

Study Area: **PG&E Greater Fresno**
Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
Mercy Springs-Canal 70 kV Line #1	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	156	87	103	64	65	81	64	88	Review existing Oroloma 70kV area reinforcement
Mercy Springs-Canal 70 kV Line #1	P1-1:A13:27:_WRIGHT D 12.47KV GEN UNIT QF & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	157	<100	<100	<100	<100	<100	<100	<100	Project: Oroloma 70kV area reinforcement
Mercy Springs-Canal 70 kV Line #1	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	123	<100	<100	<100	<100	<100	<100	<100	Project: Oroloma 70kV area reinforcement
Mercy Springs-Canal 70 kV Line #1	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	155	<100	<100	<100	<100	<100	<100	<100	Project: Oroloma 70kV area reinforcement
Oro Loma-Mendota 115kV Line	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-PANOCHE2)	P2-1	Line Section w/o Fault	119	126	198	68	50	45	68	128	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2-1	Line Section w/o Fault	102	109	151	55	49	33	55	111	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2-2	Bus	119	126	198	68	51	45	68	128	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	119	126	200	68	51	45	68	128	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	124	127	202	68	54	45	68	129	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	71	14	14	NConv	NConv	7	43	18	Install Redundant protection
Oro Loma-Mendota 115kV Line	WILSON 230/115KV TB 1 & WILSON 230/115KV TB 2	P6	N-1-1	103	<100	<100	<100	<100	<100	<100	<100	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	PANOCHE 230/115KV TB 1 & PANOCHE 230/115KV TB 2	P6	N-1-1	102	<100	<100	<100	129	<100	<100	<100	Review existing Wilson-Oro Loma 115kV line reconductoring
Oro Loma-Mendota 115kV Line	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	162	<100	<100	<100	Generation Re-dispatch
Oro Loma-Mendota 115kV Line	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	153	<100	<100	<100	Generation Re-dispatch
Oro Loma-Mendota 115kV Line	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	7	23	50	59	131	19	14	22	Generation Re-dispatch
Oro Loma-Mendota 115kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	3	29	56	63	134	18	18	28	Generation Re-dispatch
Atwater-Merced 115 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	45	NConv	NA	Project:Wilson 115kV Reinforcement
	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	45	NConv	NA	Install Redundant protection
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	40	42	NConv	NConv	Install Redundant protection
	WILSON-ATWATER #2 115KV [4160] & EL CAPITAN-WILSON 115KV [1510]	P6	N-1-1	124	114	125	<100	<100	<100	<100	115	Review existing Wilson 115kV Reinforcement
Barton-Airways-Sanger 115 kV Line	P1-2:A14:17:_MUSTANG SW STA-GREGG 230KV [4700]	P1	N-1	21	25	37	57	100	13	35	25	Generation Re-dispatch
	P2-1:A14:5:_MUSTANG SW STA-GREGG 230KV [4700] (GREGG-HENTAP1)	P2-1	Line Section w/o Fault	22	28	40	60	100	10	37	27	Generation Re-dispatch
	P2-3:A14:15:_HENRIETTA_D - 1D 230KV & MUSTANG SW STA-GREGG LINE	P2-3	Non-Bus-Tie Breaker	21	25	37	57	100	13	35	25	Generation Re-dispatch
	P2-3:A14:17:_MUSTANGSS 230KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie Breaker	21	25	37	57	100	13	35	25	Generation Re-dispatch
	P2-3:A14:4:_GREGG 230KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie Breaker	21	26	37	57	101	13	35	25	Generation Re-dispatch
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	19	9	16	NConv	NConv	2	16	9	Install Redundant protection
	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	137	<100	<100	<100	Generation Re-dispatch
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	7	17	31	62	130	9	35	16	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	17	22	38	66	133	8	39	21	Generation Re-dispatch
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	23	35	53	74	141	2	46	34	Generation Re-dispatch



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				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	28	40	60	78	144	2	50	40	Generation Re-dispatch
Borden 230/70 kV Transformer #1	P1-3:A13:10:_BORDEN 230/70KV TB 4	P1	N-1	113	76	82	53	23	31	53	71	Project: Borden 230/70 kV Transformer Bank #1 Capacity Increase
	P2-3:A13:17:_BORDEN 230KV - MIDDLE BREAKER BAY 4	P2-3	Non-Bus-Tie Breaker	116	77	83	53	23	31	53	72	Project: Borden 230/70 kV Transformer Bank #1 Capacity Increase
	P1-1-20002_Ext - Helms Unit #3 Out & P1-3:A13:10:_BORDEN 230/70KV TB 4	P3	G1/N1	115	<100	<100	<100	<100	<100	<100	<100	Project: Borden 230/70 kV Transformer Bank #1 Capacity Increase
	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERC GN 13.80KV & KINGSBUR 13.80KV & SANGERC GN 13.80KV GEN UNITS & P1-3:A13:10:_BORDEN 230/70KV TB 4	P3	G1/N1	113	<100	<100	<100	<100	<100	<100	<100	Project: Borden 230/70 kV Transformer Bank #1 Capacity Increase
Borden-Coppermine 70 kV Line	Base Case	P0	Base Case	118	82	92	15	27	29	14	67	Project: Coppermine reconductoring Project approved in TPP 2021-22
Borden-Storey 230kV Line No 1	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	63	9	NA	NConv	NConv	41	99	13	Install Redundant protection
	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	100	<100	<100	<100	Generation Re-dispatch
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	17	17	NA	31	102	47	57	18	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	21	23	NA	35	105	46	60	23	Generation Re-dispatch
Borden-Storey 230kV Line No 2	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	55	7	NA	NConv	NConv	38	87	10	Install Redundant protection
California Ave.-Sanger 115 kV Line	P7-1:A14:11:_CALIFORNIA AVE-MCCALL 115KV [2360] & MCCALL-WEST FRESNO #2 115KV [2370]	P7	DCTL	83	90	103	49	71	57	48	91	Generation Re-dispatch
Chowchilla-Kerckhoff #2 115 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	18	NConv	NA	Project:Wilson 115kV Reinforcement
	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	16	NConv	NA	Project:Wilson 115kV Reinforcement
	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	18	NConv	NA	Install Redundant protection
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	69	20	NConv	NConv	Install Redundant Battery
	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	16	NConv	NA	Install Redundant protection
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	65	57	NConv	NConv	Install Redundant Battery
	WILSON-LE GRAND 115KV [4170] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	92	96	101	<100	101	136	<100	97	monitor future forecast
	KERCKHOFF-CLOVIS-SANGER #1 115KV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115KV [1900]	P6	N-1-1	<100	<100	<100	104	103	105	104	<100	Generation Re-dispatch
	WILSON-LE GRAND 115KV [4170] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	96	99	105	<100	97	132	<100	101	Under review
	KERCKHOFF-CLOVIS-SANGER #1 115KV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115KV [1900]	P6	N-1-1	<100	<100	<100	107	107	109	107	<100	Generation Re-dispatch
	WILSON-LE GRAND 115KV [4170] & PANOCHÉ-MENDOTA 115KV [3230]	P6	N-1-1	71	<100	<100	<100	<100	105	<100	<100	Sensitivity Only
	SCHINDLR 115/12.47KV TB 2 & GATES D 230/70KV TB 5	P6	N-1-1	143	149	<100	94	<100	<100	95	151	Increase Bank/Line capacity
Coalinga #1-San Miguel 70 kV Line	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	<100	101	<100	<100	<100	<100	<100	100	Increase Bank/Line capacity
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	48	68	43	58	110	43	30	69	Project in progress
	P5-5c:A14:14:_Gates 230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	14	29	95	39	114	57	34	29	Install Redundant Battery
	CALIFORNIA FLATS SW STA-GATES 230KV [5281] & TEMPLETON-GATES 230KV [5934]	P6	N-1-1	<100	<100	<100	<100	113	<100	<100	<100	Generation Re-dispatch
Coburn-Lasaguillass 230 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	85	35	21	NConv	NConv	34	58	39	Install Redundant Battery

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
Crescent-Schindler 70kV	P1-1:A14:70:_AGRICO 13.80KV & AGRICO 13.80KV & AGRICO 13.80KV GEN UNITS & P1-3:A14:10:_HELM 230/70KV TB 1	P3	G1/N1	<100	<100	<100	<100	103	<100	<100	<100	Generation Re-dispatch
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	NA	NA	NA	NA	NConv	NA	NA	NA	Install Redundant Battery
Dairyland-Mendota 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	33	3	17	NConv	NConv	10	24	4	Install Redundant Battery
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	NConv	NConv	NConv	45	36	15	NConv	NConv	Install Redundant Battery
Dinuba-Orosi 70 kV Line	P1-2:A14:113:_REEDLEY-DINUBA #1 70KV [9050]	P1	N-1	48	120	104	28	73	33	28	120	Project:Dinuba Energy Storage/Reedly 70kV Reinforcement
	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCN 13.80KV & KINGSBUR 13.80KV & SANGERCN 13.80KV GEN UNITS & P1-2:A14:113:_REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<100	112	<100	<100	<100	<100	<100	112	Project:Reedley 70 kV Area Reinforcement Project
	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A14:113:_REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<100	120	105	<100	<100	<100	<100	121	Project:Reedley 70 kV Area Reinforcement Project
	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-2:A14:113:_REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<100	120	103	<100	<100	<100	<100	120	Project:Reedley 70 kV Area Reinforcement Project
Dos Amigos PP-Panoche #3 230 kV Line	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	22	3	12	10	7	119	7	2	Project in progress
	P5-5c:A14:14:_Gates 230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	17	5	12	8	7	121	7	4	Install Redundant Battery
	LOS BANOS-PADRE FLAT SW STA 230KV [1092] & LOS BANOS-PANOCHÉ #2 230KV [5040]	P6	N-1-1	<100	<100	<100	<100	<100	106	<100	<100	Sensitivity Only
El Capitan-Wilson 115 kV Line	WILSON-ATWATER #2 115KV [4160] & ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	<100	117	127	<100	<100	<100	<100	117	Operating Solution
EXCELSIORSS-SCHINDLR #1 115kV Line	EXCELSIOR SW STA-SCHINDLER #2 115KV [3249] & GATES D 230/70KV TB 5	P6	N-1-1	165	165	<100	100	<100	<100	112	167	Increase Bank/Line capacity
EXCELSIORSS-SCHINDLR #2 115kV Line	EXCELSIOR SW STA-SCHINDLER #1 115KV [3248] & GATES D 230/70KV TB 5	P6	N-1-1	165	165	<100	100	<100	<100	112	167	Increase Bank/Line capacity
Exchequer 115/70/13.8 kV Transformer	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	26	NConv	NA	Project:Wilson 115kV Reinforcement
	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	26	NConv	NA	Install Redundant protection
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	24	26	NConv	NConv	Install Redundant Battery
Exchequer-Le Grand 115 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	54	NConv	NA	Project:Wilson 115kV Reinforcement
	P1-1:A13:1:_Q1244BTG4 0.69KV GEN UNIT 4 & P1-3:A13:28:_MERCED 115/70KV TB 2	P3	G1/N1	<100	<100	<100	<100	<100	100	<100	<100	Sensitivity Only
	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	54	NConv	NA	Install Redundant protection
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	57	54	NConv	NConv	Install Redundant Battery
Five Points Sw Sta-Huron-Gates 70kV Line(Five Points Sw Sta-Calflax section)	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	140	144	32	83	36	92	93	147	Under review
	P2-2:A13:25:_PANOCHÉ2 115KV SECTION 2D	P2-2	Bus	12	30	11	9	36	102	11	29	Sensitivity Only
	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	141	147	35	83	41	75	96	149	Under review
	P2-3:A13:42:_PANOCHÉ2 - 2D 115KV & PANOCHÉ-ORO LOMA LINE	P2-3	Non-Bus-Tie Breaker	12	30	11	9	37	102	12	29	Sensitivity Only
	P2-3:A14:18:_MUSTANGSS 230KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	10	22	4	31	4	107	18	20	Sensitivity Only
	P2-4:A13:13:_PANOCHÉ1 SECTION 1D & PANOCHÉ2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	96	39	42	1	60	145	63	38	Sensitivity Only
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	148	151	41	88	45	68	107	154	Under review
	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	148	154	<100	<100	<100	98	<100	156	Increase Bank/Line capacity

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				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	139	142	<100	<100	<100	<100	<100	144	Increase Bank/Line capacity
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	147	150	41	79	55	92	108	152	Project in progress
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	47	39	4	NConv	NConv	106	53	40	Install Redundant Battery
	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	10	22	4	31	3	107	18	20	Sensitivity Only
Gates 230/70 kV Transformer #5	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	109	82	22	48	25	33	74	83	Under review
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	109	108	35	71	25	13	74	109	Install Redundant Battery
	PANOCHE-EXCELSIOR SW STA #2 115KV [3260] & PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	107	105	<100	<100	<100	<100	<100	106	Under review
	P7-1:A14:10:_PANOCHE-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOCHE2 115KV [3231]	P7	DCTL	109	108	36	71	25	11	74	109	Under review
Gates-Coalinga #1 70 kV Line	GATES D 230/70KV TB 5 & SCHINDLR 115/12.47KV TB 2	P6	N-1-1	102	103	<100	<100	<100	<100	<100	104	Increase Bank/Line capacity
Gates-Gregg 230 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	37	13	9	NConv	NConv	40	15	15	Install Redundant Battery
Gates-Jayne Sw Sta 70kV	GATES D 230/70KV TB 5 & SCHINDLR 115/12.47KV TB 2	P6	N-1-1	97	99	<100	<100	<100	<100	<100	100	Increase Bank/Line capacity
Gates-Midway 230kV	P5-5c:A14:1:_Gates 500kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	25	35	12	124	83	89	8	35	Install Redundant Battery
Gates-Tulare Lake 70 kV Line	P1-2:A14:125:_ARCO-TULARE LAKE 70KV [8460]	P1	N-1	121	123	125	69	70	100	69	123	Disable automatic load transfer to Gates-Tulare Lake
	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-2:A14:125:_ARCO-TULARE LAKE 70KV [8460]	P3	G1/N1	121	123	125	<100	<100	<100	100	123	Disable automatic load transfer to Gates-Tulare Lake
Gregg-Ashlan 230 kV Line	GREGG-HERNDON #2 230KV [4840] & GREGG-HERNDON #1 230KV [4830]	P6	N-1-1	182	178	172	<100	<100	109	<100	181	Review existing Ashlan SPS
Gregg-Helms 230kV Line No 1	P2-1:A14:3:_HELMS-GREGG #2 230KV [4880] (GREGG-HELMS PP3)	P2-1	Line Section w/o Fault	93	93	94	3	NConv	92	3	93	Generation Re-dispatch
Gregg-Helms 230kV Line No 2	P2-1:A14:2:_HELMS-GREGG #1 230KV [4870] (GREGG-HELMS PP1)	P2-1	Line Section w/o Fault	93	93	94	3	NConv	92	3	93	Generation Re-dispatch
Guernsey-Henrietta 70 kV Line (Guernsey-Jacobs corner Tap)	Base Case	P0	Base Case	105	107	91	58	41	55	59	108	Review load powerfactor at Guernsey,.
GWF-Kingsburg 115 kV Line	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	68	91	101	39	62	9	23	92	monitor future forecast
	P2-4:A14:39:_MC CALL 230KV - SECTION 1D & 1E	P2-4	Bus-Tie-Breaker	NA	88	104	NA	106	NA	NA	89	monitor future forecast
	P2-4:A14:6:_MC CALL 230KV - SECTION 2E & 1E	P2-4	Bus-Tie-Breaker	67	92	107	52	95	12	40	93	monitor future forecast
	P5-5a:A14:6:_HERNDON #1 115KV BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	68	90	100	39	62	9	23	92	Install Redundant protection
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	32	58	86	NConv	NConv	11	6	57	Install Redundant Battery
	MUSTANG SW STA-GREGG 230KV [4700] & LEPRINO FOODS-LEPRINO SW STA 115KV [1741]	P6	N-1-1	<100	<100	<100	<100	<100	115	<100	<100	Sensitivity Only
	TRANQUILLITY SW STA-HELM 230KV [5370] & CHSR09SWSTA-MUSTANGSS 230KV [0]	P6	N-1-1	<100	95	114	<100	103	<100	<100	97	Under review
	P7-1:A14:17:_HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	61	89	109	48	116	28	25	90	monitor future forecast
	P1-1:A14:70:_AGRICO 13.80KV & AGRICO 13.80KV & AGRICO 13.80KV GEN UNITS	P1	N-1	37	38	39	25	100	78	25	38	Generation Re-dispatch
	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	37	38	39	25	128	78	25	38	Generation Re-dispatch
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	37	38	39	25	103	78	25	38	Project in progress

Study Area: PG&E Greater Fresno
Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
Helm-Stroud Sw Station 70 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	38	38	39	NConv	NConv	78	25	38	Install Redundant Battery
	P5-5c:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	37	38	39	25	126	78	25	38	Install Redundant Battery
	P5-5c:A14:12:_Mustang SW STA 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	37	38	39	25	111	78	25	38	Install Redundant Battery
	PANOCH-EXCELSIOR SW STA #2 115KV [3260] & PANOCH-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCH1_KAMM	P6	N-1-1	<100	<100	<100	<100	124	<100	<100	<100	Generation Re-dispatch
	P7-1:A13:14:_EXCELSIORSS-PANOCH1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7	DCTL	37	38	39	25	125	78	25	38	Generation Re-dispatch
	P7-1:A14:10:_PANOCH-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOCH2 115KV [3231]	P7	DCTL	37	38	39	25	128	78	25	38	Generation Re-dispatch
	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	37	38	39	25	117	78	25	38	Generation Re-dispatch
Henrietta-GWF 115 kV Line	P2-4:A14:39:_MC CALL 230KV - SECTION 1D & 1E	P2-4	Bus-Tie-Breaker	NA	36	50	NA	106	NA	NA	38	Generation Re-dispatch
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	19	7	25	NConv	NConv	11	18	7	Install Redundant Battery
	HELM-MCCALL 230KV [4860] & CHSR09SWSTA-MUSTANGSS 230KV [0]	P6	N-1-1	<100	<100	<100	<100	117	<100	<100	<100	Generation Re-dispatch
	P7-1:A14:17:_HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	10	39	57	26	117	28	2	40	Generation Re-dispatch
Hermdin 230/115kV Bank 1	HERNDON 230/115KV TB 2 & HERNDON 230/115KV TB 3	P6	N-1-1	101	105	109	<100	<100	<100	<100	107	Under review
Hermdin 230/115kV Bank 2	HERNDON 230/115KV TB 1 & HERNDON 230/115KV TB 3	P6	N-1-1	102	106	109	<100	<100	<100	<100	107	Under review
Hermdon 230/115 kV Transformer #3	HERNDON 230/115KV TB 1 & HERNDON 230/115KV TB 2	P6	N-1-1	101	104	108	<100	<100	<100	<100	106	Under review
Hermdon-Ashlan 230 kV Line	GREGG-HERNDON #2 230KV [4840] & GREGG-HERNDON #1 230KV [4830]	P6	N-1-1	117	109	98	<100	<100	<100	<100	111	Review existing Ashlan SPS
Hermdon-Barton 115 kV Line	P5-5c:A14:10:_Mccall 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	84	96	NConv	34	71	38	33	98	Install Redundant Battery
Hermdon-Bullard #1 115 kV Line	P2-1:A14:80:_HERNDON-BULLARD #1 115KV [1760] (HERNDON-PNDLJ1)	P2-1	Line Section w/o Fault	118	72	77	61	42	72	61	73	Project:Hermdon-Bullard reconductoring
	P2-2:A14:49:_HERNDON 115KV SECTION 1D	P2-2	Bus	118	72	77	61	42	72	61	73	Project:Hermdon-Bullard reconductoring
Hermdon-Bullard #2 115 kV Line	P2-2:A14:50:_HERNDON 115KV SECTION 2D	P2-2	Bus	101	61	62	51	33	67	51	62	Project:Hermdon-Bullard reconductoring
	P2-3:A14:65:_HERNDON - 2D 115KV & HERNDON-WOODWARD LINE	P2-3	Non-Bus-Tie Breaker	101	61	62	51	33	67	51	62	Project:Hermdon-Bullard reconductoring
Hermdon-Manchester 115 kV Line	P5-5c:A14:10:_Mccall 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	84	96	NConv	36	69	41	35	97	Install Redundant Battery
Hermdon-Woodward 115 kV Line	P5-5c:A14:10:_Mccall 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	74	83	NConv	28	44	24	26	85	Install Redundant Battery
Jackson Sw Sta-Contadina 115kV Line	P2-4:A14:39:_MC CALL 230KV - SECTION 1D & 1E	P2-4	Bus-Tie-Breaker	NA	85	100	NA	103	NA	NA	86	monitor future forecast
	P2-4:A14:6:_MC CALL 230KV - SECTION 2E & 1E	P2-4	Bus-Tie-Breaker	NA	89	103	NA	93	NA	NA	90	monitor future forecast
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	NA	54	82	NA	NConv	NA	NA	54	Install Redundant Battery
	CHSR09SWSTA-MUSTANGSS 230KV [0] & HELM-MCCALL 230KV [4860]	P6	N-1-1	<100	<100	104	<100	112	<100	<100	<100	monitor future forecast
	P7-1:A14:17:_HELM-MCCALL 230KV [4860] & HENTAP2-MUSTANGSS #1 230KV [0]	P7	DCTL	NA	86	105	NA	114	NA	NA	87	monitor future forecast
Kerckhoff - Clovis - Sanger #1 115 kV Line (Woodward-Shepherd)	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	105	<100	<100	<100	Generation Re-dispatch
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	22	30	41	59	107	21	41	29	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	25	34	45	62	109	20	44	34	Generation Re-dispatch

Study Area: PG&E Greater Fresno
Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
Kingsburg E-Kingsburg D 115kV section	MCCALL-KINGSBURG #2 115KV [2300] & WAUKENA SW STA-CORCORAN 115KV [8773]	P6	N-1-1	107	<100	<100	<100	<100	<100	<100	<100	Operating Solution
	MUSTANG SW STA-GREGG 230KV [4700] & MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_SUNMAIDJCT	P6	N-1-1	<100	<100	<100	<100	<100	148	<100	<100	Sensitivity Only
Kingsriver-Sanger-Reedley 115 kV Line	SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	128	141	133	<100	110	<100	<100	142	Operating Solution
	MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE & SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY	P6	N-1-1	117	125	117	<100	<100	<100	<100	126	Operating Solution
	SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	113	123	113	<100	95	<100	<100	124	Operating Solution
	MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE & SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY	P6	N-1-1	112	122	113	<100	95	<100	<100	124	Operating Solution
Las Aguilas-Panoche 230kV Line No 1	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of non-redundent batt)	P5	Non-Redundent Battery	101	27	10	NConv	NConv	31	72	32	Install Redundant Battery
Las Aguilas-Panoche 230kV Line No 2	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of non-redundent batt)	P5	Non-Redundent Battery	101	27	10	NConv	NConv	32	73	32	Install Redundant Battery
Legrand-Chowchilla 115kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2-2	Bus	94	83	89	60	63	100	60	84	Sensitivity Only
	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2-3	Non-Bus-Tie Breaker	94	83	89	60	63	100	60	84	Sensitivity Only
	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2-3	Non-Bus-Tie Breaker	94	83	89	60	63	100	60	84	Sensitivity Only
	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2-3	Non-Bus-Tie Breaker	95	83	89	60	63	100	60	84	Sensitivity Only
	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	98	84	93	60	61	100	60	85	Sensitivity Only
	P1-1:A13:10:_LILBEAR5SPV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G1/N1	<100	101	90	<100	<100	<100	<100	<100	Under review
	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G1/N1	<100	102	<100	<100	<100	<100	99	<100	Under review
	P1-1:A13:12:_LILBEAR3SPV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G1/N1	<100	101	<100	<100	<100	<100	<100	<100	Under review
Legrand-Dairyland 115kV(Legrand-chowchilla solar section)	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of non-redundent batt)	P5	Non-Redundent Battery	57	24	9	NConv	NConv	10	40	26	Install Redundant Battery
	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2-2	Bus	95	83	89	60	51	100	60	84	Sensitivity Only
	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2-3	Non-Bus-Tie Breaker	95	83	89	60	51	100	60	84	Sensitivity Only
	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2-3	Non-Bus-Tie Breaker	95	83	89	60	51	100	60	84	Sensitivity Only
	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2-3	Non-Bus-Tie Breaker	95	83	89	60	51	100	60	84	Sensitivity Only
	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	98	84	92	60	49	100	60	84	Sensitivity Only
	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G1/N1	<100	103	<100	<100	<100	<100	100	<100	Under review
	P1-1:A13:10:_LILBEAR5SPV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G1/N1	<100	101	<100	<100	<100	<100	<100	<100	Under review
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of non-redundent batt)	P5	Non-Redundent Battery	57	24	9	NConv	NConv	9	40	26	Install Redundant Battery
	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-PANOCHE2)	P2-1	Line Section w/o Fault	135	98	148	78	23	50	78	100	Review existing Wilson-Oro Loma 115kV line reconductoring
	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2-1	Line Section w/o Fault	118	87	116	66	20	38	66	88	Review existing Wilson-Oro Loma 115kV line reconductoring
	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2-2	Bus	135	98	148	78	23	50	78	100	Review existing Wilson-Oro Loma 115kV line reconductoring

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
Legrand-Wilson 115kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	135	98	149	78	23	50	78	100	Review existing Wilson-Oro Loma 115kV line reconductoring
	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	140	99	151	78	25	50	78	101	Review existing Wilson-Oro Loma 115kV line reconductoring
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of non-redundent batt)	P5	Non-Redundent Battery	87	24	8	NConv	NConv	13	57	27	Install Redundant Battery
	PANOCHE 230/115KV TB 1 & PANOCHE 230/115KV TB 2	P6	N-1-1	<100	<100	<100	<100	111	<100	<100	<100	Generation Re-dispatch
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	NA	6	18	NA	107	NA	NA	6	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	NA	7	21	NA	109	NA	NA	7	Generation Re-dispatch
Los Banos 230/70 kV Transformer #3	P1-3:A13:7:_LOSBANOS 230/70KV TB 4	P1	N-1	100	103	105	55	69	57	55	104	Increase bank capacity
	P2-2:A13:2:_LOSBANOS 230KV SECTION 2D	P2-2	Bus	100	103	105	55	69	57	55	104	Increase bank capacity
	P1-1:A13:33:_ONEILPMP 9.11KV GEN UNIT 1 & P1-3:A13:7:_LOSBANOS 230/70KV TB 4	P3	G1/N1	105	111	113	<100	<100	<100	<100	112	Increase bank capacity
	P1-1:A13:43:_STOREY1DIST 12.47KV GEN UNIT 1 & P1-3:A13:7:_LOSBANOS 230/70KV TB 4	P3	G1/N1	<100	<100	105	<100	<100	<100	<100	<100	Increase bank capacity
	ONEILPMP 9.11KV GEN UNIT 1 & LOSBANOS 230/70KV TB 4	P6	N-1-1	93	98	103	<100	<100	<100	<100	99	Increase bank capacity
Los Banos-Canal-Oro Loma 70 kV Line	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	102	108	136	<100	<100	<100	<100	109	Review existing Oro Loma 70kV Reinforcement
	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	135	142	170	<100	115	<100	<100	143	Review existing Oro Loma 70kV Reinforcement
	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	118	124	148	<100	101	<100	<100	125	Review existing Oro Loma 70kV Reinforcement
	P1-1:A13:21:_QUINTOSLRSPV 0.34KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	<100	100	118	<100	<100	<100	<100	102	Review existing Oro Loma 70kV Reinforcement
	P1-1:A13:21:_QUINTOSLRSPV 0.34KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	125	132	150	<100	<100	<100	<100	134	Review existing Oro Loma 70kV Reinforcement
	P1-1:A13:21:_QUINTOSLRSPV 0.34KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	109	116	131	<100	<100	<100	<100	117	Review existing Oro Loma 70kV Reinforcement
Los Banos-Canal-Oro Loma 70 kV Line (Arbur tap-wright)	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	95	100	118	42	62	32	42	101	Review existing Oro Loma 70kV Reinforcement
Los Banos-Canal-Oro Loma 70 kV Line(Losbanos-pnchowind)	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	126	132	150	54	89	51	54	134	Review existing Oro Loma 70kV Reinforcement
Los Banos-Canal-Oro Loma 70 kV Line(pnchowind-wright tap)	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	110	115	131	47	78	44	47	117	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P3	G1/N1	118	97	107	<100	<100	<100	<100	98	Review existing Oro Loma 70kV Reinforcement
	P1-1:A13:43:_STOREY1DIST 12.47KV GEN UNIT 1 & P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P3	G1/N1	<100	<100	110	<100	<100	<100	<100	<100	Review existing Oro Loma 70kV Reinforcement
	P1-1:A13:21:_QUINTOSLRSPV 0.34KV GEN UNIT 1 & P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P3	G1/N1	<100	100	110	<100	<100	<100	<100	101	Review existing Oro Loma 70kV Reinforcement
	P7-1:A13:11:_LOS BANOS-PANOCHE #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	114	93	103	54	55	45	53	95	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line(canal-livingston section)	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	93	100	110	43	57	32	43	101	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line(chevpipe-losbanos section)	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	114	93	103	53	55	45	53	95	Review existing Oro Loma 70kV Reinforcement
Los Banos-Livingston Jct-Canal 70 kV Line(chevpipe-santa nella section)	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	113	93	102	53	54	43	52	94	Review existing Oro Loma 70kV Reinforcement

Study Area: PG&E Greater Fresno
Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
Los Banos-Livingston Jct-Canal 70 kV Line(santanella-livingston section)	P1-2:A13:73:_LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P1	N-1	92	100	110	43	54	27	43	101	Review existing Oro Loma 70kV Reinforcement
Los Banos-Mercy Springs Sw Sta 70kV Line (Mercy Springs Sw Sta - Arburua Sub section)	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	105	111	131	44	69	34	44	113	Review existing Oro Loma 70kV Reinforcement
Los Banos-Mercy Springs Sw Sta 70kV Line (Mercy Springs Sw Sta - Arburua Sub section)	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	114	120	151	<100	93	<100	<100	122	Review existing Oro Loma 70kV Reinforcement
Los Banos-Mercy Springs Sw Sta 70kV Line (Mercy Springs Sw Sta - Arburua Sub section)	P1-1:A13:21:_QUINTOSLRSPV 0.34KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	105	112	131	<100	<100	<100	<100	113	Review existing Oro Loma 70kV Reinforcement
Los Banos-Panoche #2 230 kV Line	P5-5c:A14:14:_Gates 230-70kV Batt(Failure of non-redundent batt)	P5	Non-Redundent Battery	25	4	13	15	5	102	11	3	Install Redundant Battery
Manchester - Airways - Sanger 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of non-redundent batt)	P5	Non-Redundent Battery	24	5	13	NConv	NConv	4	18	3	Install Redundant Battery
Manchester - Airways - Sanger 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of non-redundent batt)	P5	Non-Redundent Battery	43	27	22	NConv	NConv	14	4	29	Install Redundant Battery
Manchester - Airways - Sanger 115 kV Line	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	125	<100	<100	<100	Generation Re-dispatch
Manchester - Airways - Sanger 115 kV Line	MUSTANG SW STA-GREGG 230KV [4700] & TRANQUILLITY SW STA-KEARNEY 230KV [5380]	P6	N-1-1	<100	<100	<100	<100	127	<100	<100	<100	Generation Re-dispatch
Manchester - Airways - Sanger 115 kV Line	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	22	31	46	69	127	6	44	30	Generation Re-dispatch
Manchester - Airways - Sanger 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	26	36	52	73	130	6	48	35	Generation Re-dispatch
Manchester - Airways - Sanger 115 kV Line	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	6	9	22	61	125	45	32	8	Generation Re-dispatch
Manchester - Airways - Sanger 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	8	15	29	65	128	44	36	14	Generation Re-dispatch
Manchester-Airways-Sanger 115 kV Line	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	118	<100	<100	<100	Generation Re-dispatch
Manchester-Airways-Sanger 115 kV Line	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	15	21	33	63	117	11	38	23	Generation Re-dispatch
Mc Call 230kV-115kV Bank No 2	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	P2-4	Bus-Tie-Breaker	79	89	103	72	99	42	73	89	monitor future forecast
	MC CALL 230/115KV TB 1 & MC CALL 230/115KV TB 3	P6	N-1-1	<100	92	104	<100	122	<100	<100	93	monitor future forecast
Mc Call 230kV-115kV Bank No 3	P2-3:A14:49:_MC CALL 115KV - MIDDLE BREAKER BAY 3	P2-3	Non-Bus-Tie Breaker	87	98	115	82	124	34	72	98	monitor future forecast
	MC CALL 230/115KV TB 1 & MC CALL 230/115KV TB 2	P6	N-1-1	<100	94	106	<100	124	<100	<100	94	monitor future forecast
Mccall 230-115kV Bank 1	MC CALL 230/115KV TB 3 & MC CALL 230/115KV TB 2	P6	N-1-1	<100	94	107	<100	125	<100	<100	95	monitor future forecast
Mccall- Malaga 115kV	P1-1:A14:65:_RIOBRVOFSNO 12.47KV GEN UNIT 1 & P1-2:A14:51:_SANGER-MALAGA 115KV [3600]	P3	G1/N1	<100	<100	<100	<100	106	<100	<100	<100	Generation Re-dispatch
McCall-Kingsburg #1 115 kV Line	MCCALL-KINGSBURG #2 115KV [2300] & JACKSONSWSTA-GWF_HEP 115KV [0]	P6	N-1-1	<100	113	121	<100	<100	<100	<100	114	Operating Solution
	MCCALL-KINGSBURG #2 115KV [2300] & GWF-KINGSBURG 115KV [1743]	P6	N-1-1	103	<100	<100	<100	<100	<100	<100	<100	Operating Solution
	MUSTANG SW STA-GREGG 230KV [4700] & MCCALL-KINGSBURG #2 115KV [2300]	P6	N-1-1	<100	<100	<100	<100	<100	143	<100	<100	Sensitivity Only
Mccall-Kingsburg 115kV lIne No 2 (Guardian sub-Kingsburg section)	MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_SUNMAIDJCT & GWF-KINGSBURG 115KV [1743]	P6	N-1-1	103	<100	<100	<100	<100	<100	<100	<100	Operating Solution
	MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_SUNMAIDJCT & JACKSONSWSTA-GWF_HEP 115KV [0]	P6	N-1-1	<100	113	121	<100	<100	<100	<100	114	Operating Solution
Mccall-Kingsburg 115kV Line No 2 (Guardian sub-Mccall section)	MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_SUNMAIDJCT & GWF-KINGSBURG 115KV [1743]	P6	N-1-1	109	<100	<100	<100	<100	<100	<100	<100	Operating Solution
	MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_SUNMAIDJCT & JACKSONSWSTA-GWF_HEP 115KV [0]	P6	N-1-1	<100	119	127	<100	<100	<100	<100	120	Operating Solution

2022-2023 ISO Reliability Assessment - Preliminary Study Results												
Study Area: PG&E Greater Fresno												
Thermal Overloads												
Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
McCall-Reedley 115 kV Line (Reedley-Wahtoke)	P5-5c:A14:21:_Sanger 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	115	122	110	68	78	60	68	124	Install Redundant Battery
	SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & KINGS RIVER-SANGER-REEDLEY 115KV [2030]	P6	N-1-1	111	118	104	<100	<100	<100	<100	120	Operating Solution
McCall-Sanger #1 115 kV Line	MCCALL-SANGER #2 115KV [2340] & MCCALL-SANGER #3 115KV [2350]	P6	N-1-1	<100	<100	<100	<100	102	<100	<100	<100	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	32	43	57	49	101	17	31	42	Generation Re-dispatch
McCall-Sanger #2 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	23	29	48	NConv	NConv	18	13	29	Install Redundant Battery
	MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #3 115KV [2350]	P6	N-1-1	<100	<100	<100	<100	116	<100	<100	<100	Generation Re-dispatch
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	33	44	59	52	112	20	33	44	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	37	48	64	55	114	19	35	48	Generation Re-dispatch
McCall-Sanger #3 115 kV Line	P2-3:A14:50:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	56	68	82	62	110	28	47	68	Generation Re-dispatch
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	27	34	40	NConv	NConv	4	16	34	Install Redundant Battery
	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	133	<100	<100	<100	Generation Re-dispatch
	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	52	64	81	66	123	29	47	64	Generation Re-dispatch
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	39	52	70	61	132	16	38	52	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	43	56	75	64	134	16	41	56	Generation Re-dispatch
Mendota-San Joaquin-Helm 70 kV Line	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	168	<100	<100	<100	Generation Re-dispatch
Mendota-San Joaquin-Helm 70kV(Adams East Tap-Mendota Biomass section)	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	147	<100	<100	<100	Generation Re-dispatch
Mendota-San Joaquin-Helm 70kV(Adams East-Westlands section)	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	161	<100	<100	<100	Generation Re-dispatch
	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	157	<100	<100	<100	Generation Re-dispatch
Mendota-San Joaquin-Helm 70kV(Mendota sub-Mendota Biomass section)	P1-3:A14:10:_HELM 230/70KV TB 1	P1	N-1	3	3	3	3	101	3	3	3	Generation Re-dispatch
	P2-2:A14:14:_HELM 230KV SECTION 1D	P2-2	Bus	3	3	3	3	101	3	3	3	Generation Re-dispatch
	P1-1-20008_Holm Unit #1 out & P1-3:A14:10:_HELM 230/70KV TB 1	P3	G1/N1	<100	<100	<100	<100	100	<100	<100	<100	Generation Re-dispatch
	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	145	<100	<100	<100	Generation Re-dispatch
Merced 115/70 kV Transformer #2	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	74	NConv	NA	Project:Wilson 115kV Reinforcement
	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	74	NConv	NA	Install Redundant protection
	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	85	74	NConv	NConv	Install Redundant Battery
Merced Falls-Exchequer 70 kV Line	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	147	NConv	NA	Project:Wilson 115kV Reinforcement
	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	146	NConv	NA	Install Redundant protection
	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	136	145	NConv	NConv	Install Redundant Battery
	EXCHEQUER-LE GRAND 115KV [1560] & MUSTANG3N4-MUSTANGSS #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	100	<100	<100	<100	Generation Re-dispatch
	PANOCHE-MENDOTA 115KV [3230] & WILSON-LE GRAND 115KV [4170]	P6	N-1-1	<100	<100	<100	<100	<100	102	<100	<100	Sensitivity Only
	EXCHEQUER-LE GRAND 115KV [1560] & HELMS-GREGG #1 230KV [4870]	P6	N-1-1	<100	<100	113	<100	<100	<100	<100	<100	monitor future forecast
	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	146	NConv	NA	Project:Wilson 115kV Reinforcement

Study Area: PG&E Greater Fresno
Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
Merced-Merced Falls 70 kV Line	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	146	NConv	NA	Install Redundant protection
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	162	146	NConv	NConv	Install Redundant Battery
	EXCHEQUER-LE GRAND 115KV [1560] & MUSTANG3N4-MUSTANGSS #1 230KV [0]	P6	N-1-1	<100	<100	<100	<100	106	<100	<100	<100	Generation Re-dispatch
	PANOCHÉ-MENDOTA 115KV [3230] & WILSON-LE GRAND 115KV [4170]	P6	N-1-1	<100	<100	<100	<100	<100	102	<100	<100	Sensitivity Only
MERCED-MERCED M #2 115 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	NConv	NA	NA	NConv	NA	38	NConv	NA	Project:Wilson 115kV Reinforcement
	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	NConv	NA	NA	NConv	NA	38	NConv	NA	Install Redundant protection
	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	NConv	NConv	NConv	NConv	43	39	NConv	NConv	Install Redundant Battery
Mercy Springs Sw Sta- Oro loma 70kV Line (Mercy Springs Sw Sta-Mercy springs sub section)	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	156	87	103	64	65	81	64	88	Review existing Oro Loma 70kV Reinforcement
Mercy Springs Sw Sta- Oro loma 70kV Line (Mercy Springs Sw Sta-Mercy springs sub section)	P1-1:A13:27:_WRIGHT D 12.47KV GEN UNIT QF & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	157	<100	<100	<100	<100	<100	<100	<100	Review existing Oro Loma 70kV Reinforcement
Mercy Springs Sw Sta- Oro loma 70kV Line (Mercy Springs Sw Sta-Mercy springs sub section)	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G1/N1	155	<100	<100	<100	<100	<100	<100	<100	Review existing Oro Loma 70kV Reinforcement
Mosslanding- Las Aguilas 230kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	135	26	3	NConv	NConv	66	97	33	Install Redundant Battery
MustangSS-Gates 230KV Line No 1	P1-2:A14:25:_GATES-MUSTANG SW STA #2 230KV [2605]	P1	N-1	8	19	31	53	32	100	14	19	Sensitivity Only
	P1-1:A14:35:_WESTLNDs 0.48KV GEN UNIT 1 & P1-2:A14:25:_GATES-MUSTANG SW STA #2 230KV [2605]	P3	G1/N1	<100	<100	<100	<100	<100	<100	102	<100	Sensitivity Only
	TRANQUILLITY SW STA-HELM 230KV [5370] & GATES-MUSTANG SW STA #2 230KV [2605]	P6	N-1-1	<100	<100	<100	<100	<100	112	<100	<100	Sensitivity Only
MustangSS-Gates 230KV Line No 2	P1-2:A14:24:_GATES-MUSTANG SW STA #1 230KV [2604]	P1	N-1	8	19	31	53	32	100	14	19	Sensitivity Only
	P2-3:A14:27:_GATES F 230KV - MIDDLE BREAKER BAY 5	P2-3	Non-Bus-Tie Breaker	8	19	32	52	31	100	14	19	Sensitivity only
	P1-1:A14:35:_WESTLNDs 0.48KV GEN UNIT 1 & P1-2:A14:24:_GATES-MUSTANG SW STA #1 230KV [2604]	P3	G1/N1	<100	<100	<100	<100	<100	<100	102	<100	Sensitivity Only
	TRANQUILLITY SW STA-HELM 230KV [5370] & GATES-MUSTANG SW STA #1 230KV [2604]	P6	N-1-1	<100	<100	<100	<100	<100	112	<100	<100	Sensitivity Only
Oro Loma-Mendota 70kV Line (Toma tek - Mendota section)	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	32	28	31	24	104	28	24	28	Generation Re-dispatch
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	32	28	31	25	102	28	24	28	Install Redundant Battery
	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	184	<100	<100	<100	Generation Re-dispatch
Oroloma-Mendota 70kV Line	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	69	72	78	33	101	36	33	73	Generation Re-dispatch
	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-PANOCHE2)	P2-1	Line Section w/o Fault	73	75	108	30	98	36	30	76	Monitor future forecast
	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2-1	Line Section w/o Fault	70	72	101	33	91	36	33	73	Monitor future forecast
	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2-2	Bus	69	72	78	33	107	36	33	73	Generation Re-dispatch
	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2-2	Bus	73	75	108	30	102	36	30	76	Monitor future forecast
	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2-3	Non-Bus-Tie Breaker	69	72	78	33	107	36	33	73	Generation Re-dispatch
	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2-3	Non-Bus-Tie Breaker	69	72	78	33	107	36	33	73	Generation Re-dispatch

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2-3	Non-Bus-Tie Breaker	69	72	78	33	107	36	33	73	Generation Re-dispatch
	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	73	75	108	30	102	36	30	76	Monitor future forecast, for off-peak generation re-dispatch
	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	77	75	108	30	114	36	30	76	Monitor future forecast, for off-peak generation re-dispatch
	P1-1-20008_Holm Unit #1 out & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G1/N1	<100	<100	<100	<100	100	<100	<100	<100	Generation Re-dispatch
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	71	71	85	33	115	33	33	72	Install Redundant Battery
	DAIRYLAND-MENDOTA 115KV [1360] & PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	<100	<100	<100	<100	211	<100	<100	<100	Generation Re-dispatch
PANOCHE2-EXCELSIORSS 115kV Line	PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & GATES D 230/70KV TB 5	P6	N-1-1	186	186	<100	113	<100	<100	124	188	Increase Bank/Line capacity
Panoche-Gates 230kV Line No 1	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	64	37	16	NConv	NConv	86	82	41	Install Redundant Battery
	P5-5c:A14:1:_Gates 500kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	27	33	16	35	125	21	53	34	Install Redundant Battery
	CHSR09SWSTA-MUSTANGSS 230KV [0] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	106	<100	<100	<100	Generation Re-dispatch
	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	17	9	5	70	107	52	15	9	Generation Re-dispatch
Panoche-Gates 230kV Line No 2	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	68	39	17	NConv	NConv	91	87	44	Install Redundant Battery
	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	18	10	6	74	103	62	16	10	Install Redundant Battery
	P5-5c:A14:1:_Gates 500kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	29	35	17	37	133	22	56	36	Install Redundant Battery
	CHSR09SWSTA-MUSTANGSS 230KV [0] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	112	<100	<100	<100	Generation Re-dispatch
	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	18	10	6	74	114	55	16	10	Generation Re-dispatch
Panoche-Mendota 115 kV Line	P5-5c:A13:2:_Wilson 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	NConv	NConv	NConv	60	44	82	NConv	NConv	Install Redundant Battery
Panoche-Oro Loma 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	22	41	60	NConv	NConv	13	8	40	Install Redundant Battery
Panoche-Schindler #1 115 kV Line	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	105	104	35	63	47	9	71	105	Under review
	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	106	105	33	63	47	11	72	106	Under review
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	109	108	29	66	50	10	79	109	Under review
	P1-1:A14:26:_EXCLSRSLRSPV 0.38KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	106	106	<100	<100	<100	<100	<100	108	Increase Bank/Line capacity
	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	105	102	<100	<100	<100	<100	<100	104	Increase Bank/Line capacity
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	109	107	29	60	53	3	79	109	Project in progress
	PANOCHE-EXCELSIOR SW STA #2 115KV [3260] & GATES D 230/70KV TB 5	P6	N-1-1	199	198	<100	119	<100	<100	133	200	Increase Bank/Line capacity
Panoche-Schindler #2 115 kV Line	P2-3:A14:58:_EXCELSIORSS 115KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	14	56	55	50	59	108	2	54	Sensitivity Only
	PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & GATES D 230/70KV TB 5	P6	N-1-1	198	146	<100	<100	<100	<100	132	148	Increase Bank/Line capacity
Reedley 115/70 kV Transformer #4	P1-3:A14:40:_REEDLEY 115/70KV TB 2	P1	N-1	94	100	82	58	58	50	58	101	Project:Reedley 70 kV Area Reinforcement Project
	P2-3:A14:139:_REEDLEY 115KV - RING R5 & R6	P2-3	Non-Bus-Tie Breaker	94	100	83	58	59	50	58	101	Sensitivity Only

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
	P2-3:A14:141:_ REEDLEY 115KV - RING R1 & R6	P2-3	Non-Bus-Tie Breaker	94	100	83	58	58	50	58	101	Sensitivity Only
Reedley-Dinuba 70 kV Line	P1-2:A14:114:_ REEDLEY-OROSI 70KV [9060]	P1	N-1	73	115	80	47	73	38	47	115	Project:Reedley 70 kV Area Reinforcement Project
	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCGRN 13.80KV & KINGSBUR 13.80KV & SANGERCGRN 13.80KV GEN UNITS & P1-2:A14:114:_ REEDLEY-OROSI 70KV [9060]	P3	G1/N1	<100	115	<100	<100	<100	<100	<100	116	Project:Reedley 70 kV Area Reinforcement Project
	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-2:A14:114:_ REEDLEY-OROSI 70KV [9060]	P3	G1/N1	<100	114	<100	<100	<100	<100	<100	115	Project:Reedley 70 kV Area Reinforcement Project
Reedley-Orosi 70 kV Line	P1-2:A14:113:_ REEDLEY-DINUBA #1 70KV [9050]	P1	N-1	46	114	102	27	70	32	27	114	Project:Reedley 70 kV Area Reinforcement Project
	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A14:113:_ REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<100	114	102	<100	<100	<100	<100	115	Project:Reedley 70 kV Area Reinforcement Project
	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-2:A14:113:_ REEDLEY-DINUBA #1 70KV [9050]	P3	G1/N1	<100	114	101	<100	<100	<100	<100	114	Project:Reedley 70 kV Area Reinforcement Project
Sanger-Reedley 115 kV Line	MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE & KINGS RIVER-SANGER-REEDLEY 115KV [2030]	P6	N-1-1	101	108	103	<100	<100	<100	<100	109	Operating Solution
Schindler 115/70 kV Transformer #1	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	129	130	11	81	16	47	94	132	Under review
	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	130	133	16	81	25	34	96	135	Under review
	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	79	25	26	10	68	102	49	24	Sensitivity Only
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	137	138	24	88	29	37	109	140	Under review
	P1-1:A14:35:_WESTLNDSD 0.48KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	130	131	<100	<100	<100	94	<100	134	Increase Bank/Line capacity
	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	128	127	<100	<100	<100	<100	<100	129	Increase Bank/Line capacity
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	135	136	24	77	33	53	110	138	Project in progress
	PANOCHE 230/115KV TB 2 & PANOCHE 230/115KV TB 1	P6	N-1-1	<100	<100	<100	<100	<100	115	<100	<100	Sensitivity Only
Schindler-Coalinga #2 70 kV Line	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	110	116	1	71	21	84	84	118	Under review
	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	111	118	6	71	3	70	87	120	Under review
	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	72	39	28	19	59	119	30	37	Sensitivity Only
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	119	123	30	78	33	57	101	125	Under review
	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	122	129	<100	<100	<100	91	<100	131	Increase Bank/Line capacity
	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	110	112	<100	<100	<100	<100	<100	114	Increase Bank/Line capacity
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	117	121	30	66	44	88	103	123	Project in progress
	P5-5c:A14:14:_Gates 230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	120	119	73	64	41	99	129	120	Install Redundant Battery
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	27	18	22	NConv	NConv	67	40	20	Install Redundant Battery
	PANOCHE 230/115KV TB 1 & PANOCHE 230/115KV TB 2	P6	N-1-1	<100	<100	<100	<100	<100	136	<100	<100	Sensitivity Only
Schindler-Coalinga #2 70 kV Line (Schindler-Paige section)	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	108	111	1	72	16	35	85	113	Under review
	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	109	114	5	72	31	27	88	116	Under review
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	117	119	16	79	39	16	102	121	Under review
	P1-1:A14:24:_PAIGESLRSPV 0.55KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	112	114	<100	<100	<100	<100	<100	116	Increase Bank/Line capacity
	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	107	107	<100	<100	<100	<100	<100	109	Increase Bank/Line capacity
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	115	118	17	67	53	46	103	120	Project in progress

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	53	45	15	NConv	NConv	52	64	46	Install Redundant Battery
	P5-5c:A14:14:_Gates 230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	118	116	66	65	48	58	130	117	Install Redundant Battery
Schindler-Huron-Gates 70 kV Line	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	138	141	20	83	37	49	93	143	Under review
	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2-2	Bus	139	144	24	83	48	36	96	146	Under review
	P2-3:A14:135:_SCHINDLR 115KV - RING R1 & R3	P2-3	Non-Bus-Tie Breaker	147	149	152	92	41	41	93	149	Increase Line/Bank capacity
	P2-3:A14:58:_EXCELSIORSS 115KV - MIDDLE BREAKER BAY 2	P2-3	Non-Bus-Tie Breaker	147	149	152	92	41	41	93	149	Increase Line/Bank capacity
	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	180	117	116	55	10	88	117	116	Increase Line/Bank capacity
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	79	80	113	48	81	21	67	82	Monitor future forecast
	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	92	34	34	10	24	110	62	34	Sensitivity Only
	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2-4	Bus-Tie-Breaker	147	148	31	88	55	39	108	151	Under review
	P1-1:A14:23:_WHTNYPTSPV 0.55KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	142	144	<100	<100	<100	94	<100	146	Increase Bank/Line capacity
	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G1/N1	138	139	<100	<100	<100	<100	<100	141	Increase Bank/Line capacity
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	77	79	112	39	95	30	68	81	Project in progress
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	26	37	75	NConv	NConv	45	9	34	Install Redundant Battery
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	180	182	181	114	11	29	115	181	Install Redundant Battery
	P5-5c:A14:27:_Excelsior SW STA 115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	147	149	152	92	42	41	93	149	Install Redundant Battery
	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (Failure of Non-Redundent Relay)	P5	Non-Redundent Relay	145	147	31	79	67	54	109	149	Project in progress
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	48	39	4	NConv	NConv	71	53	42	Install Redundant Battery
	PANOCHE-EXCELSIOR SW STA #2 115KV [3260] & PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	172	172	173	109	<100	<100	110	173	Increase Line/Bank capacity
	PANOCHE 230/115KV TB 2 & PANOCHE 230/115KV TB 1	P6	N-1-1	160	<100	114	<100	<100	101	<100	<100	Increase Line/Bank capacity
	P7-1:A13:14:_EXCELSIORSS-PANOCHE1 115KV [3250] & EXCELSIORSS-PANOCHE2 115KV [3231]	P7	DCTL	148	150	148	99	11	31	95	149	Increase Line/Bank capacity
	P7-1:A14:10:_PANOCHE-SCHINDLER #1 115KV [3250] & EXCELSIORSS-PANOCHE2 115KV [3231]	P7	DCTL	180	182	181	115	11	29	116	181	Increase Line/Bank capacity
	P1-2:A13:29:_MELONES-WILSON 230KV [5080]	P1	N-1	77	66	56	21	38	48	112	69	Sensitivity Only
	P2-2:A14:2:_HELMS PP2 230KV SECTION 1E	P2-2	Bus	100	92	80	12	22	16	94	94	Adjust wilson reactor
	P2-3:A13:67:_WILSON 230KV - RING R4 & R3	P2-3	Non-Bus-Tie Breaker	76	NA	NA	21	NA	51	103	NA	sensitivity only
	P2-3:A13:69:_STOREY 2 230KV - RING R3 & R2	P2-3	Non-Bus-Tie Breaker	75	NA	NA	20	NA	49	111	NA	sensitivity only
	P2-4:A14:34:_HELMS PP1 SECTION 1D & HELMS PP2 SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	102	94	82	12	22	15	94	96	Adjust wilson reactor
	P2-4:A14:35:_HELMS PP2 SECTION 1E & HELMS PP3 SECTION 1F 230KV	P2-4	Bus-Tie-Breaker	126	118	103	12	38	2	94	120	Adjust wilson reactor
	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-2:A14:17:_MUSTANG SW STA-GREGG 230KV [4700]	P3	G1/N1	107	112	<100	<100	<100	<100	<100	111	Adjust wilson reactor
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	186	86	54	NConv	NConv	38	192	96	Install Redundant Battery

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
Warnerville - Wilson 230 kV Line	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	80	83	67	33	18	83	113	86	Install Redundant Battery
	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	114	114	109	29	17	5	60	113	Install Redundant Battery
	HELMS-GREGG #2 230KV [4880] & HELMS-GREGG #1 230KV [4870]	P6	N-1-1	124	115	99	<100	<100	<100	<100	117	Under review
	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	104	<100	103	<100	Generation Re-dispatch
	P7-1:A13:4:_MELONES-WILSON 230KV [5080] & COTTLE-MELONES 230KV [4530]	P7	DCTL	70	59	50	16	33	53	106	62	Sensitivity Only
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	81	81	81	44	107	41	99	82	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	86	86	89	48	110	41	103	88	Generation Re-dispatch
	P7-1:A14:8:_HELMS-GREGG #1 230KV [4870] & HELMS-GREGG #2 230KV [4880]	P7	DCTL	126	118	103	12	38	2	94	120	under review
Wilson 230kV reactor	P1-2:A13:29:_MELONES-WILSON 230KV [5080]	P1	N-1	76	66	56	21	38	NA	111	68	Sensitivity Only
	P2-3:A13:67:_WILSON 230KV - RING R4 & R3	P2-3	Non-Bus-Tie Breaker	75	NA	NA	20	NA	NA	102	NA	sensitivity only
	P2-3:A13:69:_STOREY 2 230KV - RING R3 & R2	P2-3	Non-Bus-Tie Breaker	75	NA	NA	20	NA	NA	110	NA	sensitivity only
	P2-4:A14:34:_HELMS PP1 SECTION 1D & HELMS PP2 SECTION 1E 230KV	P2-4	Bus-Tie-Breaker	101	93	81	12	22	NA	94	95	Under review
	P2-4:A14:35:_HELMS PP2 SECTION 1E & HELMS PP3 SECTION 1F 230KV	P2-4	Bus-Tie-Breaker	124	116	102	12	38	NA	94	118	Under review
	P1-1:A14:48:_HELMS 1 18.00KV GEN UNIT 1 & P1-2:A14:17:_MUSTANG SW STA-GREGG 230KV [4700]	P3	G1/N1	106	111	<100	<100	<100	<100	<100	110	Under review
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	185	85	54	NConv	NConv	NA	190	95	Install Redundant Battery
	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	80	83	67	33	18	NA	112	85	Install Redundant Battery
	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	113	113	108	29	17	NA	60	112	Install Redundant Battery
	HELMS-GREGG #2 230KV [4880] & HELMS-GREGG #1 230KV [4870]	P6	N-1-1	121	113	97	<100	<100	<100	<100	115	Under review
	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	103	<100	100	<100	Generation Re-dispatch
	P7-1:A13:4:_MELONES-WILSON 230KV [5080] & COTTLE-MELONES 230KV [4530]	P7	DCTL	69	59	49	16	33	NA	104	61	Sensitivity Only
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	80	80	81	44	106	NA	98	81	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	85	85	88	48	109	NA	102	87	Generation Re-dispatch
	P7-1:A14:8:_HELMS-GREGG #1 230KV [4870] & HELMS-GREGG #2 230KV [4880]	P7	DCTL	124	116	102	12	38	NA	94	118	under review
Wilson-Atwater #2 115 kV Line	EL CAPITAN-WILSON 115KV [1510] & ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	115	125	137	<100	<100	<100	<100	126	Operating Solution
Wilson-Le Grand 115 kV Line	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	46	21	11	NConv	NConv	17	25	24	Install Redundant Battery
Wilson-Merced #1 115 kV Line	P2-2:A13:17:_WILSON B 115KV SECTION 2D	P2-2	Bus	110	NA	NA	64	NA	49	66	NA	Project:Wilson 115kV Reinforcement
	P2-3:A13:30:_WILSON B - 2D 115KV & WILSON-ORO LOMA LINE	P2-3	Non-Bus-Tie Breaker	110	NA	NA	64	NA	49	66	NA	Project:Wilson 115kV Reinforcement
	WILSON-ATWATER #2 115KV [4160] & EL CAPITAN-WILSON 115KV [1510]	P6	N-1-1	114	125	137	<100	<100	<100	<100	126	Operating Solution
	P7-1:A13:10:_ATWATER-EL CAPITAN 115KV [1020] & WILSON-ATWATER #2 115KV [4160]	P7	DCTL	87	95	104	53	35	41	54	96	monitor future forecast

Study Area: **PG&E Greater Fresno**
Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)					Loading % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2027 SP High CEC Forecast	
	P7-1:A13:12:_EL CAPITAN-WILSON 115KV [1510] & WILSON-ATWATER #2 115KV [4160]	P7	DCTL	87	95	104	73	35	56	74	96	monitor future forecast
Wilson-Merced #2 115 kV Line	P2-2:A13:16:_WILSON A 115KV SECTION 1D	P2-2	Bus	108	NA	NA	55	NA	43	61	NA	Project:Wilson 115kV Reinforcement
	P2-3:A13:29:_WILSON A - 1D 115KV & WILSONSTCOM-WILSON A #1 LINE	P2-3	Non-Bus-Tie Breaker	108	NA	NA	55	NA	43	61	NA	Project:Wilson 115kV Reinforcement
	WILSON-MERCED #1 115KV [4180] & EL CAPITAN-WILSON 115KV [1510]	P6	N-1-1	113	<100	<100	<100	<100	<100	<100	<100	Operating Solution
	WILSON-MERCED #1 115KV [4180] & EL CAPITAN-WILSON 115KV [1510]	P6	N-1-1	<100	123	135	<100	<100	<100	<100	125	Operating Solution
Wilson-Oro Loma 115 kV Line	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-PANOCHE2)	P2-1	Line Section w/o Fault	134	98	148	77	23	50	77	100	Review existing Wilson-Oro Loma 115kV line reconductoring
	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2-1	Line Section w/o Fault	117	87	116	66	20	38	66	88	Review existing Wilson-Oro Loma 115kV line reconductoring
	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2-2	Bus	134	98	148	77	23	50	77	100	Review existing Wilson-Oro Loma 115kV line reconductoring
	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2-3	Non-Bus-Tie Breaker	134	98	149	77	23	50	77	100	Review existing Wilson-Oro Loma 115kV line reconductoring
	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2-4	Bus-Tie-Breaker	140	99	151	77	25	50	77	101	Review existing Wilson-Oro Loma 115kV line reconductoring
	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	87	24	8	NConv	NConv	13	56	27	Install Redundant Battery
	PANOCHE 230/115KV TB 1 & PANOCHE 230/115KV TB 2	P6	N-1-1	118	<100	<100	<100	111	<100	<100	<100	Project:Wilson-Oro Loma 115 kV Line Reconductoring
	PANOCHE 230/115KV TB 2 & PANOCHE 230/115KV TB 1	P6	N-1-1	118	<100	<100	<100	<100	<100	<100	<100	Project:Wilson-Oro Loma 115 kV Line Reconductoring
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	25	6	18	39	107	24	8	6	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	20	8	21	43	109	23	7	7	Generation Re-dispatch
Wilson-Storey 230kV Line No 1	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	78	20	NA	NConv	NConv	38	114	25	Install Redundant Battery
	P5-5c:A14:14:_Gates 230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	8	7	NA	40	60	100	58	8	Install Redundant Battery
	TRANQUILLITY SW STA-KEARNEY 230KV [5380] & MUSTANG SW STA-GREGG 230KV [4700]	P6	N-1-1	<100	<100	<100	<100	116	<100	<100	<100	Generation Re-dispatch
	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	28	30	NA	42	117	78	69	30	Generation Re-dispatch
	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	33	36	NA	46	121	44	73	36	Generation Re-dispatch
Wilson-Storey 230kV Line No 2	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(Failure OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	61	16	NA	NConv	NConv	30	89	20	Install Redundant Battery



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
CHWCHLLA 115 kV	Basecase	P0	BaseCase	High	1.01	1.01	0.99	1.02	1.08	1.02	1.03	1.01	Generation Re-dispatch
CERTTEED 115 kV	Basecase	P0	BaseCase	High	1.02	1.02	0.99	1.03	1.08	1.02	1.03	1.02	Generation Re-dispatch
CHWCGN 115 kV	Basecase	P0	BaseCase	High	1.02	1.02	1.00	1.03	1.08	1.02	1.03	1.02	Generation Re-dispatch
CHWCHLA2 115 kV	Basecase	P0	BaseCase	High	1.02	1.02	1.00	1.03	1.08	1.02	1.03	1.02	Generation Re-dispatch
EXCQUEUR 115 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.03	1.05	1.09	1.07	1.05	1.04	Generation Re-dispatch
LE GRAND 115 kV	Basecase	P0	BaseCase	High	1.02	1.02	1.00	1.03	1.07	1.03	1.03	1.02	Generation Re-dispatch
SHARON 115 kV	Basecase	P0	BaseCase	High	1.01	1.01	0.99	1.03	1.07	1.02	1.03	1.01	Generation Re-dispatch
CORSGOLD 115 kV	Basecase	P0	BaseCase	High	0.99	0.99	0.96	1.03	1.05	1.01	1.03	0.99	Generation Re-dispatch
ELPECO T 70 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.03	1.04	1.05	1.03	1.04	1.03	Generation Re-dispatch
CHENY 115 kV	Basecase	P0	BaseCase	High	1.06	1.06	1.06	1.05	1.05	1.05	1.05	1.06	Adjust Panoche 230/115kV transformer tap
NEWHALL 115 kV	Basecase	P0	BaseCase	High	1.01	1.02	1.00	1.02	1.06	1.02	1.02	1.02	Generation Re-dispatch
GILLRAN 115 kV	Basecase	P0	BaseCase	High	1.01	1.01	1.00	1.01	1.06	1.02	1.01	1.01	Generation Re-dispatch
DAIRYLND 115 kV	Basecase	P0	BaseCase	High	1.01	1.01	0.99	1.02	1.08	1.02	1.02	1.01	Generation Re-dispatch
PANOCH1 115 kV	Basecase	P0	BaseCase	High	1.06	1.06	1.06	1.05	1.05	1.05	1.05	1.06	Adjust Panoche 230/115kV transformer tap
PANOCH2 115 kV	Basecase	P0	BaseCase	High	1.06	1.06	1.06	1.05	1.05	1.05	1.05	1.06	Adjust Panoche 230/115kV transformer tap
LUIS_#3 115 kV	Basecase	P0	BaseCase	High	1.05	1.05	1.05	1.04	1.04	1.04	1.04	1.05	Adjust Panoche 230/115kV transformer tap
LUIS_#5 115 kV	Basecase	P0	BaseCase	High	1.05	1.05	1.05	1.04	1.04	1.04	1.04	1.05	Adjust Panoche 230/115kV transformer tap
OXFORD 115 kV	Basecase	P0	BaseCase	High	1.05	1.05	1.05	1.04	1.04	1.05	1.04	1.05	Adjust Panoche 230/115kV transformer tap
CALPEAKPNCHE 115 kV	Basecase	P0	BaseCase	High	1.06	1.06	1.06	1.05	1.05	1.05	1.05	1.06	Adjust Panoche 230/115kV transformer tap
MADERAPR 115 kV	Basecase	P0	BaseCase	High	1.01	1.02	1.00	1.02	1.06	1.02	1.02	1.02	Generation Re-dispatch
WSTLD1RA 115 kV	Basecase	P0	BaseCase	High	1.05	1.05	1.05	1.04	1.04	1.05	1.04	1.05	Adjust Panoche 230/115kV transformer tap
STARWDPNCH 115 kV	Basecase	P0	BaseCase	High	1.06	1.06	1.06	1.05	1.05	1.05	1.05	1.06	Adjust Panoche 230/115kV transformer tap
PMTFMPP 115 kV	Basecase	P0	BaseCase	High	1.01	1.02	1.00	1.01	1.06	1.02	1.02	1.01	Generation Re-dispatch
CHWCHLASLR 115 kV	Basecase	P0	BaseCase	High	1.01	1.01	0.99	1.03	1.08	1.02	1.03	1.01	Generation Re-dispatch
ORO LOMA 70 kV	Basecase	P0	BaseCase	High	1.06	1.06	1.04	1.08	1.06	1.07	1.08	1.06	Project:Oro Loma 70kV reinforcement
SNTA RTA 70 kV	Basecase	P0	BaseCase	High	1.04	1.03	1.02	1.07	1.06	1.05	1.07	1.03	Oro Loma 70kV reinforcement
DOS PALS 70 kV	Basecase	P0	BaseCase	High	1.05	1.05	1.03	1.07	1.06	1.06	1.07	1.04	Oro Loma 70kV reinforcement
MADERA 70 kV	Basecase	P0	BaseCase	High	1.03	1.04	1.03	1.05	1.05	1.04	1.04	1.04	Generation Re-dispatch
NRTHFORK 70 kV	Basecase	P0	BaseCase	High	0.90	0.95	0.93	1.04	1.06	0.99	1.03	1.00	Generation Re-dispatch
SJNO2 70 kV	Basecase	P0	BaseCase	High	0.90	0.96	0.94	1.04	1.06	0.99	1.03	1.00	Generation Re-dispatch
SJNO3 70 kV	Basecase	P0	BaseCase	High	0.89	0.95	0.93	1.04	1.06	0.99	1.03	0.99	Generation Re-dispatch
EL PECO 70 kV	Basecase	P0	BaseCase	High	1.02	1.03	1.02	1.04	1.06	1.03	1.04	1.03	Generation Re-dispatch
FIREBAGH 70 kV	Basecase	P0	BaseCase	High	1.01	1.01	0.98	1.06	0.98	1.04	1.06	1.01	Oro Loma 70kV reinforcement
ADAMS_E 70 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.02	1.04	1.02	1.05	1.04	1.03	Sensitivity Only
AIRWAYS 115 kV	Basecase	P0	BaseCase	High	1.02	1.01	0.98	1.05	1.06	1.03	1.05	1.01	Generation Re-dispatch
CLOVIS-2 115 kV	Basecase	P0	BaseCase	High	1.01	1.01	0.98	1.05	1.03	1.03	1.05	1.01	Generation Re-dispatch
CLOVISJ2 115 kV	Basecase	P0	BaseCase	High	1.02	1.01	0.98	1.05	1.03	1.03	1.05	1.01	Generation Re-dispatch
SANGER 115 kV	Basecase	P0	BaseCase	High	1.03	1.02	1.00	1.05	1.05	1.03	1.05	1.02	Generation Re-dispatch
LASPALMS 115 kV	Basecase	P0	BaseCase	High	1.01	1.01	0.98	1.05	1.05	1.03	1.05	1.01	Generation Re-dispatch
MC CALL 115 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.02	1.06	1.05	1.05	1.06	1.04	Generation Re-dispatch
WAHTOKE 115 kV	Basecase	P0	BaseCase	High	1.02	1.02	0.99	1.05	1.03	1.03	1.05	1.02	Under review
SESWTF 115 kV	Basecase	P0	BaseCase	High	1.02	1.01	0.98	1.05	1.06	1.03	1.05	1.01	Generation Re-dispatch
KNGSCOGN 115 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.01	1.05	1.05	1.04	1.05	1.03	Generation Re-dispatch
SUNMAID 115 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.01	1.05	1.05	1.04	1.05	1.03	Generation Re-dispatch
RAINBW 115 kV	Basecase	P0	BaseCase	High	1.02	1.02	0.99	1.05	1.05	1.03	1.05	1.02	Generation Re-dispatch



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
DANISHCM 115 kV	Basecase	P0	BaseCase	High	1.02	1.02	0.98	1.05	1.05	1.03	1.05	1.02	Generation Re-dispatch
PIEDRA 1 115 kV	Basecase	P0	BaseCase	High	1.02	1.02	0.99	1.05	1.04	1.03	1.05	1.02	Generation Re-dispatch
PIEDRA 2 115 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.00	1.05	1.05	1.04	1.05	1.03	Generation Re-dispatch
BALCH 115 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.02	1.06	1.05	1.05	1.05	1.04	Generation Re-dispatch
KNGSVRV1 115 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.01	1.05	1.04	1.04	1.05	1.03	Generation Re-dispatch
CAL AVE 115 kV	Basecase	P0	BaseCase	High	1.02	1.01	0.98	1.05	1.05	1.03	1.05	1.01	Monitor future forecast
BARTON 115 kV	Basecase	P0	BaseCase	High	1.02	1.02	0.98	1.05	1.07	1.03	1.05	1.02	Generation Re-dispatch
MANCHSTR 115 kV	Basecase	P0	BaseCase	High	1.01	1.01	0.97	1.05	1.05	1.02	1.05	1.00	Generation Re-dispatch
HERNDON 115 kV	Basecase	P0	BaseCase	High	1.02	1.02	0.99	1.05	1.05	1.03	1.05	1.02	Generation Re-dispatch
PNEDLE 115 kV	Basecase	P0	BaseCase	High	1.00	0.99	0.97	1.04	1.07	1.01	1.04	0.99	Generation Re-dispatch
BULLARD 115 kV	Basecase	P0	BaseCase	High	0.99	0.99	0.97	1.04	1.07	1.01	1.04	0.99	Generation Re-dispatch
KINGSBURGD 115 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.01	1.05	1.06	1.03	1.05	1.03	Generation Re-dispatch
KINGSBURGE 115 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.01	1.05	1.06	1.03	1.05	1.03	Generation Re-dispatch
GRDNGLS1WB 115 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.01	1.05	1.05	1.04	1.05	1.03	Generation Re-dispatch
GRDNGLS2EB 115 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.01	1.05	1.05	1.04	1.05	1.03	Generation Re-dispatch
WISHON 70 kV	Basecase	P0	BaseCase	High	0.91	0.97	0.95	1.04	1.07	1.00	1.04	1.01	Generation Re-dispatch
KETTLEMNS 70 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.04	1.05	1.04	1.04	1.05	1.03	New Gates 230/70kV transformer project
BIOLA 70 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.01	1.05	1.07	1.04	1.04	1.03	Generation Re-dispatch
SAN JOQN 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.09	1.04	1.05	1.05	Generation Re-dispatch
SNJQTP 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.08	1.04	1.05	1.05	Generation Re-dispatch
HELM 70 kV	Basecase	P0	BaseCase	High	1.05	1.05	1.05	1.05	1.07	1.04	1.05	1.05	Generation Re-dispatch
AGRCJCT 70 kV	Basecase	P0	BaseCase	High	1.03	1.03	1.02	1.04	1.13	1.03	1.04	1.04	Generation Re-dispatch
AGRICO 70 kV	Basecase	P0	BaseCase	High	1.03	1.04	1.03	1.04	1.13	1.03	1.04	1.04	Generation Re-dispatch
KEARNEY 70 kV	Basecase	P0	BaseCase	High	1.05	1.05	1.04	1.04	1.03	1.04	1.03	1.05	Under review
KERMAN1 70 kV	Basecase	P0	BaseCase	High	1.02	1.02	1.01	1.03	1.15	1.02	1.03	1.03	Generation Re-dispatch
KERMAN2 70 kV	Basecase	P0	BaseCase	High	1.02	1.02	1.01	1.03	1.15	1.02	1.03	1.03	Generation Re-dispatch
SANGERCGN 115 kV	Basecase	P0	BaseCase	High	1.02	1.02	0.99	1.05	1.04	1.03	1.05	1.02	Generation Re-dispatch
AUBERRY 70 kV	Basecase	P0	BaseCase	High	0.91	0.96	0.94	1.04	1.07	1.00	1.03	1.01	Generation Re-dispatch
CAMDEN 70 kV	Basecase	P0	BaseCase	High	0.95	0.94	0.92	1.01	1.06	0.98	1.01	0.94	Generation Re-dispatch
CARUTHRS 70 kV	Basecase	P0	BaseCase	High	1.04	1.05	1.03	1.05	1.08	1.05	1.04	1.04	Generation Re-dispatch
CORCORAN 70 kV	Basecase	P0	BaseCase	High	1.02	1.04	1.02	1.05	1.05	1.06	1.05	1.04	Sensitivity Only
JGBSWLL 70 kV	Basecase	P0	BaseCase	High	1.02	1.03	1.01	1.04	1.04	1.05	1.04	1.03	Sensitivity Only
GWF_HENR 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.04	1.04	1.05	1.04	Generation Re-dispatch
BOSWELL 70 kV	Basecase	P0	BaseCase	High	1.02	1.03	1.01	1.05	1.04	1.05	1.04	1.03	Sensitivity Only
HENRIETTAE 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.04	1.04	1.05	1.04	Generation Re-dispatch
KENT SS 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.04	1.04	1.05	1.04	Generation Re-dispatch
CRESCENTSS 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.07	1.05	1.05	1.04	Generation Re-dispatch
STROUD 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.03	1.05	1.08	1.05	1.04	1.04	Generation Re-dispatch
KENT_S 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.04	1.04	1.05	1.04	Generation Re-dispatch
SCULPIN 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.07	1.05	1.05	1.04	Generation Re-dispatch
Q1136 70 kV	Basecase	P0	BaseCase	High	1.04	1.04	1.04	1.05	1.04	1.04	1.05	1.04	Generation Re-dispatch
OAKHURST 115 kV	Basecase	P0	BaseCase	Low	0.98	0.98	0.94	1.03	1.04	1.00	1.02	0.97	Monitor future forecast
CANAL 70 kV	Basecase	P0	BaseCase	Low	0.99	0.98	0.97	1.03	0.94	1.00	1.03	0.98	Generation Re-dispatch
ORTIGA 70 kV	Basecase	P0	BaseCase	Low	0.99	0.99	0.98	1.03	0.95	1.00	1.03	0.99	Generation Re-dispatch
MARIPOS2 70 kV	Basecase	P0	BaseCase	Low	0.94	0.94	0.92	0.97	1.02	0.98	0.97	0.94	Under review



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
BER VLLY 70 kV	Basecase	P0	BaseCase	Low	0.96	0.96	0.95	0.98	1.02	0.99	0.98	0.96	monitor future forecast
SAXONCRK 70 kV	Basecase	P0	BaseCase	Low	0.96	0.96	0.94	0.97	1.02	0.98	0.97	0.96	monitor future forecast
INDN FLT 70 kV	Basecase	P0	BaseCase	Low	0.95	0.95	0.94	0.97	1.02	0.98	0.97	0.95	Under review
YOSEMITE 70 kV	Basecase	P0	BaseCase	Low	0.95	0.94	0.93	0.97	1.02	0.97	0.97	0.94	Under review
NRTHFORK 70 kV	Basecase	P0	BaseCase	Low	0.90	0.95	0.93	1.04	1.06	0.99	1.03	1.00	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO2 70 kV	Basecase	P0	BaseCase	Low	0.90	0.96	0.94	1.04	1.06	0.99	1.03	1.00	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	Basecase	P0	BaseCase	Low	0.89	0.95	0.93	1.04	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
TOMATAK 70 kV	Basecase	P0	BaseCase	Low	0.88	0.89	0.88	0.89	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	Basecase	P0	BaseCase	Low	0.89	0.90	0.90	0.90	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	Basecase	P0	BaseCase	Low	0.89	0.90	0.90	0.90	0.97	0.90	0.90	0.90	Under review
CALRENEW 70 kV	Basecase	P0	BaseCase	Low	0.89	0.90	0.90	0.90	0.97	0.90	0.90	0.90	Under review
WISHON 70 kV	Basecase	P0	BaseCase	Low	0.91	0.97	0.95	1.04	1.07	1.00	1.04	1.01	Project: Coppermine reconductoring approved in 2021-22 TPP
GUERNSEY 70 kV	Basecase	P0	BaseCase	Low	0.95	0.95	0.99	1.02	1.00	0.99	1.01	0.95	Sensitivity Only
COPPRMNE 70 kV	Basecase	P0	BaseCase	Low	0.95	1.00	0.99	1.04	1.05	1.01	1.04	1.04	Project: Coppermine reconductoring approved in 2021-22 TPP
AUBERRY 70 kV	Basecase	P0	BaseCase	Low	0.91	0.96	0.94	1.04	1.07	1.00	1.03	1.01	Project: Coppermine reconductoring approved in 2021-22 TPP
CAMDEN 70 kV	Basecase	P0	BaseCase	Low	0.95	0.94	0.92	1.01	1.06	0.98	1.01	0.94	Under review
ARMSTRNG 70 kV	Basecase	P0	BaseCase	Low	0.95	0.95	0.98	1.02	1.00	0.99	1.01	0.95	Sensitivity Only
RESERVE 70 kV	Basecase	P0	BaseCase	Low	0.95	0.95	0.98	1.02	1.00	0.99	1.01	0.95	Sensitivity Only
AMSTG SW 70 kV	Basecase	P0	BaseCase	Low	0.95	0.95	0.98	1.02	1.00	0.99	1.01	0.95	Sensitivity Only
FRIANTDAM 70 kV	Basecase	P0	BaseCase	Low	0.95	1.00	0.99	1.03	1.05	1.01	1.03	1.04	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P1-1:A14:49:_HELMS 2 18.00KV GEN UNIT 1	P1	N-1	Low	0.90	0.96	0.93	1.04	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P1-1:A14:51:_HELMS 3 18.00KV GEN UNIT 1	P1	N-1	Low	0.90	0.96	0.93	1.04	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
MENDOTA 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCGRN 13.80KV & KINGSBUR 13.80KV & SANGERCGRN 13.80KV GEN UNITS	P1	N-1	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCGRN 13.80KV & KINGSBUR 13.80KV & SANGERCGRN 13.80KV GEN UNITS	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCGRN 13.80KV & KINGSBUR 13.80KV & SANGERCGRN 13.80KV GEN UNITS	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
SJNO3 70 kV	P1-1-20002_Ext - Helms Unit #3 Out	P1	N-1	Low	0.90	0.96	0.93	1.04	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
MENDOTA 70 kV	P1-2:A13:16:_PADRE FLAT SW STA-PANOCH 230KV [5030]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-2:A13:16:_PADRE FLAT SW STA-PANOCH 230KV [5030]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P1-2:A13:16:_PADRE FLAT SW STA-PANOCH 230KV [5030]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CHWCHLLA 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	Low	0.93	0.92	0.87	0.95	1.11	0.99	0.96	0.91	Monitor future forecast
SHARON 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	Low	0.94	0.93	0.88	0.97	1.10	0.99	0.97	0.93	Monitor future forecast
TOMATAK 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170]	P1	N-1	Low	0.87	0.89	0.88	0.89	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
MENDOTA 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170]	P1	N-1	Low	0.89	0.90	0.90	0.90	0.95	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170]	P1	N-1	Low	0.89	0.90	0.90	0.90	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170]	P1	N-1	Low	0.89	0.90	0.90	0.90	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P1-2:A13:46:_LE GRAND-DAIRYLAND 115KV [2100] MOAS OPENED ON LE GRAND_CHWCHLASLRJT	P1	N-1	Low	0.86	0.89	0.88	0.88	0.97	0.89	0.88	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P1-2:A13:46:_LE GRAND-DAIRYLAND 115KV [2100] MOAS OPENED ON LE GRAND_CHWCHLASLRJT	P1	N-1	Low	0.88	0.90	0.90	0.88	0.95	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-2:A13:46:_LE GRAND-DAIRYLAND 115KV [2100] MOAS OPENED ON LE GRAND_CHWCHLASLRJT	P1	N-1	Low	0.88	0.90	0.90	0.88	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P1-2:A13:46:_LE GRAND-DAIRYLAND 115KV [2100] MOAS OPENED ON LE GRAND_CHWCHLASLRJT	P1	N-1	Low	0.88	0.90	0.90	0.88	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P1-2:A13:56:_DAIRYLAND-MENDOTA 115KV [1360]	P1	N-1	Low	0.89	0.89	0.88	0.89	0.97	0.89	0.90	0.89	Review Existing Oro Loma 70kV reinforcement project
NEWHALL 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.86	1.00	0.99	0.95	1.05	0.99	0.95	1.00	Project:Wilson 115kV Reinforcement
MENDOTA 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.87	1.01	0.99	0.95	1.05	0.99	0.96	1.01	Project: Panoche-Oro Loma 115kV reconductoring
PMTFMPP 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	Project:Wilson 115kV Reinforcement
NORTHSTAR 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
TOMATAK 70 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.70	0.88	0.88	0.81	0.97	0.88	0.81	0.88	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.72	0.90	0.89	0.82	0.94	0.89	0.82	0.89	Project:Wilson 115kV Reinforcement
BIOMASS 70 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	Project:Wilson 115kV Reinforcement
CALRENEW 70 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	Project:Wilson 115kV Reinforcement
Q1028Q1029 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
Q1127 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	Low	0.83	1.03	1.03	0.94	1.03	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
ORO LOMA 115 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	Low	0.91	0.92	0.84	1.00	0.99	0.99	1.00	0.92	Monitor future forecast
ORO LOMA 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	Low	0.93	0.95	0.86	1.03	1.02	1.02	1.03	0.94	Monitor future forecast
SNTA RTA 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	Low	0.91	0.92	0.83	1.03	1.02	1.00	1.03	0.91	Monitor future forecast
DOS PALS 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	Low	0.92	0.93	0.84	1.03	1.02	1.01	1.03	0.92	Monitor future forecast
FIREBAGH 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	Low	0.88	0.89	0.78	1.02	0.96	0.99	1.02	0.89	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P1-2:A13:61:_MENDOTA-NORTH STAR SOLAR 115KV [2113]	P1	N-1	Low	0.88	0.89	0.88	0.89	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P1-2:A13:61:_MENDOTA-NORTH STAR SOLAR 115KV [2113]	P1	N-1	Low	0.89	0.90	0.89	0.90	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-2:A13:61:_MENDOTA-NORTH STAR SOLAR 115KV [2113]	P1	N-1	Low	0.89	0.90	0.89	0.90	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P1-2:A13:61:_MENDOTA-NORTH STAR SOLAR 115KV [2113]	P1	N-1	Low	0.89	0.90	0.89	0.90	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P1-2:A13:62:_LE GRAND-DAIRYLAND 115KV [2100] MOAS OPENED ON CHWCHLASLRJT_DAIRYLND	P1	N-1	Low	0.86	0.89	0.88	0.87	0.97	0.89	0.88	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P1-2:A13:62:_LE GRAND-DAIRYLAND 115KV [2100] MOAS OPENED ON CHWCHLASLRJT_DAIRYLND	P1	N-1	Low	0.88	0.90	0.90	0.88	0.95	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-2:A13:62:_LE GRAND-DAIRYLAND 115KV [2100] MOAS OPENED ON CHWCHLASLRJT_DAIRYLND	P1	N-1	Low	0.88	0.90	0.90	0.88	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P1-2:A13:62:_LE GRAND-DAIRYLAND 115KV [2100] MOAS OPENED ON CHWCHLASLRJT_DAIRYLND	P1	N-1	Low	0.88	0.90	0.90	0.88	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
ARBURU T 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	Low	0.93	0.92	0.87	1.02	0.88	0.99	1.02	0.91	Monitor future forecast
CANAL 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	Low	0.84	0.86	0.77	1.00	0.76	0.95	1.01	0.86	Review Existing Oro Loma 70kV reinforcement project
ORTIGA 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	Low	0.88	0.88	0.81	1.01	0.81	0.97	1.01	0.88	Review Existing Oro Loma 70kV reinforcement project
MRCYSPRS 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	Low	0.91	0.90	0.84	1.02	0.84	0.98	1.02	0.89	Review Existing Oro Loma 70kV reinforcement project



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
ARBURUA 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	Low	0.92	0.91	0.86	1.02	0.87	0.99	1.02	0.91	Review Existing Oro Loma 70kV reinforcement project
MERCYSPRNGSS 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	Low	0.91	0.90	0.84	1.02	0.85	0.99	1.02	0.90	Review Existing Oro Loma 70kV reinforcement project
VEGA 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	Low	0.91	0.90	0.84	1.02	0.85	0.99	1.02	0.90	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P1-2:A13:83:_ORO LOMA-MENDOTA 70KV [9030] (2)	P1	N-1	Low	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-2:A13:83:_ORO LOMA-MENDOTA 70KV [9030] (2)	P1	N-1	Low	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P1-2:A13:83:_ORO LOMA-MENDOTA 70KV [9030] (2)	P1	N-1	Low	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
NRTHFORK 70 kV	P1-2:A13:85:_Q723-BORDEN #1 70KV [0]	P1	N-1	Low	0.89	0.95	0.93	1.03	1.06	1.00	1.03	1.00	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO2 70 kV	P1-2:A13:85:_Q723-BORDEN #1 70KV [0]	P1	N-1	Low	0.90	0.96	0.94	1.03	1.06	1.00	1.03	1.00	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P1-2:A13:85:_Q723-BORDEN #1 70KV [0]	P1	N-1	Low	0.89	0.95	0.93	1.03	1.06	1.00	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P1-2:A14:14:_GREGG-HERNDON #1 230KV [4830]	P1	N-1	Low	0.90	0.96	0.93	1.04	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P1-2:A14:15:_GREGG-HERNDON #2 230KV [4840]	P1	N-1	Low	0.90	0.96	0.93	1.04	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
TOMATAK 70 kV	P1-2:A14:17:_MUSTANG SW STA-GREGG 230KV [4700]	P1	N-1	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P1-2:A14:17:_MUSTANG SW STA-GREGG 230KV [4700]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-2:A14:17:_MUSTANG SW STA-GREGG 230KV [4700]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P1-2:A14:17:_MUSTANG SW STA-GREGG 230KV [4700]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P1-2:A14:27:_MORRO BAY-CALIFORNIA FLATS SW STA 230KV [5280]	P1	N-1	Low	0.88	NA	NA	0.88	NA	0.89	0.89	NA	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P1-2:A14:28:_CALIFORNIA FLATS SW STA-GATES 230KV [5281]	P1	N-1	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P1-2:A14:32:_TEMPLETON-GATES 230KV [5934]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-2:A14:32:_TEMPLETON-GATES 230KV [5934]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P1-2:A14:32:_TEMPLETON-GATES 230KV [5934]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P1-2:A14:46:_BARTON-AIRWAYS-SANGER 115KV [1060]	P1	N-1	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P1-2:A14:5:_MUSTANG3N4-MUSTANGSS #1 230KV [0]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-2:A14:5:_MUSTANG3N4-MUSTANGSS #1 230KV [0]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P1-2:A14:5:_MUSTANG3N4-MUSTANGSS #1 230KV [0]	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P1-3:A13:4:_PANOCHE 230/115KV TB 1	P1	N-1	Low	0.87	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Project: Wilson 115kV Reinforcement
MENDOTA 70 kV	P1-3:A13:4:_PANOCHE 230/115KV TB 1	P1	N-1	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-3:A13:4:_PANOCHE 230/115KV TB 1	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P1-3:A13:4:_PANOCHE 230/115KV TB 1	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
NRTHFORK 70 kV	P1-3:A13:41:_Q723 70/34.5KV TB 1	P1	N-1	Low	0.89	0.95	0.93	1.03	1.06	1.00	1.03	1.00	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO2 70 kV	P1-3:A13:41:_Q723 70/34.5KV TB 1	P1	N-1	Low	0.90	0.96	0.94	1.03	1.06	1.00	1.03	1.00	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P1-3:A13:41:_Q723 70/34.5KV TB 1	P1	N-1	Low	0.89	0.95	0.93	1.03	1.06	1.00	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
ARBURU T 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P1	N-1	Low	0.93	0.93	0.93	0.98	0.88	0.96	0.98	0.92	Generation Re-dispatch
LIVNGSTN 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P1	N-1	Low	0.92	0.91	0.91	0.98	0.88	0.96	0.98	0.91	Generation Re-dispatch
CANAL 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P1	N-1	Low	0.91	0.91	0.91	0.98	0.85	0.95	0.98	0.91	Generation Re-dispatch
ORTIGA 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P1	N-1	Low	0.92	0.91	0.92	0.98	0.86	0.96	0.98	0.91	Generation Re-dispatch
MRCYSPRS 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P1	N-1	Low	0.93	0.92	0.92	0.98	0.87	0.96	0.98	0.92	Generation Re-dispatch
ARBURUA 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P1	N-1	Low	0.93	0.92	0.93	0.98	0.88	0.96	0.98	0.92	Generation Re-dispatch

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Study Area: PG&E Greater Fresno

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
MERCYSPRNGSS 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P1	N-1	Low	0.93	0.92	0.93	0.98	0.88	0.96	0.98	0.92	Generation Re-dispatch
PCHCO PP 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P1	N-1	Low	0.89	0.88	0.95	0.92	0.91	0.91	0.92	0.88	Review Existing Oro Loma 70kV reinforcement project
INTL TUR 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P1	N-1	Low	0.90	0.89	0.96	0.92	0.92	0.92	0.93	0.89	Review Existing Oro Loma 70kV reinforcement project
VEGA 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P1	N-1	Low	0.93	0.92	0.93	0.98	0.88	0.96	0.98	0.92	Generation Re-dispatch
COLCGN T 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.90	0.87	0.99	0.96	1.01	0.96	0.97	0.86	New Gates 230/70kV transformer project
OIL CITYT 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.91	0.87	0.99	0.97	1.01	0.97	0.97	0.87	New Gates 230/70kV transformer project
PENNZIER 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.91	0.87	0.99	0.97	1.01	0.97	0.97	0.87	New Gates 230/70kV transformer project
AVNLPARK 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.90	0.86	0.99	0.94	1.03	0.94	0.95	0.86	New Gates 230/70kV transformer project
SUN CITY 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.90	0.87	0.99	0.94	1.03	0.94	0.95	0.86	New Gates 230/70kV transformer project
AVENAL 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.90	0.87	0.99	0.94	1.03	0.94	0.95	0.86	New Gates 230/70kV transformer project
KETTLEMN 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.89	0.85	0.99	0.95	1.01	0.94	0.96	0.85	New Gates 230/70kV transformer project
CHEVPLIN 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.90	0.86	0.99	0.95	1.01	0.94	0.96	0.85	New Gates 230/70kV transformer project
WESTLND� 3 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.92	0.88	1.00	0.95	1.00	0.97	0.96	0.87	New Gates 230/70kV transformer project
GATES 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.92	0.88	1.00	0.95	1.00	0.97	0.96	0.87	New Gates 230/70kV transformer project
JAYNESWSTA 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.92	0.88	1.00	0.95	1.00	0.97	0.96	0.87	New Gates 230/70kV transformer project
HURON 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.92	0.88	0.99	0.95	1.00	0.97	0.96	0.87	New Gates 230/70kV transformer project
CALFLAX 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.93	0.89	0.99	0.96	1.01	0.98	0.97	0.89	New Gates 230/70kV transformer project
PLSNTVLY 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.92	0.89	0.99	0.97	1.02	0.98	0.98	0.89	New Gates 230/70kV transformer project
COLNGA 2 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.91	0.87	0.99	0.96	1.01	0.97	0.97	0.87	New Gates 230/70kV transformer project
DERRICK 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.91	0.88	0.99	0.97	1.01	0.97	0.98	0.87	New Gates 230/70kV transformer project
TORNADO 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.90	0.87	0.99	0.96	1.01	0.96	0.97	0.86	New Gates 230/70kV transformer project
COLNGA 1 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.90	0.86	0.98	0.96	1.00	0.96	0.97	0.86	New Gates 230/70kV transformer project
JACALITO 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	Low	0.91	0.87	0.99	0.96	1.00	0.97	0.97	0.86	New Gates 230/70kV transformer project
SJNO3 70 kV	P1-3:A14:15:_HELMS PP1 230/18KV TB 1	P1	N-1	Low	0.90	0.96	0.93	1.04	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P1-3:A14:16:_HELMS PP2 230/18KV TB 1	P1	N-1	Low	0.90	0.96	0.93	1.04	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P1-3:A14:17:_HELMS PP3 230/18KV TB 1	P1	N-1	Low	0.90	0.96	0.93	1.04	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
MENDOTA 70 kV	P1-4:A13:12:_CHWCHLASLRC1 SVD=V	P1	N-1	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P1-4:A13:12:_CHWCHLASLRC1 SVD=V	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P1-4:A13:12:_CHWCHLASLRC1 SVD=V	P1	N-1	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P1-4:A14:13:_ASHLAN SVD=V2	P1	N-1	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P1-4:A14:14:_ASHLAN SVD=V1	P1	N-1	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
NRTHFORK 70 kV	P1-4:A14:34:_COPPRMNE SVD=V	P1	N-1	Low	NA	0.89	0.86	NA	1.06	NA	NA	0.93	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO2 70 kV	P1-4:A14:34:_COPPRMNE SVD=V	P1	N-1	Low	NA	0.89	0.87	NA	1.06	NA	NA	0.93	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P1-4:A14:34:_COPPRMNE SVD=V	P1	N-1	Low	NA	0.88	0.86	NA	1.06	NA	NA	0.93	Project: Coppermine reconductoring approved in 2021-22 TPP
WISHON 70 kV	P1-4:A14:34:_COPPRMNE SVD=V	P1	N-1	Low	NA	0.90	0.88	NA	1.07	NA	NA	0.95	Monitor Future forecast
AUBERRY 70 kV	P1-4:A14:34:_COPPRMNE SVD=V	P1	N-1	Low	NA	0.89	0.87	NA	1.07	NA	NA	0.94	Project: Coppermine reconductoring approved in 2021-22 TPP
CHWCHLLA 115 kV	P2-1:A13:14:_LE GRAND-CHOWCHILLA 115KV [2110] (CHWCHLLA-CERTAN T)	P2	Bus/Breaker	Low	0.93	0.92	0.87	0.96	1.11	0.99	0.96	0.91	Monitor Future forecast



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
SHARON 115 kV	P2-1:A13:14:_LE GRAND-CHOWCHILLA 115KV [2110] (CHWCHLLA-CERTAN T)	P2	Bus/Breaker	Low	0.94	0.93	0.88	0.97	1.10	0.99	0.97	0.93	Monitor Future forecast
MENDOTA 70 kV	P2-1:A13:40:_DAIRYLAND-MENDOTA 115KV [1360] (NEWHALL-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-1:A13:40:_DAIRYLAND-MENDOTA 115KV [1360] (NEWHALL-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-1:A13:40:_DAIRYLAND-MENDOTA 115KV [1360] (NEWHALL-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-1:A13:41:_DAIRYLAND-MENDOTA 115KV [1360] (GILLTAP-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-1:A13:41:_DAIRYLAND-MENDOTA 115KV [1360] (GILLTAP-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-1:A13:41:_DAIRYLAND-MENDOTA 115KV [1360] (GILLTAP-MADERAPR)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P2-1:A13:45:_DAIRYLAND-MENDOTA 115KV [1360] (MENDOTA-GILLTAP)	P2	Bus/Breaker	Low	0.89	0.89	0.88	0.89	0.97	0.89	0.90	0.89	Review Existing Oro Loma 70kV reinforcement project
NEWHALL 115 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.86	1.00	0.99	0.95	1.05	0.99	0.95	1.00	Project:Wilson 115kV Reinforcement
MENDOTA 115 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	Project: Panoche-Oro Loma 115kV reconductoring
PMTFMPP 115 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	Project:Wilson 115kV Reinforcement
NORTHSTAR 115 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
TOMATAK 70 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.70	0.88	0.88	0.81	0.97	0.88	0.81	0.88	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.94	0.89	0.82	0.90	Project:Wilson 115kV Reinforcement
BIOMASS 70 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.97	0.89	0.82	0.89	Project:Wilson 115kV Reinforcement
CALRENEW 70 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	Project:Wilson 115kV Reinforcement
Q1028Q1029 115 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
Q1127 115 kV	P2-1:A13:46:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-PANOCHE1)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.03	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
NEWHALL 115 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.86	1.00	0.99	0.95	1.05	0.99	0.95	1.00	Project:Wilson 115kV Reinforcement

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High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
MENDOTA 115 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.95	1.05	0.99	0.96	1.01	Project: Panoche-Oro Loma 115kV reconductoring
PMTFMPP 115 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	Project:Wilson 115kV Reinforcement
NORTHSTAR 115 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
TOMATAK 70 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.70	0.88	0.88	0.81	0.97	0.88	0.81	0.88	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.94	0.89	0.82	0.89	Project:Wilson 115kV Reinforcement
BIOMASS 70 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	Project:Wilson 115kV Reinforcement
CALRENEW 70 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	Project:Wilson 115kV Reinforcement
Q1028Q1029 115 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
Q1127 115 kV	P2-1:A13:47:_PANOCHE-MENDOTA 115KV [3230] (PANOCHET-MENDOTA)	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.03	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
HAMMONDS 115 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.86	0.88	0.61	0.96	0.93	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
ORO LOMA 115 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.86	0.88	0.62	0.97	0.94	0.98	0.97	0.87	Project:Wilson-Oro Loma 115kV reconductoring
LUIS_#3 115 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
DFS 115 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.86	0.88	0.62	0.97	0.94	0.98	0.97	0.87	Project: Panoche-Oro Loma 115kV reconductoring
LUIS_#5 115 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
OXFORD 115 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
EL NIDO 115 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.95	0.97	0.84	1.01	1.01	1.01	1.01	0.97	Monitor Future forecast
WSTLD1RA 115 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
ORO LOMA 70 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.89	0.90	0.70	1.00	0.97	1.01	1.00	0.90	Review Existing Oro Loma 70kV reinforcement project
SNTA RTA 70 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.86	0.87	0.66	0.99	0.97	1.00	0.99	0.87	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.87	0.88	0.68	1.00	0.97	1.00	1.00	0.88	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-1:A13:48:_PANOCHE-ORO LOMA 115KV [3240] (PANOCH EJ-PANOCHE2)	P2	Bus/Breaker	Low	0.83	0.84	0.59	0.98	0.94	0.98	0.98	0.84	Review Existing Oro Loma 70kV reinforcement project

2022-2023 ISO Reliability Assessment - Preliminary Study Results

Study Area: PG&E Greater Fresno

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
HAMMONDS 115 kV	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2	Bus/Breaker	Low	0.90	0.91	0.73	0.99	0.94	1.00	0.99	0.91	Monitor Future forecast
ORO LOMA 115 kV	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2	Bus/Breaker	Low	0.90	0.91	0.74	0.99	0.95	0.99	0.99	0.90	Project:Wilson-Oro Loma 115kV reconductoring
DFS 115 kV	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2	Bus/Breaker	Low	0.90	0.91	0.73	0.99	0.95	0.99	0.99	0.91	Project: Panoche-Oro Loma 115kV reconductoring
EL NIDO 115 kV	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2	Bus/Breaker	Low	0.97	0.98	0.89	1.02	1.02	1.01	1.02	0.98	Monitor Future forecast
ORO LOMA 70 kV	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2	Bus/Breaker	Low	0.92	0.93	0.75	1.02	0.98	1.02	1.02	0.93	Monitor Future forecast
SNTA RTA 70 kV	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2	Bus/Breaker	Low	0.89	0.90	0.72	1.01	0.98	1.01	1.01	0.90	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2	Bus/Breaker	Low	0.91	0.92	0.73	1.02	0.98	1.02	1.02	0.91	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-1:A13:49:_PANOCHE-ORO LOMA 115KV [3240] (PANOCHEJ-HAMMONDS)	P2	Bus/Breaker	Low	0.87	0.88	0.65	1.01	0.95	1.00	1.01	0.87	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 115 kV	P2-1:A13:51:_PANOCHE-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.91	0.93	0.83	1.01	0.99	0.99	1.01	0.92	Monitor Future forecast
DFS 115 kV	P2-1:A13:51:_PANOCHE-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.91	0.93	0.83	1.01	0.99	0.99	1.01	0.92	Monitor Future forecast
ORO LOMA 70 kV	P2-1:A13:51:_PANOCHE-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.94	0.95	0.85	1.04	1.02	1.02	1.04	0.95	Monitor Future forecast
SNTA RTA 70 kV	P2-1:A13:51:_PANOCHE-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.91	0.92	0.82	1.03	1.01	1.01	1.03	0.92	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-1:A13:51:_PANOCHE-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.92	0.93	0.83	1.03	1.02	1.01	1.03	0.93	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-1:A13:51:_PANOCHE-ORO LOMA 115KV [3240] (HAMMONDS-DFSTP)	P2	Bus/Breaker	Low	0.88	0.90	0.77	1.02	0.96	1.00	1.02	0.89	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 115 kV	P2-1:A13:52:_PANOCHE-ORO LOMA 115KV [3240] (DFSTP-ORO LOMA)	P2	Bus/Breaker	Low	0.91	0.92	0.84	1.00	0.99	0.99	1.00	0.92	Monitor Future forecast
ORO LOMA 70 kV	P2-1:A13:52:_PANOCHE-ORO LOMA 115KV [3240] (DFSTP-ORO LOMA)	P2	Bus/Breaker	Low	0.93	0.95	0.86	1.03	1.02	1.02	1.03	0.94	Monitor Future forecast
SNTA RTA 70 kV	P2-1:A13:52:_PANOCHE-ORO LOMA 115KV [3240] (DFSTP-ORO LOMA)	P2	Bus/Breaker	Low	0.91	0.92	0.83	1.03	1.02	1.00	1.03	0.91	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-1:A13:52:_PANOCHE-ORO LOMA 115KV [3240] (DFSTP-ORO LOMA)	P2	Bus/Breaker	Low	0.92	0.93	0.84	1.03	1.02	1.01	1.03	0.92	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-1:A13:52:_PANOCHE-ORO LOMA 115KV [3240] (DFSTP-ORO LOMA)	P2	Bus/Breaker	Low	0.88	0.89	0.78	1.02	0.96	0.99	1.02	0.89	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P2-1:A13:53:_DE FRANCESCO TAP 115KV [3245] (DFSTP-DFS)	P2	Bus/Breaker	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P2-1:A13:62:_PARAMOUNT FARMS TAP 115KV [1744] (PMTFMPPJT-PMTFMPP)	P2	Bus/Breaker	Low	0.88	0.89	0.88	0.89	0.97	0.89	0.90	0.89	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-1:A14:2:_HELMS-GREGG #1 230KV [4870] (GREGG-HELMS PP1)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	Diverge	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P2-1:A14:2:_HELMS-GREGG #1 230KV [4870] (GREGG-HELMS PP1)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	Diverge	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
BIOMASS 70 kV	P2-1:A14:3:_HELMS-GREGG #2 230KV [4880] (GREGG-HELMS PP3)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	Diverge	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P2-1:A14:3:_HELMS-GREGG #2 230KV [4880] (GREGG-HELMS PP3)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	Diverge	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
TOMATAK 70 kV	P2-1:A14:36:_BARTON-AIRWAYS-SANGER 115KV [1060] (AIRWAYJ2-BARTON)	P2	Bus/Breaker	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-1:A14:40:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890] (CLOVISJ1-SANGER)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-1:A14:40:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890] (CLOVISJ1-SANGER)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P2-1:A14:40:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890] (CLOVISJ1-SANGER)	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
ARBURU T 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.92	0.91	0.92	0.96	0.84	0.95	0.98	0.91	Generation Re-dispatch
LIVNGSTN 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.91	0.90	0.90	0.96	0.83	0.95	0.98	0.90	Review Existing Oro Loma 70kV reinforcement project
CANAL 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.90	0.90	0.89	0.96	0.81	0.93	0.98	0.89	Review Existing Oro Loma 70kV reinforcement project
CHEVPIPE 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.93	0.93	0.94	0.96	0.87	0.95	0.98	0.93	Generation Re-dispatch
SNTA NLA 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.93	0.93	0.94	0.96	0.87	0.95	0.98	0.93	Generation Re-dispatch
LOS BANS 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.94	0.94	0.95	0.96	0.89	0.95	0.98	0.94	Generation Re-dispatch
ORTIGA 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.91	0.90	0.90	0.96	0.82	0.94	0.98	0.90	Review Existing Oro Loma 70kV reinforcement project
MRCYSPRS 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.92	0.91	0.91	0.96	0.83	0.94	0.98	0.91	Generation Re-dispatch
ARBURUA 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.92	0.91	0.91	0.96	0.84	0.94	0.98	0.91	Generation Re-dispatch
PCHCOWND 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.94	0.93	0.95	0.96	0.89	0.95	0.98	0.93	Generation Re-dispatch
MERCYSPRNGSS 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.92	0.91	0.91	0.96	0.83	0.95	0.98	0.91	Generation Re-dispatch
WRGHT PP 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.92	0.92	0.93	0.96	0.86	0.94	0.98	0.91	Generation Re-dispatch
PCHCO PP 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.88	0.87	0.94	0.90	0.87	0.89	0.92	0.87	Review Existing Oro Loma 70kV reinforcement project
INTL TUR 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.88	0.88	0.94	0.90	0.88	0.90	0.92	0.88	Review Existing Oro Loma 70kV reinforcement project
ONLL PMP 69 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.94	0.94	0.95	0.96	0.89	0.95	0.98	0.93	Generation Re-dispatch
VEGA 70 kV	P2-2:A13:1:_LOSBANOS 230KV SECTION 1D	P2	Bus/Breaker	Low	0.92	0.91	0.91	0.96	0.83	0.95	0.98	0.91	Generation Re-dispatch
MENDOTA 70 kV	P2-2:A13:23:_DAIRYLND 115KV SECTION 1E	P2	Bus/Breaker	Low	0.88	0.90	0.90	0.89	0.94	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-2:A13:23:_DAIRYLND 115KV SECTION 1E	P2	Bus/Breaker	Low	0.88	0.90	0.90	0.89	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-2:A13:23:_DAIRYLND 115KV SECTION 1E	P2	Bus/Breaker	Low	0.88	0.90	0.90	0.89	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
NEWHALL 115 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.86	1.00	0.99	0.95	1.05	0.99	0.95	1.00	Project: Panoche-Oro Loma 115kV reconductoring
MENDOTA 115 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	Project: Panoche-Oro Loma 115kV reconductoring
PMTFMPP 115 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	Project: Panoche-Oro Loma 115kV reconductoring
NORTHSTAR 115 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
TOMATAK 70 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.70	0.88	0.88	0.81	0.97	0.88	0.81	0.88	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.94	0.89	0.82	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.97	0.89	0.82	0.89	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	Review Existing Oro Loma 70kV reinforcement project
Q1028Q1029 115 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
Q1127 115 kV	P2-2:A13:24:_PANOCHE1 115KV SECTION 1D	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.03	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
HAMMONDS 115 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.87	0.88	0.61	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
ORO LOMA 115 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.86	0.88	0.62	0.97	0.94	0.98	0.97	0.87	Project:Wilson-Oro Loma 115kV reconductoring
LUIS_#3 115 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
DFS 115 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.86	0.88	0.62	0.97	0.93	0.98	0.97	0.87	Project: Panoche-Oro Loma 115kV reconductoring
LUIS_#5 115 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
OXFORD 115 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring

2022-2023 ISO Reliability Assessment - Preliminary Study Results

Study Area: PG&E Greater Fresno

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
EL NIDO 115 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.95	0.97	0.84	1.01	1.01	1.01	1.01	0.97	Monitor Future forecast
WSTLD1RA 115 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
ORO LOMA 70 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.89	0.90	0.70	1.00	0.97	1.01	1.00	0.90	Review Existing Oro Loma 70kV reinforcement project
SNTA RTA 70 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.86	0.87	0.66	0.99	0.97	1.00	0.99	0.87	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.87	0.88	0.68	1.00	0.97	1.00	1.00	0.88	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-2:A13:25:_PANOCHE2 115KV SECTION 2D	P2	Bus/Breaker	Low	0.83	0.84	0.59	0.98	0.94	0.98	0.98	0.84	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-2:A13:4:_PANOCHE 230KV SECTION 1E	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-2:A13:4:_PANOCHE 230KV SECTION 1E	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-2:A13:4:_PANOCHE 230KV SECTION 1E	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
CAMDEN 70 kV	P2-2:A14:17:_MC CALL 230KV SECTION 1D	P2	Bus/Breaker	Low	0.93	0.92	0.89	0.99	1.04	0.96	0.99	0.92	Monitor Future forecast
COLCGN T 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.90	0.87	0.99	0.97	1.00	0.96	0.97	0.86	New Gates 230/70kV transformer project
OIL CITYT 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.91	0.88	0.99	0.97	1.00	0.97	0.97	0.87	New Gates 230/70kV transformer project
PENNZIER 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.91	0.88	0.99	0.97	1.00	0.97	0.97	0.87	New Gates 230/70kV transformer project
AVNLPARK 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.90	0.87	0.99	0.95	1.02	0.94	0.95	0.86	New Gates 230/70kV transformer project
SUN CITY 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.90	0.87	0.99	0.95	1.02	0.94	0.95	0.86	New Gates 230/70kV transformer project
AVENAL 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.90	0.87	0.99	0.95	1.02	0.94	0.95	0.86	New Gates 230/70kV transformer project
KETTLEMN 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.90	0.86	0.99	0.95	1.00	0.94	0.95	0.85	New Gates 230/70kV transformer project
CHEVPLIN 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.90	0.86	0.99	0.95	1.01	0.94	0.95	0.85	New Gates 230/70kV transformer project
WESTLND 3 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.92	0.88	1.00	0.96	0.99	0.97	0.96	0.87	New Gates 230/70kV transformer project
GATES 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.92	0.88	1.00	0.96	0.99	0.97	0.96	0.87	New Gates 230/70kV transformer project
JAYNESWSTA 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.92	0.88	1.00	0.96	0.99	0.97	0.96	0.87	New Gates 230/70kV transformer project
HURON 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.92	0.88	0.99	0.96	0.99	0.97	0.96	0.87	New Gates 230/70kV transformer project
CALFLAX 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.93	0.89	0.99	0.97	1.00	0.98	0.96	0.89	New Gates 230/70kV transformer project
PLSNTVLY 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.92	0.89	0.99	0.97	1.01	0.98	0.97	0.89	New Gates 230/70kV transformer project
COLNGA 2 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.91	0.87	0.99	0.97	1.00	0.97	0.97	0.87	New Gates 230/70kV transformer project
DERRICK 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.91	0.88	0.99	0.97	1.01	0.97	0.97	0.87	New Gates 230/70kV transformer project
TORNADO 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.90	0.87	0.99	0.97	1.00	0.96	0.97	0.86	New Gates 230/70kV transformer project
COLNGA 1 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.90	0.87	0.98	0.97	0.99	0.96	0.97	0.86	New Gates 230/70kV transformer project
JACALITO 70 kV	P2-2:A14:20:_GATES D 230KV SECTION 2D	P2	Bus/Breaker	Low	0.91	0.87	0.99	0.96	0.99	0.97	0.97	0.86	New Gates 230/70kV transformer project
CHWCHILLA 115 kV	P2-3:A13:27:_LE GRAND - MA 115KV & LE GRAND-CHOWCHILLA LINE	P2	Bus/Breaker	Low	0.93	0.92	0.87	0.96	1.10	0.99	0.96	0.91	Monitor Future forecast
SHARON 115 kV	P2-3:A13:27:_LE GRAND - MA 115KV & LE GRAND-CHOWCHILLA LINE	P2	Bus/Breaker	Low	0.94	0.93	0.88	0.97	1.10	0.99	0.97	0.93	Monitor Future forecast
TOMATAK 70 kV	P2-3:A13:32:_DAIRYLND - 1D 115KV & DAIRYLAND-MENDOTA LINE	P2	Bus/Breaker	Low	0.89	0.89	0.88	0.89	0.97	0.89	0.90	0.89	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P2-3:A13:33:_DAIRYLND - 1E 115KV & LE GRAND-DAIRYLAND LINE	P2	Bus/Breaker	Low	0.87	0.89	0.88	0.88	0.97	0.89	0.88	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-3:A13:33:_DAIRYLND - 1E 115KV & LE GRAND-DAIRYLAND LINE	P2	Bus/Breaker	Low	0.88	0.90	0.90	0.89	0.94	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-3:A13:33:_DAIRYLND - 1E 115KV & LE GRAND-DAIRYLAND LINE	P2	Bus/Breaker	Low	0.88	0.90	0.90	0.89	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-3:A13:33:_DAIRYLND - 1E 115KV & LE GRAND-DAIRYLAND LINE	P2	Bus/Breaker	Low	0.88	0.90	0.90	0.89	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
NEWHALL 115 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.86	1.00	0.99	0.95	1.05	0.99	0.95	1.00	Project: Panoche-Oro Loma 115kV reconductoring
MENDOTA 115 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	Project: Panoche-Oro Loma 115kV reconductoring



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
PMTFMPP 115 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	Project: Panoche-Oro Loma 115kV reconductoring
NORTHSTAR 115 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
TOMATAK 70 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.70	0.88	0.88	0.81	0.97	0.88	0.81	0.88	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.94	0.89	0.82	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.97	0.89	0.82	0.89	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	Review Existing Oro Loma 70kV reinforcement project
Q1028Q1029 115 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
Q1127 115 kV	P2-3:A13:34:_PANOCHE1 - 1D 115KV & PANOCHE-CAL PEAK-STARWOOD LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.03	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
NEWHALL 115 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.86	1.00	0.99	0.95	1.05	0.99	0.95	1.00	Project: Panoche-Oro Loma 115kV reconductoring
MENDOTA 115 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	Project: Panoche-Oro Loma 115kV reconductoring
PMTFMPP 115 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	Project: Panoche-Oro Loma 115kV reconductoring
NORTHSTAR 115 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
TOMATAK 70 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.70	0.88	0.88	0.81	0.97	0.88	0.81	0.88	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.94	0.89	0.82	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.97	0.89	0.82	0.89	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	Review Existing Oro Loma 70kV reinforcement project
Q1028Q1029 115 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
Q1127 115 kV	P2-3:A13:35:_PANOCHE1 - 1D 115KV & PANOCHE-EXCELSIOR SW STA #1 LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.03	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
NEWHALL 115 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.96	1.05	0.99	0.96	1.01	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.86	1.00	0.99	0.95	1.05	0.99	0.95	1.00	Project: Panoche-Oro Loma 115kV reconductoring
MENDOTA 115 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.04	1.02	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.87	1.01	0.99	0.95	1.05	0.99	0.96	1.01	Project: Panoche-Oro Loma 115kV reconductoring
PMTFMPP 115 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.86	1.01	0.99	0.95	1.05	0.99	0.95	1.01	Project:Wilson 115kV Reinforcement



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
NORTHSTAR 115 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
TOMATAK 70 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.70	0.88	0.88	0.81	0.97	0.88	0.81	0.88	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.72	0.90	0.89	0.82	0.94	0.89	0.82	0.89	Project:Wilson 115kV Reinforcement
BIOMASS 70 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	Project:Wilson 115kV Reinforcement
CALRENEW 70 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.72	0.89	0.89	0.82	0.97	0.89	0.82	0.89	Project:Wilson 115kV Reinforcement
Q1028Q1029 115 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
Q1127 115 kV	P2-3:A13:36:_PANOCHE1 - 1D 115KV & PANOCHE-MENDOTA LINE	P2	Bus/Breaker	Low	0.83	1.03	1.03	0.94	1.03	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
NEWHALL 115 kV	P2-3:A13:39:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	Low	0.87	1.00	0.97	0.96	1.07	1.01	0.96	1.00	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-3:A13:39:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	Low	0.86	1.00	0.97	0.94	1.06	1.00	0.95	0.99	Project: Panoche-Oro Loma 115kV reconductoring
MENDOTA 115 kV	P2-3:A13:39:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	Low	0.83	1.01	1.00	0.94	1.04	1.01	0.94	1.01	Project: Panoche-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P2-3:A13:39:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	Low	0.87	1.00	0.97	0.95	1.06	1.01	0.95	1.00	Project: Panoche-Oro Loma 115kV reconductoring
PMTFMPP 115 kV	P2-3:A13:39:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	Low	0.86	1.00	0.97	0.95	1.06	1.00	0.95	1.00	Project:Wilson 115kV Reinforcement
TOMATAK 70 kV	P2-3:A13:39:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	Low	0.70	0.87	0.85	0.81	0.97	0.87	0.81	0.87	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-3:A13:39:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	Low	0.72	0.88	0.87	0.82	0.94	0.88	0.82	0.88	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-3:A13:39:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	Low	0.72	0.88	0.87	0.82	0.97	0.88	0.82	0.88	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-3:A13:39:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	Low	0.72	0.88	0.87	0.82	0.97	0.88	0.82	0.88	Review Existing Oro Loma 70kV reinforcement project
Q1127 115 kV	P2-3:A13:39:_MENDOTA 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	Low	0.83	1.03	1.02	0.94	1.03	1.03	0.94	1.03	Project:Wilson 115kV Reinforcement
TOMATAK 70 kV	P2-3:A13:40:_MENDOTA 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	Low	0.90	0.89	0.88	0.89	0.97	0.89	0.90	0.89	Review Existing Oro Loma 70kV reinforcement project
HAMMONDS 115 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.87	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
ORO LOMA 115 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.86	0.88	0.62	0.97	0.94	0.98	0.97	0.87	Project:Wilson-Oro Loma 115kV reconductoring
LUIS_#3 115 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
DFS 115 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.86	0.88	0.61	0.97	0.93	0.98	0.97	0.87	Project: Panoche-Oro Loma 115kV reconductoring
LUIS_#5 115 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
OXFORD 115 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
EL NIDO 115 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.95	0.97	0.84	1.01	1.01	1.01	1.01	0.97	Monitor Future forecast
WSTLD1RA 115 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.86	0.88	0.60	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
ORO LOMA 70 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.89	0.90	0.70	1.00	0.97	1.01	1.00	0.90	Review Existing Oro Loma 70kV reinforcement project
SNTA RTA 70 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.86	0.87	0.66	0.99	0.97	1.00	0.99	0.86	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.87	0.88	0.68	1.00	0.97	1.00	1.00	0.88	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-3:A13:41:_PANOCHE2 - 2D 115KV & PANOCHE-EXCELSIOR SW STA #2 LINE	P2	Bus/Breaker	Low	0.83	0.84	0.59	0.98	0.94	0.98	0.98	0.84	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 115 kV	P2-3:A13:42:_PANOCHE2 - 2D 115KV & PANOCHE-ORO LOMA LINE	P2	Bus/Breaker	Low	0.91	0.92	0.84	1.00	0.99	0.99	1.00	0.92	Monitor Future forecast
ORO LOMA 70 kV	P2-3:A13:42:_PANOCHE2 - 2D 115KV & PANOCHE-ORO LOMA LINE	P2	Bus/Breaker	Low	0.93	0.95	0.86	1.03	1.01	1.02	1.03	0.94	Monitor Future forecast
SNTA RTA 70 kV	P2-3:A13:42:_PANOCHE2 - 2D 115KV & PANOCHE-ORO LOMA LINE	P2	Bus/Breaker	Low	0.91	0.92	0.83	1.03	1.01	1.00	1.03	0.91	Review Existing Oro Loma 70kV reinforcement project

2022-2023 ISO Reliability Assessment - Preliminary Study Results

Study Area: PG&E Greater Fresno

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
DOS PALS 70 kV	P2-3:A13:42:_PANOCHE2 - 2D 115KV & PANOCHE-ORO LOMA LINE	P2	Bus/Breaker	Low	0.92	0.93	0.84	1.03	1.02	1.01	1.03	0.92	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-3:A13:42:_PANOCHE2 - 2D 115KV & PANOCHE-ORO LOMA LINE	P2	Bus/Breaker	Low	0.88	0.89	0.78	1.02	0.96	0.99	1.02	0.89	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 115 kV	P2-3:A13:44:_ORO LOMA 115KV - MIDDLE BREAKER BAY 4	P2	Bus/Breaker	Low	0.91	0.93	0.84	1.00	1.01	1.00	1.00	0.92	Monitor Future forecast
ORO LOMA 70 kV	P2-3:A13:44:_ORO LOMA 115KV - MIDDLE BREAKER BAY 4	P2	Bus/Breaker	Low	0.90	0.92	0.83	1.04	1.00	0.99	1.04	0.91	Monitor Future forecast
SNTA RTA 70 kV	P2-3:A13:44:_ORO LOMA 115KV - MIDDLE BREAKER BAY 4	P2	Bus/Breaker	Low	0.87	0.89	0.79	1.03	1.00	0.98	1.03	0.88	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-3:A13:44:_ORO LOMA 115KV - MIDDLE BREAKER BAY 4	P2	Bus/Breaker	Low	0.89	0.90	0.81	1.03	1.00	0.98	1.03	0.89	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-3:A13:44:_ORO LOMA 115KV - MIDDLE BREAKER BAY 4	P2	Bus/Breaker	Low	0.85	0.86	0.74	1.02	0.96	0.96	1.02	0.85	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-3:A13:65:_WILSON 230KV - RING R1 & R2	P2	Bus/Breaker	Low	0.89	NA	NA	0.89	NA	0.90	0.90	NA	Review Existing Oro Loma 70kV reinforcement project
NRTHFORK 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	Low	0.89	0.95	0.90	1.03	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO2 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	Low	0.90	0.95	0.90	1.03	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P2-3:A14:1:_GREGG 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	Low	0.89	0.94	0.89	1.03	1.06	0.99	1.03	0.98	Project: Coppermine reconductoring approved in 2021-22 TPP
TOMATAK 70 kV	P2-3:A14:125:_ASHLAN 230KV - RING R4 & R5	P2	Bus/Breaker	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P2-3:A14:126:_ASHLAN 230KV - RING R4 & R3	P2	Bus/Breaker	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-3:A14:16:_MUSTANGSS 230KV - MIDDLE BREAKER BAY 1	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-3:A14:19:_CALFLATSSS 230KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P2-3:A14:38:_AIRWAYS - 1E 115KV & BARTON-AIRWAYS-SANGER LINE	P2	Bus/Breaker	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-3:A14:43:_SANGER 115KV - MIDDLE BREAKER BAY 7	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-3:A14:43:_SANGER 115KV - MIDDLE BREAKER BAY 7	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P2-3:A14:43:_SANGER 115KV - MIDDLE BREAKER BAY 7	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CAMDEN 70 kV	P2-3:A14:49:_MC CALL 115KV - MIDDLE BREAKER BAY 3	P2	Bus/Breaker	Low	0.94	0.93	0.90	1.00	1.05	0.97	1.01	0.93	Monitor Future forecast
BIOMASS 70 kV	P2-3:A14:50:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P2-3:A14:50:_MC CALL 115KV - MIDDLE BREAKER BAY 2	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
ATWATER 115 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	Project:Wilson 115kV Reinforcement
LIVNGSTN 115 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	Sensitivity Only
GALLO 115 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	Sensitivity Only
EL CAPTN 115 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	Sensitivity Only
CRESSEY 115 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	Sensitivity Only
MERCED 115 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.29	Diverge	NA	Sensitivity Only
MERCED 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.55	Diverge	NA	Project:Wilson 115kV Reinforcement
ELNIDOBM 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.57	Diverge	NA	Project:Wilson 115kV Reinforcement
MC SWAIN 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.80	Diverge	NA	Sensitivity Only

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
MARIPOS2 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.88	Diverge	NA	Sensitivity Only
MRCDFLLS 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.80	Diverge	NA	Sensitivity Only
EXCHEQUR 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.88	Diverge	NA	Sensitivity Only
BER VLLY 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.87	Diverge	NA	Sensitivity Only
SAXONCRK 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.86	Diverge	NA	Sensitivity Only
INDN FLT 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.86	Diverge	NA	Sensitivity Only
YOSEMITE 70 kV	P2-4:A13:12:_WILSON A SECTION 1D & WILSON B SECTION 2D 115KV	P2	Bus/Breaker	Low	Diverge	NA	NA	Diverge	NA	0.85	Diverge	NA	Sensitivity Only
NEWHALL 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.84	1.00	0.98	0.96	1.05	0.99	0.96	1.00	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	1.00	0.98	0.95	1.05	0.99	0.95	1.00	Project: Panoche-Oro Loma 115kV reconductoring
DAIRYLND 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.90	1.00	0.96	0.98	1.07	0.99	0.99	1.00	Project: Panoche-Oro Loma 115kV reconductoring
MENDOTA 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.80	1.03	1.02	0.94	1.03	1.02	0.94	1.02	Project: Panoche-Oro Loma 115kV reconductoring
HAMMONDS 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.59	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
ORO LOMA 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.60	0.97	0.94	0.98	0.97	0.87	Project:Wilson-Oro Loma 115kV reconductoring
LUIS_#3 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.58	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
DFS 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.60	0.97	0.93	0.98	0.97	0.87	Project: Panoche-Oro Loma 115kV reconductoring
LUIS_#5 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.58	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
OXFORD 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.58	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
EL NIDO 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.92	0.97	0.83	1.01	1.01	1.01	1.01	0.96	Monitor Future forecast
MADERAPR 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.84	1.00	0.98	0.95	1.05	0.99	0.96	1.00	Project: Panoche-Oro Loma 115kV reconductoring
WSTLD1RA 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.87	0.58	0.96	0.92	0.98	0.96	0.87	Project: Panoche-Oro Loma 115kV reconductoring
PMTFMPP 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.84	1.00	0.98	0.95	1.05	0.99	0.95	1.00	Project: Panoche-Oro Loma 115kV reconductoring
NORTHSTAR 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.80	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring

2022-2023 ISO Reliability Assessment - Preliminary Study Results

Study Area: PG&E Greater Fresno

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
ORO LOMA 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.85	0.90	0.70	1.00	0.96	1.01	1.00	0.89	Review Existing Oro Loma 70kV reinforcement project
SNTA RTA 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.82	0.87	0.66	0.99	0.96	1.00	0.99	0.86	Review Existing Oro Loma 70kV reinforcement project
DOS PALS 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.83	0.88	0.68	1.00	0.97	1.00	1.00	0.87	Review Existing Oro Loma 70kV reinforcement project
NRTHFORK 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.89	0.95	0.93	1.04	1.06	0.99	1.03	1.00	Review Existing Oro Loma 70kV reinforcement project
SJNO2 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.90	0.96	0.94	1.04	1.06	0.99	1.03	1.00	Review Existing Oro Loma 70kV reinforcement project
SJNO3 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.89	0.95	0.93	1.04	1.06	0.99	1.03	0.99	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.79	0.84	0.59	0.98	0.94	0.98	0.98	0.83	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.68	0.88	0.87	0.81	0.94	0.88	0.81	0.88	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.70	0.89	0.89	0.82	0.93	0.89	0.82	0.89	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.69	0.89	0.89	0.82	0.96	0.89	0.82	0.89	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.69	0.89	0.89	0.82	0.96	0.89	0.82	0.89	Review Existing Oro Loma 70kV reinforcement project
AUBERRY 70 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.90	0.96	0.94	1.04	1.07	1.00	1.03	1.01	Project: Coppermine reconductoring approved in 2021-22 TPP
Q1028Q1029 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.80	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
Q1127 115 kV	P2-4:A13:13:_PANOCHE1 SECTION 1D & PANOCHE2 SECTION 2D 115KV	P2	Bus/Breaker	Low	0.80	1.03	1.03	0.94	1.03	1.03	0.94	1.03	Project: Panoche-Oro Loma 115kV reconductoring
TOMATAK 70 kV	P2-4:A13:3:_PANOCHE 230KV - SECTION 2E & 2D	P2	Bus/Breaker	Low	0.87	0.89	NA	0.88	0.97	0.89	0.89	0.89	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P2-4:A13:3:_PANOCHE 230KV - SECTION 2E & 2D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-4:A13:3:_PANOCHE 230KV - SECTION 2E & 2D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-4:A13:3:_PANOCHE 230KV - SECTION 2E & 2D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-4:A13:4:_PANOCHE 230KV - SECTION 1E & 1D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-4:A13:4:_PANOCHE 230KV - SECTION 1E & 1D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-4:A13:4:_PANOCHE 230KV - SECTION 1E & 1D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-4:A13:5:_PANOCHE 230KV - SECTION 1D & 2D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.94	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-4:A13:5:_PANOCHE 230KV - SECTION 1D & 2D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P2-4:A13:5:_PANOCHE 230KV - SECTION 1D & 2D	P2	Bus/Breaker	Low	0.89	0.90	NA	0.89	0.97	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
KEARNEY 230 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.94	0.92	0.89	1.01	1.05	0.98	1.01	0.92	Monitor Future forecast
HERNDON 230 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.93	0.91	0.87	1.01	1.06	0.98	1.01	0.91	Monitor Future forecast
TOMATAK 70 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.87	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
MANCHSTR 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.96	0.94	0.89	1.04	1.09	1.00	1.04	0.94	Monitor Future forecast

2022-2023 ISO Reliability Assessment - Preliminary Study Results

Study Area: PG&E Greater Fresno

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
HERNDON 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.95	0.93	0.89	1.04	1.10	1.00	1.04	0.93	Monitor Future forecast
PNEDLE 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.92	0.90	0.86	1.03	1.12	0.98	1.03	0.90	Project:Wilson 115kV Reinforcement
WOODWARD 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.96	0.94	0.89	1.04	1.09	1.01	1.04	0.94	Monitor Future forecast
BULLARD 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.91	0.89	0.85	1.03	1.11	0.97	1.03	0.89	Project: Herndon-Bullard reconductoring
CHLDHOSP 115 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.95	0.94	0.89	1.04	1.09	1.01	1.04	0.93	Monitor Future forecast
CAMDEN 70 kV	P2-4:A14:1:_HERNDON 230KV - SECTION 1E & 2E	P2	Bus/Breaker	Low	0.93	0.92	0.89	1.00	1.07	0.98	1.01	0.91	Monitor Future forecast
COLCGN T 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.90	0.87	0.99	0.96	0.99	0.96	0.96	0.86	New Gates 230/70kV transformer project
OIL CITYT 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.91	0.88	0.99	0.97	1.00	0.97	0.96	0.87	New Gates 230/70kV transformer project
PENNZIER 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.91	0.88	0.99	0.97	1.00	0.97	0.96	0.87	New Gates 230/70kV transformer project
AVNLPARK 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.90	0.87	0.99	0.95	1.02	0.94	0.94	0.86	New Gates 230/70kV transformer project
SUN CITY 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.90	0.87	0.99	0.95	1.02	0.94	0.94	0.86	New Gates 230/70kV transformer project
AVENAL 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.90	0.87	0.99	0.95	1.02	0.94	0.94	0.86	New Gates 230/70kV transformer project
KETTLEMN 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.89	0.86	0.99	0.95	1.00	0.94	0.94	0.85	New Gates 230/70kV transformer project
CHEVPLIN 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.89	0.86	0.99	0.95	1.00	0.94	0.94	0.85	New Gates 230/70kV transformer project
WESTLND�_3 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.92	0.88	1.00	0.96	0.99	0.97	0.95	0.87	New Gates 230/70kV transformer project
GATES 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.91	0.88	1.00	0.96	0.99	0.97	0.95	0.87	New Gates 230/70kV transformer project
JAYNESWSTA 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.91	0.88	1.00	0.96	0.99	0.97	0.95	0.87	New Gates 230/70kV transformer project
HURON 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.92	0.88	0.99	0.96	0.98	0.97	0.95	0.87	New Gates 230/70kV transformer project
CALFLAX 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.92	0.89	0.99	0.96	1.00	0.98	0.95	0.89	New Gates 230/70kV transformer project
PLSNTVLY 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.92	0.89	0.99	0.97	1.00	0.97	0.96	0.89	New Gates 230/70kV transformer project
COLNGA 2 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.90	0.87	0.99	0.97	1.00	0.97	0.96	0.87	New Gates 230/70kV transformer project
DERRICK 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.91	0.88	0.99	0.97	1.00	0.97	0.96	0.87	New Gates 230/70kV transformer project
TORNADO 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.90	0.87	0.99	0.96	0.99	0.96	0.96	0.86	New Gates 230/70kV transformer project
COLNGA 1 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.90	0.87	0.98	0.97	0.99	0.96	0.96	0.86	New Gates 230/70kV transformer project
JACALITO 70 kV	P2-4:A14:10:_GATES D 230KV - SECTION 2D & 1D	P2	Bus/Breaker	Low	0.91	0.87	0.99	0.96	0.99	0.96	0.96	0.87	New Gates 230/70kV transformer project
CAMDEN 70 kV	P2-4:A14:21:_HERNDON 115KV - SECTION 1D & 2D	P2	Bus/Breaker	Low	0.94	0.92	0.89	1.00	1.07	0.98	1.01	0.92	Monitor Future forecast
CAMDEN 70 kV	P2-4:A14:39:_MC CALL 230KV - SECTION 1D & 1E	P2	Bus/Breaker	Low	NA	0.91	0.86	NA	1.03	NA	NA	0.91	Monitor Future forecast
CAMDEN 70 kV	P2-4:A14:6:_MC CALL 230KV - SECTION 2E & 1E	P2	Bus/Breaker	Low	0.94	0.92	0.88	0.99	1.05	0.98	1.00	0.92	Monitor Future forecast
CAMDEN 70 kV	P2-4:A14:7:_MC CALL 230KV - SECTION 2E & 2D	P2	Bus/Breaker	Low	0.94	0.93	0.89	1.00	1.05	0.98	1.01	0.93	Monitor Future forecast
CAMDEN 70 kV	P2-4:A14:9:_MC CALL 230KV - SECTION 1D & 2D	P2	Bus/Breaker	Low	0.92	0.91	0.86	0.98	1.03	0.95	0.99	0.91	Monitor Future forecast
ARBURU T 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.89	0.88	0.81	NA	0.84	NA	NA	0.88	Review Existing Oro Loma 70kV reinforcement project
ARBURUA 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.89	0.88	0.80	NA	0.83	NA	NA	0.88	Review Existing Oro Loma 70kV reinforcement project
CANAL 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.80	0.81	0.69	NA	0.70	NA	NA	0.81	Review Existing Oro Loma 70kV reinforcement project
MERCYSPRNGSS 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.87	0.86	0.77	NA	0.80	NA	NA	0.86	Review Existing Oro Loma 70kV reinforcement project
MRCYSPRS 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.87	0.85	0.76	NA	0.79	NA	NA	0.85	Review Existing Oro Loma 70kV reinforcement project
ORTIGA 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.84	0.84	0.73	NA	0.76	NA	NA	0.83	Review Existing Oro Loma 70kV reinforcement project
VEGA 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P3	G-1/N-1	Low	0.87	0.86	0.77	NA	0.80	NA	NA	0.86	Review Existing Oro Loma 70kV reinforcement project



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
ARBURU T 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P3	G-1/N-1	Low	NA	NA	NA	NA	0.86	NA	NA	NA	new Losbanos 230/70kV project
INTL TUR 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P3	G-1/N-1	Low	0.89	0.88	NA	NA	NA	NA	NA	0.88	new Losbanos 230/70kV project
LIVNGSTN 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P3	G-1/N-1	Low	NA	0.89	0.89	NA	0.85	NA	NA	0.89	new Losbanos 230/70kV project
PCHCO PP 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P3	G-1/N-1	Low	0.88	0.87	NA	NA	NA	NA	0.90	0.87	new Losbanos 230/70kV project
SNTA NLA 70 kV	P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1 & P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P3	G-1/N-1	Low	NA	NA	NA	NA	0.90	NA	NA	NA	new Losbanos 230/70kV project
WRGHT PP 70 kV	P1-1:A13:27:_WRIGHT D 12.47KV GEN UNIT QF & P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P3	G-1/N-1	Low	NA	NA	NA	NA	0.90	NA	NA	NA	new Losbanos 230/70kV project
DAIRYLND 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	NA	0.90	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV reconductoring
GILLRAN 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.85	0.84	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.86	0.84	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV reconductoring
MENDOTA 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.82	0.80	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV reconductoring
NEWHALL 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.86	0.84	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
NORTHSTAR 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.82	0.80	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
PMTFMPP 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.85	0.84	NA	NA	NA	NA	NA	NA	Under Review
Q1028Q1029 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.82	0.80	NA	NA	NA	NA	NA	NA	Under Review
Q1127 115 kV	P1-1:A13:31:_CHWCHLA2 13.80KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	0.82	0.80	NA	NA	NA	NA	NA	NA	Under Review
DOS PALS 70 kV	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P3	G-1/N-1	Low	NA	NA	0.84	NA	NA	NA	NA	NA	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 70 kV	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P3	G-1/N-1	Low	NA	NA	0.86	NA	NA	NA	NA	NA	Review Existing Oro Loma 70kV reinforcement project
BER VLLY 70 kV	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-2:A13:87:_MERCED FALLS-EXCHEQUER 70KV [8990]	P3	G-1/N-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	Under Review
INDN FLT 70 kV	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-2:A13:87:_MERCED FALLS-EXCHEQUER 70KV [8990]	P3	G-1/N-1	Low	NA	NA	0.88	NA	NA	NA	NA	NA	monitor future forecast
SAXONCRK 70 kV	P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1 & P1-2:A13:87:_MERCED FALLS-EXCHEQUER 70KV [8990]	P3	G-1/N-1	Low	NA	NA	0.88	NA	NA	NA	NA	NA	monitor future forecast
BIOMASS 70 kV	P1-1:A13:9:_Q1028Q1029PV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	NA	0.70	0.89	NA	NA	NA	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
CALRENEW 70 kV	P1-1:A13:9:_Q1028Q1029PV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	NA	0.70	0.89	NA	NA	NA	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
MENDOTA 70 kV	P1-1:A13:9:_Q1028Q1029PV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	NA	0.70	0.89	NA	NA	NA	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P1-1:A13:9:_Q1028Q1029PV 34.50KV GEN UNIT 1 & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P3	G-1/N-1	Low	NA	0.69	0.87	NA	NA	NA	0.87	0.88	Review Existing Oro Loma 70kV reinforcement project
CHWCHLLA 115 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	Low	NA	0.89	0.85	NA	NA	NA	NA	0.89	Project:Wilson 115kV Reinforcement
SHARON 115 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P3	G-1/N-1	Low	NA	NA	0.86	NA	NA	NA	NA	0.90	Project:Wilson 115kV Reinforcement
FIREBAGH 70 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P3	G-1/N-1	Low	NA	0.88	0.77	NA	NA	NA	NA	0.88	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 115 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P3	G-1/N-1	Low	NA	NA	0.83	NA	NA	NA	NA	NA	monitor future forecast
SNTA RTA 70 kV	P1-1:A14:42:_KERCKHOFFPH2 13.80KV GEN UNIT 1 & P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P3	G-1/N-1	Low	NA	NA	0.83	NA	NA	NA	NA	NA	Review Existing Oro Loma 70kV reinforcement project
HENRIETA 230 kV	P1-1:A14:47:_GWF_GT2 13.80KV GEN UNIT 1 & P1-2:A14:17:_MUSTANG SW STA-GREGG 230KV [4700]	P3	G-1/N-1	Low	NA	NA	NA	0.90	NA	NA	NA	NA	generation re-dispatch
DINUBA 70 kV	P1-1:A14:57:_MCCALL1T 13.20KV GEN UNIT 1 & P1-2:A14:113:_REEDLEY-DINUBA #1 70KV [9050]	P3	G-1/N-1	Low	NA	0.90	NA	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
AVENAL 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.81	New Gates 230/70kV transformer project
AVNLPARK 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.81	New Gates 230/70kV transformer project
CALFLAX 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.89	0.85	NA	NA	NA	NA	NA	0.85	New Gates 230/70kV transformer project
CHEVPLIN 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.80	New Gates 230/70kV transformer project
COLCGN T 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.81	New Gates 230/70kV transformer project
COLNGA 1 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.81	New Gates 230/70kV transformer project
COLNGA 2 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.82	New Gates 230/70kV transformer project
DERRICK 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.82	New Gates 230/70kV transformer project
GATES 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.88	0.83	NA	NA	NA	NA	NA	0.82	New Gates 230/70kV transformer project
HURON 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.88	0.83	NA	NA	NA	NA	NA	0.83	New Gates 230/70kV transformer project
JACALITO 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.87	0.82	NA	NA	NA	NA	NA	0.82	New Gates 230/70kV transformer project
JAYNESWSTA 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.88	0.83	NA	NA	NA	NA	NA	0.83	New Gates 230/70kV transformer project
KETTLEMN 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.85	0.81	NA	NA	NA	NA	NA	0.80	New Gates 230/70kV transformer project



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
OIL CITYT 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.82	New Gates 230/70kV transformer project
PENNZIER 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.82	New Gates 230/70kV transformer project
PLSNTVLY 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.89	0.85	NA	NA	NA	NA	NA	0.85	New Gates 230/70kV transformer project
SUN CITY 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.82	NA	NA	NA	NA	NA	0.81	New Gates 230/70kV transformer project
TORNADO 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.86	0.81	NA	NA	NA	NA	NA	0.81	New Gates 230/70kV transformer project
WESTLND3_3 70 kV	P1-1:A14:66:_CHV.COAL 9.11KV GEN UNIT 1 & P1-3:A14:14:_GATES D 230/70KV TB 5	P3	G-1/N-1	Low	0.88	0.83	NA	NA	NA	NA	NA	0.83	New Gates 230/70kV transformer project
CAMDEN 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCGRN 13.80KV & KINGSBUR 13.80KV & SANGERCGRN 13.80KV GEN UNITS & P1-2:A14:144:_JACKSONSWSTA-GWF_HEP 115KV [0]	P3	G-1/N-1	Low	NA	NA	0.90	NA	NA	NA	NA	NA	Review Existing Oro Loma 70kV reinforcement project
AUBERRY 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCGRN 13.80KV & KINGSBUR 13.80KV & SANGERCGRN 13.80KV GEN UNITS & P1-4:A14:34:_COPPRMNE SVD=V	P3	G-1/N-1	Low	NA	NA	0.87	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
NRTHFORK 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCGRN 13.80KV & KINGSBUR 13.80KV & SANGERCGRN 13.80KV GEN UNITS & P1-4:A14:34:_COPPRMNE SVD=V	P3	G-1/N-1	Low	NA	NA	0.86	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO2 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCGRN 13.80KV & KINGSBUR 13.80KV & SANGERCGRN 13.80KV GEN UNITS & P1-4:A14:34:_COPPRMNE SVD=V	P3	G-1/N-1	Low	NA	NA	0.86	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCGRN 13.80KV & KINGSBUR 13.80KV & SANGERCGRN 13.80KV GEN UNITS & P1-4:A14:34:_COPPRMNE SVD=V	P3	G-1/N-1	Low	NA	NA	0.85	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
WISHON 70 kV	P1-1:A14:71:_KINGSBUR 13.80KV & SANGERCGRN 13.80KV & KINGSBUR 13.80KV & SANGERCGRN 13.80KV GEN UNITS & P1-4:A14:34:_COPPRMNE SVD=V	P3	G-1/N-1	Low	NA	NA	0.88	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
ATWATER 115 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	Install Redundant protection
LIVNGSTN 115 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	Sensitivity Only
GALLO 115 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	Sensitivity Only
EL CAPTN 115 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	Sensitivity Only
CRESSEY 115 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.25	Diverge	NA	Sensitivity Only
MERCED 115 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.29	Diverge	NA	Sensitivity Only
MERCED 70 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.55	Diverge	NA	Install Redundant protection

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
ELNIDOBM 70 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.57	Diverge	NA	Install Redundant protection
MC SWAIN 70 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.80	Diverge	NA	Sensitivity Only
MARIPOS2 70 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.88	Diverge	NA	Sensitivity Only
MRCDFLLS 70 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.80	Diverge	NA	Sensitivity Only
EXCHEQUR 70 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.88	Diverge	NA	Sensitivity Only
BER VLLY 70 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.87	Diverge	NA	Sensitivity Only
SAXONCRK 70 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.86	Diverge	NA	Sensitivity Only
INDN FLT 70 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.86	Diverge	NA	Sensitivity Only
YOSEMITE 70 kV	P5-5a:A13:5:_WILSON 115 KV #1 & #2 BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	Diverge	NA	NA	Diverge	NA	0.85	Diverge	NA	Sensitivity Only
COLCGN T 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.99	0.96	0.98	0.95	0.96	0.86	Install Redundant protection
OIL CITYT 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.91	0.88	0.99	0.96	0.98	0.96	0.96	0.87	Install Redundant protection
PENNZIER 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.91	0.88	0.99	0.96	0.98	0.96	0.96	0.87	Install Redundant protection
AVNLPARK 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.99	0.94	1.00	0.93	0.94	0.86	Install Redundant protection
SUN CITY 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.99	0.94	1.00	0.93	0.94	0.86	Install Redundant protection
AVENAL 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.99	0.94	1.00	0.93	0.94	0.86	Install Redundant protection
KETTLEMN 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.89	0.86	0.99	0.94	0.98	0.93	0.94	0.85	Install Redundant protection
CHEVPLIN 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.89	0.86	0.99	0.94	0.99	0.93	0.95	0.85	Install Redundant protection
WESTLND�_3 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.91	0.88	1.00	0.95	0.97	0.96	0.95	0.87	Install Redundant protection
GATES 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.91	0.88	1.00	0.95	0.97	0.96	0.95	0.87	New Gates 230/70kV transformer project
JAYNESWSTA 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.91	0.88	1.00	0.95	0.97	0.96	0.95	0.87	Install Redundant protection
HURON 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.92	0.88	0.99	0.95	0.97	0.96	0.95	0.87	Install Redundant protection
CALFLAX 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.92	0.89	0.99	0.96	0.98	0.97	0.95	0.89	Install Redundant protection

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
PLSNTVLY 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.92	0.89	0.99	0.97	0.99	0.96	0.96	0.89	Install Redundant protection
COLNGA 2 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.99	0.96	0.98	0.96	0.96	0.87	Install Redundant protection
DERRICK 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.91	0.88	0.99	0.97	0.98	0.96	0.96	0.87	Install Redundant protection
TORNADO 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.99	0.96	0.98	0.95	0.96	0.86	Install Redundant protection
COLNGA 1 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.98	0.96	0.97	0.95	0.96	0.86	Install Redundant protection
JACALITO 70 kV	P5-5a:A14:1:_GATES SECTION D & E 230 KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.90	0.87	0.99	0.95	0.97	0.96	0.96	0.87	Install Redundant protection
CAMDEN 70 kV	P5-5a:A14:6:_HERNDON #1 115KV BUS (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-Redundent Relay	Low	0.94	0.92	0.90	1.00	1.07	0.98	1.01	0.92	Monitor Future forecast
TOMATAK 70 kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.86	0.89	0.88	Diverge	Diverge	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.90	0.90	Diverge	Diverge	0.90	0.90	0.90	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.90	0.90	Diverge	Diverge	0.90	0.90	0.90	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:1:_Los Banos 500-230-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.90	0.90	Diverge	Diverge	0.90	0.90	0.90	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A13:10:_Chowchilla 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.89	NA	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13:10:_Chowchilla 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.94	0.90	0.90	0.90	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:10:_Chowchilla 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:10:_Chowchilla 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
CHWCHLLA 115 kV	P5-5c:A13:11:_Le Grand 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	NA	NA	0.87	NA	NA	NA	NA	NA	Monitor Future forecast
SHARON 115 kV	P5-5c:A13:11:_Le Grand 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	NA	NA	0.88	NA	NA	NA	NA	NA	Monitor Future forecast
TOMATAK 70 kV	P5-5c:A13:12:_Le Grand 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.86	0.89	NA	0.88	0.97	0.89	0.88	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13:12:_Le Grand 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.90	NA	0.89	0.95	0.90	0.89	0.90	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:12:_Le Grand 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.90	NA	0.89	0.97	0.90	0.89	0.90	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:12:_Le Grand 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.90	NA	0.89	0.97	0.90	0.89	0.90	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A13:13:_Sharon 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.89	NA	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
MENDOTA 70 kV	P5-5c:A13:13:_Sharon 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.94	0.90	0.90	0.90	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:13:_Sharon 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:13:_Sharon 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
ATWATER 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.26	0.26	Diverge	Diverge	Install Redundant Battery
LIVNGSTN 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.25	0.26	Diverge	Diverge	Project:Wilson 115kV Reinforcement
GALLO 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.25	0.25	Diverge	Diverge	Install Redundant Battery
EL CAPTN 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.25	0.25	Diverge	Diverge	Install Redundant Battery
CRESSEY 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.26	0.25	Diverge	Diverge	Install Redundant Battery
MERCED 115 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.30	0.29	Diverge	Diverge	Install Redundant Battery
MERCED 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.58	0.55	Diverge	Diverge	Install Redundant Battery
ELNIDOBM 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.60	0.57	Diverge	Diverge	Install Redundant Battery
MC SWAIN 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.86	0.80	Diverge	Diverge	Install Redundant Battery
MARIPOS2 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.93	0.88	Diverge	Diverge	Sensitivity Only
MRCDFLLS 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.86	0.80	Diverge	Diverge	Install Redundant Battery
EXCHEQUR 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.93	0.88	Diverge	Diverge	Sensitivity Only
BER VLLY 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.92	0.87	Diverge	Diverge	Sensitivity Only
SAXONCRK 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.92	0.86	Diverge	Diverge	Sensitivity Only
INDN FLT 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.92	0.86	Diverge	Diverge	Sensitivity Only
YOSEMITE 70 kV	P5-5c:A13:2:_Wilson 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	Diverge	Diverge	Diverge	Diverge	0.92	0.85	Diverge	Diverge	Sensitivity Only
TOMATAK 70 kV	P5-5c:A13:21:_Newhall 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.89	NA	0.89	0.97	0.89	0.90	0.89	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P5-5c:A13:22:_Dairyland 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.89	NA	0.89	0.97	0.89	0.90	0.89	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 115 kV	P5-5c:A13:23:_Hammonds 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	NA	NA	0.84	NA	NA	NA	NA	NA	Monitor Future forecast



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
ORO LOMA 70 kV	P5-5c:A13:23:_Hammonds 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	NA	NA	0.86	NA	NA	NA	NA	NA	Monitor Future forecast
SNTA RTA 70 kV	P5-5c:A13:23:_Hammonds 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	NA	NA	0.83	NA	NA	NA	NA	NA	Monitor Future forecast
DOS PALS 70 kV	P5-5c:A13:23:_Hammonds 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	NA	NA	0.84	NA	NA	NA	NA	NA	Monitor Future forecast
FIREBAGH 70 kV	P5-5c:A13:23:_Hammonds 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	NA	NA	0.78	NA	NA	NA	NA	NA	Review Existing Oro Loma 70kV reinforcement project
FIREBAGH 70 kV	P5-5c:A13:24:_Hammonds 115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.89	NA	1.02	0.96	0.99	1.02	0.89	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P5-5c:A13:25:_Oro Loma 115-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.89	NA	0.88	0.91	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13:25:_Oro Loma 115-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.92	0.90	0.90	0.90	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:25:_Oro Loma 115-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.95	0.90	0.90	0.90	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:25:_Oro Loma 115-70kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	NA	0.89	0.95	0.90	0.90	0.90	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A13:3:_Quinto SW STA 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13:3:_Quinto SW STA 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:3:_Quinto SW STA 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:3:_Quinto SW STA 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
NEWHALL 115 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.85	1.00	0.99	0.96	1.05	0.99	0.96	1.00	Install Redundant Battery
GILLRAN 115 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.84	1.00	0.99	0.95	1.05	0.99	0.95	1.00	Install Redundant Battery
MENDOTA 115 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.80	1.03	1.02	0.94	1.04	1.02	0.94	1.03	Install Redundant Battery
ORO LOMA 115 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.91	0.83	1.00	0.98	0.97	1.00	0.91	Project:Wilson-Oro Loma 115kV reconductoring
MADERAPR 115 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.85	1.01	0.99	0.95	1.05	0.99	0.96	1.00	Install Redundant Battery
PMTFMPP 115 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.84	1.00	0.99	0.95	1.05	0.99	0.95	1.00	Install Redundant Battery
NORTHSTAR 115 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.80	1.03	1.03	0.94	NA	1.03	0.94	1.03	Install Redundant Battery
ORO LOMA 70 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.91	0.94	0.85	1.03	1.01	1.00	1.03	0.93	Monitor Future forecast
SNTA RTA 70 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.91	0.82	1.03	1.01	0.99	1.03	0.90	Install Redundant Battery

2022-2023 ISO Reliability Assessment - Preliminary Study Results

Study Area: PG&E Greater Fresno

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
DOS PALS 70 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.92	0.83	1.03	1.01	0.99	1.03	0.92	Install Redundant Battery
FIREBAGH 70 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.85	0.88	0.77	1.02	0.96	0.97	1.02	0.88	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.68	0.88	0.87	0.81	0.95	0.88	0.81	0.88	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.70	0.89	0.89	0.82	0.94	0.89	0.82	0.89	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.70	0.89	0.89	0.82	0.96	0.89	0.82	0.89	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.70	0.89	0.89	0.82	0.96	0.89	0.82	0.89	Install Redundant Battery
Q1028Q1029 115 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.80	1.03	1.03	0.94	1.04	1.03	0.94	1.03	Install Redundant Battery
Q1127 115 kV	P5-5c:A13:4:_Panoche 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.80	1.03	1.03	0.94	1.03	1.03	0.94	1.03	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A13:5:_Tranquillity SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A13:5:_Tranquillity SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A13:5:_Tranquillity SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A13:5:_Tranquillity SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
CANAL 70 kV	P5-5c:A14:1:_Gates 500kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.99	0.98	0.97	1.02	0.89	0.99	1.03	0.98	Generation Re-dispatch
ORTIGA 70 kV	P5-5c:A14:1:_Gates 500kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.99	0.99	0.98	1.03	0.89	1.00	1.03	0.99	Generation Re-dispatch
CLOVIS-2 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.90	Diverge	1.03	0.96	0.98	1.03	0.90	Sensitivity Only
REEDLEY 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.85	Diverge	1.02	0.93	0.95	1.02	0.85	Install Redundant Battery
WAHTOKE 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.85	Diverge	1.02	0.93	0.95	1.01	0.84	Install Redundant Battery
RAINBW 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.90	Diverge	1.03	0.98	0.97	1.03	0.89	Install Redundant Battery
PIEDRA 1 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.91	0.88	Diverge	1.02	0.95	0.97	1.02	0.87	Install Redundant Battery
KNGSRVR1 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.90	Diverge	1.04	0.95	0.99	1.04	0.89	Install Redundant Battery
SANGERCGN 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.90	Diverge	1.03	0.96	0.98	1.03	0.90	Sensitivity Only
PARLIER 115 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.91	0.88	Diverge	1.02	0.94	0.97	1.02	0.87	Install Redundant Battery

Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
DUNLAP 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.92	0.87	Diverge	1.02	1.00	0.99	1.02	0.86	Project: Reedley 70kV Reinforcement
SANDCRK 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.88	Diverge	1.02	1.01	1.00	1.02	0.87	Project: Reedley 70kV Reinforcement
STONCRRLL 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.93	0.89	Diverge	1.02	1.00	1.00	1.02	0.88	Project: Reedley 70kV Reinforcement
DINUBA 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.94	0.90	Diverge	1.01	1.01	1.02	1.01	0.89	Project: Reedley 70kV Reinforcement
OROSI 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.94	0.90	Diverge	1.03	1.01	1.01	1.02	0.89	Sensitivity Only
CAMDEN 70 kV	P5-5c:A14:10:_Mccall 230-115kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	Diverge	0.97	1.10	0.93	0.95	0.89	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A14:11:_Henrietta 230-115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A14:11:_Henrietta 230-115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A14:11:_Henrietta 230-115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A14:11:_Henrietta 230-115-70kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A14:12:_Mustang SW STA 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A14:13:_California Flats 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A14:13:_California Flats 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A14:13:_California Flats 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A14:13:_California Flats 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
KEARNEY 230 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.94	0.91	0.88	1.02	1.09	1.00	1.03	0.91	Monitor Future forecast
HERNDON 230 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.94	0.91	0.87	1.03	1.10	1.01	1.03	0.91	Monitor Future forecast
ASHLAN 230 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.94	0.92	0.87	1.04	1.11	1.02	1.04	0.91	Monitor Future forecast
NRTHFORK 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(Failure of Non-Redundent Batt)	P5	Non-Redundent Battery	Low	0.88	0.95	0.88	1.03	1.06	0.99	1.03	0.99	Install Redundant Battery



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
SJNO2 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.95	0.89	1.03	1.06	0.99	1.03	0.99	Install Redundant Battery
SJNO3 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.94	0.88	1.03	1.06	0.98	1.03	0.98	Install Redundant Battery
TOMATAK 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.86	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Install Redundant Battery
BIOMASS 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
CALRENEW 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.88	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Install Redundant Battery
HERNDON 115 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.97	0.94	0.90	1.05	1.13	1.03	1.05	0.93	Monitor Future forecast
PNEDLE 115 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.94	0.91	0.87	1.04	1.15	1.01	1.05	0.90	Monitor Future forecast
BULLARD 115 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.93	0.90	0.86	1.04	1.14	1.01	1.05	0.90	Monitor Future forecast
CHLDHOSP 115 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.97	0.94	0.90	1.05	1.12	1.03	1.05	0.94	Monitor Future forecast
WISHON 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.90	0.96	0.90	1.03	1.07	1.00	1.04	1.00	Project: Coppermine reconductoring approved in 2021-22 TPP
AUBERRY 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.89	0.95	0.89	1.03	1.07	0.99	1.03	1.00	Project: Coppermine reconductoring approved in 2021-22 TPP
CAMDEN 70 kV	P5-5c:A14:2:_Gregg 230kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.93	0.91	0.89	1.00	1.07	0.98	1.01	0.91	Monitor Future forecast
CAMDEN 70 kV	P5-5c:A14:5:_Herndon 230-115kV Batt(FAILURE OF NON-REDUNDENT BATT)	P5	Non-Redundent Battery	Low	0.94	0.93	0.90	1.01	1.07	0.98	1.01	0.92	Monitor Future forecast
CHWCHLLA 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110] & P1-2:A14:45:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890]	P6	N-1-1	Low	0.90	0.88	0.85	NA	NA	NA	NA	0.87	Under Review
SHARON 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110] & P1-2:A14:45:_KERCKHOFF-CLOVIS-SANGER #1 115KV [1890]	P6	N-1-1	Low	NA	0.89	0.86	NA	NA	NA	NA	0.88	Under Review
INDN FLT 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	monitor future forecast
SAXONCRK 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-1:A13:32:_EXCHQUER 13.80KV GEN UNIT 1	P6	N-1-1	Low	NA	NA	0.90	NA	NA	NA	NA	NA	monitor future forecast
BER VLLY 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.78	NA	NA	NA	NA	0.90	NA	NA	Project:Wilson 115kV Reinforcement
BIOMASS 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.41	0.89	0.88	NA	NA	0.88	NA	0.89	Project:Wilson 115kV Reinforcement
CALRENEW 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.41	0.89	0.88	NA	NA	0.88	NA	0.89	Project:Wilson 115kV Reinforcement
CERTTEED 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.68	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
CHWCGN 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.68	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CHWCHLA2 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.68	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CHWCHLASLR 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.61	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CORSGOLD 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.89	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
DAIRYLND 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.58	NA	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV reconductoring
EXCHEQR 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.84	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
EXCHEQR 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.80	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
GILLRAN 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.51	NA	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV reconductoring
LE GRAND 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.65	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MADERAPR 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.52	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MARIPOS2 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.80	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MC SWAIN 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.85	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MENDOTA 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.48	NA	NA	NA	NA	NA	NA	NA	Project: Panoche-Oro Loma 115kV reconductoring
MENDOTA 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.41	0.89	0.88	NA	NA	0.88	NA	0.89	Project:Wilson 115kV Reinforcement
MRCDFLLS 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.84	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
NEWHALL 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.52	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
NORTHSTAR 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.48	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
OAKHURST 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
PMTFMPP 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.51	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
Q1028Q1029 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.48	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
Q1127 115 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.48	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
TOMATAK 70 kV	P1-2:A13:45:_WILSON-LE GRAND 115KV [4170] & P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P6	N-1-1	Low	0.40	0.87	0.87	NA	NA	0.87	NA	0.87	Project:Wilson 115kV Reinforcement



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
CRESSEY 115 kV	P1-2:A13:53:_EL CAPITAN-WILSON 115KV [1510] & P1-2:A13:43:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	monitor future forecast
EL CAPTN 115 kV	P1-2:A13:53:_EL CAPITAN-WILSON 115KV [1510] & P1-2:A13:43:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	monitor future forecast
GALLO 115 kV	P1-2:A13:53:_EL CAPITAN-WILSON 115KV [1510] & P1-2:A13:43:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	Low	NA	NA	0.88	NA	NA	NA	NA	NA	monitor future forecast
LIVNGSTN 115 kV	P1-2:A13:53:_EL CAPITAN-WILSON 115KV [1510] & P1-2:A13:43:_ATWATER-LIVINGSTON-MERCED 115KV [1030] MOAS OPENED ON ATWATR J_MERCED	P6	N-1-1	Low	NA	NA	0.87	NA	NA	NA	NA	NA	monitor future forecast
DOS PALS 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240] & P1-4:A14:27:_GREGG SVD=V	P6	N-1-1	Low	NA	NA	0.82	NA	NA	NA	NA	NA	monitor future forecast
FIREBAGH 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240] & P1-4:A14:27:_GREGG SVD=V	P6	N-1-1	Low	0.87	0.88	0.76	NA	NA	NA	NA	0.87	Review Existing Oro Loma 70kV reinforcement project
ORO LOMA 115 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240] & P1-4:A14:27:_GREGG SVD=V	P6	N-1-1	Low	0.90	NA	0.82	NA	NA	NA	NA	NA	Project:Wilson-Oro Loma 115kV reconductoring
ORO LOMA 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240] & P1-4:A14:27:_GREGG SVD=V	P6	N-1-1	Low	NA	NA	0.84	NA	NA	NA	NA	NA	monitor future forecast
SNTA RTA 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240] & P1-4:A14:27:_GREGG SVD=V	P6	N-1-1	Low	0.89	NA	0.81	NA	NA	NA	NA	NA	Review Existing Oro Loma 70kV reinforcement project
SJNO3 70 kV	P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082] & P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400]	P6	N-1-1	Low	NA	0.85	0.80	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
STOREY 230 kV	P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082] & P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400]	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	monitor future forecast
AUBERRY 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	0.87	0.82	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
BORDEN 230 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.88	NA	NA	NA	NA	NA	monitor future forecast
CHSR08A 230 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	monitor future forecast
CHSR08B 230 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	monitor future forecast
COPPRMNE 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.87	NA	NA	NA	NA	NA	monitor future forecast
FRIANTDAM 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.87	NA	NA	NA	NA	NA	monitor future forecast
NRTHFORK 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	0.86	0.81	NA	NA	NA	NA	NA	Under Review
RIVERROC 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	monitor future forecast
RVRRCK T 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	NA	0.89	NA	NA	NA	NA	NA	monitor future forecast



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
SJNO2 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	0.86	0.81	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
WISHON 70 kV	P1-2:A14:11:_BORDEN-GREGG #2 230KV [4400] & P1-2:A14:10:_BORDEN-GREGG #1 230KV [1082]	P6	N-1-1	Low	NA	0.88	0.83	NA	NA	NA	NA	NA	Project: Coppermine reconductoring approved in 2021-22 TPP
CALFLAX 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.64	0.62	NA	NA	NA	NA	0.89	0.64	New Gates 230/70kV transformer project
CANTUA 115 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.79	0.80	NA	NA	NA	NA	NA	0.82	New Gates 230/70kV transformer project
COLCGN T 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.61	0.59	NA	NA	NA	NA	0.90	0.61	New Gates 230/70kV transformer project
COLNGA 1 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.61	0.59	NA	NA	NA	NA	NA	0.60	New Gates 230/70kV transformer project
COLNGA 2 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.62	0.59	NA	NA	NA	NA	0.90	0.61	New Gates 230/70kV transformer project
DERRICK 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.62	0.60	NA	NA	NA	NA	NA	0.62	New Gates 230/70kV transformer project
EXCELSIORSS 115 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.79	0.80	NA	NA	NA	NA	NA	0.82	New Gates 230/70kV transformer project
EXCLSRSLR 115 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.79	0.80	NA	NA	NA	NA	NA	0.82	New Gates 230/70kV transformer project
FIVEPOINTSSS 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.70	0.69	NA	NA	NA	NA	NA	0.71	New Gates 230/70kV transformer project
KAMM 115 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.79	0.80	NA	NA	NA	NA	NA	0.82	New Gates 230/70kV transformer project
OIL CITYT 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.62	0.60	NA	NA	NA	NA	0.90	0.62	New Gates 230/70kV transformer project
PAIGESLR 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.70	0.70	NA	NA	NA	NA	NA	0.72	New Gates 230/70kV transformer project
PENNZIER 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.62	0.60	NA	NA	NA	NA	0.90	0.62	New Gates 230/70kV transformer project

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High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
PLSNTVLY 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.64	0.62	NA	NA	NA	NA	0.90	0.65	New Gates 230/70kV transformer project
SCHINDLR 115 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.77	0.78	NA	NA	NA	NA	NA	0.80	New Gates 230/70kV transformer project
SCHLNDLR 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.71	0.71	NA	NA	NA	NA	NA	0.73	New Gates 230/70kV transformer project
TORNADO 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.61	0.59	NA	NA	NA	NA	0.90	0.61	New Gates 230/70kV transformer project
WESTLNDS 115 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.79	0.80	NA	NA	NA	NA	NA	0.82	New Gates 230/70kV transformer project
WHTNYPT 70 kV	P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM & P1-3:A14:14:_GATES D 230/70KV TB 5	P6	N-1-1	Low	0.70	0.69	NA	NA	NA	NA	NA	0.72	New Gates 230/70kV transformer project
DINUBA 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.82	0.78	0.75	NA	NA	NA	NA	0.78	Project: Reedley 70kV Reinforcement
DNUBAEGY 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.84	0.81	0.78	NA	NA	NA	NA	0.80	Project: Reedley 70kV Reinforcement
DUNLAP 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.79	0.75	0.72	NA	NA	NA	NA	0.75	Project: Reedley 70kV Reinforcement
KNGSRVR1 115 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	NA	NA	0.87	NA	NA	NA	NA	NA	monitor future forecast
OROSI 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.82	0.78	0.75	NA	NA	NA	NA	0.78	Project: Reedley 70kV Reinforcement
PIEDRA 1 115 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	NA	0.89	0.85	NA	NA	NA	NA	0.88	Project: Reedley 70kV Reinforcement
REEDLEY 115 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.84	0.80	0.75	NA	NA	NA	NA	0.80	Project: Reedley 70kV Reinforcement
REEDLEY 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.85	0.82	0.78	NA	NA	NA	NA	0.82	Project: Reedley 70kV Reinforcement
SANDCRK 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.80	0.76	0.73	NA	NA	NA	NA	0.76	Project: Reedley 70kV Reinforcement



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
STONCRRL 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.81	0.77	0.74	NA	NA	NA	NA	0.76	Project: Reedley 70kV Reinforcement
TVY VLLY 70 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.85	0.81	0.77	NA	NA	NA	NA	0.81	Project: Reedley 70kV Reinforcement
WAHTOKE 115 kV	P1-2:A14:54:_SANGER-REEDLEY 115KV [9140] MOAS OPENED ON PARLIER_REEDLEY & P1-2:A14:55:_MCCALL-REEDLEY 115KV [2320] MOAS OPENED ON MC CALL_WAHTOKE	P6	N-1-1	Low	0.83	0.79	0.74	NA	NA	NA	NA	0.79	Project: Reedley 70kV Reinforcement
WST FRSO 115 kV	P1-2:A14:63:_SANGER-CALIFORNIA AVE 115KV [9130] & P1-2:A14:65:_MCCALL-WEST FRESNO #2 115KV [2370]	P6	N-1-1	Low	NA	0.89	0.77	NA	NA	NA	NA	0.88	Under Review
CAL AVE 115 kV	P1-2:A14:65:_MCCALL-WEST FRESNO #2 115KV [2370] & P1-2:A14:63:_SANGER-CALIFORNIA AVE 115KV [9130]	P6	N-1-1	Low	NA	0.90	0.78	NA	NA	NA	NA	0.89	Under Review
DANISHCM 115 kV	P1-2:A14:65:_MCCALL-WEST FRESNO #2 115KV [2370] & P1-2:A14:63:_SANGER-CALIFORNIA AVE 115KV [9130]	P6	N-1-1	Low	NA	NA	0.80	NA	NA	NA	NA	NA	monitor future forecast
CAMDEN 70 kV	P1-2:A14:75:_MCCALL-KINGSBURG #2 115KV [2300] & P1-2:A14:72:_MCCALL-KINGSBURG #1 115KV [2290] MOAS OPENED ON KINGS J1_KINGS J2	P6	N-1-1	Low	0.88	0.89	0.87	NA	NA	NA	NA	0.89	Under Review
ATWATER 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.77	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
EL NIDO 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.83	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
ELNIDOBM 70 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.84	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MERCED 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.78	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
MERCED 70 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.83	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
WILSON A 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.79	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
WILSON B 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.79	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
WILSONSTCOM 115 kV	P1-3:A13:2:_WILSON 230/115KV TB 1 & P1-3:A13:3:_WILSON 230/115KV TB 2	P6	N-1-1	Low	0.79	NA	NA	NA	NA	NA	NA	NA	Project:Wilson 115kV Reinforcement
CALPEAKPNCHE 115 kV	P1-3:A13:5:_PANOCHE 230/115KV TB 2 & P1-3:A13:4:_PANOCHE 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
CHENY 115 kV	P1-3:A13:5:_PANOCHE 230/115KV TB 2 & P1-3:A13:4:_PANOCHE 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
DFS 115 kV	P1-3:A13:5:_PANOCHE 230/115KV TB 2 & P1-3:A13:4:_PANOCHE 230/115KV TB 1	P6	N-1-1	Low	0.87	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
HAMMONDS 115 kV	P1-3:A13:5:_PANOCHE 230/115KV TB 2 & P1-3:A13:4:_PANOCHE 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
LUIS_#3 115 kV	P1-3:A13:5:_PANOCHE 230/115KV TB 2 & P1-3:A13:4:_PANOCHE 230/115KV TB 1	P6	N-1-1	Low	0.87	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap

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High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
LUIS_#5 115 kV	P1-3:A13:5:_PANOCHE 230/115KV TB 2 & P1-3:A13:4:_PANOCHE 230/115KV TB 1	P6	N-1-1	Low	0.87	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
OXFORD 115 kV	P1-3:A13:5:_PANOCHE 230/115KV TB 2 & P1-3:A13:4:_PANOCHE 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
PANOCHE1 115 kV	P1-3:A13:5:_PANOCHE 230/115KV TB 2 & P1-3:A13:4:_PANOCHE 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
PANOCHE2 115 kV	P1-3:A13:5:_PANOCHE 230/115KV TB 2 & P1-3:A13:4:_PANOCHE 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
STARWDPNCH 115 kV	P1-3:A13:5:_PANOCHE 230/115KV TB 2 & P1-3:A13:4:_PANOCHE 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
WSTLD1RA 115 kV	P1-3:A13:5:_PANOCHE 230/115KV TB 2 & P1-3:A13:4:_PANOCHE 230/115KV TB 1	P6	N-1-1	Low	0.88	NA	NA	NA	NA	NA	NA	NA	Adjust Panoche 230/115kV transformer tap
ARBURUA 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	NA	0.90	NA	NA	NA	NA	NA	0.90	new Losbanos 230/70kV project
CANAL 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	0.89	0.89	0.88	NA	NA	NA	NA	0.89	new Losbanos 230/70kV project
INTL TUR 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	0.89	0.88	NA	NA	NA	NA	NA	0.88	new Losbanos 230/70kV project
LIVNGSTN 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	NA	0.89	0.89	NA	NA	NA	NA	0.89	new Losbanos 230/70kV project
MERCYSPRNGSS 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	NA	0.90	NA	NA	NA	NA	NA	0.89	new Losbanos 230/70kV project
MRCYSPRS 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	NA	0.89	0.90	NA	NA	NA	NA	0.89	new Losbanos 230/70kV project
ORTIGA 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	0.90	0.89	0.89	NA	NA	NA	NA	0.89	new Losbanos 230/70kV project
PCHCO PP 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	0.88	0.87	NA	NA	NA	0.90	NA	0.87	new Losbanos 230/70kV project
VEGA 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3 & P1-1:A13:25:_VEGA 0.36KV GEN UNIT 1	P6	N-1-1	Low	NA	0.90	NA	NA	NA	NA	NA	0.89	new Losbanos 230/70kV project
AVENAL 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	Low	0.75	0.58	NA	NA	NA	NA	NA	0.57	New Gates 230/70kV transformer project
AVNLPARK 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	Low	0.75	0.58	NA	NA	NA	NA	NA	0.57	New Gates 230/70kV transformer project
CHEVPLIN 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	Low	0.74	0.57	NA	NA	NA	NA	NA	0.56	New Gates 230/70kV transformer project
GATES 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	Low	0.77	0.59	NA	NA	NA	NA	NA	0.59	New Gates 230/70kV transformer project
HURON 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	Low	0.77	0.60	NA	NA	NA	NA	NA	0.59	New Gates 230/70kV transformer project

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High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
JACALITO 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	Low	0.76	0.59	NA	NA	NA	NA	NA	0.58	New Gates 230/70kV transformer project
JAYNESWSTA 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	Low	0.77	0.59	NA	NA	NA	NA	NA	0.59	New Gates 230/70kV transformer project
KETTLEMN 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	Low	0.74	0.56	NA	NA	NA	NA	NA	0.55	New Gates 230/70kV transformer project
SUN CITY 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	Low	0.75	0.58	NA	NA	NA	NA	NA	0.57	New Gates 230/70kV transformer project
WESTLND3_3 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5 & P1-2:A14:43:_PANOCHE-EXCELSIOR SW STA #1 115KV [3250] MOAS OPENED ON PANOCHE1_KAMM	P6	N-1-1	Low	0.77	0.60	NA	NA	NA	NA	NA	0.59	New Gates 230/70kV transformer project
TOMATAK 70 kV	P7-1:A13:11:_LOS BANOS-PANOCHE #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P7-1:A13:11:_LOS BANOS-PANOCHE #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P7-1:A13:11:_LOS BANOS-PANOCHE #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A13:11:_LOS BANOS-PANOCHE #1 230KV [5030] & LOS BANOS-MERCY SPRINGS SW STA 70KV [8929]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
NRTHFORK 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	Low	0.89	0.95	0.90	1.03	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO2 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	Low	0.90	0.95	0.90	1.03	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
SJNO3 70 kV	P7-1:A13:13:_BORDEN-GREGG 230KV #1 & #2 [4400]	P7	DCTL	Low	0.89	0.94	0.89	1.03	1.06	0.99	1.03	0.98	Project: Coppermine reconductoring approved in 2021-22 TPP
TOMATAK 70 kV	P7-1:A13:2:_MELONES-WILSON 230KV [5080] & WARNERVILLE-WILSON 230KV [5870]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.88	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A13:2:_MELONES-WILSON 230KV [5080] & WARNERVILLE-WILSON 230KV [5870]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.89	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P7-1:A13:2:_MELONES-WILSON 230KV [5080] & WARNERVILLE-WILSON 230KV [5870]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A13:2:_MELONES-WILSON 230KV [5080] & WARNERVILLE-WILSON 230KV [5870]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.89	0.90	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A13:6:_PANOCHE-TRANQLTYSS #1 230KV [0] & PANOCHE-TRANQLTYSS #2 230KV [0]	P7	DCTL	Low	0.88	0.89	NA	0.88	0.97	0.89	0.89	0.89	Project:Wilson 115kV Reinforcement
MENDOTA 70 kV	P7-1:A13:6:_PANOCHE-TRANQLTYSS #1 230KV [0] & PANOCHE-TRANQLTYSS #2 230KV [0]	P7	DCTL	Low	0.89	0.90	NA	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P7-1:A13:6:_PANOCHE-TRANQLTYSS #1 230KV [0] & PANOCHE-TRANQLTYSS #2 230KV [0]	P7	DCTL	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A13:6:_PANOCHE-TRANQLTYSS #1 230KV [0] & PANOCHE-TRANQLTYSS #2 230KV [0]	P7	DCTL	Low	0.89	0.90	NA	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
ORO LOMA 115 kV	P7-1:A13:7:_LOS BANOS-PANOCHE #1 230KV [5030] & PANOCHE-ORO LOMA 115KV [3240]	P7	DCTL	Low	0.91	0.92	0.84	1.00	0.99	0.99	1.00	0.92	Project:Wilson-Oro Loma 115kV reconductoring
ORO LOMA 70 kV	P7-1:A13:7:_LOS BANOS-PANOCHE #1 230KV [5030] & PANOCHE-ORO LOMA 115KV [3240]	P7	DCTL	Low	0.93	0.95	0.86	1.03	1.02	1.02	1.03	0.94	Review Existing Oro Loma 70kV reinforcement project
SNTA RTA 70 kV	P7-1:A13:7:_LOS BANOS-PANOCHE #1 230KV [5030] & PANOCHE-ORO LOMA 115KV [3240]	P7	DCTL	Low	0.91	0.92	0.83	1.03	1.02	1.00	1.03	0.91	Monitor Future forecast
DOS PALS 70 kV	P7-1:A13:7:_LOS BANOS-PANOCHE #1 230KV [5030] & PANOCHE-ORO LOMA 115KV [3240]	P7	DCTL	Low	0.92	0.93	0.84	1.03	1.02	1.01	1.03	0.92	Monitor Future forecast
FIREBAGH 70 kV	P7-1:A13:7:_LOS BANOS-PANOCHE #1 230KV [5030] & PANOCHE-ORO LOMA 115KV [3240]	P7	DCTL	Low	0.88	0.89	0.78	1.02	0.96	0.99	1.02	0.89	Review Existing Oro Loma 70kV reinforcement project
CAMDEN 70 kV	P7-1:A14:13:_MCCALL-KINGSBURG #1 115KV [2290] & MCCALL-KINGSBURG #2 115KV [2301]	P7	DCTL	Low	0.88	0.89	0.87	0.95	1.10	0.93	0.95	0.89	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:19:_MCCALL-SANGER #1 115KV [2330] & MCCALL-SANGER #2 115KV [2340]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:22:_HENTAP1-MUSTANGSS #1 230KV [0] & HERNDON-KEARNEY 230KV [4900]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:25:_HERNDON-BARTON 115KV [1750] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
SJNO3 70 kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	Low	0.90	0.95	0.93	1.04	1.06	0.99	1.03	0.99	Project: Coppermine reconductoring approved in 2021-22 TPP
TOMATAK 70 kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.96	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:26:_HENTAP1-MUSTANGSS #1 230KV [0] & TRANQLTYSS-MCMULLN1 #1 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:28:_GWF-KINGSBURG 115KV [1743] & GWF-HENRIETTA 70KV [8774]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
TOMATAK 70 kV	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project



Substation	Contingency (All and Worst P6)	Category	Category Description	High/Low Voltage	Voltage PU (Baseline Scenarios)					Voltage PU (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
					2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2027 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
MENDOTA 70 kV	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:3:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
MENDOTA 70 kV	P7-1:A14:31:_ARCO-MIDWAY 230KV [4320] & GATES-MIDWAY 230KV [4891]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P7-1:A14:31:_ARCO-MIDWAY 230KV [4320] & GATES-MIDWAY 230KV [4891]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:31:_ARCO-MIDWAY 230KV [4320] & GATES-MIDWAY 230KV [4891]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:34:_MCCALL-REEDLEY 115KV [2320] & MCCALL-SANGER #3 115KV [2350]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
TOMATAK 70 kV	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	Low	0.88	0.89	0.88	0.88	0.97	0.89	0.89	0.89	Review Existing Oro Loma 70kV reinforcement project
MENDOTA 70 kV	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.96	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:4:_MUSTANGSS-GATES #1 230KV [0] & MUSTANGSS-GATES #2 230KV [0] (2)	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.96	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
MENDOTA 70 kV	P7-1:A14:7:_BARTON-AIRWAYS-SANGER 115KV [1060] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.94	0.90	0.90	0.90	Review Existing Oro Loma 70kV reinforcement project
BIOMASS 70 kV	P7-1:A14:7:_BARTON-AIRWAYS-SANGER 115KV [1060] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement
CALRENEW 70 kV	P7-1:A14:7:_BARTON-AIRWAYS-SANGER 115KV [1060] & MANCHESTER-AIRWAYS-SANGER 115KV [2180]	P7	DCTL	Low	0.89	0.90	0.90	0.89	0.97	0.90	0.90	0.90	Project: Oro Loma 70kV Reinforcement

Study Area: PG&E Greater Fresno

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)					Post Cont. Voltage Deviation % (Sensitivity Scenarios)			Project & Potential Mitigation Solutions
				2024 Summer Peak	2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 Spring Off-Peak	2024 SP Heavy Renewable & Min Gas Gen	2024 Spring OP Sensitivity	2027 SP High CEC Forecast	
ARBURUA 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	<8	<8	13	<8	9	<8	<8	<8	Monitor future forecast
CALFLAX 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	<8	11	<8	<8	<8	<8	<8	12	Under review
CANAL 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	14	12	20	<8	18	<8	<8	13	Project:Oro Loma 70kV reinforcement
CHEVPLIN 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	9	13	<8	<8	<8	<8	<8	14	Under review
CHWCHLLA 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	<8	<8	12	<8	<8	<8	<8	<8	Monitor future forecast
COLNGA 1 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	<8	11	<8	<8	<8	<8	<8	13	Under review
COLNGA 2 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	<8	11	<8	<8	<8	<8	<8	12	Under review
DOS PALS 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	<8	<8	19	<8	<8	<8	<8	<8	Monitor future forecast
FIREBAGH 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	13	12	20	<8	<8	<8	<8	13	Project:Oro Loma 70kV reinforcement
GILLRAN 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	15	<8	<8	<8	<8	<8	<8	<8	Project:Wilson 115kV reinforcement
KETTLEMN 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	9	13	<8	<8	<8	<8	<8	14	Under review
LIVNGSTN 70 kV	P1-3:A13:6:_LOSBANOS 230/70KV TB 3	P1	N-1	<8	<8	<8	<8	9	<8	<8	<8	Generation Re-dispatch
MENDOTA 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	20	<8	<8	<8	<8	<8	<8	<8	Project:Wilson 115kV reinforcement
NEWHALL 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	14	<8	<8	<8	<8	<8	<8	<8	Project:Wilson 115kV reinforcement
ORO LOMA 115 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	<8	<8	18	<8	<8	<8	<8	<8	Monitor future forecast
ORO LOMA 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	<8	<8	18	<8	<8	<8	<8	<8	Monitor future forecast
ORTIGA 70 kV	P1-2:A13:71:_LOS BANOS-LIVINGSTON JCT-CANAL 70KV [8940]	P1	N-1	11	11	17	<8	14	<8	<8	11	Project:Oro Loma 70kV reinforcement
PLSNTVLY 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	<8	9	<8	<8	<8	<8	<8	10	Under review
PMTFMPP 115 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	15	<8	<8	<8	<8	<8	<8	<8	Project:Wilson 115kV reinforcement
SHARON 115 kV	P1-2:A13:39:_LE GRAND-CHOWCHILLA 115KV [2110]	P1	N-1	<8	<8	11	<8	<8	<8	<8	<8	Monitor future forecast
SNTA RTA 70 kV	P1-2:A13:60:_PANOCHE-ORO LOMA 115KV [3240]	P1	N-1	<8	<8	19	<8	<8	<8	<8	<8	Monitor future forecast
TOMATAK 70 kV	P1-2:A13:59:_PANOCHE-MENDOTA 115KV [3230]	P1	N-1	18	<8	<8	<8	<8	<8	<8	<8	Project:Oro Loma 70kV reinforcement
TORNADO 70 kV	P1-3:A14:14:_GATES D 230/70KV TB 5	P1	N-1	<8	11	<8	<8	<8	<8	<8	13	Under review



Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Sensitivity	
Helms unit 1_P1-1	P1	N-1	No issues	TBD	No issues	No issues	No issues	No issues	Under review
Gates 500/230kV Transformer #11 Fault, 6 cyc clearing_P1-3	P1	N-1	No issues	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Under review
P2, P4 Moccasin 115kV Bus Fault, 6 cyc clearing	P2	Bus/Breaker	Potential WECC/NERC criteria violation	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Under review
P2, P4 Moccasin 115kV Bus Fault, 6 cyc clearing	P2	Bus/Breaker	No issues	TBD	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	No issues	Under review
P2, P4 Intake 230kV Bus Fault, 3 or 6 cyc clearing	P2	Bus/Breaker	Potential WECC/NERC criteria violation	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Under review
P2, P4 Warnerville 230kV Bus Fault, 3 or 4 cyc clearing	P2	Bus/Breaker	Potential WECC/NERC criteria violation	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Under review
P2, P4 Warnerville 115kV Bus Fault, 4 cyc clearing	P2	Bus/Breaker	Potential WECC/NERC criteria violation	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Under review
P2, P4, P7 Westley 230kV Bus Fault, 6 cyc clearing	P2	Bus/Breaker	No issues	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Under review
Gates 230kV Bus_P2-2	P2	Bus/Breaker	No issues	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Under review
P3 Loss of Moccasin Generator + Transformer, 18 cyc clearing	P3	G-1/N-1	Potential WECC/NERC criteria violation	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Under review
P3 Loss of Holm Generator + Transformer, 18 cyc clearing	P3	G-1/N-1	Potential WECC/NERC criteria violation	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Under review
P3 Loss of Kirkwood Generator + Transformer, 18 cyc clearing	P3	G-1/N-1	Potential WECC/NERC criteria violation	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Under review
P3 Loss of Holm Generator + Transmission Line, 18 cyc clearing	P3	G-1/N-1	Potential WECC/NERC criteria violation	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Under review
P3 Loss of Kirkwood Generator + Transmission Line, 18 cyc clearing	P3	G-1/N-1	Potential WECC/NERC criteria violation	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	Under review
Helms units 1 and 2_P3-1	P3	G-1/N-1	No issues	TBD	No issues	No issues	No issues	No issues	Under review
P5-5c - Failure of non-redundant DC battery supplying Borden 230kV and 70kV Buse	P5	Non-Redundent Battery	Potential WECC/NERC criteria violation	TBD	No issues	No issues	No issues	Potential WECC/NERC criteria violation	Under review
P6,P7, Loss of Moccasin-Newark Lines #3 & #4, Fault @ Moccasin, 26 cyc clearing	P6	N-1-1	No issues	TBD	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	No issues	Under review
Warnerville-Standiford 115kV Lines #7 & #8 (P6, P7, Warnerville-Standiford Lines #7 & #8 Fault @ Standiford, 24 cyc clearing)	P6	N-1-1	Potential WECC/NERC criteria violation	TBD	Potential WECC/NERC criteria violation	Potential WECC/NERC criteria violation	No issues	No issues	Under review
Borden 230kV Bus_P6-3	P6	N-1-1	No issues	TBD	Potential WECC/NERC criteria violation	No issues	Potential WECC/NERC criteria violation	No issues	Under review
Permanent fault on Helms - Gregg #1 & #2 230 kV Lines_P7-	P7	DTCL	No issues	TBD	No issues	No issues	No issues	No issues	Under review

Contingency	Category	Category Description	Transient Stability Performance						Potential Mitigation Solutions
			Baseline Scenarios				Sensitivity Scenarios		
			2024 Spring Off-Peak	2027 Summer Peak	2032 Summer Peak	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Sensitivity	
Temporary fault on Helms - Gregg #1 & #2 230 kV Lines_P7-1	P7	DTCL	No issues	TBD	No issues	No issues	No issues	No issues	Under review

Study Area: PG&E Greater Fresno



Single Contingency Load Drop

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

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

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



Single Source Substation with more than 100 MW Load

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

No single source substation with more than 100 MW