

2014-2015 ISO Reliability Assessment - Preliminary Study Results

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

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
HUMB-SP-T-1	Essex Jct - Arcata - Fairhaven 60kV line (Between Fairhaven - Arcata JCT2)	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA & BLUELKPP 12.47 Unit ID 1	C	L-1/G-1	< 100%	< 100%	102%	Increase output from Fairhaven. Alternatively explore SPS / Demand Response / Energy storage solutions.
HUMB-SP-T-2	Humboldt Bay - Humboldt No.1 60 kV Line (HUMBOLDT-HMBLT JT)	Humboldt Bay - Eureka 60 kV Line & Humboldt Bay - Humboldt No.2 60 kV Line	C	L-1-1	101%	93%	101%	Adjust generation at Humboldt Bay
HUMB-SP-T-3	Humboldt Bay - Eureka 60 kV Line	Humboldt Bay - Humboldt No.1 60 kV Line (HUMBOLDT-HMBLT & Humboldt Bay - Humboldt No.2 60 kV Line	C	L-1-1	101%	< 100%	100%	Implement operating procedure to reduce output from Humboldt Bay 60 kV generation following first contingency for Category C
HUMB-SP-T-4	Laytonville - Willits 60kV line	Bridgeville 60/12 kV Transformer & HMBLT	C	L-1-1	< 100%	102%	< 100%	Bridgeville - Garberville 115kV line

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2016 Winter Peak	2019 Winter Peak	2024 Winter Peak	
HUMB-WP-T-1	Essex Jct - Arcata - Fairhaven 60kV line (Between Fairhaven - Arcata JCT2)	BLUELKPP 12.47 Unit ID 1 & Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-Arcata)	B	G-1 / L-1	< 100%	< 100%	120%	Increase Output from Fairhaven unit. Drop load at Arcata if overload persists. Alternatively explore SPS / Demand Response / Energy storage solutions.
HUMB-WP-T-2	Fairhaven - Humboldt 60kV line(Between Arcata JCT2 - Sierra Pac Lumber Sub Tap)	FAIRHAVN 13.80 Unit ID 1 & Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-Arcata)	B	G-1 / L-1	< 100%	< 100%	103%	Increase Output from Fairhaven unit. Drop load at Fairhaven / Sierra Pac Lumber sub if overload persists. Alternatively explore SPS / Demand Response / Energy storage solutions.
HUMB-WP-T-3	Fairhaven - Humboldt 60kV line(Between Fairhaven - Sierra Pac Lumber Sub Tap)	FAIRHAVN 13.80 Unit ID 1 & Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-Arcata)	B	G-1 / L-1	< 100%	< 100%	101%	
HUMB-WP-T-4	Fairhaven - Humboldt 60kV line(Between Arcata JCT2 - Humboldt)	FAIRHAVN 13.80 Unit ID 1 & Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-Arcata)	B	G-1 / L-1	< 100%	< 100%	113%	Increase Output from Blue Lake PP. Drop Load at Arcata if Overload persists.
HUMB-WP-T-5	Fairhaven - Humboldt 60kV line(Between Arcata JCT2 - Sierra Pac Lumber Sub Tap)	FAIRHAVN 13.80 Unit ID 1 & Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-Arcata)	C	L-1-1	< 100%	< 100%	103%	Increase Output from Fairhaven unit. Drop load at Fairhaven / Sierra Pac Lumber sub if overload persists. Alternatively explore SPS / Demand Response / Energy storage solutions.

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Thermal Overloads



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					2016 Winter Peak	2019 Winter Peak	2024 Winter Peak	
HUMB-WP-T-6	Fairhaven - Humboldt 60kV line(Between Fairhaven - Sierra Pac Lumber Sub Tap)	FAIRHAVN 13.80 Unit ID 1 & Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-Arcata)	C	L-1-1	< 100%	< 100%	101%	
HUMB-WP-T-7	Fairhaven - Humboldt 60kV line(Between Arcata JCT2 - Humboldt)	FAIRHAVN 13.80 Unit ID 1 & Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-Arcata)	C	L-1-1	< 100%	< 100%	113%	Increase Output from Blue Lake PP. Drop Load at Arcata if Overload persists.
HUMB-WP-T-8	Humboldt Bay - Humboldt No.1 60 kV Line (HUMBOLDT-HMBLT JT)	Humboldt Bay - Eureka 60 kV Line & Humboldt Bay - Humboldt No.2 60 kV Line	C	L-1-1	< 100%	100%	100%	Adjust generation at Humbltdt 60kV
HUMB-WP-T-9	Humboldt Bay - Rio Dell Jct 60kV line (Between Newburg - Rio Dell Tap)	Humboldt 115/60 No.2 Transformer & Humboldt 115/60 No.1 Transformer	C	T-1-1	110%	< 100%	< 100%	Adjust generation at Humbltdt 60kV
HUMB-WP-T-10	Rio Dell Jct-Bridgeville 60 kV (between Carlotta-Swns Flat)	Humboldt 115/60 No.2 Transformer & Humboldt 115/60 No.1 Transformer	C	T-1-1	101%	< 100%	< 100%	Adjust generation at Humbltdt 60kV
HUMB-WP-T-11	Rio Dell Jct-Bridgeville 60 kV (between Swns Flat - Bridgeville 60 kV)	Humboldt 115/60 No.2 Transformer & Humboldt 115/60 No.1 Transformer	C	T-1-1	101%	< 100%	< 100%	Adjust generation at Humbltdt 60kV
HUMB-WP-T-12	Laytonville - Willits 60kV line	Rio Dell Tap 60 kV Line(SCOTIATP-RIODLLTP) & Bridgeville 60/12 kV Transformer	C	L-1-1	< 100%	106%	< 100%	Bridgeville - Garberville 60kV line

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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
					2016 Summer Off-Peak	2019 Summer Light Load	N/A	
HUMB-NP-T-1	Humboldt Bay - Rio Dell Jct 60kV line (Between Newburg - Rio Dell Tap)	Humboldt 115/60 No.1 Transformer & Humboldt 115/60 No.2 Transformer	C	T-1-1	< 100%	103%	N/A	Reduce Humboldt 60kV generation.

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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
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
HUMB-SP-VD-1	HOOPA 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	16%	< 5%	< 5%	Maple Creek SVC
HUMB-SP-VD-2	MPLE CRK 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	15%	< 5%	< 5%	
HUMB-SP-VD-3	RDGE CBN 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	12%	< 5%	< 5%	
HUMB-SP-VD-4	RUSS RCH 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	15%	< 5%	< 5%	
HUMB-SP-VD-5	WILLWCRK 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	16%	< 5%	< 5%	

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Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Winter Peak	2019 Winter Peak	2024 Winter Peak	
HUMB-WP-VD-1	ORICK 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	8%	9%	13%	New Cap bank needed in the 7-10 year timeframe. In the short term use PG&E action plan.
HUMB-WP-VD-2	ARCATA 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	8%	9%	13%	
HUMB-WP-VD-12	TRINIDAD 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-Arcata)	B	L-1	8%	9%	13%	
HUMB-WP-VD-3	SIMPSON 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	7%	8%	13%	
HUMB-WP-VD-4	BCHIPMIL 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	7%	8%	12%	
HUMB-WP-VD-5	BIG_LAGN 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	8%	9%	13%	
HUMB-WP-VD-6	BLUE LKE 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	7%	8%	13%	
HUMB-WP-VD-7	BLUELKPP 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	7%	8%	13%	
HUMB-WP-VD-8	HOOPA 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	16%	< 5%	< 5%	Maple Creek SVC
HUMB-WP-VD-9	MPLC CRK 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	15%	< 5%	< 5%	
HUMB-WP-VD-10	RDGE CBN 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	12%	< 5%	< 5%	
HUMB-WP-VD-11	RUSS RCH 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	15%	< 5%	< 5%	
HUMB-WP-VD-13	WILLWCRK 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	16%	< 5%	< 5%	

Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2016 Summer Off-Peak	2019 Summer Light Load	N/A	

No voltage deviation concern identified.

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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
					2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	
HUMB-SP-V-1	HOOPA 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	0.8047	>0.9	>0.9	Maple Creek SVC
HUMB-SP-V-2	MPLE CRK 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	0.8631	>0.9	>0.9	
HUMB-SP-V-3	RUSS RCH 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	0.8529	>0.9	>0.9	
HUMB-SP-V-4	WILLWCRK 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	0.8211	>0.9	>0.9	

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High/Low Voltage



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Winter Peak	2019 Winter Peak	2024 Winter Peak	
HUMB-WP-V-1	ORICK 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	0.9085	0.9012	0.8473	May need a cap bank in the 7 - 10 year time frame. In the short term use PG&E's Summer action plan.
HUMB-WP-V-2	ARCATA 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	0.937	0.9297	0.882	
HUMB-WP-V-3	SIMPSON 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	0.9307	0.9236	0.8698	
HUMB-WP-V-4	BCHIPMIL 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	0.9325	0.9255	0.8738	
HUMB-WP-V-5	BIG_LAGN 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	0.9124	0.9051	0.8514	
HUMB-WP-V-6	BLUE LKE 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	0.931	0.924	0.8702	
HUMB-WP-V-7	TRINIDAD 60 kV	Essex Jct - Arcata - Fairhaven 60 kV Line (ARC_JT2X-ARCA	B	L-1	0.9151	0.9077	0.8542	
HUMB-WP-V-8	MPLE CRK 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	0.8597	>0.9	>0.9	Maple Creek SVC
HUMB-WP-V-9	HOOPA 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	0.7982	>0.9	>0.9	
HUMB-WP-V-10	RUSS RCH 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	0.8489	>0.9	>0.9	
HUMB-WP-V-11	WILLWCRC 60 kV	Humboldt - Maple Creek 60 kV Line	B	L-1	0.8153	>0.9	>0.9	
HUMB-WP-V-12	HOOPA 60 kV	Humboldt 115/60 No.2 Transformer & Humboldt 115/60 No.1 Transformer	C	L-1-1	0.8892	>0.9	>0.9	
HUMB-WP-V-13	BRDGVLL 60 kV	Bridgeville 60/12 kV Transformer & Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER	C	L-1-1	0.8099	>0.9	>0.9	Bridgeville - Garberville 115kV line
HUMB-WP-V-14	FRT SWRD 60 kV	Bridgeville 60/12 kV Transformer & Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER	C	L-1-1	0.821	>0.9	>0.9	

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High/Low Voltage



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Winter Peak	2019 Winter Peak	2024 Winter Peak	
HUMB-WP-V-15	FRUITLND 60 kV	Bridgeville 60/12 kV Transformer & Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER	C	L-1-1	0.81	>0.9	>0.9	
HUMB-WP-V-16	GRBRVLE 60 kV	Bridgeville 60/12 kV Transformer & Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER	C	L-1-1	0.8367	>0.9	>0.9	
HUMB-WP-V-17	KEKAWAKA 60 kV	Bridgeville 60/12 kV Transformer & Rio Dell Jct - Bridgeville 60 kV Line (CARLOTTA-PCLUMBER	C	L-1-1	0.8403	>0.9	>0.9	



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2016 Summer Off-Peak	2019 Summer Light Load	Select..	

No high/low voltage concerns identified.

Study Area: **PG&E North Coast & North Bay - Summer Peak**



Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)			Potential Mitigation Solutions
				2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	

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

Study Area: **PG&E North Coast & North Bay- Winter Peak**



Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)			Potential Mitigation Solutions
				2016 Winter Peak	2019 Winter Peak	2024 Winter Peak	

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

Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)			Potential Mitigation Solutions
				2016 Summer Off-Peak	2019 Summer Light Load	N/A	

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

Study Area: **PG&E North Coast & North Bay - Summer Peak**

Single Source Substation with more than 100 MW Load



ID	Substation	Load Served (MW)			Potential Mitigation Solutions
		2016 Summer Peak	2019 Summer Peak	2024 Summer Peak	

No single source substation with more than 100 MW Load

Study Area: **PG&E North Coast & North Bay- Winter Peak**

Single Source Substation with more than 100 MW Load



ID	Substation	Load Served (MW)			Potential Mitigation Solutions
		2016 Winter Peak	2019 Winter Peak	2024 Winter Peak	

No single source substation with more than 100 MW Load

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Study Area: **PG&E North Coast & North Bay- Summer Off-Peak & Summer Light Load**

Single Source Substation with more than 100 MW Load



ID	Substation	Load Served (MW)			Potential Mitigation Solutions
		2016 Summer Off-Peak	2019 Summer Light Load	N/A	

No single source substation with more than 100 MW Load