

**Thermal Overloads**

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014	2017	2022	
Nvly-T-01	Caribou No.11 230/115/60 kV Transformer	BUS FAULT AT 31482 PALERMO 115.00	C1	Bus	106%	106%	106%	Add bus tie breaker at Palermo 115 kV bus
Nvly-T-02	Sycamore Creek-Notre Dame-Table Mountain 115 kV Line	BUS FAULT AT 31504 TBLE MTN Bus 1 Sec F 115.00	C1	Bus	138%	72%	78%	Interim operating solution
Nvly-T-03	Table Mountain-Butte No.1 115 kV Line	BUS FAULT AT 31504 TBLE MTN Bus 2 Sec E 115.00	C1	Bus	106%	65%	70%	Interim operating solution
Nvly-T-04	Table Mountain-Paradise 115 kV Line	BUS FAULT AT 31504 TBLE MTN Bus 1 Sec F 115.00	C1	Bus	106%	62%	66%	Interim operating solution
Nvly-T-05	Keswick-Cascade 60 kV Line	COTTONWOOD BUS PARALLEL BKR STUCK 115KV	C2	Stuck Bkr	168%	148%	95%	Operating solution
Nvly-T-06	Trinity-Keswick 60 kV Line	COTTONWOOD BUS PARALLEL BKR STUCK 115KV	C2	Stuck Bkr	155%	138%	94%	Operating solution
Nvly-T-07	Butte-Sycamore Creek 115 kV Line	Sycamore Creek-Notre Dame-Table MOUNTAIN-Butte No.1 115 kV Line	C3	N-1-1	105%	29%	33%	Interim operating solution
Nvly-T-08	Coleman-Red Bluff 60 kV Line	Cottonwood-Red Bluff 60 kV Line _Cottonwood No.1 60 kV Line	C3	N-1-1	134%	36%	36%	Interim operating solution
Nvly-T-09	Cottonwood-Benton No.1 60 kV Line	Cottonwood No.1 230/115 kV Transformer _Cottonwood No.4 230/115 kV Transformer	C3	N-1-1	129%	117%	95%	Operating solution
Nvly-T-10	Keswick-Cascade 60 kV Line	Bridgeville-Cottonwood 115 kV Line _Trinity-Cottonwood 115 kV Line	C3	N-1-1	176%	156%	104%	Operating solution
Nvly-T-11	Round Mountain-Cottonwood(E) No.2 230 kV Line	Cottonwood-Round Mountain 230 kV Line _Round Mountain No.1 500/230 kV Transform	C3	N-1-1	103%	102%	102%	Operating solution
Nvly-T-12	Round Mountain-Cottonwood(E) No.3 230 kV Line	Round Mountain-Cottonwood(E) No.2 230 _Round Mountain No.1 500/230 kV Transform	C3	N-1-1	114%	114%	114%	Operating solution

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

Study Area: **PG&E North Valley - Summer Peak**



### Thermal Overloads

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					2014	2017	2022	
Nvly-T-13	Table Mountain-Butte No.1 115 kV Line	Sycamore Creek-Notre Dame-Table Mouna_Table Mountain-Butte No.2 115 kV Line	C3	N-1-1	144%	95%	103%	Interim operating solution and re-rate.
Nvly-T-14	Table Mountain-Butte No.2 115 kV Line	Sycamore Creek-Notre Dame-Table Mouna_Table Mountain-Butte No.1 115 kV Line	C3	N-1-1	143%	87%	95%	Interim operating solution
Nvly-T-15	Trinity-Keswick 60 kV Line	Bridgeville-Cottonwood 115 kV Line _Trinity-Cottonwood 115 kV Line	C3	N-1-1	161%	144%	100%	Operating solution
Nvly-T-16	Trinity-Maple Creek 60 kV Line	Humboldt-Trinity 115 kV Line _Bridgeville-Cottonwood 115 kV Line	C3	N-1-1	133%	112%	77%	Operating solution
Nvly-T-17	Table Mountain-Butte No.1 115 kV Line	Sycamore Creek-Notre Dame-Table Mountain and Table Mountain-Butte No.2 115 kV Lines	C5	DCTL	144%	95%	103%	Interim operating solution and re-rate.
Nvly-T-18	Cottonwood-Benton No.1 60 kV Line	Loss of Cottonwood 230 kV substation	D8	Loss of Substation	127%	117%	99%	Under Review

**Thermal Overloads**

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Light Load	2017 Summer Off-Peak	N/A	
Nvly-OP-T-01	Keswick-Cascade 60 kV Line	Bridgeville-Cottonwood 115 kV Line _Trinity-Cottonwood 115 kV Line	C3	N-1-1	48%	176%		Reduce Humboldt generation.
Nvly-OP-T-02	Trinity-Keswick 60 kV Line	Bridgeville-Cottonwood 115 kV Line _Trinity-Cottonwood 115 kV Line	C3	N-1-1	38%	147%		Reduce Humboldt generation.
Nvly-OP-T-03	Cottonwood-Benton No.1 60 kV Line	Cottonwood No.1 230/115 kV Transformer_Cottonwood No.4 230/115 kV Transformer	C3	N-1-1	113%	69%		Operating solution
Nvly-OP-T-04	Table Mountain-Pease 60 kV Line (Peach-Encinal Tap)	Palermo-Pease 115 kV Line and Pease-Rio Oso 115 kV Line	C5	DCTL	101%	85%		Reduce Pease 60 kV generation

**Voltage Deviations**

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014	2017	2022	
Nvly-DV-01	BIG MDWS 60 kV	Caribou-Table Mountain 230 kV Line	B	N-1	-5%	-5%	-6%	Existing SPS review or voltage support
Nvly-DV-02	CHESTER 60 kV	Caribou-Table Mountain 230 kV Line	B	N-1	-8%	-8%	-9%	Existing SPS review or voltage support
Nvly-DV-03	GANSNER 60 kV	Caribou-Table Mountain 230 kV Line	B	N-1	-5%	-5%	-5%	Existing SPS review or voltage support
Nvly-DV-04	GRYS FLT 60 kV	Caribou-Table Mountain 230 kV Line	B	N-1	-5%	-5%	-5%	Existing SPS review or voltage support
Nvly-DV-05	HMLTN BR 60 kV	Caribou-Table Mountain 230 kV Line	B	N-1	-5%	-5%	-6%	Existing SPS review or voltage support
Nvly-DV-06	SPANSHCK 60 kV	Caribou-Table Mountain 230 kV Line	B	N-1	-5%	-5%	-5%	Existing SPS review or voltage support
Nvly-DV-07	CHICO B 115 kV	BUS FAULT AT 31504 TBLE MTN Bus 1 Sec F 115.00	C1	Bus	-10%	-1%	-1%	Interim operating solution.
Nvly-DV-08	STLLWATR 60 kV	BUS FAULT AT 31580 CASCADE 60.00	C1	Bus	-10%	-10%	-11%	Voltage support at STLLWATR 60 kV
Nvly-DV-09	FRNCHGLH 60 kV	COTTONWOOD BUS PARALLEL BKR STUCK 115KV	C2	Stuck Bkr	-11%	-8%	-5%	Interim operating solution.
Nvly-DV-10	KESWICK 60 kV	COTTONWOOD BUS PARALLEL BKR STUCK 115KV	C2	Stuck Bkr	-10%	-8%	-6%	Interim operating solution.

**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	
Nvly-OP-DV-01	DIRYVLE 60 kV	BUS FAULT AT 31608 RED BLFF 60.00	C1	Bus	-13%	-2%		Interim operating solution
Nvly-OP-DV-02	LP FB SP 60 kV	BUS FAULT AT 31608 RED BLFF 60.00	C1	Bus	-16%	-6%		Interim operating solution
Nvly-OP-DV-03	GERBER 60 kV	BUS FAULT AT 31608 RED BLFF 60.00	C1	Bus	-16%	-6%		Interim operating solution
Nvly-OP-DV-04	LS MLNSJ 60 kV	BUS FAULT AT 31608 RED BLFF 60.00	C1	Bus	-13%	-2%		Interim operating solution
Nvly-OP-DV-05	VINA 60 kV	BUS FAULT AT 31608 RED BLFF 60.00	C1	Bus	-13%	-2%		Interim operating solution

**High/Low Voltage**

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2014	2017	2022	
Nvly-V-01	CAPYSWCH 60 kV	Normal	A	N-0	1.05	1.05	1.05	Under review for possible exemption.
Nvly-V-02	CORNSWCH 60 kV	Normal	A	N-0	1.05	1.05	1.05	Under review for possible exemption.
Nvly-V-03	CR CANAL 60 kV	Normal	A	N-0	0.91	1.02	1.03	Interim operating solution.
Nvly-V-04	GLENN 60 kV	Normal	A	N-0	1.05	1.05	1.05	Under review for possible exemption.
Nvly-V-05	HATLOSCK 60 kV	Normal	A	N-0	1.06	1.06	1.06	Under review for possible exemption.
Nvly-V-06	HT CRKRG 60 kV	Normal	A	N-0	1.06	1.06	1.06	Under review for possible exemption.
Nvly-V-07	MALACHA1 115 kV	Normal	A	N-0	1.05	1.05	1.05	Under review for possible exemption.
Nvly-V-08	RASN JNT 60 kV	Normal	A	N-0	0.92	1.02	1.03	Interim operating solution.
Nvly-V-09	TYLER 60 kV	Normal	A	N-0	0.91	1.02	1.03	Interim operating solution.
Nvly-V-10	BIG BAR 60 kV	Humboldt-Trinity 115 kV Line _Bridgeville-Cottonwood 115 kV Line	C3	N-1-1	0.85	0.93	0.98	Interim operating solution.
Nvly-V-11	CLARK RD 60 kV	Table Mountain No.2 230/115/60 kV Tran_DE SABLA 6.90 Unit ID 1	C3	N-1-1	0.89	0.89	0.88	Operating solution.
Nvly-V-12	CNTRVLE 60 kV	Table Mountain No.2 230/115/60 kV Tran_DE SABLA 6.90 Unit ID 1	C3	N-1-1	0.89	0.89	0.88	Operating solution.
Nvly-V-13	DE SABLA 60 kV	Table Mountain No.2 230/115/60 kV Tran_DE SABLA 6.90 Unit ID 1	C3	N-1-1	0.89	0.89	0.88	Operating solution.
Nvly-V-14	DIRYVLE 60 kV	Cottonwood-Red Bluff 60 kV Line _Cottonwood No.1 60 kV Line	C3	N-1-1	0.90	1.01	1.01	Interim operating solution.
Nvly-V-15	GERBER 60 kV	Coleman-Red Bluff 60 kV Line _Cottonwood-Red Bluff 60 kV Line	C3	N-1-1	0.87	1.01	1.01	Interim operating solution.
Nvly-V-16	GROUSCRK 60 kV	Humboldt-Trinity 115 kV Line _Bridgeville-Cottonwood 115 kV Line	C3	N-1-1	0.83	0.93	0.98	Interim operating solution.
Nvly-V-17	HYAMPOM 60 kV	Humboldt-Trinity 115 kV Line _Bridgeville-Cottonwood 115 kV Line	C3	N-1-1	0.83	0.93	0.98	Interim operating solution.
Nvly-V-18	LP FB SP 60 kV	Coleman-Red Bluff 60 kV Line _Cottonwood-Red Bluff 60 kV Line	C3	N-1-1	0.88	1.02	1.02	Interim operating solution.
Nvly-V-19	LS MLNSJ 60 kV	Cottonwood-Red Bluff 60 kV Line _Cottonwood No.1 60 kV Line	C3	N-1-1	0.89	1.00	1.00	Interim operating solution.
Nvly-V-20	RED BLFF 60 kV	Cottonwood-Red Bluff 60 kV Line _Cottonwood No.1 60 kV Line	C3	N-1-1	0.87	1.03	1.04	Interim operating solution.
Nvly-V-21	TRES VIS 60 kV	Table Mountain No.2 230/115/60 kV Tran_DE SABLA 6.90 Unit ID 1	C3	N-1-1	0.90	0.91	0.90	Operating solution.

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

Study Area: **PG&E North Valley - Summer Peak**



### High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2014	2017	2022	
Nvly-V-22	VINA 60 kV	Cottonwood-Red Bluff 60 kV Line _Cottonwood No.1 60 kV Line	C3	N-1-1	0.88	1.00	1.00	Interim operating solution.

# 2012/2013 ISO Reliability Assessment - Final Study Results

Study Area: **PG&E North Valley - 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	
Nvly-OP-V-01	FRSTGLEN 115 kV	Normal	A	N-0	1.05	1.06		Under review for possible exemption.
Nvly-OP-V-02	HYAMPOM 60 kV	Normal	A	N-0	1.05	1.06		Under review for possible exemption.
Nvly-OP-V-03	WILDWOOD 115 kV	Normal	A	N-0	1.06	1.06		Under review for possible exemption.
Nvly-OP-V-04	TRINITY 115 kV	Normal	A	N-0	1.06	1.06		Under review for possible exemption.
Nvly-OP-V-05	PANRAMA 115 kV	Normal	A	N-0	1.06	1.06		Under review for possible exemption.
Nvly-OP-V-06	MALACHA1 115 kV	Normal	A	N-0	1.05	1.05		Under review for possible exemption.
Nvly-OP-V-07	OREGNTRL 115 kV	Normal	A	N-0	1.04	1.05		Under review for possible exemption.
Nvly-OP-V-08	SMPSN-AN 115 kV	Normal	A	N-0	1.06	1.06		Under review for possible exemption.
Nvly-OP-V-09	WHEELBR 115 kV	Normal	A	N-0	1.06	1.06		Under review for possible exemption.
Nvly-OP-V-10	COTWDPGE 115 kV	Normal	A	N-0	1.06	1.06		Under review for possible exemption.
Nvly-OP-V-11	JESSUP 115 kV	Normal	A	N-0	1.05	1.06		Under review for possible exemption.
Nvly-OP-V-12	CASCADE 115 kV	Normal	A	N-0	1.04	1.05		Under review for possible exemption.
Nvly-OP-V-13	SPI_AND 115 kV	Normal	A	N-0	1.05	1.05		Under review for possible exemption.
Nvly-OP-V-14	BIG BAR 60 kV	Normal	A	N-0	1.05	1.06		Under review for possible exemption.
Nvly-OP-V-15	GROUSCRK 60 kV	Normal	A	N-0	1.05	1.06		Under review for possible exemption.



## 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	
Nvly-OP-V-16	TRINITY 60 kV	Normal	A	N-0	1.05	1.06		Under review for possible exemption.
Nvly-OP-V-17	FRNCHGLH 60 kV	Normal	A	N-0	1.05	1.05		Under review for possible exemption.
Nvly-OP-V-18	KESWICK 60 kV	Normal	A	N-0	1.04	1.05		Under review for possible exemption.
Nvly-OP-V-19	COWCK TP 60 kV	Normal	A	N-0	1.04	1.05		Under review for possible exemption.
Nvly-OP-V-20	TKO TAP 60 kV	Normal	A	N-0	1.04	1.05		Under review for possible exemption.
Nvly-OP-V-21	HT CRKRG 60 kV	Normal	A	N-0	1.05	1.05		Under review for possible exemption.
Nvly-OP-V-22	HATLOSCK 60 kV	Normal	A	N-0	1.05	1.05		Under review for possible exemption.
Nvly-OP-V-23	NewBus 60 kV	Normal	A	N-0	N/A	1.05		Under review for possible exemption.
Nvly-OP-V-24	DIRYVLE 60 kV	BUS FAULT AT 31608 RED BLFF 60.00	C1	Bus	0.88	1.02		Interim operating solution
Nvly-OP-V-25	LS MLNSJ 60 kV	BUS FAULT AT 31608 RED BLFF 60.00	C1	Bus	0.88	1.02		Interim operating solution
Nvly-OP-V-26	VINA 60 kV	BUS FAULT AT 31608 RED BLFF 60.00	C1	Bus	0.88	1.01		Interim operating solution
Nvly-OP-V-27	RED BLFF 60 kV	BUS FAULT AT 31608 RED BLFF 60.00	C1	Bus	0.85	N/A		Interim operating solution
Nvly-OP-V-28	GERBER 60 kV	BUS FAULT AT 31608 RED BLFF 60.00	C1	Bus	0.85	0.98		Interim operating solution
Nvly-OP-V-29	LP FB SP 60 kV	BUS FAULT AT 31608 RED BLFF 60.00	C1	Bus	0.84	0.98		Interim operating solution



*Transient Stability*

ID	Contingency	Category	Category Description	Transient Stability Performance			Potential Mitigation Solutions
				2014	2017	2022	

No transient stability issues identified.



*Transient Stability*

ID	Contingency	Category	Category Description	Transient Stability Performance			Potential Mitigation Solutions
				2014 Summer Light Load	2017 Summer Off-Peak	N/A	

No transient stability issues identified.

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

Study Area: **PG&E North Valley**



### 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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Study Area: **PG&E North Valley**



*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