sensitivity only
	CLY LNDG - 1D 60kV & BAIR-COOLEY LANDING #2 line	P2	Non-bus-tie breaker	86	94	96	84	91	98	45	67	104	89	102	96	96	96	104	102	Sensitivity only
	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	87	95	97	84	92	99	46	68	105	90	103	97	89	97	105	103	Sensitivity only
	CLY LND 115/60kV TB 1 & CLY LND2 115/60kV TB 2	P6	N-1-1	120	139	137	131	146	151	<90	94	156	125	150	114	125	137	154	150	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
Bair-Cooley Landing #2 60kV Line	CLY LNDG 60kV Section 1D	P2	Bus	65	92	90	44	62	60	35	78	100	66	92	131	144	90	100	92	Sensitivity only
	BAIR-COOLEY LANDING #2 60kV [6210] (BAIR-REDWDTP2)	P2	Line section w/o fault	76	91	91	58	70	70	37	73	100	77	94	131	144	91	100	94	Sensitivity only
	BAIR 60kV Section MA	P2	Bus	76	91	91	58	70	70	37	73	100	77	94	131	144	91	100	94	Sensitivity only
	CLY LND 115/60kV TB 1 & CLY LND2 115/60kV TB 2	P6	N-1-1	111	139	136	97	115	116	<90	103	155	114	146	110	118	136	154	147	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
Britton-Monta Vista 115 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	154	110	105	125	128	120	52	62	152	157	123	96	100	105	152	123	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
Christie-Sobrante (Oleum-Sobrante) 115kV Line	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	135	108	102	133	111	109	79	85	120	138	112	125	132	102	120	112	System upgrade or preferred resource
Cooley Landing-Palo Alto 115kV Line	RVNSWD E 115kV - Section 1E & 2E	P2	Bus-tie breaker	126	110	108	83	83	81	102	105	110	126	108	111	115	108	110	108	Rerate
	Ravenswood-Palo Alto Nos. 1 & 2 115 kV lines	P7	DCTL	123	108	107	82	81	81	102	104	108	123	106	109	113	107	108	106	Rerate
	RAVENSWOOD-PALO ALTO #1 115kV & RAVENSWOOD-PALO ALTO #2 115kV	P6	N-1-1	123	108	106	<90	<90	<90	102	104	108	123	106	109	113	106	108	106	Rerate
Eastshore 230/115kV Transformer #1	E. SHORE 230kV - Middle Breaker Bay 3	P2	Non-bus-tie breaker	94	108	108	99	104	109	81	58	111	95	109	109	102	108	111	109	Operational action plan
Evergreen 115/60 kV Transformer No. 1	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	109	94	95	97	97	101	40	43	107	116	107	87	77	95	107	107	Disable automatic switching
	LOS GATS 60kV Section 1D	P2	Bus	109	94	95	97	97	101	40	43	107	116	107	87	77	95	107	107	Disable automatic switching
Evergreen-Almaden 60 kV Line	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	140	117	115	105	104	108	42	45	134	148	132	113	88	115	134	132	Disable automatic switching
	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	139	116	115	116	115	119	42	45	133	148	131	113	88	115	133	131	Disable automatic switching
	LOS GATS 60kV Section 1D	P2	Bus	140	117	115	105	104	108	42	45	134	148	132	113	88	115	134	132	Disable automatic switching
	LOS GATS 60kV Section 1D	P2	Bus	139	116	115	116	115	119	42	45	133	148	131	113	88	115	133	131	Disable automatic switching
Jefferson-Hillsdale JCT 60kV Line	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	136	137	131	188	192	202	93	92	147	142	148	131	164	131	147	148	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	138	137	133	191	195	202	95	94	150	144	149	133	160	133	150	149	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration

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	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	138	138	133	199	194	203	96	95	150	145	149	150	165	133	150	149	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	136	136	131	187	191	194	93	92	147	142	148	147	161	131	151	148	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
Jefferson-Stanford #1 60kV Line	Jefferson 230 kV BAAH Bus #2 (failure of non-redundant relay)	P5	Non-redundant relay (Bus)	90	87	87	106	108	110	68	76	90	92	89	87	92	87	90	89	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	90	88	87	111	107	110	68	77	90	92	89	93	96	87	90	89	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	<90	<90	<90	103	106	104	<90	<90	<90	90	<90	<90	<90	<90	91	<90	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
Las Positas-Newark 230kV Line	C.COSTA 230kV - Section 2F & 2E	P2	Bus-tie breaker	94	99	94	79	75	76	16	61	99	99	101	117	101	94	99	101	Sensitivity only
Lawrence - Monta Vista 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	169	130	124	148	151	143	60	75	178	173	144	154	163	124	178	144	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	242	186	177	176	180	170	85	108	254	248	207	154	163	177	254	207	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
Los Esteros-Montague 115 kV Line	LOS ESTEROS-NORTECH 115kV & LOS ESTEROS-TRIMBLE 115kV	P6	N-1-1	94	<90	<90	<90	<90	<90	<90	<90	100	<90	94	<90	<90	<90	100	93	Sensitivity only
Loyola-Monta Vista 60 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	105	88	86	114	118	113	39	35	119	109	107	86	86	86	119	107	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
	Monta Vista 115kV BAAH Bus #1 (failure of non-redundant relay)	P5	Non-redundant relay (Bus)	106	<90	<90	119	<90	<90	39	<90	<90	110	<90	<90	<90	<90	<90	<90	Load power factor correction and reactive power compensation if needed
Martinez-Sobrante 115kV Line	PITSBG D 230kV Section 2D	P2	Bus	105	119	120	96	102	110	141	68	116	103	117	96	<90	120	116	117	System upgrade or preferred resource
	PITSBG D - 2D 230kV & PITSBG D-TBC_PTB1 #1 line	P2	Non-bus-tie breaker	105	119	120	96	102	110	141	68	116	103	117	96	<90	120	116	117	System upgrade or preferred resource
	SOBRANTE 115kV Section 1D	P2	Bus	97	<90	<90	75	<90	<90	44	<90	<90	100	<90	96	<90	<90	<90	<90	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	SOBRANTE - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #1 line	P2	Non-bus-tie breaker	98	<90	<90	75	<90	<90	44	<90	<90	101	<90	96	<90	<90	<90	<90	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	SOBRANTE - 1D 115kV & SOBRANTE-G #1 line	P2	Non-bus-tie breaker	97	<90	<90	75	<90	<90	44	<90	<90	100	<90	96	<90	<90	<90	<90	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	SOBRANTE - 1D 115kV & SOBRANTE-STD. OIL line	P2	Non-bus-tie breaker	98	<90	<90	76	<90	<90	44	<90	<90	101	<90	96	<90	<90	<90	<90	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	99	<90	<90	75	<90	<90	51	<90	<90	102	<90	96	<90	<90	<90	<90	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
Martin-Larkin (HY-1) 115kV Cable	A-Y #1 115kV & X-Y #1 115kV	P6	N-1-1	158	173	176	195	198	202	<90	144	185	164	186	176	176	176	183	186	Long term: Larkin bus upgrade Short term: Action plan
Martin-Sneath Lane 60kV Line	MILLBRAE-SAN MATEO #1 115kV & MARTIN-MILLBRAE #1 115kV	P6	N-1-1	146	125	119	131	129	132	<90	90	142	152	132	114	119	119	142	131	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
Metcalf 230/115 kV Trans No. 1	MTCALF D 115kV Section 1X	P2	Bus	70	74	68	109	110	75	57	81	92	80	79	63	68	68	92	79	Short Term : Action Plan ; Long Term : Preferred resource
	METCALF 230kV - Section 1E & 2E	P2	Bus-tie breaker	82	87	84	100	102	87	54	78	103	92	96	63	84	84	103	96	Short Term : Action Plan ; Long Term : Preferred resource
	METCALF 230kV - Section 2D & 2E	P2	Bus-tie breaker	94	99	97	113	114	98	62	88	118	106	110	63	97	97	118	110	Short Term : Action Plan ; Long Term : Preferred resource
	METCALF 230/115kV TB 2 & METCALF 230/115kV TB 4	P6	N-1-1	95	98	99	100	100	99	<90	<90	100	98	100	99	99	99	100	100	Short Term : Action Plan ; Long Term : Preferred resource

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Metcalf 230/115 kV Trans No. 2	MTCALF E 115kV Section 1Y	P2	Bus	95	99	100	95	93	97	52	72	115	105	112	88	100	100	115	112	Short Term : Action Plan ; Long Term : Preferred resource
	METCALF 230kV - Section 1D & 1E	P2	Bus-tie breaker	88	90	87	104	102	90	56	79	108	99	100	88	100	87	108	100	Short Term : Action Plan ; Long Term : Preferred resource
	METCALF 230kV - Section 1D & 2D	P2	Bus-tie breaker	100	102	99	116	113	100	63	89	123	113	114	88	100	99	123	114	Short Term : Action Plan ; Long Term : Preferred resource
Metcalf 230/115 kV Trans No. 3	MTCALF E 115kV Section 2X	P2	Bus	94	98	99	94	92	96	51	71	113	104	111	87	99	99	113	111	Short Term : Action Plan ; Long Term : Preferred resource
	METCALF 230kV - Section 1D & 2D	P2	Bus-tie breaker	97	99	96	112	110	97	61	87	119	109	110	87	99	96	119	110	Short Term : Action Plan ; Long Term : Preferred resource
	METCALF 230kV - Section 2D & 2E	P2	Bus-tie breaker	93	99	96	112	113	97	61	87	118	106	110	87	99	96	118	110	Short Term : Action Plan ; Long Term : Preferred resource
Metcalf 230/115 kV Trans No. 4	MTCALF D 115kV Section 2Y	P2	Bus	68	72	66	106	107	73	56	79	89	78	77	62	66	66	89	77	Short Term : Action Plan ; Long Term : Preferred resource
	METCALF 230kV - Section 1D & 1E	P2	Bus-tie breaker	89	91	87	105	104	90	56	80	108	99	100	62	87	87	108	100	Short Term : Action Plan ; Long Term : Preferred resource
	METCALF 230kV - Section 1E & 2E	P2	Bus-tie breaker	84	90	87	103	105	89	55	80	106	95	99	62	87	87	106	99	Short Term : Action Plan ; Long Term : Preferred resource
	METCALF 230/115kV TB 2 & METCALF 230/115kV TB 1	P6	N-1-1	95	98	99	100	100	99	<90	<90	100	98	100	99	99	99	100	100	Short Term : Action Plan ; Long Term : Preferred resource
Metcalf-El Patio No. 2 115 kV Line	MTCALF D Section 1D & MTCALF E Section 1E 115kV	P2	Bus-tie breaker	88	92	93	74	71	80	43	62	106	98	103	93	93	93	106	103	Sensitivity only
	MTCALF D Section 1D & MTCALF E Section 1E 115kV	P2	Bus-tie breaker	88	92	93	74	71	80	42	62	106	98	103	93	93	93	106	103	Sensitivity only
Metcalf-Evergreen No. 1 115 kV Line	MTCALF E 115kV Section 2E	P2	Bus	<90	88	89	<90	76	78	<90	65	101	<90	99	89	89	89	101	99	Project: Metcalf - Evergreen 115 kV line reconductoring Potential scope change
Metcalf-Llagas 115 kV Line	LLAGAS-GILROY-GILROY F-GILROYPK 115kV & METCALF-MORGAN HILL 115kV	P6	N-1-1	102	111	114	<90	<90	<90	<90	<90	130	109	134	<90	<90	114	130	134	Project: Morgan Hill Area Reinforcement (Spring) Short term: Action plan Potential scope change
Metcalf-Morgan Hill 115 kV Line	MTCALF D-LLAGAS 115kV & LLAGAS-GILROY-GILROY F-GILROYPK 115kV	P6	N-1-1	91	96	99	<90	<90	<90	<90	<90	110	96	113	<90	<90	99	110	113	Project: Morgan Hill Area Reinforcement (Spring) Short term: Action plan Potential scope change
Millbrae-Sneath Lane 60kV Line	MILLBRAE-SAN MATEO #1 115kV & MARTIN-MILLBRAE #1 115kV	P6	N-1-1	125	103	99	108	109	113	<90	<90	117	129	107	<90	91	99	117	105	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
Monta Vista 115/60 kV Trans No. 6	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	109	<90	<90	125	<90	<90	83	<90	<90	109	<90	<90	<90	<90	<90	<90	Load power factor correction and reactive power compensation if needed
Monta Vista 230/115 kV Trans No. 2	MONTAVIS 230kV Section 2D	P2	Bus	102	99	97	101	98	100	54	73	111	109	104	97	97	97	111	104	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
	MONTAVIS - 2D 230kV & MONTA VISTA-JEFFERSON #2 line	P2	Non-bus-tie breaker	102	99	97	101	98	100	54	73	111	109	104	97	97	97	111	104	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
	MONTAVIS 230/115kV TB 3 & MONTAVIS 230/115kV TB 4	P6	N-1-1	<90	100	100	<90	100	100	<90	<90	106	91	102	100	100	100	106	102	Sensitivity only
Monta Vista 230/115 kV Trans No. 3	MONTAVIS 230/115kV TB 2 & MONTAVIS 230/115kV TB 4	P6	N-1-1	<90	97	97	<90	97	97	<90	<90	103	<90	99	97	97	97	103	99	Sensitivity only
Monta Vista 230/115 kV Trans No. 4	MONTAVIS 230/115kV TB 2 & MONTAVIS 230/115kV TB 3	P6	N-1-1	<90	100	100	<90	100	100	<90	<90	105	91	102	100	100	100	105	102	Sensitivity only
Monta Vista-Permanente 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	109	<90	<90	53	<90	<90	59	<90	<90	107	<90	<90	<90	<90	<90	<90	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	109	<90	<90	57	<90	<90	58	<90	<90	107	<90	<90	<90	<90	<90	<90	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan

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Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	110	<90	<90	61	<90	<90	59	<90	<90	109	<90	<90	<90	<90	<90	<90	Load power factor correction and reactive power compensation if needed
	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	109	<90	<90	65	<90	<90	58	<90	<90	108	<90	<90	<90	<90	<90	<90	Load power factor correction and reactive power compensation if needed
Monta Vista-Wolfe 115 kV Line	STELLING-MONTA VISTA 115kV [1000]	P1	N-1	103	95	93	79	80	82	49	60	105	107	100	86	91	93	105	100	Short Term : Action Plan ; Long Term : Preferred resource
Moraga-Claremont #1 115kV Line	OAK C115 115kV Section ME	P2	Bus	100	99	95	82	83	86	41	71	109	102	103	99	112	95	105	100	Substation upgrade
	MORAGA 115kV Section 2D	P2	Bus	99	95	97	87	89	93	49	73	106	101	99	99	112	97	107	100	Substation upgrade
	OAK C115 - ME 115kV & OAKLAND C-MARITIME line	P2	Non-bus-tie breaker	100	99	95	82	83	86	41	71	109	102	103	99	112	95	105	102	Substation upgrade
	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	104	104	105	88	88	91	56	80	120	106	107	99	112	105	125	118	Substation upgrade
	SOBRANTE 230kV - Section 2D & 1D	P2	Bus-tie breaker	101	100	104	86	86	87	63	85	109	103	103	99	112	104	116	111	Substation upgrade
	MORAGA 115kV - Section 2E & 2D	P2	Bus-tie breaker	98	93	95	72	86	90	77	82	103	100	96	99	112	95	102	96	Substation upgrade
	C-X #2 115kV & C-X #3 115kV	P6	N-1-1	104	102	103	98	96	99	<90	<90	118	104	105	101	109	103	112	107	System upgrade or preferred resource
Moraga-Claremont #2 115kV Line	OAK C115 115kV Section ME	P2	Bus	100	99	96	83	83	86	41	71	109	102	103	99	110	96	105	100	Substation upgrade
	OAK C115 - ME 115kV & OAKLAND C-MARITIME line	P2	Non-bus-tie breaker	100	99	96	83	83	86	41	71	109	102	103	99	110	96	105	103	Substation upgrade
	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	104	104	105	88	88	91	56	80	120	106	107	99	110	105	126	119	Substation upgrade
	SOBRANTE 230kV - Section 2D & 1D	P2	Bus-tie breaker	101	100	104	86	87	87	63	85	109	103	103	99	110	104	116	111	Substation upgrade
	MORAGA 115kV - Section 1E & 1D	P2	Bus-tie breaker	90	95	100	82	86	88	33	72	105	92	99	99	110	100	112	106	Substation upgrade
	C-X #2 115kV & C-X #3 115kV	P6	N-1-1	104	102	103	98	96	99	<90	<90	118	104	105	101	109	103	112	108	System upgrade or preferred resource
Moraga-Lakewood 115kV Line (Lakewood Reactors)	PITSBG D 230kV Section 2D	P2	Bus	71	82	85	95	93	102	131	50	76	67	77	85	85	85	76	77	Review existing SPS
	CLAYTN 115kV Section 1D	P2	Bus	186	207	205	168	168	170	84	105	219	188	213	205	205	205	219	213	Review existing SPS
	CLAYTN - 1D 115kV & PITTSBURG-KIRKER-COLUMBIA STEEL line	P2	Non-bus-tie breaker	186	207	205	168	168	170	84	105	219	188	213	205	205	205	219	213	Review existing SPS
	PITSBG D - 2D 230kV & PITSBG D-TBC_PT B1 #1 line	P2	Non-bus-tie breaker	71	82	85	95	93	102	131	50	76	67	77	85	85	85	76	77	Review existing SPS
Moraga-Oakland X #1 115kV Line	K-D #1 115kV & K-D #2 115kV	P6	N-1-1	<90	<90	93	<90	<90	<90	<90	<90	95	<90	<90	<90	<90	98	109	102	System upgrade or preferred resource
Moraga-Oakland X #2 115kV Line	K-D #1 115kV & K-D #2 115kV	P6	N-1-1	<90	<90	93	<90	<90	<90	<90	<90	95	<90	<90	<90	<90	98	109	102	System upgrade or preferred resource
Moraga-Oakland X #3 115kV Line	K-D #1 115kV & K-D #2 115kV	P6	N-1-1	<90	<90	93	<90	<90	<90	<90	<90	95	<90	<90	<90	<90	98	109	102	System upgrade or preferred resource
Moraga-Oakland X #4 115kV Line	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	108	118	127	101	109	113	23	89	132	111	123	119	138	127	132	123	Substation upgrade
	K-D #1 115kV & K-D #2 115kV	P6	N-1-1	<90	<90	93	<90	<90	<90	<90	<90	95	<90	<90	<90	<90	98	109	102	System upgrade or preferred resource
	SN LNDRO 115kV Section 1E	P2	Bus	127	84	79	127	97	92	78	70	92	129	88	67	57	79	92	88	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
	MORAGA 115kV Section 2E	P2	Bus	114	<90	<90	114	<90	<90	72	<90	<90	115	<90	67	57	<90	<90	<90	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)								Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
Moraga-San Leandro #1 115kV Line	MORAGA 115kV - Section 2E & 2D	P2	Bus-tie breaker	115	59	55	114	68	64	73	51	64	116	62	67	57	55	64	62	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
	Moraga-Oakland J 115 kV and Moraga-San Leandro No. 3 115 kV lines	P7	DCTL	118	71	67	119	81	77	75	60	77	119	74	72	69	67	77	74	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
	MORAGA-SAN LEANDRO #2 115kV & MORAGA-SAN LEANDRO #3 115kV	P6	N-1-1	131	<90	<90	131	100	94	<90	<90	95	132	91	<90	<90	<90	93	89	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
Moraga-San Leandro #2 115kV Line	MORAGA 115kV Section 1E	P2	Bus	132	88	83	132	101	96	82	73	96	133	92	88	84	83	96	92	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
	MORAGA 115kV - Section 1E & 1D	P2	Bus-tie breaker	129	86	82	131	99	93	80	71	94	130	91	88	84	82	94	91	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
	Moraga-Oakland J 115 kV and Moraga-San Leandro No. 3 115 kV lines	P7	DCTL	119	71	68	120	82	78	76	61	78	120	75	73	70	68	78	75	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
	MORAGA-SAN LEANDRO #1 115kV & MORAGA-SAN LEANDRO #3 115kV	P6	N-1-1	131	<90	<90	132	100	95	<90	<90	95	133	91	<90	<90	<90	93	90	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
Moraga-San Leandro #3 115kV Line	Moraga-San Leandro Nos. 1 & 2 115 kV lines	P7	DCTL	106	71	68	107	83	78	66	60	78	107	75	72	69	68	78	75	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
	MORAGA-SAN LEANDRO #1 115kV & MORAGA-SAN LEANDRO #2 115kV	P6	N-1-1	106	<90	<90	106	<90	<90	<90	<90	<90	107	<90	<90	<90	<90	<90	<90	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
MOSSLNSW-LASAGUILASS #2 230KV	Moss Landing-Los Banos 500 kV Line	P1	N-1	6	27	29	12	32	22	8	113	47	15	30	29	30	29	47	30	Action plan
	Moss Landing-Los Banos & Tesla-Metcalf 500 kV Lines	P6	N-1-1	<90	<90	90	<90	99	<90	<90	<90	100	<90	100	90	100	90	100	100	Action plan
Newark-Applied Materials 115kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	263	224	213	218	223	211	110	148	296	270	244	135	140	213	296	244	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	210	164	156	186	190	180	79	103	221	216	180	135	140	156	221	180	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
	NEWARK F-LAWRENCE-LOCKHD 1 115kV & BRITTON-MONTA VISTA 115kV	P6	N-1-1	97	100	97	<90	<90	<90	<90	<90	109	99	102	97	97	97	109	102	System upgrade or preferred resource
	PIERCY-METCALF 115kV [4318]	P1	N-1	108	76	77	96	71	75	54	49	86	114	87	105	77	77	86	87	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
	MTCALF E 115kV Section 2E	P2	Bus	108	76	77	97	72	75	54	49	86	114	88	106	72	77	86	88	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)								Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
Newark-Dixon Landing 115kV Line	MTCALF E - 2E 115kV & STONE- EVERGREEN-METCALF line	P2	Non-bus-tie breaker	108	76	77	97	71	75	54	49	86	114	87	106	72	77	86	87	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	108	76	77	97	72	75	54	49	87	114	88	106	72	77	87	88	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
	Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	108	76	77	97	72	75	54	49	87	114	88	106	43	77	87	88	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
Newark-Lawrence 115kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	331	274	260	239	246	232	138	182	360	340	297	220	227	260	360	297	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	251	203	192	199	204	192	98	129	272	258	221	220	227	192	272	221	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
	Newark-Applied Materials & Lawrence-Monta Vista 115 kV Lines	P7	DCTL	106	112	107	76	78	77	71	103	122	109	111	107	107	107	122	111	System upgrade or preferred resource
	Moss Landing-Los Banos & Tesla-Metcalf 500 kV Lines	P6	N-1-1	<90	<90	<90	<90	81	<90	<90	79	102	<90	92	<90	<90	<90	102	92	System upgrade or preferred resource
Newark-Milpitas #1 115kV Line	SWIFT-METCALF 115kV & NEWARK-MILPITAS #2 115kV	P6	N-1-1	114	118	115	97	99	97	<90	<90	138	121	132	127	137	115	138	132	System upgrade or preferred resource
Newark-Milpitas #2 115kV Line	NEWARK-MILPITAS #1 115kV & SWIFT-METCALF 115kV	P6	N-1-1	96	100	95	<90	<90	<90	<90	<90	114	100	109	106	114	95	114	109	Sensitivity only
Newark-Northern Receiving Station #1 115kV Line	Los Esteros 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	81	96	97	85	90	82	69	85	102	105	105	97	97	97	102	105	Sensitivity only
NRS-Scott No. 2 115 kV Line	DVRaGT1 13.80kV & DVRbGt2 13.80kV & DVRaST3 13.80kV Gen Units & NORTHERN RECEIVING STATION-SCOTT #1 115kV	P3	G-1/N-1	110	117	122	95	99	100	<90	92	120	111	125	122	122	122	119	125	Potential reconductor as part of NRS-SRS #1 115 kV line reconductor project
	DVRaGT1 13.80kV & DVRbGt2 13.80kV & DVRaST3 13.80kV Gen Units & NORTHERN RECEIVING STATION-SCOTT #1 115kV [3111]	P3	G-1/N-1	108	116	120	95	99	100	<90	92	119	109	123	120	120	120	119	123	Potential reconductor as part of NRS-SRS #1 115 kV line reconductor project
Oakland C - Oakland L #1 115kV Cable	CLARMNT 115kV - Section 2D & 1D	P2	Bus-tie breaker	100	101	99	97	97	99	55	79	108	101	102	91	91	99	108	102	Substation upgrade
	K-D #2 115kV & K-D #1 115kV	P6	N-1-1	99	100	99	96	96	98	<90	<90	108	100	102	91	91	99	108	102	System upgrade or preferred resource
Oakland C - Oakland X #2 115kV Cable	CLARMNT 115kV - Section 2D & 1D	P2	Bus-tie breaker	91	90	106	86	85	87	71	90	99	91	92	83	82	106	116	109	Substation upgrade
	C-X #3 115kV & D-L #1 115kV	P6	N-1-1	96	94	100	<90	<90	<90	<90	100	104	96	95	<90	<90	121	134	124	System upgrade or preferred resource
Oakland D - Oakland L 115kV Cable	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	95	93	106	82	81	81	84	93	117	95	94	93	90	106	132	124	Substation upgrade
	C-X #2 115kV & C-X #3 115kV	P6	N-1-1	95	93	106	<90	<90	<90	<90	99	118	95	94	<90	<90	106	118	109	System upgrade or preferred resource
	CHRISTIE-SOBRANTE 115kV [1260]	P1	N-1	110	<90	<90	92	<90	<90	59	<90	<90	111	<90	107	74	<90	<90	<90	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	SOBRANTE 115kV Section 1D	P2	Bus	114	<90	<90	97	<90	<90	61	<90	<90	116	<90	108	82	<90	<90	<90	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	CHRISTIE 115kV - Ring R3 & R2	P2	Non-bus-tie breaker	110	50	49	92	42	42	59	37	53	111	52	108	82	49	53	52	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	SOBRANTE - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #1 line	P2	Non-bus-tie breaker	114	49	49	97	42	43	61	39	54	116	52	108	82	49	54	52	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan

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				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
Oleum-Christie 115kV Line	SOBRANTE - 1D 115kV & SOBRANTE-G #1 line	P2	Non-bus-tie breaker	114	49	49	97	42	43	61	39	54	116	52	108	82	49	54	52	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	SOBRANTE - 1D 115kV & SOBRANTE-STD. OIL line	P2	Non-bus-tie breaker	114	49	49	97	42	43	61	39	54	116	52	108	82	49	54	52	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	SOBRANTE 115kV - Section 1D & 2D	P2	Bus-tie breaker	116	49	49	99	42	43	61	39	53	118	52	108	82	49	53	52	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	114	49	49	97	42	43	61	39	54	115	52	108	82	49	54	52	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	Christie-Sobrante 115 kV and Martinez-Sobrante 115 kV lines	P7	DCTL	110	50	49	92	42	42	59	38	54	111	53	107	100	49	54	53	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	98	71	66	89	69	67	60	56	80	101	73	107	100	66	80	73	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	UNION CH 9.11kV Gen Unit 1 & CHRISTIE-SOBRANTE 115kV	P3	G-1/N-1	129	<90	<90	107	<90	<90	<90	<90	<90	131	<90	128	<90	<90	<90	<90	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
Oleum-Martinez 115kV Line	SOBRANTE 115kV Section 1D	P2	Bus	246	193	182	260	211	212	170	160	215	250	197	222	255	182	215	197	System upgrade or preferred resource
	SOBRANTE - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #1 line	P2	Non-bus-tie breaker	246	193	182	260	211	212	170	160	215	250	197	222	255	182	215	197	System upgrade or preferred resource
	SOBRANTE - 1D 115kV & SOBRANTE-G #1 line	P2	Non-bus-tie breaker	246	193	182	260	211	212	170	160	215	250	197	222	255	182	215	197	System upgrade or preferred resource
	SOBRANTE - 1D 115kV & SOBRANTE-STD. OIL line	P2	Non-bus-tie breaker	246	193	182	260	211	212	170	160	215	250	197	222	255	182	215	197	System upgrade or preferred resource
	SOBRANTE - 1D 115kV & SOBRANTE-NRTH TWR line	P2	Non-bus-tie breaker	<90	193	182	<90	211	212	<90	160	215	<90	197	222	255	182	215	197	System upgrade or preferred resource
	PITSBG D - 2D 230kV & PITSBG D-TBC_PTB1 #1 line	P2	Non-bus-tie breaker	123	123	123	129	118	126	153	79	120	120	118	222	255	123	120	118	System upgrade or preferred resource
	SOBRANTE 115kV - Section 1D & 2D	P2	Bus-tie breaker	251	192	182	266	210	211	172	160	215	256	196	222	255	182	215	196	System upgrade or preferred resource
	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	245	193	182	259	211	212	170	160	215	249	197	222	255	182	215	197	System upgrade or preferred resource
	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	98	76	72	109	87	89	90	71	84	99	76	99	110	72	84	76	Project: North Tower 115 kV Looping Project In-service date: 12/18 Short term: Action Plan
	NEWARK-DIXON LANDING 115kV [2990]	P1	N-1	97	76	76	94	70	75	48	49	87	102	87	98	63	76	87	87	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
	NEWARK F 115kV Section 2F	P2	Bus	98	76	77	95	71	75	48	49	87	102	88	99	71	77	87	88	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
	NEWARK F - 2F 115kV & NEWARK-NUMMI line	P2	Non-bus-tie breaker	98	76	77	95	71	75	48	49	87	102	88	99	71	77	87	88	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
	NEWARK F - 2F 115kV & NEWARK F-LOCKHD 2-APP MAT line	P2	Non-bus-tie breaker	98	76	76	94	70	75	48	49	87	102	87	99	71	76	87	87	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)								Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
Piercy-Metcalf 115 kV Line	NEWARK F - 2F 115kV & NEWARK-TRIMBLE line	P2	Non-bus-tie breaker	98	76	77	95	71	75	48	49	87	102	88	99	71	77	87	88	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
	NEWARK F 115kV - Section 1F & 2F	P2	Bus-tie breaker	98	76	77	96	72	76	48	49	88	103	88	99	71	77	88	88	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	100	<90	<90	90	<90	<90	48	<90	<90	106	<90	99	71	<90	<90	<90	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
	Newark-Dixon Landing 115 kV and Newark-Milpitas No. 1 115 kV lines	P7	DCTL	97	76	76	94	70	75	48	49	87	102	87	98	63	76	87	87	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
	Newark - Dixon Landing & Newark - Milpitas #1 115 kV Lines	P7	DCTL	97	76	76	94	70	75	48	49	87	102	87	98	63	76	87	87	Project: Metcalf - Piercy & Swift and Newark - Dixon Landing 115 kV Upgrade In-service date: 4/19 Short term: Action plan
Pittsburg 230/115kV Transformer #12	LMECCT2 18.00kV & LMECCT1 18.00kV & LMECST1 18.00kV Gen Units & PITSBG D 230/115kV TB 13	P3	G-1/N-1	104	<90	<90	86	<90	<90	<90	<90	<90	106	<90	97	<90	<90	<90	<90	Project: Pittsburg 230/115 kV Transformer Capacity Increase In-service date: 5/22 Short term: Action plan
Pittsburg 230/115kV Transformer #13	PITSBG D 230kV Section 2D	P2	Bus	112	60	60	105	58	57	74	4	62	111	60	101	57	60	62	60	Project: Pittsburg 230/115 kV Transformer Capacity Increase In-service date: 5/22 Short term: Action plan
	PITSBG D - 2D 230kV & PITSBG D-TBC_PT B1 #1 line	P2	Non-bus-tie breaker	112	60	60	105	58	57	74	4	62	111	60	101	57	60	62	60	Project: Pittsburg 230/115 kV Transformer Capacity Increase In-service date: 5/22 Short term: Action plan
	LMECCT2 18.00kV & LMECCT1 18.00kV & LMECST1 18.00kV Gen Units & PITSBG D 230/115kV TB 12	P3	G-1/N-1	120	<90	<90	100	<90	<90	<90	<90	<90	122	<90	112	<90	<90	<90	<90	Project: Pittsburg 230/115 kV Transformer Capacity Increase In-service date: 5/22 Short term: Action plan
Pittsburg-Clayton #1 115kV Line	PITSBURG 115kV Section 2D	P2	Bus	<90	97	97	<90	74	77	<90	52	100	<90	100	97	97	97	100	100	Sensitivity only
	PITSBURG - 2D 115kV & PITTSBURG-KIRKER-COLUMBIA STEEL line	P2	Non-bus-tie breaker	94	97	97	75	74	77	60	52	100	95	100	97	97	97	100	100	Sensitivity only
	Pittsburg-Clayton Nos. 3 & 4 115 kV lines	P7	DCTL	94	97	97	75	74	77	60	52	100	95	100	97	97	97	100	100	Sensitivity only
	PITTSBURG-CLAYTON #4 115kV & PITTSBURG-KIRKER-COLUMBIA STEEL 115kV	P6	N-1-1	94	97	97	<90	<90	<90	<90	<90	100	95	100	97	97	97	101	100	Sensitivity only
Pittsburg-Clayton #3 115 kV Line	CLAYTN 115kV Section 2D	P2	Bus	<90	100	101	<90	88	91	<90	54	106	<90	104	101	101	101	106	104	Review existing SPS
	PITTSBURG-CLAYTON #1 115kV & PITTSBURG-CLAYTON #4 115kV	P6	N-1-1	99	100	101	<90	<90	91	<90	<90	106	99	104	101	101	101	106	104	Review existing SPS
Pittsburg-Clayton #4 115kV Line	PITTSBURG-CLAYTON #1 115kV & PITTSBURG-KIRKER-COLUMBIA STEEL 115kV	P6	N-1-1	105	108	108	<90	<90	91	<90	<90	114	106	112	108	108	108	115	112	Review existing SPS
Potrero-Larkin #1 (AY-1) 115kV Cable	H-Y #1 115kV & X-Y #1 115kV	P6	N-1-1	161	176	178	179	181	186	<90	146	186	167	187	178	178	178	186	187	Long term: Larkin bus upgrade Short term: Action plan
Potrero-Larkin #2 (AY-2) 115kV Cable	A-X #1 115kV & A-Y #1 115kV	P6	N-1-1	97	101	101	113	114	114	<90	<90	109	99	104	101	101	101	109	104	Project: TBC runback scheme modification and SF 115 kV cable upgrade Short term: Action plan

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)								Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
Potrero-Mission (AX) 115kV Cable	POTRERO 115kV Section 2E	P2	Bus	67	78	77	100	101	101	33	70	94	67	81	77	77	77	94	81	Project: TBC runback scheme modification and SF 115 kV cable upgrade Short term: Action plan
	POTRERO - 2E 115kV & POTRERO-TBC_POT1 #1 line	P2	Non-bus-tie breaker	67	78	77	100	101	101	33	70	94	67	81	77	77	77	94	81	Project: TBC runback scheme modification and SF 115 kV cable upgrade Short term: Action plan
	P-X #1 115kV & P-X #2 115kV	P6	N-1-1	99	101	100	115	116	116	<90	<90	109	101	106	108	111	100	109	106	Project: TBC runback scheme modification and SF 115 kV cable upgrade Short term: Action plan
Ravenswood-Cooley Landing #1 115kV Line	RVNSWD E 115kV Section 1X	P2	Bus	109	117	114	95	99	96	94	94	124	114	118	117	124	114	124	118	Project: Ravenswood - Cooley Landing 115 kV Line Reconductor Short term: Action plan Potential scope change
	RVNSWD E 115kV - Section 1E & 2E	P2	Bus-tie breaker	166	167	163	140	147	146	120	141	177	169	170	117	124	163	177	170	Project: Ravenswood - Cooley Landing 115 kV Line Reconductor Short term: Action plan Potential scope change
	Ravenswood-Palo Alto Nos. 1 & 2 115 kV lines	P7	DCTL	133	130	128	110	113	113	102	115	135	135	131	93	98	128	135	131	Project: Ravenswood - Cooley Landing 115 kV Line Reconductor Short term: Action plan Potential scope change
	RAVENSWOOD-PALO ALTO #1 115kV & RAVENSWOOD-PALO ALTO #2 115kV	P6	N-1-1	133	130	128	110	113	113	102	115	135	135	131	93	98	128	135	131	Project: Ravenswood - Cooley Landing 115 kV Line Reconductor Short term: Action plan Potential scope change
Ravenswood-Cooley Landing #2 115kV Line	BAIR 115/60kV TB 1 & CLY LND 115/60kV TB 1	P6	N-1-1	<90	97	95	<90	<90	92	<90	<90	109	<90	102	95	95	95	109	102	Sensitivity only
Ravenswood-Palo Alto #1 115kV Line	RAVENSWOOD-COOLEY LANDING #1 115kV & RAVENSWOOD-PALO ALTO #2 115kV	P6	N-1-1	108	105	104	95	98	98	<90	94	109	110	106	102	107	104	109	106	Close Cooley Landing 115 kV Bus Tie
Ravenswood-Palo Alto #2 115kV Line	RVNSWD E Section 1E & RVNSWD D Section 1D 115kV	P2	Bus-tie breaker	108	104	103	95	97	96	81	93	108	109	105	100	105	103	108	105	Close Cooley Landing 115 kV Bus Tie
	Ravenswood-Palo Alto No. 1 115 kV and Cooley Landing-Palo Alto 115 kV lines	P7	DCTL	104	91	90	81	81	80	86	87	91	104	90	91	95	90	91	90	Load power factor correction and reactive power compensation if needed
	RAVENSWOOD-COOLEY LANDING #1 115kV & RAVENSWOOD-PALO ALTO #1 115kV	P6	N-1-1	108	105	104	95	97	97	<90	94	109	110	106	102	107	104	109	106	Close Cooley Landing 115 kV Bus Tie
San Jose 'B'-Stone-Evergreen 115 kV Line	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	88	90	90	69	70	72	40	52	102	94	103	90	90	90	102	103	Sensitivity only
San Mateo 115/60kV Transformer #8	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	90	90	86	132	135	141	67	63	101	93	98	86	86	86	101	98	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	87	88	83	130	134	138	66	61	98	90	95	83	83	83	98	95	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	88	88	84	132	134	139	66	61	98	90	95	92	101	84	98	95	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	90	90	<90	131	135	137	<90	<90	101	93	98	93	102	<90	101	98	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
San Mateo-Bair 60kV Line	CLY LNDG 60kV Section 1D	P2	Bus	87	102	99	76	87	85	55	80	114	89	103	117	55	99	114	103	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	85	100	97	74	84	85	54	79	112	88	101	117	55	97	112	101	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	CLY LND 115/60kV TB 1 & CLY LND2 115/60kV TB 2	P6	N-1-1	120	140	135	118	132	132	<90	102	157	125	145	116	<90	135	157	145	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)								Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
San Mateo-Belmont 115kV Line	RVNSWD D 115kV - Section 1D & 2D	P2	Bus-tie breaker	107	107	106	96	98	99	73	90	116	109	111	96	97	106	116	111	Project: South of San Mateo capacity increase Short term: Action plan Potential scope change
	Ravenswood 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	97	104	103	89	93	91	88	82	81	102	108	103	103	103	81	108	Project: South of San Mateo capacity increase Short term: Action plan Potential scope change
	Ravenswood-Bair Nos. 1 & 2 115 kV lines	P7	DCTL	94	95	94	85	87	89	63	80	104	95	99	94	94	94	104	99	Sensitivity only
	RAVENSWD 230/115kV TB 1 & RAVENSWD 230/115kV TB 2	P6	N-1-1	100	102	101	100	100	100	<90	90	114	100	104	100	101	101	114	105	Project: South of San Mateo capacity increase Short term: Action plan Potential scope change
San Mateo-Hillsdale JCT 60kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	80	78	74	100	102	102	49	58	89	84	83	74	74	74	89	83	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	161	162	154	240	246	259	110	106	177	168	178	154	154	154	177	178	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	161	161	155	244	248	258	110	107	181	169	178	155	155	155	181	178	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	161	163	155	252	248	260	111	108	181	170	178	176	197	155	181	178	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	Metcalf-Monta Vista No. 3 & Monta Vista-Coyote Sw. Sta. 230 kV Line	P7	DCTL	81	77	74	100	100	102	49	58	87	85	83	176	197	74	87	83	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	160	162	153	239	245	250	110	106	177	168	177	173	194	153	182	177	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	179	181	172	229	234	247	125	119	198	188	198	172	172	172	198	198	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	180	180	173	232	237	246	125	120	202	189	198	173	173	173	202	198	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	180	182	173	241	236	248	126	122	202	190	199	202	225	173	202	199	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	179	180	171	227	233	238	125	119	198	188	198	198	220	171	203	198	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	172	173	164	255	262	276	120	114	189	180	189	164	164	164	189	189	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5	Non-redndant relay (Bus)	173	172	165	260	264	275	120	115	193	182	190	165	165	165	193	190	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	173	174	166	270	264	277	121	117	193	183	190	192	214	166	193	190	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	172	173	164	254	261	265	120	115	189	180	189	189	210	164	194	189	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
Sobrante 230/115kV Transformer #1	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	94	78	79	102	85	83	62	66	83	96	80	79	79	79	83	80	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
Sobrante-El Cerrito STA G #1 115kV Lin	CHRISTIE-SOBRANTE 115kV & SOBRANTE-G #1 115kV	P6	N-1-1	100	<90	<90	94	<90	<90	<90	<90	93	102	<90	95	101	<90	93	<90	Sensitivity only
Sobrante-El Cerrito STA G #2 115kV Line	CHRISTIE-SOBRANTE 115kV & SOBRANTE-G #1 115kV	P6	N-1-1	100	<90	<90	94	<90	<90	<90	<90	93	102	<90	95	102	<90	93	<90	Sensitivity only

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)								Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
Sobrante-Moraga 115kV Line	SOBRANTE 230kV - Section 2D & 1D	P2	Bus-tie breaker	104	104	102	97	98	98	53	83	112	107	108	84	104	102	112	108	Substation upgrade or rerate
	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	112	72	77	106	68	64	75	63	78	114	75	84	104	77	78	75	Project: East Shore - Oakland J 115 kV Reconductoring Project In-service date: 4/20 Short term: Action plan
	SOBRANTE 230/115kV TB 1 & SOBRANTE 230/115kV TB 2	P6	N-1-1	101	100	98	96	97	97	<90	<90	109	102	104	98	98	99	108	105	System upgrade or preferred resource
Stone-Evergreen-Metcalf 115kV Line	MTCALF D Section 1D & MTCALF E Section 1E 115kV	P2	Bus-tie breaker	<90	96	97	<90	81	83	<90	70	111	<90	108	97	97	97	111	108	Project: Metcalf - Evergreen 115 kV line reconductoring Potential scope change
	METCALF-EVERGREEN #1 115kV & SAN JOSE B-STONE-EVERGREEN 115kV	P6	N-1-1	97	97	100	<90	<90	91	<90	<90	111	102	112	100	100	100	112	112	Project: Metcalf - Evergreen 115 kV line reconductoring Potential scope change
Tassajara-Newark 230kV Line	PITSBG D 230kV Section 2D	P2	Bus	92	89	89	89	77	79	106	42	83	92	86	89	89	89	83	86	Substation upgrade or rerate
	PITSBG D - 2D 230kV & PITSBG D-TBC_PT81 #1 line	P2	Non-bus-tie breaker	92	89	89	89	77	79	106	42	83	92	86	89	89	89	83	86	Substation upgrade or rerate
Trimble-San Jose 'B' 115 kV Line	MTCALF D 115kV - Section 1D & 2D	P2	Bus-tie breaker	105	108	111	78	85	89	37	54	115	93	118	142	145	111	115	118	Substation upgrade or rerate
	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	90	93	94	73	81	76	29	45	101	74	101	142	145	94	101	101	Substation upgrade or rerate
	Metcalf - El Patio No. 1 & 2 115 kV Lines	P7	DCTL	98	101	103	77	84	84	37	52	108	85	110	103	103	103	108	110	System upgrade or preferred resource
	Moss Landing-Los Banos & Tesla-Metcalf 500 kV Lines	P6	N-1-1	96	100	100	100	100	98	<90	99	121	100	115	101	101	100	121	115	System upgrade or preferred resource
Whisman-Monta Vista 115 kV Line	MONTAVIS SVD=v & MTN VIEW-MONTA VISTA 115kV	P6	N-1-1	97	<90	<90	<90	<90	<90	<90	<90	96	100	<90	<90	<90	<90	96	<90	Sensitivity only

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
AGNEW 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.02	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
ALHAMBRA 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.03	1.03	1.03	1.07	1.04	1.03	1.05	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
ALMADEN 60 kV	Base Case	P0	N-0	0.99	<1.05	<1.05	0.98	<1.05	<1.05	1.05	<1.05	<1.05	0.98	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
ALMADEN 60 kV	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	0.89	0.93	0.93	0.94	0.94	0.93	1.04	1.00	0.91	0.88	0.92	0.95	0.93	0.93	0.92	0.91	Disable automatics
ALMADEN 60 kV	LOS GATS 60kV Section 1D	P2	Bus	0.89	0.93	0.93	0.94	0.94	0.93	1.04	1.00	0.91	0.88	0.92	0.95	0.93	0.93	0.92	0.91	Disable automatics
ALMADEN 60 kV	LECEFGT1 13.80kV & LECEFGT2 13.80kV & LECEFGT3 13.80kV & LECEFGT4 13.80kV Gen Units & MONTA VISTA-LOS GATOS 60kV [7610]	P3	G-1/N-1	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	0.90	>0.9	>0.9	>0.9	0.90	0.90	Disable automatics
ALMADEN 60 kV	MONTA VISTA-LOS GATOS 60kV [7610] & METCALF-EVERGREEN #1 115kV [2520]	P6	N-1-1	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	0.86	0.89	>0.9	>0.9	>0.9	0.89	0.89	Disable automatics
ALTAMONT 60 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.05	1.05	1.05	1.09	1.06	1.04	1.07	1.04	1.04	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
AMES DST 115 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.03	<1.05	<1.05	1.06	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
APP MAT 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.74	0.83	0.84	0.77	0.75	0.78	0.97	0.93	0.70	0.74	0.79	0.87	0.84	0.84	0.79	0.70	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
BARTLP 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.01	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
BARTRC 115 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
BIXLER 60 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.03	<1.05	<1.05	1.08	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
BOLLMAN 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.03	1.03	1.03	1.07	1.04	1.03	1.05	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
BRENTWOD 230 kV	Base Case	P0	N-0	1.02	1.01	1.01	1.02	1.02	1.01	1.05	1.02	1.01	1.03	1.01	1.00	1.01	1.01	1.01	1.01	Load power factor correction and voltage support if needed
BRITTN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.73	0.82	0.83	0.76	0.74	0.78	0.97	0.93	0.69	0.72	0.78	0.87	0.84	0.83	0.78	0.69	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
CALMAT60 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
CALMAT60 60 kV	PITTSBURG-SAN RAMON 230kV [5490] & SAN RAMON-MORAGA 230kV [5660]	P6	N-1-1	0.69	0.69	0.69	0.74	0.74	0.74	>0.9	0.79	0.68	0.69	0.68	0.71	0.69	0.69	0.68	0.67	Reverse power relay at San Ramon
CAROLD2 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	0.89	0.87	0.88	0.75	0.74	0.74	>0.9	>0.9	0.86	0.88	0.86	0.90	0.88	0.88	0.86	0.84	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
CAROLNDS 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	>0.9	>0.9	>0.9	0.86	0.85	0.85	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
CASTROVL 230 kV	Base Case	P0	N-0	1.03	1.01	1.01	1.01	1.00	1.00	1.05	1.02	1.00	1.03	1.01	1.01	1.01	1.01	1.01	1.00	Load power factor correction and voltage support if needed
CHRISTIE 115 kV	Base Case	P0	N-0	1.05	1.03	1.04	1.03	1.03	1.03	1.08	1.04	1.03	1.04	1.03	1.04	1.03	1.04	1.03	1.03	Load power factor correction and voltage support if needed
CHRISTIE 60 kV	Base Case	P0	N-0	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.07	1.07	1.07	1.06	1.06	1.07	1.06	Load power factor correction and voltage support if needed
CLARMNT 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.03	1.03	1.03	1.08	1.04	1.03	1.05	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
CLARMNT 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.04	1.04	1.04	1.04	1.04	1.11	1.06	1.04	1.08	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
CLARMNT 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.11	1.07	1.04	1.09	1.05	1.06	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
CLARMNT 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.03	1.03	1.01	1.03	1.03	1.11	1.05	1.03	1.08	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
CLARMNT 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.04	<1.10	<1.10	1.11	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
CLARMNT 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
CLAYTN 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.03	1.03	1.03	1.07	1.04	1.02	1.05	1.02	1.03	1.03	1.03	1.02	1.02	Load power factor correction and voltage support if needed
CLMBIAHS 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.03	1.04	1.04	1.07	1.04	1.03	1.05	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
CLMBIAPV 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.03	1.04	1.04	1.07	1.04	1.03	1.05	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
CLY LND 115 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.03	<1.05	<1.05	1.07	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
CON25 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.03	<1.05	<1.05	1.08	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
CP LECEF 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
CRYSTLSG 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	0.89	0.87	0.88	0.75	0.74	0.74	>0.9	>0.9	0.86	0.88	0.86	0.90	0.88	0.88	0.86	0.84	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
CV BART 230 kV	Base Case	P0	N-0	1.03	1.01	1.01	1.01	1.00	1.00	1.05	1.02	1.00	1.03	1.01	1.01	1.01	1.01	1.01	1.00	Load power factor correction and voltage support if needed
CYTE PMP 115 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.05	1.05	1.04	1.09	1.05	1.03	1.06	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
DIXON LD 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
DMTAR_SL 115 kV	Base Case	P0	N-0	1.06	1.03	1.03	1.01	1.03	1.02	1.07	1.04	1.02	1.06	1.03	1.03	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
DMTAR_SL 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.09	1.04	1.04	1.02	1.03	1.03	1.11	1.05	1.03	1.10	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
DMTAR_SL 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.11	1.04	1.04	1.03	1.04	1.04	1.11	1.06	1.04	1.11	1.05	1.05	1.04	1.04	1.05	1.04	Load power factor correction and voltage support if needed
DMTAR_SL 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.09	1.03	1.03	0.99	1.02	1.02	1.11	1.05	1.03	1.09	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
DMTAR_SL 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.09	<1.10	<1.10	1.02	<1.10	<1.10	1.11	<1.10	<1.10	1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
DMTAR_SL 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
DOW TAP2 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.03	1.04	1.03	1.07	1.04	1.03	1.05	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
DYERWND 60 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.06	1.05	1.05	1.10	1.07	1.04	1.07	1.04	1.04	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
E DUBLIN 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.07	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
E DUBLIN 60 kV	PITTSBURG-SAN RAMON 230kV [5490] & SAN RAMON-MORAGA 230kV [5660]	P6	N-1-1	0.55	0.54	0.54	0.62	0.61	0.61	>0.9	0.68	0.53	0.55	0.53	0.58	0.54	0.54	0.53	0.53	Reverse power relay at San Ramon
EBMUDGRY 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.02	<1.05	<1.05	1.07	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
EBMUDGRY 115 kV	CLAYTN - 1D 115kV & PITTSBURG-KIRKER-COLUMBIA STEEL line	P2	Non-bus-tie breaker	1.00	0.89	0.89	0.93	0.93	0.93	1.07	0.98	0.88	1.00	0.89	0.95	0.89	0.89	0.89	0.88	Review existing SPS
EBMUDGRY 115 kV	CLAYTN 115kV Section 1D	P2	Bus	>0.9	0.89	0.89	>0.9	0.93	0.93	>0.9	0.98	0.88	>0.9	0.89	0.95	0.89	0.89	0.89	0.88	Review existing SPS
EDENVALE 115 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.04	1.05	1.04	1.09	1.05	1.03	1.07	1.03	1.05	1.04	1.04	1.03	1.03	Load power factor correction and voltage support if needed
EDENVALE 115 kV	POTRERO - 1E 115kV & POT_SVC-POTRERO #1 line	P2	Non-bus-tie breaker	1.06	1.04	<1.10	1.05	1.05	<1.10	1.10	1.05	1.03	1.07	<1.10	1.05	<1.10	<1.10	<1.10	1.03	Load power factor correction and voltage support if needed
EDENVALE 115 kV	POTRERO 115kV Section 1E	P2	Bus	1.06	1.04	<1.10	1.05	1.05	<1.10	1.10	1.05	1.03	1.07	<1.10	1.05	<1.10	<1.10	<1.10	1.03	Load power factor correction and voltage support if needed
EDENVALE 115 kV	SJB DG 115kV Section 1D	P2	Bus	1.06	1.04	1.04	1.04	1.05	1.04	1.10	1.05	1.03	1.07	1.03	1.05	1.04	1.04	1.03	1.03	Load power factor correction and voltage support if needed
EDENVALE 115 kV	SJB DG Section 1D & SJB EF Section 1F 115kV	P2	Bus-tie breaker	1.07	1.04	1.04	1.05	1.05	1.04	1.10	1.05	1.03	1.08	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
EDENVALE 115 kV	SJB EF - 1F 115kV & SAN JOSE B-STONE-EVERGREEN line	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.05	1.05	1.04	1.10	1.05	1.03	1.07	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
EDENVALE 115 kV	SJB EF 115kV Section 1F	P2	Bus	1.07	1.04	1.04	1.05	1.05	1.04	1.10	1.06	1.03	1.07	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
EDES 115 kV	Base Case	P0	N-0	1.06	1.03	1.03	1.01	1.03	1.03	1.07	1.04	1.03	1.06	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
EDES 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.10	1.04	1.03	1.02	1.03	1.03	1.11	1.05	1.03	1.10	1.04	1.04	1.04	1.03	1.04	1.03	Load power factor correction and voltage support if needed
EDES 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.11	1.04	1.04	1.03	1.04	1.03	1.12	1.06	1.04	1.11	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
EDES 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.10	1.03	1.03	0.98	1.03	1.03	1.11	1.05	1.03	1.10	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
EDES 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.10	<1.10	<1.10	1.02	<1.10	<1.10	1.11	<1.10	<1.10	1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
EDES 115 kV	MORAGA 230/115kV TB 2 & MORAGA 230/115kV TB 1	P6	N-1-1	1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
EL CRRT0 115 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.03	1.04	1.03	1.08	1.05	1.03	1.06	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
EL CRRT0 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.04	1.04	1.04	1.04	1.04	1.11	1.06	1.04	1.08	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
EL CRRT0 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.11	1.06	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
EL CRRT0 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.04	1.04	1.02	1.03	1.03	1.11	1.05	1.03	1.08	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
EL CRRT0 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.04	<1.10	<1.10	1.11	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
EL CRRT0 115 kV	SOBRANTE - 1D 115kV & SOBRANTE-G #1 line	P2	Non-bus-tie breaker	0.97	0.97	0.97	0.92	0.93	0.93	1.03	0.98	0.95	0.97	0.96	0.98	0.89	0.97	0.96	0.95	Sensitivity only
EL CRRT0 115 kV	SOBRANTE - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #1 line	P2	Non-bus-tie breaker	0.97	0.97	0.97	0.92	0.93	0.93	1.03	0.98	0.95	0.97	0.96	0.98	0.89	0.97	0.96	0.95	Sensitivity only
EL CRRT0 115 kV	SOBRANTE - 1D 115kV & SOBRANTE-NRTH TWR line	P2	Non-bus-tie breaker	>0.9	0.97	0.97	>0.9	0.93	0.93	>0.9	0.98	0.95	>0.9	0.96	0.98	0.89	0.97	0.96	0.95	Sensitivity only
EL CRRT0 115 kV	SOBRANTE - 1D 115kV & SOBRANTE-STD. OIL line	P2	Non-bus-tie breaker	0.97	0.97	0.97	0.92	0.93	0.93	1.03	0.98	0.95	0.97	0.96	0.98	0.89	0.97	0.96	0.95	Sensitivity only
EL CRRT0 115 kV	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	0.97	0.97	0.97	0.92	0.94	0.93	1.03	0.98	0.95	0.97	0.96	0.98	0.89	0.97	0.96	0.95	Sensitivity only
EL CRRT0 115 kV	SOBRANTE 115kV - Section 1D & 2D	P2	Bus-tie breaker	0.95	0.97	0.97	0.91	0.94	0.93	1.02	0.99	0.95	0.94	0.96	0.98	0.89	0.97	0.96	0.95	Sensitivity only
EL CRRT0 115 kV	SOBRANTE 115kV Section 1D	P2	Bus	>0.9	0.97	0.97	>0.9	0.93	0.93	>0.9	0.98	0.95	>0.9	0.96	0.98	0.89	0.97	0.96	0.95	Sensitivity only
EL CRRT0 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
EL PATIO 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.07	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
EL PATIO 115 kV	SJB DG Section 1D & SJB EF Section 1F 115kV	P2	Bus-tie breaker	1.07	1.01	1.01	1.02	1.02	1.01	1.10	1.03	1.00	1.08	1.00	1.03	1.01	1.01	1.00	1.00	Load power factor correction and voltage support if needed
EL PATIO 115 kV	SJB EF - 1F 115kV & SAN JOSE B-STONE-EVERGREEN line	P2	Non-bus-tie breaker	1.07	1.01	1.01	1.02	1.02	1.01	1.10	1.03	1.00	1.08	1.00	1.03	1.01	1.01	1.00	1.00	Load power factor correction and voltage support if needed
EL PATIO 115 kV	SJB EF 115kV Section 1F	P2	Bus	1.07	1.01	1.01	1.02	1.02	1.01	1.10	1.04	0.99	1.08	1.00	1.02	1.01	1.01	1.00	0.99	Load power factor correction and voltage support if needed
EMRLD LE 60 kV	Base Case	P0	N-0	1.02	<1.05	<1.05	1.03	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
EMRLD LE 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	0.89	0.88	0.89	0.76	0.75	0.75	>0.9	>0.9	0.87	0.89	0.86	>0.9	0.89	0.89	0.86	0.85	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
EST PRTL 115 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.04	1.04	1.04	1.08	1.05	1.04	1.06	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
EST PRTL 115 kV	MORAGA - 1D 115kV & MORAGA-LAKEWOOD line	P2	Non-bus-tie breaker	1.07	1.05	1.05	1.04	1.04	1.04	1.10	1.06	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
EST PRTL 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.11	1.06	1.04	1.09	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
EST PRTL 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.09	1.05	1.05	1.05	1.05	1.05	1.11	1.07	1.05	1.09	1.05	1.06	1.05	1.05	1.05	1.05	Load power factor correction and voltage support if needed
EST PRTL 115 kV	MORAGA 115kV Section 1D	P2	Bus	1.07	<1.10	<1.10	1.04	<1.10	<1.10	1.10	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
EST PRTL 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.04	1.04	1.02	1.03	1.03	1.11	1.06	1.03	1.08	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
EST PRTL 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.04	<1.10	<1.10	1.11	<1.10	<1.10	1.09	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
EST PRTL 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
EVERGREN 60 kV	Base Case	P0	N-0	1.02	<1.05	<1.05	1.00	<1.05	<1.05	1.06	<1.05	<1.05	1.01	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
EVRGRN 1 115 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.02	<1.05	<1.05	1.07	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
FMC 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.01	<1.05	<1.05	1.06	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
FOREBAYWIND 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.03	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
FRANKLIN 60 kV	Base Case	P0	N-0	1.05	1.05	1.05	1.05	1.05	1.05	1.06	1.06	1.05	1.06	1.06	1.06	1.05	1.05	1.06	1.05	Load power factor correction and voltage support if needed
FREMNT 115 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
FRICKWND 60 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.03	<1.05	<1.05	1.06	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
FRKLNALT 60 kV	Base Case	P0	N-0	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.07	1.06	1.06	1.06	1.06	Load power factor correction and voltage support if needed
GILROY 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.03	<1.05	<1.05	1.09	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
GILROY 115 kV	METCALF-MORGAN HILL 115kV [2570]	P1	N-1	1.03	1.02	1.02	0.96	0.96	1.02	1.10	1.00	1.02	1.03	1.02	0.97	1.02	1.02	1.02	1.02	Load power factor correction and voltage support if needed
GILROY 115 kV	MTCALF D - 2D 115kV & METCALF-EL PATIO #2 line	P2	Non-bus-tie breaker	1.03	1.02	1.02	0.97	0.96	1.02	1.11	1.00	1.02	1.03	1.02	0.97	1.02	1.02	1.02	1.02	Load power factor correction and voltage support if needed
GILROY 115 kV	MTCALF D 115kV Section 2D	P2	Bus	1.03	1.02	1.02	0.97	0.96	1.02	1.11	1.00	1.02	1.03	1.02	0.97	1.02	1.02	1.02	1.02	Load power factor correction and voltage support if needed
GILROY 115 kV	SJB DG 115kV Section 1D	P2	Bus	1.04	1.03	1.03	1.03	1.03	1.03	1.10	1.04	1.03	1.05	1.03	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
GILROY 115 kV	SJB DG Section 1D & SJB EF Section 1F 115kV	P2	Bus-tie breaker	1.04	1.03	1.03	1.03	1.03	1.03	1.10	1.04	1.03	1.05	1.03	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
GILROY 115 kV	SJB EF - 1F 115kV & SAN JOSE B-STONE-EVERGREEN line	P2	Non-bus-tie breaker	1.04	1.03	1.03	1.03	1.03	1.03	1.10	1.04	1.03	1.05	1.03	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
GILROY 115 kV	SJB EF 115kV Section 1F	P2	Bus	1.04	1.03	1.03	1.03	1.03	1.03	1.10	1.04	1.03	1.05	1.03	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
GLENWOOD 60 kV	CLY LND 115/60kV TB 1 & CLY LND2 115/60kV TB 2	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.89	0.90	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
GRIZZLY2 115 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.04	1.04	1.04	1.09	1.05	1.04	1.06	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
GRIZZLY2 115 kV	MORAGA 230/115kV TB 1	P1	N-1	1.08	1.04	1.04	1.04	1.04	1.04	1.10	1.06	1.04	1.08	1.04	1.05	1.05	1.04	1.04	1.04	Load power factor correction and voltage support if needed
GRIZZLY2 115 kV	MORAGA - 1D 115kV & MORAGA-LAKEWOOD line	P2	Non-bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.10	1.06	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
GRIZZLY2 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.11	1.06	1.04	1.09	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
GRIZZLY2 115 kV	MORAGA 115kV - Section 1E & 1D	P2	Bus-tie breaker	1.07	1.05	1.05	1.04	1.04	1.04	1.10	1.06	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
GRIZZLY2 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.09	1.05	1.05	1.05	1.05	1.05	1.11	1.07	1.05	1.09	1.05	1.06	1.05	1.05	1.05	1.05	Load power factor correction and voltage support if needed
GRIZZLY2 115 kV	MORAGA 115kV Section 1D	P2	Bus	1.08	<1.10	<1.10	1.04	<1.10	<1.10	1.10	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
GRIZZLY2 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.04	1.04	1.02	1.03	1.04	1.11	1.06	1.04	1.08	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
GRIZZLY2 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.04	<1.10	<1.10	1.11	<1.10	<1.10	1.09	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
GRIZZLY2 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
HILLSIDE 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.90	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
HILLSIDE 115 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.04	1.04	1.04	1.09	1.05	1.04	1.06	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
HILLSIDE 115 kV	MORAGA 230/115kV TB 1	P1	N-1	1.08	1.04	1.04	1.04	1.04	1.04	1.10	1.06	1.04	1.08	1.04	1.05	1.05	1.04	1.04	1.04	Load power factor correction and voltage support if needed
HILLSIDE 115 kV	MORAGA - 1D 115kV & MORAGA-LAKEWOOD line	P2	Non-bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.10	1.06	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
HILLSIDE 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.11	1.06	1.04	1.09	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
HILLSIDE 115 kV	MORAGA 115kV - Section 1E & 1D	P2	Bus-tie breaker	1.07	1.05	1.05	1.04	1.04	1.04	1.10	1.06	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
HILLSIDE 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.09	1.05	1.05	1.05	1.05	1.05	1.11	1.07	1.05	1.09	1.05	1.06	1.05	1.05	1.05	1.05	Load power factor correction and voltage support if needed
HILLSIDE 115 kV	MORAGA 115kV Section 1D	P2	Bus	1.08	<1.10	<1.10	1.04	<1.10	<1.10	1.10	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
HILLSIDE 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.04	1.04	1.02	1.03	1.04	1.11	1.06	1.04	1.08	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
HILLSIDE 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.04	<1.10	<1.10	1.11	<1.10	<1.10	1.09	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
HILLSIDE 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
HLF MNBY 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	>0.9	>0.9	>0.9	0.87	0.86	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
IBM-BALY 115 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.05	1.05	1.04	1.09	1.05	1.03	1.06	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
IBM-BALY 115 kV	SJB DG 115kV Section 1D	P2	Bus	1.06	1.04	1.04	1.05	1.05	1.04	1.10	1.05	1.03	1.07	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
IBM-BALY 115 kV	SJB DG Section 1D & SJB EF Section 1F 115kV	P2	Bus-tie breaker	1.06	1.04	1.04	1.05	1.05	1.04	1.10	1.06	1.04	1.07	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
IBM-CTLE 115 kV	Base Case	P0	N-0	1.06	<1.05	<1.05	1.04	<1.05	<1.05	1.09	<1.05	<1.05	1.07	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
IBM-HRRS 115 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.05	1.05	1.04	1.09	1.05	1.03	1.07	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
IBM-HRRS 115 kV	SJB DG 115kV Section 1D	P2	Bus	1.06	1.04	1.04	1.05	1.05	1.04	1.10	1.05	1.03	1.07	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
IBM-HRRS 115 kV	SJB DG Section 1D & SJB EF Section 1F 115kV	P2	Bus-tie breaker	1.06	1.04	1.04	1.05	1.05	1.04	1.10	1.05	1.03	1.07	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
IBM-HRRS 115 kV	SJB EF - 1F 115kV & SAN JOSE B-STONE-EVERGREEN line	P2	Non-bus-tie breaker	1.06	1.04	1.04	1.05	1.05	1.04	1.10	1.05	1.03	1.07	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
IBM-HRRS 115 kV	SJB EF 115kV Section 1F	P2	Bus	1.06	1.04	1.04	1.05	1.05	1.04	1.10	1.06	1.03	1.07	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
IMHOFF 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.03	<1.05	<1.05	1.07	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
IUKA 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
IUKA 60 kV	PITTSBURG-SAN RAMON 230kV [5490] & SAN RAMON-MORAGA 230kV [5660]	P6	N-1-1	0.68	0.67	0.67	0.72	0.72	0.72	>0.9	0.77	0.66	0.67	0.66	0.70	0.67	0.67	0.66	0.65	Reverse power relay at San Ramon
JEFFERSN 230 kV	Base Case	P0	N-0	1.02	1.02	1.02	1.02	1.03	1.02	1.05	1.04	1.01	1.02	1.02	1.03	1.02	1.02	1.02	1.01	Load power factor correction and voltage support if needed
JEFRSN_D 60 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.03	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
JEFRSN_D 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	0.90	0.88	0.89	0.76	0.75	0.75	>0.9	>0.9	0.87	0.89	0.87	>0.9	0.89	0.89	0.87	0.85	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
JENNINGS 60 kV	Base Case	P0	N-0	1.01	<1.05	<1.05	1.00	<1.05	<1.05	1.05	<1.05	<1.05	1.01	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
KIRKER 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.03	1.04	1.03	1.07	1.04	1.03	1.05	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
LAKEWD-C 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.02	<1.05	<1.05	1.07	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
LAKEWD-C 115 kV	CLAYTN - 1D 115kV & PITTSBURG-KIRKER-COLUMBIA STEEL line	P2	Non-bus-tie breaker	1.00	0.90	0.90	0.93	0.93	0.93	1.08	0.99	0.89	1.00	0.89	0.95	0.90	0.90	0.89	0.89	Review existing SPS
LAKEWD-C 115 kV	CLAYTN 115kV Section 1D	P2	Bus	>0.9	0.90	0.90	>0.9	0.93	0.93	>0.9	0.99	0.89	>0.9	0.89	0.95	0.90	0.90	0.89	0.89	Review existing SPS

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
LARKIN D 115 kV	A-Y #1 (UNDERGROUND IDLE) 115kV [9952] & X-Y #1 115kV [9960]	P6	N-1-1	>0.9	>0.9	0.90	0.90	0.89	0.90	>0.9	0.00	0.90	>0.9	0.88	>0.9	0.89	0.90	0.88	0.90	TBD
LAS PLGS 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	0.89	0.87	0.88	0.74	0.73	0.73	>0.9	>0.9	0.86	0.88	0.85	0.89	0.88	0.88	0.85	0.84	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
LAWRENCE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.77	0.85	0.86	0.80	0.78	0.81	0.98	0.94	0.74	0.76	0.81	0.89	0.86	0.86	0.81	0.74	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
LIVERMRE 60 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.03	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
LIVERMRE 60 kV	PITTSBURG-SAN RAMON 230kV [5490] & SAN RAMON-MORAGA 230kV [5660]	P6	N-1-1	0.76	0.70	0.70	0.80	0.80	0.80	>0.9	0.84	0.68	0.76	0.68	0.78	0.70	0.70	0.68	0.68	Reverse power relay at San Ramon
LK_REACT 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.03	<1.05	<1.05	1.07	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
LK_REACT 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.04	1.04	1.03	1.04	1.04	1.11	1.06	1.03	1.08	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
LK_REACT 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.03	1.03	1.01	1.03	1.03	1.11	1.05	1.02	1.08	1.03	1.04	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
LK_REACT 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.03	<1.10	<1.10	1.11	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
LK_REACT 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
LLAGAS 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.03	<1.05	<1.05	1.09	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
LLAGAS 115 kV	METCALF-MORGAN HILL 115kV [2570]	P1	N-1	1.03	1.02	1.02	0.96	0.96	1.02	1.10	1.00	1.01	1.03	1.02	0.97	1.02	1.02	1.02	1.01	Load power factor correction and voltage support if needed
LLAGAS 115 kV	LLAGAS - 1D 115kV & LLAGAS-GILROY-GILROY F-GILROYPK line	P2	Non-bus-tie breaker	1.02	0.99	0.99	1.01	1.01	1.00	1.10	1.03	0.98	1.03	0.98	1.01	0.99	0.99	0.98	0.98	Load power factor correction and voltage support if needed
LLAGAS 115 kV	LLAGAS 115kV - Section 1D & 1E	P2	Bus-tie breaker	1.03	1.01	1.00	1.02	1.02	1.01	1.10	1.03	0.99	1.03	1.00	1.02	1.01	1.00	1.00	0.99	Load power factor correction and voltage support if needed
LLAGAS 115 kV	LLAGAS 115kV Section 1D	P2	Bus	1.02	0.99	0.99	1.01	1.01	1.00	1.10	1.03	0.98	1.03	0.98	1.01	0.99	0.99	0.98	0.98	Load power factor correction and voltage support if needed
LLAGAS 115 kV	MTCALF D - 2D 115kV & METCALF-EL PATIO #2 line	P2	Non-bus-tie breaker	1.03	1.02	1.02	0.97	0.96	1.02	1.11	1.00	1.02	1.03	1.02	0.97	1.02	1.02	1.02	1.02	Load power factor correction and voltage support if needed
LLAGAS 115 kV	MTCALF D 115kV Section 2D	P2	Bus	1.03	1.02	1.02	0.97	0.96	1.02	1.11	1.00	1.02	1.03	1.02	0.97	1.02	1.02	1.02	1.02	Load power factor correction and voltage support if needed
LLAGAS 115 kV	POTRERO - 1E 115kV & POT_SVC-POTRERO #1 line	P2	Non-bus-tie breaker	1.04	1.03	<1.10	1.03	1.03	<1.10	1.10	1.04	1.03	1.04	<1.10	1.03	<1.10	<1.10	<1.10	1.03	Load power factor correction and voltage support if needed
LLAGAS 115 kV	POTRERO 115kV Section 1E	P2	Bus	1.04	1.03	<1.10	1.03	1.03	<1.10	1.10	1.04	1.03	1.04	<1.10	1.03	<1.10	<1.10	<1.10	1.03	Load power factor correction and voltage support if needed
LLAGAS 115 kV	SJB DG 115kV Section 1D	P2	Bus	1.04	1.03	1.03	1.03	1.03	1.03	1.10	1.04	1.03	1.05	1.03	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
LLAGAS 115 kV	SJB DG Section 1D & SJB EF Section 1F 115kV	P2	Bus-tie breaker	1.04	1.03	1.03	1.03	1.03	1.03	1.10	1.04	1.03	1.05	1.03	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
LLAGAS 115 kV	SJB EF - 1F 115kV & SAN JOSE B-STONE-EVERGREEN line	P2	Non-bus-tie breaker	1.04	1.03	1.03	1.03	1.03	1.03	1.10	1.04	1.03	1.05	1.03	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
LLAGAS 115 kV	SJB EF 115kV Section 1F	P2	Bus	1.04	1.03	1.03	1.03	1.03	1.03	1.10	1.04	1.03	1.05	1.03	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
LLAGAS 115 kV	LLAGAS-GILROY-GILROY F-GILROYPK 115kV [0] & METCALF-MORGAN HILL 115kV [2570]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	0.90	>0.9	>0.9	>0.9	0.90	>0.9	Project: Morgan Hill Area Reinforcement (Spring) Potential scope change
LMEC 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.04	1.04	1.04	1.07	1.04	1.03	1.05	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
LOCKHD 1 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.83	0.88	0.89	0.85	0.83	0.86	0.99	0.96	0.79	0.83	0.85	0.92	0.89	0.89	0.85	0.79	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
LOS ALTS 60 kV	Base Case	P0	N-0	1.01	<1.05	<1.05	1.02	<1.05	<1.05	1.08	<1.05	<1.05	1.01	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
LOS ALTS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.57	0.74	0.76	0.65	0.63	0.68	0.97	0.90	0.57	0.56	0.68	0.81	0.76	0.76	0.68	0.57	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
LOS GATS 60 kV	Base Case	P0	N-0	0.94	0.98	0.98	1.00	0.99	0.98	1.06	1.02	0.97	0.94	0.98	1.00	0.98	0.98	0.98	0.97	Load power factor correction and voltage support if needed
LOS GATS 60 kV	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	0.84	0.91	0.90	0.91	0.91	0.90	1.03	0.98	0.88	0.83	0.89	0.93	0.90	0.90	0.89	0.88	Disable automatics
LOS GATS 60 kV	LOS GATS 60kV Section 1D	P2	Bus	0.84	0.91	0.90	0.91	0.91	0.90	1.03	0.98	0.88	0.83	0.89	0.93	0.90	0.90	0.89	0.88	Disable automatics
LOS GATS 60 kV	MONTAVIS - 2D 230kV & MONTA VISTA-JEFFERSON #2 line	P2	Non-bus-tie breaker	0.88	0.96	0.96	0.97	0.96	0.96	1.04	1.01	0.95	0.88	0.96	0.98	0.96	0.96	0.96	0.95	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
LOS GATS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.49	0.72	0.74	0.62	0.60	0.65	0.95	0.89	0.55	0.47	0.66	0.79	0.74	0.74	0.66	0.55	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
LOS GATS 60 kV	MONTAVIS 230kV Section 2D	P2	Bus	0.88	0.96	0.97	0.97	0.96	0.96	1.04	1.01	0.95	0.88	0.96	0.98	0.96	0.97	0.96	0.95	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
LOS GATS 60 kV	LECEFGT1 13.80kV & LECEFGT2 13.80kV & LECEFGT3 13.80kV & LECEFGT4 13.80kV Gen Units & MONTA VISTA-LOS GATOS 60kV [7610]	P3	G-1/N-1	0.82	0.90	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	0.82	0.87	>0.9	0.89	0.90	0.87	0.87	Disable automatics
LOS GATS 60 kV	SAN JOSE B-STONE-EVERGREEN 115kV [1550] & MONTA VISTA-LOS GATOS 60kV [7610]	P6	N-1-1	0.81	0.89	0.89	0.90	0.90	0.89	>0.9	>0.9	0.86	0.80	0.87	>0.9	0.89	0.89	0.87	0.86	Disable automatics
LOYOLA 60 kV	Base Case	P0	N-0	1.01	<1.05	<1.05	1.02	<1.05	<1.05	1.08	<1.05	<1.05	1.01	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
LOYOLA 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.57	0.75	0.77	0.66	0.64	0.69	0.97	0.90	0.58	0.56	0.69	0.82	0.77	0.77	0.69	0.58	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
LPOSTAS 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.03	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
LS ESTRS 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
LS PSTAS 230 kV	CONTRA COSTA-LAS POSITAS 230kV [4510] & LAS POSITAS-NEWARK 230kV [4980]	P6	N-1-1	>0.9	0.55	0.54	0.80	0.74	0.79	>0.9	>0.9	0.52	0.90	0.51	0.80	0.54	0.54	0.51	0.52	Reverse power relay at Las Positas
MABURY 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.01	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
MARITIME 115 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.03	1.03	1.03	1.07	1.04	1.03	1.04	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
MARITIME 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.04	1.04	1.03	1.04	1.04	1.11	1.06	1.03	1.08	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
MARITIME 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.05	1.04	1.04	1.04	1.04	1.11	1.06	1.04	1.08	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
MARITIME 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.07	1.03	1.03	1.00	1.02	1.02	1.11	1.05	1.02	1.07	1.03	1.04	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
MARITIME 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.03	<1.10	<1.10	1.11	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
MARITIME 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
MARKHAM 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.01	<1.05	<1.05	1.06	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
MARTIN 60 kV	Base Case	P0	N-0	0.97	1.05	1.04	1.05	1.06	1.04	1.15	1.09	1.05	0.97	1.05	1.06	1.04	1.04	1.05	1.05	Load power factor correction and voltage support if needed
MARTNZ D 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.03	<1.05	<1.05	1.07	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
MARTNZ E 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.03	<1.05	<1.05	1.07	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
MCKEE 115 kV	Base Case	P0	N-0	1.05	1.02	1.01	1.01	1.02	1.01	1.06	1.03	1.01	1.05	1.01	1.03	1.01	1.01	1.01	1.01	Load power factor correction and voltage support if needed
MCKEE 115 kV	MABURY-DIXON LD-MCKEE 115kV [0]	P1	N-1	1.09	1.02	1.02	1.01	1.03	1.02	1.09	1.04	1.01	1.10	1.01	1.03	1.02	1.02	1.01	1.01	Load power factor correction and voltage support if needed
MCKEE 115 kV	DIXON LD - 1D 115kV & MABURY-DIXON LD-MCKEE line	P2	Non-bus-tie breaker	1.10	1.02	1.02	1.02	1.03	1.02	1.09	1.04	1.01	1.10	1.01	1.03	1.02	1.02	1.01	1.01	Load power factor correction and voltage support if needed
MCKEE 115 kV	MABURY - 1D 115kV & MABURY-DIXON LD-MCKEE line	P2	Non-bus-tie breaker	1.09	1.02	1.02	1.01	1.03	1.02	1.09	1.04	1.01	1.10	1.01	1.03	1.02	1.02	1.01	1.01	Load power factor correction and voltage support if needed
MCKEE 115 kV	MCKEE 115kV - Section 1F & 1E	P2	Bus-tie breaker	1.06	1.04	1.04	1.04	1.04	1.04	1.10	1.05	1.03	1.07	1.03	1.05	1.03	1.04	1.03	1.03	Load power factor correction and voltage support if needed
MCKEE 115 kV	Dixon Landing - McKee & Milpitas - Swift 115 kV Lines	P7	DCTL	1.09	1.02	1.02	1.02	1.03	1.02	1.09	1.05	1.01	1.10	1.01	1.03	1.02	1.02	1.01	1.01	Load power factor correction and voltage support if needed
MEDW LNE 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.02	<1.05	<1.05	1.07	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
MEDW LNE 115 kV	CLAYTN - 1D 115kV & PITTSBURG-KIRKER-COLUMBIA STEEL line	P2	Non-bus-tie breaker	1.00	0.89	0.89	0.92	0.92	0.92	1.08	0.98	0.88	1.00	0.88	0.94	0.89	0.89	0.88	0.88	Review existing SPS
MEDW LNE 115 kV	CLAYTN 115kV Section 1D	P2	Bus	>0.9	0.89	0.89	>0.9	0.92	0.92	>0.9	0.98	0.88	>0.9	0.88	0.94	0.89	0.89	0.88	0.88	Review existing SPS
MENLO 60 kV	CLY LND 115/60kV TB 1 & CLY LND2 115/60kV TB 2	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.89	0.89	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	0.90	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
MILLBRAE 115 kV	MILLBRAE-SAN MATEO #1 115kV [2640] & MARTIN-MILLBRAE #1 115kV [2230]	P6	N-1-1	0.83	<1.10	<1.10	<1.10	<1.10	<1.10	1.12	<1.10	<1.10	0.83	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
MILLBRAE 60 kV	Base Case	P0	N-0	1.01	<1.05	<1.05	1.02	<1.05	<1.05	1.07	<1.05	<1.05	1.01	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
MILPITAS 115 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
MNTA VSA 60 kV	Base Case	P0	N-0	1.02	<1.05	<1.05	1.04	<1.05	<1.05	1.07	<1.05	<1.05	1.02	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
MOCCASIN 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.04	<1.05	<1.05	1.05	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
MOFT.FLD 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.83	0.88	0.89	0.85	0.83	0.86	0.99	0.96	0.79	0.83	0.85	0.92	0.90	0.89	0.85	0.79	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
MONTAGUE 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
MORAGA 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.03	<1.05	<1.05	1.07	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
MORAGA 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.04	1.04	1.04	1.04	1.04	1.11	1.06	1.04	1.09	1.04	1.05	1.05	1.04	1.04	1.04	Load power factor correction and voltage support if needed
MORAGA 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.10	1.06	1.05	1.05	1.05	1.05	1.12	1.07	1.05	1.10	1.06	1.06	1.06	1.05	1.06	1.05	Load power factor correction and voltage support if needed
MORAGA 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.03	1.03	1.01	1.03	1.03	1.11	1.05	1.03	1.08	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
MORAGA 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.04	<1.10	<1.10	1.11	<1.10	<1.10	1.09	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
MORAGA 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
MORAGA 230 kV	Base Case	P0	N-0	1.03	1.00	1.00	1.00	1.00	1.00	1.06	1.02	1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	Load power factor correction and voltage support if needed
MRGN HIL 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.03	<1.05	<1.05	1.10	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
MRGN HIL 115 kV	LLAGAS-GILROY-GILROY F-GILROYPK 115kV [0] & METCALF-MORGAN HILL 115kV [2570]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.87	>0.9	0.87	>0.9	>0.9	>0.9	0.87	0.87	Project: Morgan Hill Area Reinforcement (Spring) Potential scope change
MRGN HIL 115 kV	Morgan Hill - Llagas & Metcalf - Llagas 115 kV Lines	P7	DCTL	1.05	<1.10	<1.10	1.04	<1.10	<1.10	1.10	<1.10	<1.10	1.05	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
MT VIEW 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.59	0.76	0.77	0.68	0.66	0.70	0.93	0.90	0.60	0.58	0.71	0.82	0.78	0.77	0.71	0.60	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
MT VIEW 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Relay	0.45	>0.9	>0.9	0.50	>0.9	>0.9	0.90	>0.9	>0.9	0.44	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Redundent relay upgrade
MTCALF D 115 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.05	1.05	1.04	1.09	1.05	1.03	1.06	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
MTCALF D 115 kV	SJB DG Section 1D & SJB EF Section 1F 115kV	P2	Bus-tie breaker	1.06	1.04	1.04	1.05	1.05	1.05	1.10	1.06	1.04	1.07	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
NEWARK 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
NEWARK D 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.03	<1.05	<1.05	1.05	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
NORTECH 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
NRS 300 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
NRS 400 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
NUMMI 115 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
OAK C115 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.03	1.03	1.03	1.07	1.04	1.03	1.05	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
OAK C115 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.04	1.04	1.03	1.04	1.04	1.11	1.06	1.03	1.08	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
OAK C115 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.11	1.07	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
OAK C115 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.03	1.03	1.01	1.02	1.02	1.11	1.05	1.02	1.08	1.03	1.04	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
OAK C115 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.03	<1.10	<1.10	1.11	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
OAK C115 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
OAKLND23 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.03	<1.05	<1.05	1.07	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
OAKLND23 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.04	1.04	1.03	1.04	1.04	1.11	1.06	1.03	1.08	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
OAKLND23 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.11	1.07	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
OAKLND23 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.03	1.03	1.01	1.02	1.02	1.11	1.05	1.02	1.08	1.03	1.04	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
OAKLND23 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.03	<1.10	<1.10	1.11	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
OAKLND23 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
OLEUM 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.03	1.03	1.03	1.08	1.04	1.03	1.05	1.04	1.04	1.03	1.04	1.04	1.03	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
OWENSTAP 115 kV	Base Case	P0	N-0	1.07	<1.05	<1.05	1.01	<1.05	<1.05	1.07	<1.05	<1.05	1.07	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
OWENSTAP 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.10	<1.10	<1.10	1.02	<1.10	<1.10	1.12	<1.10	<1.10	1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
OWENSTAP 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.12	<1.10	<1.10	1.03	<1.10	<1.10	1.12	<1.10	<1.10	1.12	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
OWENSTAP 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.10	<1.10	<1.10	0.99	<1.10	<1.10	1.11	<1.10	<1.10	1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
OWENSTAP 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.10	<1.10	<1.10	1.02	<1.10	<1.10	1.12	<1.10	<1.10	1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
PACIFICA 60 kV	Base Case	P0	N-0	0.99	<1.05	<1.05	1.02	<1.05	<1.05	1.09	<1.05	<1.05	0.99	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
PARKS 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.07	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
PCBRICK 60 kV	Base Case	P0	N-0	1.05	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.07	1.06	1.06	1.06	1.06	Load power factor correction and voltage support if needed
PERMNNTE 60 kV	Base Case	P0	N-0	1.00	<1.05	<1.05	1.04	<1.05	<1.05	1.06	<1.05	<1.05	1.01	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
PERMNNTE 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.57	0.77	0.78	0.68	0.67	0.71	0.95	0.91	0.61	0.56	0.72	0.83	0.79	0.78	0.72	0.61	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
PERMNNTE 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Relay	0.57	>0.9	>0.9	0.60	>0.9	>0.9	0.95	>0.9	>0.9	0.56	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Redundent relay upgrade
PHILLIPS 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.75	0.84	0.85	0.79	0.76	0.80	0.97	0.94	0.72	0.74	0.80	0.88	0.85	0.85	0.80	0.72	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
PIERCY 115 kV	Base Case	P0	N-0	1.06	1.03	1.03	1.03	1.04	1.03	1.08	1.04	1.02	1.06	1.03	1.04	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
PIERCY 115 kV	MCKEE 115kV - Section 1F & 1E	P2	Bus-tie breaker	1.06	1.04	1.04	1.04	1.05	1.04	1.10	1.05	1.03	1.07	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
PIERCY 115 kV	McKee - Piercy & Milpitas - Swift 115 kV Lines	P7	DCTL	1.07	1.04	1.04	1.05	1.05	1.04	1.10	1.06	1.03	1.07	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
PITSBURG 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.03	1.04	1.04	1.07	1.04	1.03	1.05	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
POTRERO 115 kV	PTR_SHNT SHUNT=b & SAN MATEO-MARTIN 230kV [9980]	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
PP STEEL 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.02	1.03	1.02	1.07	1.04	1.02	1.05	1.03	1.03	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
PRAXAIR 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.03	1.04	1.04	1.07	1.04	1.03	1.05	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
PRT CSTA 60 kV	Base Case	P0	N-0	1.05	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.07	1.06	1.06	1.06	1.06	Load power factor correction and voltage support if needed
PT PINLE 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.02	1.03	1.02	1.07	1.04	1.02	1.05	1.03	1.03	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
RADUM 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
RADUM 60 kV	PITTSBURG-SAN RAMON 230kV [5490] & SAN RAMON-MORAGA 230kV [5660]	P6	N-1-1	0.66	0.65	0.65	0.71	0.71	0.71	>0.9	0.76	0.64	0.66	0.64	0.68	0.65	0.65	0.64	0.64	Reverse power relay at San Ramon
RALSTON 60 kV	Base Case	P0	N-0	1.02	<1.05	<1.05	1.02	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
RALSTON 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5	Relay	0.89	0.87	0.88	0.75	0.74	0.71	0.96	0.95	0.86	0.88	0.86	0.90	0.88	0.88	0.86	0.86	Redundent relay upgrade
RALSTON 60 kV	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5	Relay	0.89	0.87	0.88	0.74	0.73	0.72	0.95	0.94	0.85	0.87	0.86	0.90	0.87	0.88	0.86	0.85	Redundent relay upgrade
RALSTON 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	0.89	0.87	0.88	0.75	0.74	0.74	>0.9	>0.9	0.87	0.88	0.86	0.90	0.88	0.88	0.86	0.84	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
RALSTON 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.89	0.87	0.88	0.71	0.73	0.71	0.94	0.93	0.85	0.87	0.85	0.88	0.87	0.88	0.85	0.85	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
RICHMOND 115 kV	Base Case	P0	N-0	1.06	1.04	1.04	1.04	1.04	1.04	1.09	1.05	1.04	1.06	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
RICHMOND 115 kV	MORAGA - 1D 115kV & MORAGA-LAKEWOOD line	P2	Non-bus-tie breaker	1.07	1.05	1.05	1.04	1.04	1.04	1.10	1.06	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
RICHMOND 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.11	1.06	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
RICHMOND 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.05	1.05	1.05	1.05	1.04	1.11	1.07	1.05	1.09	1.05	1.06	1.05	1.05	1.05	1.05	Load power factor correction and voltage support if needed
RICHMOND 115 kV	MORAGA 115kV Section 1D	P2	Bus	1.07	<1.10	<1.10	1.04	<1.10	<1.10	1.10	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
RICHMOND 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.04	1.04	1.02	1.03	1.03	1.11	1.06	1.03	1.08	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
RICHMOND 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.04	<1.10	<1.10	1.11	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
RICHMOND 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
RIVRBANK 115 kV	Base Case	P0	N-0	1.06	1.00	1.00	1.01	1.01	1.00	1.08	1.02	1.00	1.06	1.00	0.99	1.00	1.00	1.00	1.00	Load power factor correction and voltage support if needed
ROSSMOOR 230 kV	Base Case	P0	N-0	1.03	1.00	1.00	1.00	1.00	1.00	1.06	1.02	1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	Load power factor correction and voltage support if needed
RVNSWD D 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.04	<1.05	<1.05	1.07	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SAN PBLO 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.02	1.02	1.02	1.07	1.04	1.02	1.05	1.03	1.03	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
SAN RAMN 60 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.02	<1.05	<1.05	1.07	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SANPAULA 115 kV	MILLBRAE-SAN MATEO #1 115kV [2640] & MARTIN-MILLBRAE #1 115kV [2230]	P6	N-1-1	0.83	<1.10	<1.10	<1.10	<1.10	<1.10	1.12	<1.10	<1.10	0.83	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
SANRAMON 230 kV	PITTSBURG-SAN RAMON 230kV [5490] & SAN RAMON-MORAGA 230kV [5660]	P6	N-1-1	0.35	0.32	0.32	0.44	0.43	0.43	>0.9	0.51	0.30	0.34	0.30	0.38	0.32	0.32	0.30	0.30	Reverse power relay at San Ramon
SCHNITZ 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.03	1.03	1.03	1.07	1.04	1.03	1.05	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
SCHNITZ 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.04	1.04	1.03	1.04	1.04	1.11	1.06	1.03	1.08	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
SCHNITZ 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.11	1.07	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
SCHNITZ 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.03	1.03	1.01	1.02	1.02	1.11	1.05	1.02	1.08	1.03	1.04	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
SCHNITZ 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.03	<1.10	<1.10	1.11	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
SCHNITZ 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
SENER 60 kV	Base Case	P0	N-0	1.02	<1.05	<1.05	1.00	<1.05	<1.05	1.06	<1.05	<1.05	1.01	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SEQUOIA 60 kV	Base Case	P0	N-0	1.05	1.05	1.05	1.05	1.05	1.05	1.06	1.06	1.05	1.06	1.06	1.06	1.05	1.05	1.06	1.05	Load power factor correction and voltage support if needed
SFPP CNC 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.05	<1.05	<1.05	1.04	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SJB DG 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.01	<1.05	<1.05	1.06	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SJB EF 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.01	<1.05	<1.05	1.06	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SJB EF 115 kV	SJB DG Section 1D & SJB EF Section 1F 115kV	P2	Bus-tie breaker	1.07	1.01	1.01	1.01	1.01	1.01	1.11	1.03	0.99	1.08	1.00	1.02	1.01	1.01	1.00	0.99	Load power factor correction and voltage support if needed
SJB EF 115 kV	SJB EF - 1F 115kV & SAN JOSE B-STONE-EVERGREEN line	P2	Non-bus-tie breaker	1.07	1.00	1.01	1.01	1.02	1.01	1.10	1.03	0.99	1.08	1.00	1.02	1.00	1.01	1.00	0.99	Load power factor correction and voltage support if needed
SJB EF 115 kV	SJB EF 115kV Section 1F	P2	Bus	1.07	1.00	1.00	1.01	1.02	1.01	1.10	1.03	0.99	1.08	1.00	1.02	1.00	1.00	1.00	0.99	Load power factor correction and voltage support if needed
SN BRNOT 60 kV	Base Case	P0	N-0	1.00	<1.05	<1.05	1.02	<1.05	<1.05	1.09	<1.05	<1.05	1.00	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SN JSE A 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.01	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SN JSE A 115 kV	SJB DG Section 1D & SJB EF Section 1F 115kV	P2	Bus-tie breaker	1.07	1.01	1.01	1.01	1.01	1.01	1.11	1.03	0.99	1.08	1.00	1.02	1.01	1.01	1.00	0.99	Load power factor correction and voltage support if needed
SN JSE A 115 kV	SJB EF - 1F 115kV & SAN JOSE B-STONE-EVERGREEN line	P2	Non-bus-tie breaker	1.07	1.00	1.01	1.01	1.02	1.01	1.10	1.03	0.99	1.08	1.00	1.02	1.01	1.01	1.00	0.99	Load power factor correction and voltage support if needed
SN JSE A 115 kV	SJB EF 115kV Section 1F	P2	Bus	1.07	1.00	1.01	1.01	1.02	1.01	1.10	1.03	0.99	1.08	1.00	1.02	1.00	1.01	1.00	0.99	Load power factor correction and voltage support if needed
SN LNDRO 115 kV	Base Case	P0	N-0	1.06	1.03	1.03	1.02	1.02	1.02	1.07	1.04	1.02	1.06	1.03	1.03	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
SN LNDRO 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.09	1.04	1.04	1.02	1.03	1.03	1.11	1.05	1.03	1.09	1.03	1.04	1.04	1.04	1.03	1.03	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
SN LNDRO 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.10	1.04	1.04	1.03	1.04	1.04	1.11	1.06	1.04	1.11	1.05	1.05	1.04	1.04	1.05	1.04	Load power factor correction and voltage support if needed
SN LNDRO 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.09	1.03	1.03	0.99	1.02	1.02	1.11	1.05	1.02	1.09	1.03	1.04	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
SN LNDRO 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.09	<1.10	<1.10	1.02	<1.10	<1.10	1.11	<1.10	<1.10	1.09	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
SN LNDRO 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
SNANDRES 60 kV	Base Case	P0	N-0	1.00	<1.05	<1.05	1.02	<1.05	<1.05	1.08	<1.05	<1.05	1.00	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SNTH LNE 60 kV	Base Case	P0	N-0	1.00	<1.05	<1.05	1.02	<1.05	<1.05	1.09	<1.05	<1.05	0.99	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	Base Case	P0	N-0	1.06	1.05	1.05	1.04	1.04	1.04	1.09	1.05	1.04	1.06	1.04	1.05	1.05	1.05	1.04	1.04	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	MORAGA 230/115kV TB 1	P1	N-1	1.08	1.05	1.05	1.04	1.04	1.04	1.10	1.06	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	MORAGA - 1D 115kV & MORAGA-LAKEWOOD line	P2	Non-bus-tie breaker	1.08	1.05	1.05	1.05	1.05	1.04	1.10	1.06	1.05	1.08	1.05	1.05	1.05	1.05	1.05	1.05	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.09	1.05	1.05	1.05	1.05	1.05	1.11	1.07	1.05	1.09	1.05	1.06	1.05	1.05	1.05	1.05	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	MORAGA 115kV - Section 1E & 1D	P2	Bus-tie breaker	1.08	1.05	1.05	1.04	1.05	1.04	1.10	1.06	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.09	1.06	1.06	1.05	1.05	1.05	1.11	1.07	1.05	1.09	1.06	1.06	1.06	1.06	1.06	1.05	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	MORAGA 115kV Section 1D	P2	Bus	1.08	<1.10	<1.10	1.05	<1.10	<1.10	1.10	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.04	1.04	1.02	1.04	1.04	1.11	1.06	1.04	1.08	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.09	<1.10	<1.10	1.05	<1.10	<1.10	1.11	<1.10	<1.10	1.09	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	1.08	1.06	1.06	1.05	1.06	1.05	1.10	1.07	1.06	1.08	1.06	1.07	1.06	1.06	1.06	1.06	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	SOBRANTE 115kV - Section 1D & 2D	P2	Bus-tie breaker	1.08	1.06	1.06	1.06	1.06	1.05	1.10	1.07	1.06	1.08	1.06	1.06	1.06	1.06	1.06	1.06	Load power factor correction and voltage support if needed
SOBRANTE 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
STANFORD 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5	Relay	0.85	0.85	0.87	0.73	0.72	0.69	0.93	0.94	0.85	0.85	0.84	0.88	0.86	0.87	0.84	0.85	Redundent relay upgrade
STANFORD 60 kV	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5	Relay	0.85	0.86	0.86	0.72	0.71	0.70	0.92	0.93	0.83	0.84	0.84	0.88	0.86	0.86	0.84	0.83	Redundent relay upgrade
STANFORD 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	0.86	0.86	0.87	0.74	0.72	0.72	>0.9	>0.9	0.85	0.85	0.84	0.88	0.87	0.87	0.84	0.83	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
STANFORD 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.85	0.85	0.86	0.69	0.71	0.69	0.91	0.91	0.83	0.83	0.84	0.87	0.86	0.86	0.84	0.83	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
STATIN D 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.03	1.03	1.03	1.08	1.04	1.03	1.05	1.03	1.04	1.03	1.04	1.03	1.03	Load power factor correction and voltage support if needed
STATIN D 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.04	1.04	1.04	1.04	1.04	1.11	1.06	1.04	1.08	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
STATIN D 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.11	1.07	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
STATIN D 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.03	1.03	1.01	1.02	1.03	1.11	1.05	1.03	1.08	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
STATIN D 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.04	<1.10	<1.10	1.11	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
STATIN D 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
STATIN J 115 kV	Base Case	P0	N-0	1.07	1.03	1.03	1.01	1.03	1.02	1.07	1.04	1.03	1.07	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
STATIN J 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.10	1.04	1.04	1.02	1.03	1.03	1.12	1.05	1.03	1.10	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
STATIN J 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.12	1.04	1.04	1.03	1.04	1.03	1.12	1.06	1.04	1.12	1.05	1.05	1.04	1.04	1.05	1.04	Load power factor correction and voltage support if needed
STATIN J 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.10	1.03	1.03	0.99	1.03	1.03	1.11	1.05	1.03	1.10	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
STATIN J 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.10	<1.10	<1.10	1.02	<1.10	<1.10	1.12	<1.10	<1.10	1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
STATIN J 115 kV	MORAGA 230/115kV TB 2 & MORAGA 230/115kV TB 1	P6	N-1-1	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	1.12	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
STATIN L 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.03	1.03	1.03	1.08	1.04	1.03	1.05	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
STATIN L 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.04	1.04	1.03	1.04	1.04	1.11	1.06	1.03	1.08	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
STATIN L 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.05	1.05	1.04	1.04	1.04	1.11	1.07	1.04	1.08	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
STATIN L 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.03	1.03	1.01	1.02	1.02	1.11	1.05	1.02	1.08	1.03	1.04	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
STATIN L 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.03	<1.10	<1.10	1.11	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
STATIN L 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
STATIN X 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.03	1.03	1.03	1.07	1.04	1.03	1.05	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
STATIN X 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.08	1.04	1.04	1.03	1.04	1.04	1.11	1.06	1.03	1.08	1.04	1.05	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
STATIN X 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.09	1.05	1.05	1.04	1.04	1.04	1.11	1.07	1.04	1.09	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
STATIN X 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.08	1.03	1.03	1.00	1.02	1.02	1.11	1.05	1.02	1.08	1.03	1.04	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
STATIN X 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.08	<1.10	<1.10	1.03	<1.10	<1.10	1.11	<1.10	<1.10	1.08	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
STATIN X 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.11	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
STAUFFER 60 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.05	<1.05	<1.05	1.05	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
STD. OIL 115 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.02	1.02	1.02	1.07	1.03	1.02	1.05	1.03	1.03	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
STELLING 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.61	0.76	0.78	0.69	0.66	0.71	0.94	0.90	0.60	0.60	0.71	0.82	0.78	0.78	0.71	0.60	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
STELLING 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Relay	0.46	>0.9	>0.9	0.51	>0.9	>0.9	0.90	>0.9	>0.9	0.45	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Redundent relay upgrade
STONE 115 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.01	<1.05	<1.05	1.07	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SUNOL 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
SUNOL 60 kV	PITTSBURG-SAN RAMON 230kV [5490] & SAN RAMON-MORAGA 230kV [5660]	P6	N-1-1	0.79	0.78	0.78	0.82	0.82	0.82	>0.9	0.85	0.77	0.79	0.77	0.80	0.78	0.78	0.77	0.77	Reverse power relay at San Ramon
SWIFT 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.07	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
TRIMBLE 115 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
UNIN CHM 60 kV	Base Case	P0	N-0	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.07	1.06	1.06	1.06	1.06	Load power factor correction and voltage support if needed
UNITEDSP 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.03	1.04	1.03	1.07	1.04	1.03	1.05	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
URICH 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.05	<1.05	<1.05	1.05	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
VALLECTS 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
VALLECTS 60 kV	PITTSBURG-SAN RAMON 230kV [5490] & SAN RAMON-MORAGA 230kV [5660]	P6	N-1-1	0.76	0.75	0.75	0.79	0.79	0.79	>0.9	0.83	0.74	0.75	0.74	0.77	0.75	0.75	0.74	0.74	Reverse power relay at San Ramon
VALLY VW 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.03	1.03	1.03	1.08	1.05	1.03	1.05	1.04	1.04	1.04	1.04	1.04	1.03	Load power factor correction and voltage support if needed
VALLY VW 115 kV	MORAGA - 2D 230kV & CONTRA COSTA-MORAGA #2 line	P2	Non-bus-tie breaker	1.07	1.04	1.04	1.03	1.04	1.04	1.11	1.06	1.04	1.07	1.04	1.05	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
VALLY VW 115 kV	MORAGA 115kV - Section 2D & 1D	P2	Bus-tie breaker	1.07	1.05	1.05	1.04	1.04	1.04	1.11	1.06	1.04	1.07	1.04	1.05	1.05	1.05	1.04	1.04	Load power factor correction and voltage support if needed
VALLY VW 115 kV	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	1.07	1.04	1.04	1.02	1.03	1.03	1.10	1.05	1.03	1.07	1.03	1.04	1.03	1.04	1.03	1.03	Load power factor correction and voltage support if needed
VALLY VW 115 kV	MORAGA 230kV Section 2D	P2	Bus	1.07	<1.10	<1.10	1.03	<1.10	<1.10	1.11	<1.10	<1.10	1.07	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
VALLY VW 115 kV	SOBRANTE - 1D 115kV & SOBRANTE-G #1 line	P2	Non-bus-tie breaker	0.97	0.97	0.97	0.92	0.94	0.94	1.03	0.99	0.96	0.97	0.97	0.98	0.89	0.97	0.97	0.96	Sensitivity only

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
VALLY VW 115 kV	SOBRANTE - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #1 line	P2	Non-bus-tie breaker	0.97	0.97	0.97	0.92	0.94	0.94	1.03	0.99	0.96	0.97	0.97	0.98	0.89	0.97	0.97	0.96	Sensitivity only
VALLY VW 115 kV	SOBRANTE - 1D 115kV & SOBRANTE-NRTH TWR line	P2	Non-bus-tie breaker	>0.9	0.97	0.97	>0.9	0.94	0.94	>0.9	0.99	0.96	>0.9	0.97	0.98	0.89	0.97	0.97	0.96	Sensitivity only
VALLY VW 115 kV	SOBRANTE - 1D 115kV & SOBRANTE-STD. OIL line	P2	Non-bus-tie breaker	0.97	0.97	0.97	0.92	0.94	0.94	1.03	0.99	0.96	0.97	0.97	0.98	0.89	0.97	0.97	0.96	Sensitivity only
VALLY VW 115 kV	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	0.97	0.97	0.97	0.93	0.94	0.94	1.03	0.99	0.96	0.97	0.97	0.98	0.89	0.97	0.97	0.96	Sensitivity only
VALLY VW 115 kV	SOBRANTE 115kV - Section 1D & 2D	P2	Bus-tie breaker	0.95	0.97	0.97	0.90	0.94	0.94	1.03	0.99	0.96	0.95	0.97	0.98	0.89	0.97	0.97	0.96	Sensitivity only
VALLY VW 115 kV	SOBRANTE 115kV Section 1D	P2	Bus	>0.9	0.97	0.97	>0.9	0.94	0.94	>0.9	0.99	0.96	>0.9	0.97	0.98	0.89	0.97	0.97	0.96	Sensitivity only
VALLY VW 115 kV	MORAGA 230/115kV TB 1 & MORAGA 230/115kV TB 2	P6	N-1-1	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	Load power factor correction and voltage support if needed
VASCO 60 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.03	<1.05	<1.05	1.06	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
VASCO 60 kV	PITTSBURG-SAN RAMON 230kV [5490] & SAN RAMON-MORAGA 230kV [5660]	P6	N-1-1	0.84	0.63	0.62	0.85	0.79	0.84	>0.9	>0.9	0.60	0.84	0.60	0.85	0.62	0.63	0.60	0.60	Reverse power relay at San Ramon
VINEYARD 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.02	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
W.P.BART 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.03	1.03	1.03	1.07	1.04	1.03	1.05	1.03	1.04	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
WARNERVL 230 kV	Base Case	P0	N-0	1.04	1.00	1.00	1.01	1.01	1.00	1.05	1.02	1.00	1.04	1.00	0.99	1.00	1.00	1.00	1.00	Load power factor correction and voltage support if needed
WATRSLED 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5	Relay	0.92	0.90	0.91	0.80	0.79	0.77	0.98	0.97	0.90	0.91	0.89	0.93	0.91	0.91	0.89	0.90	Redundent relay upgrade
WATRSLED 60 kV	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5	Relay	0.92	0.91	0.91	0.79	0.78	0.77	0.97	0.96	0.89	0.91	0.89	0.93	0.91	0.91	0.89	0.89	Redundent relay upgrade
WATRSLED 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	>0.9	>0.9	>0.9	0.80	0.79	0.79	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	0.89	0.88	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
WATRSLED 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.92	0.90	0.91	0.77	0.78	0.77	0.96	0.95	0.89	0.90	0.89	0.91	0.91	0.91	0.89	0.89	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
WHISMAN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.60	0.76	0.77	0.68	0.66	0.70	0.93	0.90	0.60	0.59	0.71	0.82	0.78	0.77	0.71	0.60	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan
WHISMAN 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Relay	0.45	>0.9	>0.9	0.50	>0.9	>0.9	0.90	>0.9	>0.9	0.44	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Redundent relay upgrade
WOLFE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.61	0.76	0.77	0.69	0.66	0.70	0.94	0.90	0.60	0.60	0.71	0.82	0.78	0.77	0.71	0.60	Project: Monta Vista 230 kV Bus Upgrade In-service date: 1/20 Short term: Action plan

Study Area: PG&E Greater Bay Area

High/Low Voltages



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
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	
WOLFE 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5	Relay	0.46	>0.9	>0.9	0.51	>0.9	>0.9	0.90	>0.9	>0.9	0.45	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Redundent relay upgrade
WOODSIDE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5	Relay	0.89	0.87	0.88	0.74	0.73	0.70	0.95	0.95	0.86	0.89	0.85	0.89	0.88	0.88	0.85	0.86	Redundent relay upgrade
WOODSIDE 60 kV	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5	Relay	0.89	0.87	0.87	0.73	0.72	0.71	0.95	0.94	0.84	0.88	0.85	0.89	0.87	0.87	0.85	0.84	Redundent relay upgrade
WOODSIDE 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1-1	0.89	0.87	0.88	0.75	0.73	0.73	>0.9	>0.9	0.86	0.89	0.85	0.89	0.88	0.88	0.85	0.84	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
WOODSIDE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.89	0.86	0.87	0.70	0.72	0.70	0.94	0.93	0.84	0.87	0.85	0.87	0.87	0.87	0.85	0.84	Project: Jefferson - Stanford #2 60 kV Line Review Stanford 60 kV system configuration
WRNRVLE 115 kV	Base Case	P0	N-0	1.05	<1.05	<1.05	1.01	<1.05	<1.05	1.07	<1.05	<1.05	1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
WTRSHDTP 60 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.02	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
ZANKER 115 kV	Base Case	P0	N-0	1.03	<1.05	<1.05	1.02	<1.05	<1.05	1.05	<1.05	<1.05	1.03	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed
ZONDWD 60 kV	Base Case	P0	N-0	1.04	<1.05	<1.05	1.03	<1.05	<1.05	1.06	<1.05	<1.05	1.04	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	Load power factor correction and voltage support if needed

[illegible]

Study Area: PG&E Greater Bay Area

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)								Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	2027 SP - No East Bay Generation	2022 SP High CEC Forecast - No East Bay Generation	2027 SP Peak-Shift - No East Bay Generation	

Study Area: PG&E Greater Bay Area

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions
			2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	Select..	Select..	Select..	Select..	Select..	
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.	P4-2		0	0	0	0	0						No violation
Contra Costa-Gateway 230 kV SLG fault with delayed clearing.	P5-2		0	0	0	0	0						No violation
Contra Costa-Moraga # 1 & 2 SLG fault with normal clearing.	P7-1		0	0	0	0	0						No violation
Crocket 3Ø fault with normal clearing with LMEC offline in the base case.	P3-1		0	0	0	0	0						No violation
DEC 3Ø fault with normal clearing.	P1-1		0	0	0	0	0						No violation
LMEC 3Ø fault with normal clearing.	P1-1		0	0	0	0	0						No violation
Los Esteros SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-1		0	0	0	0	0						No violation
Los Esteros SLG fault with delayed clearing.	P5-1		0	0	0	0	0						No violation
Metcalf 115 kV bus SLG fault with delayed clearing.	P5-5		0	0	0	0	0						No violation
Metcalf 115 kV bus SVD SLG fault expanded to elements lost due to stuck breaker and clear fault from remote breakers with normal clearing time.	P4-5		6	0	0	0	0						Under review with PTO .
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.	P4-6		6	0	0	0	0						Under review with PTO .
Metcalf 230 kV bus 3Ø fault with normal clearing with Metcalf 500/230 kV #13 Transformer offline in the base case.	P6-2		0	0	0	0	0						No violation
Metcalf 230 kV bus SLG fault with normal clearing.	P2-2		0	0	0	0	0						No violation
Metcalf 230 kV bus-tie breaker SLG fault with normal clearing.	P2-4		17	0	8	0	7						Under review with PTO .
Metcalf 230 kV line breaker SLG fault with normal clearing.	P2-3		4	0	0	0	0						Under review with PTO .

Study Area: PG&E Greater Bay Area

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions
			2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	Select..	Select..	Select..	Select..	Select..	
Metcalf 500/230 kV #13 Transformer 3Ø fault with normal clearing with LMEC offline in the base case.	P3-3		0	0	0	0	0						No violation
Metcalf 500/230 kV #13 Transformer 3Ø fault with normal clearing.	P1-3		0	0	0	0	0						No violation
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.	P4-3		4	0	0	0	0						Under review with PTO .
Metcalf 500/230 kV #13 Transformer SLG fault with delayed clearing.	P5-3		5	0	0	0	0						Under review with PTO .
Monta Vista 230 kV SVD 3Ø fault with normal clearing with LMEC offline in the base case.	P3-4		0	0	0	0	0						No violation
Monta Vista 230 kV SVD 3Ø fault with normal clearing.	P1-4		0	0	0	0	0						No violation
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.	P4-4		0	0	0	0	0						No violation
Monta Vista 230 kV SVD SLG fault with delayed clearing.	P5-4		0	0	0	0	0						No violation
Newark 230 kV 3Ø fault with normal clearing.	P1-2		0	0	0	0	0						No violation
Ravenswood 230 kV SVD 3Ø fault with normal clearing with Monta Vista 230 kV SVD offline in the base case.	P6-3		0	0	0	0	0						No violation
TBC SLG fault with normal clearing with LMEC offline in the base case.	P3-5		0	0	0	0	0						No violation
TBC SLG fault with normal clearing with Tesla-Newark 230 kV line offline in the base case.	P6-4		0	0	0	0	0						No violation
TBC SLG fault with normal clearing.	P1-5		0	0	0	0	0						No violation
Tesla-Newark 230 kV line 3Ø fault with normal clearing with LMEC offline in the base case.	P3-2		0	0	0	0	0						No violation
Tesla-Newark 230 kV line 3Ø fault with normal clearing with Metcalf 500/230 kV #13 Transformer offline in the base case.	P6-1		0	0	0	0	0						No violation

Study Area: PG&E Greater Bay Area



Single Contingency Load Drop

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

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

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



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)										Potential Mitigation Solutions
	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
Kirker	102	101	102								Under review with PTO