

2013/2014 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt - Summer Peak**

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
HUMB-SP-T-1	Humboldt Bay - Humboldt #2 60kV line	Humboldt Bay - Humboldt No.1 60 kV Line (HUMBOLDT-HMBLT JT & Humboldt Bay - Eureka 60 kV Line	C3	L-1-1	109%	108%	109%	Adjust generation at Humboldt Bay
HUMB-SP-T-2	Humboldt - Eureka 60kV (Between HARRIS & HARRIS ST)	Humboldt Bay - Humboldt No.1 60 kV Line (HUMBOLDT-HMBLT JT & Humboldt Bay - Humboldt No.2 60 kV Line	C3	L-1-1	117%	114%	111%	Implement operating procedure to reduce output from Humboldt Bay 60 kV generation following first contingency for Category C
HUMB-SP-T-3	Humboldt - Eureka 60kV (HARRIS ST & EUREKA)		C3	L-1-1	124%	121%	118%	
HUMB-SP-T-4	Garberville - Laytonville 60kV line(between Garberville to Kekawaka)	Humboldt Bay - Rio Dell Jact 60kV line & Bridgeville 115/60 kV Transformer	C3	L-1-1	97%	100%	<95%	Bridgeville - Garberville 115kV line
HUMB-SP-T-5	Laytonville - Willits 60kV line		C3	L-1-1	112%	115%	<95%	
HUMB-SP-T-6	Essex Jct - Arcata - Fairhaven 60kV line (Between Janes Crk TP - Arcata JCT2)	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	C5	L-2	97%	103%	116%	Increase Blue lake power generation. Drop load at Orick, Big Lagoon if overload persists.
HUMB-SP-T-7	Essex Jct - Arcata - Fairhaven 60kV line (Between Fairhaven - Arcata JCT2)	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	C5	L-2	106%	114%	128%	Increase output from Blue Lake power. Drop load at Fairhaven if overload persists.
HUMB-SP-T-8	Fairhaven - Humboldt 60kV line(Between Arcata JCT2 - Sierra Pac Lumber Sub Tap)	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	C5	L-2	<95%	<95%	104%	Increase output from area generation. Drop load at Fairhaven / S.Pac Lumber sub if overload persists.
HUMB-SP-T-9	Fairhaven - Humboldt 60kV line(Between Fairhaven - Sierra Pac Lumber Sub Tap)	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	C5	L-2	<95%	<95%	102%	

Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2015 Winter Peak	2018 Winter Peak	2023 Winter Peak	
HUMB-WP-T-1	Essex Jct - Arcata - Fairhaven 60kV line (Between Fairhaven - Arcata JCT2)	Essex Jct - Arcata - Fairhaven 60 kV Line (LP_FLKBD-JANS CR & Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCATA)	C3	L-1-1	<95%	94%	102%	Increase output from Blue Lake power. Drop load at Fairhaven if overload persists.
HUMB-WP-T-2	Essex Jct - Arcata - Fairhaven 60kV line (Between Fairhaven - Arcata JCT2)	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	C5	L-2	<95%	94%	102%	
HUMB-WP-T-3	Humboldt Bay - Eureka 60kV line	Humboldt Bay - Humboldt No.1 60 kV Line (HUMBOLDT-HMBLT JT & Humboldt Bay - Humboldt No.2 60 kV Line	C3	L-1-1	137%	133%	134%	Implement operating procedure to reduce output from Humboldt Bay 60 kV generation following first contingency for Category C

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Study Area: **PG&E Humboldt - Summer Off-Peak & Summer Light Load**



Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2015 Summer Off-Peak	2018 Summer Light Load	Select..	

No thermal violations reported

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Study Area: **PG&E Humboldt - Summer Peak**

Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
HUMB-SP-VD-1	ORICK 60kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCATA)	B	L-1	5.57%	6.27%	7.36%	Adjust output from Blue Lake power.
HUMB-SP-VD-2	ARCATA 60kV		B	L-1	5.81%	6.48%	7.51%	
HUMB-SP-VD-3	SIMPSON 60kV		B	L-1	5.45%	6.14%	7.24%	
HUMB-SP-VD-4	BCHIPMIL 60kV		B	L-1	5.46%	6.14%	7.21%	
HUMB-SP-VD-5	BIG_LAGN 60kV		B	L-1	5.56%	6.25%	7.35%	
HUMB-SP-VD-6	BLUE LKE 60kV		B	L-1	5.45%	6.14%	7.23%	
HUMB-SP-VD-7	TRINIDAD 60kV		B	L-1	5.55%	6.24%	7.33%	
HUMB-SP-VD-8	BRDGVILLE 60kV	Bridgeville 60/12 kV Transformer	B	T-1	6.50%	<5%	<5%	Adjust Humboldt 60kV generation
HUMB-SP-VD-9	SWNS FLT 60kV		B	T-1	5.60%	<5%	<5%	
HUMB-SP-VD-10	COVELO6 60kV	BUS FAULT AT 31110 BRDGVILLE 60.00	C1	Bus	Not Solved	<5%	<5%	Case not solved. Bridgeville - Garberville 115kV line will mitigate the problem. In the interim drop load at Garberville.
HUMB-SP-VD-11	FRT SWRD 60kV		C1	Bus	Not Solved	<5%	<5%	
HUMB-SP-VD-12	FRUITLND 60kV		C1	Bus	Not Solved	<5%	<5%	
HUMB-SP-VD-13	GRBRVILLE 60kV		C1	Bus	Not Solved	<5%	<5%	
HUMB-SP-VD-14	KEKAWAKA 60kV		C1	Bus	Not Solved	<5%	<5%	
HUMB-SP-VD-15	LYTNVILLE 60kV		C1	Bus	Not Solved	<5%	<5%	

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Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
HUMB-SP-VD-16	JANS CRK 60kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCATA) & Essex Jct - Arcata - Fairhaven 60 kV Line (LP_FKBD-JANS CR	C3	L-1-1	14.26%	15.85%	19.73%	Adjust output from Blue Lake power.
HUMB-SP-VD-17	ORICK 60kV		C3	L-1-1	10.89%	12.00%	15.85%	
HUMB-SP-VD-18	ARCATA 60kV		C3	L-1-1	10.94%	12.07%	15.61%	
HUMB-SP-VD-19	SIMPSON 60kV		C3	L-1-1	10.75%	11.84%	15.56%	
HUMB-SP-VD-20	BCHIPMIL 60kV		C3	L-1-1	10.69%	11.78%	15.46%	
HUMB-SP-VD-21	BIG_LAGN 60kV		C3	L-1-1	10.87%	11.98%	15.81%	
HUMB-SP-VD-22	BLUE LKE 60kV		C3	L-1-1	10.74%	11.83%	15.55%	
HUMB-SP-VD-23	TRINIDAD 60kV		C3	L-1-1	10.85%	11.96%	15.77%	

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
HUMB-SP-VD-24	BRDGVLE 60kV	Rio Dell Tap 60 kV Line(SCOTIATP-RIODLLTP) & Bridgeville 115/60 kV Transformer	C3	L-1/T-1	34.10%	31.37%	<5%	Bridgeville - Garberville 115kV line
HUMB-SP-VD-25	CARLOTTA 60kV		C3	L-1/T-1	34.28%	31.61%	<5%	
HUMB-SP-VD-26	FRT SWRD 60kV		C3	L-1/T-1	29.62%	28.37%	<5%	
HUMB-SP-VD-27	FRUITLND 60kV		C3	L-1/T-1	30.53%	28.98%	<5%	
HUMB-SP-VD-28	GRBRVLE 60kV		C3	L-1/T-1	28.51%	27.71%	<5%	
HUMB-SP-VD-29	LYTNVLE 60kV		C3	L-1/T-1	15.63%	16.05%	<5%	
HUMB-SP-VD-30	PCLUMBER 60kV		C3	L-1/T-1	34.28%	31.61%	<5%	
HUMB-SP-VD-31	SWNS FLT 60kV		C3	L-1/T-1	34.15%	31.44%	<5%	

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Winter Peak	2018 Winter Peak	2023 Winter Peak	
HUMB-WP-VD_1	ORICK 60kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCATA)	B	L-1	<5%	5.32%	6.01%	Adjust Blue Lake power generation
HUMB-WP-VD_2	ARCATA 60kV		B	L-1	<5%	5.65%	6.33%	
HUMB-WP-VD_3	SIMPSON 60kV		B	L-1	<5%	5.11%	5.79%	
HUMB-WP-VD_4	BIG_LAGN 60kV		B	L-1	<5%	5.31%	5.99%	
HUMB-WP-VD_5	BLUE LKE 60kV		B	L-1	<5%	5.12%	5.80%	
HUMB-WP-VD_6	TRINIDAD 60kV		B	L-1	<5%	5.30%	5.98%	
HUMB-WP-VD_7	FRT SWRD 60kV	Bridgeville - Garberville 115kV line	B	L-1	<5%	<5%	5.06%	Adjust Humboldt 60kV generation
HUMB-WP-VD_8	GRBRVLE 60kV		B	L-1	<5%	<5%	5.38%	
HUMB-WP-VD_9	MPLE CRK 60kV	Humboldt - Maple Creek 60 kV Line	B	L-1	9.05%	<5%	<5%	Maple Creek Reactive Support project
HUMB-WP-VD_10	RDGE CBN 60kV		B	L-1	7.15%	<5%	<5%	
HUMB-WP-VD_11	RUSS RCH 60kV		B	L-1	9.12%	<5%	<5%	
HUMB-WP-VD_12	HOOPA 60kV		B	L-1	9.47%	<5%	<5%	
HUMB-WP-VD_13	WILLWCRK 60kV		B	L-1	9.35%	<5%	<5%	

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Winter Peak	2018 Winter Peak	2023 Winter Peak	
HUMB-WP-VD_14	COVELO6 60kV	BUS FAULT AT 31110 BRDGVLE 60.00	C1	Bus	<5%	Not Solved	<5%	Bridgeville - Garberville 115kV line project. In the interim drop load at Garberville to solve for this contingency.
HUMB-WP-VD_15	FRT SWRD 60kV		C1	Bus	<5%	Not Solved	<5%	
HUMB-WP-VD_16	FRUITLND 60kV		C1	Bus	<5%	Not Solved	<5%	
HUMB-WP-VD_17	GRBRVLE 60kV		C1	Bus	<5%	Not Solved	<5%	
HUMB-WP-VD_18	KEKAWAKA 60kV		C1	Bus	<5%	Not Solved	<5%	
HUMB-WP-VD_19	LYTNVLE 60kV		C1	Bus	<5%	Not Solved	<5%	
HUMB-WP-VD_20	JANS CRK 60kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCATA) & Essex Jct - Arcata - Fairhaven 60 kV Line (LP_FKBD-JANS CR	C3	L-1-1	<5%	15.27%	17.93%	Adjust Blue Lake power generation
HUMB-WP-VD_21	ORICK 60kV		C3	L-1-1	<5%	12.17%	14.46%	
HUMB-WP-VD_22	ARCATA 60kV		C3	L-1-1	<5%	12.07%	14.35%	
HUMB-WP-VD_23	SIMPSON 60kV		C3	L-1-1	<5%	12.04%	14.19%	
HUMB-WP-VD_24	BIG_LAGN 60kV		C3	L-1-1	<5%	12.15%	14.43%	
HUMB-WP-VD_25	BLUE LKE 60kV		C3	L-1-1	<5%	12.03%	14.19%	
HUMB-WP-VD_26	TRINIDAD 60kV		C3	L-1-1	<5%	12.13%	14.40%	

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Winter Peak	2018 Winter Peak	2023 Winter Peak	
HUMB-WP-VD_27	HOOPA 60kV	Humboldt - Bridgeville 115 kV Line & Humboldt - Maple Creek 60 kV Line	C3	L-1-1	10.53%	<5%	<5%	Maple Creek Reactive Support project
HUMB-WP-VD_28	MPLE CRK 60kV		C3	L-1-1	10.05%	0.00%	<5%	
HUMB-WP-VD_29	RUSS RCH 60kV		C3	L-1-1	10.14%	<5%	<5%	
HUMB-WP-VD_30	WILLWCRK 60kV		C3	L-1-1	10.40%	<5%	<5%	
HUMB-WP-VD_31	COVELO6 60kV	Rio Dell Tap 60 kV Line(SCOTIATP-RIODLLTP) & Bridgeville 60/12 kV Transformer	C3	L-1/T-1	<5%	18.18%	<5%	Bridgeville - Garberville 115kV line project
HUMB-WP-VD_32	BRDGVILLE 60kV		C3	L-1/T-1	16.00%	35.20%	<5%	
HUMB-WP-VD_33	CARLOTTA 60kV		C3	L-1/T-1	16.18%	35.37%	<5%	
HUMB-WP-VD_34	FRT SWRD 60kV		C3	L-1/T-1	13.28%	31.92%	<5%	
HUMB-WP-VD_35	FRUITLND 60kV		C3	L-1/T-1	13.77%	32.56%	<5%	
HUMB-WP-VD_36	GRBRVILLE 60kV		C3	L-1/T-1	12.84%	31.20%	<5%	
HUMB-WP-VD_37	KEKAWAKA 60kV		C3	L-1/T-1	11.99%	28.72%	<5%	
HUMB-WP-VD_38	LYTNVILLE 60kV		C3	L-1/T-1	<5%	17.99%	<5%	
HUMB-WP-VD_39	PCLUMBER 60kV		C3	L-1/T-1	16.18%	35.37%	<5%	
HUMB-WP-VD_40	SWNS FLT 60kV		C3	L-1/T-1	16.05%	35.25%	<5%	

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Winter Peak	2018 Winter Peak	2023 Winter Peak	
HUMB-WP-VD_41	ORICK 60kV	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	C5	L-2	<5%	13.88%	16.51%	Adjust Blue Lake power generation
HUMB-WP-VD_42	ARCATA 60kV		C5	L-2	<5%	12.72%	15.13%	
HUMB-WP-VD_43	SIMPSON 60kV		C5	L-2	<5%	13.52%	16.10%	
HUMB-WP-VD_44	BIG_LAGN 60kV		C5	L-2	<5%	13.86%	16.48%	
HUMB-WP-VD_45	BLUE LKE 60kV		C5	L-2	<5%	13.53%	16.10%	
HUMB-WP-VD_46	JANS CRK 60kV		C5	L-2	<5%	15.27%	17.92%	
HUMB-WP-VD_47	TRINIDAD 60kV		C5	L-2	<5%	13.83%	16.45%	

Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Summer Off-Peak	2018 Summer Light Load	N/A	
HUMB-NP-VD-1	BRDGVLE	Bridgeville 115/60 kV Transformer	B	T-1	<5%	6.05%		Adjust Humboldt 60kV generation
HUMB-NP-VD-2	COVELO6 60kV	Humboldt Bay - Rio Dell Jct 60kV line & Bridgeville 115/60 kV Transformer	C3	L-1/T-1	Not Solved	<10%		Case does not solve. Bridgeville - Garberville 115kV line will mitigate the issue. In the interim drop load at Rio Dell, Carlotta, Bridgeville, Fruitland, Fortseward, Garberville depending on the need.
HUMB-NP-VD-3	BRDGVLE 60kV		C3	L-1/T-1	Not Solved	<10%		
HUMB-NP-VD-4	CARLOTTA 60kV		C3	L-1/T-1	Not Solved	<10%		
HUMB-NP-VD-5	FRT SWRD 60kV		C3	L-1/T-1	Not Solved	<10%		
HUMB-NP-VD-6	FRUITLND 60kV		C3	L-1/T-1	Not Solved	<10%		
HUMB-NP-VD-7	GRBRVLE 60kV		C3	L-1/T-1	Not Solved	<10%		
HUMB-NP-VD-8	KEKAWAKA 60kV		C3	L-1/T-1	Not Solved	<10%		
HUMB-NP-VD-9	LYTNVLE 60kV		C3	L-1/T-1	Not Solved	<10%		
HUMB-NP-VD-10	PCLUMBER 60kV		C3	L-1/T-1	Not Solved	<10%		
HUMB-NP-VD-11	RIO DELL 60kV		C3	L-1/T-1	Not Solved	<10%		
HUMB-NP-VD-12	SWNS FLT 60kV		C3	L-1/T-1	Not Solved	<10%		

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Study Area: **PG&E Humboldt - Summer Peak**

High/Low Voltage



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
HUMB-SP-V-1	COVELO6 60kV	BUS FAULT AT 31110 BRDGVILLE 60.00	C1	Bus	0.88	>0.9	>0.9	Bridgeville - Garberville 115kV line
HUMB-SP-V-2	FRT SWRD 60kV		C1	Bus	0.80	>0.9	>0.9	
HUMB-SP-V-3	FRUITLND 60kV		C1	Bus	0.79	>0.9	>0.9	
HUMB-SP-V-4	GRBRVILLE 60kV		C1	Bus	0.81	>0.9	>0.9	
HUMB-SP-V-5	KEKAWAKA 60kV		C1	Bus	0.82	>0.9	>0.9	
HUMB-SP-V-6	LYTENVILLE 60kV		C1	Bus	0.88	>0.9	>0.9	

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
HUMB-SP-V-7	COVELO6 60kV	Rio Dell Tap 60 kV Line(SCOTIATP-RIODLLTP) & Bridgeville 115/60 kV Transformer	C3	L-1/T-1	Not Solved	Not Solved	>0.9	Case not solved. Bridgeville - Garberville 115kV line project mitigates the problem. In the interim drop load at Garberville to solve the case.
HUMB-SP-V-8	BRDGVLE 60kV		C3	L-1/T-1	Not Solved	Not Solved	>0.9	
HUMB-SP-V-9	CARLOTTA 60kV		C3	L-1/T-1	Not Solved	Not Solved	>0.9	
HUMB-SP-V-10	FRT SWRD 60kV		C3	L-1/T-1	Not Solved	Not Solved	>0.9	
HUMB-SP-V-11	FRUITLND 60kV		C3	L-1/T-1	Not Solved	Not Solved	>0.9	
HUMB-SP-V-12	GRBRVLE 60kV		C3	L-1/T-1	Not Solved	Not Solved	>0.9	
HUMB-SP-V-13	KEKAWAKA 60kV		C3	L-1/T-1	Not Solved	Not Solved	>0.9	
HUMB-SP-V-14	LYTNVLE 60kV		C3	L-1/T-1	Not Solved	Not Solved	>0.9	
HUMB-SP-V-15	PCLUMBER 60kV		C3	L-1/T-1	Not Solved	Not Solved	>0.9	
HUMB-SP-V-16	SWNS FLT 60kV		C3	L-1/T-1	Not Solved	Not Solved	>0.9	

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
HUMB-SP-V-17	ORICK 60kV	Essex Jct - Arcata - Fairhaven 60 kV Line (LP_FlkBD-JANS CR) & Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCATA)	C3	L-1-1	0.88	0.86	0.82	Adjust Blue Lake generation
HUMB-SP-V-18	ARCATA 60kV		C3	L-1-1	>0.9	0.90	0.86	
HUMB-SP-V-19	SIMPSON 60kV		C3	L-1-1	0.89	0.87	0.83	
HUMB-SP-V-20	BCHIPMIL 60kV		C3	L-1-1	0.89	0.88	0.83	
HUMB-SP-V-21	BIG_LAGN 60kV		C3	L-1-1	0.88	0.86	0.82	
HUMB-SP-V-22	BLUE LKE 60kV		C3	L-1-1	0.89	0.87	0.83	
HUMB-SP-V-23	BLUELKPP 60kV		C3	L-1-1	0.89	0.87	0.83	
HUMB-SP-V-24	JANS CRK 60kV		C3	L-1-1	0.89	0.88	0.84	
HUMB-SP-V-25	TRINIDAD 60kV		C3	L-1-1	0.88	0.86	0.82	
HUMB-SP-V-26	NEWBURG 60kV	Humboldt Bay - Rio Dell Jct 60kV line & Bridgeville 115/60 kV Transformer	C3	L-1/T-1	0.89	>0.9	>0.9	Bridgeville - Garberville 115kV line
HUMB-SP-V-27	FRT SWRD 60kV		C3	L-1/T-1	0.81	0.89	>0.9	
HUMB-SP-V-28	KEKAWAKA 60kV		C3	L-1/T-1	0.81	0.89	>0.9	
HUMB-SP-V-29	SWNS FLT 60kV		C3	L-1/T-1	0.86	0.93	>0.9	

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Study Area: **PG&E Humboldt - Summer Peak**

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
HUMB-SP-V-30	ORICK 60kV	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	C5	L-2	0.88	0.86	0.82	Adjust Blue Lake generation
HUMB-SP-V-31	ARCATA 60kV		C5	L-2	0.91	0.90	0.86	
HUMB-SP-V-32	SIMPSON 60kV		C5	L-2	0.89	0.87	0.83	
HUMB-SP-V-33	BCHIPMIL 60kV		C5	L-2	0.89	0.87	0.83	
HUMB-SP-V-34	BIG_LAGN 60kV		C5	L-2	0.88	0.86	0.82	
HUMB-SP-V-35	BLUE LKE 60kV		C5	L-2	0.89	0.87	0.83	
HUMB-SP-V-36	BLUELKPP 60kV		C5	L-2	0.89	0.87	0.83	
HUMB-SP-V-37	JANS CRK 60kV		C5	L-2	0.89	0.87	0.84	
HUMB-SP-V-38	TRINIDAD 60kV		C5	L-2	0.88	0.86	0.82	

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Winter Peak	2018 Winter Peak	2023 Winter Peak	
HUMB-WP-V-1	COVELO6 60kV	BUS FAULT AT Bridgeville 60kV bus	C1	Bus	>0.9	Not Solved	>0.9	Case Not Solved. Open CB 32 at Garberville to open the Bridgeville - Garberville 60kV line at Garberville.
HUMB-WP-V-2	FRT SWRD 60kV		C1	Bus	>0.9	Not Solved	>0.9	
HUMB-WP-V-3	FRUITLND 60kV		C1	Bus	>0.9	Not Solved	>0.9	
HUMB-WP-V-4	GRBRVLE 60kV		C1	Bus	>0.9	Not Solved	>0.9	
HUMB-WP-V-5	KEKAWAKA 60kV		C1	Bus	>0.9	Not Solved	>0.9	
HUMB-WP-V-6	LYTNVLE 60kV		C1	Bus	>0.9	Not Solved	>0.9	
HUMB-WP-V-7	COVELO6 60kV	Rio Dell Tap 60 kV Line(SCOTIATP-RIODLLTP) & Bridgeville 115/60 kV Transformer	C3	L-1/T-1	>0.9	Not Solved	>0.9	2018 case not solved. Bridgeville - Garberville 115kV line Project. In the interim drop load at Garberville.
HUMB-WP-V-8	BRDGVLE 60kV		C3	L-1/T-1	0.89	Not Solved	>0.9	
HUMB-WP-V-9	CARLOTTA 60kV		C3	L-1/T-1	0.88	Not Solved	>0.9	
HUMB-WP-V-10	FRT SWRD 60kV		C3	L-1/T-1	0.91	Not Solved	>0.9	
HUMB-WP-V-11	FRUITLND 60kV		C3	L-1/T-1	0.90	Not Solved	>0.9	
HUMB-WP-V-12	GRBRVLE 60kV		C3	L-1/T-1	0.93	Not Solved	>0.9	
HUMB-WP-V-13	KEKAWAKA 60kV		C3	L-1/T-1	0.93	Not Solved	>0.9	
HUMB-WP-V-14	LYTNVLE 60kV		C3	L-1/T-1	>0.9	Not Solved	>0.9	
HUMB-WP-V-15	PCLUMBER 60kV		C3	L-1/T-1	0.88	Not Solved	>0.9	
HUMB-WP-V-16	SWNS FLT 60kV		C3	L-1/T-1	0.89	Not Solved	>0.9	

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Winter Peak	2018 Winter Peak	2023 Winter Peak	
HUMB-WP-V-17	ORICK 60kV	Essex Jct - Arcata - Fairhaven 60 kV Line (LP_FKBD-JANS CR) & Essex Jct - Arcata Fairhaven 60 kV Line (ARC_JT2X-ARCATA)	C3	L-1-1	>0.9	0.87	0.84	Adjust Blue Lake generation
HUMB-WP-V-18	ARCATA 60kV		C3	L-1-1	>0.9	0.90	0.88	
HUMB-WP-V-19	SIMPSON 60kV		C3	L-1-1	>0.9	0.88	0.85	
HUMB-WP-V-20	BCHIPMIL 60kV		C3	L-1-1	>0.9	0.88	0.86	
HUMB-WP-V-21	BCHIPMIL 60kV		C3	L-1-1	>0.9	0.88	0.86	
HUMB-WP-V-22	BIG_LAGN 60kV		C3	L-1-1	>0.9	0.87	0.84	
HUMB-WP-V-23	BLUE LKE 60kV		C3	L-1-1	>0.9	0.88	0.85	
HUMB-WP-V-24	BLUELKPP 60kV		C3	L-1-1	>0.9	0.88	0.85	
HUMB-WP-V-25	JANS CRK 60kV		C3	L-1-1	>0.9	0.88	0.85	
HUMB-WP-V-26	TRINIDAD 60kV		C3	L-1-1	>0.9	0.87	0.84	

2013/2014 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt - Winter Peak**

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Winter Peak	2018 Winter Peak	2023 Winter Peak	
HUMB-WP-V-27	ORICK 60kV	Humboldt No.1 60 kV and Arcata - Humboldt 60 kV Lines	C5	L-2	>0.9	0.87	0.84	Adjust Blue Lake generation
HUMB-WP-V-28	ARCATA 60kV		C5	L-2	>0.9	>0.9	0.88	
HUMB-WP-V-29	SIMPSON 60kV		C5	L-2	>0.9	0.88	0.85	
HUMB-WP-V-30	BCHIPMIL 60kV		C5	L-2	>0.9	0.88	0.86	
HUMB-WP-V-31	BIG_LAGN 60kV		C5	L-2	>0.9	0.87	0.84	
HUMB-WP-V-32	BLUE LKE 60kV		C5	L-2	>0.9	0.88	0.85	
HUMB-WP-V-33	JANS CRK 60kV		C5	L-2	>0.9	0.88	0.85	
HUMB-WP-V-34	TRINIDAD 60kV		C5	L-2	>0.9	0.87	0.84	

2013/2014 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt - Summer Off-Peak & Summer Light Load**

High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Off-Peak	2018 Summer Light Load	N/A	
HUMB-NP-V-1	COVELO6 60kV	Humboldt Bay - Rio Dell Jct 60kV line & Bridgeville 115/60 kV Transformer	C3	L-1/T-1	Not Solved	>0.9		Case does not solve. Bridgeville - Garberville 115kV line will mitigate the issue. In the interim drop load at Rio Dell, Carlotta, Bridgeville, Fruitland, Fortseward, Garberville depending on the need.
HUMB-NP-V-2	NEWBURG 60kV		C3	L-1/T-1	Not Solved	>0.9		
HUMB-NP-V-3	BRDGVILLE 60kV		C3	L-1/T-1	Not Solved	>0.9		
HUMB-NP-V-4	CARLOTTA 60kV		C3	L-1/T-1	Not Solved	>0.9		
HUMB-NP-V-5	FRT SWRD 60kV		C3	L-1/T-1	Not Solved	>0.9		
HUMB-NP-V-6	FRUITLND 60kV		C3	L-1/T-1	Not Solved	>0.9		
HUMB-NP-V-7	GRBRVILLE 60kV		C3	L-1/T-1	Not Solved	>0.9		
HUMB-NP-V-8	KEKAWAKA 60kV		C3	L-1/T-1	Not Solved	>0.9		
HUMB-NP-V-9	LYTNVILLE 60kV		C3	L-1/T-1	Not Solved	>0.9		
HUMB-NP-V-10	PCLUMBER 60kV		C3	L-1/T-1	Not Solved	>0.9		
HUMB-NP-V-11	RIO DELL 60kV		C3	L-1/T-1	Not Solved	>0.9		
HUMB-NP-V-12	SWNS FLT 60kV		C3	L-1/T-1	Not Solved	>0.9		

2013/2014 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt - Summer Peak**



Single Contingency Load Drop

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

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

2013/2014 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt - Winter Peak**



Single Contingency Load Drop

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

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

2013/2014 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt - Summer Off-Peak & Summer Light Load**



Single Contingency Load Drop

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

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

2013/2014 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt - Winter Peak**

Single Source Substation with more than 100 MW Load



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

No single source substation with more than 100 MW Load



Single Source Substation with more than 100 MW Load

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

No single source substation with more than 100 MW Load

2013/2014 ISO Reliability Assessment - Study Results

Study Area: **PG&E Humboldt - Summer Off-Peak & Summer Light Load**



Single Source Substation with more than 100 MW Load

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

No single source substation with more than 100 MW Load