2016-2017 ISO Reliability Assessment - Preliminary Study Results

Study Area: **PG&E Kern**

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-1	34860 TAFT A 70.0 34919 TX_BV_HL 70.0 1 1	Base Case	P0	Base Case	97.50	98.26	98.27	80.74	78.86	99.82	102.03	98.83	102.84	98.87	Sensitivity Under Review
Kern-T-2	30948 ELKHIL_G 230 30970 MIDWAY 230 1 1	P1-2:A15:16:_ELKHIL_G-MIDWAY #2 230kV [0] and 450.2	P1	Single Contingency	<100%	69.01	68.58	<100%	18.35	<100%	69.11	69.24	77.84	100.65	Generation redispatch
Kern-T-3	30948 ELKHIL_G 230 30970 MIDWAY 230 2 1	P1-2:A15:15:_ELKHIL_G-MIDWAY #1 230kV [0] and 450.2	P1	Single Contingency	<100%	69.01	68.58	<100%	18.35	<100%	69.11	69.24	77.84	100.65	Generation redispatch
Kern-T-4	34704 SEMITROPIC_D 115 34743 SEMITROPIC_E 115 1 1	P1-2:A15:38:_Smyrna-Semitropic-Midway 115 kV Line and 82.9	P1	Single Contingency	<100%	<100%	98.92	<100%	<100%	<100%	<100%	<100%	104.90	122.62	Short term : Generation Redispatch Long Term :Possible reconducturing as part of Midway - Semitropic line reconductoring project.
Kern-T-5	34742 SEMITRPJ 115 34746 GANSO 115 1 1	P1-2:A15:42:_Semitropic-Midway #1 115 kV Line and 136.6	P1	Single Contingency	<100%	<100%	87.21	<100%	<100%	<100%	<100%	<100%	91.21	102.99	Sensitivity Under Review
Kern-T-6	34704 SEMITROPIC_D 115 34743 SEMITROPIC_E 115 1 1	P2-1:A15:55:_GANSO-MIDWAY 115kV [0] No Fault and 82.9	P2-1	Single Contingency	<100%	<100%	127.76	<100%	<100%	<100%	<100%	<100%	133.84	151.59	Short term : Generation Redispatch Long Term :Possible reconducturing as part of Midway - Semitropic line reconductoring project.
Kern-T-7	34724 KRN OL J 115 34798 KERNWATR 115 1 1	P2-1:A15:56:_PTRL JCT-LIVE OAK 115kV [0] No Fault and 125.7	P2-1	Single Contingency	87.80	<100%	<100%	23.44	<100%	107.30	<100%	<100%	<100%	<100%	Short Term: Ap-KR-15: Curtail load at Magunden Long Term: Kern 115kV Area Reinforcement
Kern-T-8	34726 PTRL JCT 115 34719 POSOMTJT 115 1 1	P2-1:A15:69:_KERN PWR-KERNWATR 115kV [0] No Fault and 125.7	P2-1	Single Contingency	83.77	<100%	<100%	26.79	<100%	101.24	<100%	<100%	<100%	<100%	Short Term: AP-KR-12: Curtail 5MW@ KernWater; curtail 20MW @ Kern Oil, Operations sees this overloading, in 7450 Procedure, check case Long Term: Kern 115kV Area Reinforcement
Kern-T-9	34728 LIVE OAK 115 34752 KERN PWR 115 1 1	P2-1:A15:69:_KERN PWR-KERNWATR 115kV [0] No Fault and 82	P2-1	Single Contingency	87.42	<100%	<100%	2.20	<100%	114.36	<100%	<100%	<100%	<100%	Operations sees this overloading, in 7450 Procedure, check case
Kern-T-10	34752 KERN PWR 115 34798 KERNWATR 115 1 1	P2-1:A15:56:_PTRL JCT-LIVE OAK 115kV [0] No Fault and 125.7	P2-1	Single Contingency	90.91	<100%	<100%	26.53	<100%	110.43	<100%	<100%	<100%	<100%	Operations sees this overloading, in 7450 Procedure, check case

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-11	30945 KERN PP 230 30943 STCKDLJ2 230 1 1	P2-4:A15:8:_MIDWAY 230kV - Section 2E & 2F and 637	P2	Single Contingency	104.07	<100%	<100%	10.89	<100%	116.28	<100%	<100%	<100%	<100%	Short Term: Curtail pumping load on the Midway - Wheeler Ridge 230kV Lines Long Term: Midway - Kern #2 line
Kern-T-12	30945 KERN PP 230 30944 BKRSFDJ2 230 1 1	P2-3:A15:5:_KERN PP - 1D 230kV & STCKDLEA-STCKDLJ1 #1 line and 478	P2	Single Contingency	91.23	<100%	<100%	25.13	<100%	105.63	<100%	<100%	<100%	<100%	Short Term:Curtail pumping load on the Midway - Wheeler Ridge 230kV Lines Long Term: Midway - Kern #2 line
Kern-T-13	30948 ELKHIL_G 230 30970 MIDWAY 230 1 1	P2-4:A15:4:_MIDWAY 230kV - Section 2F & 2E and 450.2	P2	Single Contingency	<100%	70.09	69.62	<100%	18.31	<100%	70.21	70.24	78.89	101.77	Gen-Redispatch
Kern-T-14	30948 ELKHIL_G 230 30970 MIDWAY 230 2 1	P2-2:A15:13:_MIDWAY 230kV Section 1F and 450.2	P2	Single Contingency	<100%	69.09	68.45	<100%	18.36	<100%	69.18	69.48	77.73	100.54	Gen-Redispatch
Kern-T-15	30970 MIDWAY 230 30943 STCKDLJ2 230 1 1	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and 658	P2	Single Contingency	93.02	<100%	<100%	7.99	<100%	103.70	<100%	<100%	<100%	<100%	Gen-Redispatch
Kern-T-16	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P2-4:A15:6:_MIDWAY 230kV - Section 1E & 1D and 1262	P2	Single Contingency	100.15	99.49	99.32	100.44	0.88	100.27	99.54	99.50	99.45	99.72	Gen-Redispatch
Kern-T-17	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P2-4:A15:8:_MIDWAY 230kV - Section 2D & 1D and 1262	P2	Single Contingency	<100%	100.31	100.17	<100%	0.88	<100%	100.39	100.25	100.14	99.75	Gen-Redispatch
Kern-T-18	30970 MIDWAY 230 30946 LAPALOMA 230 2 1	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and 1262	P2	Single Contingency	100.85	<100%	<100%	100.98	<100%	101.09	<100%	<100%	<100%	<100%	Gen-Redispatch
Kern-T-19	30976 MIDWAY-R12 230 30060 MIDWAY 500 12 1	P2-4:A15:2:_MIDWAY 230kV - Section 1F & 1E and 1122	P2	Single Contingency	43.87	<100%	<100%	129.77	<100%	35.59	<100%	<100%	<100%	<100%	Gen-Redispatch
Kern-T-20	30994 WHEELER 230 39981 WHEELR_J 230 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 329	P2	Single Contingency	<100%	NConv	105.26	<100%	37.93	<100%	NConv	106.22	120.68	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-21	34129 MCFRLD T 115 34712 FAMOSO 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 126	P2	Single Contingency	<100%	<100%	108.14	<100%	<100%	<100%	<100%	<100%	123.09	NConv	Short term : Generation Redispatch Long Term :Possible reconducturing as part of Midway - Semitropic line reconductoring project.
Kern-T-22	34704 SEMITROPIC_D 115 34705 WSCOPRSN 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 82.9	P2	Single Contingency	<100%	NConv	192.30	<100%	22.31	<100%	NConv	48.25	215.67	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-23	34704 SEMITROPIC_D 115 34743 SEMITROPIC_E 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 82.9	P2	Single Contingency	<100%	NConv	198.13	<100%	0.00	<100%	NConv	0.00	220.47	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-24	34705 WSCOPRSN 115 34710 CHARKA 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 87.2	P2	Single Contingency	<100%	NConv	170.79	<100%	14.71	<100%	NConv	36.12	192.28	NConv	Revise East Kern Voltage Conversion Project Scope

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-25	34706 WESTPARK 115 34752 KERN PWR 115 1 1	P2-3:A15:62:_KERN PWR - 2E 115kV & KRN OL J-MAGUNDEN #1 line and 125.1	P2	Single Contingency	112.12	<100%	<100%	40.09	<100%	117.53	<100%	<100%	<100%	<100%	Kern PP 115 kV Area Reinforcement
Kern-T-26	34709 7STNDRD 115 34752 KERN PWR 115 1 1	P2-2:A15:36:_KERN PWR 115kV Section 2E and 125.1	P2	Single Contingency	91.30	<100%	<100%	1.30	<100%	119.68	<100%	<100%	<100%	<100%	Short Term:Curtail load at 7th Standard, Lerdo and Famoso subs Long Term: Kern 115kV Area Reinforcement
Kern-T-27	34710 CHARKA 115 34712 FAMOSO 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 82.9	P2	Single Contingency	<100%	NConv	149.09	<100%	7.18	<100%	NConv	17.65	169.95	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-28	34712 FAMOSO 115 34131 CAWLOB T 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 126	P2	Single Contingency	<100%	<100%	113.58	<100%	<100%	<100%	<100%	<100%	130.08	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-29	34712 FAMOSO 115 34784 CAWELO C 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 87.6	P2	Single Contingency	<100%	NConv	121.02	<100%	0.00	<100%	NConv	0.00	138.27	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-30	34714 LERDO 115 34715 OGLE JCT 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 87.6	P2	Single Contingency	<100%	NConv	137.16	<100%	20.77	<100%	NConv	28.82	155.24	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-31	34716 LRDO JCT 115 34709 7STNDRD 115 1 1	P2-2:A15:36:_KERN PWR 115kV Section 2E and 125.1	P2	Single Contingency	74.38	<100%	<100%	4.46	<100%	100.08	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-32	34724 KRN OL J 115 34798 KERNWATR 115 1 1	P2-2:A15:27:_LIVE OAK 115kV Section 1D and 125.7	P2	Single Contingency	87.78	<100%	<100%	23.32	<100%	107.33	<100%	<100%	<100%	<100%	Short Term: Ap-KR-15: Curtail load at Magunden Long Term: Kern 115kV Area Reinforcement
Kern-T-33	34736 MAGUNDEN 115 39982 WHEELR_J 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 224	P2	Single Contingency	<100%	NConv	84.16	<100%	21.79	<100%	NConv	141.41	99.96	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-34	34742 SEMITRPJ 115 34704 SEMITROPIC_D 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 126	P2	Single Contingency	<100%	<100%	150.41	<100%	<100%	<100%	<100%	<100%	168.59	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-35	34742 SEMITRPJ 115 34704 SEMITROPIC_D 115 1 2	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 239	P2	Single Contingency	<100%	<100%	93.14	<100%	<100%	<100%	<100%	<100%	104.40	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-36	34742 SEMITRPJ 115 34746 GANSO 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 136.6	P2	Single Contingency	<100%	NConv	160.09	<100%	43.60	<100%	NConv	41.53	177.34	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-37	34743 SEMITROPIC_E 115 34774 MIDWAY 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 164.3	P2	Single Contingency	<100%	<100%	107.66	<100%	<100%	<100%	<100%	<100%	118.91	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-38	34746 GANSO 115 34774 MIDWAY 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 164.3	P2	Single Contingency	<100%	<100%	139.56	<100%	<100%	<100%	<100%	<100%	153.83	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-39	34749 TPMNTP1 115 34750 TUPMAN 115 1 1	P2-2:A15:48:_MIDWAY 115kV Section 2E and 88	P2	Single Contingency	122.27	<100%	131.27	59.10	<100%	127.46	<100%	<100%	147.05	138.63	Under Review/Replace limiting switching at Tupman
Kern-T-40	34751 TPMNTP2 115 34750 TUPMAN 115 1 1	P2-4:A15:18:_MIDWAY 115kV - Section 2E & 1E and 88	P2	Single Contingency	<100%	<100%	101.10	<100%	<100%	<100%	<100%	<100%	109.04	101.70	Under Review/Replace limiting switching at Tupman

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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-41	34752 KERN PWR 115 30945 KERN PP 230 3 1	P2-2:A15:4:_KERN PP 230kV Section 1D and 318	P2	Single Contingency	136.61	<100%	<100%	40.35	<100%	156.84	<100%	<100%	<100%	<100%	Revise East Kern Voltage Conversion Project Scope
Kern-T-42	34752 KERN PWR 115 30945 KERN PP 230 5 1	P2-4:A15:12:_KERN PWR 115kV - Section 2D & 2E and 352.6	P2	Single Contingency	<100%	76.31	86.46	<100%	31.86	<100%	80.29	65.28	93.69	102.75	Short Term: Curtail load at Tevis and Stockdale by remotely open Tevis CB152 and CB162, and Stockdale CB112 and CB122 via SCADA. Long Term: Kenr 230kV Area Reinforcement (Kern Bank SPS)
Kern-T-43	34752 KERN PWR 115 34798 KERNWATR 115 1 1	P2-2:A15:27:_LIVE OAK 115kV Section 1D and 125.7	P2	Single Contingency	90.89	<100%	<100%	26.42	<100%	110.46	<100%	<100%	<100%	<100%	Short Term: Curtail load at Magunden. Long Term: Kern 115kV Area Reinforcement
Kern-T-44	34752 KERN PWR 115 34922 KRN OLJ2 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 126	P2	Single Contingency	<100%	<100%	74.75	<100%	<100%	<100%	<100%	<100%	87.09	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-45	34774 MIDWAY 115 30970 MIDWAY 230 2 1	P2-4:A15:6:_MIDWAY 230kV - Section 1E & 1D and 398.4	P2	Single Contingency	75.06	76.61	89.45	24.02	41.83	84.55	78.14	48.92	98.54	134.23	Generation redispatch
Kern-T-46	34774 MIDWAY 115 30970 MIDWAY 230 3 1	P2-4:A15:8:_MIDWAY 230kV - Section 2D & 1D and 420	P2	Single Contingency	<100%	74.17	82.97	<100%	41.23	<100%	75.63	46.30	91.76	126.44	Generation redispatch
Kern-T-47	34774 MIDWAY 115 34780 CYMRIC 115 1 1	P2-3:A15:85:_MIDWAY - 2D 115kV & TPMNTP1-TUPMAN #1 line and 120	P2	Single Contingency	<100%	<100%	27.06	<100%	<100%	<100%	<100%	<100%	29.17	99.95	Generation redispatch
Kern-T-48	34777 FELLOWSG 115 34800 SANTA FE SUB 115 1 1	P2-3:A15:145:_TAFT 115kV - Ring R2 & R1 and 82.9	P2	Single Contingency	46.58	<100%	<100%	107.63	<100%	45.79	<100%	<100%	<100%	<100%	Generation redispatch
Kern-T-49	34779 MIDSUN 115 34777 FELLOWSG 115 1 1	P2-3:A15:145:_TAFT 115kV - Ring R2 & R1 and 82.9	P2	Single Contingency	31.79	<100%	<100%	100.83	<100%	41.77	<100%	<100%	<100%	<100%	Generation redispatch
Kern-T-50	34780 CYMRIC 115 34781 TEXCO_NM 115 1 1	P2-2:A15:47:_MIDWAY 115kV Section 2D and 120	P2	Single Contingency	<100%	25.36	27.18	<100%	34.67	<100%	27.63	30.43	29.29	99.95	Generation redispatch
Kern-T-51	34784 CAWELO C 115 34715 OGLE JCT 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 88	P2	Single Contingency	<100%	<100%	113.21	<100%	<100%	<100%	<100%	<100%	129.73	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-52	34922 KRN OLJ2 115 34131 CAWLOB T 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 126	P2	Single Contingency	<100%	<100%	112.02	<100%	<100%	<100%	<100%	<100%	128.48	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-53	34932 WASCO 115 34129 MCFRLD T 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 126	P2	Single Contingency	<100%	<100%	122.76	<100%	<100%	<100%	<100%	<100%	138.83	NConv	Revise Voltage Conversion Project
Kern-T-54	34932 WASCO 115 34704 SEMITROPIC_D 115 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 126	P2	Single Contingency	<100%	<100%	130.69	<100%	<100%	<100%	<100%	<100%	147.45	NConv	Revise Voltage Conversion Project
Kern-T-55	38600 BUENAVJ1 230 30970 MIDWAY 230 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 329	P2	Single Contingency	<100%	NConv	108.13	<100%	71.23	<100%	NConv	104.69	116.84	NConv	Revise East Kern Voltage Conversion Project Scope

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Kern-T-56	38600 BUENAVJ1 230 30970 MIDWAY 230 1 1	P2-4:A15:5:_MIDWAY 230kV - Section 2D & 2E and 329	P2	Single Contingency	107.28	<100%	<100%	82.04	<100%	108.35	<100%	<100%	<100%	<100%	Under Review
Kern-T-57	38600 BUENAVJ1 230 38640 WHLR RJ1 230 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 329	P2	Single Contingency	<100%	NConv	97.00	<100%	60.40	<100%	NConv	93.60	105.53	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-58	38605 BUENAVJ2 230 30970 MIDWAY 230 1 1	P2-2:A15:13:_MIDWAY 230kV Section 1D and 329	P2	Single Contingency	106.05	<100%	<100%	81.46	<100%	106.82	<100%	<100%	<100%	<100%	Under Review
Kern-T-59	38605 BUENAVJ2 230 30970 MIDWAY 230 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 329	P2	Single Contingency	<100%	NConv	108.37	<100%	71.35	<100%	NConv	104.83	117.09	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-60	38605 BUENAVJ2 230 30970 MIDWAY 230 1 1	P2-4:A15:6:_MIDWAY 230kV - Section 1E & 1D and 329	P2	Single Contingency	106.25	70.18	72.94	81.95	51.89	107.10	71.70	59.84	75.74	82.73	Under Review
Kern-T-61	38605 BUENAVJ2 230 38645 WHLR RJ2 230 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 329	P2	Single Contingency	<100%	NConv	98.01	<100%	61.27	<100%	NConv	94.54	106.57	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-62	38640 WHLR RJ1 230 38650 WND GPJ1 230 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 329	P2	Single Contingency	<100%	NConv	88.11	<100%	51.43	<100%	NConv	84.28	96.49	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-63	38645 WHLR RJ2 230 38655 WND GPJ2 230 1 1	P2-4:A15:2:_KERN PP 230kV - Section 1D & 2D and 329	P2	Single Contingency	<100%	NConv	86.57	<100%	49.99	<100%	NConv	82.69	94.89	NConv	Revise East Kern Voltage Conversion Project Scope
Kern-T-64															
Kern-T-65															
Kern-T-66															
Kern-T-67	30948 ELKHIL_G 230 30970 MIDWAY 230 1 1	P1-1:A15:66:_TEXSUNST 18kV Gen Unit 1 and P1-2:A15:16:_ELKHIL_G-MIDWAY #2 230kV [0]	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	100.06	Dec gen Elkhills
Kern-T-68	30948 ELKHIL_G 230 30970 MIDWAY 230 2 1	P1-1:A15:66:_TEXSUNST 18kV Gen Unit 1 and P1-2:A15:15:_ELKHIL_G-MIDWAY #1 230kV [0]	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	100.06	Dec gen Elkhills
Kern-T-69	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P1-1:A15:45:_MT POSO 14kV Gen Unit 1 and P1-2:A15:17:_MIDWAY-LAPALOMA #2 230kV [0]	P3	Multiple Contingency (G-1, N-1)	99.75	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	La Paloma Gen re-dispatch
Kern-T-70	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P1-1:A15:81:_WHLR RD1 13kV Gen Unit 2 and P1-2:A15:17:_MIDWAY-LAPALOMA #2 230kV [0]	P3	Multiple Contingency (G-1, N-1)	99.71	<100%	<100%	99.80	<100%	99.78	<100%	<100%	<100%	<100%	La Paloma Gen re-dispatch
Kern-T-71	30970 MIDWAY 230 30946 LAPALOMA 230 2 1	P1-1:A15:39:_DEXEL + 14kV Gen Unit 1 and P1-2:A15:16:_MIDWAY-LAPALOMA #1 230kV [0]	P3	Multiple Contingency (G-1, N-1)	99.74	<100%	<100%	99.76	<100%	99.82	<100%	<100%	<100%	<100%	La Paloma Gen re-dispatch
Kern-T-72	34704 SEMITROPIC_D 115 34743 SEMITROPIC_E 115 1 1	P1-1:A15:18:_WILDWOOD2 0kV Gen Unit 1 and P1-2:A15:38:_Smyrna-Semitropic-Midway 115 kV Line	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	124.88	Interim split 115kV bus, Long Term Reconductor

Study Area: PG&E Kern

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-73	34704 SEMITROPIC_D 115 34743 SEMITROPIC_E 115 1 1	P1-1:A15:43:_MT POSO 14kV Gen Unit 1 and P1-2:A15:38:_Smyrna-Semitropic-Midway 115 kV Line	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	106.14	<100%	<100%	<100%	<100%	<100%	113.13	<100%	Interim split 115kV bus, Long Term Reconductor
Kern-T-74	34704 SEMITROPIC_D 115 34743 SEMITROPIC_E 115 1 1	P1-1:A15:53:_PSE-LVOK 9kV Gen Unit 1 and P1-2:A15:38:_Smyrna-Semitropic-Midway 115 kV Line	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	101.01	<100%	<100%	<100%	<100%	<100%	108.02	<100%	Interim split 115kV bus, Long Term Reconductor
Kern-T-75	34706 WESTPARK 115 34752 KERN PWR 115 1 1	P1-1:A15:59:_PSE-BEAR 14kV Gen Unit 1 and P1-2:A15:42:_WESTPARK-KERN PWR #2 115kV [0]	P3	Multiple Contingency (G-1, N-1)	96.04	<100%	<100%	<100%	<100%	99.57	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-76	34706 WESTPARK 115 34752 KERN PWR 115 2 1	P1-1:A15:59:_PSE-BEAR 14kV Gen Unit 1 and P1-2:A15:41:_WESTPARK-KERN PWR #1 115kV [0]	P3	Multiple Contingency (G-1, N-1)	96.04	<100%	<100%	<100%	<100%	99.57	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-77	34724 KRN OL J 115 34798 KERNWATR 115 1 1	P1-1:A15:42:_OILDALE 14kV Gen Unit 1 and P1-2:A15:49:_Live Oak-Kern Oil 115kV	P3	Multiple Contingency(G-1, N-1)	<100%	<100%	<100%	<100%	<100%	105.37	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-78	34728 LIVE OAK 115 34752 KERN PWR 115 1 1	P1-1:A15:56:_PSE-LVOK 9kV Gen Unit 1 and P1-2:A15:48:_Kern Oil-Witco 115kV Line	P3	Multiple Contingency(G-1, N-1)	<100%	<100%	<100%	<100%	<100%	107.12	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-79	34742 SEMITRPJ 115 34746 GANSO 115 1 1	P1-1:A15:15:_Q557 0kV Gen Unit 1 and P1-2:A15:42:_Semitropic-Midway #1 115 kV Line	P3	Multiple Contingency(G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	105.08	Sensitivity Under Review
Kern-T-80	34752 KERN PWR 115 34798 KERNWATR 115 1 1	P1-1:A15:42:_OILDALE 14kV Gen Unit 1 and P1-2:A15:49:_Live Oak-Kern Oil 115kV	P3	Multiple Contingency(G-1, N-1)	92.54	<100%	<100%	<100%	<100%	108.50	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-81	34774 MIDWAY 115 34780 CYMRIC 115 1 1	P1-1:A15:32:_FELLOWS 21kV Gen Unit QF and P1-2:A15:28:_MIDWAY-TAFT #1 115kV [0]	P3	Multiple Contingency(G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	110.08	Sensitivity Under Review
Kern-T-82	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P1-4:A15:8:_Q620C2 and P1-2:A15:21:_MIDWAY-LAPALOMA #2 230kV [0]	P3	Multiple Contingency(G-1, N-1)	<100%	99.42	99.27	<100%	<100%	<100%	99.45	99.50	99.35	99.30	Sensitivity Under Review
Kern-T-83	34776 TAFT 115 34860 TAFT A 70.0 2 1	P1-1:A15:42:_BADGERCK 14kV Gen Unit 1 and P1-3:A15:60:_TAFT 115/70kV TB 1	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	100.51	<100%	<100%	<100%	<100%	<100%	100.19	<100%	Short Term: Curtail load at Elk Hills and Texaco BV Hills Long Term: bank replacement
Kern-T-84	34776 TAFT 115 34860 TAFT A 70.0 2 1	P1-1:A15:6:_Q356 35kV Gen Unit 1 and P1-3:A15:60:_TAFT 115/70kV TB 1	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	93.35	<100%	<100%	<100%	<100%	<100%	102.57	105.90	Short Term: Curtail load at Elk Hills and Texaco BV Hills Long Term: bank replacement

Study Area: PG&E Kern

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-85	34780 CYMRIC 115 34781 TEXCO_NM 115 1 1	P1-1:A15:32:_FELLOWS 21kV Gen Unit QF and P1-2:A15:28:_MIDWAY-TAFT #1 115kV [0]	P3	Multiple Contingency (G-1, N-1)	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	110.09	Sensitivity Under Review
Kern-T-86	30900 GATES 230 30970 MIDWAY 230 1 1	P1-3:A15:3:_MIDWAY 500/230kV TB 13 and P1-3:A15:2:_MIDWAY 500/230kV TB 12	P6	Multiple Contingency	<100%	<100%	99.97	<100%	<100%	<100%	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-87	30945 KERN PP 230 30944 BKRSFDJ2 230 1 1	P1-2:A15:9:_Midway-Kern #1 230kV Line and P1-2:A15:10:_Midway-Kern #3 230kV Line	P6	Multiple Contingency	91.62	<100%	<100%	<100%	<100%	99.91	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-88	30948 ELKHIL_G 230 30970 MIDWAY 230 1 1	P1-2:A15:69:_KERNRDGE-TEMBLOR #1 115kV [0] and P1-2:A15:16:_ELKHIL_G-MIDWAY #2 230kV [0]	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	100.16	Sensitivity Under Review
Kern-T-89	30948 ELKHIL_G 230 30970 MIDWAY 230 2 1	P1-2:A15:69:_KERNRDGE-TEMBLOR #1 115kV [0] and P1-2:A15:15:_ELKHIL_G-MIDWAY #1 230kV [0]	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	100.16	Sensitivity Under Review
Kern-T-90	30970 MIDWAY 230 30942 STCKDLJ1 230 1 1	P1-2:A15:10:_Midway-Kern #3 230kV Line and P1-2:A15:11:_Midway-Kern #4 230kV Line	P6	Multiple Contingency	99.91	<100%	<100%	<100%	<100%	100.04	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-91	30970 MIDWAY 230 30946 LAPALOMA 230 1 1	P1-4:A15:8:_REGULUS and P1-2:A15:17:_MIDWAY-LAPALOMA #2 230kV [0]	P6	Multiple Contingency	99.72	<100%	<100%	99.81	<100%	99.79	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-92	30970 MIDWAY 230 30946 LAPALOMA 230 2 1	P1-4:A15:8:_REGULUS and P1-2:A15:16:_MIDWAY-LAPALOMA #1 230kV [0]	P6	Multiple Contingency	99.72	<100%	<100%	99.81	<100%	99.79	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-93	34704 SEMITROPIC_D 115 34743 SEMITROPIC_E 115 1 1	P1-2:A15:38:_Smyrna-Semitropic-Midway 115 kV Line and P1-2:A15:51:_Lerdo-Kern Oil-7th Standard 115kV Line	P6	Multiple Contingency	<100%	<100%	109.50	<100%	<100%	<100%	<100%	<100%	116.61	137.40	Generation redispatch, Due to new Project? famoso Braker is closed
Kern-T-94	34706 WESTPARK 115 34752 KERN PWR 115 1 1	P1-2:A15:42:_WESTPARK-KERN PWR #2 115kV [0] and P1-2:A15:51:_Kern-Magunden-Witco 115kV Line	P6	Multiple Contingency	111.81	<100%	<100%	<100%	<100%	117.14	<100%	<100%	<100%	<100%	Normally open CB122 at Magunden and disable restore function, Mountain Bear INC gen
Kern-T-95	34706 WESTPARK 115 34752 KERN PWR 115 2 1	P1-2:A15:41:_WESTPARK-KERN PWR #1 115kV [0] and P1-2:A15:51:_Kern-Magunden-Witco 115kV Line	P6	Multiple Contingency	111.81	<100%	<100%	<100%	<100%	117.14	<100%	<100%	<100%	<100%	Normally open CB122 at Magunden and disable restore function Mountain Bear INC gen
Kern-T-96	34726 PTRL JCT 115 34719 POSOMTJT 115 1 1	P1-2:A15:43:_7TH STANDARD-KERN 115kV [1981] and P1-2:A15:48:_Kern Oil-Witco 115kV Line	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	100.52	<100%	<100%	<100%	<100%	Sensitivity Under Review

Study Area: PG&E Kern

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-97	34726 PTRL JCT 115 34728 LIVE OAK 115 1 1	P1-2:A15:43:_7TH STANDARD-KERN 115kV [1981] and P1-2:A15:48:_Kern Oil-Witco 115kV Line	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	100.51	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-98	34728 LIVE OAK 115 34752 KERN PWR 115 1 1	P1-2:A15:48:_Kern Oil-Witco 115kV Line and P1-2:A15:43:_7TH STANDARD-KERN 115kV [1981]	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	111.39	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-99	34742 SEMITRPJ 115 34704 SEMITROPIC_D 115 1 1	P1-2:A15:42:_Semitropic-Midway #1 115 kV Line and P1-2:A15:51:_Lerdo-Kern Oil-7th Standard 115kV Line	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	100.81	Sensitivity Under Review
Kern-T-100	34742 SEMITRPJ 115 34746 GANSO 115 1 1	P1-2:A15:51:_Lerdo-Kern Oil-7th Standard 115kV Line and P1-2:A15:42:_Semitropic-Midway #1 115 kV Line	P6	Multiple Contingency	<100%	<100%	94.88	<100%	<100%	<100%	<100%	<100%	99.62	113.33	Sensitivity Under Review
Kern-T-101	34746 GANSO 115 34774 MIDWAY 115 1 1	P1-2:A15:42:_Semitropic-Midway #1 115 kV Line and P1-2:A15:51:_Lerdo-Kern Oil-7th Standard 115kV Line	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	89.85	101.11	Sensitivity Under Review
Kern-T-102	34752 KERN PWR 115 30945 KERN PP 230 4 1	P1-3:A15:6:_KERN PP 230/115kV TB 5 and P1-3:A15:4:_KERN PP 230/115kV TB 3	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	127.55	Sensitivity Under Review
Kern-T-103	34752 KERN PWR 115 34798 KERNWATR 115 1 1	P1-3:A15:41:_GODN_BER 115/13.8kV TB 1 and P1-2:A15:49:_Live Oak-Kern Oil 115kV	P6	Multiple Contingency	92.29	<100%	<100%	<100%	<100%	108.25	<100%	<100%	<100%	<100%	Sensitivity Under Review
Kern-T-104	34774 MIDWAY 115 30970 MIDWAY 230 1 1	P1-3:A15:17:_MIDWAY 230/115kV TB 2 and P1-3:A15:18:_MIDWAY 230/115kV TB 3	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	118.59	Sensitivity Under Review
Kern-T-105	34774 MIDWAY 115 30970 MIDWAY 230 2 1	P1-3:A15:16:_MIDWAY 230/115kV TB 1 and P1-3:A15:18:_MIDWAY 230/115kV TB 3	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	118.59	Sensitivity Under Review
Kern-T-106	34774 MIDWAY 115 30970 MIDWAY 230 3 1	P1-3:A15:16:_MIDWAY 230/115kV TB 1 and P1-3:A15:17:_MIDWAY 230/115kV TB 2	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	115.18	Sensitivity Under Review
Kern-T-107	34774 MIDWAY 115 34780 CYMRIC 115 1 1	P1-1:A15:32:_FELLOWS 21kV Gen Unit QF and P1-2:A15:28:_MIDWAY-TAFT #1 115kV [0]	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	110.08	Sensitivity Under Review
Kern-T-108	34776 TAFT 115 34860 TAFT A 70.0 2 1	P1-3:A15:60:_TAFT 115/70kV TB 1 and P1-3:A15:88:_Q356 70/34.5kV TB 1	P6	Multiple Contingency	<100%	<100%	93.36	<100%	<100%	<100%	<100%	<100%	102.60	105.88	Sensitivity Under Review

Study Area: PG&E Kern

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations	
Kern-T-109	34776 TAFT 115 34860 TAFT A 70.0 2 1	P1-3:A15:65:_WILDWOOD2 115/34.5kV TB 1, Loosing Solar Units and P1-3:A15:60:_TAFT 115/70kV TB 1	P6	Multiple Contingency	<100%	<100%	100.52	<100%	<100%	<100%	<100%	<100%	100.19	Replace TB	Sensitivity Under Review
Kern-T-110	34780 CYMRIC 115 34781 TEXCO_NM 115 1 1	P1-1:A15:32:_FELLOWS 21kV Gen Unit QF and P1-2:A15:28:_MIDWAY-TAFT #1 115kV [0]	P6	Multiple Contingency	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	<100%	110.09	Sensitivity Under Review
Kern-T-111	34918 KERN PW2 70.0 34914 KERN PW1 70.0 1 1	P1-2:A15:73:_Kern-Old River #1 70kV and P1-3:A15:43:_KERN PWR 115/70kV TB 1	P6	Multiple Contingency	<100%	100.18	<100%	<100%	<100%	<100%	100.48	<100%	<100%	<100%	Short Term:Curtail load at Tevis, Stckdale, Westpark and Magunden Long Term: Kern 230kV Area Reinforcement (Kern Bank SPS)
Kern-T-112	30945 KERN PP 230 30942 STCKDLJ1 230 1 1	P7-1:A15:12:_Midway-Kern No. 3 & Midway-Kern No. 4 230 kV Lines and 478	P7	Multiple Contingency (common structure)	91.43	<100%	<100%	28.28	<100%	105.58	<100%	<100%	<100%	<100%	Replace the Limiting element, Midway-Kern PP Nos.1,3, and 4 230 kV Lines Capacity Increase
Kern-T-113	30945 KERN PP 230 30944 BKRSFDJ2 230 1 1	P7-1:A15:12:_Midway-Kern No. 3 & Midway-Kern No. 4 230 kV Lines and 478	P7	Multiple Contingency (common structure)	91.09	<100%	<100%	27.23	<100%	105.12	<100%	<100%	<100%	<100%	Replace the Limiting element, Midway-Kern PP Nos.1,3, and 4 230 kV Lines Capacity Increase
Kern-T-114	30970 MIDWAY 230 30942 STCKDLJ1 230 1 1	P7-1:A15:12:_Midway-Kern No. 3 & Midway-Kern No. 4 230 kV Lines and 591.2	P7	Multiple Contingency (common structure)	105.93	<100%	<100%	15.27	<100%	117.58	<100%	<100%	<100%	<100%	Replace the Limiting element, Midway-Kern PP Nos.1,3, and 4 230 kV Lines Capacity Increase

Study Area: PG&E Kern

Voltage Deviations

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

Study Area: PG&E Kern

High/Low Voltage

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

Study Area: PG&E Kern

High/Low Voltage

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

Study Area: PG&E Kern

High/Low Voltage

California ISO

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

Study Area: PG&E Kern

High/Low Voltage

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

2016-2017 ISO Reliability Assessment - Preliminary Study Results

Study Area: **PG&E Kern**

Transient Stability

ID	Contingency	Category	Category Description	Transient Stability Performance(Voltage and Frequency violations)										Potential Mitigation Solutions
				2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 Spring Off-Peak	2021 Spring Light Load	Select..	Select..	Select..	Select..	Select..	
Kern-TS-1	Kern PP 230/115 kV Transformer #5	P1	Single Contingency	8	6	5	9	5	N/A	N/A	N/A	N/A	N/A	Under Review
Kern-TS-2	MIDWAY 500/230kV TB 13	P1	Single Contingency	2	2	2	4	4	N/A	N/A	N/A	N/A	N/A	Under Review
Kern-TS-3	30970 Midway 230 kV Bus Section 1D	P2	Single Contingency	NonConv	NonConv	NonConv	11	0	N/A	N/A	N/A	N/A	N/A	Under Review
Kern-TS-4	Smyrna-Semitropic-Midway 115 kV Line & MT POSO 14kV Gen Unit 1	P3	Multiple Contingency	75	80	None	NonConv	19	N/A	N/A	N/A	N/A	N/A	Voltage Conversion Project fixes later years
Kern-TS-5	Midway-Temblor 115kV Line &SVD at Midway	P6	Multiple Contingency	NonConv	None	NonConv	NonConv	25	N/A	N/A	N/A	N/A	N/A	Under Review
Kern-TS-6	Midway-Kern No. 3 & Midway-Kern No. 4 230 kV Lines	P7	Multiple Contingency	2	None	None	8	None	N/A	N/A	N/A	N/A	N/A	Voltage Conversion Project fixes later years

Study Area: PG&E Kern

Single Contingency Load Drop

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

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

Study Area: PG&E Kern

Single Source Substation with more than 100 MW Load

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

No single source substation with more than 100 MW Load