

May 30, 2008

# **RIVERSIDE PUBLIC UTILITIES**

## **Riverside Energy Resource Center 3&4**

Electrical Transmission Impact Study

**PROJECT NUMBER:** 113560

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## **Electrical System Impact Study**

Prepared by POWER Engineers, Inc. for

## **Riverside Public Utilities**

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### **EXECUTIVE SUMMARY**

An analysis of the impact of expanding the existing RERC generation facilities to include Units 3&4 on the Riverside Public Utilities existing 69 kV transmission system configuration was performed. This analysis entailed running multiple load flow cases at various loading and generation levels with the base system and using N-1 outages, as well as performing a short circuit analysis on the system with the additional generation. The load flow analysis did not include any aspects or features of the future Riverside Transmission Reliability Project which will significantly reinforce the RPU system. The detailed results of the analysis are shown on the tables starting on pages 5 (load flow analysis) and 7 (short circuit analysis).

In summary, the load flow analysis showed that the addition of RERC Units 3&4 significantly decreases the number of overloading problems on the RPU system. At peak anticipated loading for the summer of 2009 with the existing RERC and Springs generation on-line there are 13 N-1 outages which will lead to 16 overloaded lines. However, with the addition of the proposed RERC units there are only 6 N-1 outages contributing to 7 overloaded lines with the tie breaker between RERC Units 1&2 and RERC Units 3&4 open. If necessary to alleviate these remaining overloads should they be of significant duration, the City has in place a load shedding plan of action which will be used to ensure that system stability and reliability is not compromised.

The short circuit analysis indicates that there are six breakers on the RPU system which will require replacement. The Freeman, Hunter, and Riverside stations will all need at least one breaker replaced due to the higher fault currents resulting from the expansion of the RERC generation facility. All of the existing breakers in the Casa Blanca, Kaiser, La Colina, Harvey Lynn, Magnolia, Mt. View, Orangecrest, Plaza, RERC, Springs, and University Substations are acceptable, and do not require replacement due to Units 3&4.

### INTRODUCTION

Riverside Public Utilities (RPU) proposes to expand the existing RERC (Riverside Energy Resource Center) 95-megawatt (MW) simple-cycle power plant within the City of Riverside, California. The proposed facility upgrade, referred to as the Riverside Energy Resource Center (RERC) Units 3&4 Project (Project), will result in a 191 MW power plant. RPU will develop, build, own, and operate the facility.

The RERC expansion is to supply the internal needs of the City of Riverside primarily during summer peak electrical demands and will serve the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from RERC will be exported outside of the City.

At present Southern California Edison's (SCE) Vista Substation provides the only external connection for the RPU system through which all of the City's power imports flow. In the summer of 2007 the City had a peak load of 609 MW. The Vista Substation transformer banks for RPU have a total capacity of 557 MW, with no additional capacity for expansion. The remainder of the City's power is supplied by existing internal generation as needed; however, the projected system load for the summer of 2009 is 682 MW. With Vista's limit of 567 MW and the City's existing generation of 128 MW (summer rating of 96 MW at RERC and 32 MW at Springs) the loss of any available capacity would require that the City immediately institute rolling blackouts to reduce system loading. The expansion of RERC would mitigate that risk and allow

the City to supply all of its customers should the loading during the summer of 2009 exceed expectations, as well as for some future years.

RPU has another project underway, the Riverside Transmission Reliability Project (RTRP), which will add a second point of interconnection to the SCE system as well as reinforcing significant portions of the RPU system. This second point of interconnection will allow for additional power imports to help meet future loads. As the RTRP will follow RERC 3&4 with a present estimated completion of 2012, none of the RTRP improvements or features were included in the load flow analysis of this study.

#### OBJECTIVE

POWER Engineers has been contracted to analyze the impacts on the transmission system due to the proposed interconnect.

- Load flow studies have been conducted for the base case and the N-1 contingency cases for
  - Case 1: The existing system with all generation on-line
    Case 2: The new system after adding units 3 and 4, and all generation on-line.

Both these cases have been analyzed considering 50% and 100% loading.

- Short circuit studies were conducted to determine if the addition of the new units would require any breakers to interrupt fault currents above their limits.
  - If any breakers are found to require replacement, a sensitivity case would also be run based on the future system configuration after the Riverside Transmission Reliability Project (RTRP) is completed. The system configuration for this case is:
    - The Wilderness 230 69 kV substation on-line
    - The Vista 230 69 kV substation on-line
    - All Springs generation running
    - Existing RERC Units 1&2, planned RERC Units 3&4, and two potential future RERC 25 MW heat recovery steam generator units all on-line.
    - Riverside's east and west 69 kV transmission systems tied together via the Riverside, Mt. View, and Freeman Substations.
    - All planned RTRP 69 kV transmission lines upgrades in service.

### **PROJECT DESCRIPTION**

The existing RERC site is owned by the City of Riverside and is located adjacent to the City of Riverside's Riverside Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. At present RERC consists of two aero-derivative combustion turbine generators with Emission Control Modules (ECM), an on-site substation, natural gas and water supply interconnection, and on-site administration building and warehouse. The combined RERC Units 1&2 and RERC Units 3&4 expansion would occupy approximately 14 of 16 acres with the remaining 2 acres reserved for construction laydown. The entire plant perimeter is fenced with a combination of chain-link fencing and architectural block walls.

#### **RERC Substation: Existing Equipment scenario**

- Presently, there are two 69 kV transmission lines connected into RERC. One connects from RERC to the Mt. View Substation, with the other from RERC to the Riverside Substation. Both Mt. View and Riverside Substations are owned and operated by the City.
- The RERC high voltage switchyard is comprised of the 69 kV bus work, switches, arresters, insulators, interrupting devices, instrument transformers and associated galvanized steel structures.
- The initial 69 kV substation is comprised of two full bays of breaker-and-a-half scheme consisting of six breakers, two 69 kV line positions, and two GSU positions.

The ultimate layout after the addition of Units 3&4 will consist of four bays of breaker-and-a-half with a main north bus and main south bus. There will also be a tie breaker to allow segregation of the north and south main buses to align two units onto each of the of the two transmission lines that leave the RERC switchyard. This feature is included to preclude all four units being able to feed power into one transmission line during an N-1 contingency and overloading it.

### IMPACT STUDY ANALYSIS

#### Introduction

The analysis for this project was performed using ASPEN's Power Flow and Oneliner software. Models of the existing Riverside system were obtained from the City.

The Power Flow model included the existing RERC generation, the entire 69 kV transmission system, and system loads lumped on the appropriate substation 69 kV bus. RPU indicated that the impedances used in this model were developed (with the use of temperature, wind speed, etc) to maximize load flow voltage drop for worst case load flow analysis. The proposed RERC Units 3&4 were added to the model.

The Oneliner model also included the existing RERC generation, the entire 69 kV transmission system, but no loads were modeled. The impedances used in this model were developed to maximize fault currents for relaying and worst case short circuit analysis. The proposed RERC Units 3&4 were added to the model.

A second Oneliner model was also created which contained the future 69 kV transmission system configuration, the new Wilderness 230-69 kV substation, the existing RERC Units 1&2, planned RERC Units 3&4, and the two potential RERC 25 MW heat recovery steam generator units (modeled as a single 50 MW unit for simplicity) all on-line. This model is used for the sensitivity case.

#### Load Flow

#### Methodology

The load flow analysis was performed for the base case system, as well as for N-1 conditions. No N-2 conditions were analyzed. The N-1 cases systematically took each 69 kV and 33 kV transmission line out of service individually. All of these existing system N-1 cases were run at maximum loading levels, with RERC at present generation levels (Units 1&2 only) and with

RERC at maximum generation levels (all four units on-line. Results of these cases are shown in the accompanying table on page 5.

The established criterion used by Riverside for N-1 outages is for a maximum allowable line loading of 110%, with a maximum allowable line loading of 100% for normal system operations.

#### **Existing System Configuration Analysis**

The RERC facility is connected to the RPU system via two 69 kV transmission lines. One line is connected to the Mountain View Substation and has a normal rating of 114 MW. The other line is connected to the Riverside Substation and has a normal rating of 97 MW. The RPU system was studied under peak load conditions of 682 MW with RERC and Springs both generating at their maximum outputs and it was found that no lines are overloaded with all lines in service.

Under peak loading conditions without any generation at RERC there are sixteen single contingency (N-1) outages that lead to 33 violations of the City's 110% line loading criteria. Under peak system loading with the existing RERC and Springs generation on line there are 13 N-1 outages leading to 16 violations of the City's criteria. The addition of RERC Units 3&4 with the RERC switchyard tie breaker open drops the number of N-1 outages leading to violations from 13 to 6, and the number of violations from 16 to 7. Thus while overloads remain, the addition of RERC 3&4 significantly improves the system condition.

The RPU 69 kV electrical system was also studied under minimum loading conditions of 341 MW. Line loading for base case and contingency cases was less than 100% of the nominal conductor rating for this system load condition.

#### Mitigated System Analysis

Any line loadings above 125% of nominal will require load shedding. The City has in place a load shedding plan of action which will be used to mitigate line overloads. RPU will take operator action to shed load as needed to preclude sustained operation in an overloaded condition. The area(s) which will be affected by the load shedding will be determined on an as needed basis and determined by the N-1 outage which is occurring, system configuration at the time of the outage, and substation loading. Ultimately the combination of new generation and the RTRP project are needed to eliminate all overloads.

Table 1: Overloaded Line Su	Immary - Existing System			
Outros Casa	Overloaded Line Summary (%	) - All Four RERC Units On-line	Overloaded Line Summary (%)	- Existing RERC Units On-line
Outage Case	50% System Loading	100% System Loading	50% System Loading	100% System Loading
Base Case	_	-	-	-
Alumax - Hunter			-	Vista - Hunter : 131.19
Alumax - Vista				Vista - Hunter : 131.19
Casa Blanca - Freeman				
Casa Blanca - Magnolia	_			-
Freeman - Vista	-	Plaza - Riverside : 117.54		Mt. View - RERC : 111.57
Freeman - Orangecrest				<u> </u>
Freeman - Kaiser		Mt. View - Harvey Lynn : 111.62		Mt. View - Harvey Lynn: 114.95
Freeman - Mt. View				_
Hunter - University		La Colina - Vista : 133.69		La Colina - Vista : 138.11
Hunter - Riverside	-	-		-
Hunter - Vista	-		-	Vista - Alumax : 119.97 Alumax - Hunter : 119.97
Kaiser - Harvey Lynn				
La Colina - Orangecrest				
La Colina - University			-	La Colina - Vista : 113.48
La Colina - Springs				
La Colina - Vista	-	Hunter - University: 142.07	-	Hunter - University : 144.04
		Mt. View - Freeman : 116.05		Mt. View - Freeman : 114.75
Harvey Lynn - Mt. View		Freeman - Kaiser: 113.48		Harvey Lynn - Kaiser: 111.43
				Freeman - Kaiser: 116.20
Magnolia - Riverside				
Mt. View - RERC	_			Plaza - Riverside : 134.92
Mt. View - Plaza				Mt. View - RERC : 110.72
Mt. View - Vista	-	Plaza - Riverside : 127.78		Mt. View - RERC : 114.77
Orangecrest - Springs				
Plaza - Riverside				Mt. View - RERC : 125.03
RERC - Riverside				
Riverside - Vista #1	_			-
Riverside - Vista #2				_

	Line Operating R	latings for the RPU system	n	
1000 A	85	Springs - Orangecrest	750 A	
Alumax - Hunter	Casa Blanca - Freeman	Plaza - Mt. View		
Hunter - Riverside	Hunter - University	Riverside - RERC	Riverside - Magnolia	580 A
La Colina - Springs	Kaiser - Freeman	Riverside - Plaza		
RERC - Mt. View	Harvey Lynn - Kaiser	University - La Colina	Magnolia - Casa Blanca	360 A
Vista - Riverside	Mt. View - Freeman	Vista - La Colina		
Vista - Freeman	Mt. View - Harvey Lynn	Vista - Mt. View		
Vista - Alumax	Orangecrest - La Colina	Vista - Riverside		
	Orangecrest - Freeman	Vista - Hunter	1	

### PRT 112-109 (SR-06) City of Riverside (05/30/08)js 113560

#### Breaker Rating Study Methodology

Short-circuit analysis was performed by POWER to determine if the addition of RERC Units 3&4 would increase the system fault currents enough to cause any breakers to be operated beyond their interrupting limits. If any breakers were found to require a replacement, a sensitivity case would also be run based on the future system configuration after the Riverside Transmission Reliability Project (RTRP) is completed.

This sensitivity case has two purposes. The first is to ensure that any existing breakers replaced due to RERC Units 3&4 were rated high enough that they would not again need to be replaced once the RTRP project was completed. The second was to allow the new breakers at RERC for Units 3&4 to be sized such that they would not need to be replaced upon completion of RTRP.

The system configuration for the sensitivity case after RTRP completion is:

- The Wilderness 230 69 kV substation on-line
- The Vista 230 69 kV substation on-line
- All Springs generation running
- Existing RERC Units 1&2, planned RERC Units 3&4, and two potential future RERC 25 MW heat recovery steam generator units all on-line.
- The east and west 69 kV transmission systems tied together via the Riverside, Mt. View, and Freeman Substations.
- All planned RTRP 69 kV transmission lines upgrades in service.

RPU also asked that a sensitivity case also be run for the 33 kV Riverside breakers. This sensitivity case was for the Riverside 33 kV breakers (A1-1 and A1-2) which are shown to be underrated. RPU has stated that the 33 kV system loading is low enough to allow all of the 33 kV system to be served with only one of the existing 69/33 kV Riverside transformers. The sensitivity case uses the existing 69 kV system configuration and the presently planned RERC expansion (Units 1-4) but only one of the Riverside transformers in service, in an attempt to lower the 33 kV fault currents below the existing breaker interrupt ratings. The results indicate that with only Riverside transformer AT2 in service the fault current will be 98.1 % of the breaker interrupt rating for A1-2, while with only AT1 in service the fault current will be 100.8 % of the breaker interrupt rating for A1-1. The difference between the two results is the fact that transformer AT2 has a slightly higher impedance, and hence decreases the fault currents just enough to fall under the breaker rating.

Using substation configuration drawings and specific breaker rating information (obtained from the City and shown in Appendix A), the Oneliner model was modified to allow a breaker rating analysis to be performed. This analysis is an automated process within the computer program. Once the individual breaker configuration and interrupting information is added to the model the software performs a series of faults. These faults include the normal system configuration, but it also simulates faults with appropriate branch outages to find maximum short-circuit currents that flow through each breaker. It then computes the ANSI X/R ratio and adjusts the short-circuit current accordingly. Finally, it compares the currents to the rated capabilities of the breakers and reports the findings. Any breakers which have ratings below the short circuit current seen are flagged. The program logic adheres to ANSI/IEEE standards for total-current related and symmetric-current rated breakers. The analysis of the existing system configuration with RERC Units 1-4 on-line determined that there are six breakers which will require replacement. The tables on the following pages show the results of the analysis: the breakers which will require replacement and the currents which the breakers will be required to interrupt. Table 3 shows the complete results for the existing system configuration, while Table 4 shows the complete results for the sensitivity case. On the following page is a summary of those breakers which require replacement for the addition of RERC Units 3&4.

### Table 2: Breakers Requiring Replacement

Breaker ID	Rating	Predicted Fault Duty			
Alumax Substation					
Fuse	20,000 A	20,408 A			
Freeman Substation					
#1 - Xfmr AT-1 & Mt. View line	12,600 A	20,383 A			
#9 - Xfmr AT-1 & Vista line	12,600 A	20,383 A			
#13 - Xfmr T-3 & Orangecrest line	12,600 A	20,383 A			
Hunter Substation					
#4 - University line	19,000 A	20,576 A			
Riverside Substation					
#1 - Xfmr AT-1 33 kV	8,400 A	8,890A			
#2 - Xfmr AT-2 33 kV	8,400 A	8,911 A			

Station	Breaker	Device Rating (A)	Fault Current (A)	Duty (%)
Alumov	Euse	20 000	19.240	19806 P. J
Alumax	#1 - Freeman line	8 400	4 543	54 1
Casa Blanca	#1 - Fleenan me	25,000	4 543	18.2
	#2 - XIIII 1-3	8 400	4,543	54.1
	#4 - Alfill 1-3 & 1-4	8 400	4 543	54 1
	#5 - Magnolia liste	12,600	13 156	01.1
	#1 - XIMP AT-1 & ML View line	21,500	13,525	12 0
	#10 - Xfmr 1-4 & 1-6	31,500	13,525	42.9
	#12 - Xfmr 1-1 & Mt. View line		13,525	50.4
	#13 - Xtmr 1-3 & Orangecrest line	12,000	13,323	58.4
Freeman	#14 - Xtmr 1-5 & Orangecrest line	24,000	13,525	56.4
	#15 - Xfmr 1-5 & Kaiser line	24,000	13,525	50.4
	#8 - Xfmr   -6 & Kaiser line	21,000	13,323	04.4
	#9 - Xfmr A1-1 & Vista line	12,000	12,100	42.0
	#9A - Xfmr 1-4 & Vista line	31,500	8.072	42.8
	#7 - Casa Blanca line	0,400	0,072	57.0
	#1 - Vista line	31,500	18,014	57.2
	#2 - Xfmr T-1, T-2, T3, & T-4	31,500	18,014	57.2
	#3 - Riverside line		16,936	53.8
Hunter	#4 - University line	19,000	ting (A)         Fault Current (A)         Dut           0,000         19,240 $4$ 8,400         4,543         5           5,000         4,543         5           8,400         4,543         5           8,400         4,543         5           8,400         13,525         4           4,000         13,525         5           2,600         13,525         5           1,500         13,525         5           4,000         13,525         5           4,000         13,525         5           1,000         13,525         6           2,600         13,156         1           1,500         13,525         4           8,400         8,072         4           8,400         13,525         4           1,500         16,125         5           1,500         18,014         5           1,500         16,125         5           1,500         16,125         5           1,500         13,764         4           1,000         14,275         6           1,000         14,275         6	55.0
	#5 - Alumax line	31,500		55.9
	#6 - Xfmr T-2 & T-5	24,000	16,125	67.2
	#7 - Xfmr T-5 & T-6	31,500	16,125	51.2
	#8 - Xfmr <u>T-6</u>	31,500		51.2
Kaiser	Fuse	17,500	10,203	58.3
	#1 - Xfmr T-1 & Vista line	21,000	14,275	68.0
	#2 - University & Springs lines	<u>31,500</u>	13,764	43.7
	#3 - Xfmr T-1 & T-2	21,000	14,275	68.0
	#4 - Xfmr T-4 & Springs line	27,000	14,275	52.9
La Comina	#5 - Xfmr T-2 & University line	21,000	14,275	68.0
	#6 - Xfmr T-3 & T-4	19,000	14,275	75.1
	#7 - Xfmr T-3 & Orangecrest line	21,000	14,275	68.0
	#8 - Orangecrest & Vista lines	31,500	13,859	44.0
	#1 - Xfmr T-5 & Mt. View line	21,000	9,792	46.6
	#3 - Xfmr T-2 & Mt. View line	21,000	9,792	46.6
Harvey Lynn	#4 - Xfmr T-3 & Kaiser line	21,000	9,792	46.6
	#6 - Xfmr T-1, T-4, & Kaiser line	27,000	9,792	36.3
	#7 - Xfmr T-1, T-4, & T-5	Device Rating (A)         Fault Current (A)           20,000         19,240           8,400         4,543           25,000         4,543           8,400         4,543           12,600         13,156           31,500         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           31,500         13,525           8,400         8,072           31,500         13,525           8,400         8,072           31,500         18,014           31,500         18,014           31,500         16,125           31,500         16,125           31,500         16,125           31,500         16,125           31,500         14,275           21,000         14,275           21,000         14,275           21,000         14,275	77.7	
	#3 - Casa Blanca line	8,400	6,663	79.3
Magnolia	#4 - Bus tie	8,400	6,663	79.3
	#5 - Riverside line	8,400	6,663	79.3
	#1 - RERC line	31,500	12,707	40.3
	#2 - Bus tie	31,500	15,207	48.3
	#3 - Vista line	31,500	16,669	52.9
Mt View	#4 - Freeman line	31,500	17,700	56.2
	#5 - Plaza line	31,500	16.359	51.9
	#6 - Harvey Lynn line	20,000         19,240           8,400         4,543           25,000         4,543           25,000         4,543           8,400         4,543           12,600         13,156           31,500         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           8,400         8,072           31,500         13,525           8,400         8,072           31,500         13,525           8,400         8,072           31,500         18,983           31,500         16,125           31,500         16,125           31,500         16,125           31,500         16,125           31,500         14,275           21,000         14,275           21,000         14,275           31,500         1	18.307	58.1
	#7 - Xfmr T-2 T-4 T-6 & Bus tie	20,000         19,240           8,400         4,543           25,000         4,543           8,400         4,543           8,400         4,543           8,400         4,543           8,400         13,525           12,600         13,525           11         24,000         13,525           11         24,000         13,525           11         24,000         13,525           11         24,000         13,525           11         24,000         13,525           21,000         13,525         21,000         13,525           12,600         13,1500         18,014           31,500         18,014         31,500         18,014           31,500         16,125         31,500         16,125           31,500         16,125         31,500         16,125           31,500         16,125         31,500         14,275           31,500         14,275         31,500         13,764           21,000         14,275         19,000         14,275           31,500         13,760         13,2859         21,000         9,792           21,000         9,	51.9	
	#1 - Xfmr T-5 & Freeman line	31 500	11.164	35.4
1	#2 - Xfmr T-1 & Freeman line	31 500	11,164	35.4
	#5 - Xfmr T-1 & Springs line	31 500	11 164	35.4
Orangecrest	#6 - Xfmr T-2 & Springs line	31 500	11 164	35.4
	#8 - Xfmr T-2 & La Colina line	31 500	11 164	35.4
	#9 - Xfmr T-5 & La Colina line	31 500	11 164	35.4
	#1 - Mt View line	21,000	10 335	40.2
Dista	#1 - WIL VIEW INTE	21,000	10,335	40.2
Fiaza	#2 - Dus lie #3 - Riverside lipe	21,000	10,335	40.2
		21,000	10,000	62.6
	#1 - NORTH BUS & GSU 1	31,500	13,710	11 6
	#2 - GSU 1 & Mt. View line	31,500	13,095	41.0
	#3 - South Bus & Mt. View line	31,500	19,/18	62.6
RERC	HH - NORTH BUS & GSU 2	31,500	19,/18	02.0 57.5
	HO South Due & Diverside line	31,500	8,400         4,543           25,000         4,543           8,400         4,543           8,400         4,543           8,400         4,543           12,600         13,156           31,500         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           24,000         13,525           12,600         13,156           31,500         13,525           8,400         8,072           31,500         18,014           31,500         18,014           31,500         16,125           31,500         16,125           31,500         16,125           31,500         16,125           31,500         14,275           21,000         14,275           21,000         14,275           31,500         13,859           21,000	57.5
#1 - Freeman line         8,400         4, #2 - XImr T-3         25,000         4, #4 - XImr T-3 & T-4         8,400         4, #5 - Magnolia line         8,400         13, #10 - Ximr T-1 & Mt View line         12,600         13, #11 - Ximr T-1 & Mt View line         24,000         13, #13 - Ximr T-1 & X Vista line         12,600         13, #15 - Ximr T-1 & X Vista line         13,500         13, #17 - Casa Blanca line         8,400         8, #1 - Vista line         13,500         18, #2 - Ximr T-1 & X Vista line         13,500         18, #2 - Ximr T-1 & Xista line         13,500         18, #3 - Riverside line         13,500         16, #3 - Riverside line         13,500         16, #3 - Riverside line         13,500         16, #3 - Ximr T-2 & T-5         24,000         16, #3 - Ximr T-1 & Xista line         17,500         10, #3 - Ximr T-2 & Xista line         13,500         16, #3 - Ximr T-2 & Xista line         13,500         13, #3 - Ximr T-2 & X	19,/18	02.0		
		31,500	19,/18	02.0
	Unit 4 - GSU4	31,500	19,/18	02.0

Table 3: Results of Breaker Rating Analysis - All RERC Generation On-line

Station	Breaker	Device Rating (A)	Fault Current (A)	Duty (%)
	#1 - Xfmr AT-1 33 kV*	8,400	8,465	
	#2 - Xfmr AT-2 33 kV*	8,400	8,465	
	#4 - Bus tie 33 kV	25,000	13,964	55.9
	#5 - Xfmr T-2 & Bus tie	25,000	13,964	55.9
	#6 - Magnolia line	25,000	13,964	55.9
	#1N - Xfmr AT-1	31,500	20,352	64.6
	#1S - Vista #1 line	31,500	20,352	64.6
	#1T - Xfmr AT-1 & Vista #1 line tie	27,000	20,338	75.3
Riverside	#2N - Xfmr AT-2	27,000	20,352	75.4
	#2S - Vista #2 line	31,500	20,352	64.6
	#2T - Xfmr AT-2 & Vista #2 line tie	31,500	20,340	64.6
	#3N - RERC line	31,500	20,352	64.6
	#3S - Hunter line	31,500	20,352	64.6
	#3T - RERC & Hunter lines tie	31,500	18,641	59.2
	#4N - North Bus & Plaza line	31,500	20,352	64.6
	#4S - South Bus & Xfmr T-5	31,500	20,352	64.6
	#4T - Xfmr T-5 & Plaza line tie	31,500	20,352	64.6
	#1 - GSU 1 & La Colina line	31,500	10,353	32.9
	#2 - Xfmr T-1 & La Colina line	31,500	11,080	35.2
Springs	#3 - Xfmr T-1 & GSU 2	31,500	11,080	3 <u>5.2</u>
Springs	#5 - GSU 2 & Orangecrest line	31,500	8,548	27.1
	#6 - Xfmr T-2 & Orangecrest line	40,000	11,080	27.7
	#8 - Xfmr T-2 & GSU 1	40,000	11,080	27.7
	#1 - Hunter line	31,500	9,496	30.1
University	#3 - Bus tie	31,500	9,496	30.1
	#5 - La Colina line	31,500	9,496	30.1

Table 3: Results of Breaker Rating Analysis - All RERC Generation On-line

\* The 33 kV system is fed from Riverside.

Alumax         Fuse         20.000         20.408           Casa Blands         #1 - Freeman Ine         8.400         4.813         57.3           Casa Blands         #2 - Xfmr T-3 & T-4         8.400         4.813         57.3           Fish Magnolia line         8.400         4.813         57.3           #1 - Xmr AT-1 & M. View line         12.600         20.383         64.7           #1 - Xmr AT-1 & M. View line         12.600         20.383         64.7           #1 - Xmr T-5 & Orangecrest line         24.000         20.383         64.7           #1 - Xmr T-5 & Crangecrest line         24.000         20.383         64.7           #1 - Xmr T-5 & Kaiser line         24.000         20.383         64.7           #0 - Xfmr T-4 & Vista line         11.600         12.600         20.383         64.7           #0 - Xfmr T-4 & Vista line         31.500         10.838         64.7           #1 - Ximr T-5 & Crangecrest line         21.000         20.383         64.7           #2 - Xmr T-4 & Vista line         31.500         19.766         62.7           #3 - Nore risk wista line         31.500         17.965         57.0           #4 - University line         21.000         17.965         57.0 <t< th=""><th>Station</th><th>Breaker</th><th>Device Rating (A)</th><th>Fault Current (A)</th><th>Duty (%)</th></t<>	Station	Breaker	Device Rating (A)	Fault Current (A)	Duty (%)
H - Freeman line         8.400         4.813         57.3           Casa Bianca         B2 - Ximr T-3         25.000         4.813         57.3           #4 - Ximr T-1 & Mt. View line         12.600         20.383         64.7           #1 - Ximr AT-1 & Mt. View line         12.600         20.383         64.7           #1 - Ximr T-3 & Crangecrest line         12.600         20.383         64.7           #1 - Ximr T-3 & Crangecrest line         24.000         20.383         64.9           #1 - Ximr T-5 & Kaiser line         24.000         20.383         64.9           #1 - Ximr T-5 & Kaiser line         24.000         20.383         64.7           #1 - Ximr T-5 & Kaiser line         24.000         20.383         64.7           #1 - Ximr T-5 & Kaiser line         12.600         20.383         64.7           #1 - Ximr T-1 & Vista line         13.500         19.766         62.7           #2 - Ximr T-1 T, T-2, T3, & T-4         31.500         19.766         62.7           #3 - Riverside line         31.500         17.965         74.9           #4 - University line         19.000         20.576         74.9           #3 - Ximr T-4 & Vista line         31.500         17.965         77.9           #4 - Mir T	Alumax	Fuse	20,000	20,408	
Casa Blance         #2 - Ximr T-3         25,000         4,813         19.3           #5 - Magnolia line         8,400         4,813         57.3           #5 - Magnolia line         8,400         4,813         57.3           #1 - Ximr AT-18 ML: View line         12,600         20,383         64.7           #10 - Ximr T-4 & T-6         31,500         20,383         64.9           #11 - Ximr T-5 & Orangecrest line         12,000         20,383         84.9           #14 - Ximr T-6 & Kaiser line         24,000         20,383         84.9           #0 - Ximr T-6 & Kaiser line         21,000         20,383         64.7           #0 - Ximr T-6 & Kaiser line         21,000         20,383         64.7           #0 - Ximr T-6 & Kaiser line         31,500         19,766         62.7           #0 - Ximr T-6 & Kaiser line         31,500         19,766         62.7           #5 - Aumax line         31,500         15,661         52.9           #1 - Vista line         31,500         17,965         57.0           #6 - Ximr T-6         31,500         17,965         57.0           #5 - Aumax line         31,500         17,965         57.0           #5 - Aumax line         31,500         17,246		#1 - Freeman line	8,400	4,813	57.3
Hart - Kim T-3 & T-4         8.400         4.813         57.3           #5 - Magnolia line         6.400         4.813         57.3           #1 - Ximr AT-1 & ML View line         12.600         20.383         64.7           #10 - Ximr T-4 & T-6         31.500         20.383         64.7           #12 - Ximr T-5 & Crangecrest line         12.600         20.383         84.9           #14 - Ximr T-5 & Crangecrest line         24.000         20.383         84.9           #16 - Ximr T-5 & Kaiser line         21.000         20.383         84.9           #0 - Ximr AT 1 & Vista line         31.500         20.383         84.9           #0 - Ximr AT 4 & Vista line         12.600         20.383         84.9           #0 - Ximr AT 4 & Vista line         31.500         10.2383         84.9           #1 - Vista line         31.500         19.766         62.7           #1 - Vista line         31.500         10.661         52.9           #2 - Ximr T-1 & Vista line         31.500         10.667         89.5           #4 - University line         19.000         7.266         57.0           #4 - Vintr T-1 & Vista line         21.000         17.246         82.1           #4 - Ximr T-1 & Vista line         31.500	Station         #1           Alumax         Fuse           #1         #2           #4         #1           #4         #1           #10         #12           #4         #1           #10         #12           #11         #11           #10         #12           #11         #13           #14         #15           #8         #9           #9         #9           #9         #3           #4         #15           #8         #4           #5         #6           #7         #8           #4         #5           #4         #5           #6         #7           #8         #4           #4         #5           #6         #7           #8         #4           #7         #3           Harvey Lynn         #4           #6         #7           Magnolia         #4           #5         #6           #7         *3           Orangecrest         #1           #2         *3	#2 - Xfmr T-3	25,000	4,813	<u>19.3</u>
#0 - Magnolia line         0.440         4,613         97.3           #1 - Xtmr T-1 & Mt. View line         12,600         20,383         84.7           #10 - Xtmr T-1 & Mt. View line         24,000         20,383         84.9           #13 - Xtmr T-3 & Orangecrest line         12,600         20,383         84.9           #15 - Xtmr T-5 & Kaiser line         24,000         20,383         84.9           #0 - Xtmr T-1 & Vista line         12,600         20,383         84.9           #0 - Xtmr T-1 & Vista line         21,000         20,383         84.9           #0 - Xtmr T-1 & Vista line         31,500         19,766         82.7           #7 - Cass Blanca line         8,400         9,023         84.7           #1 - Vista line         31,500         19,766         82.7           #2 - Xtmr T-1, T-2, T3, & T-4         31,500         19,766         82.7           #3 - Riverside line         31,500         17,965         57.0           #4 - University line         21,000         17,965         57.0           #5 - Aurmax line         31,500         17,965         57.0           #4 - Winversity X Springs lines         31,500         17,965         57.0           #3 - Xtmr T-3 & X-4         19,000		#4 - Xfmr T-3 & T-4	8,400	20,000         20,408           8,400         4,813         57.3           25,000         4,813         19.3           8,400         4,813         57.3           8,400         4,813         57.3           12,600         20,383         64.7           24,000         20,383         84.9           12,600         20,383         84.9           24,000         20,383         84.9           24,000         20,383         84.9           21,000         20,383         84.9           21,000         20,383         84.9           21,000         20,383         64.7           31,500         19,766         62.7           31,500         19,766         62.7           31,500         19,766         62.7           31,500         19,766         62.7           31,500         19,766         62.7           31,500         17,965         74.9           31,500         17,965         74.9           31,500         17,965         57.0           31,500         17,246         82.1           31,500         17,246         82.1           31,50	57.3
# 1 - Ximr 7 + 1 & Mr. View line         1.200         20,383         64.7           #10 - Ximr 7 + & Mr. View line         24,000         20,383         64.9           #13 - Ximr 7 - 1 & Mr. View line         24,000         20,383         64.9           #14 - Ximr 7 - 5 & Orangecrest line         24,000         20,383         64.9           #14 - Ximr 7 - 5 & Asiser line         24,000         20,383         64.9           #16 - Ximr 7 - 6 & Kaiser line         24,000         20,383         64.7           #0 - Ximr 7 - 6 & Kaiser line         21,000         20,383         64.7           #0 - Ximr 7 - 6 & Kaiser line         21,000         20,383         64.7           #1 - Xima T - 6 & Kaiser line         31,500         19,766         62.7           #1 - Vista line         31,500         19,766         62.7           #2 - Kimr 7 - 5 & T - 6         31,500         17,965         74.9           #4 - University line         19,000         20,576         74.9           #4 - S. Kimr 7 - 6         31,500         17,965         57.0           #4 - S. Ximr 7 - 6         31,500         17,965         57.0           #5 - Kimr 7 - 8         74.9         74.9         74.9         74.9           #1 - Ximr 7 - 1		#5 - Magnolia line	6,400	4,813	57.3
Freeman         #10 - Xim T - 3 MC Vew line         24,000         20,032         04.9           #13 - Xim T - 3 & Orangecrest line         12,000         20,383         04.9           #14 - Xim T - 5 & Crangecrest line         24,000         20,383         04.9           #15 - Xim T - 5 & Kaiser line         24,000         20,383         04.9           #0 - Xim T - 5 & Kaiser line         21,000         20,383         04.9           #0 - Xim T - 1 & Vista line         11,500         20,383         04.7           #0 - Xim T - 1 & Vista line         31,500         19,766         62.7           #1 - Vista line         31,500         19,766         62.7           #2 - Xim T - 2, 7.3, T-4         31,500         19,766         62.7           #2 - Xim T - 1, T-2, T.3, T-4         31,500         19,766         62.7           #3 - Riverside line         31,500         10,661         52.9           #4 - University line         31,500         17,965         57.0           Kaiser         Fuse         17,500         17,665         57.0           #4 - Xim T - 4 & Vista line         21,000         17,246         82.1           #5 - Xim T - 5 & T-6         24,000         17,246         82.1           #5 -		#1 - XIM A - 1 & Mt. View line	31 500	20,303	64.7
Freeman         #13 - Xim T - 3 & Orangecrest line         12.800         20.383         84.9           #13 - Xim T - 3 & Orangecrest line         24.000         20.383         84.9           #15 - Xim T - 5 & Katser line         24.000         20.383         84.9           #0 - Xim T - 6 & Katser line         21.000         20.383         84.9           #0 - Xim T - 1 & Vista line         12.600         20.383         84.9           #0 - Xim T - 1 & Vista line         13.500         20.383         64.7           #0 - Xim T - 1 & Vista line         31.500         19.766         62.7           #1 - Vista line         31.500         19.766         62.7           #2 - Xim T - 5         24.000         17.665         74.9           #3 - Riverside line         31.500         17.665         74.9           #4 - University line         19.000         17.665         57.0           #3 - Xim T - 6         31.500         17.665         57.0           #4 - University & Springs line         21.000         17.246         82.1           #4 - University & Springs line         21.000         17.246         82.1           #4 - Vim T - 1 & Vista line         11.000         17.246         82.1           #4 - Strm T - 2 &		#12 - Xfmr T-1 & Mt View line	24 000	20,383	84.9
Freeman         #14 - Ximr T-5 & Crangecrest line         24.000         20.383         84.9           #15 - Ximr T-6 & Kaiser line         21.000         20.383         84.9           #0 - Ximr T-6 & Kaiser line         21.000         20.383         84.9           #0 - Ximr T-6 & Kaiser line         21.000         20.383         84.7           #0 - Ximr T-4 & Vista line         31.500         20.383         84.7           #1 - Vasa line         81.500         19.766         62.7           #2 - Ximr T-1, T-2, T3, & T-4         31.500         19.766         62.7           #2 - Ximr T-1, T-2, T3, & T-4         31.500         19.766         62.7           #3 - Riverside line         31.500         20.000         83.5           #5 - Aumax line         31.500         17.965         77.0           #5 - Ximr T-3 & T-6         31.500         17.965         57.0           #6 - Ximr T-4 & Vista line         21.000         17.246         82.1           #1 - Ximr T-1 & Vista line         21.000         17.246         82.1           #2 - University is Springs lines         31.500         14.427         45.8           #3 - Ximr T-2 & University line         21.000         17.246         82.1           #1 - Ximr T		#13 - Xfmr T-3 & Orangecrest line	12,600	20,383	••
Preemain         #15 - Xmm T-5 & Kaiser line         24,000         20,383         84.9           #8 - Xmm T-1 & Vista line         12,600         20,383         64.7           #9 - Xmm T-1 & Vista line         13,500         20,383         64.7           #7 - Casa Blanca line         8,400         9,023         64.7           #1 - Vista line         31,500         19,766         62.7           #2 - Xfm T-1, T-2, T3, & T-4         31,500         19,766         62.7           #3 - Riverside line         31,500         19,766         62.7           #4 - University line         19,000         20,576         64.7           #5 - Alumax line         31,500         17,965         57.0           #6 - Khm T-5 & T-6         31,500         17,965         57.0           #8 - Xfmr T-4         Vista line         21,000         17,246         82.1           #7 - Xfm T-5 & T-6         31,500         17,246         82.1           #1 - Xfmr T-1 & Vista line         21,000         17,246         82.1           #1 - Xfmr T-1 & Sorgangerest line         21,000         17,246         82.1           #3 - Kmer T-3 & T-4         19,000         17,246         82.1           #4 - Strm T-5 & M.4. View line	<b>F</b>	#14 - Xfmr T-5 & Orangecrest line	24,000	20,383	84.9
#B - Xfmr T-1 & Vista line         21,000         20,383         490.           #9A - Xfmr T-4 & Vista line         31,500         20,383         64.7           #9A - Xfmr T-1 & Vista line         31,500         92,766         62.7           #1 - Vista line         31,500         19,766         62.7           #2 - Xfmr T-1, T-2, T3, & T-4         31,500         19,766         62.7           #3 - Riverside line         31,500         19,766         62.7           #4 - University line         19,000         20,000         63.5           #6 - Xfmr T-2 & T-5         24,000         17,965         57.0           #8 - Xfmr T-4 & Vista line         21,000         17,965         57.0           #8 - Xfmr T-4 & Vista line         21,000         17,246         82.1           #1 - Xfmr T-1 & Vista line         21,000         17,246         82.1           #2 - University & Springs lines         31,500         17,246         82.1           #2 - Strm T-3 & Crangecreat line         21,000         17,246         82.1           #3 - Xfmr T-1 & X by Crangecreat line         21,000         17,246         82.1           #5 - Xfmr T-2 & Mi. View line         21,000         17,246         82.1           #5 - Xfmr T-3 & Crangecreat l	Freeman	#15 - Xfmr T-5 & Kaiser line	24,000	20,383	84.9
#9 - Xmr A-1 & Vista line         12,600         20,383         64.7           #9 - Xmr 7-4 & Vista line         31,500         19,766         62.7           #1 - Vista line         31,500         19,766         62.7           #1 - Vista line         31,500         19,766         62.7           #1 - Vista line         31,500         19,766         62.7           #3 - Riverside line         31,500         16,661         52.9           #4 - University line         19,000         20,576         16,661         52.9           #4 - Viniversity line         31,500         17,965         57.0           #5 - Alumax line         31,500         17,965         57.0           #6 - Xfmr T-6         31,500         17,965         57.0           #1 - Xfmr T-1 & Vista line         21,000         17,246         82.1           #2 - University & Springs lines         31,500         17,246         82.1           #3 - Xfmr T-2 & University line         21,000         17,246         82.1           #3 - Xfmr T-3 & T-4         19,000         17,246         82.1           #4 - Xfmr T-3 & T-4         19,000         17,246         82.1           #5 - Sfmr T-3 & T-4         19,000         17,246 <td< td=""><td></td><td>#8 - Xfmr T-6 &amp; Kaiser line</td><td>21,000</td><td>20,383</td><td>2007期经</td></td<>		#8 - Xfmr T-6 & Kaiser line	21,000	20,383	2007期经
##A. Xtmr T-4 & Vista line         31,500         20,383         64.7           #T - Casa Blanca line         8,400         9,023           #1 - Vista line         31,500         19,766         62.7           #3. Riverside line         31,500         19,766         62.7           #3. Riverside line         31,500         10,661         52.9           #4 - University line         19,000         20,576         10,661         52.9           #5 - Alumax line         31,500         17,965         57.0         14,81         1500         17,965         57.0           #8 - Xtmr T-6         31,500         17,965         57.0         14,81         1500         17,965         57.0           #8 - Xtmr T-6         31,500         17,965         57.0         14,82         17,965         57.0           #8 - Xtmr T-4         13,500         15,580         49.5         14.2         14.2         11,600         17,246         82.1           #4 - Vitror T-1 & T-7.2         21,000         17,246         82.1         14.4         7.00         17,246         82.1           #4 - Start 4         9,000         17,246         82.1         14.4         19,000         17,246         82.1      <		#9 - Xfmr AT-1 & Vista line	12,600	20,383	
#7 - Casa blanca line         0,400         9,026         62.7           #1 - Vista line         31,500         19,766         62.7           #3 - Riverside line         31,500         19,766         62.7           #3 - Riverside line         31,500         19,766         62.7           #3 - Riverside line         31,500         20,000         63.5           #4 - University line         19,000         20,000         63.5           #6 - Xfmr T-2 & T-5         24,000         17,965         57.0           #7 - Xfmr T-1 & T-2 & T-5         24,000         17,965         57.0           #8 - Xfmr T-6         31,500         17,965         57.0           #8 - Xfmr T-1 & Strae         21,000         17,246         82.1           #2 - University & Springs lines         31,500         17,246         82.1           #3 - Xfmr T-1 & T-2         21,000         17,246         82.1           #5 - Xfmr T-3 & Charagecrest line         21,000         17,246         82.1           #6 - Xfmr T-3 & Charagecrest line         21,000         17,246         82.1           #7 - Xfmr T-3 & Charagecrest line         21,000         16,598         79.0           #7 - Xfmr T-3 & Chargeriline         21,000         16,598 <td></td> <td>#9A - Xfmr T-4 &amp; Vista line</td> <td>31,500</td> <td>20,383</td> <td>6<u>4.7</u></td>		#9A - Xfmr T-4 & Vista line	31,500	20,383	6 <u>4.7</u>
#1 - Vista line         31,500         19,766         62,7           #2 - Xfmr T-1, T-2, T3, & T-4         31,500         16,661         52.9           #3 - Riverside line         31,500         16,661         52.9           #4 - University line         19,000         20,000         63,5           #6 - Xtmr T-2 & T-5         24,000         17,965         57,0           #7 - Xtmr T-5 & T-6         31,500         17,965         57,0           Kaiser         Fuse         17,500         15,667         89,5           #1 - Xtmr T-1 & Vista line         21,000         17,246         82,1           #2 - University & Springs lines         31,500         17,246         63,9           #3 - Xtmr T-1 & T-1 & T-2         21,000         17,246         63,9           #5 - Xtmr T-3 & T-4         19,000         17,246         82,1           #4 - Xtmr T-3 & Changecrest line         21,000         17,246         82,1           #5 - Xtmr T-3 & T-4         19,000         17,246         82,1           #5 - Xtmr T-3 & T-4         19,000         17,246         82,1           #5 - Xtmr T-3 & X-14         19,000         17,246         82,1           #7 - Ktmr T-3 & Kaiser line         21,000         16,588 <td></td> <td>#/ - Casa Bianca line</td> <td>0,400</td> <td>9,023</td> <td>60.7</td>		#/ - Casa Bianca line	0,400	9,023	60.7
Hunter         Hart S. Riverside line         31,500         16,661         52.9           Hunter         #3 - Riverside line         19,000         20,576         1000           #5 - Alumax line         31,500         20,000         63,5           #6 - Xfmr T-2 & T-5         24,000         17,965         74,9           #7 - Xfmr T-5 & T-6         31,500         17,965         57,0           #8 - Xfmr T-6         31,500         17,965         57,0           #8 - Xfmr T-6         31,500         17,965         57,0           #8 - Xfmr T-6         31,500         17,965         57,0           #4 - Xfmr T-1 & Vista line         21,000         17,246         82,1           #4 - Xfmr T-2 & University line         21,000         17,246         82,1           #5 - Xfmr T-3 & Crangecrest line         21,000         17,246         82,1           #6 - Xfmr T-3 & T-4         19,000         17,246         82,1           #7 - Xfmr T-3 & Crangecrest line         21,000         17,246         82,1           #7 - Xfmr T-3 & Crangecrest line         21,000         16,598         79,0           #7 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79,0           #7 - Xfmr T-1, T-4, & Kaiser li		#1 - Vista line #2 - Xfmr T-1 T-2 T3 & T-4	31,500	19,700	62.7
Hunter         Bit Ordersolv line         19,000         20,0576           #5 - Alumax line         31,500         20,000         63.5           #6 - Xfmr T-2 & T-5         24,000         17,965         57.0           #7 - Xfmr T-5 & T-6         31,500         17,965         57.0           #8 - Xfmr T-6         31,500         17,965         57.0           #8 - Xfmr T-6         31,500         17,965         57.0           #8 - Xfmr T-1 & Vista line         21,000         17,246         82.1           #1 - Xfmr T-1 & T-2         21,000         17,246         82.1           #3 - Xfmr T-3 & T-4         19,000         17,246         82.1           #4 - Xfmr T-3 & T-4         19,000         17,246         82.1           #5 - Xfmr T-3 & T-4         19,000         17,246         82.1           #5 - Xfmr T-3 & T-4         19,000         17,246         82.1           #7 - Xfmr T-3 & T-4         19,000         17,246         82.1           #7 - Xfmr T-3 & Xfmr T-5 & Mt. View line         21,000         16,598         79.0           #8 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79.0           #7 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79.0<		#2 - Ainit 1-1, 1-2, 13, & 1-4	31,500	16 661	52.9
Hunter         #5 - Alumax line         31,500         20,000         63.5           #8 - Ximr T-2 & T-5         24,000         17,965         74.9           #7 - Ximr T-5 & T-6         31,500         17,965         57.0           #8 - Xfmr T-6         31,500         17,965         57.0           Kaiser         Fuse         17,500         15,667         89.5           #1 - Xfmr T-1 & Vista line         21,000         17,246         82.1           #2 - University & Springs line         21,000         17,246         82.1           #4 - Xfmr T-4 & Springs line         21,000         17,246         82.1           #4 - Xfmr T-3 & Orangecrest line         21,000         17,246         82.1           #7 - Xfmr T-3 & Orangecrest line         21,000         17,246         82.1           #7 - Xfmr T-3 & Changecrest line         21,000         17,246         82.1           #7 - Xfmr T-3 & Changecrest line         21,000         17,246         82.1           #7 - Xfmr T-3 & Changecrest line         21,000         16,598         79.0           #3 - Xfmr T-3 & Kaiser line         21,000         16,598         79.0           #4 - Sust lie         8,400         6,981         83.1           Magnolia		#4 - University line	19,000	All 9 (7)       Full Colling (7)       Fold (7)         20,000       20,408         8,400       4,813       57.3         8,400       4,813       57.3         8,400       4,813       57.3         8,400       4,813       57.3         8,400       4,813       57.3         8,400       4,813       57.3         8,400       4,813       57.3         8,400       20,383       64.7         24,000       20,383       84.9         24,000       20,383       84.9         24,000       20,383       84.9         24,000       20,383       84.9         21,000       20,383       84.9         24,000       20,383       64.7         8,400       9,023       9,023         31,500       19,766       62.7         31,500       19,766       62.7         31,500       17,965       57.0         31,500       17,965       57.0         31,500       17,965       57.0         31,500       17,246       82.1         31,500       17,246       82.1         31,500       17,246 <t< td=""><td>020</td></t<>	020
#6 - Xfmr T-2 & T-5         24,000         17,985         74.9           #7 - Xfmr T-5 & T-6         31,500         17,985         57.0           #8 - Xfmr T-6         31,500         17,985         57.0           Kaiser         Fuse         17,500         15,667         89.5           #1 - Xfmr T-1 & Vista line         21,000         17,246         82.1           #2 - University & Springs lines         31,500         17,246         82.1           #3 - Xfmr T-1 & T-2         21,000         17,246         82.1           #4 - Xfmr T-2 & University line         21,000         17,246         82.1           #5 - Xfmr T-3 & T-2         0.000         17,246         82.1           #5 - Xfmr T-3 & Chargecrest line         21,000         17,246         82.1           #6 - Crangecrest & Vista lines         31,500         14,427         45.8           #1 - Xfmr T-3 & Chargecrest line         21,000         16,598         79.0           #7 - Xfmr T-1, T-4, & K1-5         12,600         16,598         79.0           #4 - Stear line         8,400         6,981         83.1           Magnolia         #4 - Bus tie         8,400         6,981         83.1           #5 - Riverside line         31,500 </td <td>Hunter</td> <td>#5 - Alumax line</td> <td>31,500</td> <td>63.5</td>	Hunter	#5 - Alumax line	31,500		63.5
#7 - Xfmr T-5 & T-6         31,500         17,965         57.0           Kaiser         Fuse         17,500         17,965         57.0           Kaiser         Fuse         17,500         15,667         89.5           #1 - Xfmr T-1 & Vista line         21,000         17,246         82.1           #2 - University & Springs lines         31,500         15,560         49.5           #3 - Xfmr T-1 & T-2         21,000         17,246         82.1           #4 - Xfmr T-1 & T-2         21,000         17,246         82.1           #5 - Xfmr T-2 & University line         21,000         17,246         82.1           #5 - Xfmr T-3 & Changecrest line         21,000         17,246         82.1           #5 - Xfmr T-2 & University line         21,000         17,246         82.1           #5 - Xfmr T-3 & Changecrest line         21,000         17,246         82.1           #5 - Xfmr T-2 & ML View line         21,000         16,598         79.0           #1 - Xfmr T-3 & Kaiser line         21,000         16,598         79.0           #4 - Stmr T-1, T-4, & Kaiser line         21,000         16,598         83.1           #7 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         83.1           #		#6 - Xfmr T-2 & T-5	24,000	17,965	74.9
#8 - Xfmr T-6         31,500         17,965         57.0           Kaiser         Fuse         17,500         15,667         89.5           #1 - Xfmr T-1 & Vista line         21,000         17,246         82.1           #2 - University & Springs lines         31,500         15,580         49.5           #3 - Xfmr T-1 & T-2         21,000         17,246         82.1           #4 - Xfmr T-3 & Drangecrest line         21,000         17,246         82.1           #5 - Xfmr T-3 & T-4         19,000         17,246         82.1           #6 - Xfmr T-3 & T-3 & T-4         19,000         17,246         82.1           #7 - Xfmr T-3 & Orangecrest line         21,000         17,246         82.1           #7 - Xfmr T-3 & Mt. View line         21,000         16,598         79.0           #3 - Xfmr T-1, X + X Kaiser line         21,000         16,598         79.0           #3 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79.0           #3 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79.0           #3 - Sara Blanca line         8,400         6,981         83.1           #4 - Bus tie         8,400         6,981         83.1           #5 - Rizera line         31,	Casa Blanca Freeman Hunter La Colina Harvey Lynn Magnolia Mt. View Orangecrest	#7 - Xfmr T-5 & T-6	31,500	17,965	57.0
Kaiser         Fuse         17,500         15,867         89.5           #1 - Xfmr T-1 & Vista line         21,000         17,246         82.1           #2 - University & Springs lines         31,500         15,860         49.5           #4 - Xfmr T-1 & Vista line         21,000         17,246         82.1           #4 - Xfmr T-2 & University line         27,000         17,246         82.1           #5 - Xfmr T-2 & University line         21,000         17,246         82.1           #5 - Xfmr T-2 & University line         21,000         17,246         82.1           #6 - Xfmr T-3 & T-4         19,000         17,246         82.1           #8 - Orangecrest & Vista lines         31,500         14,427         45.8           #1 - Xfmr T-5 & Mt. View line         21,000         16,598         79.0           #3 - Casa Blanca line         21,000         16,598         79.0           #4 - Kfmr T-1, T-4, & K-5         12,600         16,598         83.1           #3 - Casa Blanca line         8,400         6,981         83.1           #4 - Bus tie         8,400         6,981         83.1           #4 - Bus tie         31,500         27,238         80.1           #5 - Rizerside line         31,500		#8 - Xfmr T-6	31,500	17,965	57.0
#1 - Xfmr T-1 & Vista line         21,000         17,246         82.1           #2 - University & Springs lines         31,500         15,580         49.5           #3 - Xfmr T-1 & T-2         21,000         17,246         82.1           #4 - Xfmr T-1 & T-2         21,000         17,246         82.1           #5 - Xfmr T-3 & T-4         19,000         17,246         82.1           #6 - Xfmr T-3 & T-4         19,000         17,246         82.1           #7 - Xfmr T-3 & T-4         19,000         17,246         82.1           #8 - Orangecrest & Vista lines         31,500         14,427         45.8           #1 - Xfmr T-5 & Mt. View line         21,000         16,598         79.0           #3 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79.0           #4 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79.0           #4 - Ktmr T-1, T-4, & Kaiser line         21,000         16,598         61.5           #3 - Casa Blanca line         8,400         6,981         83.1           #4 - Bus tie         31,500         22,506         71.4           #4 - Bus tie         31,500         27,627         86.1           #5 - Rizerside line         31,500         27,1	Kaiser	Fuse	17,500	15,667	89.5
#2 - University & Springs lines         31,300         15,360         49.5           La Colina         #3 - Ximr T-1 & T-2         21,000         17,246         63.9           #5 - Ximr T-2 & University line         21,000         17,246         63.9           #5 - Ximr T-3 & Chargecrest line         21,000         17,246         82.1           #6 - Ximr T-3 & Chargecrest line         21,000         17,246         82.1           #7 - Ximr T-3 & Orangecrest line         21,000         17,246         82.1           #8 - Orangecrest & Vista lines         31,500         14,427         45.8           #1 - Ximr T-3 & Kaiser line         21,000         16,598         79.0           #3 - Ximr T-1, X & Kaiser line         21,000         16,598         79.0           #4 - Ximr T-1, X & Kaiser line         21,000         16,598         79.0           #4 - Ximr T-1, X & Kaiser line         21,000         16,598         79.0           #5 - Siverside line         8,400         6,981         83.1           Magnolia         #4 - Bus tie         8,400         6,981         83.1           #1 - RERC line         31,500         22,506         71.4           #3 - Vista line         31,500         27,123         86.1 <t< td=""><td>· ·</td><td>#1 - Xfmr T-1 &amp; Vista line</td><td>21,000</td><td>17,246</td><td>82.1</td></t<>	· ·	#1 - Xfmr T-1 & Vista line	21,000	17,246	82.1
Ha         Xim         T-14         Springs line         21,000         17,240         62.1           #4         Xim         T-2         University line         27,000         17,246         63.9           #5         Xim         T-3         X         14         17,246         63.9           #7         Xim         T-3         X         14         17,246         82.1           #7         Xim         T-3         X         14         17,246         82.1           #7         Xim         T-3         X-4         19,000         17,246         82.1           #7         Xim         T-3         X-4         19,000         16,598         79.0           #3         Xim         T-2         & M.1         View line         21,000         16,598         79.0           #3         Xim         T-3         K Kaiser line         21,000         16,598         79.0           #4         Staiser line         8,400         6,981         83.1           #3         Casa Blanca line         8,400         6,981         83.1           #4         Stain         8,400         6,972         83.0           #1         RERC		#2 - University & Springs lines	31,500	15,580	49.5
La Colina # 2.11/00 17,246 82.1 #5 - Ximr T-2 & University line 21,000 17,246 82.1 #6 - Ximr T-3 & T-4 19,000 17,246 82.1 #7 - Ximr T-3 & Orangecrest line 21,000 17,246 82.1 #8 - Orangecrest & Vista lines 31,500 14,427 45.8 #1 - Ximr T-5 & Mt. View line 21,000 16,598 79.0 #3 - Ximr T-2 & Mt. View line 21,000 16,598 79.0 #6 - Ximr T-1, T-4, & Kaiser line 21,000 16,598 79.0 #6 - Ximr T-1, T-4, & Kaiser line 21,000 16,598 79.0 #6 - Ximr T-1, T-4, & Kaiser line 27,000 16,598 79.0 #7 - Ximr T-1, T-4, & Kaiser line 27,000 16,598 79.0 #7 - Ximr T-1, T-4, & Kaiser line 27,000 16,598 79.0 #8 - Ximr T-1, T-4, & Kaiser line 27,000 16,598 79.0 #8 - Ximr T-1, T-4, & T-5 12,600 16,598 79.0 #8 - Ximr T-1, T-4, & T-5 12,600 16,598 79.0 #8 - Ximr T-1, T-4, & T-5 12,600 16,598 79.0 #1 - RERC line 8,400 6,981 83.1 #5 - Riverside line 8,400 6,972 83.0 #1 - RERC line 31,500 25,284 80.3 #2 - Bus tie 31,500 27,667 87.8 #4 - Freeman line 31,500 27,123 86.1 #5 - Plaza line 31,500 27,123 86.1 #5 - Plaza line 31,500 27,123 86.1 #5 - Yimr T-2, T-4, T-6, & Bus tie 31,500 14,455 45.9 #7 - Ximr T-2, X -4, T-6, & Bus tie 31,500 14,455 45.9 #7 - Ximr T-2 & La Colina line 31,500 14,455 45.9 #7 - Ximr T-2 & La Colina line 31,500 14,455 45.9 #8 - Ximr T-2 & La Colina line 31,500 14,455 45.9 #8 - Ximr T-2 & La Colina line 31,500 14,455 45.9 #9 - Ximr T-2 & La Colina line 31,500 14,455 45.9 #1 - North Bus & GSU 1 31,500 34,592 #2 - Bus tie 21,000 12,792 60.9 #3 - Riverside line 31,500 34,592 #2 - Suth Bus & Mt. View line 31,500 34,592 #4 - North Bus & GSU 1 31,500 34,592 #4 - North Bus & GSU 2 31,500 34,592 #4 - North Bus & GSU 2 31,500 34,592 #4 - North Bus & GSU 2 31,500 34,592 #4 - North Bus & CSU 2 31,500 34,592 #4 - North Bus & Riverside line 31,500 34,592 #4 - North Bus & Riverside line 31,500 34,592 #4 - North Bus & Riverside line 31,500 34,592 Unit 3 - GSU 3 Wt. View line 31,500 34,592 Unit 3 - GSU 3 Wt. View line 31,500 34,592 Unit 3 - GSU 3 Wt. View line 31,500 34,592 Wt - North Bus & Riverside line 31,500 34,592 Wt - North Bus & Riversid		#3 - Almi 1-1 & 1-2 #4 - Yfmr T-4 & Springs line	27,000	17,240	63.0
Magnolia         Magnolia         Magnolia         Magnolia         Magnolia         Magnolia           H1 - Xfmr T-3 & T-4         19,000         17,246         14,427         45.8           #7 - Xfmr T-3 & Orangecrest & Vista lines         31,500         14,427         45.8           #1 - Xfmr T-5 & Mt. View line         21,000         16,598         79.0           #3 - Xfmr T-3 & Kaiser line         21,000         16,598         79.0           #4 - Xfmr T-3 & Kaiser line         21,000         16,598         79.0           #4 - Xfmr T-3 & Kaiser line         21,000         16,598         79.0           #4 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79.0           #4 - Xfmr T-3 & Kaiser line         21,000         16,598         79.0           #4 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79.0           #5 - Riverside line         8,400         6,981         83.1           Magnolia         #4 - Bus tie         8,400         6,981         83.1           #5 - Riverside line         31,500         22,506         71.4           #3 - Vista line         31,500         27,123         86.1           #6 - Harvey Lynn line         31,500         27,123	La Colina	#5 - Xfmr T-2 & University line	21,000	17 246	82.1
#7 - Xfmr T-3 & Orangecrest line         21,000         17,246         82.1           #8 - Orangecrest & Vista lines         31,500         14,427         45.8           #1 - Xfmr T-5 & Mt. View line         21,000         16,598         79.0           #3 - Xfmr T-2 & Mt. View line         21,000         16,598         79.0           #4 - Xfmr T-3 & Kaiser line         21,000         16,598         79.0           #6 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         81.1           #3 - Casa Blanca line         8,400         6,981         83.1           #3 - Casa Blanca line         8,400         6,981         83.1           #5 - Riverside line         31,500         25,284         80.3           #4 - Bus tie         8,400         6,981         83.1           #5 - Riverside line         31,500         25,266         71.4           #5 - Riverside line         31,500         27,123         86.1           #4 - Freeman line         31,500         27,123         86.1           #5 - Plaza line         31,500         27,123         86.1           #6 - Harvey Lynn line         31,500         14,455         45.9           #7 - Xfmr T-2, X - F 6, & Bus tie         31,500         14,45		#6 - Xfmr T-3 & T-4	19.000	17,246	90.8
#8 - Orangecrest & Vista lines         31,500         14,427         45.8           #1 - Xfmr T-5 & Mt. View line         21,000         16,598         79.0           #3 - Xfmr T-2 & Mt. View line         21,000         16,598         79.0           #4 - Xfmr T-3 & Kajser line         21,000         16,598         79.0           #4 - Xfmr T-1, T-4, & Kajser line         21,000         16,598         61.5           #7 - Xfmr T-1, T-4, & T-5         12,600         16,598         83.1           #3 - Casa Blanca line         8,400         6,981         83.1           #4 - Bus tie         8,400         6,981         83.1           #5 - Riverside line         31,500         25,284         80.3           #2 - Bus tie         31,500         22,506         71.4           #3 - Vista line         31,500         27,667         87.8           #4 - Freeman line         31,500         27,123         86.1           #5 - Plaza line         31,500         27,123         86.1           #6 - Harvey Lynn line         31,500         27,123         86.1           #5 - Streeman line         31,500         14,455         45.9           #2 - Xfmr T-1 & Springs line         31,500         14,455         45.9<		#7 - Xfmr T-3 & Orangecrest line	21,000	17,246	82.1
#1 - Xfmr T-5 & Mt. View line         21,000         16,598         79.0           Harvey Lynn         #4 - Xfmr T-3 & Kaiser line         21,000         16,598         79.0           #4 - Xfmr T-3 & Kaiser line         21,000         16,598         79.0           #6 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79.0           #6 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79.0           #7 - Xfmr T-1, T-4, & Kaiser line         21,000         16,598         79.0           #3 - Casa Blanca line         8,400         6,981         83.1           #4 - Bus tie         8,400         6,981         83.1           #5 - Riverside line         31,500         25,284         80.3           #2 - Bus tie         31,500         25,284         80.3           #2 - Bus tie         31,500         22,506         71.4           #3 - Vista line         31,500         27,123         86.1           #4 - Freeman line         31,500         27,123         86.1           #4 - Freeman line         31,500         14,455         45.9           #2 - Xfmr T-1 & Freeman line         31,500         14,455         45.9           #2 - Xfmr T-2 & La Colina line         31,500 <td></td> <td>#8 - Orangecrest &amp; Vista lines</td> <td>31,500</td> <td>14,427</td> <td>45.8</td>		#8 - Orangecrest & Vista lines	31,500	14,427	45.8
#3 - Xfmr T-2 & Mt. View line         21,000         16,598         79.0           Harvey Lynn         #4 - Xfmr T-3 & Kaiser line         21,000         16,598         79.0           #6 - Xfmr T-1, T-4, & Kaiser line         27,000         16,598         61.5           #7 - Xfmr T-1, T-4, & T-5         12,600         16,598         10.5           #3 - Casa Blanca line         8,400         6,981         83.1           #4 - Bus tie         8,400         6,981         83.1           #5 - Riverside line         8,400         6,972         83.0           #4 - Bus tie         31,500         25,284         80.3           #2 - Bus tie         31,500         22,506         71.4           #3 - Vista line         31,500         27,667         87.8           #4 - Freeman line         31,500         27,123         86.1           #5 - Plaza line         31,500         27,123         86.1           #5 - Rarey Lynn line         31,500         14,455         45.9           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         14,455         45.9           #7 - Xfmr T-2, T-4, T-6, & La Colina line         31,500         14,455         45.9           #8 - Xfmr T-2 & Springs line         31,500		#1 - Xfmr T-5 & Mt. View line	21,000	16,598	79.0
Harvey Lynn       #4 - Xfmr T-3 & Kaiser line       21,000       16,598       79.0         #6 - Xfmr T-1, T-4, & Kaiser line       27,000       16,598       61.5         #7 - Xfmr T-1, T-4, & T-5       12,600       16,598       61.5         Magnolia       #3 - Casa Blanca line       8,400       6,981       83.1         #4 - Bus tie       8,400       6,981       83.1         #5 - Riverside line       8,400       6,972       83.0         #1 - RERC line       31,500       25,284       80.3         #2 - Bus tie       31,500       25,284       80.3         #2 - Bus tie       31,500       27,667       87.8         #4 - Freeman line       31,500       27,123       86.1         #5 - Plaza line       31,500       27,123       86.1         #6 - Harvey Lynn line       31,500       27,123       86.1         #6 - Harvey Lynn line       31,500       14,455       45.9         #7 - Xfmr T-1 & Freeman line       31,500       14,455       45.9         #7 - Xfmr T-2, T-4, T-6, & Bus tie       31,500       14,455       45.9         #8 - Xfmr T-1 & Springs line       31,500       14,455       45.9         #8 - Xfmr T-2 & La Colina line       3		#3 - Xfmr T-2 & Mt. View line	21,000	16,598	79.0
#6 - Xfmr 1-1, 1-4, & Kaiser line         27,000         16,598         61.5           #7 - Xfmr 1-1, 1-4, & T-5         12,600         16,598         61.5           Magnolia         #3 - Casa Blanca line         8,400         6,981         83.1           #5 - Riverside line         8,400         6,981         83.1           #5 - Riverside line         8,400         6,981         83.1           #5 - Riverside line         31,500         22,284         80.3           #1 - RERC line         31,500         22,506         71.4           #3 - Vista line         31,500         22,525         80.1           #5 - Plaza line         31,500         25,235         80.1           #5 - Plaza line         31,500         27,123         86.1           #6 - Harvey Lynn line         31,500         27,123         86.1           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         14,455         45.9           #7 - Xfmr T-3, & Freeman line         31,500         14,455         45.9           #7 - Xfmr T-1 & Springs line         31,500         14,455         45.9           #8 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-2 & La Colina line         31,500	Harvey Lynn	#4 - Xfmr T-3 & Kaiser line	21,000		79.0
#7 - Xtmr 1-1, 1-4, & 1-5         12,000         16,998           Magnolia         #3 - Casa Blanca line         8,400         6,981         83.1           #4 - Bus tie         8,400         6,981         83.1           #5 - Riverside line         8,400         6,981         83.1           #5 - Riverside line         8,400         6,972         83.0           #1 - RERC line         31,500         25,284         80.3           #2 - Bus tie         31,500         22,506         71.4           #3 - Vista line         31,500         27,667         87.8           #4 - Freeman line         31,500         27,123         86.1           #5 - Plaza line         31,500         27,123         86.1           #5 - Riverside line         31,500         27,123         86.1           #6 - Atmrey Lynn line         31,500         14,455         45.9           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         14,455         45.9           #1 - Xfmr T-3 & Freeman line         31,500         14,455         45.9           #6 - Xfmr T-1 & Springs line         31,500         14,455         45.9           #6 - Xfmr T-2 & La Colina line         31,500         14,455         45.9 <tr< td=""><td></td><td>#6 - Xfmr T-1, T-4, &amp; Kaiser line</td><td>27,000</td><td>16,598</td><td>61.5</td></tr<>		#6 - Xfmr T-1, T-4, & Kaiser line	27,000	16,598	61.5
Magnolia         #3 - Casa Bianca line         8,400         6,981         83.1           #4 - Bus tie         8,400         6,981         83.1           #5 - Riverside line         8,400         6,972         83.0           #1 - RERC line         31,500         22,506         71.4           #3 - Vista line         31,500         22,506         71.4           #3 - Vista line         31,500         25,235         80.1           #5 - Piaza line         31,500         25,235         80.1           #6 - Harvey Lynn line         31,500         27,123         86.1           #6 - Harvey Lynn line         31,500         27,123         86.1           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #7 - Xfmr T-1 & Freeman line         31,500         14,455         45.9           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         14,455         45.9           #8 - Xfmr T-1 & Freeman line         31,500         14,455         45.9           #6 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #7 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #8 - Xfmr T-2 & Springs line         31,500		#/ - Ximr I-1, I-4, & I-3	12,600	10,090	02.4
Minghond         #F- Busite         0,901         0,971         001           #5 - Riverside line         8,400         6,972         83.0           #1 - RERC line         31,500         22,284         80.3           #2 - Busite         31,500         22,506         71.4           #3 - Vista line         31,500         27,667         87.8           #4 - Freeman line         31,500         27,235         80.1           #5 - Plaza line         31,500         27,123         86.1           #6 - Harvey Lynn line         31,500         27,123         86.1           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         14,455         45.9           #7 - Xfmr T-1 & Freeman line         31,500         14,455         45.9           #2 - Xfmr T-1 & Springs line         31,500         14,455         45.9           #6 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #6 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #7 - S & La Colina line         31,500         14,455         45.9           #8 - Xfmr T-5 & La Colina line         31,500	Magnolia	#3 - Casa bianca line	8,400	6 981	83.1
Mt. View         #1 - RERC line         31,500         25,284         80.3           #2 - Bus tie         31,500         22,506         71.4           #3 - Vista line         31,500         22,506         71.4           #3 - Vista line         31,500         22,506         71.4           #3 - Vista line         31,500         27,667         87.8           #4 - Freeman line         31,500         25,235         80.1           #5 - Plaza line         31,500         27,123         86.1           #6 - Harvey Lynn line         31,500         27,123         86.1           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         14,455         45.9           #2 - Xfmr T-1 & Freeman line         31,500         14,455         45.9           #2 - Xfmr T-1 & Springs line         31,500         14,455         45.9           #6 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #8 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #1 - Mt. View line         31,500 <t< td=""><td>Magnolia</td><td>#5 - Riverside line</td><td>8 400</td><td>6,972</td><td>83.0</td></t<>	Magnolia	#5 - Riverside line	8 400	6,972	83.0
#2 - Bus tie         31,500         22,506         71.4           #3 - Vista line         31,500         27,667         87.8           #4 - Freeman line         31,500         25,235         80.1           #5 - Plaza line         31,500         27,123         86.1           #6 - Harvey Lynn line         31,500         27,123         86.1           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #1 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #1 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         14,455         45.9           #2 - Xfmr T-1 & Springs line         31,500         14,455         45.9           #5 - Xfmr T-2 & Springs line         31,500         14,455         45.9           #6 - Xfmr T-2 & Springs line         31,500         14,455         45.9           #8 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #1 - Mt. View line         21,000         12,792         60.9           #2 - Bus tie         21,000         12,792         60.9           #3 - Riverside line         31,500         3		#1 - RERC line	31,500	25,284	80.3
Mt. View         #3 - Vista line         31,500         27,667         87.8           Mt. View         #4 - Freeman line         31,500         25,235         80.1           #5 - Plaza line         31,500         27,123         86.1           #6 - Harvey Lynn line         31,500         27,123         86.1           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #1 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #1 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         14,455         45.9           #2 - Xfmr T-1 & Springs line         31,500         14,455         45.9           #5 - Xfmr T-2 & Springs line         31,500         14,455         45.9           #6 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #8 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #1 - Mt. View line         21,000         12,792         60.9           #1 - Mt. View line         31,500         34,592         44.9           #2 - GSU 1 & Mt. View line         31,500         34,592         44.9		#2 - Bus tie	31,500	22,506	71.4
Mt. View         #4 - Freeman line         31,500         25,235         80.1           #5 - Plaza line         31,500         27,123         86.1           #6 - Harvey Lynn line         31,500         28,569         990.7           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #1 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         14,455         45.9           #2 - Xfmr T-1 & Freeman line         31,500         14,455         45.9           #5 - Xfmr T-1 & Springs line         31,500         14,455         45.9           #6 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #8 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #1 - Mt. View line         21,000         12,792         60.9           #1 - Mt. View line         21,000         12,792         60.9           #2 - Bus tie         21,000         12,792         60.9           #3 - Riverside line         31,500         34,592         44.9           #2 - GSU 1 & Mt. View l		#3 - Vista line	31,500	27,667	87.8
#5 - Plaza line         31,500         27,123         86.1           #6 - Harvey Lynn line         31,500         28,569         90.7           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #1 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #1 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         14,455         45.9           #2 - Xfmr T-1 & Springs line         31,500         14,455         45.9           #5 - Xfmr T-2 & Springs line         31,500         14,455         45.9           #6 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #8 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #1 - Mt. View line         21,000         12,792         60.9           #1 - Mt. View line         21,000         12,792         60.9           #2 - Bus tie         21,000         12,792         60.9           #3 - Riverside line         31,500         34,592         44.9           #2 - GSU 1 & Mt. View line	Mt. View	#4 - Freeman line	31,500	25,235	80.1
#6 - Harvey Lynn line         31,500         28,569         90.7           #7 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #1 - Xfmr T-2, T-4, T-6, & Bus tie         31,500         27,123         86.1           #1 - Xfmr T-5 & Freeman line         31,500         14,455         45.9           #2 - Xfmr T-1 & Freeman line         31,500         14,455         45.9           #5 - Xfmr T-1 & Springs line         31,500         14,455         45.9           #6 - Xfmr T-2 & Springs line         31,500         14,455         45.9           #6 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #8 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #1 - Mt. View line         21,000         12,792         60.9           #1 - Mt. View line         21,000         12,792         60.9           #2 - Bus tie         21,000         12,792         60.9           #3 - Riverside line         31,500         34,592         44.9           #2 - GSU 1 & Mt. View line <td></td> <td>#5 - Plaza line</td> <td>31,500</td> <td>27,123</td> <td>86.1</td>		#5 - Plaza line	31,500	27,123	86.1
#f - Xmr 1-2, 1-4, 1-6, & Bus tie         31,500         27,123         86.1           #1 - Xfmr T-5 & Freeman line         31,500         14,455         45.9           #2 - Xfmr T-1 & Freeman line         31,500         14,455         45.9           #5 - Xfmr T-1 & Springs line         31,500         14,455         45.9           #6 - Xfmr T-2 & Springs line         31,500         14,455         45.9           #8 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #8 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #1 - Mt. View line         21,000         12,792         60.9           #1 - Mt. View line         21,000         12,792         60.9           #3 - Riverside line         21,000         12,792         60.9           #3 - Riverside line         31,500         34,592         44.9           #4 - North Bus & GSU 1         31,500         34,592         45.9           #4 - North Bus & GSU 2         31,500         34,592         45.92           #5 - GSU 2 & Riverside line		#6 - Harvey Lynn line	31,500	28,569	90.7
mill         Aim 1-5 & Freeman line         31,500         14,455         45.9           Orangecrest         #2 - Xfmr T-1 & Freeman line         31,500         14,455         45.9           #5 - Xfmr T-1 & Springs line         31,500         14,455         45.9           #6 - Xfmr T-2 & Springs line         31,500         14,455         45.9           #8 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-2 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           #1 - Mt. View line         21,000         12,792         60.9           #2 - Bus tie         21,000         12,792         60.9           #3 - Riverside line         21,000         12,792         60.9           #3 - Riverside line         31,500         34,592         44.9           #4 - North Bus & GSU 1         31,500         34,592         44.9           #4 - North Bus & GSU 2         31,500         34,592         45.92           #5 - GSU 2 & Riverside line         31,500         34,592         45.92		#/ - XIMT 1-2, 1-4, 1-6, & Bus tie	31,500	27,123	86.1
Provide         Provide <t< td=""><td></td><td>#1 - AIMF 1-5 &amp; Freeman line</td><td>31,500</td><td>14,455</td><td>45.9</td></t<>		#1 - AIMF 1-5 & Freeman line	31,500	14,455	45.9
Orangecrest         International springs internation international springs internation international springs internation internation international springs internation international springs international springs international springs international springs international springs internatindusprings international springematch springs internati		#5 - Xfmr T-1 & Springe line	31,500	14,400	45.9
#8 - Xfmr T-2 & La Colina line       31,500       14,455       45.9         #9 - Xfmr T-5 & La Colina line       31,500       14,455       45.9         #9 - Xfmr T-5 & La Colina line       31,500       14,455       45.9         #1 - Mt. View line       21,000       12,792       60.9         #2 - Bus tie       21,000       12,792       60.9         #3 - Riverside line       21,000       12,792       60.9         #3 - Riverside line       21,000       12,792       60.9         #3 - Riverside line       31,500       34,592         #2 - GSU 1 & Mt. View line       31,500       32,433         #3 - South Bus & Mt. View line       31,500       34,592         #4 - North Bus & GSU 2       31,500       34,592         #5 - GSU 2 & Riverside line       31,500       34,592         Unit 3 - GSU 3       Werside line       31,500       34,592         Unit 3 - GSU 3       Werside line       31,500       34,592         Unit 4 - GSU4       Werside line       31,500       34,592	Orangecrest	#6 - Xfmr T-2 & Springs line	31,500	14 455	45.9
#9 - Xfmr T-5 & La Colina line         31,500         14,455         45.9           Plaza         #1 - Mt. View line         21,000         12,792         60.9           #3 - Riverside line         21,000         12,792         60.9           #3 - Riverside line         21,000         12,792         60.9           #4 - North Bus & GSU 1         31,500         34,592           #2 - GSU 1 & Mt. View line         31,500         32,433           #3 - South Bus & Mt. View line         31,500         34,592           #4 - North Bus & GSU 2         31,500         34,592           #4 - North Bus & GSU 2         31,500         34,592           #5 - GSU 2 & Riverside line         31,500         34,592           #5 - GSU 2 & Riverside line         31,500         34,592           Unit 3 - GSU 3         W NEW         34,592           Unit 4 - GSU4         NEW         34,592		#8 - Xfmr T-2 & La Colina line	31.500	14.455	45.9
Plaza         #1 - Mt. View line         21,000         12,792         60.9           #2 - Bus tie         21,000         12,792         60.9           #3 - Riverside line         21,000         12,792         60.9           #3 - Riverside line         21,000         12,792         60.9           #1 - North Bus & GSU 1         31,500         34,592           #2 - GSU 1 & Mt. View line         31,500         32,433           #3 - South Bus & Mt. View line         31,500         34,592           #4 - North Bus & GSU 2         31,500         34,592           #5 - GSU 2 & Riverside line         31,500         32,433           #6 - South Bus & Riverside line         31,500         34,592           Unit 3 - GSU 3         WINEW         34,592           Unit 4 - GSU4         NEW         34,592		a Blanca         #2 - Xfmr T-3         25,000           #4 - Xfmr T-3 & T-4         8,400           #5 - Magnolia line         8,400           #1 - Xfmr AT-1 & Mt. View line         12,600           #1 - Xfmr T-4 & T-6         31,500           #12 - Xfmr T-1 & Mt. View line         24,000           #13 - Xfmr T-5 & Orangecrest line         12,600           #14 - Xfmr T-5 & Kaiser line         24,000           #8 - Xfmr T-6 & Kaiser line         24,000           #8 - Xfmr T-6 & Kaiser line         21,000           #9 - Xfmr AT-1 & Vista line         31,500           #7 - Casa Blanca line         8,400           #1 - Vista line         31,500           #7 - Casa Blanca line         31,500           #7 - Casa Blanca line         31,500           #7 - Stmr T-1, T-2, T3, & T-4         31,500           #3 - Riverside line         31,500           #4 - University line         31,500           #6 - Xfmr T-2 & T-5         24,000           #7 - Xfmr T-1 & Vista line         21,000           #4 - Xfmr T-3 & Strangecrest line         21,000           #3 - Xfmr T-1 & Vista line         21,000           #3 - Xfmr T-2 & University line         21,000           #4 - Xfmr T-3 & Crangecrest line	14,455	45.9	
Plaza         #2 - Bus tie         21,000         12,792         60.9           #3 - Riverside line         21,000         12,792         60.9           #1 - North Bus & GSU 1         31,500         34,592           #2 - GSU 1 & Mt. View line         31,500         32,433           #3 - South Bus & Mt. View line         31,500         34,592           #4 - North Bus & GSU 2         31,500         34,592           #5 - GSU 2 & Riverside line         31,500         32,433           #6 - South Bus & Riverside line         31,500         34,592           Unit 3 - GSU 3         W NEW         34,592           Unit 4 - GSU4         NEW         34,592		#1 - Mt. View line	21,000	12,792	60.9
#3 - Riverside line         21,000         12,792         60.9           #1 - North Bus & GSU 1         31,500         34,592           #2 - GSU 1 & Mt. View line         31,500         32,433           #3 - South Bus & Mt. View line         31,500         34,592           #4 - North Bus & GSU 2         31,500         34,592           #5 - GSU 2 & Riverside line         31,500         32,433           #6 - South Bus & Riverside line         31,500         32,433           Unit 3 - GSU 3         W NEW         34,592           Unit 4 - GSU4         NEW         34,592	Plaza	#2 - Bus tie	21,000	12,792	60.9
#1 - North Bus & GSU 1         31,500         34,592           #2 - GSU 1 & Mt. View line         31,500         32,433           #3 - South Bus & Mt. View line         31,500         34,592           #4 - North Bus & GSU 2         31,500         34,592           #5 - GSU 2 & Riverside line         31,500         32,433           #6 - South Bus & Riverside line         31,500         34,592           Unit 3 - GSU 3         W NEW         34,592           Unit 4 - GSU4         NEW         34,592		#3 - Riverside line	21,000	12,792	60.9
#2 - GSU 1 & Mt. View line         31,500         32,433           #3 - South Bus & Mt. View line         31,500         34,592           #4 - North Bus & GSU 2         31,500         34,592           #5 - GSU 2 & Riverside line         31,500         32,433           #6 - South Bus & Riverside line         31,500         32,433           Unit 3 - GSU 3         WEW         34,592           Unit 4 - GSU4         WEW         34,592		#1 - North Bus & GSU 1	31,500	34,592	
#3 - South Bus & Mt. View line         31,500         34,592           RERC         #4 - North Bus & GSU 2         31,500         34,592           #5 - GSU 2 & Riverside line         31,500         32,433           #6 - South Bus & Riverside line         31,500         34,592           Unit 3 - GSU 3         WEW         34,592           Unit 4 - GSU4         WEW         34,592		#2 - GSU 1 & Mt. View line	31,500	4,813       53         20,383       64         20,383       84         20,383       84         20,383       84         20,383       84         20,383       84         20,383       84         20,383       84         20,383       84         20,383       84         20,383       84         20,383       84         20,383       64         9,023       90         19,766       65         20,576       20         20,000       65         17,965       55         17,965       55         17,965       55         17,246       82         17,246       82         17,246       82         17,246       82         17,246       82         17,246       82         17,246       82         16,598       75         16,598       75         16,598       75         16,598       75         16,598       75         16,598       75         16,598	
RERC         #+ - Notifi bus & 630 2         31,500         34,992           #5 - GSU 2 & Riverside line         31,500         32,433           #6 - South Bus & Riverside line         31,500         34,592           Unit 3 - GSU 3         WEW         34,592           Unit 4 - GSU4         WEW         34,592		#3 - SOUTH BUS & ML VIEW IINE	31,500	34,592	
#6 - South Bus & Riverside line         31,500         32,453           Unit 3 - GSU 3         WEW         34,592           Unit 4 - GSU4         NEW         34,592	RERC	#5 - GSU 2 & Riverside line	31,500	32 433	
Unit 3 - GSU 3		#6 - South Bus & Riverside line	31,500	34,592	
Unit 4 - GSU4		Unit 3 - GSU 3	NEW	34.592	
		Unit 4 - GSU4	NEW	34,315	-

Table 4: Results of Breaker Rating Analysis - Sensitivity Case

Station	Breaker	Device Rating (A)	Fault Current (A)	Duty (%)
	#1 - Xfmr AT-1 33 kV	8,400	8,890	
	#2 - Xfmr AT-2 33 kV	8,400	8,911	
	#4 - Bus tie 33 kV	25,000	14,938	59.8
	#5 - Xfmr T-2 & Bus tie	25,000	14,938	59.8
	#6 - Magnolia line	25,000	14,938	59.8
	#1N - Xfmr AT-1	31,500	25,824	82.0
	#1S - Vista #1 line	31,500	25,824	82.0
	#1T - Xfmr AT-1 & Vista #1 line tie	27,000	25,824	<b>19516</b>
Riverside	#2N - Xfmr AT-2	27,000	25,824	MAD5/6
	#2S - Vista #2 line	31,500	25,824	82.0
	#2T - Xfmr AT-2 & Vista #2 line tie	31,500	25,824	82.0
	#3N - RERC line	31,500	25,824	82.0
	#3S - Hunter line	31,500	25,824	82.0
	#3T - RERC & Hunter lines tie	31,500	23,295	74.0
	#4N - North Bus & Plaza line	31,500	25,824	82.0
	#4S - South Bus & Xfmr T-5	31,500	25,824	82.0
	#4T - Xfmr T-5 & Plaza line tie	31,500	24,260	77.0
	#1 - GSU 1 & La Colina line	31,500	12,066	38.3
	#2 - Xfmr T-1 & La Colina line	31,500	13,585	43.1
Springs	#3 - Xfmr T-1 & GSU 2	31,500	13,585	43.1
Springs	#5 - GSU 2 & Orangecrest line	31,500	12,066	38.3
	#6 - Xfmr T-2 & Orangecrest line	40,000	13,585	34.0
	#8 - Xfmr T-2 & GSU 1	40,000	13,585	34.0
	#1 - Hunter line	31,500	10,892	34.6
University	#3 - Bus tie	31,500	10,892	34.6
	#5 - La Colina line	31,500	10,892	34.6

Table 4: Results of Breaker Rating Analysis - Sensitivity Case