



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	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP ATE	
Lugo 500/230kV Transformer No.1	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.4	< 100	< 100	Congestion management New Lugo 500/230kV transformer No.3
	line_202857_Line COLWATER-DUNN-BAK-MNTPS-IVANPAH 115 ck 1 Tran LUGO 500 to LUGO 230 ck 2	P6	N-1-1	117.2	< 100	< 100	< 100	110.0	149.3	< 100	174.2	123.1	< 100	HDPP RAS, Mojave Desert RAS
Lugo 500/230kV Transformer No.2	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	< 100	< 100	102.2	< 100	< 100	Congestion management New Lugo 500/230kV transformer No.3
	line_202856_Line COLWATER-DUNN-BAK-MNTPS-IVANPAH 115 ck 1 Tran LUGO 500 to LUGO 230 ck 1	P6	N-1-1	117.3	< 100	< 100	< 100	110.6	149.3	< 100	174.3	123.2	< 100	HDPP RAS, Mojave Desert RAS
Pisgah - Lugo 230kV Line No.2	line_203403_Tran LUGO 500 to LUGO 230 ck 1 Tran LUGO 500 to LUGO 230 ck 2	P6	N-1-1	NotConv	103.6	NotConv	< 100	NotConv	NotConv	< 100	NotConv	NotConv	< 100	HDPP RAS, Mojave Desert RAS New Lugo 500/230kV transformer No.3
Eldorado - Cima - Pisgah 230kV Line No.1	line_203403_Tran LUGO 500 to LUGO 230 ck 1 Tran LUGO 500 to LUGO 230 ck 2	P6	N-1-1	NotConv	102.5	NotConv	< 100	NotConv	NotConv	< 100	NotConv	NotConv	< 100	HDPP RAS, Mojave Desert RAS New Lugo 500/230kV transformer No.3
Eldorado - Cima - Pisgah 230kV Line No.2	line_203403_Tran LUGO 500 to LUGO 230 ck 1 Tran LUGO 500 to LUGO 230 ck 2	P6	N-1-1	NotConv	102.7	NotConv	< 100	NotConv	NotConv	< 100	NotConv	NotConv	< 100	HDPP RAS, Mojave Desert RAS New Lugo 500/230kV transformer No.3
Victor - Lugo 230kV Line No.1	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	101.6	< 100	118.9	< 100	< 100	Congestion management Lugo-Victor 230kV line reconductoring
	line_200180_Line VICTOR - LUGO 230 ck 2 line VICTOR - LUGO 230 ck 3	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_4_P7-4:Line VICTOR - LUGO 230 ck 3 line VICTOR - LUGO 230 ck 4	P7	DCTL	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	Loss of any one of the remaining three Victor - Lugo 230kV lines	P1	N-1	< 100	< 100	< 100	< 100	< 100	100.7	< 100	117.7	< 100	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
Victor - Lugo 230kV Line No.2	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	101.6	< 100	118.9	< 100	< 100	Congestion management Lugo-Victor 230kV line reconductoring
	line_200112_Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 3	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_200113_Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 4	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_4_P7-4:Line VICTOR - LUGO 230 ck 3 line VICTOR - LUGO 230 ck 4	P7	DCTL	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	Loss of any one of the remaining three Victor - Lugo 230kV lines	P1	N-1	< 100	< 100	< 100	< 100	< 100	100.7	< 100	117.7	< 100	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
Victor - Lugo 230kV Line No.3	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	101.6	< 100	118.9	< 100	< 100	Congestion management Lugo-Victor 230kV line reconductoring
	line_200113_Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 4	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_200181_Line VICTOR - LUGO 230 ck 2 line VICTOR - LUGO 230 ck 4	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_5_P7-5:Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 2	P7	DCTL	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring



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				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	2035 SP ATE	
	Loss of any one of the remaining three Victor - Lugo 230kV lines	P1	N-1	< 100	< 100	< 100	< 100	< 100	100.7	< 100	117.7	< 100	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
Victor - Lugo 230kV Line No.4	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	101.6	< 100	118.9	< 100	< 100	Congestion management Lugo-Victor 230kV line reconductoring
	line_200112_Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 3	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_200180_Line VICTOR - LUGO 230 ck 2 line VICTOR - LUGO 230 ck 3	P6	N-1-1	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	line_5_P7-5:Line VICTOR - LUGO 230 ck 1 line VICTOR - LUGO 230 ck 2	P7	DCTL	123.7	< 100	< 100	< 100	117.6	151.1	< 100	177.3	125.5	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
	Loss of any one of the remaining three Victor - Lugo 230kV lines	P1	N-1	< 100	< 100	< 100	< 100	< 100	100.7	< 100	117.7	< 100	< 100	HDPP RAS Lugo-Victor 230kV line reconductoring
Victor 230/115kV Transformer No.2	line_203398_Tran VICTOR 230/115 #3 Tran VICTOR 230/115 #4	P6	N-1-1	< 100	< 100	105.3	131.3	< 100	< 100	< 100	< 100	< 100	114.3	Utilize existing spare transformer; Limit Coolwater BESS charging
Victor 230/115kV Transformer No.3	line_203395_Tran VICTOR 230/115 #2 Tran VICTOR 230/115 #4	P6	N-1-1	< 100	< 100	104.9	130.8	< 100	< 100	< 100	< 100	< 100	114.0	Utilize existing spare transformer; Limit Coolwater BESS charging
	line_P5_BD_005_Victor 115 kV North Bus SecAB	P5.5	Non-redundant Relay	< 100	< 100	104.9	130.8	< 100	< 100	< 100	< 100	< 100	114.0	Utilize existing spare transformer; Limit Coolwater BESS charging
Victor 230/115kV Transformer No.4	line_203394_Tran VICTOR 230/115 #2 Tran VICTOR 230/115 #3	P6	N-1-1	< 100	< 100	104.9	130.8	< 100	< 100	< 100	< 100	< 100	114.0	Utilize existing spare transformer; Limit Coolwater BESS charging
Victor - Roadway 115kV Line	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	< 100	< 100	112.8	< 100	< 100	Congestion management Victor-Roadway 115kV line reconductoring
	line_200210_Line VICTOR - KRAMER 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 1	P6	N-1-1	< 100	< 100	< 100	100.9	< 100	< 100	< 100	136.3	< 100	< 100	Limit BESS charging following first contingency under off peak scenario Generation redispatch after the first contingency
	line_6_P7-6:Line KRAMER - VICTOR 230.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P7	DCTL	NotConv	NotConv	< 100	NotConv	136.6	157.0	162.9	NotConv	113.1	< 100	Mojave Desert RAS; Limit BESS charging under off peak scenario
	Kramer - Victor No. 1 or No.2 230 kV Line	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	113.4	< 100	< 100	North of Lugo CRAS Line reconductoring
Victor - Kramer 115kV Line	line_200277:Line VICTOR - ROADWAY 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	129.2	< 100	< 100	Generation redispatch following the first contingency
	line_6_P7-6:Line KRAMER - VICTOR 230.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P7	DCTL	NotConv	NotConv	< 100	NotConv	159.8	168.8	165.6	NotConv	129.9	< 100	Mojave Desert RAS; Limit BESS charging under off peak scenario
Roadway - Kramer 115kV Line	line_200210_Line VICTOR - KRAMER 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	101.8	< 100	< 100	Generation redispatch after the first contingency
	line_200306_Line VICTOR - ROADWAY 115.0 ck 1 line CAL GEN - INYOKERN 115 ck 1	P6	N-1-1	< 100	< 100	< 100	102.8	< 100	< 100	< 100	< 100	< 100	< 100	Limit BESS charging
	line_6_P7-6:Line KRAMER - VICTOR 230.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P7	DCTL	NotConv	NotConv	< 100	NotConv	161.3	169.0	163.3	NotConv	130.4	< 100	Mojave Desert RAS; Limit BESS charging under off peak scenario
Ivanpah - Mountain Pass 115kV Line	line_202021_Line IVANPAH - ELDORDO2 230.0 ck 1 Line PRIMM - IVANPAH 230.0 ck 1	P6	N-1-1	NotConv	125.4	< 100	< 100	NotConv	NotConv	125.4	NotConv	< 100	< 100	Ivanpah RAS



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				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	2035 SP ATE	
Kramer - Victor 230kV Line No.1	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	< 100	< 100	124.1	< 100	< 100	Congestion management Kramer-Victor 230kV Line reconductoring
	Line VICTOR - ROADWAY 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P6	N-1-1	122.3	114.6	< 100	NotConv	106.0	115.5	111.9	199.9	< 100	< 100	Generation redispatch following the first contingency
	Line ROADWAY - KRAMER 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P6	N-1-1	109.5	105.2	< 100	< 100	103.2	108.1	102.9	181.0	< 100	< 100	Generation redispatch following the first contingency
	Kramer - Victor No. 2 230 kV Line	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	161.0	< 100	< 100	North of Lugo CRAS
Kramer - Victor 230kV Line No.2	Base Case	P0	Base Case	< 100	< 100	< 100	< 100	< 100	< 100	< 100	124.1	< 100	< 100	Congestion management Kramer-Victor 230kV Line reconductoring
	line_200276_Line VICTOR - ROADWAY 115.0 ck 1 Line KRAMER - VICTOR 230.0 ck 1	P6	N-1-1	122.3	114.6	< 100	NotConv	106.0	115.5	111.9	199.9	< 100	< 100	Generation redispatch following the first contingency
	Kramer - Victor No. 1 230 kV Line	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	161.0	< 100	< 100	North of Lugo CRAS
Kramer - Coolwater 230kV Line No.2	line_100009_Line SANDLOT - KRAMER 230.0 ck 1	P1	N-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	138.0	< 100	< 100	North of Lugo CRAS
Kramer 230/115kV Transformer No.1	line_202559_Line KRAMER - VICTOR 230.0 ck 1 Tran KRAMER 230/115 #2	P6	N-1-1	< 100	115.5	< 100	< 100	< 100	< 100	119.8	100.5	< 100	< 100	Generation redispatch following the first contingency
	line_6_P7-6:Line KRAMER - VICTOR 230.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P7	DCTL	NotConv	NotConv	< 100	NotConv	111.2	113.7	193.8	NotConv	< 100	< 100	Mojave Desert RAS; Limit BESS charging under off peak scenario
Kramer 230/115kV Transformer No.2	line_202558_Line KRAMER - VICTOR 230.0 ck 1 Tran KRAMER 230/115 #1	P6	N-1-1	< 100	115.5	< 100	< 100	< 100	< 100	119.8	100.5	< 100	< 100	Generation redispatch following the first contingency
	line_6_P7-6:Line KRAMER - VICTOR 230.0 ck 1 Line KRAMER - VICTOR 230.0 ck 2	P7	DCTL	NotConv	NotConv	< 100	NotConv	111.2	113.7	193.8	NotConv	< 100	< 100	Mojave Desert RAS; Limit BESS charging under off peak scenario
Coolwater-Baker-Dunnsiding-Mountain Pass 115kV Line	line_202021_Line IVANPAH - ELDORDO2 230.0 ck 1 Line PRIMM - IVANPAH 230.0 ck 1	P6	N-1-1	NotConv	118.6	< 100	< 100	NotConv	NotConv	118.3	NotConv	< 100	< 100	Ivanpah RAS
Sandlot-Kramer 230kV Line	line_120011_P2_KRAMER 230 kV: CAP #2 KRAMER-COLWATER 230 kV	P2	Bus	< 100	< 100	< 100	< 100	< 100	< 100	< 100	131.6	< 100	< 100	North of Lugo CRAS
	line_130009_P2L_KRAMER 230 kV: Shunt Cap CAP #2 KRAMER-COLWATER 230 kV	P2	Bus+Long Lead Time	< 100	< 100	< 100	< 100	< 100	< 100	< 100	133.4	< 100	< 100	North of Lugo CRAS
	line_200279_Line VICTOR - ROADWAY 115.0 ck 1 Line KRAMER - COLWATER 230.0 ck 2	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	< 100	< 100	131.9	< 100	< 100	North of Lugo CRAS
Control - Inyokern 115kV	P5_TC_Control-Inyo_W bus breaker	P5	Non-redundant Trip Coil	< 100	< 100	< 100	110.6	121.7	124.1	< 100	< 100	110.9	< 100	Install redundant trip coil
	P5_TC_Control-Inyo_E bus breaker	P5	Non-redundant Trip Coil	< 100	< 100	< 100	110.1	120.9	123.2	< 100	< 100	110.7	< 100	Install redundant trip coil
Control-Coso-Inyokern 115kV Line	line_202706_Line CONTROL - INYOKERN 115.0 ck 1 Tran INYO 115/INYO PS 115 #1	P6	N-1-1	< 100	< 100	< 100	< 100	< 100	101.6	< 100	< 100	< 100	< 100	Operating Procedure 7690 would redispatch generation
	line_120002_P2_Control EAST BUS: INYO PHASE SHIFTER (CONTROL-INYO) CONTROL-CASA DIABLO 115 kV CONTROL-COSO-INYOKREN CONTROL	P2	Bus	< 100	< 100	< 100	< 100	120.9	123.2	< 100	< 100	< 100	< 100	Bishop RAS Reduce generation at Oxbow B or Casa Diablo



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	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP ATE	
Inyokern - Control 115kV Line	line_130002_P2L_KRAMER 230 kV Shunt Control EAST BUS: INYO PHASE SHIFTER (CONTROL-INYO) CONTROL-CASA DIABLO 115 kV CONTROL-CO	P2	Bus+Long Lead Time	< 100	< 100	< 100	< 100	120.9	123.1	< 100	< 100	< 100	< 100	Bishop RAS Reduce generation at Oxbow B or Casa Diablo
	line_202946_Line CONTROL - TAP710 115.0 ck 1 Tran INYO 115/INYO PS 115 #1	P6	N-1-1	< 100	< 100	< 100	110.6	119.8	122.5	< 100	< 100	111.3	< 100	Bishop RAS Reduce generation at Oxbow B or Casa Diablo
System	DC_Victor230	P5	Non-redundant DC Supply	NotConv	NotConv	NotConv	NotConv	NotConv	NotConv	NotConv	NotConv	NotConv	NotConv	Install redundant DC
System	DC_Control115	P5	Non-redundant DC Supply	NotConv	NotConv	< 100	< 100	< 100	< 100	< 100	NotConv	< 100	< 100	Install redundant DC
Kramer-Victor 230kV No.1 and No.2	DC_Kramer115	P5	Non-redundant DC Supply	< 100	< 100	< 100	< 100	NotConv	NotConv	< 100	104.2	NotConv	< 100	Install redundant DC
Kramer-Victor 230kV No.1 and No.2	DC_Victor115	P5	Non-redundant DC Supply	< 100	< 100	< 100	< 100	< 100	< 100	< 100	121.2	< 100	< 100	Install redundant DC

Study Area: SCE North of Lugo

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	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	2032 Spring Off-Peak	2027 SP High CEC Forecast	2024 SP Heavy Renewable & Min Gas Gen	2024 OP Sensitivity	2035 SP ATE	
COLWATER - DUNNSIDE - BAKER - TORTILLA - TIEFORT 115 kV	line_200657_Line KRAMER - COLWATER 115.0 ck 1 Line KRAMER - TORTILLA 115.0 ck 1	P6	N-1-1	0.70	0.65	0.9 < V < 1.05	0.63	0.9 < V < 1.05	0.9 < V < 1.05	0.54	0.9 < V < 1.05	1.47	0.9 < V < 1.05	Short-term: OP-127 redialize system Long-term: New 230/115kV transformer at Coolwater
	line_200661_Line KRAMER - COLWATER 115.0 ck 1 line COLWATER-SEG2-TORTILLA 115 ck 1	P6	N-1-1	0.74	0.74	0.9 < V < 1.05	0.84	0.9 < V < 1.05	0.9 < V < 1.05	0.74	0.78	0.9 < V < 1.05	0.9 < V < 1.05	Short-term: OP-127 redialize system Long-term: New 230/115kV transformer at Coolwater
	line_300001_P5_Cool Water 115 kV WEST BUS	P5	Non-redundant Relay	0.64	0.73	0.9 < V < 1.05	0.84	0.9 < V < 1.05	0.9 < V < 1.05	0.64	0.72	0.9 < V < 1.05	0.9 < V < 1.05	Short-term: OP-127 redialize system Long-term: New 230/115kV transformer at Coolwater
	line_P5_BD_003_Kramer 115 kv East Bus	P5	Non-redundant Relay	0.74	0.59	0.9 < V < 1.05	0.67	0.9 < V < 1.05	0.9 < V < 1.05	0.63	0.9 < V < 1.1	0.9 < V < 1.05	0.9 < V < 1.05	Short-term: OP-127 redialize system Long-term: New 230/115kV transformer at Coolwater
IVANPAH 230kV, IVANPAH-MTN PASS-BAKER-DUNNSIDE-BAKER-COLWATER 115 kV	line_202021_Line IVANPAH - ELDORDO2 230.0 ck 1 Line PRIMM - IVANPAH 230.0 ck 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	0.81	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	1.13	0.9 < V < 1.1	Ivanpah RAS
	line_202022_Line IVANPAH - ELDORDO2 230.0 ck 1 Line PRIMM - ELDORDO2 230.0 ck 1	P6	N-1-1	0.9 < V < 1.1	0.9 < V < 1.1	1.20	1.43	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	1.48	0.9 < V < 1.1	
INYOKERN, SEARLES, DOWNS, COSO 115 kV	line_201323_Line INYOKERN - KRAMER 115.0 ck 1 line CAL GEN - INYOKERN 115 ck 1	P6	N-1-1	0.85	0.86	0.77	0.89	0.9 < V < 1.05	0.89	0.85	0.86	0.9 < V < 1.05	0.76	Install shunt capacitors
	Base case	P0	Base case	0.95 < V < 1.05	0.95 < V < 1.05	0.92	0.95 < V < 1.05	0.95 < V < 1.05	0.95 < V < 1.05	0.95 < V < 1.05	0.95 < V < 1.05	0.95 < V < 1.05	0.91	
CONTROL, INYO 115kV	Base case	P0	Base case	0.99	1.00	0.98	1.00	1.00	0.99	1.00	0.99	1.01	0.98	Monitor voltage profile
	line_201310_Line INYOKERN - KRAMER 115.0 ck 1 Line TAP701 - KRAMER 115.0 ck 1	P6	N-1-1	0.996 < V < 1.052	0.996 < V < 1.052	0.90	0.996 < V < 1.052	0.996 < V < 1.052	0.996 < V < 1.052	0.996 < V < 1.052	0.92	0.996 < V < 1.052	0.90	Monitor voltage profile
	line_201252_Line CSA DIAB - CONTROL 115.0 ck 1 line TAP704 - CONTROL 115 ck 1	P6	N-1-1	1.08	1.08	0.996 < V < 1.052	1.10	1.10	1.09	1.08	1.08	0.996 < V < 1.052	0.996 < V < 1.052	Install shunt reactor at Control

2022-2023 ISO Reliability Assessment - Study Results

Study Area: SCE North of Lugo

Voltage Deviation

[illegible]

No P1 or P3 contingencies resulted in voltage deviation greater than 8%

Study Area: SCE North of Lugo

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance				
			Baseline Scenarios			Sensitivity Scenarios	
			2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Sensitivity
Control-Casa Diablo 1150kV (1PH fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Casa Diablo 1150kV (1PH fault at Casa Diablo)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Coso-Inyokern 115kV (1PH fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Coso-Inyokern 115kV (1PH fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Inyokern (Fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Inyokern (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Inyo 115kV (Fault at Control)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Inyokern-Downs 115kV (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Inyokern-Searles 15kV (Fault at Inyokern)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Roadway 115kV (Fault at Kramer)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Roadway 115kV (Fault at Roadway)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Victor 115kV (Fault at Kramer)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Victor 115kV (Fault at Victor)	P4.2	Stuck Breaker	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control 115/55kV Transforemer Banks	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer 230/115kV Transformer Banks	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Lugo 500/230kkV Transformer Banks no RAS	P6	Normal clearing	Unstable	Unstable	Stable/WECC criteria met	WECC criteria not met	Unstable
Lugo 500/230kV Transformer Banks RAS	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Inyokern-Randsburg Nos.1 & 3 115kV	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Unstable	Stable/WECC criteria met	Unstable
Coolwater-Kramer & Coolwater-SEGS-Tortilla 115kV (Fault at Coolwater)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Coolwater-Kramer & Coolwater-SEGS-Tortilla 115kV_OP (Fault at Coolwater)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Coolwater-Kramer & Kramer-Tortilla 115kV (Fault at Kramer)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Coolwater-Kramer & Kramer-Tortilla 115kV_OP (Fault at Kramer)	P6	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Victor 230kV Nos.1 & 2 no RAS	P7	Normal clearing	Unstable	Unstable	Unstable	Unstable	Stable/WECC criteria met
Kramer-Victor 230kV Nos.1 & 2 RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Lugo-Victor 230kV Nos.1 & 2 no RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Lugo-Victor 230kV Nos.1 & 2 RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Coso-Inyokern & Control-Inyokern 115kV no RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control-Coso-Inyokern & Control-Inyokern 115kV RAS	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Victor & Roadway-Victor 115kV	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer-Victor & Kramer-Roadway 115kV	P7	Normal clearing	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Cool Water 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Kramer 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Unstable	Stable/WECC criteria met	Unstable
Tortilla 115kV East Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Victor 115kV North Bus SecAB	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Control 55kV Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
Inyokern 115kV Bus	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TL_BLM-Kramer 230kV (fault at BLM)	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TL_BLM-Kramer 230kV (fault at Kramer)	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TL_LUZ-Kramer 230kV (fault at LUZ)	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met

Study Area: SCE North of Lugo

Transient Stability

Contingency	Category	Category Description	Transient Stability Performance				
			Baseline Scenarios			Sensitivity Scenarios	
			2027 Summer Peak	2032 Summer Peak	2024 Spring Off-Peak	2027 SP High CEC Forecast	2024 OP Sensitivity
TC_Kramer_Kramer-Victor 115kV No.1	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TC_Tortilla_Tortilla-SEGS-Coolwater 115kV	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TC_Tortilla_Tortilla-Kramer 115kV	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TC_Victor_Victor-Kramer 115kV No.1	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
TC_Victor_Victor-Roadway 115kV	P5	Non-Redundant Relay	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met	Stable/WECC criteria met
DC_Kramer 230	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Sandlot 230	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Victor 230	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Control 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Coolwater 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Inyokern 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Kramer 115	P5	Non-Redundant Relay	Unstable	Diverge	Unstable	Diverge	Diverge
DC_Tortilla 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge
DC_Victor 115	P5	Non-Redundant Relay	Diverge	Diverge	Diverge	Diverge	Diverge

Potential Mitigation Solutions
No Issues
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HDPP RAS, Mojave Desert RAS
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OP 7690
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Mojave Desert RAS;
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OP 7690
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Potential Mitigation Solutions

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Potential Mitigation Solutions
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Install Redundant DC

Study Area: SCE North of Lugo



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	2035 SP ATE	

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

Study Area: SCE North of Lugo



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	2035 SP ATE	

No single source substation with more than 100 MW