

## 2012/2013 ISO Reliability Assessment - Final Study Results

Study Area: **PG&E Central Valley Stockton - Summer Peak**

### Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014	2017	2022	
Stoc-T-1	Weber - Mormon Jct 60 kV Line	Normal	A	N-0	89%	93%	103%	Rerate
Stoc-T-2	Lockeford No. 1 60 kV Line	Hammer - Country Club 60 kV Line	B	N-1	158%	165%	178%	Overload due to automatic pick-up of radially served load. Potential mitigation is to disable automatic pick-up scheme.
Stoc-T-3	Vally Springs No. 1 60 kV Line	Weber - Mormon Jct 60 kV Line	B	N-1	118%	124%	137%	Overload due to automatic pick-up of radially served load. Potential mitigation is to disable automatic pick-up scheme.
Stoc-T-4	Kasson - Louise 60 kV Line	BUS FAULT AT 33528 KASSON 115.00	C1	Bus	113%	117%	124%	Upgrade Kasson 115 kV bus.
Stoc-T-5	Manteca - Louise 60 kV Line	BUS FAULT AT 33528 KASSON 115.00	C1	Bus	151%	155%	163%	Upgrade Kasson 115 kV bus.
Stoc-T-6	Manteca 115/60 kV Transformer No. 3	BUS FAULT AT 33528 KASSON 115.00	C1	Bus	191%	198%	209%	Upgrade Kasson 115 kV bus.
Stoc-T-7	Tesla - Weber 230 kV Line	BUS FAULT AT 30624 TESLA E 230.00 Bus 2	C1	Bus	84%	93%	106%	Replace limiting component.
Stoc-T-8	Tesla - Weber 230 kV Line	TESLA E 230 kV Bus 2 and TESLA D 230 kV Bus 2 - CB 822 Failure	C2	Stuck Bkr	85%	94%	107%	Replace limiting component.
Stoc-T-9	Bellota-Riverbank-Melones 115 kV Line	BELLOTA 230 kV Bus 1 and Bus 2 - CB 200 Failure	C2	Stuck Bkr	94%	102%	114%	Add sectionalizing breaker at Bellota 230 kV bus
Stoc-T-10	Kasson - Louise 60 kV Line	Schulte - Kasson - Manteca 115 kV Line_Manteca - Vierra 115 kV Line	C3	N-1-1	80%	87%	101%	Rerate.
Stoc-T-11	Lockeford - Industrial 60 kV Line	Lockeford - Lodi 60 kV Line No. 2 _Lodi - Industrial 60 kV Line	C3	N-1-1	140%	145%	150%	Lodi area reinforcement.
Stoc-T-12	Lockeford - Lodi 60 kV Line No. 1	Lockeford - Lodi 60 kV Line No. 2 _Lockeford - Industrial 60 kV Line	C3	N-1-1	136%	142%	147%	Lodi area reinforcement.
Stoc-T-13	Lockeford - Lodi 60 kV Line No. 2	Lockeford - Industrial 60 kV Line _Lodi - Industrial 60 kV Line	C3	N-1-1	157%	163%	168%	Lodi area reinforcement.

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Stoc-T-14	Lockeford - Lodi 60 kV Line No. 3	Lockeford - Lodi 60 kV Line No. 2 _Lockeford - Industrial 60 kV Line	C3	N-1-1	168%	175%	182%	Lodi area reinforcement.
Stoc-T-15	Lockeford No. 1 60 kV Line	Lockeford - Bellota 230 kV Line _Hammer - Country Club 60 kV	C3	N-1-1	Diverge	Diverge	Diverge	Short term: Disable automatics. Long term: Lodi area reinforcement.
Stoc-T-16	Lodi - Industrial 60 kV Line	Lockeford - Lodi 60 kV Line No. 2 _Lockeford - Industrial 60 kV Line	C3	N-1-1	177%	184%	190%	Lodi area reinforcement.
Stoc-T-17	Stockton 'A' - Lockeford - Bellota 115 kV Line No. 2	Stockton 'A'-Lockeford-Bellota 115 kV _Gold Hill-Bellota-Lockeford 115 kV Line	C3	N-1-1	91%	96%	102%	Operating solution
Stoc-T-18	Stockton 'A' - Weber 60 kV Line No. 3	Stockton 'A' - Weber 60 kV Line No. 1 _Stockton 'A' - Weber 60 kV Line No. 2	C3	N-1-1	124%	128%	14%	Interim operating solution
Stoc-T-19	Tesla - Weber 230 kV Line	Rio Oso - Lockeford 230 kV Line _Bellota - Tesla 230 kV Line No. 2	C3	N-1-1	82%	91%	104%	Replace limiting component.
Stoc-T-20	Kasson - Louise 60 kV Line	Schulte-Kasson-Manteca 115 kV Line & Manteca-Vierra 115 kV Line	C5	DCTL	80%	87%	101%	Rerate

**Thermal Overloads**

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Light Load	2017 Summer Off-Peak	N/A	
Stoc-OP-T-01	Bellota-Riverbank-Melones 115 kV Line	TESLA 115 kV Bus 1 and Bus 2 - CB 102 Failure	C2	Stuck Bkr	134%	14%		Interim operating solution.
Stoc-OP-T-02	Riverbank Jct - Manteca 115 kV Line	Stanislaus-Melones-Manteca 115 kV Line_Bellota-Riverbank-Melones 115 kV Line	C3	N-1-1	119%	105%		Reduce Melones area generation

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## Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014	2017	2022	
Stoc-DV-01	STKTON B 115 kV	BELLOTA 230 kV Bus 1 and Bus 2 - CB 200 Failure	C2	Stuck Bkr	-6%	-8%	-12%	Add sectionalizing breaker at Bellota 230 kV bus
Stoc-DV-02	STKTON A 115 kV	BELLOTA 230 kV Bus 1 and Bus 2 - CB 200 Failure	C2	Stuck Bkr	-5%	-7%	-10%	Add sectionalizing breaker at Bellota 230 kV bus
Stoc-DV-03	LOCKFORD 115 kV	BELLOTA 230 kV Bus 1 and Bus 2 - CB 200 Failure	C2	Stuck Bkr	-6%	-8%	-12%	Add sectionalizing breaker at Bellota 230 kV bus
Stoc-DV-04	RVRBANK 115 kV	BELLOTA 230 kV Bus 1 and Bus 2 - CB 200 Failure	C2	Stuck Bkr	-6%	-8%	-11%	Add sectionalizing breaker at Bellota 230 kV bus



Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Light Load	2017 Summer Off-Peak	N/A	

No voltage deviation issues identified.

**High/Low Voltage**

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2014	2017	2022	
Stoc-V-01	DONNELLS 115 kV	Normal	A	N-0	1.06	1.06	1.05	Under review for possible exemption.
Stoc-V-02	BEARDSLY 115 kV	Normal	A	N-0	1.05	1.05	1.05	Under review for possible exemption.
Stoc-V-03	VICTOR 60 kV	Lockeford - Bellota 230 kV Line _Hammer - Country Club 60 kV	C3	N-1-1	0.84	0.89	0.77	Lodi area reinforcement.
Stoc-V-04	MONDAVI 60 kV	Lockeford - Bellota 230 kV Line _Hammer - Country Club 60 kV	C3	N-1-1	0.82	0.87	0.75	Lodi area reinforcement.
Stoc-V-05	LODI 60 kV	Lockeford - Bellota 230 kV Line _Hammer - Country Club 60 kV	C3	N-1-1	0.83	0.87	0.75	Lodi area reinforcement.
Stoc-V-06	COLONY 60 kV	Lockeford - Bellota 230 kV Line _Hammer - Country Club 60 kV	C3	N-1-1	0.84	0.89	0.76	Lodi area reinforcement.
Stoc-V-07	MSHR 60V 60 kV	Lockeford - Bellota 230 kV Line _Hammer - Country Club 60 kV	C3	N-1-1	0.78	0.83	0.68	Lodi area reinforcement.

**High/Low Voltage**

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2014 Summer Light Load	2017 Summer Off-Peak	N/A	
Stoc-OP-V-01	HERDLYN 60 kV	Normal	A	N-0	1.07	1.04		Under review for possible exemption.
Stoc-OP-V-02	B.BTHNY- 60 kV	Normal	A	N-0	1.07	1.04		Under review for possible exemption.
Stoc-OP-V-03	HRDLNJCT 60 kV	Normal	A	N-0	1.07	1.04		Under review for possible exemption.
Stoc-OP-V-04	TOSCO-PP 60 kV	Normal	A	N-0	1.07	1.05		Under review for possible exemption.
Stoc-OP-V-05	SOUTH BY 60 kV	Normal	A	N-0	1.07	1.05		Under review for possible exemption.
Stoc-OP-V-06	WEST SDE 60 kV	Normal	A	N-0	1.07	1.04		Under review for possible exemption.
Stoc-OP-V-07	VICTOR 60 kV	Rio Oso - Lockeford 230 kV Line _Lockeford - Bellota 230 kV Line	C3	N-1-1	0.93	0.86		Lodi area reinforcement.
Stoc-OP-V-08	MONDAVI 60 kV	Rio Oso - Lockeford 230 kV Line _Lockeford - Bellota 230 kV Line	C3	N-1-1	0.92	0.85		Lodi area reinforcement.
Stoc-OP-V-09	LODI 60 kV	Rio Oso - Lockeford 230 kV Line _Lockeford - Bellota 230 kV Line	C3	N-1-1	0.92	0.85		Lodi area reinforcement.
Stoc-OP-V-10	COLONY 60 kV	Rio Oso - Lockeford 230 kV Line _Lockeford - Bellota 230 kV Line	C3	N-1-1	0.93	0.85		Lodi area reinforcement.

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*Single Contingency Load Drop*

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)			Potential Mitigation Solutions
				2014	2017	2022	

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



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**Single Source Substation with more than 100 MW Load**



ID	Substation	Load Served (MW)			Potential Mitigation Solutions
		2014	2017	2022	

No single source substation with more than 100 MW Load