

2012/2013 ISO Reliability Assessment - Preliminary Study Results

Study Area: **PG&E Greater Bay Area San Jose - Summer Peak**



Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
SanJ-SP-T-01	Newark-Dixon Landing 115 kV Line	Piercy-Metcalf 115 kV Line	B	N-1	109%	N/A	N/A	Mitigated by Mabury Voltage Conversion Project
SanJ-SP-T-02	Piercy-Metcalf 115 kV Line	Newark-Dixon Landing 115 kV Line	B	N-1	101%	88%	93%	Mitigated by Mabury Voltage Conversion Project
SanJ-SP-T-03	Los Esteros-Montague 115 kV Line	Los Esteros-Trimble 115 kV Line	B	N-1	94%	98%	102%	Re-rate or reconductor line.
SanJ-SP-T-04	Markham No. 1 115 kV Tap	Markham No. 2 115 kV Tap	B	N-1	98%	106%	110%	Re-rate or reconductor line.
SanJ-SP-T-05	NRS-Scott No. 1 115 kV Line	Los Esteros-Nortech 115 kV Line _DVR	B	L-1/G-1	102%	108%	112%	Re-rate or reconductor line.
SanJ-SP-T-06	NRS-Scott No. 1 115 kV Line	Nortech-NRS 115 kV Line _DVR	B	L-1/G-1	97%	103%	106%	Re-rate or reconductor line.
SanJ-SP-T-07	NRS-Scott No. 1 115 kV Line	NRS-Scott No. 2 115 kV Line _DVR	B	L-1/G-1	97%	102%	106%	Re-rate or reconductor line.
SanJ-SP-T-08	Newark-Dixon Landing 115 kV Line	BUS FAULT AT 35643 MTCALF 2E 115.00	C1	Bus	109%	N/A	N/A	Mitigated by Mabury Voltage Conversion Project
SanJ-SP-T-09	Metcalf-Llagas 115 kV Line	BUS FAULT AT 35648 LLAGAS F 115.00	C1	Bus	100%	99%	98%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-10	Green Valley - Llagas 115 kV Line (LLAGAS - MORGN J2)	BUS FAULT AT 35648 LLAGAS F 115.00	C1	Bus	108%	107%	106%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-11	Green Valley - Llagas 115 kV Line (MORGN J1 - MORGN J2)	BUS FAULT AT 35648 LLAGAS F 115.00	C1	Bus	100%	99%	98%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-12	Metcalf 230/115 kV Trans No. 4	CB FAULT AT METCALF SUB 230 CB312	C2	Breaker	95%	100%	108%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate

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SanJ-SP-T-13	Metcalf 230/115 kV Trans No. 2	CB FAULT AT METCALF SUB 230 CB312	C2	Breaker	N/A	100%	108%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-14	Metcalf 230/115 kV Trans No. 1	CB FAULT AT METCALF SUB 230 CB322	C2	Breaker	N/A	99%	107%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-15	Metcalf 230/115 kV Trans No. 3	CB FAULT AT METCALF SUB 230 CB322	C2	Breaker	106%	112%	120%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-16	Newark-Dixon Landing 115 kV Line	CB FAULT AT METCALF SUB 115 CB492	C2	Breaker	109%	N/A	N/A	Mitigated by Mabury Voltage Conversion Project
SanJ-SP-T-17	Evergreen-Mabury 115 kV Line	Newark-Dixon Landing 115 kV Line _Piercy-Metcalf 115 kV Line	C3	N-1-1	N/A	146%	154%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-18	Metcalf-Evergreen No. 2 115 kV Line	Markham No. 1 115 kV Tap _Metcalf-Evergreen No. 1 115 kV Line	C3	N-1-1	110%	N/A	N/A	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-19	Green Valley - Llagas 115 kV Line (LLAGAS - MORGAN J2)	Metcalf-Morgan Hill 115 kV Line _Llagas-Gilroy Foods 115 kV Line	C3	N-1-1	123%	128%	138%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-20	Los Esteros-Montague 115 kV Line	Los Esteros-Trimble 115 kV Line _Los Esteros-Nortech 115 kV Line	C3	N-1-1	114%	118%	123%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-21	Los Esteros-Trimble 115 kV Line	Los Esteros-Montague 115 kV Line _Los Esteros-Nortech 115 kV Line	C3	N-1-1	101%	105%	109%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate

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ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
SanJ-SP-T-22	Mabury-Jennings J. 115 kV Line	Newark-Dixon Landing 115 kV Line _Piercy-Metcalf 115 kV Line	C3	N-1-1	N/A	146%	153%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-23	Mabury 115 kV Tap	Newark-Dixon Landing 115 kV Line _Piercy-Metcalf 115 kV Line	C3	N-1-1	N/A	126%	133%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-24	McKee-Piercy 115 kV Line	Newark-Dixon Landing 115 kV Line _Mabury-Jennings J. 115 kV Line	C3	N-1-1	N/A	100%	104%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-25	Metcalf 500/230 kV Trans No. 13	Metcalf 500/230 kV Trans No. 11 _Metcalf 500/230 kV Trans No. 12	C3	N-1-1	94%	101%	111%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-26	Green Valley - Llagas 115 kV Line (MORGN J1 - MORGN J2)	Metcalf-Morgan Hill 115 kV Line _Llagas-Gilroy Foods 115 kV Line	C3	N-1-1	114%	119%	128%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-27	Metcalf-Morgan Hill 115 kV Line	Metcalf-Llagas 115 kV Line _Llagas-Gilroy Foods 115 kV Line	C3	N-1-1	105%	109%	116%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-28	Metcalf-Llagas 115 kV Line	Metcalf-Morgan Hill 115 kV Line _Llagas-Gilroy Foods 115 kV Line	C3	N-1-1	114%	119%	128%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-29	Metcalf 230/115 kV Trans No. 4	Metcalf 230/115 kV Trans No. 2 _Metcalf 230/115 kV Trans No. 3	C3	N-1-1	99%	104%	111%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-30	Metcalf 230/115 kV Trans No. 2	Metcalf 230/115 kV Trans No. 4 _Metcalf 230/115 kV Trans No. 3	C3	N-1-1	101%	106%	113%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
SanJ-SP-T-31	Metcalf 230/115 kV Trans No. 3	Metcalf 230/115 kV Trans No. 4 230/115 kV Trans No. 2	C3	N-1-1	99%	104%	111%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-32	Newark-Dixon Landing 115 kV Line	Newark-Los Esteros 230 kV Line Metcalf 115 kV Line	C3	N-1-1	109%	N/A	N/A	Mitigated by Mabury Voltage Conversion Project
SanJ-SP-T-33	Newark-Milpitas 115 kV Line No. 1	Newark-Milpitas 115 kV Line No. 2 Metcalf 115 kV Line	C3	N-1-1	141%	100%	107%	
SanJ-SP-T-34	Newark-Milpitas 115 kV Line No. 2	Newark-Milpitas 115 kV Line No. 1 Metcalf 115 kV Line	C3	N-1-1	118%	123%	133%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-35	Piercy-Metcalf 115 kV Line	Newark-Los Esteros 230 kV Line Dixon Landing 115 kV Line	C3	N-1-1	101%	89%	94%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-36	Piercy-Metcalf 115 kV Line	Newark-Dixon Landing 115 kV Line Mabury-Jennings J. 115 kV Line	C3	N-1-1	N/A	118%	123%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-37	Swift-Metcalf 115 kV Line	Newark-Milpitas 115 kV Line No. 1 Milpitas 115 kV Line No. 2	C3	N-1-1	104%	109%	117%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-38	Trimble-San Jose 'B' 115 kV Line	Los Esteros-Nortech 115 kV Line 230/115 kV Transformer	N-1-1	N-1-1	112%	119%	122%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-39	Newark-Dixon Landing 115 kV Line	Swift - Metcalf & Piercy - Metcalf 115 kV Lines	C5	DCTL	110%	N/A	N/A	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
SanJ-SP-T-40	Trimble-San Jose 'B' 115 kV Line	Metcalf - El Patio No. 1 & 2 115 kV Lines	C5	DCTL	111%	115%	120%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate

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Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
SanJ-SP-T-41	Piercy-Metcalf 115 kV Line	Newark - Dixon Landing & Newark - Milpitas #1 115 kV Lines	C5	DCTL	101%	88%	93%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Light Load	2017 Summer Off-Peak	N/A	

No thermal overloads identified.

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Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
SanJ-SP-DV-01	ALMADEN 60kV	Evergreen-Almaden 60 kV Line	B	N-1	-10%	-11%	-11%	Reactive Support
SanJ-SP-DV-02	ALMADEN 60kV	Evergreen 115/60 kV Transformer No. 1	B	N-1	-10%	-11%	-11%	Reactive Support
SanJ-SP-DV-03	LOS GATOS 60 kV	Monta Vista-Los Gatos 115 kV Line	B	N-1	-5%	-6%	-6%	Reactive Support
SanJ-SP-DV-04	ALMADEN 60kV	Newark-Los Esteros 230 kV Line _Evergreen-Almaden 60 kV Line	C3	N-1-1	-10%	-11%	-11%	Reactive Support
SanJ-SP-DV-05	LLAGAS 115kV	Metcalf-Morgan Hill 115 kV Line _Llagas- Gilroy Foods 115 kV Line	C3	N-1-1	-10%	-11%	-13%	Reactive Support
SanJ-SP-DV-06	MGRN HIL 115kV	Metcalf-Morgan Hill 115 kV Line _Llagas- Gilroy Foods 115 kV Line	C3	N-1-1	-13%	-14%	-15%	Reactive Support

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Study Area: **PG&E Greater Bay Area San Jose - Summer Light Load & Summer Off-Peak**



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	
SanJ-OP-DV-01	ZANKER 115kV	Newark-Kifer 115 kV Line(Newark-Zinker J2)	B	N-1	-6%	-4%		Reactive Support
SanJ-OP-DV-02	ELPT_SJ2 115kV	El Patio-San Jose Sta. 'A' 115 kV Line	B	N-1	-5%	-3%		Reactive Support
SanJ-OP-DV-03	IBM-HR J 115kV	Metcalf-El Patio No. 1 115 kV Line	B	N-1	-5%	-3%		Reactive Support
SanJ-OP-DV-04	MABURY J 115kV	Dixon Landing-McKee 115 kV Line	B	N-1	-6%	-4%		Reactive Support
SanJ-OP-DV-05	MABURY 115kV	Dixon Landing-McKee 115 kV Line	B	N-1	-6%	0%		Reactive Support
SanJ-OP-DV-06	MARKHM J 115kV	Markham No. 1 115 kV Tap	B	N-1	-6%	-4%		Reactive Support
SanJ-OP-DV-07	MARKHAM 115kV	Markham No. 1 115 kV Tap	B	N-1	-6%	-4%		Reactive Support
SanJ-OP-DV-08	IBM-CTLE 115kV	Edenvale-IBM Cottle 115 kV Line	B	N-1	-6%	-4%		Reactive Support
SanJ-OP-DV-09	EDNVL J1 115kV	Metcalf-Edenvale No. 1 115 kV Line	B	N-1	-5%	-3%		Reactive Support
SanJ-OP-DV-10	EVRGRN J 115kV	Markham No. 2 115 kV Tap	B	N-1	-6%	-4%		Reactive Support
SanJ-OP-DV-11	EDNVL J3 115kV	Edenvale-IBM Cottle 115 kV Line	B	N-1	-5%	-3%		Reactive Support
SanJ-OP-DV-12	GILROYTP 115kV	Llagas-Gilroy Foods 115 kV Line	B	N-1	-6%	-4%		Reactive Support
SanJ-OP-DV-13	GILROYPK 115kV	Llagas-Gilroy Foods 115 kV Line	B	N-1	-6%	-4%		Reactive Support
SanJ-OP-DV-14	STONE 115kV	Markham No. 2 115 kV Tap	B	N-1	-6%	-4%		Reactive Support

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High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
SanJ-SP-V-01	JENNINGS 115kV	Normal	A	N-0	1.05	0.99	0.99	Reactive Support
SanJ-SP-V-02	JENING J 115kV	Normal	A	N-0	1.05	0.99	0.99	Reactive Support
SanJ-SP-V-03	EVERGREN 60kV	Normal	A	N-0	1.06	1.06	1.05	Reactive Support
SanJ-SP-V-04	EVRGRN J 60kV	Normal	A	N-0	1.06	Not Run	Not Run	Reactive Support
SanJ-SP-V-05	SENER 60kV	Normal	A	N-0	1.06	1.05	1.05	Reactive Support
SanJ-SP-V-06	SENER J 60kV	Normal	A	N-0	1.06	1.06	1.05	Reactive Support
SanJ-SP-V-07	ALMADEN 60kV	Evergreen 115/60 kV Transformer No. 1	B	N-1	0.91	0.90	0.89	Reactive Support
SanJ-SP-V-08	DIXON LD 115kV	Newark-Dixon Landing 115 kV Line _Piercy-Metcalf 115 kV Line	C3	N-1-1	1.00	0.90	0.89	Reactive Support
SanJ-SP-V-09	MCKEE 115kV	Newark-Dixon Landing 115 kV Line _Piercy-Metcalf 115 kV Line	C3	N-1-1	0.99	0.91	0.90	Reactive Support
SanJ-SP-V-10	MRGN HIL 115kV	Metcalf-Morgan Hill 115 kV Line _Llagas-Gilroy Foods 115 kV Line	C3	N-1-1	0.89	0.87	0.86	Reactive Support
SanJ-SP-V-11	LLAGAS 115kV	Metcalf-Morgan Hill 115 kV Line _Llagas-Gilroy Foods 115 kV Line	C3	N-1-1	0.91	0.90	0.89	Reactive Support
SanJ-SP-V-12	PIERCY 115kV	Newark-Dixon Landing 115 kV Line _Piercy-Metcalf 115 kV Line	C3	N-1-1	1.00	0.90	0.89	Reactive Support

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Study Area: **PG&E Greater Bay Area San Jose - Summer Light Load & Summer Off-Peak**



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	
SanJ-OP-V-01	MTCALF D 115kV	Normal	A	N-0	1.06	1.04		Reactive Support

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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

ID	Contingency	Category	Category Description	Transient Stability Performance			Potential Mitigation Solutions
				2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
SanJ-TS-01	SLG fault on Metcalf 230 kV bus section 1D with delayed clearing on the bus-tie breaker.	C9	Bus section SLG fault with delayed clearing	Transient Voltage Dip exceeding 30% at some buses; and Transient Voltage Dip exceeding 20% for more than 40 cycles at some load buses in the San Jose Area	Transient Voltage Dip exceeding 30% at some buses; and Transient Voltage Dip exceeding 20% for more than 40 cycles at some load buses in the San Jose Area	Transient Voltage Dip exceeding 30% at some buses; and Transient Voltage Dip exceeding 20% for more than 40 cycles at some load buses in the San Jose Area	Potential Upgrade of the Metcalf 230kV Bus

Transient Stability

ID	Contingency	Category	Category Description	Transient Stability Performance			Potential Mitigation Solutions
				2014 Summer Light Load	2017 Summer Off-Peak	N/A	
SanJ-OP-TS-0	SLG fault on Metcalf 230 kV bus section 1D with delayed clearing on the bus-tie breaker.	C9	Bus section SLG fault with delayed clearing	Transient Voltage Dip exceeding 30% at some buses in the San Jose Area	Transient Voltage Dip exceeding 30% at some buses in the San Jose Area		Potential Upgrade of the Metcalf 230kV Bus