

## 2013/2014 ISO Reliability Assessment - Preliminary Study Results

Study Area: **PG&E Greater Bay Area Diablo- 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	
Diab-SP-T-01	Pittsburg - Clayton #3 115 kV Line	C1-24_BUS FAULT AT 32970 CLAYTN 115.00 Bus #2	C1	Bus	102%	91%	92%	Pittsburg-Lakewood SPS
Diab-SP-T-02	Lakewood - Meadow Lane - Clayton 115 kV Line	C1-23_BUS FAULT AT 32970 CLAYTN 115.00 Bus #1	C1	Bus	139%	120%	124%	Pittsburg-Lakewood SPS
Diab-SP-T-03	Contra Costa - Moraga #1 230 KV Line	C2-6_CB FAULT AT 30525 C.COSTA 230 CB820	C2	Breaker	115%	< 100%	< 100%	Action Plan until Contra Costa - Motage 230kV Line Reconductor Project Completion
Diab-SP-T-04	Moraga 230/115 kV Transformer No. 2	C2-21_CB FAULT AT 33020 MORAGA 115 CB432	C2	Breaker	148%	< 100%	< 100%	Action Plan until Motage 230/115kV #2 Transformer Replacement Project Completion
Diab-SP-T-05	Pittsburg - Clayton #3 115 kV Line	C2-16_CB FAULT AT 32950 PITSBURG 115 CB222	C2	Breaker	118%	106%	108%	Pittsburg-Lakewood SPS
Diab-SP-T-06	Moraga - Lakewood 115 kV Line	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	243%	244%	245%	Pittsburg-Lakewood SPS
Diab-SP-T-07	Oleum - Martinez 115 kV Line	C2-12_CB FAULT AT 30540 SOBRANTE 230 CB202	C2	Breaker	108%	< 100%	< 100%	Drop load either manually or thru SPS as appropriate
Diab-SP-T-08	Sobrante - Grizzly - Claremont #2 115 kV Line	C2-13_CB FAULT AT 30550 MORAGA 230 CB202	C2	Breaker	103%	< 100%	< 100%	Drop load either manually or thru SPS as appropriate
Diab-SP-T-09	Moraga 230/115 kV Transformer No. 2	C2-21_CB FAULT AT 33020 MORAGA 115 CB432	C2	Breaker	144%	< 100%	< 100%	Action Plan until Motage 230/115kV #2 Transformer Replacement Project Completion
Diab-SP-T-10	Moraga - Lakewood 115 kV Line	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	257%	258%	259%	Pittsburg-Lakewood SPS
Diab-SP-T-11	Sobrante - Moraga 115 kV Line	C2-12_CB FAULT AT 30540 SOBRANTE 230 CB202	C2	Breaker	< 100%	102%	106%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate

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					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
Diab-SP-T-12	Sobrante - Moraga 115 kV Line	C2-13_CB FAULT AT 30550 MORAGA 230 CB202	C2	Breaker	127%	< 100%	< 100%	Drop load either manually or thru SPS as appropriate
Diab-SP-T-13	Contra Costa - Moraga #1 230 KV Line	B2_17_Contra Costa-Las Positas 230kV Line & B2_13_Contra Costa-Moraga #2 230kV Line	C3	N-1-1	107.00%	< 100%	< 100%	Drop load either manually or thru SPS as appropriate
Diab-SP-T-14	Moraga 230/115 kV Transformer No. 2	B3_16_Moraga 230/115kV Transformer #1 & B3_17_Moraga 230/115kV Transformer #3	C3	N-1-1	149.00%	< 100%	< 100%	Action Plan until Moraga 230/115kV #2 Transformer Replacement Project Completion
Diab-SP-T-15	Pittsburg 230/115 kV Transformer No. 12	B3_8_Pittsburg 230/115kV Transformer #13 & B3_27_LMEC GSU CC2	C3	N-1-1	124.00%	< 100%	< 100%	Action Plan until Pittsburg 230/115kV #14 Transformer Addition Project Completion
Diab-SP-T-16	Pittsburg 230/115 kV Transformer No. 13	B3_7_Pittsburg 230/115kV Transformer #12 & B3_27_LMEC GSU CC2	C3	N-1-1	144.00%	< 100%	< 100%	Action Plan until Pittsburg 230/115kV #14 Transformer Addition Project Completion
Diab-SP-T-17	Pittsburg - Clayton #1 115 kV Line	B2_47_Pittsburg-Clayton #4 115kV Line & B2_53_Pittsburg-Clayton #3 115 kV Line	C3	N-1-1	109.00%	< 100%	100.00%	Pittsburg - Lakewood SPS
Diab-SP-T-18	Pittsburg - Clayton #4 115 kV Line	B2_46_Pittsburg-Clayton #1 115kV Line & B2_53_Pittsburg-Clayton #3 115 kV Line	C3	N-1-1	123.00%	111.00%	113.00%	Pittsburg - Lakewood SPS
Diab-SP-T-19	Pittsburg - Clayton #3 115 kV Line	B2_46_Pittsburg-Clayton #1 115kV Line & B2_47_Pittsburg-Clayton #4 115kV Line	C3	N-1-1	114.00%	103.00%	105.00%	Pittsburg - Lakewood SPS
Diab-SP-T-20	Lakewood - Meadow Lane - Clayton 115 kV Line	B2_55_Clayton-Meadow Lane 115kV Line & B2_56_Lakewood-Clayton 115kV Line	C3	N-1-1	141.00%	122.00%	126.00%	Pittsburg - Lakewood SPS

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## Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
Diab-SP-T-21	Moraga - Lakewood 115 kV Line	B2_56_Lakewood-Clayton 115kV Line & B2_57_Lakewood-Meadow Lane-Clayton 115kV Line	C3	N-1-1	124.00%	124.00%	126.00%	Pittsburg - Lakewood SPS
Diab-SP-T-22	Oleum - Martinez 115 kV Line	B2_39_Sobrante-El Cerrito STA G #1 115kV Line & B2_40_Sobrante-El Cerrito STA G #2 115kV Line	C3	N-1-1	129.00%	< 100%	< 100%	Action Plan until North Tower Looping Project Completion
Diab-SP-T-23	Moraga 230/115 kV Transformer No. 2	B3_16_Moraga 230/115kV Transformer #1 & B3_17_Moraga 230/115kV Transformer #3	C3	N-1-1	145.00%	< 100%	< 100%	Action Plan until Motage 230/115kV #2 Transformer Replacement Project Completion
Diab-SP-T-24	Moraga - Lakewood 115 kV Line	B2_56_Lakewood-Clayton 115kV Line & B2_57_Lakewood-Meadow Lane-Clayton 115kV Line	C3	N-1-1	131.00%	132.00%	133.00%	Pittsburg - Lakewood SPS
Diab-SP-T-25	Sobrante - Moraga 115 kV Line	B3_14_Sobrante 230/115kV Transformer #1 & B3_15_Sobrante 230/115kV Transformer #2	C3	N-1-1	< 100%	< 100%	103.00%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
Diab-SP-T-26	Contra Costa - Balfour 60 kV Line	B2_81_Willow Pass-Contra Costa 60kV Line & B2_9_CC PP - CC Sub 230kV Line	C3	N-1-1	< 100%	104.00%	104.00%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
Diab-SP-T-27	Contra Costa - Balfour 60 kV Line	B2_81_Willow Pass-Contra Costa 60kV Line & B3_6_CC Sub 230/115kV Transformer #3	C3	N-1-1	< 100%	< 100%	104.00%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate

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Study Area: **PG&E Greater Bay Area Diablo- 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	
Diab-SP-T-28	33054 BALFOUR 60.0 33083 MDLRVRJT 60.0 1	B2_81_Willow Pass-Contra Costa 60kV Line & B3_6_CC Sub 230/115kV Transformer #3	C3	N-1-1	< 100%	101.00%	114.00%	Re-rate or reconductor line. Drop load either manually or thru SPS as appropriate
Diab-SP-T-29	Pittsburg - Clayton #1 115 kV Line	C5_24_Pittsburg-Clayton Nos. 3 & 4 115 kV lines	C5	DCTL	108.00%	< 100%	< 100%	Pittsburg - Lakewood SPS
Diab-SP-T-30	Moraga - Lakewood 115 kV Line	C5_27_Lakewood-Clayton and Lakewood-Meadow Lane-Clayton 115 kV I	C5	DCTL	124.00%	< 100%	< 100%	Pittsburg - Lakewood SPS
Diab-SP-T-31	Moraga - Lakewood 115 kV Line	C5_27_Lakewood-Clayton and Lakewood-Meadow Lane-Clayton 115 kV I	C5	DCTL	131.00%	< 100%	< 100%	Pittsburg - Lakewood SPS

San Onofre Nuclear Generation Station was retired on June 7, 2013 and therefore was removed from the base cases used for the 2013/14 ISO transmission planning process.

**Thermal Overloads**

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2015 Summer Off-Peak	2018 Summer Light Load	N/A	
Diab-OP-T-01	Pittsburg - Los Medanos #1 115 kV Line	B3_23_DEC GSU STG1 & B2_49_Pittsburg-Los Mendanos #2 115kV Line	B	L-1/G-1	106%	< 100%	—	Reduce LMEC Generation
Diab-OP-T-02	Pittsburg - Los Medanos #1 115 kV Line	B2_49_Pittsburg-Los Mendanos #2 115kV Line	B	N-1	104%	< 100%	—	Reduce LMEC Generation
Diab-OP-T-05	Pittsburg - Los Medanos #1 115 kV Line	C1-20_BUS FAULT AT 32950 PITSBURG 115.00 Sec 2D	C1	Bus	104%	< 100%	—	Reduce LMEC Generation
Diab-OP-T-08	Pittsburg - Los Medanos #1 115 kV Line	C2-16_CB FAULT AT 32950 PITSBURG 115 CB222	C2	Breaker	104%	< 100%	—	Pittsburg-Lakewood SPS
Diab-OP-T-12	Oleum - Martinez 115 kV Line	B3_7_Pittsburg 230/115kV Transformer #12 & B3_8_Pittsburg 230/115kV Transformer #13	C3	N-1-1	101%	< 100%	—	Drop load either manually or thru SPS as appropriate

**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	
Diab-SP-DV-01	EBMUDGRY 115kV	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	-19.00%	-18.00%	-19.00%	Pittsburg-Lakewood SPS
Diab-SP-DV-02	LAKEWD-C 115kV	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	-18.00%	-18.00%	-18.00%	Pittsburg-Lakewood SPS
Diab-SP-DV-03	LAKEWD-M 115kV	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	-18.00%	-18.00%	-18.00%	Pittsburg-Lakewood SPS
Diab-SP-DV-04	LK_REACT 115kV	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	-10.00%	-9.00%	-9.00%	Pittsburg-Lakewood SPS
Diab-SP-DV-05	LKWD_JCT 115kV	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	-18.00%	-17.00%	-18.00%	Pittsburg-Lakewood SPS
Diab-SP-DV-06	MEDW LNE 115kV	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	-19.00%	-18.00%	-19.00%	Pittsburg-Lakewood SPS
Diab-SP-DV-07	MRAGA 2M 230kV	C2-13_CB FAULT AT 30550 MORAGA 230 CB202	C2	Breaker	-11.00%	<10%	<10%	Pittsburg-Lakewood SPS

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Study Area: **PG&E Greater Bay Area Diablo- 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	
Diab-SP-V-01	EBMUDGRY	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	0.80	0.80	0.81	Pittsburg-Lakewood SPS
Diab-SP-V-02	LAKEWD-C	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	0.80	0.81	0.81	Pittsburg-Lakewood SPS
Diab-SP-V-03	LAKEWD-M	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	0.80	0.81	0.81	Pittsburg-Lakewood SPS
Diab-SP-V-04	LK_REACT	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	0.89	0.89	0.89	Pittsburg-Lakewood SPS
Diab-SP-V-05	LKWD_JCT	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	0.80	0.81	0.81	Pittsburg-Lakewood SPS
Diab-SP-V-06	MEDW LNE	C2-17_CB FAULT AT 32970 CLAYTN 115 CB102	C2	Breaker	0.79	0.80	0.80	Pittsburg-Lakewood SPS

# 2013/2014 ISO Reliability Assessment - Preliminary Study Results

Study Area: **PG&E Greater Bay Area Diablo - 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	
Diab-OP-V-01	MARSH 60kV	B3_21_Contra Costa Sub 115/60kV Transformer #2	B	N-1	> 0.95	1.11	–	Under review for possible exemption or reactive device
Diab-OP-V-02	MARSH 60kV	C1-28_BUS FAULT AT 33000 CC SUB 115.00 Bus #2	C1	Bus	> 0.9	1.11	–	Under review for possible exemption or reactive device
Diab-OP-V-03	CC SUB 60kV	C1-36_BUS FAULT AT 33050 CC SUB 60.00 Bus #2	C1	Bus	> 0.9	1.12	–	Under review for possible exemption or reactive device

**Transient Stability**

ID	Contingency	Category	Category Description	Transient Stability Performance			Potential Mitigation Solutions
				2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
Diab-TS-01	SLG fault at DEC with delayed clearing	C6	Generator 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 Pittsburg 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 Pittsburg 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 Pittsburg Area	Potential Upgrade of the Voltage Support in the Pittsburg Areas

## 2013/2014 ISO Reliability Assessment - Preliminary Study Results

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



### Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)			Potential Mitigation Solutions
				Select..	Select..	Select..	

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

## 2013/2014 ISO Reliability Assessment - Preliminary Study Results

Study Area: **PG&E Greater Bay Area Diablo - 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..	

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

## 2013/2014 ISO Reliability Assessment - Preliminary Study Results

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

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



ID	Substation	Load Served (MW)			Potential Mitigation Solutions
		Select..	Select..	Select..	

No single source substation with more than 100 MW Load

Study Area: **PG&E Greater Bay Area Diablo - 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..	

No single source substation with more than 100 MW Load