Pico Power Project

Appendix 6-C
SVP System Impact Study

October 2002

REPORT ON THE SYSTEM IMPACT OF SILICON VALLEY POWER'S PICO 120 MW COMBINED CYCLE POWER PLANT PROJECT

Prepared For

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SECTION 1 INTRODUCTION AND PROJECT DESCRIPTION

Silicon Valley Power (SVP) is planning to install a 120 MW (nominal) combined cycle generating facility (the Pico Project) at a site next to Kifer receiving station. The Project will be looped into the Kifer – Scott 115 kV line.

SVP has requested that PG&E conduct a System Impact/Facility Study (SIS/FS) for this Project. In addition, SVP has engaged Navigant Consulting, Inc (NCI) to perform some additional analysis to support the Project's Application for Certification (AFC) to California Energy Commission (CEC). The work that NCI will undertake is to perform technical studies to identify the impacts to SVP's interconnected transmission system, if any, caused by the addition of the Project, and to verify the results of PG&E's SIS/FS.

NCI applied the NERC/WECC and Cal-ISO Planning Standards in evaluating the performance of the system before and after the addition of the Pico Project to the SVP system.

The technical studies discussed below shows that there would be one adverse system impact (a 104% overload of the Scott - Kifer 115 kV line) under normal and single contingency conditions due solely to addition of the Pico Project. Under a condition in which the Los Esteros - Northern Receiving Station (NRS) 230 kV line were to be delayed, the Scott - Kifer 115 kV line would load to 117% of its normal rating under Summer Peak conditions with the Pico Project in-service. In addition, without the Los Esteros-NRS 230 kV line in service, this circuit would exceed it emergency rating for 25 other Category B outages, 5 N-2 outages, and 5 bus outages (at Newark 230 kV and 115 kV, Northern Receiving Station 115 kV, and Trimble 115 kV). The highest loading on the Scott -Kifer 115 kV circuit would be 130% for a Category 'B' outage and 164% for a Category 'C' outage.

SVP is planning to reconductor the Scott - Kifer 115 kV line prior to the energization of the Pico Project. The reconductored line would utilize bundled 954 Al conductor (at present, it utilizes a single 954 Al conductor). This bundled conductor would have a normal rating of 1666 amperes and an emergency rating of 1908 amperes, which is twice the rating of the current line. These new ratings will be more that adequate to handle the loading levels identified in these studies even if the Los Esteros - Northern 230 kV line were to be delayed beyond the energization of the Pico Project.

The Summer Off-Peak base case showed no loading violations under any of the Category 'B' scenarios studied. Two bus section outages caused overloads on some PG&E 115 kV lines, but the addition of the Pico Project did not increase these overloads.

BASE CASE PARAMETERS

Powerflow cases modeling the 2005 summer peak and the 2005 summer off-peak loading conditions were obtained from PG&E. With data supplied by SVP, NCI then modeled SVP's 60 kV system, including the pertinent 115/60/12 kV transformers at Kifer, Scott and Northern Receiving Stations. SVP also provided NCI with the distribution of the SVP load to the various buses. This load distribution was used to distribute the Summer Peak and Summer Off-Peak loads in the PG&E powerflow cases to the detailed SVP transmission model used in NCI's analysis. (However, those loads specified by SVP as being loads that do not change as a function of the time of day were not modified during the load distribution process.) A sensitivity analysis was also performed to determine the system impacts caused by the Pico Project if the Los Esteros - Northern Receiving Station 230 kV line were to be delayed beyond the energization date of the Pico Project.

Some key parameters of the study base cases are listed below in Table 1.

TABLE 1
POWERFLOW BASE CASES - SUMMARY OF KEY PARAMETERS
(MW)

	Summer Peak		Summer Off-Peak	
	Pre	Post	Pre	Post
System Loads				
PG&E System Load	24,557	24,557	12,369	12,369
PG&E San Jose Division	1,888	1,888	920	920
SVP	543	543	267	267
San Jose Division Gen				
Metcalf Energy Center	600	600	600	600
Los Esteros Energy Center	304	304	186	186
SVP Gen				
CCA	24	24	24	24
Cogen	6.6	6.6	6.6	6.6
Gianera	41.2	41.2	0	0
Pico CC	0	120	0	120
Major Path Flows				
Path 66 -COI (N-S)	3808	3808	555	555
Path 15 (N-S)	793	793	-919	-919

Path 26 - Midway to Vincent (N-S)	3025	3025	1070	1070

GENERATION INTERCONNECTION QUEUE ASSUMPTIONS

NCI's analysis was based on system base cases provided by PG&E. The Generation Interconnection Queue Assumptions used in this study were identical to those assumed by PG&E in their System Impact Study (which is included in this report as Appendix I).

CONTINGENCIES EVALUATED

A complete list of all contingencies evaluated for this analysis is included in Appendix II.

SECTION 4 SUMMARY OF POWER FLOW STUDY RESULTS

SUMMER PEAK POWERFLOW RESULTS: (LOS ESTEROS - NORTHERN 230 KV LINE IN-SERVICE)

N-0 Results

These studies indicated that no overloads would occur under N-0 conditions in the Summer Peak base cases.

Category 'B' Outages

These studies indicated that under Summer Peak Conditions the Scott - Pico 115 kV circuit would overload by 4% if the Los Esteros - Northern 230 kV line or the Northern 230/115 kV bank were lost. They also showed that the East Shore 230/115 kV bank would be overloaded by 3% above its emergency rating due to the Newark 230/115 kV Bank #9 Outage. However, this is a 4% reduction in overload as compared to the pre-Project case. Table 1, below, documents these overloads.

Category 'C' Outages: N-2 and Bus Section Outages

These studies indicated that the addition of the Pico Project mitigated or reduced the magnitude of all pre-Project N-2 overloads except for overloads associated with one outage. With the Tesla - Ravenswood and Newark - Ravenswood 230 kV double-line-outage the overloads on the Ravenswood – Ames 115 kV and Newark – Ames 115 kV lines increase by approximately 2% above the levels in the pre-Project cases (which were as high as 153%).

For the bus outage cases, the studies indicate that the addition of the Pico Project created an overload on the Scott - Pico - Kifer 115 kV line for an outage of the entire bus at NRS 115 kV. Also, for the outage of the entire bus at Kifer 115 kV, the Agnew - Tasman 60 kV line overloads and the overload on the Northern - Tasman 60 kV line increases by 36%. Table 2, below, lists the results for all of these Category 'C' contingencies.

Powerflow plots for all N-0 cases as well as all cases with criteria violations are provided in Appendix III.

SUMMER PEAK POWERFLOW RESULTS: (LOS ESTEROS - NORTHERN 230 KV LINE DELAYED)

N-0 Results

These studies indicated that the Scott – Pico 115 kV circuit would load to 117% of its normal rating.

Category 'B' Outages

These studies show that at least one section of the Scott – Pico - Kifer 115 kV line will exceed its emergency rating after outages on 25 other facilities ; the worst overload being 130% due to the Newark – Northern #1 115 kV line outage combined with loss of a Gianera Unit or loss of either of the Kifer 115/60/12 kV transformer banks. The studies also showed that the East Shore 230/115 kV bank would be overloaded by 10% above its emergency rating due to the Newark 230/115 kV Bank #9 Outage. However, this is a 4% reduction in overload as compared to the pre-Project case. Table 1, below, documents these overloads.

CATEGORY 'C' OUTAGES: N-2 AND BUS SECTION OUTAGES

Similar to the scenario in which the Los Esteros – Northern 230 kV line is in-service, these studies indicated that the addition of the Pico Project mitigated or reduced all N-2 overloads except for overloads associated with five outages. With the Tesla - Ravenswood and Newark - Ravenswood 230 kV Double-Line-Outage (DLO) the overloads on the Ravenswood – Ames 115 kV line and Newark – Ames 115 kV lines increase by approximately 2% above the pre-Project overloads (which were as high as 151%). In addition, the Scott - Pico - Kifer 115 kV line exceeds its emergency rating for the other four outages mentioned above. The largest overload on this line is 164% for the Newark – Northern #1 and #2 115 kV DLO.

For the bus outage cases, the studies indicate that the addition of the Pico Project increased the overload on the Scott - Pico - Kifer 115 kV line for an outages of the entire bus at Trimble 115 kV, NRS 115 kV, Newark 'E' 230 kV, Newark 'D1' 230 kV, and Newark 'D1' 115 kV. Table 2, below, lists the results for all of the Category 'C' contingencies run for this study.

Powerflow plots for all N-0 cases as well as cases with criteria violations are provided in Appendix III.

MITIGATION MEASURES

SVP is planning to reconductor the Scott - Kifer 115 kV line prior to the energization of the Pico Project. The reconductored line would utilize bundled 954 Al conductor. This

bundled conductor would have a normal rating of 1666 amperes and an emergency rating of 1908 amperes. These ratings will be more that adequate to handle the loading levels identified in these studies even if the Los Esteros - Northern 230 kV line were to be delayed beyond the energization of the Pico Project. The other Category 'B' overloads identified in this study are not caused by the addition of the Pico Project to the SVP system. In fact, some of these overloads are reduced by the addition of the Pico Project to the system. PG&E should be proposing reinforcement projects or other mitigation measures as part of its annual transmission expansion plan to mitigate these pre-existing overloads.

Because the NERC/WECC and Cal-ISO Planning Standards allow firm load tripping for Category 'C' contingencies, SVP is proposing to work with PG&E to develop operating procedures or special protection schemes that can be used to mitigate the Category 'C' overloads identified in this study (except for the Scott - Pico - Kifer 115 kV line overload which will be mitigated by the reconductoring described above).

Table 1: Category 'A' and Category 'B' Results

				Los Esteros - Northern 230 kV line			
				In service		Not in Service	
OUTAGE	FACILITY	Line Rating	Units	Pre-Project	Post-Project	Pre-Project	Post-Project
Normal							
Base Case	Scott – Pico 115 kV	948.86	AMPS	-N/A-	-N/A-	-N/A-	1.17
Base Case	E. Shore 230/115 kV Bk#1	120	MVA	-N/A-	-N/A-	0.95	-N/A-
G-1							
RCEC CTs #1 and ST #1	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.09
G-2							
RCEC CTs #1 and #2 and ST #1	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.12
Gianera Unit #1 and #2	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.11
L-1/G-1							
CCA - Kifer 60 kV and CCA Gen	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.25
CCA - Kifer 60 kV and CCA Gen	Scott – Kifer 115 kV	948.86	AMPS	<93%	<93%	0.99	<93%
Los Esteros - Agnew 115 kV and SVP Gianera Generator Unit 1	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.09
Newark - Northern #1 115 kV and SVP CCA Generator	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	1.09	1.28
Newark - Northern #2 115 kV and SVP CCA Generator	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	1.07	1.23
Newark - Northern #1 115 kV and SVP Gianera Generator Unit 1	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	1.12	1.30
Newark - Northern #2 115 kV and SVP Gianera Generator Unit 1	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	1.09	1.26
Swift - Metcalf 115 kV and SVP Gianera Generator Unit 1	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.15
N-1							
Kifer 115/60 kV Bk#1 or Bk#2	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	1.04	1.30
CCA - Kifer 60 kV	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.18
CCA - Mathew 60 kV	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	0.96	1.23
Fiberglass - Walsh 60 kV	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.19
Kifer - Fiberglass 60 kV	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	0.96	1.22
Los Esteros - Northern 230 kV	Scott – Pico 115 kV	948.86	AMPS	<93%	1.04	-N/A-	-N/A-
Northern 230/115 kV Bk#1	Scott – Pico 115 kV	948.86	AMPS	<93%	1.04	-N/A-	-N/A-

				Los Esteros - Northern 230 kV line			
				In service		Not in Service	
OUTAGE	FACILITY	Line Rating	Units	Pre-Project	Post-Project	Pre-Project	Post-Project
Mathew - Brokaw 60 kV	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.13
McKee - Piercy 115 kV	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.09
Metcalf - Piercy 115 kV	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.11
Newark - Northern #1 115 kV	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	1.07	1.25
Newark - Northern #2 115 kV	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	1.04	1.21
Newark 230/115 kV Bk#11	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.09
Newark 230/115 kV Bk#7	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.10
Newark 230/115 kV Bk#9	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	0.99	1.27
	E. Shore 230/115 kV	120	MVA	1.07	1.03	1.14	1.10
Swift - Metcalf 115 kV	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.11
Walsh - Uranium 60 kV	Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.09

Table 2: N-2 and Bus Section Outage Results

				Los Esteros - Northern 230 kV line			
				In service		Not in Service	
OUTAGE	FACILITY	Line Rating	Units	Pre-Project	Post-Project	Pre-Project	Post-Project
N-2							
Los Esteros - Trimble and Los Esteros - Montague 115 kV DLO	Los Estros - Nortech 115 kV	1606.54	AMPS	<93%	<93%	1.17	1.02
	Kifer - Nortech 115 kV	1541.27	AMPS	<93%	<93%	1.13	0.97
Metcalf - Evergreen #1 and #2 115 kV DLO	San Jose St 'A' - 'F' 115 kV	1054.29	AMPS	0.96	<93%	1.03	0.94
	El Patio - San Jose St 'A' 115kV (ELPT_SJ1 - SN JSE A)	1224.99	AMPS	0.96	<93%	1.02	0.93
	El Patio - San Jose St 'A' 115kV (ELPT_SJ2 - EL PATIO)	1224.99	AMPS	0.96	<93%	1.02	0.93
Metcalf - Monta Vista 230 kV and Cal MEC - Monta Vista 230 kV	Metcalf - Hicks 230 kV	1252.60	AMPS	1.03	1.01	1.04	1.02
	Metcalf - Vasona 115 kV	1253.10	AMPS	1.00	0.98	1.01	0.99
Metcalf - Piercy and Metcalf - Swift 115 kV DLO	Scott - Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.21
Monta Vista - Lawrence and Monta Vista - Britton 115 kV DLO	Scott - Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.13
Newark - Northern #1 and #2 115 kV DLO	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	<93%	<93%	1.60	1.64
	Los Estros - Nortech 115 kV	1606.54	AMPS	<93%	<93%	1.01	<93%
Newark Dist - Los Esteros and Metcalf - Los Esteros 230 kV DLO	E. Shore 230/115 kV	120	MVA	0.99	0.95	<93%	0.95
Tesla - Newark #1 and #2 230 kV	Scott - Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.10
	E. Shore 230/115 kV	120	MVA	0.99	0.96	1.02	0.99
	Contra Costa - Los Positas 115 kV	1004.09	AMPS	0.99	0.96	0.99	0.96
Tesla - Ravenswood and Newark - Ravenswood 230 kV DLO	Ravenswood-Ames #1 and #2 115 kV	617.51	AMPS	1.53	1.55	1.51	1.53
	Ames Dist - Ames 115 kV	471.92	AMPS	1.11	1.13	1.10	1.11
	Newark - Ames Dist 115 kV	471.92	AMPS	1.24	1.26	1.23	1.24
	Newark - Ames #1 and #2 115 kV	522.13	AMPS	1.13	1.14	1.11	1.13
	Newark - Ames #3 115 kV	471.92	AMPS	1.22	1.24	1.21	1.22
	E. Shore - San Mateo #2 230 kV	1162.23	AMPS	1.22	1.21	1.23	1.22
	Scott - Pico 115 kV	948.86	AMPS	<93%	<93%	<93%	1.16
	E. Shore - San Mateo #1 230 kV	1207.42	AMPS	1.15	1.14	1.16	1.15

				Los Esteros - Northern 230 kV line			
				In service		Not in Service	
OUTAGE	FACILITY	Line Rating	Units	Pre-Project	Post-Project	Pre-Project	Post-Project
BUS							
Trimble 115kV Bus Fault	Scott - Pico 115 kV	948.86	AMPS	< 0.93%	< 0.93%	< 0.93%	1.11
	Los Estros - Nortech 115 kV	1606.54	AMPS	< 0.93%	< 0.93%	0.97	< 0.93%
Northern Receiving Station 115kV Bus Fault	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	< 0.93%	1.27	1.24	1.26
	Los Estros - Nortech 115 kV	1606.5	AMPS	1.00	< 0.93%	1.00	< 0.93%
	Kifer - Nortech 115 kV	1541.3	AMPS	0.96	< 0.93%	0.96	< 0.93%
Newark "F1" 115kV Bus Fault	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	< 0.93%	< 0.93%	1.03	1.20
Newark "E1" 230kV Bus Fault	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	< 0.93%	< 0.93%	1.01	1.11
	E. Shore 230/115 kV	120	MVA	0.97	0.94		0.98
Newark "D2" 230kV Bus Fault	Scott - Pico 115 kV	948.86	AMPS	< 0.93%	< 0.93%	1.10	< 0.93%
	E. Shore 230/115 kV	120	MVA	0.94	< 0.93%	0.95	< 0.93%
Newark "D2" 115 kV Bus Fault	E. Shore 230/115 kV	120	MVA	1.22	1.22	1.22	1.22
Newark "D1" 230kV Bus Fault	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	< 0.93%	< 0.93%	1.06	1.34
	E. Shore 230/115 kV	120	MVA	0.98	0.94	1.05	< 0.93%
Newark "D1" 115kV Bus Fault	Scott - Kifer 115 kV/Scott – Pico 115 kV	948.86	AMPS	< 0.93%	< 0.93%	1.08	1.27
Metcalf "D&E1" 115kV Bus Fault	Morgan Hill - Llagas 115 kV	743.03	AMPS	1.19	1.19	1.19	1.19
	Metcalf - El-Patio 115 kV #1	948.86	AMPS	1.07	1.01	1.13	1.06
	Swift - Metcalf 115 kV	1144.7	AMPS	0.97	0.94	1.00	0.96
Kifer Receiving Station 115kV Bus Fault	Newark - Northern #2 115 kV	948.86	AMPS	< 0.93%	< 0.93%	1.47	0.94
	Newark - Northern #1 115 kV	948.86	AMPS	< 0.93%	< 0.93%	1.43	0.94
	E. Shore 230/115 kV	120.00	MVA	< 0.93%	< 0.93%	1.03	0.98
	Agnew - Tasman 60 kV	1908.1	AMPS	< 0.93%	1.19	< 0.93%	< 0.93%
	Kifer Re - CCA 60 kV	1908.1	AMPS	< 0.93%	1.00	< 0.93%	< 0.93%
	Norman - Agnew 60 kV	1908.1	AMPS	< 0.93%	1.00	< 0.93%	< 0.93%
	Northern - Tasman 60 kV	1908.1	AMPS	1.13	1.49	1.23	1.13

SUMMER OFF-PEAK POWERFLOW RESULTS: (LOS ESTEROS - NORTHERN 230 KV LINE IN-SERVICE)

N-0 Results

The off-peak studies indicated that no overloads would occur under N-0 conditions in the off-peak base cases.

Category 'B' Outages

These studies showed that no facilities were overloaded under "N-1" contingencies after the addition of the Pico Project.

Category 'C' Outages: N-2 and Bus Section Outages

These studies indicated that no overloads would occur for any of the double line outages studied. Overloads did occur for the Metcalf D - E1 Bus outage and the Metcalf D2 bus outage in which the Metcalf - Morgan Hill and Metcalf - Llagas 115 kV lines overload by as much as 146%. However, the addition of the Pico Project did not increase these overloads. Table 3, below, documents these overloads

SUMMER OFF-PEAK POWERFLOW RESULTS: (LOS ESTEROS - NORTHERN 230 KV LINE DELAYED)

N-0 Results

The off-peak studies indicated that no overloads would occur under N-0 conditions in the off-peak base cases.

Category 'B' Outages

These studies showed that no facilities were overloaded under "N-1" contingencies after the addition of the Pico Project.

Category 'C' Outages: N-2 and Bus Section Outages

As discovered in the analysis with the Los Esteros - Northern 230 kV line in service, the studies with the line delayed indicated that no overloads would occur for any of the double line outages studied. Overloads did occur for the Metcalf D - E1 Bus outage and the Metcalf D2 bus outage in which the Metcalf - Morgan Hill and Metcalf - Llagas 115 kV lines overload by as much as 146%. However, the addition of the Pico Project did not increase these overloads. The cases without the Los Esteros - Northern 230 kV line resulted in loadings on the Metcalf - Morgan Hill 115 kV line that are approximately 1% less than with the line in-service. These overloads are listed in Table 3, below.

Table 3: Bus Outage Results for Summer Off-Peak Cases

				Los Esteros - Northern 230 kV line			
				In service		Not in Service	
OUTAGE	FACILITY	Line Rating	Units	Pre-Project	Post-Project	Pre-Project	Post-Project
BUS							
Metcalf "D&E1" 115kV Bus Fault	Metcalf - Morgan Hill 115 kV	803.27	AMPS	1.17	1.17	1.16	1.16
	Morgan Hill - Llagas 115 kV	743.03	AMPS	1.46	1.46	1.46	1.46
Metcalf "D2" 115kV Bus Fault	Metcalf-Green Valley (MTCALF D - MORGN J1)	803.27	AMPS	1.15	1.15	1.15	1.15
	Green Valley-Llagas (LLAGAS - MORGN J2)	743.03	AMPS	1.24	1.24	1.24	1.24
	Metcalf - Green Valley (MORGN J1 - MORGN J2)	803.27	AMPS	1.15	1.15	1.15	1.15

SECTION 5 SUMMARY OF SHORT CIRCUIT STUDY RESULTS

A summary of the short circuit analyses performed to determine the impact of the Pico Project on the SVP system is provided in Table 4 on the next page.

The two sections of the table labeled "SVP: 0 MW, LE 230: No, LE 115: Yes" and "SVP: 120 MW, LE 230: No, LE 115: Yes" provide the 3 phase and single-line-to-ground short circuit duties at each bus for the two cases without the Los Esteros - NRS 230 kV line. The first of these two cases does not include the Pico Project, while the second case does. The results of this sensitivity analysis indicates that while 2 - 31.5 kA circuit breakers at Kifer Receiving Station will need to be replaced prior to the addition of the Pico Project, the addition of the Pico Project does not overstress any additional circuit breakers.

The two sections of the table labeled "SVP: 0 MW, LE 230: Yes, LE 115: Yes" and "SVP: 120 MW, LE 230: Yes, LE 115: Yes" provide the 3-phase and single-line-to-ground short circuit duties at each bus for the two cases that include the Los Esteros - NRS 230 kV line. The first of these two cases does not include the Pico Project, while the second case does. The results of this first analysis indicates that a total of 4 circuit breakers at Kifer Receiving Station are overstressed and will need to be replaced (2 - 31.5 kA breakers and 2 - 40 kA breakers). Two of these breakers were overstressed prior to the addition of the Pico Project (two 31.5 kA breakers), and two breakers were overstressed by the addition of the Pico Project (two 40 kA breakers)

Note that the fault duties listed in Table 4 are the total fault duty at each bus. To determine if a circuit breaker is actually overstressed, the fault contribution from the circuit protected by the circuit breaker needs to be subtracted from the total fault duty to arrive at the fault current that actually flows through the circuit breaker.

Table 4: Silicon Valley Power - Pico Power Plant - 2004 Short Circuit Studies

Bus	kV	Min-imum Breaker Rating	#	SVP: LE 230: LE 115: 3 Phase	0 MW No Yes L-Gnd	Re-place Bkrs	SVP: LE 230: LE 115: 3 Phase	120 MW No Yes L-Gnd	Re-place Bkrs	SVP: LE 230: LE 115: 3 Phase	120 MW No Yes L-Gnd	Re-place Bkrs	SVP: LE 230: LE 115: 3 Phase	120 MW No Yes L-Gnd	Re-place Bkrs
FMC	115			23,091	20,118		23,679	20,438		23,379	20,295		23,908	20,579	
FMC TAP	115			28,405	26,836		29,026	27,222		28,579	26,955		29,150	27,308	
FMC TAP2	115			21,251	17,122		21,918	17,437		21,703	17,382		22,297	17,658	
LOS ESTE	115			41,865	44,472		43,052	45,357		41,864	45,453		43,073	46,388	
NEWARK D	115			37,962	39,866		38,556	40,312		38,489	40,280		39,001	40,661	
NEWARK F	115			55,114	55,784		56,334	56,621		55,810	56,290		56,898	57,030	
NORTECH	115			32,072	26,848		33,343	27,459		32,404	27,048		33,587	27,611	
NTS 1	115			21,176	16,937		21,878	17,264		21,680	17,226		22,305	17,512	
SAN JOSE	115			28,932	27,732		29,562	28,133		29,100	27,851		29,681	28,217	
STS 1	115			21,247	17,115		21,915	17,430		21,701	17,375		22,295	17,652	
ZANKER T	115			20,308	13,955		20,938	14,180		20,918	14,421		21,470	14,618	
KIFER RE	115	45,000		32,757	30,696		35,747	32,392		36,140	33,379		39,076	34,997	
NORTH RE	115	40,000		29,486	24,350		31,418	25,232		37,094	33,292		39,152	34,385	
PICO	115			31,962	29,824		35,097	31,582		35,708	32,825		38,843	34,532	
SCOTT RE	115	47,000		31,339	29,231		34,210	30,847		35,494	32,613		38,382	34,191	
AGNEW	60	**27,000**	**1**	**28,367**	19,630	0	**29,385**	20,007	0	**30,390**	20,653	0	**31,268**	20,967	0
BROKAW	60	31,500		20,298	11,705		20,880	11,876		21,166	11,972		21,660	12,113	
CCA	60	40,000		27,316	21,383		28,309	21,836		28,811	22,130		29,674	22,510	
CENTRAL	60	40,000		26,027	16,949		26,935	17,256		27,742	17,695		28,522	17,949	
FIBERGLA	60	**31,500**	**2**	31,219	27,764	0	**32,514**	28,485	0	**33,185**	29,018	0	**34,326**	29,634	0
GIANERA A	60	40,000		33,381	34,057		34,713	35,007		36,579	38,129		38,284	39,374	
GIANERA T	60	40,000		33,381	34,055		34,713	35,004		36,579	38,127		38,284	39,371	
HOMESTEA	60	40,000		16,973	8,805		17,410	8,919		17,641	8,987		18,009	9,079	
JULIETTE	60	40,000		26,822	17,798		27,751	18,121		28,746	18,736		29,542	19,004	
KIFER RE	60	**31,500**	**4**	**34,417**	**37,733**	**2**	**35,972**	**38,977**	**2**	**36,782**	**39,951**	**2**	**38,167**	**41,040**	**2**
KIFER RE	60	**40,000**	**6**			**0**			**0**			**0**			**2**
MATHEW	60	40,000		23,917	15,935		24,696	16,213		25,084	16,381		25,754	16,612	
NORMAN A	60	40,000		28,774	20,066		29,851	20,467		30,651	20,926		31,586	21,260	
NORTH RE	60	40,000		34,614	35,886		36,043	36,925		38,059	40,421		39,317	41,374	
SCOTT RE	60	40,000		32,628	35,294		34,108	36,454		35,042	37,590		36,360	38,607	
SERRA	60	40,000		15,743	7,806		16,123	7,901		16,314	7,952		16,632	8,029	
TASMAN	60	40,000		31,371	25,565		32,570	26,142		34,073	27,647		35,114	28,143	
URANIUM	60	41,800		22,132	12,804		22,826	13,003		23,188	13,131		23,781	13,296	
WALSH	60	40,000		27,632	20,291		28,665	20,712		29,197	21,004		30,097	21,357	
ZENO	60	40,000		21,715	12,408		22,394	12,600		22,764	12,729		23,344	12,887	
Replace	**60**	**kV**				**2**			**2**			**2**			**4**

LE 115: Los Esteros 230-115 kV with 115 kV lines

LE 230: Los Esteros 230 kV tie to the Northern Receiving Station

APPENDIX I

PG&E SYSTEM IMPACT STUDY

The PG&E System Impact Study is provided as Appendix 6-B.

APPENDIX II

CONTINGENCY LIST

```
#
# Contingency List for the Pico Generation System Impact Study
# Performed by Navigant Consulting, Inc.
#
#  Outages are listed in the following order:
#
#   (1) Single Generator Contingencies,
#   (2) Single Line and Transformer Contingencies,
#   (3) Overlapping Generator and Line Contingencies,
#   (4) Double Generator Contingencies, and
#   (5) Double Line Contingencies.
#
#
# PG&E 2002 TRANSMISSION ASSESSMENT STUDY: 2004 SUMMER PEAK AREA
7/8 FL CASE
# G-1 Contingency List with added SVP Generation on LV system.
BEGIN CASE ANALYSIS

**** CASE NUMBER **** 1
 3 35663 0   "1 "   0    #LECEFGT4 13.80  1
 3 35665 0   "1 "   0    #LECEFST2 13.80
0
**** CASE NUMBER **** 2
 3 30547 0   "1 "   0    #RCEC CT1 18.00  2
 3 30549 0   "1 "   0    #RCEC ST1 18.00
0
**** CASE NUMBER **** 3
 3 35850 0   "1 "   0    #GLRY COG 13.80  3
0
**** CASE NUMBER **** 4
 3 35860 0   "1 "   0    #OLS-AGNE  9.11  4
0
**** CASE NUMBER **** 5
 3 35861 0   "1 "   0    #SJ-SCL W  9.11  5
0
**** CASE NUMBER **** 6
 3 35863 0   "1 "   0    #CATALYST  9.11  6
0
**** CASE NUMBER **** 7
 3 33176 0   "1 "   0    #SEP GT1  18.00  7
0
```

```
**** CASE NUMBER **** 8
 3 33178 0    "1 "   0     #SEP ST    18.00  8
0
**** CASE NUMBER **** 9
 3 33179 0    "1 "   0     #GPAECGEN  13.80  9
0
**** CASE NUMBER **** 10
 3 33256 0    "1 "   0     #PTRERO7A  18.00  10
0
**** CASE NUMBER **** 11
 3 33257 0    "1 "   0     #PTRERO7B  18.00  11
0
**** CASE NUMBER **** 12
 3 33258 0    "1 "   0     #PTRERO7C  18.00  12
0
**** CASE NUMBER **** 13
 3 35881 0    "1 "   0     #MEC CTG1  18.00  13
0
**** CASE NUMBER **** 14
# SVP Generation
 3   55 0    "1 "   0     #Gianera   13.80  14
0
**** CASE NUMBER **** 15
 3   75 0    "1 "   0     #Cogen     12.00  15
0
**** CASE NUMBER **** 16
 3   22 0    "1 "   0     #CCA       13.80  16
0

STOP
```

```
# PG&E 2002 TRANSMISSION ASSESSMENT STUDY: 2004 SUMMER PEAK AREA
7/8 FL CASE
# PRE-PROJECT [L-1] and [T-1] CONTINGENCY LIST
BEGIN CASE ANALYSIS

**** CASE NUMBER **** 1
 1 30040 30042 "1 "  0   # line from TESLA   500.00 to METCALF 500.00 1
0
**** CASE NUMBER **** 2
 1 30042 30045 "1 "  0   # line from METCALF 500.00 to MOSSLAND 500.00 2
0
**** CASE NUMBER **** 3
 1 30624 30630 "1 "  0   # line from TESLA E 230.00 to NEWARK D 230.00 3
0
**** CASE NUMBER **** 4
 1 30640 30655 "1 "  0   # line from TESLA F 230.00 to ADCC    230.00 4
 1 30655 30631 "1 "  0   # line from ADCC    230.00 to NEWARK E 230.00
DELETE ISLANDS
0
**** CASE NUMBER **** 5
 1 30631 30635 "1 "  0   # line from NEWARK E 230.00 to NWK DIST 230.00 5
0
**** CASE NUMBER **** 6
 1 30635 30731 "1 "  0   # line from NWK DIST 230.00 to LS ESTRS 230.00 6
0
**** CASE NUMBER **** 7
 1 30735 30731 "1 "  0   # line from METCALF 230.00 to LS ESTRS 230.00 7
0
**** CASE NUMBER **** 8
 1 30731 30732 "1 "  0   # line from LS ESTRS 230.00 to NORTHERN 230.00 8
0
**** CASE NUMBER **** 9
 1 30730 30735 "1 "  0   # line from HICKS   230.00 to METCALF 230.00 9
0
**** CASE NUMBER **** 10
 1 30735 30733 "1 "  0   # line from METCALF 230.00 to VASONA  230.00 10
0
**** CASE NUMBER **** 11
 1 30720 30733 "1 "  0   # line from SARATOGA 230.00 to VASONA  230.00 11
0
```

```
**** CASE NUMBER **** 12
 1 30735 30705  "3 "   0    # line from METCALF  230.00  to  MONTAVIS 230.00  12
0
**** CASE NUMBER **** 13
 1 30735 30741  "4 "   0    # line from METCALF  230.00  to  CAL MEC  230.00  13
0
**** CASE NUMBER **** 14
 1 30741 30705  "4 "   0    # line from CAL MEC  230.00  to  MONTAVIS 230.00  14
0
**** CASE NUMBER **** 15
 1 30735 30750  "1 "   0    # line from METCALF  230.00  to  MOSSLND2 230.00  15
0
**** CASE NUMBER **** 16
 1 30735 30755  "1 "   0    # line from METCALF  230.00  to  MOSSLND1 230.00  16
0
**** CASE NUMBER **** 17
 1 30640 30703  "1 "   0    # line from TESLA C  230.00  to  RAVENSWD 230.00  17
0
**** CASE NUMBER **** 18
 1 30630 30703  "1 "   0    # line from NEWARK D 230.00  to  RAVENSWD 230.00  18
0
**** CASE NUMBER **** 19
 1 35120 36851  "1 "   0    # line from NEWARK D 115.00  to  NORTHERN 115.00  19
0
**** CASE NUMBER **** 20
 1 35122 36851  "2 "   0    # line from NEWARK F 115.00  to  NORTHERN 115.00  20
0
**** CASE NUMBER **** 21
 1 36851 36852  "1 "   0    # line from NORTHERN 115.00  to  SCOTT   115.00  21
0
**** CASE NUMBER **** 22
 1 36851 36852  "2 "   0    # line from NORTHERN 115.00  to  SCOTT   115.00  22
0
**** CASE NUMBER **** 23
 1 36850 36852  "1 "   0    # line from KIFER   115.00  to  SCOTT   115.00  23
0
**** CASE NUMBER **** 24
 1 36850 36861  "1 "   0    # line from KIFER   115.00  to  PICO115  115.00  24
0
```

```
**** CASE NUMBER **** 25
 1 36852 36861  "1 "   0    # line from SCOTT    115.00  to  PICO115  115.00  25
0
**** CASE NUMBER **** 26
 1 35659 36850  "1 "   0    # line from NORTECH  115.00  to  KIFER    115.00  26
INTERMEDIATE SOLUTION
0
**** CASE NUMBER **** 27
 1 35659 35658  "1 "   0    # line from NORTECH  115.00  to  LS ESTRS 115.00  27
0
**** CASE NUMBER **** 28
 1 35658 35612  "1 "   0    # line from LS ESTRS 115.00  to  TRIMBLE  115.00  28
0
**** CASE NUMBER **** 29
 1 35658 35606  "1 "   0    # line from LS ESTRS 115.00  to  AGNEW    115.00  29
DELETE ISLANDS
0
**** CASE NUMBER **** 30
 1 35658 35610  "1 "   0    # line from LS ESTRS 115.00  to  MONTAGUE 115.00  30
0
**** CASE NUMBER **** 31
 1 35122 35600  "1 "   0    # line from NEWARK F 115.00  to  DIXON LD 115.00  31
0
**** CASE NUMBER **** 32
 1 35612 35610  "1 "   0    # line from TRIMBLE  115.00  to  MONTAGUE 115.00  32
0
**** CASE NUMBER **** 33
 1 35602 35604  "1 "   0    # line from ZNKER J2 115.00  to  ZANKER   115.00  33
 1 35602 36850  "1 "   0    # line from ZNKER J2 115.00  to  KIFER    115.00
DELETE ISLANDS
0
**** CASE NUMBER **** 34
 1 35603 35612  "1 "   0    # line from ZNKER J1 115.00  to  TRIMBLE  115.00  34
0
**** CASE NUMBER **** 35
 1 35122 35624  "1 "   0    # line from NEWARK F 115.00  to  MILPITAS 115.00  35
0
**** CASE NUMBER **** 36
 1 35122 35624  "2 "   0    # line from NEWARK F 115.00  to  MILPITAS 115.00  36
0
```

```
**** CASE NUMBER **** 37
 1 35600 35629  "1 "   0    # line from DIXON LD 115.00  to  MABURY J 115.00  37
 1 35626 35629  "1 "   0    # line from MCKEE    115.00  to  MABURY J 115.00
 1 35629 35630  "1 "   0    # line from MABURY J 115.00  to  MABURY   115.00
DELETE ISLANDS
0
**** CASE NUMBER **** 38
 1 35612 35616  "1 "   0    # line from TRIMBLE  115.00  to  SJ B  E 115.00  38
0
**** CASE NUMBER **** 39
 1 35615 35617  "1 "   0    # line from FMC      115.00  to  FMC JCT  115.00  39
 1 36850 35617  "1 "   0    # line from KIFER    115.00  to  FMC JCT  115.00
0
**** CASE NUMBER **** 40
 1 35615 35616  "1 "   0    # line from FMC      115.00  to  SJ B   E 115.00  40
0
**** CASE NUMBER **** 41
 1 35618 35619  "1 "   0    # line from SN JSE A 115.00  to  SJ B   F 115.00  41
0
**** CASE NUMBER **** 42
 1 35618 35613  "1 "   0    # line from SN JSE A 115.00  to  ELPT_SJ1 115.00  42
 1 35613 35614  "1 "   0    # line from ELPT_SJ1 115.00  to  ELPT_SJ2 115.00
 1 35613 35614  "2 "   0    # line from ELPT_SJ1 115.00  to  ELPT_SJ2 115.00
 1 35614 35620  "1 "   0    # line from ELPT_SJ2 115.00  to  EL PATIO 115.00
0
**** CASE NUMBER **** 43
 1 35620 35621  "1 "   0    # line from EL PATIO 115.00  to  IBM-HR J 115.00  43
 1 35621 35642  "1 "   0    # line from IBM-HR J 115.00  to  MTCALF D 115.00
0
**** CASE NUMBER **** 44
 1 35620 35651  "2 "   0    # line from EL PATIO 115.00  to  BAILY J3 115.00  44
 1 35642 35651  "2 "   0    # line from MTCALF D 115.00  to  BAILY J3 115.00
0
**** CASE NUMBER **** 45
 1 35619 35631  "1 "   0    # line from SJ B   F 115.00  to  MARKHM J 115.00  45
 1 35631 35632  "1 "   0    # line from MARKHM J 115.00  to  MARKHAM  115.00
 1 35631 35636  "1 "   0    # line from MARKHM J 115.00  to  EVRGRN 1 115.00
DELETE ISLANDS
0
```

```
**** CASE NUMBER **** 46
 1 35622 35643  "1 "   0    # line from SWIFT    115.00  to  MTCALF E 115.00  46
0
**** CASE NUMBER **** 47
 1 35626 35656  "1 "   0    # line from MCKEE    115.00  to  PIERCY   115.00  47
0
**** CASE NUMBER **** 48
 1 35656 35643  "1 "   0    # line from PIERCY   115.00  to  MTCALF E 115.00  48
0
**** CASE NUMBER **** 49
 1 35624 35627  "1 "   0    # line from MILPITAS 115.00  to  WAKSHA J 115.00  49
 1 35628 35627  "1 "   0    # line from WAUKESHA 115.00  to  WAKSHA J 115.00
 1 35622 35627  "1 "   0    # line from SWIFT    115.00  to  WAKSHA J 115.00
DELETE ISLANDS
0
**** CASE NUMBER **** 50
 1 35643 35645  "1 "   0    # line from MTCALF E 115.00  to  EVRGRN J 115.00  50
 1 35633 35645  "1 "   0    # line from EVRGRN 2 115.00  to  EVRGRN J 115.00
 1 35625 35645  "1 "   0    # line from MARKHMJ2 115.00  to  EVRGRN J 115.00
 1 35634 35635  "1 "   0    # line from STONE J  115.00  to  GEN ELEC 115.00
 1 35634 36420  "1 "   0    # line from STONE J  115.00  to  STONE    115.00
DELETE ISLANDS
0
**** CASE NUMBER **** 51
 1 35636 35643  "1 "   0    # line from EVRGRN 1 115.00  to  MTCALF E 115.00  51
0
**** CASE NUMBER **** 52
 1 35641 35642  "1 "   0    # line from EDNVL J1 115.00  to  MTCALF D 115.00  52
 1 35641 35649  "1 "   0    # line from EDNVL J1 115.00  to  EDNVL J3 115.00
 1 35639 35641  "1 "   0    # line from IBM-HRRS 115.00  to  EDNVL J1 115.00
 1 35621 35639  "1 "   1    # line from IBM-HR J 115.00  to  IBM-HRRS 115.00
0
**** CASE NUMBER **** 53
 1 35642 35653  "1 "   0    # line from MTCALF D 115.00  to  BAILY J2 115.00  53
 1 35638 35653  "1 "   0    # line from EDENVALE 115.00  to  BAILY J2 115.00
 1 35652 35653  "1 "   0    # line from BAILY J1 115.00  to  BAILY J2 115.00
 1 35651 35652  "1 "   0    # line from BAILY J3 115.00  to  BAILY J1 115.00
DELETE ISLANDS
0
```

```
**** CASE NUMBER **** 54
 1 35122 35357  "1 "   0    # line from NEWARK F 115.00  to  LCKHD J1 115.00  54
 1 35357 35358  "1 "   0    # line from LCKHD J1 115.00  to  MFT.FD J 115.00
 1 35357 35363  "1 "   0    # line from LCKHD J1 115.00  to  LAWRENCE 115.00
 1 35358 35361  "1 "   0    # line from MFT.FD J 115.00  to  LOCKHD 1 115.00
 1 35361 35362  "1 "   1    # line from LOCKHD 1 115.00  to  LOCKHD 2 115.00
DELETE ISLANDS
0
**** CASE NUMBER **** 55
 1 35122 35360  "1 "   0    # line from NEWARK F 115.00  to  LCKHD J2 115.00  55
 1 35360 35362  "1 "   0    # line from LCKHD J2 115.00  to  LOCKHD 2 115.00
 1 35360 35365  "1 "   0    # line from LCKHD J2 115.00  to  AMD JCT  115.00
 1 35365 35369  "1 "   0    # line from AMD JCT  115.00  to  APP MAT  115.00
 1 35361 35362  "1 "   1    # line from LOCKHD 1 115.00  to  LOCKHD 2 115.00
DELETE ISLANDS
0
**** CASE NUMBER **** 56
 1 35356 35367  "1 "   0    # line from MNTA VSA 115.00  to  PHLPS_JT 115.00  56
 1 35363 35367  "1 "   0    # line from LAWRENCE 115.00  to  PHLPS_JT 115.00
DELETE ISLANDS
0
**** CASE NUMBER **** 57
 1 35356 35368  "1 "   0    # line from MNTA VSA 115.00  to  BRITTN   115.00  57
0
**** CASE NUMBER **** 58
 1 35455 35460  "1 "   0    # line from MNTA VSA  60.00  to  LOS GATS  60.00  58
 1 35757 35460  "1 "   1    # line from ALMADEN   60.00  to  LOS GATS  60.00
0
**** CASE NUMBER **** 59
### NRS - Los Esteros Outage
 1 30732 30731  "1 "   0    # line form NORTHERN 230.00  to  LS ESTRS 230.00  59
0
**** CASE NUMBER **** 60
#
#  TRANSFORMER CONTINGENCIES
#
 2 30735 30042  "11"   0    # tran from METCALF  230.00  to  METCALF  500.00  60
0
```

```
**** CASE NUMBER **** 61
 2 30735 30042 "12"   0    # tran from METCALF 230.00 to METCALF 500.00 61
INTERMEDIATE SOLUTION
0
**** CASE NUMBER **** 62
 2 30735 30042 "13"   0    # tran from METCALF 230.00 to METCALF 500.00 62
0
**** CASE NUMBER **** 63
 2 35642 30735 "1 "   0    # tran from MTCALF D 115.00 to METCALF 230.00 63
0
**** CASE NUMBER **** 64
 2 35643 30735 "2 "   0    # tran from MTCALF E 115.00 to METCALF 230.00 64
0
**** CASE NUMBER **** 65
 2 35643 30735 "3 "   0    # tran from MTCALF E 115.00 to METCALF 230.00 65
0
**** CASE NUMBER **** 66
 2 35642 30735 "4 "   0    # tran from MTCALF D 115.00 to METCALF 230.00 66
0
**** CASE NUMBER **** 67
 2 30630 35120 "9 "   0    # tran from NEWARK D 230.00 to NEWARK D 115.00 67
0
**** CASE NUMBER **** 68
 2 30630 35121 "7 "   0    # tran from NEWARK D 230.00 to NEWARK E 115.00 68
0
**** CASE NUMBER **** 69
 2 30631 35122 "11"   0    # tran from NEWARK E 230.00 to NEWARK F 115.00 69
0
**** CASE NUMBER **** 70
 2 35356 30705 "2 "   0    # tran from MNTA VSA 115.00 to MONTAVIS 230.00 70
0
**** CASE NUMBER **** 71
 2 35356 30705 "3 "   0    # tran from MNTA VSA 115.00 to MONTAVIS 230.00 71
0
**** CASE NUMBER **** 72
 2 35658 30731 "1 "   0    # tran from LS ESTRS 115.00 to LS ESTRS 230.00 72
0
**** CASE NUMBER **** 73
 2 35658 30731 "2 "   0    # tran from LS ESTRS 115.00 to LS ESTRS 230.00 73
0
```

```
**** CASE NUMBER **** 74
 2 36851 30732  "1 "   0    # tran from NORTHERN 115.00  to  NORTHERN 230.00  74
0
**** CASE NUMBER **** 75
# SVP Low Voltage System - Line Outages
 1   6    18  "1 "   0   #   Kifer Re  60.0 Fibergla  60.0 1            75
0
**** CASE NUMBER **** 76
 1   6    12  "1 "   0   #   Kifer Re  60.0 Norman A  60.0 1            76
0
**** CASE NUMBER **** 77
 1  12    13  "1 "   0   #   Norman A  60.0 Agnew    60.0 1            77
0
**** CASE NUMBER **** 78
 1   7   114  "1 "   0   #   Scott Re  60.0 Lakeside  60.0 1            78
0
**** CASE NUMBER **** 79
 1   7    20  "1 "   0   #   Scott Re  60.0 Zeno     60.0 1            79
0
**** CASE NUMBER **** 80
 1   7   111  "1 "   0   #   Scott Re  60.0 RayT2    60.0 1            80
DELETE ISLANDS
0
**** CASE NUMBER **** 81
 1   7   110  "1 "   0   #   Scott Re  60.0 RayT1    60.0 1            81
DELETE ISLANDS
0
**** CASE NUMBER **** 82
 1   7     6  "1 "   0   #   Scott Re  60.0 Kifer Re  60.0 1            82
0
**** CASE NUMBER **** 83
 1   9    92  "1 "   0   #   Northern  60.0 BUS0     60.0 1            83
 1  92    60  "1 "   0   #   BUS0      60.0 Juliette  60.0 1
0
**** CASE NUMBER **** 84
 1   9    54  "1 "   0   #   Northern  60.0 Gianera   60.0 1            84
0
**** CASE NUMBER **** 85
 1  54     9  "2 "   0   #   Gianera   60.0 Northern  60.0 2            85
0
```

```
**** CASE NUMBER **** 86
 1  11    7 "1 "   0   #  Homestea  60.0 Scott Re  60.0 1          86
0
**** CASE NUMBER **** 87
 1  13   14 "1 "   0   #  Agnew    60.0 Tasman   60.0 1          87
0
**** CASE NUMBER **** 88
 1  14   93 "2 "   0   #  Tasman   60.0 BUS1     60.0 2          88
 1  93    9 "2 "   0   #  BUS1     60.0 Northern 60.0 2
0
**** CASE NUMBER **** 89
 1  16   20 "1 "   0   #  Uranium  60.0 Zeno     60.0 1          89
0
**** CASE NUMBER **** 90
 1  17   16 "1 "   0   #  Walsh    60.0 Uranium  60.0 1          90
0
**** CASE NUMBER **** 91
 1  18   17 "1 "   0   #  Fibergla 60.0 Walsh    60.0 1          91
0
**** CASE NUMBER **** 92
 1  19   11 "1 "   0   #  Serra    60.0 Homestea 60.0 1          92
0
**** CASE NUMBER **** 93
 1  21    6 "1 "   0   #  CCA      60.0 Kifer Re 60.0 1          93
0
**** CASE NUMBER **** 94
 1  21   31 "1 "   0   #  CCA      60.0 Mathew   60.0 1          94
0
**** CASE NUMBER **** 95
 1  31   57 "1 "   0   #  Mathew   60.0 Brokaw   60.0 1          95
0
**** CASE NUMBER **** 96
 1  57   19 "1 "   0   #  Brokaw   60.0 Serra    60.0 1          96
0
**** CASE NUMBER **** 97
 1  60   15 "1 "   0   #  Juliette 60.0 Central  60.0 1          97
0
**** CASE NUMBER **** 98
 1 114   15 "1 "   0   #  Lakeside 60.0 Central  60.0 1          98
0
```

```
**** CASE NUMBER ****  99
# SVP Low Voltage System - Xfmr Outages
#
 1  75    30  "1 "   0   #  Cogen    12.0 Laf300   12.0 1          99
 3  75     0  "1 "   0   #  Cogen    12.00
 3  75     0  "2 "   0   #  Cogen    12.00
0
**** CASE NUMBER ****  100
 2   90   37  "1 "   0   #  AgnT1p    12  Agn100    12  1          100
 2   90   13  "1 "   0   #  AgnT1p    12  Agnew     60  1
DELETE ISLANDS
0
**** CASE NUMBER ****  101
 2   91   38  "1 "   0   #  AgnT2p    12  Agn200    12  1          101
 2   91   13  "2 "   0   #  AgnT2p    12  Agnew     60  2
DELETE ISLANDS
0
**** CASE NUMBER ****  102
 2   94   42  "1 "   0   #  CenT1p    12  Cen100    12  1          102
 2   15   94  "1 "   0   #  Central   60  CenT1p    12  1
DELETE ISLANDS
0
**** CASE NUMBER ****  103
 2   95   43  "1 "   0   #  CenT2p    12  Cen200    12  1          103
 2   95   15  "2 "   0   #  CenT2p    12  Central   60  2
DELETE ISLANDS
0
**** CASE NUMBER ****  104
 2   96   50  "1 "   0   #  FibT1p    12  Fibergla  12  1          104
 2   96   18  "1 "   0   #  FibT1p    12  Fibergla  60  1
0
**** CASE NUMBER ****  105
 2   97   50  "1 "   0   #  FibT2p    12  Fibergla  12  1          105
 2   97   18  "2 "   0   #  FibT2p    12  Fibergla  60  2
0
**** CASE NUMBER ****  106
 2   98   50  "1 "   0   #  FibT3p    12  Fibergla  12  1          106
 2   18   98  "3 "   0   #  Fibergla  60  FibT3p    12  3
0
```

```
**** CASE NUMBER **** 107
 2   99   35 "1 "   0   #  HomT1p    12 Hom100    12 1          107
 2   99   11 "1 "   0   #  HomT1p    12 Homestea  60 1
DELETE ISLANDS
0
**** CASE NUMBER **** 108
 2  102   51 "1 "   0   #  SerT1p    12 Ser100    12 1          108
 2  102   19 "1 "   0   #  SerT1p    12 Serra     60 1
DELETE ISLANDS
0
**** CASE NUMBER **** 109
 2  103   39 "1 "   0   #  TasT1p    12 Tas100    12 1          109
 2  103   14 "1 "   0   #  TasT1p    12 Tasman    60 1
DELETE ISLANDS
0
**** CASE NUMBER **** 110
 2  104   44 "1 "   0   #  UraT2a    12 Ura200    12 1          110
 2  104   16 "2 "   0   #  UraT2a    12 Uranium   60 2
DELETE ISLANDS
0
**** CASE NUMBER **** 111
 2  105   45 "1 "   0   #  UraT3p    12 Ura300    12 1          111
 2  105   16 "3 "   0   #  UraT3p    12 Uranium   60 3
DELETE ISLANDS
0
**** CASE NUMBER **** 112
 2   36   11 "2 "   0   #  Hom200    12 Homestea  60 2          112
DELETE ISLANDS
0
**** CASE NUMBER **** 113
 2   41   14 "3 "   0   #  Tas300    12 Tasman    60 3          113
DELETE ISLANDS
0
**** CASE NUMBER **** 114
 2   40   14 "2 "   0   #  Tas200    12 Tasman    60 2          114
DELETE ISLANDS
0
**** CASE NUMBER **** 115
 2   47   17 "2 "   0   #  Wal200    12 Walsh     60 2          115
DELETE ISLANDS
0
```

```
**** CASE NUMBER **** 116
 2   46   17 "1 "   0   #   Wal100    12  Walsh     60  1            116
DELETE ISLANDS
0
**** CASE NUMBER **** 117
 2   53   20 "2 "   0   #   Zen200    12  Zeno      60  2            117
DELETE ISLANDS
0
**** CASE NUMBER **** 118
 2   52   20 "1 "   0   #   Zen100    12  Zeno      60  1            118
DELETE ISLANDS
0
**** CASE NUMBER **** 119
 2   22   21 "1 "   0   #   CCA100    14  CCA       60  1            119
 3   22    0 "1 "   0   #   CCA      13.80
DELETE ISLANDS
0
**** CASE NUMBER **** 120
 2   33   31 "1 "   0   #   Mat200    12  Mathew     60  1            120
DELETE ISLANDS
INTERMEDIATE SOLUTION
0
**** CASE NUMBER **** 121
 2   32   31 "1 "   0   #   Mat100    12  Mathew     60  1            121
DELETE ISLANDS
0
**** CASE NUMBER **** 122
 2   56   54 "2 "   0   #   Gia200    14  Gianera    60  2            122
 3   56    0 "1 "   0   #   Gianera  13.80
0
**** CASE NUMBER **** 123
 2   55   54 "1 "   0   #   Gia100    14  Gianera    60  1            123
 3   55    0 "1 "   0   #   Gianera  13.80
0
**** CASE NUMBER **** 124
 2   59   57 "2 "   0   #   Bro200    12  Brokaw     60  2            124
DELETE ISLANDS
0
```

```
**** CASE NUMBER **** 125
 2   58   57 "1 "   0   #  Bro100    12 Brokaw    60 1          125
DELETE ISLANDS
0
**** CASE NUMBER **** 126
 2   62   60 "2 "   0   #  Jul200    12 Juliette  60 2          126
DELETE ISLANDS
0
**** CASE NUMBER **** 127
 2   61   60 "1 "   0   #  Jul100    12 Juliette  60 1          127
DELETE ISLANDS
0
**** CASE NUMBER **** 128
 2    6  180 "1 "   0   #  Kifer Re  60 FI3W0000 100 1          128
 2   76  180 "1 "   0   #  KRSA      12 FI3W0000 100 1
0
**** CASE NUMBER **** 129
 2    6  181 "2 "   0   #  Kifer Re  60 FI3W0001 100 2          129
 2   77  181 "2 "   0   #  KRSB      12 FI3W0001 100 2
0
**** CASE NUMBER **** 130
 2    7  183 "1 "   0   #  Scott Re  60 FI3W0003 100 1          130
 2   78  183 "1 "   0   #  SRSA      12 FI3W0003 100 1
0
**** CASE NUMBER **** 131
 2    7  182 "2 "   0   #  Scott Re  60 FI3W0002 100 2          131
 2   79  182 "2 "   0   #  SRSB      12 FI3W0002 100 2
0
**** CASE NUMBER **** 132
 2    9  184 "1 "   0   #  Northern  60 FI3W0004 100 1          132
 2   80  184 "1 "   0   #  NRSC      12 FI3W0004 100 1
0
**** CASE NUMBER **** 133
 2    9  185 "2 "   0   #  Northern  60 FI3W0005 100 2          133
 2   81  185 "2 "   0   #  NRSB      12 FI3W0005 100 2
0
**** CASE NUMBER **** 134
 2  112  110 "1 "   0   #  Ray100    12 RayT1     60 1          134
DELETE ISLANDS
0
```

```
**** CASE NUMBER ****  135
 2 113   111 "1 "   0   #  Ray200    12 RayT2     60 1            135
DELETE ISLANDS
0
**** CASE NUMBER ****  136
 2 115   114 "1 "   0   #  Lak100    12 Lakeside  60 1            136
DELETE ISLANDS
0
**** CASE NUMBER ****  137
 2 116   114 "2 "   0   #  Lak200    12 Lakeside  60 2            137
DELETE ISLANDS
0
**** CASE NUMBER ****  138
 1   6    25 "1 "   0   #  Kifer Re  60 Laf T1    60 1            138
 2  28    25 "1 "   0   #  Laf100    12 Laf T1    60 1
DELETE ISLANDS
0
**** CASE NUMBER ****  139
 1   6    26 "2 "   0   #  Kifer Re  60 Laf T2    60 2            139
 2  29    26 "2 "   0   #  Laf200    12 Laf T2    60 2
DELETE ISLANDS
0
**** CASE NUMBER ****  140
 1   6    27 "3 "   0   #  Kifer Re  60 Laf T3    60 3            140
 2  30    27 "3 "   0   #  Laf300    12 Laf T3    60 3
DELETE ISLANDS
0

STOP
```

```
# PG&E 2002 TRANSMISSION ASSESSMENT STUDY: 2004 SUMMER PEAK AREA
7/8 FL CASE
#  [L-1/G-1] OVERLAPPING CONTINGENCIES
BEGIN CASE ANALYSIS

**** CASE NUMBER ****  1
# (1)  L-1/G-1 Evergreen - San Jose B 115 kV and Agnew Co-gen
#
 1 35619 35631  "1 "   0    # line from  SJ B   F 115.00  BRKR to (3)   MARKHM J 115.00
 1 35631 35632  "1 "   0    # line from  MARKHM J 115.00   (3) to (2)   MARKHAM  115.00
 1 35631 35636  "1 "   0    # line from  MARKHM J 115.00   (3) to BRKR  EVRGRN 1
115.00
 2 35632 35863  "1 "   0    # TRAN from  MARKHAM  115.00  BRKR to (1)   CATALYST
9.11
 4 35863    0  "1 "   0    # LOAD-DROP    CATALYST   9.11  LOAD==9.23(3.13)
 3 35863    0  "1 "   0    # GEN-DROP    CATALYST   9.11  GEN==2.25(0.00)
 1 35632 35625  "1 "   1    # close Markham to Markham J2
 2 35632 35863  "1 "   1    # restore TRAN from  MARKHAM 115.00 to CATALYST 9.11
 4 35863 0     "**"   1    # restore all loads to CATALYST
 3 35860  0    "1 "   0     # OLS-AGNE   9.11
 0
**** CASE NUMBER ****  2
# (2)  L-1/G-1 Metcalf - Evergreen #2 115 kV and Agnew Co-gen
#
 1  35625 35645  "1 "   0    # line from  MARKHMJ2 115.00   (2) to (3)   EVRGRN J 115.00
 1  35625 35634  "1 "   0    # line from  MARKHMJ2 115.00   (2) to (3)   STONE J  115.00
 1  35645 35633  "1 "   0    # line from  EVRGRN J 115.00   (3) to BRKR  EVRGRN 2 115.00
 1  35645 35643  "1 "   0    # line from  EVRGRN J 115.00   (3) to BRKR  MTCALF E 115.00
 1  35634 35635  "1 "   0    # line from  STONE J  115.00   (3) to (1)   GEN ELEC 115.00
 1  35634 36420  "1 "   0    # line from  STONE J  115.00   (3) to BRKR  STONE    115.00
 4  35635    0  "1 "   0    # LOAD-DROP    GEN ELEC 115.00  LOAD==15.70(11.37)
 4  36420    0  "1 "   0    # LOAD-DROP    STONE    115.00  LOAD==34.74(13.06)
 4  36420    0  "2 "   0    # LOAD-DROP    STONE    115.00  LOAD==12.18(-5.33)
 3 35860  0    "1 "   0     # OLS-AGNE   9.11
 0
```

```
**** CASE NUMBER **** 3
# (3) L-1/G-1 Metcalf - Evergreen #1 115 kV and Agnew Co-gen
#
 1 35636 35643 "1 "   0    # line from EVRGRN 1 115.00 BRKR to BRKR MTCALF E
115.00
 3 35860 0    "1 "   0    # OLS-AGNE   9.11
 0
**** CASE NUMBER **** 4
# (4) L-1/G-1 Newark Distribution - Los Esteros 230 kV and SVP CCA Generator
#
 1 30635 30731 "1 "   0    # line from NWK DIST 230.00 BRKR to BRKR LS ESTRS
230.00
 3   22 0    "1 "   0    # CCA      13.80
 0
**** CASE NUMBER **** 5
# (5) L-1/G-1 Newark - Scott #1 115 kV and SVP CCA Generator
#
 1 35120 36851 "1 "   0    # line from NEWARK D 115.00 BRKR to BRKR NORTHERN
115.00
 3   22 0    "1 "   0    # CCA      13.80
 0
**** CASE NUMBER **** 6
# (6) L-1/G-1 Newark - Scott #1 115 kV and SVP CCA Generator
#
 1 35122 36851 "2 "   0    # line from NEWARK F 115.00 BRKR to BRKR NORTHERN
115.00
 3   22 0    "1 "   0    # CCA      13.80
 0
**** CASE NUMBER **** 7
# (7) L-1/G-1 Kifer - San Jose B 115 kV and SVP CCA Generator
#
1 35615 35617 "1 "   0    # line from FMC     115.00 to FMC JCT 115.00
1 36850 35617 "1 "   0    # line from KIFER   115.00 to FMC JCT 115.00
3   22 0    "1 "   0    # CCA      13.80
0
```

```
**** CASE NUMBER **** 8
# (8) L-1/G-1 El Patio - San Jose A 115 kV and SVP CCA Generator
#
 1 35618 35613 "1 "  0   # line from SN JSE A 115.00 to ELPT_SJ1 115.00
 1 35613 35614 "1 "  0   # line from ELPT_SJ1 115.00 to ELPT_SJ2 115.00
 1 35613 35614 "2 "  0   # line from ELPT_SJ1 115.00 to ELPT_SJ2 115.00
 1 35614 35620 "1 "  0   # line from ELPT_SJ2 115.00 to EL PATIO 115.00
 3  22 0   "1 "  0   # CCA     13.80
 0
**** CASE NUMBER **** 9
# (9) L-1/G-1 Evergreen - San Jose B 115 kV and SVP CCA Generator
#
 1 35619 35631 "1 "  0   # line from SJ B  F 115.00 BRKR to (3)  MARKHM J 115.00
 1 35631 35632 "1 "  0   # line from MARKHM J 115.00  (3) to (2)  MARKHAM
115.00
 1 35631 35636 "1 "  0   # line from MARKHM J 115.00  (3) to BRKR EVRGRN 1
115.00
 2 35632 35863 "1 "  0   # TRAN from MARKHAM 115.00 BRKR to (1)  CATALYST
9.11
 4 35863   0 "1 "  0   # LOAD-DROP   CATALYST  9.11 LOAD==9.23(3.13)
 3 35863   0 "1 "  0   # GEN-DROP   CATALYST  9.11 GEN==2.25(0.00)
 1 35632 35625 "1 "  1   # close Markham to Markham J2
 2 35632 35863 "1 "  1   # restore TRAN from MARKHAM 115.00 to CATALYST 9.11
 4 35863 0    "**"  1   # restore all loads to CATALYST
 3  22 0   "1 "  0   # CCA     13.80
 0
**** CASE NUMBER **** 10
# (10) L-1/G-1 Metcalf - Evergreen #2 115 kV and SVP CCA Generator
#
 1 35625 35645 "1 "  0   # line from MARKHMJ2 115.00  (2) to (3)  EVRGRN J 115.00
 1 35625 35634 "1 "  0   # line from MARKHMJ2 115.00  (2) to (3)  STONE J 115.00
 1 35645 35633 "1 "  0   # line from EVRGRN J 115.00  (3) to BRKR EVRGRN 2 115.00
 1 35645 35643 "1 "  0   # line from EVRGRN J 115.00  (3) to BRKR MTCALF E 115.00
 1 35634 35635 "1 "  0   # line from STONE J 115.00  (3) to (1)  GEN ELEC 115.00
 1 35634 36420 "1 "  0   # line from STONE J 115.00  (3) to BRKR STONE   115.00
 4 35635   0 "1 "  0   # LOAD-DROP   GEN ELEC 115.00 LOAD==15.70(11.37)
 4 36420   0 "1 "  0   # LOAD-DROP   STONE   115.00 LOAD==34.74(13.06)
 4 36420   0 "2 "  0   # LOAD-DROP   STONE   115.00 LOAD==12.18(-5.33)
 3  22 0   "1 "  0   # CCA     13.80
 0
```

```
**** CASE NUMBER **** 11
# (11) L-1/G-1 Metcalf - Evergreen #1 115 kV and SVP CCA Generator
#
 1 35636 35643 "1 "   0    # line from EVRGRN 1 115.00 BRKR to BRKR MTCALF E
115.00
 3   22 0    "1 "   0    # CCA      13.80
 0
**** CASE NUMBER **** 12
# (12) L-1/G-1 Los Esteros - Nortech 115 kV and SVP CCA Generator
#
 1 35659 35658 "1 "   0    # line from NORTECH 115.00 to LS ESTRS 115.00
 3   22 0    "1 "   0    # CCA      13.80
 0
**** CASE NUMBER **** 13
# (13) L-1/G-1 Nortech - Kifer 115 kV and SVP CCA Generator
#
 1 35659 36850 "1 "   0    # line from NORTECH 115.00 to KIFER   115.00
 3   22 0    "1 "   0    # CCA      13.80
 0
**** CASE NUMBER **** 14
#
# (14) L-1/G-1 Los Esteros - Metcalf 230 kV and SVP Gianera Generator Unit 1
#
 1 30735 30731 "1 "   0    # line from METCALF 230.00 BRKR to BRKR LS ESTRS
230.00
 3   55 0    "1 "   0    # Gianera  13.80
 0
**** CASE NUMBER **** 15
# (15) L-1/G-1 Newark - Scott #1 115 kV and SVP Gianera Generator Unit 1
#
 1 35120 36851 "1 "   0    # line from NEWARK D 115.00 BRKR to BRKR NORTHERN
115.00
 3   55 0    "1 "   0    # Gianera  13.80
 0
**** CASE NUMBER **** 16
# (16) L-1/G-1 Newark - Scott #2 115 kV and SVP Gianera Generator Unit 1
#
 1 35122 36851 "2 "   0    # line from NEWARK F 115.00 BRKR to BRKR NORTHERN
115.00
 3   55 0    "1 "   0    # Gianera  13.80
 0
```

```
**** CASE NUMBER **** 17
# (17) L-1/G-1 El Patio - San Jose A 115 kV and SVP Gianera Generator Unit 1
#
 1 35618 35613 "1 "  0   # line from SN JSE A 115.00 to ELPT_SJ1 115.00
 1 35613 35614 "1 "  0   # line from ELPT_SJ1 115.00 to ELPT_SJ2 115.00
 1 35613 35614 "2 "  0   # line from ELPT_SJ1 115.00 to ELPT_SJ2 115.00
 1 35614 35620 "1 "  0   # line from ELPT_SJ2 115.00 to EL PATIO 115.00
 3  55 0   "1 "  0    # Gianera  13.80
 0
**** CASE NUMBER **** 18
# (18) L-1/G-1 Evergreen - San Jose B 115 kV and SVP Gianera Generator Unit 1
#
 1 35619 35631 "1 "  0   # line from SJ B  F 115.00 BRKR to (3)  MARKHM J 115.00
 1 35631 35632 "1 "  0   # line from MARKHM J 115.00  (3) to (2)  MARKHAM
115.00
 1 35631 35636 "1 "  0   # line from MARKHM J 115.00  (3) to BRKR EVRGRN 1
115.00
 2 35632 35863 "1 "  0   # TRAN from MARKHAM 115.00 BRKR to (1)  CATALYST
9.11
 4 35863   0 "1 "  0   # LOAD-DROP   CATALYST  9.11 LOAD==9.23(3.13)
 3 35863   0 "1 "  0   # GEN-DROP   CATALYST  9.11 GEN==2.25(0.00)
 1 35632 35625 "1 "  1   # close Markham to Markham J2
 2 35632 35863 "1 "  1   # restore TRAN from MARKHAM 115.00 to CATALYST 9.11
 4 35863 0    "**"  1   # restore all loads to CATALYST
 3  55 0   "1 "  0    # Gianera  13.80
 0
**** CASE NUMBER **** 19
# (19) L-1/G-1 Swift - Metcalf 115 kV and SVP Gianera Generator Unit 1
#
 1 35622 35643 "1 "  0   # line from SWIFT   115.00 BRKR to BRKR MTCALF E
115.00
 3  55 0   "1 "  0    # Gianera  13.80
 0
```

```
**** CASE NUMBER **** 20
# (20) L-1/G-1 Metcalf - Evergreen #2 115 kV and SVP Gianera Generator Unit 1
#
 1 35625 35645 "1 "  0   # line from MARKHMJ2 115.00  (2) to (3)  EVRGRN J 115.00
 1 35625 35634 "1 "  0   # line from MARKHMJ2 115.00  (2) to (3)  STONE J  115.00
 1 35645 35633 "1 "  0   # line from EVRGRN J 115.00  (3) to BRKR EVRGRN 2 115.00
 1 35645 35643 "1 "  0   # line from EVRGRN J 115.00  (3) to BRKR MTCALF E 115.00
 1 35634 35635 "1 "  0   # line from STONE J  115.00  (3) to (1)  GEN ELEC 115.00
 1 35634 36420 "1 "  0   # line from STONE J  115.00  (3) to BRKR STONE   115.00
 4 35635   0 "1 "  0   # LOAD-DROP   GEN ELEC 115.00 LOAD==15.70(11.37)
 4 36420   0 "1 "  0   # LOAD-DROP   STONE   115.00 LOAD==34.74(13.06)
 4 36420   0 "2 "  0   # LOAD-DROP   STONE   115.00 LOAD==12.18(-5.33)
 3  55 0   "1 "  0   # Gianera  13.80
 0
**** CASE NUMBER **** 21
# (21) L-1/G-1 Metcalf - Evergreen #1 115 kV and SVP Gianera Generator Unit 1
#
 1 35636 35643 "1 "  0   # line from EVRGRN 1 115.00 BRKR to BRKR MTCALF E
115.00
 3  55 0   "1 "  0   # Gianera  13.80
 0
**** CASE NUMBER **** 22
# (22) L-1/G-1 Los Esteros - Agnew 115 kV and SVP Gianera Generator Unit 1
#
 1 35658 35606 "1 "  0   # line from LS ESTRS 115.00 BRKR to BRKR AGNEW
115.00
 3  55 0   "1 "  0   # Gianera  13.80
DELETE ISLANDS
 0
**** CASE NUMBER **** 23
# (23) L-1/G-1 Los Esteros - Nortech 115 kV and SVP Gianera Generator Unit 1
#
 1 35659 35658 "1 "  0   # line from NORTECH 115.00 to LS ESTRS 115.00 27
 3  55 0   "1 "  0   # Gianera  13.80
 0
```

```
**** CASE NUMBER **** 24
# (24) L-1/G-1 Nortech - Kifer 115 kV and SVP Gianera Generator Unit 1
#
 1 35659 36850 "1 "   0    # line from NORTECH 115.00 to KIFER   115.00 26
INTERMEDIATE SOLUTION
 3   55 0   "1 "   0    # Gianera  13.80
 0
**** CASE NUMBER **** 25
# (25) L-1/G-1 Scott - Kifer 115 kV and SVP Gianera Generator Unit 1
#
 1 36850 36852 "1 "   0    # line from KIFER   115.00 BRKR to BRKR SCOTT   115.00
 3   55 0   "1 "   0    # Gianera  13.80
 0
**** CASE NUMBER **** 26
# (25) L-1/G-1 Scott - Pico 115 kV and SVP Gianera Generator Unit 1
#
 1 36850 36861 "1 "   0    # line from KIFER   115.00 BRKR to BRKR PICO    115.00
 3   55 0   "1 "   0    # Gianera  13.80
 0
**** CASE NUMBER **** 27
# (26) L-1/G-1 Newark Distribution - Los Esteros 230 kV and Gilroy Energy Co-gen
#
 1 30635 30731 "1 "   0    # line from NWK DIST 230.00 BRKR to BRKR LS ESTRS
230.00
 3 35850    0 "1"    0    # GLRY COG 13.80      PGEN=121.97 QGEN=47.00
 0
**** CASE NUMBER **** 28
# (27) L-1/G-1 Newark - Newark Distribution 230 kV and Gilroy Energy Co-gen
#
 1 30631 30635 "1 "   0    # line from NEWARK 230.00  (2) to BRKR NWK DIST
230.00
INTERMEDIATE SOLUTION
 3 35850    0 "1"    0    # GLRY COG 13.80      PGEN=121.97 QGEN=47.00
 0
**** CASE NUMBER **** 29
# (28) L-1/G-1 Metcalf - Morgan Hill 115 kV and Gilroy Energy Co-gen
#
 1 35642 35646 "1 "   0    # line from MTCALF D 115.00 BRKR to BRKR MRGN HIL
115.00
 3 35850    0 "1"    0    # GLRY COG 13.80      PGEN=121.97 QGEN=47.00
 0
```

```
**** CASE NUMBER **** 30
# (29) L-1/G-1 Metcalf - Llagas 115 kV and Gilroy Energy Co-gen
#
 1 35642 35654 "1 "   0    # line from MTCALF D 115.00 BRKR to (2)  MORGN J1
115.00
 1 35654 35655 "1 "   0    # line from MORGN J1 115.00  (2) to (2)  MORGN J2 115.00
 1 35655 35648 "1 "   0    # line from MORGN J2 115.00  (2) to BRKR LLAGAS  115.00
 3 35850 0    "1 "   0     # GLRY COG 13.80
 0
**** CASE NUMBER **** 31
# (30) L-1/G-1 Morgan Hill - Llagas 115 kV and Gilroy Energy Co-gen
#
 1 35646 35648 "1 "   0     # line from MRGN HIL 115.00 BRKR to BRKR LLAGAS
115.00
 3 35850 0    "1 "   0     # GLRY COG 13.80
 0
**** CASE NUMBER **** 32
# (31) L-1/G-1 Los Esteros - Nortech 115 kV and Gilroy Energy Co-gen
#
 1 35659 35658 "1 "   0     # line from NORTECH 115.00 to LS ESTRS 115.00 27
 3 35850 0    "1 "   0     # GLRY COG 13.80
 0
**** CASE NUMBER **** 33
# (32) L-1/G-1 Nortech - Kifer 115 kV and Gilroy Energy Co-gen
#
 1 35659 36850 "1 "   0     # line from NORTECH 115.00 to KIFER   115.00 26
 3 35850 0    "1 "   0     # GLRY COG 13.80
 0
**** CASE NUMBER **** 141
# SVP Low Voltage System - Overlapping Outages - These look to be the most
# significant
#
 3   22    0 "1 "   0   #  CCA      13.80                        141
 1   11    7 "1 "   0   #  Homestea  60.0 Scott Re  60.0 1
0
**** CASE NUMBER **** 142
 3   22    0 "1 "   0   #  CCA      13.80                        142
 1   21    6 "1 "   0   #  CCA      60.0 Kifer Re  60.0 1
0

STOP
```

```
# PG&E 2002 TRANSMISSION ASSESSMENT STUDY: 2004 SUMMER PEAK AREA
7/8 FL CASE
# G-2 Contingency List including SVP's LV generation.
BEGIN CASE ANALYSIS

**** CASE NUMBER **** 1
 3 35662 0    "1 "   0     #LECEFGT3  13.80   1
INTERMEDIATE SOLUTION
 3 35663 0    "1 "   0     #LECEFGT4  13.80
INTERMEDIATE SOLUTION
 3 35665 0    "1 "   0     #LECEFST2  13.80
0
**** CASE NUMBER **** 2
 3 30547 0    "1 "   0     #RCEC CT1  18.00   2
 3 30548 0    "1 "   0     #RCEC CT2  18.00
 3 30549 0    "1 "   0     #RCEC ST1  18.00
0
**** CASE NUMBER **** 3
 3 35850 0    "1 "   0     #GLRY COG  13.80   3
 3 35851 0    "1 "   0     #GROYPKR1  13.80
0
**** CASE NUMBER **** 4
 3 35860 0    "1 "   0     #OLS-AGNE   9.11   4
0
**** CASE NUMBER **** 5
 3 35861 0    "1 "   0     #SJ-SCL W   9.11   5
0
**** CASE NUMBER **** 6
 3 35850 0    "1 "   0     #GLRY COG  13.80   6
 3 35863 0    "1 "   0     #CATALYST   9.11
0
**** CASE NUMBER **** 7
 3 35881 0    "1 "   0     #MEC CTG1  18.00   7
INTERMEDIATE SOLUTION
 3 35881 0    "1 "   0     #MEC CTG1  18.00
INTERMEDIATE SOLUTION
 3 35883 0    "1 "   0     #MEC STG1  18.00
0
```

```
**** CASE NUMBER **** 8
 3   55 0    "1 "   0     #Gianera   13.80   8
 3   56 0    "1 "   0     #Gianera   13.80
0
**** CASE NUMBER **** 9
 3   75 0    "1 "   0     #Cogen     12.00   9
 3   22 0    "1 "   0     #CCA       13.80
0

STOP
```

```
# PG&E 2002 TRANSMISSION ASSESSMENT STUDY: 2004 SUMMER PEAK AREA
7/8 FL CASE
# L-2 Contingency List with added SVP Generation on LV system.
BEGIN CASE ANALYSIS

**** CASE NUMBER **** 1
 1 30624 30630 "1 "  0  # line from TESLA E 230.00 to NEWARK D 230.00  1
 1 30640 30655 "1 "  0  # line from TESLA F 230.00 to ADCC    230.00
 1 30655 30631 "1 "  0  # line from ADCC    230.00 to NEWARK E 230.00
DELETE ISLANDS
0
**** CASE NUMBER **** 2
 1 30730 30735 "1 "  0  # line from HICKS   230.00 to METCALF 230.00  2
 1 30735 30733 "1 "  0  # line from METCALF 230.00 to VASONA  230.00
0
**** CASE NUMBER **** 3
 1 30735 30705 "3 "  0  # line from METCALF 230.00 to MONTAVIS 230.00  3
 1 30741 30705 "4 "  0  # line from CAL MEC 230.00 to MONTAVIS 230.00
0
**** CASE NUMBER **** 4
 1 30640 30703 "1 "  0  # line from TESLA C 230.00 to RAVENSWD 230.00  4
 1 30630 30703 "1 "  0  # line from NEWARK D 230.00 to RAVENSWD 230.00
0
**** CASE NUMBER **** 5
 1 30735 30750 "1 "  0  # line from METCALF 230.00 to MOSSLND2 230.00  5
 1 30735 30755 "1 "  0  # line from METCALF 230.00 to MOSSLND1 230.00
0
**** CASE NUMBER **** 6
 1 30635 30731 "1 "  0  # line from NWK DIST 230.00 to LS ESTRS 230.00  6
 1 30735 30731 "1 "  0  # line from METCALF 230.00 to LS ESTRS 230.00
0
**** CASE NUMBER **** 7
 1 35120 36851 "1 "  0  # line from NEWARK D 115.00 to NORTHERN 115.00  7
 1 35122 36851 "2 "  0  # line from NEWARK F 115.00 to NORTHERN 115.00
0
**** CASE NUMBER **** 8
 1 36851 36852 "1 "  0  # line from NORTHERN 115.00 to SCOTT   115.00  8
 1 36851 36852 "2 "  0  # line from NORTHERN 115.00 to SCOTT   115.00
0
```

```
**** CASE NUMBER **** 9
 1 35658 35612  "1 "   0   #  line from LS ESTRS 115.00  to  TRIMBLE  115.00  9
 1 35658 35610  "1 "   0   #  line from LS ESTRS 115.00  to  MONTAGUE 115.00
0
**** CASE NUMBER **** 10
 1 35602 35604  "1 "   0   #  line from ZNKER J2 115.00  to  ZANKER   115.00 10
 1 35602 36850  "1 "   0   #  line from ZNKER J2 115.00  to  KIFER    115.00
 1 35603 35612  "1 "   0   #  line from ZNKER J1 115.00  to  TRIMBLE  115.00
DELETE ISLANDS
0
**** CASE NUMBER **** 11
 1 35122 35600  "1 "   0   #  line from NEWARK F 115.00  to  DIXON LD 115.00 11
 1 35122 35624  "1 "   0   #  line from NEWARK F 115.00  to  MILPITAS 115.00
0
**** CASE NUMBER **** 12
 1 35620 35621  "1 "   0   #  line from EL PATIO 115.00  to  IBM-HR J 115.00 12
 1 35621 35642  "1 "   0   #  line from IBM-HR J 115.00  to  MTCALF D 115.00
 1 35620 35651  "2 "   0   #  line from EL PATIO 115.00  to  BAILY J3 115.00
 1 35642 35651  "2 "   0   #  line from MTCALF D 115.00  to  BAILY J3 115.00
0
**** CASE NUMBER **** 13
 1 35643 35645  "1 "   0   #  line from MTCALF E 115.00  to  EVRGRN J 115.00 13
 1 35633 35645  "1 "   0   #  line from EVRGRN 2 115.00  to  EVRGRN J 115.00
 1 35625 35645  "1 "   0   #  line from MARKHMJ2 115.00  to  EVRGRN J 115.00
 1 35625 35632  "1 "   1   #  line from MARKHMJ2 115.00  to  MARKHAM  115.00
 1 35636 35643  "1 "   0   #  line from EVRGRN 1 115.00  to  MTCALF E 115.00
0
**** CASE NUMBER **** 14
 1 35622 35643  "1 "   0   #  line from SWIFT    115.00  to  MTCALF E 115.00 14
 1 35656 35643  "1 "   0   #  line from PIERCY   115.00  to  MTCALF E 115.00
0
**** CASE NUMBER **** 15
 1 35612 35616  "1 "   0   #  line from TRIMBLE  115.00  to  SJ B   E 115.00 15
 1 35615 35617  "1 "   0   #  line from FMC      115.00  to  FMC JCT  115.00
 1 36850 35617  "1 "   0   #  line from KIFER    115.00  to  FMC JCT  115.00
0
```

```
**** CASE NUMBER **** 16
 1 35356 35367  "1 "   0   #  line from MNTA VSA 115.00  to  PHLPS_JT 115.00  16
 1 35363 35367  "1 "   0   #  line from LAWRENCE 115.00  to  PHLPS_JT 115.00
 1 35356 35368  "1 "   0   #  line from MNTA VSA 115.00  to  BRITTN   115.00
DELETE ISLANDS
0

STOP
```

```
# PICO POWER PLANT STUDY CONTINGENCY LIST - BUS FAULTS
# 2002 TRANSMISSION ASSESSMENT CASE - MODIFIED 2004 CASE
# PRE-PROJECT [B-1] CONTINGENCY LIST
#
BEGIN CASE ANALYSIS

**** CASE NUMBER **** 1
#
# Newark "D1" 230kV Bus Fault
#
 1 30624 30630 "1 "  0    line from TESLA E 230.00 to NEWARK D 230.00
 1 30630 30703 "1 "  0    line from NEWARK D 230.00 to RAVENSWD 230.00
 2 30630 35120 "9 "  0    tran from NEWARK D 230.00 to NEWARK D 115.00
 6 30630    0 "v "  0    shunt caps on bus NEWARK D 230.00
0
**** CASE NUMBER **** 2
#
# Newark "D2" 230kV Bus Fault
#
 1 35219 30630 "1 "  0    line from LS PSTAS 230.00 to NEWARK D 230.00
 1 30585 30630 "1 "  0    line from VINEYARD 230.00 to NEWARK D 230.00
 2 30630 35121 "7 "  0    tran from NEWARK D 230.00 to NEWARK E 115.00
0
**** CASE NUMBER **** 3
#
# Newark "E1" 230kV Bus Fault
#
 1 30640 30655 "1 "  0    line from TESLA F 230.00 to ADCC    230.00
 1 30655 30631 "1 "  0    line from ADCC    230.00 to NEWARK E 230.00
 2 30631 35122 "11"  0    tran from NEWARK E 230.00 to NEWARK F 115.00
 6 30631    0 "v "  0    svc on bus NEWARK D 230.00
0
**** CASE NUMBER **** 4
#
# Newark "E2" 230kV Bus Fault
#
 1 30562 30631 "1 "  0    line from TES JCT 230.00 to NEWARK E 230.00
 1 30554 30631 "1 "  0    line from CASTROVL 230.00 to NEWARK E 230.00
 1 30631 30635 "1 "  0    line from NEWARK E 230.00 to NWK DIST 230.00
0
```

```
**** CASE NUMBER **** 5
#
# Metcalf "D1" 230kV Bus Fault
#
 1 30730 30735  "1 "   0    line from HICKS   230.00  to  METCALF  230.00
 2 35642 30735  "1 "   0    tran from MTCALF D 115.00  to  METCALF  230.00
 6 30735    0  "v "   0    shunt caps on bus METCALF 230.00
0
**** CASE NUMBER **** 6
#
# Metcalf "D2" 230kV Bus Fault
#
 1 30735 30731  "1 "   0    line from METCALF  230.00  to  LS ESTRS 230.00
 1 30735 30733  "1 "   0    line from METCALF  230.00  to  VASONA   230.00
 2 35642 30735  "4 "   0    tran from MTCALF D 115.00  to  METCALF  230.00
0
**** CASE NUMBER **** 7
#
# Metcalf "E1" 230kV Bus Fault
#
 1 30735 30705  "3 "   0    line from METCALF  230.00  to  MONTAVIS 230.00
 1 30735 30755  "1 "   0    line from METCALF  230.00  to  MOSSLND1 230.00
 2 35643 30735  "2 "   0    tran from MTCALF E 115.00  to  METCALF  230.00
0
**** CASE NUMBER **** 8
#
# Metcalf "E2" 230kV Bus Fault
#
 1 30735 30741  "4 "   0    line from METCALF  230.00  to  CAL MEC  230.00
 1 30735 30750  "1 "   0    line from METCALF  230.00  to  MOSSLND2 230.00
 2 35643 30735  "3 "   0    tran from MTCALF E 115.00  to  METCALF  230.00
0
```

```
**** CASE NUMBER ****  9
#
#  Newark "D1" 115kV Bus Fault
#
 1 35120 36851  "1 "   0     line from NEWARK D 115.00  to  NORTHERN 115.00
 1 35120 38432  "1 "   0     line from NEWARK D 115.00  to  OAKDLTID 115.00
 1 35120 35111  "1 "   0     line from NEWARK D 115.00  to  JARVIS   115.00
 6 35120    0  "v "   0     shunt caps on bus NEWARK D 115.00
 4 35120    0  "3 "   0     dist load on bus NEWARK D 115.00
0
**** CASE NUMBER ****  10
#
#  Newark "D2" 115kV Bus Fault
#
 1 35120 38432  "2 "   0     line from NEWARK D 115.00  to  OAKDLTID 115.00
 1 35120 35107  "1 "   0     line from NEWARK D 115.00  to  DUMBARTN 115.00
 1 35120 35124  "2 "   0     line from NEWARK D 115.00  to  NUMI JCT 115.00
 2 35120 35109  "1 "   0     tran from NEWARK D 115.00  to  NWRK 2 M 115.00
 2 35217 35109  "1 "   0     tran from NEWARK    60.00  to  NWRK 2 M 115.00
 4 35120    0  "4 "   0     dist load on bus NEWARK D 115.00
0
**** CASE NUMBER ****  11
#
#  Newark "E1" 115kV Bus Fault
#
 1 35349 35121  "1 "   0     line from AMES DST 115.00  to  NEWARK E 115.00
 1 35121 35351  "2 "   0     line from NEWARK E 115.00  to  AMES BS2 115.00
 1 35121 35110  "1 "   0     line from NEWARK E 115.00  to  FREMNT   115.00
0
**** CASE NUMBER ****  12
#
#  Newark "E2" 115kV Bus Fault
#
 1 35121 35350  "3 "   0     line from NEWARK E 115.00  to  AMES BS1 115.00
 1 35121 35350  "1 "   0     line from NEWARK E 115.00  to  AMES BS1 115.00
 1 35121 35110  "2 "   0     line from NEWARK E 115.00  to  FREMNT   115.00
0
```

```
**** CASE NUMBER ****  13
#
#  Newark "F1" 115kV Bus Fault
#
 1 35122 36851  "2 "   0     line from NEWARK F 115.00  to  NORTHERN 115.00
 1 35122 35624  "1 "   0     line from NEWARK F 115.00  to  MILPITAS 115.00
 1 35122 35603  "1 "   0     line from NEWARK F 115.00  to  ZNKER J1 115.00
 1 35603 35612  "1 "   0     line from ZNKER J1 115.00  to  TRIMBLE  115.00
 1 35122 35357  "1 "   0     line from NEWARK F 115.00  to  LCKHD J1 115.00
 1 35357 35358  "1 "   0     line from LCKHD J1 115.00  to  MFT.FD J 115.00
 1 35357 35363  "1 "   0     line from LCKHD J1 115.00  to  LAWRENCE 115.00
 1 35358 35361  "1 "   0     line from MFT.FD J 115.00  to  LOCKHD 1 115.00
 1 35361 35362  "1 "   1     line from LOCKHD 1 115.00  to  LOCKHD 2 115.00
0
**** CASE NUMBER ****  14
#
#  Newark "F2" 115kV Bus Fault
#
 1 35122 35602  "1 "   0     line from NEWARK F 115.00  to  ZNKER J2 115.00
 1 35602 35604  "1 "   0     line from ZNKER J2 115.00  to  ZANKER   115.00
 1 35602 36850  "1 "   0     line from ZNKER J2 115.00  to  KIFER    115.00
 1 35122 35600  "1 "   0     line from NEWARK F 115.00  to  DIXON LD 115.00
 1 35122 35624  "2 "   0     line from NEWARK F 115.00  to  MILPITAS 115.00
 1 35122 35360  "1 "   0     line from NEWARK F 115.00  to  LCKHD J2 115.00
 1 35360 35362  "1 "   0     line from LCKHD J2 115.00  to  LOCKHD 2 115.00
 1 35360 35365  "1 "   0     line from LCKHD J2 115.00  to  AMD JCT  115.00
 1 35365 35369  "1 "   0     line from AMD JCT  115.00  to  APP MAT  115.00
 1 35361 35362  "1 "   1     line from LOCKHD 1 115.00  to  LOCKHD 2 115.00
0
**** CASE NUMBER ****  15
#
#  Metcalf "D2" 115kV Bus Fault
#
 1 35620 35621  "1 "   0     line from EL PATIO 115.00  to  IBM-HR J 115.00
 1 35621 35642  "1 "   0     line from IBM-HR J 115.00  to  MTCALF D 115.00
 1 35641 35642  "1 "   0     line from EDNVL J1 115.00  to  MTCALF D 115.00
 1 35641 35649  "1 "   0     line from EDNVL J1 115.00  to  EDNVL J3 115.00
 1 35639 35641  "1 "   0     line from IBM-HRRS 115.00  to  EDNVL J1 115.00
 1 35621 35639  "1 "   1     line from IBM-HR J 115.00  to  IBM-HRRS 115.00
 1 35642 35646  "1 "   0     line from MTCALF D 115.00  to  MRGN HIL 115.00
0
```

```
**** CASE NUMBER ****  16
#
#  Metcalf "E2" 115kV Bus Fault
#
 1 35636 35643  "1 "   0     line from EVRGRN 1 115.00  to  MTCALF E 115.00
 1 35622 35643  "1 "   0     line from SWIFT    115.00  to  MTCALF E 115.00
0
**** CASE NUMBER ****  17
#
#  Metcalf "D&E1" 115kV Bus Fault
#
 1 35656 35643  "1 "   0     line from PIERCY   115.00  to  MTCALF E 115.00
 1 35620 35651  "2 "   0     line from EL PATIO 115.00  to  BAILY J3 115.00
 1 35642 35651  "2 "   0     line from MTCALF D 115.00  to  BAILY J3 115.00
 1 35643 35645  "1 "   0     line from MTCALF E 115.00  to  EVRGRN J 115.00
 1 35633 35645  "1 "   0     line from EVRGRN 2 115.00  to  EVRGRN J 115.00
 1 35625 35645  "1 "   0     line from MARKHMJ2 115.00  to  EVRGRN J 115.00
 1 35634 35635  "1 "   0     line from STONE J  115.00  to  GEN ELEC 115.00
 1 35634 36420  "1 "   0     line from STONE J  115.00  to  STONE    115.00
 1 35642 35653  "1 "   0     line from MTCALF D 115.00  to  BAILY J2 115.00
 1 35638 35653  "1 "   0     line from EDENVALE 115.00  to  BAILY J2 115.00
 1 35652 35653  "1 "   0     line from BAILY J1 115.00  to  BAILY J2 115.00
 1 35651 35652  "1 "   0     line from BAILY J3 115.00  to  BAILY J1 115.00
 1 35642 35654  "1 "   0     line from MTCALF D 115.00  to  MORGN J1 115.00
0
**** CASE NUMBER ****  18
#
#  Trimble 115kV Bus Fault
#
 8 35612                 isolate bus TRIMBLE  115.00
0
**** CASE NUMBER ****  19
#
#  San Jose "E" 115kV Bus Fault
#
 8 35616                 isolate bus SJ B  E  115.00
0
```

```
**** CASE NUMBER ****  20
#
#  Northern Receiving Station 115kV Bus Fault
#
 8 36851                    isolate bus NORTHERN 115.00
0
**** CASE NUMBER ****  21
#
#  Scott Receiving Station 115kV Bus Fault
#
 8 36852                    isolate bus SCOTT    115.00
0
**** CASE NUMBER ****  22
#
#  Kifer Receiving Station 115kV Bus Fault
#
 8 36850                    isolate bus KIFER    115.00
0

STOP
```

APPENDIX III

POWERFLOW PLOTS

Powerflow Plots have been provided to the CEC
and are available upon request.

Appendix III

Table 1 Outage Plots

Outage Plots have been provided to the CEC
and are available upon request.