Russell City Energy Center

Appendix 6-A
Generator Interconnection Data Sheet

May 2001

Russell City Energy Center AFC

May 2001

Pacific Gas and Electric Company™

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Generator Interconnection Data Sheet

For Wholesale Generators Connected

to the PG&E Electric System

at Voltages 60 kV and Above

Generator Interconnection Data Sheet

Note: Generators who are submitting a Completed Application pursuant to PG&E's Transmission Owners Tariff must completely fill out this Generator Interconnection Data Sheet as an integral part of their application.

1. General Project Information

A.

Project Name	Russel City Energy Center
Street Address	3636 Enterprize Avenue
City, State	Hayward, CA
Zip Code	94548
Phone Number	925.600.2074
Fax Number	925.600.8926
Email Address	billt@calpine.com

B.

Developer Name	Calpine/Bechtel
Street Address	6700 Koll Center Parkway, Suite 200
City, State	Pleasanton, CA
Zip Code	94566
Phone Number	925.600.2074
Fax Number	925.600.8926
Email Address	billt@calpine.com

C.

Site Owner Name	Calpine/Bechtel
Street Address	3636 Enterprize Avenue
City, State	Hayward, CA
Zip Code	94545
Phone Number	925.600.2074
Fax Number	925.600.8926
Email Address	billt@calpine.com

D. The anticipated operation date: July 01, 2004

2. Type of Project (select one)

Cogeneration	_____	Reciprocating. Engine	_____
Biomass	_____	Steam Turbine	_____
Gas Turbine	_____	Wind	_____
Hydro	_____	Other Describe: 2 x 2 x 1 Combined Cycle Wholesale Generator	_____
Photovoltaic	_____		

3. Maximum generator power delivered to PG&E grid at Point of Interconnection

Generator rated output	+	635,000	kW
Less generator auxiliary load:	-	15,000	kW
Maximum net power delivered to PG&E Grid:	=	620,000	kW
Standby load to be served when generator is OFF:	–	1,000	kW

4. Generator Information

A.	Manufacturer	Siemens Westinghouse	CTGs (2)	STG
B.	Year Manufactured	2002		
C.	Rated Size:	kW:	214,200	235,000
		KVA:	252,000	277,000
		Terminal Voltage	15,000	18,000
		Power Factor (%):	.85	.85
D.	Type: (select one)	Induction:	_____	_____
		Synchronous:	X	X
		D.C. with Inverter:	_____	_____
E.	Synchronizing			
		Auto	X	X
		Manual	X	X
		Relay Supervision (y/n)	Yes	Yes
F.	Voltage:			
		Output	15	18
		Interconnection	230	230

G.	Phase: (select one)	1ϕ	_____	_____
		3ϕ	X	X
H.	Connection (select one)	Delta	_____	_____
		Grounded WYE	X	X
		Ungrounded	_____	_____
I.	Inertia Constant (if known)	CTG: 129,440 Generator + Exciter WR^2 (lbf x ft^2) STG: To be provided later		
J.	Generator Voltage Regulation Range	± 5%		
K.	Generator Power Factor Regulation Range	0.85 lagging to 0.95 leading		

5. Generating Grounding

If the generator output is greater than 40kW (individually or as an aggregate group), ground protection will be required. If grounding will be required, please indicate type of ground detection below:

Wye Grounded/Delta Ground Bank with Overcurrent Relay	_____
Wye Grounded/Broken Delta[1]: Ground Bank with Low Pick-up Overvoltage Relay	_____
Current Transformer with Overcurrent Relay: In Neutral of Dedicated Transformer	_____
Potential Transformer with Voltage Relay[1]: In Neutral of Dedicated Transformer	X
Other: _____	_____

[1] This is PG&E's preferred ground detection.

6. Step-Up Transformer Data (Note: these transformer ratings are preliminary&estimated)

A. Rated MVA 252 MVA

B. Cooling Type OA/FA/FA

C. Impedance - Z 10 5 % Impedance

D. Primary Voltage 236 ~~KW~~ KV

Secondary Voltage 15___ ~~KW~~ KV

E. Available H.V. Taps

247.8	kV	Available L.V. Taps	_____ kV
241.9	kV		_____ kV
236.0	kV		_____ kV
230.1	kV		_____ kV
224.2	kV		_____ kV
_____	kV		_____ kV

F. Please indicate present tap settings: H.V Tap: 236 kV kV

L.V Tap: _____ kV

G. Does transformer have tap changing under load? ___No_____

H. Is transformer a regulating-type transformer? No

If yes, please indicate regulating voltage range and the number of steps.

_____ kV to _____ kV Number of steps _____

I. Please indicate how the transformer windings are connected:

H.V. Side:			L.V. Side:		
	____	Wye		____	Wye
	__X	Grounded Wye		____	Grounded Wye
	____	Delta		__X	Delta

J. Transformer Fuse Type: ___Later Size ___Later

K. If the transformer test report is not available, please provide the following impedances using the MVA base given in (10.A) above:

R_T	per unit resistance	.15%	pu
X_T	per unit reactance	10 %	pu
B_T	per unit magnetizing susceptance	LATER	pu
G_T	per unit core loss conductance	LATER	pu

L. Other comments regarding the transformer?

_____

_____

M Desired transformer connection:

Delta Grounded Wye Ungrounded Wye

PG&E Side	_____	X	_____
Generator Side	X	_____	_____

7. Please provide two original prints and one reproducible copy (no larger than 36" x 24") of the following:

A. SITE DRAWING to scale, showing generator location and point of interconnection with PG&E.

B. For generation greater than 1000 kW provide the following:
   1) Substation grounding drawings showing all ground connections.
   2) A list of the amount and location of the shunt capacitor compensation that will be provided (induction generators only).

C. SINGLE LINE DIAGRAM, showing switches/disconnects of the proposed interconnection, including the required protection devices and breakers.

D. THREE LINE DIAGRAM, showing the proposed CTS and PTs as they are connected to the relays and meters.

E. DESCRIPTION of operation and elementary drawings, showing the synchronization (if appropriate), and tripping of breakers by the required relays. (If not provided, they may be requested after approval of the single and three line diagrams.) LATER

F. LIST of relays, switches and revenue meters (if customer provided), disconnects, etc., specified to meet the requirements of PG&E's Interconnection Handbook and include the following information:.
   1) Manufacturer's name and model number, with each device listed. LATER
   2) Range of available settings. LATER
   3) Proposed settings. LATER
   4) Ratio of associated current and potential transformers. If multi-ratio, state the available ratios and which one is proposed. LATER

8. Proposed breaker(s) will be equipped with[2]:

Undervoltage Release	_____
D.C. Trip	X

9. The following information is required for Induction Generators only.

Do you wish reclose blocking? Yes ___, No ___ (N/A)

Note: we test automatically. Sufficient capacitance may be on the line now, or in the future, and your generator may self-excite unexpectedly.

[2] Capacitor Trip is not acceptable.

Information contained in Sections 10 through 15 is required only for Synchronous Generators. It is acceptable to provide IEEE block diagrams for the dynamic data specified in Sections 10 through 15.

(IEEE Block Diagrams have been provided in lieu of completing Sections 10 through 15 in "ATTACHMENT 2")

10. Synchronous Generator – General Data:

A.	Rated Generator speed	_____	rpm
B.	Number of Poles	_____	
C.	Rated Generator Power Factor	_____	
D.	Generator Efficiency at Rated Load	_____	%
E.	Moment of Inertia (Turbine plus Generator) ωR^2	_____	lb-ft^2
F.	Inertia Time Constant (on machine base) H:	_____	sec or MJ/MVA
G.	SCR (Short-Circuit Ratio - the ratio of the field current required for rated open-circuit voltage to the field current required for rated short-circuit current.	_____	
H.	Typical Generator Auxiliary Load	_____	MW
I.	Maximum Power Output	_____	MW
J.	Please attach generator reactive capability curves. If these curves are not available, provide the maximum and minimum reactive limits	Q_{MAX}: _____	MVAR, lagging
		Q_{MIN}: _____	MVAR, leading
K.	Rated Hydrogen Cooling Pressure (Steam Units only)	_____	psig
L.	Please attach a simple one-line diagram that includes the generator step-up transformer bank, plant load, meter, and transmission-level bus.		
M.	Please attach a plot of generator terminal voltage versus field current that shows the air gap line, the open-circuit saturation curve, and the saturation curve at full load and rated power factor.		

11. Synchronous Generator – Impedence:

A.	X_d	direct-axis unsaturated synchronous reactance	_____	pu
B.	X_q	quadrature-axis unsaturated synchronous reactance	_____	pu
C.	X'_d	direct-axis unsaturated transient reactance	_____	pu
D.	X'_{ds}	direct-axis saturated transient reactance	_____	pu
E.	X'_q	quadrature-axis unsaturated transient reactance	_____	pu
F.	X'_{qs}	quadrature-axis saturated transient reactance	_____	pu

G.	X''_d	direct-axis unsaturated subtransient reactance	_____	pu
H.	X''_{ds}	direct-axis saturated subtransient reactance	_____	pu
I.	X''_q	quadrature-axis unsaturated subtransient reactance	_____	pu
J.	X''_{qs}	quadrature-axis saturated subtransient reactance	_____	pu
K.	X_L	stator leakage reactance or Potier reactance	_____	pu
L.	R_a	armature resistance	_____	pu
M.	X_2	negative sequence reactance (saturated/unsaturated)	_____/_____	pu
N.	X_0	zero sequence reactance (saturated/unsaturated)	_____/_____	pu

12. Synchronous Generator – Time Constants:

A.	T_{q0}	direct-axis transient open-circuit time constant	_____	sec
B.	T'_{q0}	quadrature-axis open-circuit time constant	_____	sec
C.	T''_{q0}	direct-axis subtransient open-circuit time constant	_____	sec
D.	T''_{q0}	quadrature-axis subtransient open-circuit time constant	_____	sec
E.	$T_{A\ GEN}$	armature short-circuit time constant	_____	sec
F.	T'_D	direct-axis transient short-circuit time constant	_____	sec
G.	T'_Q	quadrature-axis transient short-circuit time constant	_____	sec
H.	T''_D	direct-axis subtransient short-circuit time constant	_____	sec
I.	T''_Q	quadrature-axis subtransient short-circuit time constant	_____	sec

13. Excitation System Information

Please indicate, in the space provided on the left, the excitation system used for your generator.

A. Rotating DC commutator exciter with continuously acting regulator. The regulator power source is independent of the generator terminal voltage and current.

Manufacturer _____, Type _____

B. Rotating DC commentator exciter with continuously acting regulator. The regulator power source is bus fed from the generator terminal voltage.

Manufacturer _____, Type _____

C. Rotating DC commutator exciter with non-continuously acting regulator (i.e., regulator adjustments are made in discrete increments).

Manufacturer _____, Type _____

D. Rotating AC Alternator Exciter with non-controlled (diode) rectifiers. The regulator power source is independent of the generator terminal voltage and current (not bus-fed).

Manufacturer _____, Type _____

E. Rotating AC Alternator Exciter with controlled (thyristor) rectifiers. The regulator power source is fed from the exciter output voltage.

Manufacturer _____, Type _____

F. Rotating AC Alternator Exciter with controlled (thyristor) rectifiers.

Manufacturer _____, Type _____

G. Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from the generator terminal voltage.

Manufacturer _____, Type _____

H. Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from a combination of generator terminal voltage and current (compound-source controlled rectifiers system.

Manufacturer _____, Type _____

I. Please attach a copy of the instruction manual for your excitation system. Make sure that a block diagram or schematic of the excitation system is included in the manual. The diagram should show the input, output, and all feedback loops of the excitation system.

J. If the manufacturer's data for the excitation system (i.e., time constants, gains, and saturation curves) are available, please attach these also.

K. What is the excitation system response ratio (ASA)?

L. What is the rated exciter output voltage at full load? _____ volts

M. What is the maximum exciter output voltage (ceiling voltage)? _____ volts

N. Other comments regarding the excitation system?

_____

_____

_____

_____

_____

_____

_____

14. Power System Stabilizer Information (supplementary excitation system)

(Note: Complete this section only if your machine has PSS control.)

A. Manufacturer: _____

B. Is your PSS digital or analog? _____

C. What is the actuating signal (the input signal) for your PSS?

_____ Bus frequency _____ Shaft slip _____ Accelerating power
_____Other

If "Other", indicate signal _____.

D. Please attach a copy of the instruction manual for your PSS. The manual should include a block diagram or schematic of the PSS and the correspondence between dial settings and the time constants or PSS gain.

E. Please attach a copy of the test report for your PSS. This report should contain the dial settings or time constants and PSS gain. If this report is not available, write the dial settings below:

1.)	T_1	washout or reset time constant dial setting	_____
2.)	T_2	first lead time constant dial setting	_____
3.)	T_3	first lag time constant dial setting	_____
4.)	T_4	second lead time constant dial setting	_____
5.)	T_5	second lag time constant dial setting	_____
6.)	K	PSS gain dial setting	_____
7.)	V_{max}	maximum PSS output dial setting	_____
8.)	V_{cut}	dial setting for which PSS is set to zero when generator terminal voltage deviation is too large	_____
9.)	Other	_____	_____
10.)	Other	_____	_____

F: Other comments regarding the PSS?

_____

_____

_____

_____

_____

_____

15. Turbine-Governor Information

Please complete Part A for steam, gas or combined-cycle turbines, Part B for hydro turbines, and

Part C for both.

A. Steam, gas or combined-cycle turbines:

1.) Steam turbine, Gas turbine, or Combined-cycle _____

2.) If steam or combined-cycle, does the turbine system have a reheat process (i.e., both high- and low-pressure turbines)? _____

3.) If steam with reheat process, or if combined-cycle, indicate, in the space provided, the percent of full load power produced by each turbine:

by low pressure turbine or gas turbine: _____ %

by high pressure turbine or steam turbine: _____ %

B. Hydro turbines:

1.) What is the turbine efficiency at rated load? _____ %

2.) What is the length of the penstock? _____ ft

3.) What is the average cross-sectional area of the penstock _____ ft^2

4.) What is the typical maximum head (vertical distance from the bottom of the penstock, at the gate, to the water level)? _____ ft

5.) Is the water supply run-of-the-river or reservoir? _____

6.) What is the water flow rate at the typical maximum head? _____ ft^3/sec

7.) What is the average energy rate? _____ kW-hrs/acre-ft

8.) What is the estimated yearly energy production? _____ kW-hrs

C. Complete this section for each machine, independent of the turbine type.

1.) Turbine manufacturer _____

2.) Maximum turbine power output _____ MW

3.) Minimum turbine power output (while on line) _____ MW

4.) Governor information:

a: Droop setting (speed regulation) _____

b: Is the governor mechanical-hydraulic or electro-hydraulic? (Electro-hydraulic governors have an electronic speed sensor and transducer.) _____

c: Please provide below any time constants you have from the manufacturer describing the speed response of the governor. Be sure to identify each time constant.

_____ _____ sec

_____ _____ sec

_____ _____ sec

d: Other comments regarding the turbine governor system?

_____

_____

_____

_____

Completed By: Wayne Icenhower, Date: February 13, 2001

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Russell City Energy Center

Appendix 6-B
System Impact Study
Study Plan
Final

May 2001

Russell City Energy Center AFC

May 2001

System Impact Study

Study Plan

FINAL

Calpine /Bechtel Joint Development
Russell City Energy Center

Pacific Gas and Electric Company

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Introduction and Project Description

Calpine/Bechtel Joint Development (Applicant) is evaluating the feasibility of a 635 MW (nominal rating) generating facility and substation in Pacific Gas and Electric Company's (PG&E's) East Bay Division. The project will be called the Russell City Energy Center Project (RCEC). The proposed project site is located at 3636 Enterprise Avenue, Hayward, CA 94545 and near PG&E's Grant - East Shore 115 kV lines.

Figure 1 provides an overview of the vicinity of the proposed project, as well as the transmission facilities in the area. The Applicant has requested that PG&E conduct a Systems Impact Study(SIS) for this project. The planned operational date of the proposed project is July 1, 2003. The SIS will determine:

1. The transmission system impacts caused solely by the addition of RCEC and

2. The system reinforcement necessary to mitigate the adverse impact of RCEC under various system conditions, if any.

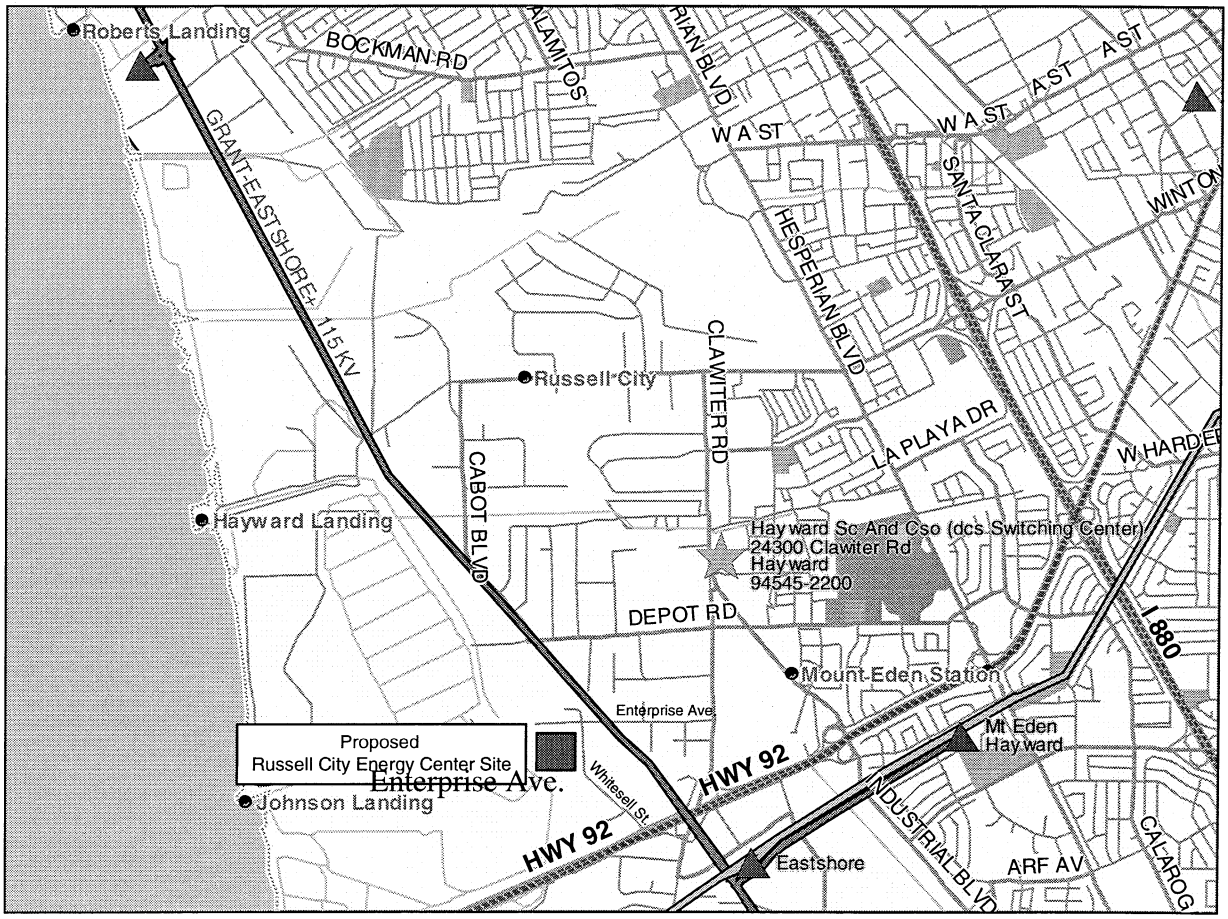

Figure 1: Vicinity Map – Russell City Energy Center Project

This Study Plan will form the basis for the SIS Agreement by defining the scope, content, assumptions, and terms of reference of the SIS.

Study Fee

The applicant must pay a one-time study fee for performing the SIS is $100,000. $50,000 is due with the submittal of SISA, and the balance of $50,000 will be due on June 1, 2001. If the Applicant chooses not to continue with the study after receiving this Study Plan, a fee of $5,000 shall be assessed to reimburse PG&E for the cost of processing the Study Request.[1]

Schedule

The following schedule shows the milestones associated with the study.

Task	Milestone Description	Target Date
1	Establish study commencement date based on receipt of study fee	4/13/01
2	Send draft report to Applicant and Cal-ISO for review and comments	7/9/01
3	Receive comments from Applicant and Cal-ISO	7/23/01
4	Issue Final SIS	8/6/01

PG&E must receive a completed System Impact Study Agreement from the Applicant (including the study fee) by April 13, 2001. If PG&E does not receive the completed Study Agreement by this date, the Interconnection Application will be considered as withdrawn and the Applicant's project position in the generation interconnection queue shall be lost.

Cost Estimates

No cost estimates will be provided in System Impact Study. Cost estimates will be provided when the project progresses to the Facilities Study.

Project Information and Interconnection Plan

The proposed RCEC will consist of a 635 MW (nominal) generating facility and a 230 kV swtichyard inside a new substation. The study plan will refer to this new substation as Russel Enterprise Substation.

The RCEC generating facility will have a maximum rated output of 635 MW with a plant load of 15 MW. Therefore, the maximum net generating capacity delivered to PG&E's transmission system will be 620 MW. REC will be a 2 X 1 combined cycle generating facility using the following turbine/generators:

- Two - gas-fired combustion turbine/generators (CTG) rated at 190 MW (nominal) each.
- One - steam turbine/generator (STG) rated at 255 MW (nominal).

Each turbine/generator unit will have a dedicated 15/230 kV step-up transformer connecting the unit to the RCEC Switchyard.

[1] Refer to PG&E's Transmission Owner Tariff TO4 Terms and Conditions.

The RCEC will be connected at the 230 kV voltage level to the PG&E transmission grid via two new 230 kV generation tie lines (about 4600 feet each) into the East Shore 230 kV bus. The turbine/generator units and the 230 kV transmission lines will be arranged in a ring bus configuration.

East Shore Substation currently has a single 230 kV bus configuration. For the System Impact Study, East Shore Substation will be modeled with six 230 kV lines (two from San Mateo, two from Pittsburg, and two from RCEC). The cost and feasibility of this arrangement will be addressed when the study progresses to the Facilities Study phase.

Calpine/Bechtel Joint Development has proposed that the two 230 kV circuits share the same route as PG&E's existing Grant-East Shore 115 kV lines. Calpine/Bechtel Joint Development has also proposed that for the portion of the route between RCEC and Eastshore Substation, they would replace the existing 115 kV towers with double circuit 230 kV towers, under hung with 115 kV as appropriate.

A single-line diagram for Russell Enterprise Substation is shown in Figure 2.

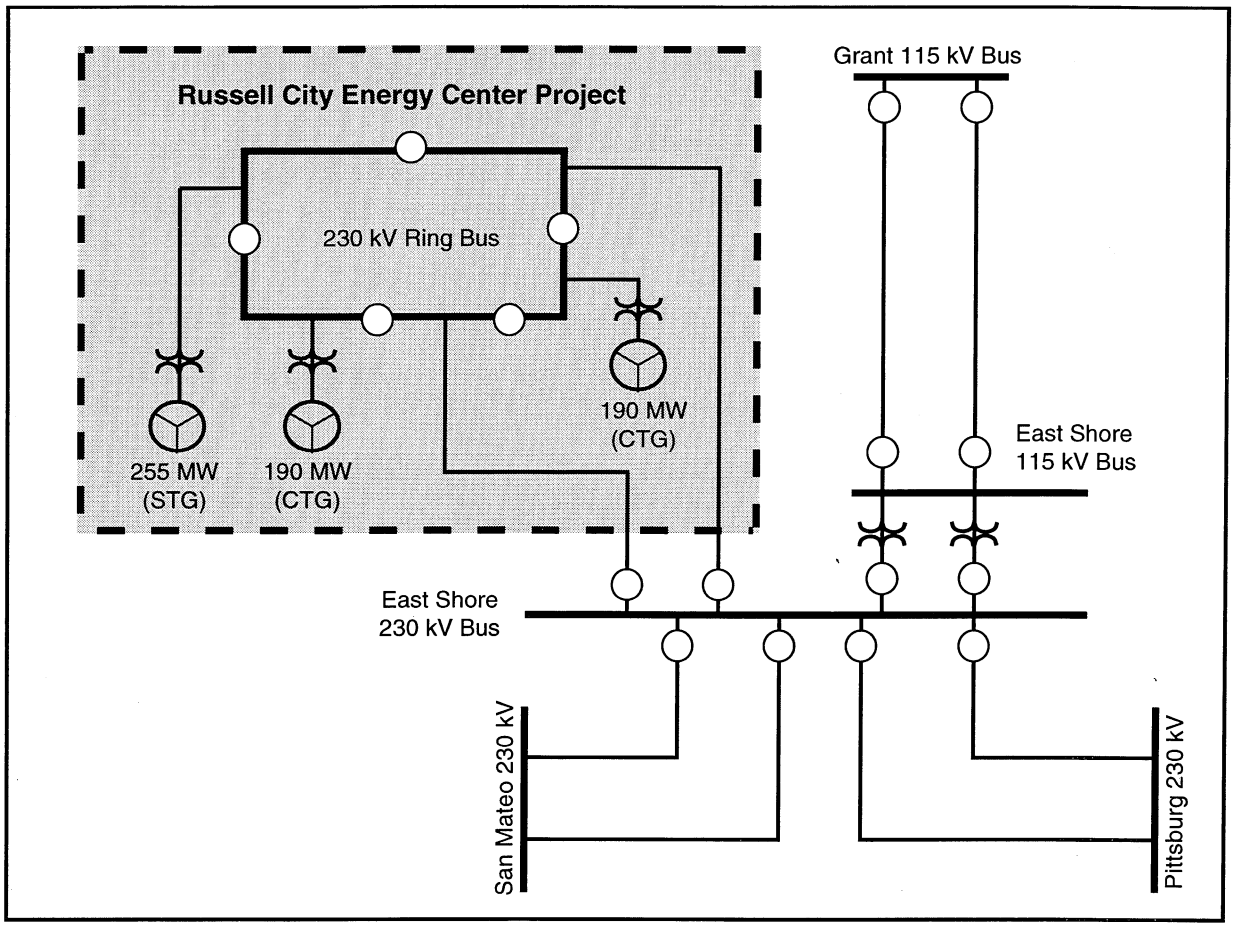

Figure 2: Single Line Diagram - Area Transmission facilities and RCEC

Study Assumptions

PG&E will conduct the SIS under the following assumptions:

1) The maximum delivery from the proposed project to the PG&E transmission grid will be 620 MW modeled at 0.85 lagging power factor; and it will be on line at this capacity by July 1, 2003.

2) A power plant load of 15 MW will be modeled.

3) The generator ties from Russell Enterprise Substation to East Shore Substation will be modeled as sharing the right-of-way with PG&E's existing Grant - East Shore 115 kV lines.

4) As part of the transmission system mitigation plan for the Delta Energy Center, the existing San Mateo - Contra Costa 230 kV line will be converted to the San Mateo - Pittsubrg 230 kV line and the East Shore - Contra Costa 230 kV line will be converted to the East Shore - Pittsburg 230 kV line.

5) As requested by Calpine/Bechtel Joint Development, this study will also assume that the Pittsburg - San Mateo 230 kV Line (to be operational by 2002) will be looped into East Shore Substation as part of the Russell City Energy Center Project.

6) East Shore Substation will be modeled as having and six 230 kV transmission lines (San Mateo - East Shore #1 and #2, Pittsburg - East Shore #1 and #2, Russell Enterprise - East Shore #1 and #2). The required 230 kV bus configuration at East Shore Substation will be determined when the project progresses forward to the Facilities Study phase.

7) The study will take into account the planned generating facilities in Northern California whose schedules are concurrent with or precede RCEC's schedule. These facilities are described in the section discussing the power flow base cases.

8) The study will take into account all the approved PG&E transmission reliability projects that will be operational by summer 2003.

Note: These assumptions and any changes thereto must be confirmed before the SIS can commence.

Power Flow Base Case Assumptions

Two power flow cases will be used to evaluate the transmission system impact of the RCEC.

1) **2003 Summer Peak Full Loop Base Case:**

   Power flow analysis will be performed using PG&E's 2003 Summer Peak Full Loop Base Case (in General Electric Power Flow format). This base case was developed from PG&E's 2001 base case series and has a 1-in-10 year extreme weather load level for the Greater Bay Area.

2) **2003 Partial Peak Base Case:**

   Power flow analysis will also be performed using the 2003 Summer Partial Peak Base Case. The Greater Bay Area load levels are reduced approximately 22% from the levels shown in the Summer Peak Base Case which is representative of a typical morning of a summer peak day.

Base Case Key Generation Assumptions

These two base cases will model all the approved PG&E transmission reliability projects that will be operational by summer 2003. The following major reliability projects will be included:

- Install a third 500/230 kV, 1120 MVA transformer at Tesla Substation
- Install a second 500/230 kV, 850 MVA transformer at Tracy Substation
- Install a third 500/230 kV, 1120 MVA transformer at Metcalf Substation
- A new Tesla-Newark 230 kV line
- Newark - San Mateo 230 kV line loop into Ravenswood Substation
- Static Capacitors (350 MVAR) at Metcalf 500 kV
- Static Capacitors (150 MVAR) at Martin 115 kV
- Newark Substation Bank #7, 9, and 11 TCAP
- Grant-Eastshore 115 kV Transmission Project
- Los Esteros Substation Project
- Tri-Valley Project - Phase I
- Pittsburg - Tassajara 230 kV Line Reconductoring
- Newark 230 230 kV - 100 to 200 MVAR Static VAR Compensator

The base case will also include the following major proposed generating facilities in Northern California:

1) Calpine/Bechtel - 880 MW Delta Energy Center (DEC), interconnecting with the 230 kV bus at the Pittsburg Power Plant switchyard.

2) Calpine/Bechtel - 600 MW Metcalf Energy Center (MEC), interconnecting with the Metcalf - Monta Vista #4 230 kV line, through the MEC switchyard.

3) PG&E NEG - La Paloma generation facility interconnecting at Midway 230 kV bus section D; La Paloma generation facility will be will be modeled at 1110 MW in summer and 1160 MW in spring and winter.

4) Calpine - 500 MW Los Medanos Energy Center (LMEC), interconnecting with the 115 kV bus at the Pittsburg Power Plant switchyard.

5) Texaco - 338 MW Sunrise Generation Facility interconnecting at La Paloma Switching Station.

6) Three Mountain Power Company - 530 MW project interconnecting to PG&E's Pit 1 – Pit 3 and Pit 1 – Cottonwood 230 kV lines.

7) GWF - 130 MW Hanford, interconnecting to Kingxburg - Henrietta 115 kV line in Fresno area.

8) Duke Energy North America Corporation (DENA) - 1080 MW Moss Landing project (MLPP), interconnecting with the existing 230 kV bus at the Moss Landing Power Plant.

9) Southern Energy Company of California - 530 MW Contra Costa Power Plant Capacity Increase Project, interconnecting to Contra Costa PP 230 kV bus.

10) Central Reliability Energy Center - 45 MW project in San Jose/San Clara area.

11) The Midway-Sunset generation facility will be 500 MW in summer, 540 MW in spring, and 540 MW winter. Midway-Sunset generation facility will be interconnected at Midway 230 kV bus section E.

12) Sempra - 500 MW Elk Hills Power Project, interconnecting at Midway 230 kV bus.

13) FPLE - 150 MW High Wind, tapping off the Vaca -Contra Costa #2 230 kV line.

14) United Golden Gate PP - 595 MW generating facilities, interconnecting with the San Mateo - Martin #5 and #6 115 kV lines.

15) Project A - 692 MW Tesla Generation Project , interconnecting near Tesla Substation.

16) Project B – 580 MW Fremont Generating Project interconnecting to the 230 kV bus at Newark Substation.

17) Project C – 581 MW Los Esteros Generating Project interconnecting to the 115 kV bus at Los Esteros Substation.

18) Wellhead Electric - 22 MW Stockton Cogen Project, interconnecting with Newark Sierra Paper Board 60 kV Tap on the Stockton "A" #1 60 kV line.

19) Morro Bay Modernization Project replacing the existing Morro Bay Power Plant with 1,200 MW of generation.

20) Panda - 150 MW West 1-3, interconnecting with Vaca Dixon - Contra Costa #1 230 kV line.

21) Mirant - 600 MW Potrero Unit 7 Project, interconnecting Potrero and Hunters Point Switching Stations.

22) Calpine Corporation - 500 MW Sutter facility, interconnecting with WAPA's Elverta - Olinda and Elverta - Keswick 230 kV.

23) FPLE - 560 MW Elverta Project, , interconnecting with WAPA system.

24) Calpine – 1,070 MW East Altamont Generating Project interconnecting at loop the Tracy - Westley 230 kV circuit near Tracy Substation.

25) Project D - 1000 MW in the Fresno area.

26) Project E - 630 MW in Glenn and Colusa counties.

27) Project F - 1350 MW in Solano county.

Study Scope

The SIS will study the impact of RCEC's added generation on PG&E's transmission system. The specific studies conducted by the SIS are outlined in this section.

Steady State Power Flow Analysis

The two base cases will be used to simulate the impact of the new facility during normal operating conditions, as well as, single and selected multiple (ISO Categories "B" and "C") outages. The study will cover the transmission facilities within PG&E's East Bay, Diablo, San Francisco, Peninsula, Mission, De Anza, and San Jose planning areas.

The single (ISO Category "B") and selected multiple (ISO Category "C") contingencies include the following outages[2]:

ISO Category "B"

- All single generator outages within the study area.
- All single (60-230 kV) transmission circuit outages within the study area.
- All single transformer outages within the study area.
- Overlapping single generator and transmission circuit outages for the transmission lines and generators within the study area.

ISO Category "C"

- Selected bus outages (115 and 230 kV) within the study area.
- Outages caused by breaker failures (excluding bus tie and sectionalizing breakers) at the same bus section above.
- Combination of any two-generator/transmission line/transformer outages (except ones included above in Category "B") within the study area.
- Outages of double circuit tower lines (115 and 230 kV) within the study area.
- Overlapping loss of the two largest available generation units in addition to any generation unavailable due to regular overhaul schedules. (ISO Grid Criteria Level C)

System Protection Analysis

Short circuit studies will be performed to determine the impact of increased fault duty resulting from the added generation. The study will determine the maximum fault currents in the vicinity of the proposed project and it will identify equipment that becomes overstressed as a result of the added generation. New protection requirements together with protection modification at the nearby transmission substations, if needed, would also be identified.

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[2] As soon as the "B" and "C" outage list is put together, PG&E will send it to Cal-ISO and the developer for review and comment prior to running the outage evaluation.

Dynamic Stability Analysis

Dynamic stability studies will be conducted using the 2003 Summer Peak Full Loop Base Case with the addition of the Russell City Energy Center Project to ensure that the transmission system remains in operating equilibrium through abnormal operating conditions after the new facility begins operation. This full loop base case was developed from PG&E's 2001 base case series. Other PG&E approved transmission projects and new generation projects in the Bay Area that will be operational by Summer 2003 will also be modeled in this 2003 case.

Disturbance simulations will be performed for a study period of 20 seconds to determine whether the new facility will create any system instability during the following line and generator outages:

NERC/CAISO Category "B" Contingencies:

a) Full load rejection of the proposed 635 MW (nominal) generating facility.

b) A three-phase fault with the normal 6 cycles clearing time at the Russell Enterprise Substation 230 kV bus, followed by loss of one of the Russell Enterprise - East Shore 230 kV lines.

c) A three-phase fault with the normal 6 cycles clearing time at the Russell Enterprise Substation 230 kV bus, followed by loss of the 255 MW (nominal) STG.

d) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by loss of one of the East Shore - San Mateo 230 kV lines.

e) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by loss of one of the East Shore - Pittsburg 230 kV lines.

f) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by loss of East Shore Bank #1 (230/115 kV bank).

g) A three-phase fault with the normal 6 cycles clearing time at the East Shore 115 kV bus, followed by loss of one of the Grant - East Shore 115 kV lines.

h) A three-phase fault with the normal 6 cycles clearing time at the East Shore 115 kV bus, followed by loss of one of the East Shore - Mt. Eden 115 kV lines.

i) A three-phase fault with the normal 6 cycles clearing time at the East Shore 115 kV bus, followed by loss of the East Shore - Dumbarton 115 kV line.

j) A three-phase fault with the normal 6 cycles clearing time at the San Mateo 230 kV bus, followed by loss of one of the San Mateo - Ravenswood 230 kV lines.

k) A three-phase fault with the normal 6 cycles clearing time at the Pittsburg 230 kV bus, followed by loss of one of the Pittsburg - Tesla 230 kV lines.

l) A three-phase fault with the normal 6 cycles clearing time at the San Mateo 230 kV bus, followed by loss of San Mateo Bank #5 (230/115 kV bank).

NERC/CAISO Category "C" Contingencies:

a) A three-phase fault with the normal 6 cycles clearing time on East Shore 230 kV buses #1 and #2.

b) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by simultaneous loss of both East Shore - San Mateo #1 and #2 230 kV lines.

c) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by simultaneous loss of both East Shore - Pittsburg #1 and #2 230 kV lines.

d) A three-phase fault with the normal 6 cycles clearing time at the East Shore 230 kV bus, followed by simultaneous loss of both East Shore - Pittsburg #1 and East Shore - San Mateo #1 230 kV lines.

e) A three-phase fault with the normal 6 cycles clearing time on San Mateo 230 kV buses (Bus 1, Section D; Bus 2, Section D; Bus 1, Section E; Bus 2, Section E).

f) A three-phase fault with the normal 6 cycles clearing time on Pittsburg 230 kV buses (Bus 1, Section D; Bus 2, Section D; Bus 1, Section E; Bus 2, Section E).

g) A three-phase fault with the normal 6 cycles clearing time on East Shore 115 kV bus.

h) A three-phase fault with the normal 6 cycles clearing time on San Mateo 115 kV buses (Bus 1, Section D; Bus 2, Section D; Bus 1, Section E; Bus 2, Section E).

i) A three-phase fault with the normal 6 cycles clearing time at the San Mateo 230 kV bus, followed by simultaneous loss of both San Mateo - Ravenswood 230 kV lines.

Post Transient Analysis

Post transient study will be performed on outages that cause greater than 5% bus voltage drops as indicated in the power flow analysis.

Transmission Line Evaluation

The transmission line evaluation will identify existing transmission line requiring upgrades in order to mitigate overloading due to the new generation, if any.

Substation Evaluation

The Substation evaluation will identify any existing equipment, if any, requiring upgrades to mitigate problems caused by overstress or overload.

Permitting

Calpine/Bechtel Joint Development will be responsible for including the two new overhead 230 kV lines, the new 635 MW generating facility, the new 230 kV substation,

and work at existing transmission facilities as part of the project's Application For Certification (AFC) filing to the California Energy Commission (CEC). Calpine/Bechtel Joint Development will own and operate the generating facility. PG&E will not apply for any permits from the CPUC for these works. PG&E will submit an advice letter to CPCU in the form of a Notice of Construction (NOC), as required by General Order (GO) 131-D. The environmental impact component of these substation and transmission line work will be addressed in a broader-scope California Environmental Quality Act (CEQA) analysis that is part of the project's AFC filing.

Stand-by Power

This study does not address any requirements for stand-by power that the project may require. The Applicant should contact their local PG&E service office regarding this service.

Note: The developer is urged to contact their local service office promptly regarding stand-by service in order to ensure its availability for the project's start-up date.

Pacific Gas and Electric Company.

WE DELIVER ENERGY.

System Impact Study Agreement

_____ (Applicant) has reviewed the study plan for the interconnection of Applicant's electric generating plant with PG&E's system at [3], State of California and agrees with the proposed plan.

Applicant agrees to pay the proposed study fee.

Dated this _____ day of _____, 2001

APPLICANT:

BY: _____
(Signature)

_____
(Type or Print Name)

TITLE: _____

MAILING ADDRESS:

_____

_____

_____

_____

_____

[3] Enter city and county location of proposed facility.

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 6-C
Power Flow Contingencies

May 2001

Russell City Energy Center AFC

May 2001

RCEC System Impact Study
Study Plan Case

5/7/01

No.	Contingency		Ckt	Base kV	Area	Zone
1	B2 LINE Tassajara - Newark			230	30	308-316
	obranch 30562 30631 1	line from TES JCT 230.00 (3) to BRKR NEWARK E 230.00	1	230	30	308-316
	obranch 30562 30563 1	line from TES JCT 230.00 (3) to (1) TES SUB 230.00	1	230	30	308
	setpload 30563: 0.0	LOAD-DROP TES SUB 230.00 LOAD==39.18(8.93)				
	setqload 30563: 0.0	LOAD-DROP TES SUB 230.00 LOAD==39.18(8.93)				
	obranch 30561 30562 1	line from TASSAJAR 230.00 BRKR to (3) TES JCT 230.00	1	230	30	308
2	B2 LINE Contra Costa - San Mateo		1			
	obranch 30525 30700 1	line from C.COSTA 230.00 BRKR to BRKR S. MATEO 230.00	1			
2A	B2 LINE Pittsburg - San Mateo		1			
	obranch 30526 30700 1	line from PITTSBURG 230.00 BRKR to BRKR SANMATEO 230	1			
3	B2 LINE Moraga - Vaca Dixon			230	30	
	obranch 30467 30460 1	line from PARKWAY 230.00 (2) to BRKR VACA-DIX 230.00	1	230	30	304-306
	setpload 30467: 0.0	LOAD-DROP PARKWAY 230.00 LOAD==12.9577(1.846371)				
	obranch 30467 30550 1	line from PARKWAY 230.00 (2) to BRKR MORAGA 230.00	1	230	30	306-308
	setqload 30467: 0.0	LOAD-DROP PARKWAY 230.00 LOAD==12.9577(1.846371)				
4	B2 LINE Fosterw2 - Tosco		1	12.47	30	338-396
	obranch 33151 33150 1	line from FOSTERW 12.47 (1) to BRKR TOSCO 12.47	1	12.47	30	338-396
5	B2 LINE Pittsburg - Posco			115	30	308-338
	obranch 32952 33037 1	line from POSCO 115.00 BRKR to (3) LINDETP2 115.00	1	115	30	308-338
	obranch 33037 33031 1	line from LINDETP2 115.00 (3) to (2) COLSTJT2 115.00	1	115	30	308
	obranch 33031 33033 1	line from COLSTJT2 115.00 (2) to (3) KIRKTAP2 115.00	1	115	30	308
	obranch 33033 32951 1	line from KIRKTAP2 115.00 (3) to BRKR KIRKER 115.00	1	115	30	308
	obranch 33033 32950 1	line from KIRKTAP2 115.00 (3) to BRKR PITSBURG 115.00	1	115	30	308
	rbranch 32951 33032 1	SWITCH KIRKER TO TAP 1 IF TAP 2 IS LOST				
6	B2 LINE Pittsburg - Tassajara		1	230	30	308
	obranch 30526 30561 1	line from PITSBURG 230.00 BRKR to BRKR TASSAJAR 230.00	1	230	30	308
7	B2 LINE Contra Costa - East Shore		1			
	obranch 30525 30560 1	line from C.COSTA 230.00 BRKR to BRKR E. SHORE 230.00	1			
7A	B2 LINE Pittsburg - East Shore		1	230	30	308-316
	obranch 30526 30560 1	line from PITSBURG 230.00 BRKR to BRKR E. SHORE 230.00	1	230	30	308-316
7B	B2 LINE Pittsburg - East Shore		2	230	30	308-316
	obranch 30526 30560 2	line from PITSBURG 230.00 BRKR to BRKR E. SHORE 230.00	2	230	30	308-316
8	B2 LINE Fiber Junction - Contra Costa Sub			13.8-115	30	
	obranch 33046 33001 1	line from FIBRJCT2 115.00 (3) to (1) DOMTAR 115.00	1	115	30	308-338
	obranch 33044 33002 1	line from FIBRBJCT 115.00 (2) to (4) CROWN Z 115.00	1	115	30	308
	obranch 33044 33046 1	line from FIBRBJCT 115.00 (2) to (3) FIBRJCT2 115.00	1	115	30	308
	obranch 33002 33003 1	line from CROWN Z 115.00 (4) to (1) FIBREBRD 115.00	1	115	30	338-308
	obranch 33002 33133 1	TRAN from CROWN Z 115.00 (4) to (1) GWF #3 13.80	1	13.8-115	30	396-308
	obranch 33002 33145 1	TRAN from CROWN Z 115.00 (4) to (1) CROWN.Z. 13.80	1	13.8-115	30	396-308
	obranch 33046 33000 1	line from FIBRJCT2 115.00 (3) to BRKR CC SUB 115.00	1	115	30	308
9	B2 LINE Contra Costa Jct.- Contra Costa Sub.			115	30	308
	obranch 33047 33045 1	line from CC JCT 115.00 (2) to (1) FIBRJCT1 115.00	1	115	30	308
	obranch 33047 33000 1	line from CC JCT 115.00 (2) to BRKR CC SUB 115.00	1	115	30	308
11	B2 LINE Columbia St. - Pittsburg			115-13.8	30	
	obranch 32955 32953 1	line from DOW TAP2 115.00 (2) to BRKR CLMBA ST 115.00	1	115	30	308-338
	obranch 33160 33163 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM3 13.80	1	13.8	30	338-396
	obranch 33160 33162 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM2 13.80	1	13.8	30	338-396
	obranch 33160 33161 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM1 13.80	1	13.8	30	338-396

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 32956 33160 1	TRAN from DOW MTR 115.00 (2) to (4) DOW CHEM 13.80	1	13.8-115	30	338-308
	obranch 32960 33132 1	TRAN from GWF#2 HS 115.00 (2) to (1) GWF %2 13.80	1	13.8-115	30	396-308
	obranch 32961 32960 1	line from GWF2 TAP 115.00 (2) to (2) GWF%2 HS 115.00	1	115	30	308
	obranch 33038 32961 1	line from LINDEJCT 115.00 (3) to (2) GWF2 TAP 115.00	1	115	30	308
	obranch 33038 32957 1	line from LINDEJCT 115.00 (3) to BRKR PRAXAIR 115.00	1	115	30	308-338
	obranch 32954 32956 1	line from DOW TAP1 115.00 (3) to (2) DOW MTR 115.00	1	115	30	308
	obranch 32954 32953 1	line from DOW TAP1 115.00 (3) to BRKR CLMBA ST 115.00	1	115	30	308-338
	obranch 33036 32961 1	line from LINDETP1 115.00 (2) to (3) GWF2 TAP 115.00	1	115	30	308
	obranch 33036 32954 1	line from LINDETP1 115.00 (2) to (3) DOW TAP1 115.00	1	115	30	308
	obranch 33036 33030 1	line from LINDETP1 115.00 (2) to (2) COLSTJT1 115.00	1	115	30	308
	obranch 33030 32950 1	line from COLSTJT1 115.00 (2) to BRKR PITSBURG 115.00	1	115	30	308
	obranch 32955 32952 1	line from DOW TAP2 115.00 (2) to BRKR POSCO 115.00	1	115	30	338-308
12	B2 LINE Lakeville - Sobrante		1	230	30	302-308
	obranch 30435 30540 1	line from LAKEVILE 230.00 BRKR to BRKR SOBRANTE 230.00	1	230	30	302-308
13	B2 LINE Sobrante - Ignacio			230-18	30	
	obranch 30437 30438 1	line from CROCKETT 230.00 (3) to (2) C&H 230.00	1	230	30	307
	obranch 30437 30445 1	line from CROCKETT 230.00 (3) to BRKR IGNACIO 230.00	1	230	30	307-306
	obranch 30437 30540 1	line from CROCKETT 230.00 (3) to BRKR SOBRANTE 230.00	1	230	30	307-308
	obranch 30438 32900 1	TRAN from C&H 230.00 (2) to (1) CRCKTCOG 18.00	1	18-230	30	396-307
14	B2 LINE Bahia - Moraga		1	230	30	306-308
	obranch 30465 30550 1	line from BAHIA 230.00 BRKR to BRKR MORAGA 230.00	1	230	30	306-308
15	B2 LINE Contra Costa - Vaca Dixon			230	30	304-308
	setqload 30472: 0.0	LOAD-DROP PEABDY A 230.00 LOAD==8.823(-1.791586)				
	obranch 30529 30525 1	line from HIWD TAP 230.00 (3) to BRKR C.COSTA 230.00	1	230	30	308
	obranch 30472 30460 1	line from PBDY TPA 230.00 (3) to BRKR VACA-DIX 230.00	1	230	30	304
	obranch 30529 30472 1	line from HIWD TAP 230.00 (3) to BRKR PEABDY A 230.00	1	230	30	304-308
	setpload 30472: 0.0	LOAD-DROP PEABDY A 230.00 LOAD==8.823(-1.791586)				
16	B2 LINE Contra Costa Sub - Vaca Dixon				30	
	obranch 30478 30475 1	line from LAMBIE 230.00 (3) to (3) PBDY TPB 230.00	1	230	30	304
	obranch 30480 32168 1	TRAN from USWP-RUS 230.00 (3) to (1) USWINDPW 9.11	1	9.11-230	30	398-304
	obranch 30475 30460 1	line from PBDY TPB 230.00 (3) to BRKR VACA-DIX 230.00	1	230	30	304
	obranch 30480 30523 1	line from USWP-RUS 230.00 (3) to BRKR CC SUB 230.00	1	230	30	304-308
	obranch 30480 30478 1	line from USWP-RUS 230.00 (3) to BRKR LAMBIE 230.00	1	230	30	304
	obranch 32117 30478 1	line from LAMBIE69 230.00 (3) to BRKR LAMBIE 230.00	1	69-230	30	304
17	B2 LINE Contra Costa Sub - Contra Costa		1	230	30	308
	obranch 30523 30525 1	line from CC SUB 230.00 BRKR to BRKR C.COSTA 230.00	1	230	30	308
18	B2 LINE Contra Costa - Brentwood		1	230	30	308
	obranch 30525 30565 1	line from C.COSTA 230.00 BRKR to BRKR BRENTWOD 230.0	1	230	30	308
19	B2 LINE Contra Costa - Delta Pump			230-9.11	30	
	obranch 30575 33170 1	TRAN from WND MSTR 230.00 (3) to (1) WINDMSTR 9.11	1	9.11-230	30	399-308
	obranch 30525 30575 1	line from C.COSTA 230.00 BRKR to (3) WND MSTR 230.00	1	230	30	308
	obranch 30575 38610 1	line from WND MSTR 230.00 (3) to BRKR DELTAPMP 230.00	1	230	30	308-327
20	B2 LINE Contra Costa - Los Positas		1	230	30	308-316
	obranch 30525 30585 1	line from C.COSTA 230.00 BRKR to BRKR LS PSTAS 230.0	1	230	30	308-316
21	B2 LINE Contra Costa - Newark D			230-9.11	30	
	obranch 30590 33838 1	TRAN from USWP-JRW 230.00 (3) to (1) USWP_#3 9.11	1	9.11-230	30	399-316
	obranch 30590 30537 1	line from USWP-JRW 230.00 (3) to (3) DUBLIN 230.00	1	230	30	316
	obranch 30537 30527 1	line from DUBLIN 230.00 (3) to (3) N_LVMRE 230.00	1	230	30	316
	obranch 30527 35224 1	line from N_LVMRE 230.00 (3) to VINEYD D 230.00	1	230	30	316
	obranch 35224 35219 1	line from VINEYD D 230.00 (3) to VINEYARD 230.00	1	230	30	316
	obranch 35219 30630 1	line from VINEYARD 230.00 (3) to BRKR NEWARK D 230.00	1	230	30	316
	obranch 30525 30590 1	line from C.COSTA 230.00 BRKR to (3) USWP-JRW 230.00	1	230	30	308-316
22	B2 LINE Pittsburg - Tidewater		1	230	30	308
	obranch 30526 30535 1	line from PITSBURG 230.00 BRKR to BRKR TIDEWATR 230.00	1	230	30	308

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No.	Contingency		Ckt	Base kV	Area	Zone
23	B2 LINE Pittsburg - Sobrante		1	230	30	308
	obranch 30526 30540 1	line from PITSBURG 230.00 BRKR to BRKR SOBRANTE 230.0	1	230	30	308
24	B2 LINE Pittsburg - Rossmoor			230	30	308
	obranch 30526 30543 1	line from PITSBURG 230.00 BRKR to ROSSTAP1 230.00	1			
	obranch 30543 30545 1	line from ROSSTAP1 230.00 to BRKR ROSSMOOR 230.00	1	230	30	308
	obranch 30543 30550 1	line from ROSSMOOR 230.00 BRKR to BRKR MORAGA 230.0	1	230	30	308
24	B2 LINE Contra Costa - Rossmoor			230	30	308
	obranch 30525 30543 1	line from PITSBURG 230.00 BRKR to ROSSTAP1 230.00	1	230	30	308
	obranch 30543 30545 1	line from ROSSTAP1 230.00 to BRKR ROSSMOOR 230.00	1	230	30	308
	obranch 30543 30550 1	line from ROSSMOOR 230.00 BRKR to BRKR MORAGA 230.0	1	230	30	308
25	B2 LINE Pittsburg - Moraga			230	30	308
	obranch 30544 30550 1	line from ROSSTAP2 230.00 to BRKR MORAGA 230.00	1	230	30	308
	obranch 30526 30544 1	line from PITSBURG 230.00 BRKR to ROSSTAP2 230.00	1			
25	B2 LINE Contra Costa - Moraga			230	30	308
	obranch 30525 30544 1	line from PITSBURG 230.00 BRKR to ROSSTAP2 230.00	1	230	30	308
	obranch 30544 30550 1	line from ROSSTAP2 230.00 to BRKR MORAGA 230.00	1	230	30	308
26	B2 LINE Pittsburg - San Ramon		1	230	30	308-316
	obranch 30526 30555 1	line from PITSBURG 230.00 BRKR to BRKR SANRAMON 230.0	1	230	30	308-316
27	B2 LINE Pittburg - FlowInd2 - Tesla D			230-9.11	30	
	obranch 30526 30595 1	line from PITSBURG 230.00 BRKR to (3) FLOWIND2 230.00	1	230	30	308-311
	obranch 30595 30640 1	line from FLOWIND2 230.00 (3) to BRKR TESLA D 230.00	1	230	30	311
	obranch 30595 33840 1	TRAN from FLOWIND2 230.00 (3) to (1) FLOWD3-6 9.11	1	9.11-230	30	399-311
28	B2 LINE Pittburg - JV Enterprises - Tesla D			230-9.11	30	
	obranch 30526 30600 1	line from PITSBURG 230.00 BRKR to (3) JV ENTER 230.00	1	230	30	308
	obranch 30600 30640 1	line from JV ENTER 230.00 (3) to BRKR TESLA D 230.00	1	230	30	308-311
	obranch 30600 33171 1	TRAN from JV ENTER 230.00 (3) to (1) JVE&HOWD 9.11	1	9.11-230	30	399-308
29	B2 LINE Tidewater - Sobrante		1	230	30	308
	obranch 30535 30540 1	line from TIDEWATR 230.00 BRKR to BRKR SOBRANTE 230.0	1	230	30	308
31	B2 LINE Moraga - Castro Valley		1	230	30	308-316
	obranch 30550 30554 1	line from MORAGA 230.00 BRKR to BRKR CASTROVL 230.00	1	230	30	308-316
32	B2 LINE Moraga - San Ramon		1	230	30	308-316
	obranch 30550 30555 1	line from MORAGA 230.00 BRKR to BRKR SANRAMON 230.0	1	230	30	308-316
33	B2 LINE Brentwood - Kelso		1	230	30	308-341
	obranch 30565 30569 1	line from BRENTWOD 230.00 BRKR to BRKR KELSO 230.00	1	230	30	308-341
34	B2 LINE Kelso - Telsa D			230-9.11	30	
	obranch 30569 30570 1	line from KELSO 230.00 BRKR to (4) USWP-RLF 230.00	1	230	30	341-311
	obranch 30570 30571 1	line from USWP-RLF 230.00 (4) to (2) ALTALAND 230.00	1	230	30	311
	obranch 30570 30625 1	line from USWP-RLF 230.00 (4) to BRKR TESLA D 230.00	1	230	30	311
	obranch 30570 33836 1	TRAN from USWP-RLF 230.00 (4) to (1) USWP_#4 9.11	1	9.11-230	30	399-311
	obranch 30571 33832 1	TRAN from ALTALAND 230.00 (2) to (1) COG.CAPT 9.11	1	9.11-230	30	396-311
35	B2 LINE Tesla D - Delta Pump			230-9.11	30	
	obranch 30580 38610 1	line from ALTM MDW 230.00 (3) to BRKR DELTAPMP 230.00	1	230	30	327-311
	obranch 30580 33175 1	TRAN from ALTM MDW 230.00 (3) to (1) ALTAMONT 9.11	1	9.11-230	30	399-311
	obranch 30580 30625 1	line from ALTM MDW 230.00 (3) to BRKR TESLA D 230.00	1	230	30	311
36	B2 LINE Oleum - Matinez D			115	30	308-307
	obranch 33016 32990 1	line from ALHAMTP2 115.00 to BRKR MARTNZ D 115.00	1	115	30	308
	obranch 32754 33016 1	line from OLEUM 115.00 BRKR to ALHAMTP2 115.00	1	115	30	308-307
37	B2 LINE Christie - Sobrante		1	115	30	307-308
	obranch 32756 33010 1	line from CHRISTIE 115.00 BRKR to BRKR SOBRANTE 115.00	1	115	30	307-308
39	B2 LINE El Crrto - Sobrante #1		1	115	30	307-308
	obranch 32766 33010 1	line from EL CRRTO 115.00 BRKR to BRKR SOBRANTE 115.0	1	115	30	307-308
40	B2 LINE El Crrto - Sobrante #2		2	115	30	307-308

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 32766 33010 2	line from EL CRRTO 115.00 BRKR to BRKR SOBRANTE 115.0	2	115	30	307-308
41	B2 LINE Richmond - Sobrante #1		1	115	30	307-308
	obranch 32768 33010 1	line from RICHMOND 115.00 BRKR to BRKR SOBRANTE 115.0	1	115	30	307-308
42	B2 LINE Richmond - Sobrante #2		2	115	30	307-308
	obranch 32768 33010 2	line from RICHMOND 115.00 BRKR to BRKR SOBRANTE 115.0	2	115	30	307-308
43	B2 LINE Sobrante - Claremont #1			115	30	
	obranch 33012 32780 1	line from EST PRTL 115.00 (2) to BRKR CLAREMNT 115.00	1	115	30	338-307
	setpload 33012: 0.0	LOAD-DROP EST PRTL 115.00 LOAD==8(4.96)				
	setqload 33012: 0.0	LOAD-DROP EST PRTL 115.00 LOAD==8(4.96)				
	obranch 33006 33010 1	line from GRIZLYJ1 115.00 (3) to BRKR SOBRANTE 115.00	1	115	30	308
	obranch 32770 32742 1	line from GRIZZLY2 115.00 BRKR to (3) UCB JCT1 115.00	1	115	30	307
	obranch 32742 33006 1	line from UCB JCT1 115.00 (3) to (3) GRIZLYJ1 115.00	1	115	30	307-308
	obranch 33006 33012 1	line from GRIZLYJ1 115.00 (3) to (2) EST PRTL 115.00	1	115	30	308-338
44	B2 LINE Claremont - Sobrante #2			115	30	307-308
	obranch 32770 32744 2	line from GRIZZLY2 115.00 BRKR to (3) UCB JCT2 115.00	2	115	30	307
	obranch 32744 33008 2	line from UCB JCT2 115.00 (3) to (3) GRIZLYJ2 115.00	2	115	30	307-308
	obranch 33008 32780 1	line from GRIZLYJ2 115.00 (3) to BRKR CLAREMNT 115.00	1	115	30	308-307
	obranch 33008 33010 1	line from GRIZLYJ2 115.00 (3) to BRKR SOBRANTE 115.00	1	115	30	308
45	B2 LINE Sobrante - Std. Oil			115	30	
	obranch 32750 32760 1	line from PPSTLTAP 115.00 (3) to (1) PT PINLE 115.00	1	115	30	307
	setqload 32760: 0.0	LOAD-DROP PT PINLE 115.00 LOAD==17.831501(1.1305)				
	setpload 32760: 0.0	LOAD-DROP PT PINLE 115.00 LOAD==17.831501(1.1305)				
	obranch 32750 32748 1	line from PPSTLTAP 115.00 (3) to (1) PP STEEL 115.00	1	115	30	337-307
	obranch 32774 32750 1	line from PTPNLTAP 115.00 (3) to (1) PPSTLTAP 115.00	1	115	30	307
	obranch 32808 33010 1	line from SNPBLTP2 115.00 (3) to BRKR SOBRANTE 115.00	1	115	30	307-308
	obranch 32774 32808 1	line from PTPNLTAP 115.00 (3) to SNPBLTP2 115.00	1	115	30	307
	obranch 32774 32762 1	line from PTPNLTAP 115.00 (3) to BRKR STD. OIL 115.00	1	115	30	337-307
46	B2 LINE Christie - TAP GWF5				30	
	obranch 33067 32854 1	line from PCBRICK 60.00 (3) to (1) PRT CSTA 60.00	1	60	30	337-308
	setqload 32854: 0.0	LOAD-DROP PRT CSTA 60.00 LOAD==1.14(0.9785)				
	setpload 33064: 0.0	LOAD-DROP SFPP CNC 60.00 LOAD==12.8(7.6)				
	setqload 33139: 0.0	LOAD-DROP STAUFER 9.11 LOAD==3.6(0.82)				
	setqload 33064: 0.0	LOAD-DROP SFPP CNC 60.00 LOAD==12.8(7.6)				
	setpload 33139: 0.0	LOAD-DROP STAUFER 9.11 LOAD==3.6(0.82)				
	setqload 33065: 0.0	LOAD-DROP URICH 60.00 LOAD==2.2(1.65)				
	setpload 33065: 0.0	LOAD-DROP URICH 60.00 LOAD==2.2(1.65)				
	setpload 32854: 0.0	LOAD-DROP PRT CSTA 60.00 LOAD==1.14(0.9785)				
	obranch 33091 33135 1	TRAN from TAP GWF5 60.00 (2) to (1) GWF #5 13.80	1	13.8-60	30	396-308
	obranch 33064 33091 1	line from SFPP CNC 60.00 (2) to (2) TAP GWF5 60.00	1	60	30	338-308
	obranch 33065 33064 1	line from URICH 60.00 (2) to (2) SFPP CNC 60.00	1	60	30	338
	obranch 33066 33139 1	TRAN from STAUFFER 60.00 (3) to (1) STAUFER 9.11	1	9.11-60	30	396-308
	obranch 33067 33066 1	line from PCBRICK 60.00 (3) to (3) STAUFFER 60.00	1	60	30	308
	obranch 32852 33067 1	line from CHRISTIE 60.00 BRKR to (3) PCBRICK 60.00	1	60	30	307-308
	obranch 33066 33065 1	line from STAUFFER 60.00 (3) to (2) URICH 60.00	1	60	30	308-338
47	B2 LINE Pittsburg - Clayton		1	115	30	308
	obranch 32950 32970 1	line from PITSBURG 115.00 BRKR to BRKR CLAYTON 115.00	1	115	30	308
48	B2 LINE Pittsburg - Bollman#2 - Martinez E			115	30	308-338
	setqload 32992: 0.0	LOAD-TRANSFER BOLLMAN2 115.00 TO BOLLMAN1 115.0				
	setqload 33040:3.62	LOAD-TRANSFER BOLLMAN2 115.00 TO BOLLMAN1 115.0				
	setpload 33040: 6.1	LOAD-TRANSFER BOLLMAN2 115.00 TO BOLLMAN1 115.0				
	obranch 33043 32991 1	line from IMHOFF_2 115.00 (2) to BRKR MARTNZ E 115.00	1	115	30	308
	obranch 32992 33043 1	line from BOLLMAN2 115.00 (2) to (2) IMHOFF_2 115.00	1	115	30	308-338
	obranch 32950 32992 1	line from PITSBURG 115.00 BRKR to (2) BOLLMAN2 115.00	1	115	30	308-338
	setpload 32992: 0.0	LOAD-TRANSFER BOLLMAN2 115.00 TO BOLLMAN1 115.0				

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No.	Contingency		Ckt	Base kV	Area	Zone
49	B2 Pittsburg - Bollman#1 - Martinez E			115	30-8	308-338
	obranch 33040 33042 1	line from BOLLMAN1 115.00 (2) to (3) IMHOFF_1 115.00	1	115	30	308-338
	setqload 32994: 0.0	LOAD-DROP CCCSD 12.47 LOAD==4(0.91)				
	setpload 32994: 0.0	LOAD-DROP CCCSD 12.47 LOAD==4(0.91)				
	setqload 32993: 0.0	LOAD-DROP W.P.BART 115.00 LOAD==12(1.71)				
	obranch 33042 32991 1	line from IMHOFF_1 115.00 (3) to BRKR MARTNZ E 115.00	1	115	30	308
	obranch 32994 33040 1	line from W.P.BART 115.00 (2) to (2) BOLLMAN1 115.00	1	115	8-30	338
	obranch 32993 33040 1	line from W.P.BART 115.00 (2) to (2) BOLLMAN1 115.00	1	115	30	338
	obranch 32950 32993 1	line from PITSBURG 115.00 BRKR to (2) W.P.BART 115.00	1	115	30	308-338
	setpload 32993: 0.0	LOAD-DROP W.P.BART 115.00 LOAD==12(1.71)				
50	B2 LINE Pittsburg - Kirker Tap - Clayton			115	30	308
	obranch 32950 33032 3	line from PITSBURG 115.00 BRKR to (2) KIRKTAP1 115.00	3	115	30	308
	obranch 33032 32970 3	line from KIRKTAP1 115.00 (2) to BRKR CLAYTON 115.00	3	115	30	308
50	B2 LINE Pittsburg - Clayton		4	115	30	308
	obranch 32950 32970 4	line from KIRKTAP1 115.00 (2) to BRKR CLAYTON 115.00	4	115	30	308
51	B2 LINE Clayton - Meadow Lane		1	115	30	308
	obranch 32970 32971 1	line from CLAYTON 115.00 BRKR to BRKR MEDW LNE 115.00	1	115	30	308
52	B2 LINE Clayton - Lakewood Jct - Meadow Lane			115	30	308-338
	obranch 33035 32972 1	line from LKWD_JCT 115.00 (3) to (2) EBMUDGRY 115.00	1	115	30	338-308
	obranch 33035 32973 1	line from LKWD_JCT 115.00 (3) to BRKR LAKEWD-C 115.00	1	115	30	308
	obranch 32972 32971 1	line from EBMUDGRY 115.00 (2) to BRKR MEDW LNE 115.00	1	115	30	308-338
	setpload 32972: 0.0	LOAD-DROP EBMUDGRY 115.00 LOAD==0.3(0.15)				
	setpload 32972: 0.0	LOAD-DROP EBMUDGRY 115.00 LOAD==0.3(0.15)				
	obranch 32970 33035 1	line from CLAYTON 115.00 BRKR to (3) LKWD_JCT 115.00	1	115	30	308
53	B2 LINE Lake WDM - Lake WD C		1	115	30	308
	obranch 32974 32973 1	line from LAKEWD-M 115.00 BRKR to BRKR LAKEWD-C 115.0	1	115	30	308
54	B2 LINE Lake WDM - Lake Reactor			115	30	308-338
	setqload 32975:0.0	LOAD-DROP LKWDBART 115.00 LOAD==7.2(1.03)				
	obranch 32974 32975 1	line from LAKEWD-M 115.00 BRKR to (1) LKWDBART 115.00	1	115	30	308-338
	setpload 32975:0.0	LOAD-DROP LKWDBART 115.00 LOAD==7.2(1.03)				
55	B2 LINE Sobrante - Moraga			115	30	308
	obranch 32974 32976 9	line from LAKEWD-M 115.00 BRKR to (2) LK_REACT 115.00	9	115	30	308
	obranch 32976 33048 1	line from LK_REACT 115.00 (2) to (3) MORAGAJT 115.00	1	115	30	308
	obranch 33048 33010 1	line from MORAGAJT 115.00 (3) to BRKR SOBRANTE 115.00	1	115	30	308
	obranch 33048 33020 1	line from MORAGAJT 115.00 (3) to BRKR MORAGA 115.00	1	115	30	308
56	B2 LINE Martinez D - Sobrante			115	30	308
	setqload 33011: 0.0	LOAD-DROP ALHAMBRA 115.00 LOAD==21.4(4)				
	setpload 33011: 0.0	LOAD-DROP ALHAMBRA 115.00 LOAD==21.4(4)				
	obranch 32990 33014 1	line from MARTNZ D 115.00 BRKR to (2) ALHAMTP1 115.00	1	115	30	308
	obranch 33014 33011 1	line from ALHAMTP1 115.00 (2) to (2) ALHAMBRA 115.00	1	115	30	308
	obranch 33014 33010 1	line from ALHAMTP1 115.00 (2) to BRKR SOBRANTE 115.00	1	115	30	308
57	B2 LINE Matinez E - Martinez D		1	115	30	308
	obranch 32991 32990 1	line from MARTNZ E 115.00 BRKR to BRKR MARTNZ D 115.00	1	115	30	308
58	B2 LINE Moraga - Claremont #1		1	115	30	308-307
	obranch 33020 32780 1	line from MORAGA 115.00 BRKR to BRKR CLAREMNT 115.0	1	115	30	308-307
59	B2 LINE Moraga - Claremont #2		2	115	30	308-307
	obranch 33020 32780 2	line from MORAGA 115.00 BRKR to BRKR CLAREMNT 115.0	2	115	30	308-307
60	B2 LINE Moraga - Station X #1		1	115	30	308-307
	obranch 33020 32790 1	line from MORAGA 115.00 BRKR to BRKR STATIN X 115.00	1	115	30	308-307
61	B2 LINE Moraga - Station X #2		2	115	30	308-307
	obranch 33020 32790 2	line from MORAGA 115.00 BRKR to BRKR STATIN X 115.00	2	115	30	308-307
62	B2 LINE Moraga - Station X #3		3	115	30	308-307
	obranch 33020 32790 3	line from MORAGA 115.00 BRKR to BRKR STATIN X 115.00	3	115	30	308-307

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No.	Contingency		Ckt	Base kV	Area	Zone
63	B2 LINE Moraga - Station X #4		4	115	30	308-307
	obranch 33020 32790 4	line from MORAGA 115.00 BRKR to BRKR STATIN X 115.00	4	115	30	308-307
64	B2 LINE Moraga - Station J		1	115	30	308-307
	obranch 33020 32792 1	line from MORAGA 115.00 BRKR to BRKR STATIN J 115.00	1	115	30	308-307
65	B2 LINE Moraga - San Leandro #1		1	115	30	308-316
	obranch 33020 35101 1	line from MORAGA 115.00 BRKR to BRKR SN LNDRO 115.00	1	115	30	308-316
66	B2 LINE Moraga - San Leandro #2		2	115	30	308-316
	obranch 33020 35101 2	line from MORAGA 115.00 BRKR to BRKR SN LNDRO 115.00	2	115	30	308-316
67	B2 LINE Moraga - San Leandro #3		3	115	30	308-316
	obranch 33020 35101 3	line from MORAGA 115.00 BRKR to BRKR SN LNDRO 115.00	3	115	30	308-316
68	B2 LINE Oak City - Oakland23		1	115	30	337-362
	obranch 32786 32904 1	line from OAK C115 115.00 BRKR to BRKR OADLND23 115.00	1	115	30	337-362
69	B2 LINE Oleum - Christie			115	30	307-306
	obranch 32778 32756 1	line from MRTNZJCT 115.00 (3) to BRKR CHRISTIE 115.00	1	115	30	307
	setpload 32602: 0.0	LOAD-DROP NRTH TWR 115.00 LOAD==29.86845(4.256021)				
	obranch 32620 32778 1	line from NTWRJCT2 115.00 BRKR to (3) MRTNZJCT 115.00	1	115	30	306-307
	obranch 32602 32620 1	line from NRTH TWR 115.00 BRKR to (3) NTWRJCT2 115.00	1	115	30	306
	obranch 32778 32754 1	line from MRTNZJCT 115.00 (3) to BRKR OLEUM 115.00	1	115	30	307
70	B2 Bart - El Cerrito			115	30	337-307
	setpload 32752: 0.0	LOAD-DROP E.C.BART 115.00 LOAD==7.56(4.685266)				
	setqload 32752: 0.0	LOAD-DROP E.C.BART 115.00 LOAD==7.56(4.685266)				
	obranch 32752 32766 1	line from E.C.BART 115.00 (1) to BRKR EL CRRTO 115.00	1	115	30	337-307
71	B2 LINE Oleum - Valley View - El Cerrito			115	30	307
	setpload 32764: 0.0	LOAD-TRANSFER VALLY VW 115.00 TO EL CRRTO 115.00				
	setqload 32766:19.269	LOAD-TRANSFER VALLY VW 115.00 TO EL CRRTO 115.00				
	setqload 32764: 0.0	LOAD-TRANSFER VALLY VW 115.00 TO EL CRRTO 115.00				
	obranch 32802 32766 1	line from VLYVWTP1 115.00 (2) to BRKR EL CRRTO 115.00	1	115	30	307
	obranch 32802 32764 1	line from VLYVWTP1 115.00 BRKR to (2) VALLY VW 115.00	1	115	30	307
	obranch 32754 32802 1	line from OLEUM 115.00 BRKR to (2) VLYVWTP1 115.00	1	115	30	307
	setpload 32766:103.515	LOAD-TRANSFER VALLY VW 115.00 TO EL CRRTO 115.00				
72	B2 LINE Oleum - El Cerrito			115	30	307
	obranch 32754 32804 1	line from OLEUM 115.00 BRKR to BRKR VLYVWTP2 115.00	1	115	30	307
	obranch 32804 32766 1	line from VLYVWTP2 115.00 BRKR to BRKR EL CRRTO 115.00	1	115	30	307
73	B2 LINE Oleum - Martinez D (Duplicate of 36)			115	30	308-307
	obranch 32754 33016 1	line from OLEUM 115.00 BRKR to ALHAMTP2 115.00	1	115	30	308-307
	obranch 33016 32990 1	line from ALHAMTP2 115.00 to BRKR MARTNZ D 115.00	1	115	30	308
74	B2 LINE Chrisitie - Sobrante		1	115	30	307-308
	obranch 32756 33010 1	line from CHRISTIE 115.00 BRKR to BRKR SOBRANTE 115.00	1	115	30	307-308
75	B2 LINE Standard Oil - San Pablo - Sobrante			115	30	
	setqload 32758: 0.0	LOAD-TRANSFER SAN PBLO 115.00 TO SOBRANTE 115.00				
	setqload 33010: 7.466	LOAD-TRANSFER SAN PBLO 115.00 TO SOBRANTE 115.00				
	setpload 33010:43.531	LOAD-TRANSFER SAN PBLO 115.00 TO SOBRANTE 115.00				
	obranch 32806 33010 1	line from SNPBLTP1 115.00 (2) to BRKR SOBRANTE 115.00	1	115	30	307-308
	obranch 32806 32762 1	line from SNPBLTP1 115.00 (2) to BRKR STD. OIL 115.00	1	115	30	307-337
	obranch 32758 32806 1	line from SAN PBLO 115.00 (2) to BRKR SNPBLTP1 115.00	1	115	30	307
	setpload 32758: 0.0	LOAD-TRANSFER SAN PBLO 115.00 TO SOBRANTE 115.00				
77	B2 LINE Claremont - Station D #1		1	115	30	307
	obranch 32780 32782 1	line from CLAREMNT 115.00 BRKR to BRKR STATIN D 115.00	1	115	30	307
78	B2 LINE Claremont - Station D #2		2	115	30	307
	obranch 32780 32782 2	line from CLAREMNT 115.00 BRKR to BRKR STATIN D 115.00	2	115	30	307
79	B2 LINE Station D - Station L		1	115	30	307
	obranch 32782 32788 1	line from STATIN D 115.00 BRKR to BRKR STATIN L 115.00	1	115	30	307
80	B2 LINE Oak C - Station L		1	115	30	337-307

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 32786 32788 1	line from OAK C115 115.00 BRKR to BRKR STATIN L 115.00	1	115	30	337-307
81	B2 LINE Oak C - Station X		1	115	30	337-307
	obranch 32786 32790 1	line from OAK C115 115.00 BRKR to BRKR STATIN X 115.00	1	115	30	337-307
82	B2 LINE Oak C - Maritime			115	30	337
	obranch 32786 32794 1	line from OAK C115 115.00 BRKR to (1) MARITIME 115.00	1	115	30	337
	setpload 32794: 0.0	LOAD-DROP MARITIME 115.00 LOAD==19.700001(12.208962				
	setqload 32794: 0.0	LOAD-DROP MARITIME 115.00 LOAD==19.700001(12.208962				
83	B2 LINE Oak City - Alameda		1	115	30	337-328
	obranch 32786 38026 1	line from OAK C115 115.00 BRKR to BRKR ALAMEDCT 115.00	1	115	30	337-328
86	B2 LINE Station J - Alameda (Jenny)		1	115	30	307-328
	obranch 32792 38024 1	line from STATIN J 115.00 BRKR to BRKR ALAMDA J 115.00	1	115	30	307-328
87	B2 LINE East Portal - Claremont		1	115	30	338-307
	obranch 33012 32780 1	line from EAST PRTL 115.00 BRKR to BRKR CLAREMNT 115.0	1	115	30	338-307
88	B2 LINE Los Positas - Newark D		1	230	30	316
	obranch 30585 30630 1	line from LOS POSITAS 230.00 BRKR to BRKR NEWARK D 23	1	230	30	316
89	B2 LINE East Shore - San Mateo #1		1	230	30	316-310
	obranch 30560 30700 1	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	316-310
89	B2 LINE East Shore - San Mateo #2		2	230	30	316-310
	obranch 30560 30700 2	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	2	230	30	316-310
90	B2 LINE Castro Valley - Newark E		1	230	30	316
	obranch 30554 30631 1	line from CASTROVL 230.00 BRKR to BRKR NEWARK E 230.0	1	230	30	316
91	B2 LINE Tesla E - Newark D		1	230	30	311-316
	obranch 30624 30630 1	line from TESLA E 230.00 BRKR to BRKR NEWARK D 230.00	1	230	30	311-316
92	B2 LINE Tesla E - Ravenswood		1	230	30	311-310
	obranch 30640 30703 1	line from TESLA F 230.00 BRKR to BRKR RAVENSWD 230.00	1	230	30	311-310
93	B2 LINE Ravenswood - San Mateo #1		1	230	30	310
	obranch 30703 30700 1	line from RAVENSWD 230.00 BRKR to BRKR SANMATEO 230.	1	230	30	310
93	B2 LINE Ravenswood - San Mateo #2		2	230	30	310
	obranch 30703 30700 2	line from RAVENSWD 230.00 BRKR to BRKR SANMATEO 230.	2	230	30	310
93	B2 LINE Newark - Ravenswood			230	30	316-310
	obranch 30630 30639 1	line from RAVENSWD 230.00 BRKR to BRKR FGP_TAP 230.00	1	230	30	316
	obranch 30639 30703 1	line from FGP_TAP 230.00 BRKR to BRKR RAVENSWD 230.0	1	230	30	316-310
94	B2 LINE Newark E - Los Esteros		1	230	30	316-318
	obranch 30635 30731 1	line from NEWARK E 230.00 BRKR to BRKR LS_ESTRS 230.0	1	230	30	316-318
95	B2 LINE Metcalf - Los Esteros		1	230	30	318
	obranch 30735 30731 1	line from LS_ESTRS 230.00 BRKR to BRKR METCALF 230.00	1	230	30	318
96	B2 LINE Tesla E - Newark D (ADCC)			230-9.11	30	
	obranch 30655 30630 1	TRAN from ADCC 230.00 (2) to (1) NEWARK D 230.00	1	230	30	311-316
	obranch 30640 30655 1	line from TESLA 2E 230.00 BRKR to (2) ADCC 230.00	1	230	30	311
	obranch 30655 35310 1	TRAN from ADCC 230.00 (2) to (1) LFC FIN+ 9.11	1	9.11-230	30	399-311
97	B2 LINE Dumbarton - Newark		1	115	30	316
	obranch 35107 35120 1	line from DUMBARTN 115.00 BRKR to BRKR NEWARK D 115.	1	115	30	316
98	B2 LINE East Shore - Dumbarton		1	115	30	316
	obranch 35105 35107 1	line from EASTSHRE 115.00 BRKR to BRKR DUMBARTN 115.	1	115	30	316
99	B2 LINE Russell City - East Shore #1		1			
	obranch 89950 30560 1	line from GRANT 115.00 BRKR to EASTSHORE 115.00	1			
99	B2 LINE Russell City - East Shore #2		2			
	obranch 89950 30560 2	line from GRANT 115.00 BRKR to EASTSHORE 115.00	2			
100	B2 LINE East Shore - Mt Eden #1		1	115	30	316
	obranch 35105 35106 1	line from EASTSHRE 115.00 BRKR to BRKR MT EDEN 115.00	1	115	30	316
101	B2 LINE East Shore - Mt Eden #2		2	115	30	316

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 35105 35106 2	line from EASTSHRE 115.00 BRKR to BRKR MT EDEN 115.00	2	115	30	316
102	B2 LINE Owens Tap - Station J			115	30	307-337
	obranch 32798 32792 1	line from OWENSTAP 115.00 (3) to BRKR STATIN J 115.00	1	115	30	307
	obranch 32798 32800 1	line from OWENSTAP 115.00 (3) to (1) OWNBRKWY 115.00	1	115	30	307-337
103	B2 LINE San Leandro - Station J			115	30	
	obranch 35101 35113 1	line from SN LNDRO 115.00 BRKR to (2) DMTAR_SL 115.00	1	115	30	316-346
	obranch 32814 32792 1	line from EDESTAP1 115.00 (2) to BRKR STATIN J 115.00	1	115	30	307
	obranch 32810 32814 1	line from EDES 115.00 (2) to (2) EDESTAP1 115.00	1	115	30	307
	obranch 35113 32814 1	line from DMTAR_SL 115.00 (2) to (2) EDESTAP1 115.00	1	115	30	307-346
104	B2 LINE Newark E - Freemont #1		1	115	30	316
	obranch 35121 35110 1	line from NEWARK E 115.00 BRKR to BRKR FREMNT 115.00	1	115	30	316
105	B2 LINE Newark E - Freemont #2		2	115	30	316
	obranch 35121 35110 2	line from NEWARK E 115.00 BRKR to BRKR FREMNT 115.00	2	115	30	316
106	B2 LINE Newark D - Jarvis #1		1	115	30	316
	obranch 35120 35111 1	line from NEWARK D 115.00 BRKR to BRKR JARVIS 115.00	1	115	30	316
108	B2 LINE Newark F - Nummi			115	30	316
	setqload 35126: 0.0	LOAD-TRANSFER NUMMI 115.00 TO JARVIS 115.00				
	setpload 35111:95.867	LOAD-TRANSFER NUMMI 115.00 TO JARVIS 115.00				
	setpload 35126: 0.0	LOAD-TRANSFER NUMMI 115.00 TO JARVIS 115.00				
	obranch 35126 35122 1	line from NUMI_TAP 115.00 BRKR to (1) NUMMI 115.00	1	115	30	316
	obranch 35122 35126 1	line from NEWARK F 115.00 BRKR to (1) NUMI_TAP 115.00	1	115	30	316
	setqload 35111:33.647	LOAD-TRANSFER NUMMI 115.00 TO JARVIS 115.00				
110	B2 LINE Newark D - Los Esteros #1		1	230	30	316-318
	obranch 30635 30731 1	line from NEWARK D 230.00 BRKR to BRKR LS_ESTRS 230.0	1	230	30	316-318
111	B2 LINE Newark E - Ames BS1 #1		1	115	30	316-317
	obranch 35121 35350 1	line from NEWARK E 115.00 BRKR to BRKR AMES BS1 115.00	1	115	30	316-317
112	B2 LINE Newark E - Ames BS1 #2		3	115	30	316-317
	obranch 35121 35350 3	line from NEWARK E 115.00 BRKR to BRKR AMES BS1 115.00	3	115	30	316-317
113	B2 LINE Newark E - Ames BS2 #1		2	115	30	316-317
	obranch 35121 35351 2	line from NEWARK E 115.00 BRKR to BRKR AMES BS2 115.00	2	115	30	316-317
115	B2 LINE Newark F - Lockheed			115	30	
	obranch 35358 35359 1	line from MFT.FD J 115.00 (3) to (1) MOFT.FLD 115.00	1	115	30	317-347
	setqload 35359: 0.0	LOAD-DROP MOFT.FLD 115.00 LOAD==4.4772(1.02459)				
	setpload 35361: 0.0	LOAD-DROP LOCKHD 1 115.00 LOAD==23.5914(5.37264)				
	setqload 35361: 0.0	LOAD-DROP LOCKHD 1 115.00 LOAD==23.5914(5.37264)				
	obranch 35357 35363 1	line from LCKHD J1 115.00 (3) to BRKR LAWRENCE 115.00	1	115	30	317
	obranch 35357 35358 1	line from LCKHD J1 115.00 (3) to (3) MFT.FD J 115.00	1	115	30	317
	obranch 35122 35357 1	line from NEWARK F 115.00 BRKR to (3) LCKHD J1 115.00	1	115	30	316-317
	obranch 35358 35361 1	line from MFT.FD J 115.00 (3) to BRKR LOCKHD 1 115.00	1	115	30	317-347
	setpload 35359: 0.0	LOAD-DROP MOFT.FLD 115.00 LOAD==4.4772(1.02459)				
116	B2 LINE Newark F - Britton			115	30	
	obranch 35365 35369 1	line from AMD JCT 115.00 (3) to (2) APP MAT 115.00	1	115	30	347-317
	setqload 35364: 0.0	LOAD-DROP A.M.D 115.00 LOAD==6.8019(4.3911)				
	setqload 35369: 0.0	LOAD-DROP APP MAT 115.00 LOAD==25.83(5.88924)				
	setqload 35362: 0.0	LOAD-DROP LOCKHD 2 115.00 LOAD==12.4845(2.8413)				
	setpload 35364: 0.0	LOAD-DROP A.M.D 115.00 LOAD==6.8019(4.3911)				
	setpload 35369: 0.0	LOAD-DROP APP MAT 115.00 LOAD==25.83(5.88924)				
	setpload 35362: 0.0	LOAD-DROP LOCKHD 2 115.00 LOAD==12.4845(2.8413)				
	obranch 35365 35364 1	line from AMD JCT 115.00 (3) to (1) A.M.D 115.00	1	115	30	347-317
	obranch 35360 35365 1	line from LCKHD J2 115.00 (3) to (3) AMD JCT 115.00	1	115	30	317
	obranch 35360 35362 1	line from LCKHD J2 115.00 (3) to (1) LOCKHD 2 115.00	1	115	30	317-347
	obranch 35122 35360 1	line from NEWARK F 115.00 BRKR to (3) LCKHD J2 115.00	1	115	30	316-317
	obranch 35369 35368 1	line from APP MAT 115.00 (2) to BRKR BRITTON 115.00	1	115	30	317-347

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No.	Contingency		Ckt	Base kV	Area	Zone
117	B2 LINE Newark F - Dixon		1	115	30	316-318
	obranch 35122 35600 1	line from NEWARK F 115.00 BRKR to BRKR DIXON LD 115.00	1	115	30	316-318
118	B2 LINE Newark F - Milpitas		1	115	30	316-318
	obranch 35122 35624 1	line from DIXON J1 115.00 (2) to BRKR MILPITAS 115.00	1	115	30	316-318
118	B2 LINE Newark F - Milpitas		2	115	30	316-318
	obranch 35122 35624 2	line from DIXON J1 115.00 (2) to BRKR MILPITAS 115.00	2	115	30	316-318
119	B2 LINE Newark F - Kiefer			115	30	
	obranch 35122 35602 1	line from NEWARK F 115.00 BRKR to (3) ZNKER J2 115.00	1	115	30	316-318
	obranch 35602 35604 1	line from ZNKER J2 115.00 (3) to (2) ZANKER 115.00	1	115	30	318-348
	obranch 35602 36850 1	line from ZNKER J2 115.00 (3) to BRKR KIFER 115.00	1	115	30	318-321
120	B2 LINE Newark F - Trimble			115	30	318-316
	obranch 35122 35603 1	line from NEWARK F 115.00 BRKR to (3) ZNKER J1 115.00	1	115	30	316-318
	obranch 35603 35605 1	line from ZNKER J1 115.00 (3) to (1) AGNEW J 115.00	1	115	30	318
	obranch 35603 35612 1	line from ZNKER J1 115.00 (3) to BRKR TRIMBLE 115.00	1	115	30	318
121	B2 LINE Newark F - Milpitas		1	115	30	316-318
	obranch 35122 35624 1	line from NEWARK F 115.00 BRKR to BRKR MILPITAS 115.00	1	115	30	316-318
122	B2 LINE Newark D - Scott #1		1	115	30	316-321
	obranch 35120 36852 1	line from NEWARK D 115.00 BRKR to BRKR SCOTT 115.00	1	115	30	316-321
123	B2 LINE Newark F - Scott #2		2	115	30	316-321
	obranch 35122 36852 2	line from NEWARK F 115.00 BRKR to BRKR SCOTT 115.00	2	115	30	316-321
124	B2 LINE Newark D - Tuolumn #1			115	30	
	obranch 35120 38432 1	line from NEWARK D 115.00 BRKR to (6) OAKDLTID 115.00	1	115	30	316-324
	obranch 38432 36962 1	line from OAKDLTID 115.00 (6) to BRKR MOCCASIN 115.00	1	115	30	324-300
	obranch 38432 38420 1	line from OAKDLTID 115.00 (6) to BRKR TUOLUMN 115.00	1	115	30	324
125	B2 LINE Newark D - Tuolumn #2			115	30	
	obranch 38432 35120 2	line from OAKDLTID 115.00 (6) to BRKR NEWARK D 115.00	2	115	30	316-324
	obranch 38432 36962 2	line from OAKDLTID 115.00 (6) to BRKR MOCCASIN 115.00	2	115	30	324-300
	obranch 38432 38420 2	line from OAKDLTID 115.00 (6) to BRKR TUOLUMN 115.00	2	115	30	324
126	B1 GENERATOR OUTAGE -- Contra Costa Unit 7					
	setpgen 33117: 0.0	C.COS 7 18.00 PGEN=320.00 QGEN=168.31				
	setqmin 33117: 0.0	C.COS 7 18.00 PGEN=320.00 QGEN=168.31				
	setqmax 33117: 0.0	C.COS 7 18.00 PGEN=320.00 QGEN=168.31				
126	B1 GENERATOR OUTAGE -- SECAL Unit 1					
	setpgen 30521: 0.0	SECAL_1 18.00 PGEN=320.00 QGEN=168.31				
	setqmin 30521: 0.0	SECAL_1 18.00 PGEN=320.00 QGEN=168.31				
	setqmax 30521: 0.0	SECAL_1 18.00 PGEN=320.00 QGEN=168.31				
127	B1 GENERATOR OUTAGE -- Pittsburg Unit 7					
	setqmax 30000: 0.0	PTS7SWNG 20.00 PGEN=650.00 QGEN=350.00				
	setqmin 30000: 0.0	PTS7SWNG 20.00 PGEN=650.00 QGEN=350.00				
	setpgen 30000: 0.0	PTS7SWNG 20.00 PGEN=650.00 QGEN=350.00				
127	B1 GENERATOR OUTAGE -- DEC Steam Unit					
	setpgen 33110: 0.0	DEC STG1 20.00 PGEN=650.00 QGEN=350.00				
	setqmin 33110: 0.0	DEC STG1 20.00 PGEN=650.00 QGEN=350.00				
	setqmax 33110: 0.0	DEC STG1 20.00 PGEN=650.00 QGEN=350.00				
128	B1 GENERATOR OUTAGE -- Potrero Unit 3					
	setqmax 33252: 0.0	POTRERO3 20.00 PGEN=205.00 QGEN=64.00				
	setqmin 33252: 0.0	POTRERO3 20.00 PGEN=205.00 QGEN=64.00				
	setpgen 33252: 0.0	POTRERO3 20.00 PGEN=205.00 QGEN=64.00				
128	B1 GENERATOR OUTAGE -- Potrero Unit 7C					
	setqmin 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setpgen 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmax 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
128	B1 GENERATOR OUTAGE -- Golden Gate Power Project Unit 4					

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No.	Contingency	Ckt	Base kV	Area	Zone
	setpgen 33222: 0.0 POTRERO7C 20.00 PGEN=200.00 QGEN=160.00				
	setqmin 33222: 0.0 POTRERO7C 20.00 PGEN=200.00 QGEN=160.00				
	setqmax 33222: 0.0 POTRERO7C 20.00 PGEN=200.00 QGEN=160.00				
128	B1 GENERATOR OUTAGE -- Tesla Steam Unit				
	setpgen 30629: 0.0 TESLA ST1 20.00 PGEN=340.00 QGEN=227.00				
	setqmin 30629: 0.0 TESLA ST1 20.00 PGEN=340.00 QGEN=227.00				
	setqmax 30629: 0.0 TESLA ST1 20.00 PGEN=340.00 QGEN=227.00				
128	B1 GENERATOR OUTAGE -- Los Esteros Steam Unit				
	setpgen 35872: 0.0 LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0 LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmax 35872: 0.0 LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
128	B1 GENERATOR OUTAGE -- Freemont Generating Project				
	setpgen 30638: 0.0 FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0 FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0 FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
129	B3 TRANSFORMER Moraga 230/115 kV			30	308-368
	obranch 30551 33121 1 TRAN from MRAGA 1M 230.00 (3) to (1) MRAGA 1T 13.20	1	13.2-230	30	368-308
	obranch 30550 30551 1 TRAN from MORAGA 230.00 BRKR to (3) MRAGA 1M 230.00	1	230	30	308
	obranch 30551 33020 1 TRAN from MRAGA 1M 230.00 (3) to BRKR MORAGA 115.00	1	115-230	30	308
130	B3 TRANSFORMER Pittsburg 230-115 kV	12	115-230	30	308
	obranch 32950 30526 12 TRAN from PITSBURG 115.00 BRKR to BRKR PITSBURG 230.	12	115-230	30	308
131	B3 TRANSFORMER Pittsburg 230-115 kV	13	115-230	30	308
	obranch 32950 30526 13 TRAN from PITSBURG 115.00 BRKR to BRKR PITSBURG 230.	13	115-230	30	308
132	B3 TRANSFORMER Contra Costa Sub 230-115 kV	3	115-230	30	308
	obranch 33000 30523 3 TRAN from CC SUB 115.00 BRKR to BRKR CC SUB 230.00	3	115-230	30	308
133	B3 TRANSFORMER Sobrante 230-115 kV	1	115-230	30	308
	obranch 33010 30540 1 TRAN from SOBRANTE 115.00 BRKR to BRKR SOBRANTE 23	1	115-230	30	308
134	B3 TRANSFORMER Sobrante 230-115 kV	2	115-230	30	308
	obranch 33010 30540 2 TRAN from SOBRANTE 115.00 BRKR to BRKR SOBRANTE 23	2	115-230	30	308
135	B3 TRANSFORMER Contra Costa Sub 230-115 kV	1	60-115	30	308
	obranch 33050 33000 1 TRAN from CC SUB 60.00 BRKR to BRKR CC SUB 115.00	1	60-115	30	308
136	B3 TRANSFORMER East Shore 230-115 kV	1	115-230	30	316
	obranch 35105 30560 1 TRAN from EAST SHORE 115.00 BRKR to BRKR EAST SHORE	1	115-230	30	316
136	B3 TRANSFORMER East Shore 230-115 kV	2	115-230	30	316
	obranch 35105 30560 2 TRAN from EAST SHORE 115.00 BRKR to BRKR EAST SHORE	2	115-230	30	316
136	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310
	obranch 30703 33315 1 TRAN from EAST SHORE 115.00 BRKR to BRKR EAST SHORE	1	115-230	30	310
137	B3 TRANSFORMER Newark E 230-115 kV -- 3-WINDING TRANSFORMER 30	11			
	obranch 30631 35122 11 TRAN from NEWARK E 13.20 to (1) NEWARK F 115.00	11			
138	B3 TRANSFORMER Newark D 230-115 kV-- 3-WINDING TRANSFORMER 306	9			
	obranch 30630 35120 9 TRAN from NEWARK D 13.20 to (1) NEWARK D 115.00	9			
139	B3 TRANSFORMER Newark D 230-115 kV-- 3-WINDING TRANSFORMER 306	7			
	obranch 30630 35121 7 TRAN from NEWARK D 13.200 to (1) NEWARK E 115.00	7			
140	B3 TRANSFORMER Newark D 115-60 kV			30	316-368
	obranch 35109 35217 1 TRAN from NWRK 2M 115.00 (3) to BRKR NEWARK 60.00	1	60-115	30	316
	obranch 35109 35302 1 TRAN from NWRK 2M 115.00 (3) to (1) NWRK 2T 13.00	1	13-115	30	368-316
	obranch 35120 35109 1 TRAN from NEWARK D 115.00 BRKR to (3) NWRK sM 115.00	1	115	30	316
141	B3 TRANSFORMER San Ramon 230-60kV	1	60-230	30	316
	obranch 35209 30555 1 TRAN from SAN RAMON 60.00 BRKR to BRKR SAN RAMON	1	60-230	30	316
142	B3 TRANSFORMER Los Positas 230-60 kv	4	60-230	30	316
	obranch 35220 30585 4 TRAN from LOS POSITAS 60.00 BRKR to BRKR LOS POSITAS	4	60-230	30	316
143	B2 LINE Milbrae - San Paula - Martin C		115	30	

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 33309 33307 1	line from SANPAULA 115.00 (2) to BRKR MILLBRAE 115.00	1	115	30	340-310
	obranch 33307 33208 1	line from SANPAULA 115.00 (2) to BRKR MARTIN C 115.00	1	115	30	309-310
	setpload 33305:17	LOAD-TRANSFER SANPAULA 115.00 TO SHAWROAD 115.00				
	setqload 33305: 8	LOAD-TRANSFER SANPAULA 115.00 TO SHAWROAD 115.00				
144	B2 LINE East Grand - Mil SFIA - San Mateo 115 kV			115	30	310
	setqload 33306:18.631	LOAD-TRANSFER MIL-SFIA 115.00 TO AIRPORT 115.00				
	obranch 33308 33303 2	line from MIL-SFIA 115.00 (2) to BRKR EST GRNO 115.00	2	115	30	310
	obranch 33308 33310 2	line from MIL-SFIA 115.00 (2) to BRKR SANMATEO 115.00	2	115	30	310
	setpload 33308: 0.0	LOAD-TRANSFER MIL-SFIA 115.00 TO AIRPORT 115.00				
	setqload 33308: 0.0	LOAD-TRANSFER MIL-SFIA 115.00 TO AIRPORT 115.00				
	setpload 33306:49.025	LOAD-TRANSFER MIL-SFIA 115.00 TO AIRPORT 115.00				
145	B2 LINE San Mateo - ShawRoad - Martin C			115	30	340-310
	obranch 33305 33220 J6	line from SHAWRCAD 115.00 (2) to BRKR GGPP D 115.00	J6	115	30	340-310
	obranch 33310 33305 6	line from SANMATEO 115.00 BRKR to (2) SBAWROAD 115.00	6	115	30	310-340
146	B2 LINE Martin C - San Mateo 230 kV		1	230	30	310-309
	obranch 30695 30700 1	line from MARTIN C 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	310-309
147	B2 LINE Martin C - San Mateo 115 kV		3	115	30	309-310
	obranch 33208 33310 3	line from MARTIN C 115.00 BRKR to BRKR SANMATEO 115.00	3	115	30	309-310
148	B2 LINE San Mateo - Ravenswood		1	230	30	310
	obranch 30700 30703 1	line from SANMATEO 230.00 BRKR to BRKR RAVENSWD 230.0	1	230	30	310
149	B2 LINE Monta Vista - Jefferson		1			
	obranch 30705 30715 1	line from MONTAVIS 230.00 BRKR to BRKR JEFFERSN 230.00	1			
150	B2 LINE Martin C - Daly City		1	115	30	309-310
	obranch 33208 33300 1	line from MARTIN C 115.00 BRKR to BRKR DALY CTY 115.00	1	115	30	309-310
151	B2 LINE Martin C - Serona			115	30	309-310
	obranch 33301 33300 1	line from DLY CTYP 115.00 (3) to BRKR DALY CTY 115.00	1	115	30	310
	obranch 33301 33302 1	line from DLY CTYP 115.00 (3) to BRKR SERONA 115.00	1	115	30	310
	obranch 33208 33301 1	line from MARTIN C 115.00 BRKR to (3) OLY CTYP 115.00	1	115	30	309-310
152	B2 LINE Martin C - EBT		2	115	30	309-310
	obranch 33208 33303 2	line from MARTIN C 115.00 BRKR to BRKR EBT 115.00	2	115	30	309-310
153	B2 LINE Martin C - Airport			115	30	310-340
	obranch 33220 33306 5	line from GGPP D 115.00 (3) to BRKR AIRPORT 115.00	5	115	30	310-340
	obranch 33220 33322 5	line from GGPP D 115.00 (3) to UAL TAP 115.00	5	115	30	310
	obranch 33304 33322 1	TRAN from UAL COGN 115.00 BRKR to (1) UAL TAP 9.11	1	115	30	310
153	B2 LINE Martin C - GGPP		5	115	30	309-310
	obranch 33208 33220 5	line from MARTIN C 115.00 BRKR to (3) GGPP D 115.00	5	115	30	309-310
154	B2 LINE Martin C - San Mateo (Duplicate of 147)		3	115	30	309-310
	obranch 33208 33310 3	line from MARTIN C 115.00 BRKR to BRKR SANMATEO 115.00	3	115	30	309-310
155	B2 LINE Airport - San Mateo		5	115	30	340-310
	obranch 33306 33310 5	line from AIRPORT 115.00 BRKR to BRKR SANMATEO 115.00	5	115	30	340-310
156	B2 LINE Millbrae - San Mateo		1	115	30	310
	obranch 33307 33310 1	line from MILLBRAE 115.00 BRKR to BRKR SANMATEO 115.0	1	115	30	310
157	B2 LINE San Mateo - Bay Meadows Ckt 1		1	115	30	310
	obranch 33310 33311 1	lime from SANMATEO 115.00 BRKR to BRKR BAY MDWS 115.	1	115	30	310
158	B2 LINE San Mateo - Bay Meadows Ckt 2		2	115	30	310
	obranch 33310 33311 2	line from SANMATEO 115.00 BRKR to BRKR BAY MDWS 115.	2	115	30	310
159	B2 LINE San Mateo - Belmont		1	115	30	310
	obranch 33310 33312 1	line from SANMATEO 115.00 BRKR to BRKR BELMONT 115.0	1	115	30	310
160	B2 LINE San Mateo D - Ravenswood		1	115	30	310
	obranch 33310 33315 1	line from SANMATEO 115.00 BRKR to BRKR RAVENSWD 115.	1	115	30	310
161	52 LINE Belmont - Bair		1	115	30	310
	obranch 33312 33313 1	line from BELMONT 115.00 BRKR to BRKR BAIR 115.00	1	115	30	310

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No.	Contingency		Ckt	Base kV	Area	Zone
162	B2 LINE Bair - Ravenwood			115	30	310-340
	obranch 33313 33319 1	line from BAIR 115.00 BRKR to (3) SHREDJCT 115.00	1	115	30	310-340
	obranch 33319 33315 1	line from SHREDJCT 115.00 (3) to BRKR RAVENSWD 115.00	1	115	30	340-310
	setpload 33314:0.0	LOAD-DROP SHREDDER 115.00 LOAD==3.06(0.7)				
	setqload 33314:0.0	LOAD-DROP SHREDDER 115.00 LOAD==3.06(0.7)				
163	B2 LINE Ravenswood - Cooley Landing #1		1	115	30	310
	obranch 33315 33316 1	line from RAVENSWD 115.00 BRKR to BRKR CLY LNLG 115.0	1	115	30	310
164	52 LINE Ravenswood - Cooley Landing #2		2	115	30	310
	obranch 33315 33317 2	line from RAVENSWD 115.00 BRKR to BRKR CLY LNG2 115.0	2	115	30	310
165	B2 LINE Ravenswood - Ames		1	115	30	310-317
	obranch 33315 35350 1	line from RAVENSWD 115.00 BRKR to BRKR AMES BS1 115.0	1	115	30	310-317
166	B2 LINE Ravenswood - Palo Alto #1		1	115	30	310-328
	obranch 33315 38028 1	line from RAVENSWD 115.00 BRKR to BRKR PLO ALTO 115.0	1	115	30	310-328
167	52 LINE Ravenswood - Palo Alto #2		2	115	30	310-328
	obranch 33315 38028 2	line from RAVENSWD 115.00 BRKR to BRKR PLO ALTO 115.0	2	115	30	310-328
168	52 LINE Clay - Palo Alto		1	115	30	310-328
	obranch 33316 38028 1	line from CLY LNDG 115.00 BRKR to BRKR PLO ALTO 115.00	1	115	30	310-328
169	B2 LiNE East Shore - Mt Eden #2 (Duplicate of 101)		2	115	30	316
	obranch 35105 35106 2	line from EASTSHRE 115.00 BRKR to BRKR MT EDEN 115.00	2	115	30	316
170	B2 LINE Monta Vista - Jefferson			230	30	
	obranch 30705 30710 1	line from MONTAVIS 230.00 3RKR to (3) SLAC JCT 230.00	1	230	30	317-310
	obranch 30710 30711 1	line from SLAC JCT 230.00 (3) to (1) S.L.A.C. 230.00	1	230	30	310-340
	obranch 30710 30715 1	line from SLAC JCT 230.00 (3) to BRKR JEFFERSN 230.00	1	230	30	310
171	32 LINE Metcalf - Monta Vista Ckt 3		3	230	30	318-317
	obranch 30735 30705 3	line from METCALF 230.00 BRKR to BRKR MONTAVIS 230.00	3	230	30	318-317
172	B2 LINE Monta Vista - Saratoga		1	230	30	317
	obranch 30705 30720 1	line from MONTAVIS 230.00 BRKR to BRKR SARATOGA 230.0	1	230	30	317
173	32 LINE Saratoga - Vasona		1	230	30	317
	obranch 30720 30733 1	lime from SARATOGA 230.00 BRKR to (2) VASONA 230.00	1	230	30	317
174	B2 LINE Monta Vista - Hicks		1	230	30	317-318
	obranch 30705 30730 1	line from MONTAVIS 230.00 BRKR to BRKR HICKS 230.00	1	230	30	317-318
175	32 LINE Hicks - Metcalf			230	30	318
	obranch 30730 30734 1	line from HICKS 230.00 BRKR to BRKR CTYVLY 230.00	1	230	30	318
	obranch 30734 30735 1	line from CTYVLY 230.00 BRKR to BRKR METCALF 230.00	1	230	30	318
176	B2 LINE Metcalf - Moss Landing		1	230	30	318-319
	obranch 30735 30750 1	line from METCALF 230.00 BRKR to BRKR MOSSLND2 230.00	1	230	30	318-319
178	32 LINE Whisman - Monta Vista		1	115	30	317
	obranch 35352 35356 1	line from WHISMAN 115.00 BRKR to BRKR MNTA VSA 115.00	1	115	30	317
180	B2 LINE MT View - Monta Vista		1	115	30	317
	obranch 35353 35356 1	line from MT VIEW 115.00 BRKR to BRKR MNTA VSA 115.00	1	115	30	317
181	B2 LINE Ames BS1 - Ames BS2		1	115	30	317
	obranch 35350 35351 1	line from AMES BS1 115.00 BRKR to BEER AMES BS2 115.00	1	115	30	317
182	32 LINE Ravenswood - Ames BS2		1	115	30	310-317
	obranch 33315 35351 1	line from RAVENSWD 115.00 BRKR to BEER AMES BS2 115.0	1	115	30	310-317
183	B2 LINE VSA - Lawrence			115	30	317-347
	obranch 35367 35363 1	line from PHLPS-JT 115.00 (3) to BRKR LAWRENCE 115.00	1	115	30	317
	obranch 35356 35367 1	line from VSA 115.00 BRKR to (3) PHLPS_JT 115.00	1	115	30	317
	obranch 35367 35366 1	line from PHLPS-JT 15.03 (3) to (1) PHILL:PS 115.00	1	115	30	347-317
184	B2 LINE AMD - Lockheed			115	30	
	obranch 35365 35360 1	line from AiMD JCT 115.00 (3) to LCKHD J2 115.00	1	115	30	317
	obranch 35360 35362 1	line from LCKHD J2 115.00 (3) to (1) LOCKHD 2 115.00	1	115	30	317-347
	obranch 35365 35364 1	1ine from AMD JCT 115.00 (3) to (1) A.M.D 115.00	1	115	30	347-317

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 35369 35365 1	line from APP MAT 115.00 (2) to (3) AMD JCT 115.00	1	115	30	347-317
	obranch 35360 35122 1	line from LCKHD J2 115.00 (3) to BRKRNEWARK F 115.00	1	115	30	316-317
185	B2 LINE App Mat - Britton		1	115	30	317-347
	obranch 35369 35368 1	line from APP MAT 115.00 BRKR to BRKR BRITTON 115.00	1	115	30	317-347
186	B2 LINE Monta Vista - Britton		1	115	30	317
	obranch 35356 35368 1	line from MNTA VSA 115.00 BRKR to BRKR BRITTON 115.00	1	115	30	317
187	B2 LINE Stelling - Monta Vista		1	115	30	317
	obranch 35354 35356 1	line from STELLING 115.00 BRKR to BRKR MNTA VSA 115.00	1	115	30	317
188	B2 LINE Stelling - Wolfe		1	115	30	317
	obranch 35354 35355 1	line from STELLING 115.00 BRKR to BRKR WOLFE 115.00	1	115	30	317
189	B2 LINE Wolfe - Monta Vista		1	115	30	317
	obranch 35355 35356 1	line from WOLFE 115.00 BRKR to BRKR MNTA VSA 115.00	1	115	30	317
190	B2 LINE MEC - Metcalf Ckt 4		4	230	30	318
	obranch 30735 30741 4	lime from MONTAVIS 230.00 BRKR to BRKR METCALF 230.00	4	230	30	318
190	B2 LINE Monta Vista - MEC		4	230	30	318-317
	obranch 30705 30741 4	lime from MONTAVIS 230.00 BRKR to BRKR METCALF 230.00	4	230	30	318-317
191	B2 LINE Vasona - Metcalf		1	230	30	317-318
	obranch 30733 30735 1	line from VASONA 230.00 (2) to BRKR METCALF 230.00	1	230	30	317-318
192	B2 LINE Kiefer - Scott		1	115	30	321
	obranch 36850 36852 1	line from KIFER 115.00 BRKR to BRKR SCOTT 115.00	1	115	30	321
193	B2 LINE Kiefer - FMC			115	30	321-318
	obranch 35617 35615 1	line from FMC JCT 115.00 to BRKR FMC 115.00	1	115	30	318
	obranch 36850 35617 1	line from KIFER 115.00 BRKR to FMC JCT 115.00	1	115	30	321-318
194	B2 LINE FMC - San Jose B			115	30	318
	obranch 35617 35616 1	line from FMC JCT 115.00 to BRKR SJ B E 115.00	1	115	30	318
	obranch 35615 35617 1	line from FMC 115.00 BRKR to FMC JCT 115.00	1	115	30	318
195	B2 LINE Trimble - San Jose B		1	115	30	318
	obranch 35612 35616 1	line from GISH JCT 115.00 (3) to BRKR SJ B E 115.00	1	115	30	318
196	B2 LINE Los Esteros - Montague		1	115	30	318
	obranch 35658 35610 1	line from LOS ESTEROS 115.00 BRKR to BRKR MONTAGUE 1	1	115	30	318
197	B2 LINE Los Esteros - Trimble		1	115	30	318
	obranch 35658 35612 1	line from LS Esteros 115.00 BRKR to BRKR TRIMELE 115.00	1	115	30	318
198	B2 LINE Nortech - Los Esteros		1	115	30	318
	obranch 35659 35658 1	line from NORTECH 115.00 BRKR to BRKR LS ESTRS 115.00	1	115	30	318
199	B2 LINE Nortech - Kifer		1	115	30	318-321
	obranch 35659 36850 1	line from NORTECH 115.00 BRKR to BRKR KIFER 115.00	1	115	30	318-321
200	B2 LINE Los Esteros - Agnew			115-9.11	30	318-396
	obranch 35658 35606 1	line from LS ESTRS 115.00 BRKR to (2) AGNEW 115.00	1	115	30	318
	obranch 35606 35860 1	TRAN from AGNEW 115.00 (2) to (1)OLS-AGNE 9.11	1	9.11-115	30	396-318
201	B2 LINE Montague - Trimble		1	115	30	318
	obranch 35610 35612 1	line from MONTAGUE 115.00 BRKR to BRKR TRIMBLE 115.00	1	115	30	318
202	B2 Milpitas - Newark F		1	115	30	316-318
	obranch 35624 35122 1	line from DIXON JCT 115.00 (2) to BRKR NEWARK F 115.00	1	115	30	316-318
202	B2 Milpitas - Newark F		2	115	30	316-318
	obranch 35624 35122 2	line from DIXON JCT 115.00 (2) to BRKR NEWARK F 115.00	2	115	30	316-318
203	B2 LINE San Jose A - San Jose B		1	115	30	318
	obranch 35618 35619 1	line from SN JSE A 115.00 BRKR to BRKR SJ B F 115.00	1	115	30	318
204	B2 LINE San Jose A - El Patio		1	115	30	318
	obranch 35618 35620 1	line from SN SE A 115.00 BRKR to BRKR EL PATIO 115.00	1	115	30	318
205	B2 LINE Eal Patio - Metcalf			115	30	318
	obranch 35620 35621 1	line from EL PATIO 115.00 BRKR to (2) IBM-HR J 115.00	1	115	30	318

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 35621 35642 1	line from IBM-HR J 115.00 (2) to BRKR MTCALF 1 115.00	1	115	30	318
206	B2 LINE El Patio - Metcalf			115	30	318
	obranch 35651 35642 1	line from BAILY J3 115.00 (2) to BRKR MTCALF 1 115.00	1	115	30	318
	obranch 35620 35651 1	line from EL PATIO 115.00 BRKR to (2) BAILY J3 115.00	1	115	30	318
207	B2 LINE San Jose B - Evergreen			9.11-115	30	
	obranch 35631 35632 1	line from MARKHM J 115.00 (3) to (2) MARKHAM 115.00	1	115	30	318-348
	obranch 35631 35636 1	line from MAREHM J 115.00 (3) to BRKR EVRGRN 1 115.00	1	115	30	318
	obranch 35632 35863 1	TRAN from MARKHAM 115.00 (2) to (1) CATALYST 9.11	1	9.11-115	30	396-348
	obranch 35619 35631 1	line from SJ B F 115.00 BRKR to (3) MARKHM J 115.00	1	115	30	318
208	B2 LINE Evergreen - Metcalf			115	30	318
	obranch 35633 35645 1	line from EVRGRN 2 115.00 (3) to (3) EVRGRN J 115.00	1	115	30	318
	obranch 35645 35625 1	line from EVRGRN J 115.00 (3) to (2) MARKHMJ2 115.00	1	115	30	318
	obranch 35625 35634 1	line from MARKHMJ2 115.00 (3) to (2) STONE J 115.00	1	115	30	318
	obranch 35645 35643 1	line from EVRGRN J 115.00 (3) to BRKR MTCALF 2 115.00	1	115	30	318
209	52 LINE Evergreen - Metcalf		1	115	30	318
	obranch 35636 35643 1	line from EVRGRN 1 115.00 BRKR to BRKR MTCALF 2 115.00	1	115	30	318
210	B2 LINE Edenvale - Edenvale J3/J1 - Metcalf			115	30	318-348
	obranch 35649 35638 1	line from EDNVL 3 115.00 (3) to BRKR EDENVALE 115.00	1	115	30	318
	obranch 35641 35642 1	line from EDNVL JI 115.00 (3) to BRKR MTCALF 1 115.00	1	115	30	318
	obranch 35637 35649 1	line from IBM-CTLE 115.00 (1) to (3 EDNVL J3 115.00	1	115	30	348-318
	obranch 35641 35639 1	line from EDNVL 1 115.00 (3) to (1) IBM-HRRS 115.00	1	115	30	348-318
	obranch 35649 35641 1	line from EDNVL J3 115.00 (3) to (3) EDNVL Ji 115.00	1	115	30	318
211	B2 LINE Edenvale - Baily - Metcalf			115	30	318-348
	obranch 35638 35653 1	line from EDENVALE 115.00 BRKR to (3) BAILY J2 115.00	1	115	30	318
	obranch 35653 35642 1	line from BAILY 2 115.00 (3) to BRKR MTCALF 1 115.00	1	115	30	318
	obranch 35653 35652 1	line from BAILY 2 115.00 (3) to (2) BAILY Ji 115.00	1	115	30	318
	obranch 35652 35640 1	line from BAILY Ji 115.00 (2) to (1) IBM-BALY 115.00	1	115	30	348-318
212	B2 LINE Dixon Landing - McKee			115	30	318
	obranch 35629 35630 1	line from MABURY J 115.00 (3) to (1) MABURY 115.00	1	115	30	318
	obranch 35600 35629 1	line from DIXON LD 115.00 BRKR to (3) MABURY J 115.00	1	115	30	318
	obranch 35629 35626 1	line from MABURY J 115.00 (3) to BRKR MCKEE 115.00	1	115	30	318
213	B2 LINE McKee - Metcalf			115	30	318
	obranch 35626 35656 1	line from MCKEE 115.00 BRKR to (3) PIERCY 115.00	1	115	30	318
	obranch 35656 35643 1	line from PIERCY 115.00 (3) to BRKR MTCALF 2 115.00	1	115	30	318
214	B2 LINE Swift - Milpitas			115	30	318-348
	obranch 35624 35622 1	line from MILPITAS 115.00 to BRKR SWIFT 115.00	1	115	30	318
	obranch 35624 35628 1	line from MILPITAS 115.00 (2) to (IY FD.PCFIC 115.00	1	115	30	318-348
215	B2 LINE Swift - Metcalf		1	115	30	318
	obranch 35622 35643 1	line from SWIFT 115.00 BRKR to BRKR MTCALF 2 115.00	1	115	30	318
216	B2 LINE Metcalf - Morgan Hill			115	30	318
	obranch 35642 35646 1	line from MTCALF 1 115.00 BRKR to BRKR MRGN HIL 115.00	1	115	30	318
	rbranch 35654 35655 1	switch line MORG J1 115 MORG J2 115				
217	B2 LINE Morgan Hill - LLA Gas		1	115	30	318
	obranch 35646 35648 1	line from MRGN HIL 115.00 BRKR to BRKR LLAGAS 115.00	1	115	30	318
218	B2 LINE LLA Gas - Glory COG			115	30	318-348
	obranch 35650 35647 1	TRAN from GILROY F 115.00 (2) to (1) GLRY COG 13.80	1	115	30	348-318
	obranch 35648 35650 1	line from LLAGAS 115.00 BRKR to (2) GILROY F 115.00	1	115	30	318-348
219	B2 LINE LLA Gas - Metcalf			115	30	318
	obranch 35655 35654 1	line from MORGN J2 115.00 (2) to (4) MORGN J1 115.00	1	115	30	318
	obranch 35655 35642 1	line from MORGN J1 115.00 (2) to (4) METCALF 115.00	1			
	obranch 35648 35655 1	line from LLAGAS 115.00 BRKR to (2) MORGN J2 115.00	1	115	30	318
220	52 LINE Metcalf - Coyote Pump		1			
	obranch 356543 35644 1	line from MTCALF 2 115.00 BRKR to (1) CYTE PMP 115.00	1			

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No.	Contingency		Ckt	Base kV	Area	Zone
222	B2 LINE Monta Vista - Calpine MEC		4	230	30	318-317
	obranch 30705 30741 4	line from MONTAVIS 230.00 BRKR to (1) CAL_METC 230.00	4	230	30	318-317
223	B2 LINE Metcalf - Calpine MEC		4	230	30	318
	obranch 30735 30741 4	line from METCALF 230.00 BRKR to (1) CAL_METC 230.00	4	230	30	318
224	B2 LINE Table MT - Vaca Dixon		1	500	30	300
	obranch 30015 30030 1	lime from TABLE MT 500.00 BRKR to BRKR VACA-DIX 500.00	1	500	30	300
225	B2 LINE Table MT - Tesla		1	500	30	300
	obranch 30015 30040 1	line from TABLE MT 500.00 BRKR to BRKR TESLA 500.00	1	500	30	300
226	B2 LINE Vaca Dixon - Tesla		1	500	30	300
	obranch 30030 30040 1	1ine from VACA-DIX 500.00 BRKR to BRKR TESLA 500.00	1	500	30	300
227	B2 LINE Tracy - Tesla		1	500	30	300
	obranch 30035 30040 1	line from TRACY 500.00 BRKR to BRKR TESLA 500.00	1	500	30	300
228	B2 LINE Tracy - Los Banos		1	500	30	300
	obranch 30035 30050 1	0 4 line from TRACY 500.00 BRKR to BRKR LOSBANOS 500.0	1	500	30	300
229	B2 LINE Tesla - Metcalf		1	500	30	300
	obranch 30040 30042 1	line from TESLA 500.00 BRKR to BRKR METCALF 500.00	1	500	30	300
230	B2 LINE Tesla - Los Bonos		1	500	30	300
	obranch 30040 30050 1	line from TESLA 500.00 BRKR to BRKR LOSBANOS 500.00	1	500	30	300
231	B2 LINE Metcalf - Moss Landing		1	500	30	300
	obranch 30042 30045 1	line from METCALF 500.00 BRKR to BRKR MOSSLAND 500.0	1	500	30	300
232	B2 LINE Moss Landing - Los Bonos		1	500	30	300
	obranch 30045 30050 1	line from MOSSLAND 500.00 BRKR to BRKR LOSBANOS 500.	1	500	30	300
233	B2 LINE Los Banos - Gates		1	500	30	300
	obranch 30050 30055 1	line from LOSBANOS 500.00 BRKR to BRKR GATES 500.00	1	500	30	300
234	B2 LINE Los Banos - Midway		1	500	30	300
	obranch 30050 30060 1	line from LOSBANOS 500.00 BRKR to BRKR MIDWAY 500.00	1	500	30	300
235	B2 LINE Gates - Diablo		1	500	30	300
	obranch 30055 30057 1	line from GATES 500.00 BRKR to BRKR DIABLO 500.00	1	500	30	300
236	B2 LINE Gates - Midway		1	500	30	300
	obranch 30055 30060 1	line from GATES 500.00 BRKR to BRKR MIDWAY 500.00	1	500	30	300
237	TRANSFORMER Vaca-Dixon 500/230 kV				30	304-300
	obranch 30030 30067 1	TRAN from VACA-DIX 500.00 BRKR to (3) VC DX11M 500.00	1	500	30	300
	obranch 30067 32152 1	TRAN from VC DX11M 500.00 (3) to (1) VC DX11T 13.80	1	13.8-500	30	304-300
	obranch 30067 30460 1	TRAN from VC DXl1M 500.00 (3) to BRKR VACA-DIX 230.00	1	230-500	30	304-300
238	TRANSFORMER Tesla 500-230 kV		2			
	obranch 30040 30624 2	TRAN from TESLA 2M 13.80 (3) to BRKR TESLA E 230.00	2			
239	TRANSFORMER Tesla 500-230 kV		4	500-230	30	300-311
	obranch 30625 30040 4	TRAN from TESLA : 230.00 BRKR to BRKR TESLA 500.00	4	500-230	30	300-311
240	TRANSFORMER Los Banos 500-230 kV				30	313-300
	obranch 30050 30069 1	TRAN from LOSBANOS 500.00 BRKR to (3) L.BANS M 500.00	1	500	30	300
	obranch 30069 30765 1	TRAN from L.BANS M 500.00 (3) to BRKR LOSBANOS 230.00	1	230-500	30	313-300
	obranch 30069 34302 1	TRAN from L.BANS M 500.00 (3) to (1) L.BANS T 13.80	1	13.8-500	30	313-300
241	TRANSFORMER Gates 500-230 kV				30	300-314
	obranch 34607 30900 11	TRAN from GATES 13.80 BRKR to BRKR GATES 230.00	11	13.8-230	30	314
	obranch 34607 34606 11	TRAN from GATES 13.80 BRKR to BRKR GATES 13.80	11	13.8	30	314
	obranch 30055 34607 11	TRAN from GATES 500.00 BRKR to BRKR GATES 13.80	11	500-13.8	30	300-314
242	TRANSFORMER Metcalf 500-230 kV #1		11	230-500	30	318-300
	obranch 30735 30042 11	TRAN from METCALF 230.00 BRKR to BRKR METCALF 500.	11	230-500	30	318-300
243	TRANSFORMER Metcalf 500-230 kV #2		12	230-500	30	318-300
	obranch 30735 30042 12	TRAN from METCALF 230.00 BRKR to BRKR METCALF 500.	12	230-500	30	318-300
244	TRANSFORMER Mosslanding 500-230 kV		9	230-500	30	319-300

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 30750 30045 9	TEAK from M0SSLND2 230.00 BRKR to BRKR MOSSLAND 50	9	230-500	30	319-300
N1-1	OVERLAPPING LINE AND GENERATOR OUTAGE				30	308-361
	obranch 30526 30528 2	line from PITSBURG 230.00 BRKR to (6) DEC PTSG 230.00	2	230	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30528 30526 1	line from DEC PTSG 230.00 (6) to BRKR PITSBURG 230.00	1	230	30	308
	obranch 30528 33109 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG2 18.00	1	230-18	30	308-361
	obranch 30528 33108 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG1 18.00	1	230-18	30	308-361
	obranch 30528 33107 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC CTG1 24.00	1	230-24	30	308-361
	obranch 30528 33110 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG3 18.00	1	230-18	30	308-361
N1-10	OVERLAPPING LINE AND GENERATOR OUTAGE					
	obranch 30525 30700 1	line from C.COSTA 230.00 BRKR to BRKR SANMATEO 230.00	1			
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
N1-11	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	obranch 30526 30535 1	line from PITSBURG 230.00 BRKR to BRKR TIDEWATR 230.00	1	230	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-12	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	obranch 30526 30540 1	line from PITSBURG 230.00 BRKR to BRKR SOBRANTE 230.0	1	230	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-13	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308-316
	obranch 30526 30560 1	line from PITSBURG 230.00 BRKR to BRKR EASTSHORE 230.	1	230	30	308-316
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-14	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308-316
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30526 30560 2	line from PITSBURG 230.00 BRKR to BRKR EASTSHORE 230.	2	230	30	308-316
N1-15	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308-316
	obranch 30526 30555 1	line from PITSBURG 230.00 BRKR to BRKR SANRAMON 230.0	1	230	30	308-316
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-16	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30526 30561 1	line from PITSBURG 230.00 BRKR to BRKR TASSAJAR 230.00	1	230	30	308
N1-17	OVERLAPPING LINE AND GENERATOR OUTAGE			9.11-230	30	
	obranch 30526 30595 1	line from PITSBURG 230.00 BRKR to (3) FLOWIND2 230.00	1	230	30	308-311
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30595 30640 1	line from FLOWIND2 230.00 (3) to BRKR TESLA D 230.00	1	230	30	311
	obranch 30595 33840 1	TRAN from FLOWIND2 230.00 (3) to (1) FLOWD3-6 9.11	1	9.11-230	30	399-311
N1-18	OVERLAPPING LINE AND GENERATOR OUTAGE			230-9.11	30	
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30526 30600 1	line from PITSBURG 230.00 BRKR to (3) JV ENTER 230.00	1	230	30	308
	obranch 30600 30640 1	line from JV ENTER 230.00 (3) to BRKR TESLA D 230.00	1	230	30	308-311
	obranch 30600 33171 1	TRAN from JV ENTER 230.00 (3) to (1) JVE&HOWD 9.11	1	9.11-230	30	399-308
N1-19	OVERLAPPING LINE AND GENERATOR OUTAGE			115	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 32950 32970 1	line from PITSBURG 115.00 BRKR to BRKR CLAYTON 115.00	1	115	30	308
N1-2	OVERLAPPING LINE AND GENERATOR OUTAGE			230-9.11	30	
	obranch 30590 33838 1	TRAN from USWP-JRW 230.00 (3) to (1) USWP_#3 9.11	1	9.11-230	30	399-316
	setpgen 33117: 0.0:	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
	obranch 30525 30590 1	line from C.COSTA 230.00 BRKR to (3) USWP-JRW 230.00	1	230	30	308-316
	obranch 30590 30537 1	line from USWP-JRW 230.00 (3) to (3) DUBLIN 230.00	1	230	30	316
	obranch 30537 30527 1	line from DUBLIN 230.00 (3) to (3) N_LVMRE 230.00	1	230	30	316
	obranch 30527 35224 1	line from N_LVMRE 230.00 (3) to VINEYD D 230.00	1	230	30	316
	obranch 35224 35219 1	line from VINEYD D 230.00 (3) to VINEYARD 230.00	1	230	30	316
	obranch 35219 30630 1	line from VINEYARD 230.00 (3) to BRKR NEWARK D 230.00	1	230	30	316
N1-20	OVERLAPPING LINE AND GENERATOR OUTAGE			115	30	308-338

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 33043 32991 1	line from IMHOFF_2 115.00 (2) to BRKR MARTNZ E 115.00	1	115	30	308
	obranch 32992 33043 1	line from BOLLMAN2 115.00 (2) to (2) IMHOFF_2 115.00	1	115	30	308-338
	obranch 32950 32992 1	line from PITSBURG 115.00 BRKR to (2) BOLLMAN2 115.00	1	115	30	308-338
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-21	OVERLAPPING LINE AND GENERATOR OUTAGE			115	30-8	308-338
	obranch 33040 33042 1	line from BOLLMAN1 115.00 (2) to (3) IMHOFF_1 115.00	1	115	30	308-338
	obranch 33042 32991 1	line from IMHOFF_1 115.00 (3) to BRKR MARTNZ E 115.00	1	115	30	308
	obranch 32950 32993 1	line from PITSBURG 115.00 BRKR to (2) W.P.BART 115.00	1	115	30	308-338
	obranch 32993 33040 1	line from W.P.BART 115.00 (2) to (2) BOLLMAN1 115.00	1	115	30	338
	obranch 32994 33040 1	line from W.P.BART 115.00 (2) to (2) BOLLMAN1 115.00	1	115	8-30	338
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
N1-22	OVERLAPPING LINE AND GENERATOR OUTAGE			115-13.8	30	
	obranch 33036 32954 1	line from LINDETP1 115.00 (2) to (3) DOW TAP1 115.00	1	115	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 33030 33036 1	line from COLSTJT1 115.00 (2) to (2) LINDETP1 115.00	1	115	30	308
	obranch 32954 32953 1	line from DOW TAP1 115.00 (3) to BRKR CLMBA ST 115.00	1	115	30	308-338
	obranch 32954 32956 1	line from DOW TAP1 115.00 (3) to (2) DOW MTR 115.00	1	115	30	308
	obranch 32956 33160 1	TRAN from DOW MTR 115.00 (2) to (4) DOW CHEM 13.80	1	13.8-115	30	338-308
	obranch 33160 33162 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM2 13.80	1	13.8	30	338-396
	obranch 33160 33163 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM3 13.80	1	13.8	30	338-396
	obranch 33160 33161 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM1 13.80	1	13.8	30	338-396
	obranch 32950 33030 1	line from PITSBURG 115.00 BRKR to (2) COLSTJT1 115.00	1	115	30	308
N1-23	OVERLAPPING LINE AND GENERATOR OUTAGE			115	30	308
	obranch 33032 32970 3	line from KIRKTAP1 115.00 (2) to BRKR CLAYTON 115.00	3	115	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 32950 33032 3	line from PITSBURG 115.00 BRKR to (2) KIRKTAP1 115.00	3	115	30	308
N1-24	OVERLAPPING LINE AND GENERATOR OUTAGE			115-13.8	30	
	obranch 33038 32957 1	line from LINDEJCT 115.00 (3) to BRKR PRAXAIR 115.00	1	115	30	308-338
	obranch 33038 32961 1	line from LINDEJCT 115.00 (3) to (2) GWF2 TAP 115.00	1	115	30	308
	obranch 32961 32960 1	line from GWF2 TAP 115.00 (2) to (2) GWF%2 HS 115.00	1	115	30	308
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 32956 33160 1	TRAN from DOW MTR 115.00 (2) to (4) DOW CHEM 13.80	1	13.8-115	30	338-308
	obranch 33160 33163 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM3 13.80	1	13.8	30	338-396
	obranch 32955 32952 1	line from DOW TAP2 115.00 (2) to BRKR POSCO 115.00	1	115	30	338-308
	obranch 32960 33132 1	TRAN from GWF#2 HS 115.00 (2) to (1) GWF %2 13.80	1	13.8-115	30	396-308
	obranch 33160 33162 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM2 13.80	1	13.8	30	338-396
	obranch 33030 32950 1	line from COLSTJT1 115.00 (2) to BRKR PITSBURG 115.00	1	115	30	308
	obranch 32954 32956 1	line from DOW TAP1 115.00 (3) to (2) DOW MTR 115.00	1	115	30	308
	obranch 32954 32953 1	line from DOW TAP1 115.00 (3) to BRKR CLMBA ST 115.00	1	115	30	308-338
	obranch 33036 32961 1	line from LINDETP1 115.00 (2) to (3) GWF2 TAP 115.00	1	115	30	308
	obranch 33036 32954 1	line from LINDETP1 115.00 (2) to (3) DOW TAP1 115.00	1	115	30	308
	obranch 33036 33030 1	line from LINDETP1 115.00 (2) to (2) COLSTJT1 115.00	1	115	30	308
	obranch 32955 32953 1	line from DOW TAP2 115.00 (2) to BRKR CLMBA ST 115.00	1	115	30	308-338
	obranch 33160 33161 1	line from DOW CHEM 13.80 (4) to (1) DOWCHEM1 13.80	1	13.8	30	338-396
N1-25	B1 OVERLAPPING LINE AND GENERATOR OUTAGE			18-230	30	308
	obranch 30520 30521 1	TRAN from SECAL 230.00 (4) to (1) SECAL_1 18.00	1	18-230	30	308
	obranch 30520 30522 1	TRAN from SECAL 230.00 (4) to (1) SECAL_2 18.00	1	18-230	30	308
	obranch 30520 30524 1	TRAN from SECAL 230.00 (4) to (1) SECAL_3 18.00	1	18-230	30	308
	obranch 30520 30525 1	line from SECAL 230.00 (4) to BRKR C.COSTA 230.00	1	230	30	308
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
N1-26	B1 OVERLAPPING LINE AND GENERATOR OUTAGE				30	308-361
	obranch 30526 30528 2	line from PITSBURG 230.00 BRKR to (6) DEC PTSG 230.00	2	230	30	308
	obranch 30528 33107 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC CTG1 24.00	1	230-24	30	308-361
	obranch 30528 33110 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG3 18.00	1	230-18	30	308-361
	obranch 30528 30526 1	line from DEC PTSG 230.00 (6) to BRKR PITSBURG 230.00	1	230	30	308

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 30528 33109 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG2 18.00	1	230-18	30	308-361
	setpgen 30000: 0.0	PTSB 7 20.00 PGEN=685.00 QGEN=244.71				
	obranch 30528 33108 1	TRAN from DEC PTSG 230.00 (6) to (1) DEC STG1 18.00	1	230-18	30	308-361
N1-27	OVERLAPPING LINE AND GENERATOR OUTAGE -- Potrero Unit 7C			230	30	316-310
	setpgen 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmin 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmax 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	obranch 30560 30700 1	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	316-310
N1-27	OVERLAPPING LINE AND GENERATOR OUTAGE -- Potrero Unit 7C			230	30	316-310
	setpgen 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmin 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmax 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	obranch 30560 30700 2	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	2	230	30	316-310
N1-27	OVERLAPPING LINE AND GENERATOR OUTAGE -- Potrero Unit 7C			115	30	316
	obranch 35105 35107 1	line from EASTSHRE 115.00 BRKR to BRKR DUMBARTN 115.	1	115	30	316
	setqmax 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setqmin 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
	setpgen 33258: 0.0	POTRERO7C 20.00 PGEN=261.00 QGEN=160.00				
N1-28	OVERLAPPING LINE AND GENERATOR OUTAGE -- Golden Gate Power Proj			230	30	316-310
	setqmin 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	setqmax 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	obranch 30560 30700 1	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	316-310
	setpgen 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
N1-28	OVERLAPPING LINE AND GENERATOR OUTAGE -- Golden Gate Power Proj			230	30	316-310
	setpgen 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	setqmin 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	setqmax 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	obranch 30560 30700 2	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	2	230	30	316-310
N1-28	OVERLAPPING LINE AND GENERATOR OUTAGE -- Golden Gate Power Proj			115	30	316
	setpgen 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	obranch 35105 35107 1	line from EASTSHRE 115.00 BRKR to BRKR DUMBARTN 115.	1	115	30	316
	setqmin 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
	setqmax 33222: 0.0	UGGPP P4 20.00 PGEN=200.00 QGEN=160.00				
N1-29	OVERLAPPING LINE AND GENERATOR OUTAGE -- Los Esteros Steam Unit			230	30	316-310
	setpgen 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmax 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	obranch 30560 30700 1	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	316-310
N1-29	OVERLAPPING LINE AND GENERATOR OUTAGE -- Los Esteros Steam Unit			230	30	316-310
	obranch 30560 30700 2	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	2	230	30	316-310
	setqmax 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setpgen 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
N1-29	OVERLAPPING LINE AND GENERATOR OUTAGE -- Los Esteros Steam Unit			115	30	316
	setpgen 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmax 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	obranch 35105 35107 1	line from EASTSHRE 115.00 BRKR to BRKR DUMBARTN 115.	1	115	30	316
N1-29	OVERLAPPING LINE AND GENERATOR OUTAGE -- Los Esteros Steam Unit			230	30	318
	setpgen 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmax 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	obranch 30735 30731 1	line from LS_ESTRS 230.00 BRKR to BRKR METCALF 230.00	1	230	30	318
N1-29	OVERLAPPING LINE AND GENERATOR OUTAGE -- Los Esteros Steam Unit			230	30	316-318

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No.	Contingency		Ckt	Base kV	Area	Zone
	setqmax 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	obranch 30635 30731 1	line from NEWARK D 230.00 BRKR to BRKR LS_ESTRS 230.0	1	230	30	316-318
	setpgen 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
	setqmin 35872: 0.0	LEGP_ST1 20.00 PGEN=256.00 QGEN=149.00				
N1-3	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	304-308
	obranch 30529 30525 1	line from HIWD TAP 230.00 (3) to BRKR C.COSTA 230.00	1	230	30	308
	obranch 30472 30460 1	line from PBDY TPA 230.00 (3) to BRKR VACA-DIX 230.00	1	230	30	304
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
	obranch 30529 30472 1	line from HIWD TAP 230.00 (3) to BRKR PEABDY A 230.00	1	230	30	304-308
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	316-310
	obranch 30639 30703 1	line from FGP_TAP 230.00 BRKR to BRKR RAVENSWD 230.0	1	230	30	316-310
	obranch 30630 30639 1	line from RAVENSWD 230.00 BRKR to BRKR FGP_TAP 230.00	1	230	30	316
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	316-310
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30560 30700 1	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	1	230	30	316-310
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	316-310
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30560 30700 2	line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00	2	230	30	316-310
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	316
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30554 30631 1	line from CASTROVL 230.00 BRKR to BRKR NEWARK E 230.0	1	230	30	316
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	311-316
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30624 30630 1	line from TESLA E 230.00 BRKR to BRKR NEWARK D 230.00	1	230	30	311-316
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	310
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30703 30700 1	line from RAVENSWD 230.00 BRKR to BRKR SANMATEO 230.	1	230	30	310
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	310
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30703 30700 2	line from RAVENSWD 230.00 BRKR to BRKR SANMATEO 230.	2	230	30	310
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230	30	316-318
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 30635 30731 1	line from NEWARK E 230.00 BRKR to BRKR LS_ESTRS 230.0	1	230	30	316-318
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			230-9.11	30	
	obranch 30655 30630 1	TRAN from ADCC 230.00 (2) to (1) NEWARK D 230.00	1	230	30	311-316
	obranch 30640 30655 1	line from TESLA 2E 230.00 BRKR to (2) ADCC 230.00	1	230	30	311
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				

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No.	Contingency		Ckt	Base kV	Area	Zone
	obranch 30655 35310 1	TRAN from ADCC 230.00 (2) to (1) LFC FIN+ 9.11	1	9.11-230	30	399-311
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
N1-30	OVERLAPPING LINE AND GENERATOR OUTAGE – Freemont Generating Pr			115	30	316
	setpgen 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmin 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	setqmax 30638: 0.0	FGP_ST1 20.00 PGEN=256.50 QGEN=43.20				
	obranch 35105 35107 1	line from EASTSHRE 115.00 BRKR to BRKR DUMBARTN 115.	1	115	30	316
N1-31	OVERLAPPING LINE AND GENERATOR OUTAGE – Tesla Steam Unit					
	setpgen 30629: 0.0	TESLA ST1 20.00 PGEN=340.00 QGEN=227.00				
	setqmin 30629: 0.0	TESLA ST1 20.00 PGEN=340.00 QGEN=227.00				
	setqmax 30629: 0.0	TESLA ST1 20.00 PGEN=340.00 QGEN=227.00				
	obus 30632	TESLA GEN BUS				
N1-4	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
	obranch 30523 30525 1	line from CC SUB 230.00 BRKR to BRKR C.COSTA 230.00	1	230	30	308
N1-5	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
	obranch 30525 30543 1	line from C.COSTA 230.00 BRKR to BRKR ROSSTAP1 230.00	1	230	30	308
N1-6	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
	obranch 30525 30544 1	line from C.COSTA 230.00 BRKR to BRKR ROSSTAP1 230.00	1	230	30	308
N1-7	OVERLAPPING LINE AND GENERATOR OUTAGE			230	30	308
	obranch 30525 30565 1	line from C.COSTA 230.00 BRKR to BRKR BRENTWOD 230.0	1	230	30	308
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
N1-8	OVERLAPPING LINE AND GENERATOR OUTAGE			230-9.11	30	
	obranch 30525 30575 1	line from C.COSTA 230.00 BRKR to (3) WND MSTR 230.00	1	230	30	308
	obranch 30575 38610 1	line from WND MSTR 230.00 (3) to BRKR DELTAPMP 230.00	1	230	30	308-327
	obranch 30575 33170 1	TRAN from WND MSTR 230.00 (3) to (1) WINDMSTR 9.11	1	9.11-230	30	399-308
	setpgen 33170: 0.0	GEN-DROP WINDMSTR 9.11 GEN==12.00(0.00)				
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				
N1-9	OVERLAPPING LINE AND GENERATOR OUTAGE					
	obranch 30525 30585 1	line from C.COSTA 230.00 BRKR to BRKR LS PSTAS 230.00	1	230	30	308-316
	setpgen 33117: 0.0	C.COS 6 18.00 PGEN=330.00 QGEN=128.07				

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Russell City Energy Center

Appendix 6-D
Base Case Power Flow Result

May 2001

Russell City Energy Center AFC

May 2001

Case Summary rcec2

Project Name	RCEC System Impact Study
Title1	Study Plan Case, No East Shore Loop, No RCEC
Title2	(Base Case)
Case Date	5/7/01

Power Flow File	C:\T2000\Work\pge_rcec_r1_no_RCEC_base.cft

Power Flow Controls

Area Control	☐	***SmoothStep***	☑
Remote Control	☑	***XfrmVcon***	☑
GenVar Control	☑	***XfrmFcon***	☑
Solve Method	DSOLVE		

Case Settings

Overload	☑	***VlimMin***	0.92	***RateFactor***	1
VLimit	☑	***VlimMax***	1.08	***AmpFactor***	1
VChange	☑	***VlimChange***	0.08	***RatingNumber***	2
Monitored Set	monitor		292 Buses		

Contingency

Contingencies loaded from file M:\PROJ\CALPINE\172028RCEC-AFC\DFS\PowerFlow\RCEC.con

303 contingencies

RCEC System Impact Study

Study Plan Case, No East Shore Loop, No RCEC

(Base Case)

5/7/01

Overloaded Facility											Count of Overloads	
From	Name	To	Name	Circuit	Base kV	Area	Zone	MVA	Norm (%)	Emer (%)	A / B	Max (%)
32782	STATIN D	32788	STATIN L	1	115	30	307	80.7	51	51	1 / 0	122.0
32786	OAK C115	32790	STATIN X	1	115	30	337-307	111.8	71	71	1 / 0	122.1
33020	MORAGA	32780	CLARMNT	2	115	30	308-307	50.7	62	54	0 / 1	103.6
33220	GGPP D	33306	SFIA	5	115	30	310-340	147.6	74	74	0 / 1	103.3
33310	SANMATEO	33311	BAY MDWS	1	115	30	310	58.0	60	53	1 / 0	106.5
33310	SANMATEO	33311	BAY MDWS	2	115	30	310	58.0	60	53	1 / 0	106.5
33310	SANMATEO	33312	BELMONT	1	115	30	310	111.2	112	88	1 / 0	145.0
33310	SANMATEO	33315	RAVENSWD	1	115	30	310	65.1	72	63	1 / 0	143.9
35105	EASTSHRE	30560	E. SHORE	1	115-230	30	316	91.1	76	63	0 / 1	104.8
35105	EASTSHRE	30560	E. SHORE	2	115-230	30	316	90.5	75	63	0 / 1	104.1
35120	NEWARK D	36852	SCOTT	1	115	30	316-321	128.4	77	68	2 / 1	107.6
35121	NEWARK E	35110	FREMNT	1	115	30	316	43.4	62	52	1 / 0	106.3
35121	NEWARK E	35110	FREMNT	2	115	30	316	43.4	62	52	1 / 0	106.3
35122	NEWARK F	36852	SCOTT	2	115	30	316-321	113.3	68	60	1 / 1	107.3
35612	TRIMBLE	35616	SJ B E	1	115	30	318	189.0	135	103	20 / 35	184.2
35616	SJ B E	35617	FMC JCT	1	115	30	318	129.5	92	81	2 / 0	186.6
35658	LS ESTRS	35610	MONTAGUE	1	115	30	318	199.0	65	65	1 / 0	106.9
35658	LS ESTRS	35612	TRIMBLE	1	115	30	318	275.7	90	90	3 / 1	129.2
35659	NORTECH	35658	LS ESTRS	1	115	30	318	393.4	140	123	27 / 1	145.8
35659	NORTECH	36850	KIFER	1	115	30	318-321	360.6	117	117	21 / 5	140.8
36850	KIFER	35617	FMC JCT	1	115	30	321-318	74.3	53	46	2 / 0	152.0
36850	KIFER	36852	SCOTT	1	115	30	321	162.8	97	85	2 / 0	130.0
											89 / 48	186.6

Notes:

1. Overloads are based on 100% of Rating 2
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 100%
4. Statistical Information (A/B Stats and Maximum Overload)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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RCEC System Impact Study

Study Plan Case, No East Shore Loop, No RCEC

(Base Case)

5/7/01

Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
32782	STATIN D	32788	STATIN L	1	115	30	307	NS	80.7	51	51
		81	B2 LINE Oak C - Station X	1	115	30	337-307		191.5	122	122
									1 / 0		122.0
32786	OAK C115	32790	STATIN X	1	115	30	337-307	NS	111.8	71	71
		79	B2 LINE Station D - Station L	1	115	30	307		191.8	122	122
									1 / 0		122.1
33020	MORAGA	32780	CLARMNT	2	115	30	308-307	NS	50.7	62	54
		81	B2 LINE Oak C - Station X	1	115	30	337-307		97.4	119	104
									0 / 1		103.6
33220	GGPP D	33306	SFIA	5	115	30	310-340	NS	147.6	74	74
		145	B2 LINE San Mateo - ShawRoad - Martin C		115	30	340-310		205.6	103	103
									0 / 1		103.3
33310	SANMATEO	33311	BAY MDWS	1	115	30	310	NS	58.0	60	53
		158	B2 LINE San Mateo - Bay Meadows Ckt 2	2	115	30	310		117.2	121	107
									1 / 0		106.5
33310	SANMATEO	33311	BAY MDWS	2	115	30	310	NS	58.0	60	53
		157	B2 LINE San Mateo - Bay Meadows Ckt 1	1	115	30	310		117.2	121	107
									1 / 0		106.5
33310	SANMATEO	33312	BELMONT	1	115	30	310	NS	111.2	112	88
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310		182.7	185	145
									1 / 0		145.0
33310	SANMATEO	33315	RAVENSWD	1	115	30	310	NS	65.1	72	63
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310		149.6	164	144
									1 / 0		143.9
35105	EASTSHRE	30560	E. SHORE	1	115-230	30	316	NS	91.1	76	63
		97	B2 LINE Dumbarton - Newark	1	115	30	316		150.9	126	105
									0 / 1		104.8
35105	EASTSHRE	30560	E. SHORE	2	115-230	30	316	NS	90.5	75	63
		97	B2 LINE Dumbarton - Newark	1	115	30	316		149.9	125	104
									0 / 1		104.1
35120	NEWARK D	36852	SCOTT	1	115	30	316-321	NS	128.4	77	68
		192	B2 LINE Kiefer - Scott	1	115	30	321		203.3	122	108
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		200.2	120	106
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		194.3	116	103
									2 / 1		107.6
35121	NEWARK E	35110	FREMNT	1	115	30	316	NS	43.4	62	52
		105	B2 LINE Newark E - Freemont #2	2	115	30	316		88.2	126	106
									1 / 0		106.3

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Overloaded Facility		Contingency								Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone			MVA	Norm (%)	Emer (%)
35121	NEWARK E	35110	FREMNT	2	115	30	316	NS		43.4	62	52
		104	B2 LINE Newark E - Freemont #1	1	115	30	316			88.2	126	106
										1 / 0		106.3
35122	NEWARK F	36852	SCOTT	2	115	30	316-321	NS		113.3	68	60
		192	B2 LINE Kiefer - Scott	1	115	30	321			202.9	121	107
		198	B2 LINE Nortech - Los Esteros	1	115	30	318			189.4	113	100
										1 / 1		107.3

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Overloaded Facility		Contingency								Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone			MVA	Norm (%)	Emer (%)
35612	TRIMBLE	35616	SJ B E	1	115	30	318	NS		189.0	135	103
		198	B2 LINE Nortech - Los Esteros	1	115	30	318			338.9	242	184
		199	B2 LINE Nortech - Kifer	1	115	30	318-321			327.6	234	178
		204	B2 LINE San Jose A - El Patio	1	115	30	318			228.7	163	124
		229	B2 LINE Tesla - Metcalf	1	500	30	300			224.1	160	122
		206	B2 LINE El Patio - Metcalf		115	30	318			217.6	155	118
		205	B2 LINE Eal Patio - Metcalf		115	30	318			217.5	155	118
		209	52 LINE Evergreen - Metcalf	1	115	30	318			212.7	152	116
		203	B2 LINE San Jose A - San Jose B	1	115	30	318			211.9	151	115
		243	TRANSFORMER Metcalf 500-230 kV #2	12	230-500	30	318-300			205.0	146	111
		242	TRANSFORMER Metcalf 500-230 kV #1	11	230-500	30	318-300			203.9	146	111
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321			201.5	144	110
		207	B2 LINE San Jose B - Evergreen		9.11-115	30				201.4	144	110
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321			200.7	143	109
		117	B2 LINE Newark F - Dixon	1	115	30	316-318			200.5	143	109
		119	B2 LINE Newark F - Kiefer		115	30				200.5	143	109
		218	B2 LINE LLA Gas - Glory COG		115	30	318-348			198.1	141	108
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396			196.3	140	107
		231	B2 LINE Metcalf - Moss Landing	1	500	30	300			194.7	139	106
		208	B2 LINE Evergreen - Metcalf		115	30	318			193.6	138	105
		226	B2 LINE Vaca Dixon - Tesla	1	500	30	300			193.6	138	105
		176	B2 LINE Metcalf - Moss Landing	1	230	30	318-319			193.0	138	105
		190	B2 LINE MEC - Metcalf Ckt 4	4	230	30	318			192.7	138	105
		223	B2 LINE Metcalf - Calpine MEC	4	230	30	318			192.7	138	105
		118	B2 LINE Newark F - Milpitas	1	115	30	316-318			191.7	137	104
		202	B2 Milpitas - Newark F	1	115	30	316-318			191.7	137	104
		121	B2 LINE Newark F - Milpitas	1	115	30	316-318			191.7	137	104
		228	B2 LINE Tracy - Los Banos	1	500	30	300			191.4	137	104
		202A	B2 Milpitas - Newark F	2	115	30	316-318			191.2	137	104
		230	B2 LINE Tesla - Los Bonos	1	500	30	300			191.2	137	104
		118A	B2 LINE Newark F - Milpitas	2	115	30	316-318			191.2	137	104
		115	B2 LINE Newark F - Lockheed		115	30				191.0	136	104
		225	B2 LINE Table MT - Tesla	1	500	30	300			191.0	136	104
		171	32 LINE Metcalf - Monta Vista Ckt 3	3	230	30	318-317			187.1	134	102
		190A	B2 LINE Monta Vista - MEC	4	230	30	318-317			187.0	134	102
		212	B2 LINE Dixon Landing - McKee		115	30	318			186.9	134	102
		222	B2 LINE Monta Vista - Calpine MEC	4	230	30	318-317			187.0	134	102
		191	B2 LINE Vasona - Metcalf	1	230	30	317-318			186.9	133	102
		31	B2 LINE Moraga - Castro Valley	1	230	30	308-316			186.8	133	102
		232	B2 LINE Moss Landing - Los Bonos	1	500	30	300			186.6	133	101
		239	TRANSFORMER Tesla 500-230 kV	4	500-230	30	300-311			186.2	133	101
		214	B2 LINE Swift - Milpitas		115	30	318-348			185.8	133	101
		13	B2 LINE Sobrante - Ignacio		230-18	30				185.6	133	101
		127A	B1 GENERATOR OUTAGE – DEC Steam Unit							185.7	133	101
		175	32 LINE Hicks - Metcalf		230	30	318			185.1	132	101

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
		6	B2 LINE Pittsburg - Tassajara	1	230	30	308		185.0	132	101
		128E	B1 GENERATOR OUTAGE – Golden Gate Pow						184.5	132	100
		N1-31	OVERLAPPING LINE AND GENERATOR OUTAG						184.6	132	100
		126A	B1 GENERATOR OUTAGE – SECAL Unit 1						184.6	132	100
		210	B2 LINE Edenvale - Edenvale J3/J1 - Metcalf		115	30	318-348		184.5	132	100
		183	B2 LINE VSA - Lawrence		115	30	317-347		184.5	132	100
		128	B1 GENERATOR OUTAGE – Potrero Unit 3						184.6	132	100
		N1-28A	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	316-310		184.3	132	100
		N1-4	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	308		184.1	131	100
		N1-28C	OVERLAPPING LINE AND GENERATOR OUTAG		115	30	316		184.2	132	100
		N1-7	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	308		184.0	131	100
									20 / 35		184.2
35616	SJ B E	35617	FMC JCT	1	115	30	318	NS	129.5	92	81
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		298.5	213	187
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		285.6	204	179
									2 / 0		186.6
35658	LS ESTRS	35610	MONTAGUE	1	115	30	318	NS	199.0	65	65
		197	B2 LINE Los Esteros - Trimble	1	115	30	318		328.1	107	107
									1 / 0		106.9
35658	LS ESTRS	35612	TRIMBLE	1	115	30	318	NS	275.7	90	90
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		396.7	129	129
		196	B2 LINE Los Esteros - Montague	1	115	30	318		395.4	129	129
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		387.5	126	126
		201	B2 LINE Montague - Trimble	1	115	30	318		318.7	104	104
									3 / 1		129.2

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Overloaded Facility		Contingency								Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone			MVA	Norm (%)	Emer (%)
35659	NORTECH	35658	LS ESTRS	1	115	30	318	NS		393.4	140	123
		195	B2 LINE Trimble - San Jose B	1	115	30	318			466.7	167	146
		197	B2 LINE Los Esteros - Trimble	1	115	30	318			457.1	163	143
		193	B2 LINE Kiefer - FMC		115	30	321-318			433.7	155	136
		194	B2 LINE FMC - San Jose B		115	30	318			433.4	155	135
		196	B2 LINE Los Esteros - Montague	1	115	30	318			428.0	153	134
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321			427.8	153	134
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321			422.5	151	132
		119	B2 LINE Newark F - Kiefer		115	30				422.0	151	132
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310			406.0	145	127
		201	B2 LINE Montague - Trimble	1	115	30	318			405.9	145	127
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396			402.6	144	126
		215	B2 LINE Swift - Metcalf	1	115	30	318			400.1	143	125
		186	B2 LINE Monta Vista - Britton	1	115	30	317			398.3	142	125
		204	B2 LINE San Jose A - El Patio	1	115	30	318			398.2	142	124
		213	B2 LINE McKee - Metcalf		115	30	318			397.7	142	124
		183	B2 LINE VSA - Lawrence		115	30	317-347			397.4	142	124
		N1-30.	OVERLAPPING LINE AND GENERATOR OUTAG		230-9.11	30				389.1	139	122
		N1-30E	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	311-316			388.3	139	121
		97	B2 LINE Dumbarton - Newark	1	115	30	316			386.1	138	121
		95	B2 LINE Metcalf - Los Esteros	1	230	30	318			373.6	133	117
		N1-30F	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	316-318			355.7	127	111
		N1-29/	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	316-310			350.8	125	110
		128D	B1 GENERATOR OUTAGE – Los Esteros Stea							350.8	125	110
		N1-29(	OVERLAPPING LINE AND GENERATOR OUTAG		115	30	316			350.3	125	110
		94	B2 LINE Newark E - Los Esteros	1	230	30	316-318			348.0	124	109
		110	B2 LINE Newark D - Los Esteros #1	1	230	30	316-318			348.0	124	109
		192	B2 LINE Kiefer - Scott	1	115	30	321			336.0	120	105
		N1-29D	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	318			327.1	117	102
										27 / 1		145.8

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
35659	NORTECH	36850	KIFER	1	115	30	318-321	NS	360.6	117	117
		195	B2 LINE Trimble - San Jose B	1	115	30	318		432.2	141	141
		197	B2 LINE Los Esteros - Trimble	1	115	30	318		423.1	138	138
		193	B2 LINE Kiefer - FMC		115	30	321-318		400.0	130	130
		194	B2 LINE FMC - San Jose B		115	30	318		399.8	130	130
		196	B2 LINE Los Esteros - Montague	1	115	30	318		394.6	129	129
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321		393.8	128	128
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321		388.8	127	127
		119	B2 LINE Newark F - Kiefer		115	30			388.4	126	127
		201	B2 LINE Montague - Trimble	1	115	30	318		372.9	121	122
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310		373.0	121	122
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396		369.6	120	120
		215	B2 LINE Swift - Metcalf	1	115	30	318		367.1	120	120
		204	B2 LINE San Jose A - El Patio	1	115	30	318		365.3	119	119
		186	B2 LINE Monta Vista - Britton	1	115	30	317		365.3	119	119
		213	B2 LINE McKee - Metcalf		115	30	318		364.9	119	119
		183	B2 LINE VSA - Lawrence		115	30	317-347		364.5	119	119
		N1-30,	OVERLAPPING LINE AND GENERATOR OUTAG		230-9.11	30			356.4	116	116
		N1-30E	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	311-316		355.5	116	116
		97	B2 LINE Dumbarton - Newark	1	115	30	316		353.6	115	115
		95	B2 LINE Metcalf - Los Esteros	1	230	30	318		341.2	111	111
		N1-30H	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	316-318		324.0	106	106
		128D	B1 GENERATOR OUTAGE – Los Esteros Stea						318.5	104	104
		N1-29A	OVERLAPPING LINE AND GENERATOR OUTAG		230	30	316-310		318.4	104	104
		N1-29C	OVERLAPPING LINE AND GENERATOR OUTAG		115	30	316		318.1	104	104
		110	B2 LINE Newark D - Los Esteros #1	1	230	30	316-318		316.4	103	103
		94	B2 LINE Newark E - Los Esteros	1	230	30	316-318		316.4	103	103
									21 / 5		140.8
36850	KIFER	35617	FMC JCT	1	115	30	321-318	NS	74.3	53	46
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		243.1	174	152
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		230.3	164	144
									2 / 0		152.0
36850	KIFER	36852	SCOTT	1	115	30	321	NS	162.8	97	85
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321		248.4	149	130
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321		244.1	146	128
									2 / 0		130.0
									89 / 48		186.6

Notes:

1. Overloads are based on 100% of Rating 2
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 100%
4. Statistical Information (A/B Stats and Maximum Overload)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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Russell City Energy Center

Appendix 6-E
Power Flow Results

May 2001

Russell City Energy Center AFC

May 2001

Case Summary rcec1

Project Name	RCEC System Impact Study
Title1	Study Plan Case
Title2	-----
Case Date	5/7/01

Power Flow File	C:\T2000\Work\pge_rcec_r1.cft

Power Flow Controls

Area Control	☐	*SmoothStep*	☑
Remote Control	☑	*XfrmVcon*	☑
GenVar Control	☑	*XfrmFcon*	☑
Solve Method	DSOLVE		

Case Settings

Overload	☑	***VlimMin***	0.92	***RateFactor***	1
VLimit	☑	***VlimMax***	1.08	***AmpFactor***	1
VChange	☑	***VlimChange***	0.08	***RatingNumber***	2
Monitored Set	monitor		293 Buses		

Contingency

Contingencies loaded from file M:\PROJ\CALPINE\172028RCEC-AFC\DFS\PowerFlow\RCEC.con

303 contingencies

RCEC System Impact Study
Study Plan Case

5/7/01

Overloaded Facility											Count of Overloads	
From	Name	To	Name	Circuit	Base kV	Area	Zone	MVA	Norm (%)	Emer (%)	A / B	Max (%)
30560	E. SHORE	30700	SANMATEO	1	230	30	316-310	250.9	63	56	1 / 1	106.3
30560	E. SHORE	30700	SANMATEO	2	230	30	316-310	250.9	63	56	1 / 1	106.3
32782	STATIN D	32788	STATIN L	1	115	30	307	83.3	53	53	1 / 0	122.0
32786	OAK C115	32790	STATIN X	1	115	30	337-307	109.2	70	70	1 / 0	122.1
33220	GGPP D	33306	SFIA	5	115	30	310-340	147.6	74	74	0 / 1	103.3
33310	SANMATEO	33311	BAY MDWS	1	115	30	310	58.0	60	53	1 / 0	106.5
33310	SANMATEO	33311	BAY MDWS	2	115	30	310	58.0	60	53	1 / 0	106.5
33310	SANMATEO	33312	BELMONT	1	115	30	310	130.0	131	103	21 / 28	159.1
33310	SANMATEO	33315	RAVENSWD	1	115	30	310	89.8	99	86	2 / 0	165.5
35105	EASTSHRE	30560	E. SHORE	1	115-230	30	316	131.2	109	91	1 / 3	131.8
35105	EASTSHRE	30560	E. SHORE	2	115-230	30	316	130.3	109	91	1 / 1	131.3
35120	NEWARK D	36852	SCOTT	1	115	30	316-321	138.0	83	73	3 / 0	111.2
35121	NEWARK E	35110	FREMNT	1	115	30	316	43.4	62	52	1 / 0	106.3
35121	NEWARK E	35110	FREMNT	2	115	30	316	43.4	62	52	1 / 0	106.3
35122	NEWARK F	35602	ZNKER J2	1	115	30	316-318	113.0	68	60	0 / 1	100.8
35122	NEWARK F	36852	SCOTT	2	115	30	316-321	116.5	70	62	1 / 1	105.0
35612	TRIMBLE	35616	SJ B E	1	115	30	318	202.0	144	110	80 / 12	190.3
35616	SJ B E	35617	FMC JCT	1	115	30	318	113.9	81	71	2 / 0	175.9
35658	LS ESTRS	35610	MONTAGUE	1	115	30	318	201.4	66	66	1 / 0	108.3
35658	LS ESTRS	35612	TRIMBLE	1	115	30	318	279.7	91	91	4 / 0	130.6
35659	NORTECH	35658	LS ESTRS	1	115	30	318	389.1	139	122	27 / 3	146.0
35659	NORTECH	36850	KIFER	1	115	30	318-321	356.4	116	116	25 / 5	140.9
36850	KIFER	35617	FMC JCT	1	115	30	321-318	59.9	43	37	2 / 0	141.4
36850	KIFER	36852	SCOTT	1	115	30	321	145.9	87	76	2 / 0	126.7
											180 / 57	190.3

Notes:

1. Overloads are based on 100% of Rating 2
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 100%
4. Statistical Information (A/B Stats and Maximum Overload)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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RCEC System Impact Study
Study Plan Case

5/7/01

Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
30560	E. SHORE	30700	SANMATEO	1	230	30	316-310	NS	251	63	56
		11-27E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		477	121	106
		11-28E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		463	117	103
									1 / 1		106.3
30560	E. SHORE	30700	SANMATEO	2	230	30	316-310	NS	251	63	56
		11-27A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		477	121	106
		11-28A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		463	117	103
									1 / 1		106.3
32782	STATIN D	32788	STATIN L	1	115	30	307	NS	83	53	53
		81	B2 LINE Oak C - Station X	1	115	30	337-307		192	122	122
									1 / 0		122.0
32786	OAK C115	32790	STATIN X	1	115	30	337-307	NS	109	70	70
		79	B2 LINE Station D - Station L	1	115	30	307		192	122	122
									1 / 0		122.1
33220	GGPP D	33306	SFIA	5	115	30	310-340	NS	148	74	74
		145	B2 LINE San Mateo - ShawRoad - Martin C		115	30	340-310		205	103	103
									0 / 1		103.3
33310	SANMATEO	33311	BAY MDWS	1	115	30	310	NS	58	60	53
		158	B2 LINE San Mateo - Bay Meadows Ckt 2	2	115	30	310		117	121	107
									1 / 0		106.5
33310	SANMATEO	33311	BAY MDWS	2	115	30	310	NS	58	60	53
		157	B2 LINE San Mateo - Bay Meadows Ckt 1	1	115	30	310		117	121	107
									1 / 0		106.5

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Overloaded Facility		Contingency								Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone			MVA	Norm (%)	Emer (%)
33310	SANMATEO	33312	BELMONT	1	115	30	310	NS		130	131	103
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310			200	202	159
		160	B2 LINE San Mateo D - Ravenswood	1	115	30	310			148	150	118
		229	B2 LINE Tesla - Metcalf	1	500	30	300			136	137	108
		N1-29(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316			135	137	107
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-318			134	136	107
		162	B2 LINE Bair - Ravenwood		115	30	310-340			134	136	107
		N1-30F	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316			134	135	106
		N1-30F	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	310			134	135	106
		93B	B2 LINE Newark - Ravenswood		230	30	316-310			133	135	106
		98	B2 LINE East Shore - Dumbarton	1	115	30	316			133	135	106
		N1-30A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310			133	135	106
		136	B3 TRANSFORMER East Shore 230-115 kV	1	115-230	30	316			133	135	106
		136A	B3 TRANSFORMER East Shore 230-115 kV	2	115-230	30	316			133	135	106
		6	B2 LINE Pittsburg - Tassajara	1	230	30	308			133	134	106
		148	B2 LINE San Mateo - Ravenswood	1	230	30	310			133	134	106
		93	B2 LINE Ravenswood - San Mateo #1	1	230	30	310			133	134	106
		198	B2 LINE Nortech - Los Esteros	1	115	30	318			133	134	105
		N1-30(	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	310			133	134	105
		199	B2 LINE Nortech - Kifer	1	115	30	318-321			133	134	105
		243	TRANSFORMER Metcalf 500-230 kV #2	12	230-500	30	318-300			133	134	105
		242	TRANSFORMER Metcalf 500-230 kV #1	11	230-500	30	318-300			132	134	105
		26	B2 LINE Pittsburg - San Ramon	1	230	30	308-316			132	133	105
		93A	B2 LINE Ravenswood - San Mateo #2	2	230	30	310			132	133	105
		215	B2 LINE Swift - Metcalf	1	115	30	318			132	133	105
		N1-30F	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-318			132	133	105
		144	B2 LINE East Grand - Mil SFIA - San Mateo 115 kV		115	30	310			132	133	105
		110	B2 LINE Newark D - Los Esteros #1	1	230	30	316-318			132	133	105
		94	B2 LINE Newark E - Los Esteros	1	230	30	316-318			132	133	105
		N1-30E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	311-316			132	133	105
		N1-30.	OVERLAPPING LINE AND GENERATOR OUTAGE -		230-9.11	30				132	133	105
		N1-29D	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	318			132	133	104
		128D	B1 GENERATOR OUTAGE – Los Esteros Steam							132	133	104
		226	B2 LINE Vaca Dixon - Tesla	1	500	30	300			131	133	104
		13	B2 LINE Sobrante - Ignacio		230-18	30				129	130	102
		152	B2 LINE Martin C - EBT	2	115	30	309-310			129	130	102
		92	B2 LINE Tesla E - Ravenswood	1	230	30	311-310			128	130	102
		7A	B2 LINE Pittsburg - East Shore	1	230	30	308-316			128	130	102
		7B	B2 LINE Pittsburg - East Shore	2	230	30	308-316			128	130	102
		127A	B1 GENERATOR OUTAGE – DEC Steam Unit							128	129	102
		97	B2 LINE Dumbarton - Newark	1	115	30	316			128	129	102
		N1-25	B1 OVERLAPPING LINE AND GENERATOR OUTA		18-230	30	308			128	129	102
		237	TRANSFORMER Vaca-Dixon 500/230 kV			30	304-300			128	129	102
		182	32 LINE Ravenswood - Ames BS2	1	115	30	310-317			127	129	101
		N1-16	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308			128	129	101

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
		165	B2 LINE Ravenswood - Ames	1	115	30	310-317		127	129	101
		N1-29A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		127	128	101
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		127	128	101
		N1-15	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308-316		127	128	101
		153	B2 LINE Martin C - Airport		115	30	310-340		126	127	100
									21 / 28		159.1
33310	SANMATEO	33315	RAVENSWD	1	115	30	310	NS	90	99	86
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310		172	189	166
		159	B2 LINE San Mateo - Belmont	1	115	30	310		122	134	117
									2 / 0		165.5
35105	EASTSHRE	30560	E. SHORE	1	115-230	30	316	NS	131	109	91
		136A	B3 TRANSFORMER East Shore 230-115 kV	2	115-230	30	316		190	158	132
		97	B2 LINE Dumbarton - Newark	1	115	30	316		151	126	105
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		144	120	100
		N1-29A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		144	120	100
									1 / 3		131.8
35105	EASTSHRE	30560	E. SHORE	2	115-230	30	316	NS	130	109	91
		136	B3 TRANSFORMER East Shore 230-115 kV	1	115-230	30	316		189	158	131
		97	B2 LINE Dumbarton - Newark	1	115	30	316		150	125	104
									1 / 1		131.3
35120	NEWARK D	36852	SCOTT	1	115	30	316-321	NS	138	83	73
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		210	126	111
		192	B2 LINE Kiefer - Scott	1	115	30	321		207	124	110
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		204	122	108
									3 / 0		111.2
35121	NEWARK E	35110	FREMNT	1	115	30	316	NS	43	62	52
		105	B2 LINE Newark E - Freemont #2	2	115	30	316		88	126	106
									1 / 0		106.3
35121	NEWARK E	35110	FREMNT	2	115	30	316	NS	43	62	52
		104	B2 LINE Newark E - Freemont #1	1	115	30	316		88	126	106
									1 / 0		106.3
35122	NEWARK F	35602	ZNKER J2	1	115	30	316-318	NS	113	68	60
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		190	114	101
									0 / 1		100.8
35122	NEWARK F	36852	SCOTT	2	115	30	316-321	NS	117	70	62
		192	B2 LINE Kiefer - Scott	1	115	30	321		199	119	105
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		192	115	102
									1 / 1		105.0

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
35612	TRIMBLE	35616	SJ B E	1	115	30	318	NS	202	144	110
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		350	250	190
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		339	242	184
		229	B2 LINE Tesla - Metcalf	1	500	30	300		238	170	129
		204	B2 LINE San Jose A - El Patio	1	115	30	318		236	168	128
		206	B2 LINE El Patio - Metcalf		115	30	318		228	163	124
		205	B2 LINE Eal Patio - Metcalf		115	30	318		228	163	124
		209	52 LINE Evergreen - Metcalf	1	115	30	318		224	160	122
		203	B2 LINE San Jose A - San Jose B	1	115	30	318		219	156	119
		243	TRANSFORMER Metcalf 500-230 kV #2	12	230-500	30	318-300		217	155	118
		242	TRANSFORMER Metcalf 500-230 kV #1	11	230-500	30	318-300		216	154	117
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321		215	154	117
		117	B2 LINE Newark F - Dixon	1	115	30	316-318		215	153	117
		119	B2 LINE Newark F - Kiefer		115	30			214	153	116
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321		214	153	116
		218	B2 LINE LLA Gas - Glory COG		115	30	318-348		211	151	115
		207	B2 LINE San Jose B - Evergreen		9.11-115	30			210	150	114
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396		209	150	114
		226	B2 LINE Vaca Dixon - Tesla	1	500	30	300		207	148	113
		231	B2 LINE Metcalf - Moss Landing	1	500	30	300		206	147	112
		223	B2 LINE Metcalf - Calpine MEC	4	230	30	318		206	147	112
		190	B2 LINE MEC - Metcalf Ckt 4	4	230	30	318		206	147	112
		176	B2 LINE Metcalf - Moss Landing	1	230	30	318-319		206	147	112
		230	B2 LINE Tesla - Los Bonos	1	500	30	300		205	147	112
		228	B2 LINE Tracy - Los Banos	1	500	30	300		205	147	112
		208	B2 LINE Evergreen - Metcalf		115	30	318		205	147	112
		118	B2 LINE Newark F - Milpitas	1	115	30	316-318		205	146	111
		121	B2 LINE Newark F - Milpitas	1	115	30	316-318		205	146	111
		202	B2 Milpitas - Newark F	1	115	30	316-318		205	146	111
		115	B2 LINE Newark F - Lockheed		115	30			205	146	111
		202A	B2 Milpitas - Newark F	2	115	30	316-318		204	146	111
		118A	B2 LINE Newark F - Milpitas	2	115	30	316-318		204	146	111
		191	B2 LINE Vasona - Metcalf	1	230	30	317-318		200	143	109
		31	B2 LINE Moraga - Castro Valley	1	230	30	308-316		200	143	109
		239	TRANSFORMER Tesla 500-230 kV	4	500-230	30	300-311		200	143	109
		127A	B1 GENERATOR OUTAGE – DEC Steam Unit						199	142	108
		13	B2 LINE Sobrante - Ignacio		230-18	30			199	142	108
		175	32 LINE Hicks - Metcalf		230	30	318		198	142	108
		183	B2 LINE VSA - Lawrence		115	30	317-347		198	142	108
		11-28(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316		198	141	107
		6	B2 LINE Pittsburg - Tassajara	1	230	30	308		198	141	107
		210	B2 LINE Edenvale - Edenvale J3/J1 - Metcalf		115	30	318-348		198	141	107
		128E	B1 GENERATOR OUTAGE – Golden Gate Powe						197	141	107
		128	B1 GENERATOR OUTAGE – Potrero Unit 3						197	141	107
		126A	B1 GENERATOR OUTAGE – SECAL Unit 1						197	141	107

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Overloaded Facility		Contingency							Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
		N1-31	OVERLAPPING LINE AND GENERATOR OUTAGE -						197	141	107
		186	B2 LINE Monta Vista - Britton	1	115	30	317		197	141	107
		N1-4	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308		197	141	107
		232	B2 LINE Moss Landing - Los Bonos	1	500	30	300		197	141	107
		N1-7	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308		197	141	107
		20	B2 LINE Contra Costa - Los Positas	1	230	30	308-316		197	141	107
		126	B1 GENERATOR OUTAGE – Contra Costa Unit 7						197	141	107
		N1-28A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		197	140	107
		N1-6	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308		196	140	107
		N1-28E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		197	140	107
		N1-8	OVERLAPPING LINE AND GENERATOR OUTAGE		230-9.11	30			197	140	107
		N1-5	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308		196	140	107
		N1-27C	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316		196	140	107
		128A	B1 GENERATOR OUTAGE – Potrero Unit 7C						196	140	107
		92	B2 LINE Tesla E - Ravenswood	1	230	30	311-310		196	140	106
		N1-3	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	304-308		196	140	106
		N1-27E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		195	139	106
		N1-27A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		195	139	106
		96	B2 LINE Tesla E - Newark D (ADCC)		230-9.11	30			194	138	105
		N1-30H	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316		194	139	105
		N1-21	OVERLAPPING LINE AND GENERATOR OUTAGE		115	30-8	308-338		194	138	105
		128E	B1 GENERATOR OUTAGE – Freemont Generati						194	138	105
		N1-12	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308		194	138	105
		N1-11	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308		194	138	105
		N1-19	OVERLAPPING LINE AND GENERATOR OUTAGE		115	30	308		194	138	105
		N1-23	OVERLAPPING LINE AND GENERATOR OUTAGE		115	30	308		194	138	105
		N1-20	OVERLAPPING LINE AND GENERATOR OUTAGE		115	30	308-338		194	138	105
		N1-14	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308-316		194	138	105
		N1-30C	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	310		194	138	105
		N1-13	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308-316		194	138	105
		N1-24	OVERLAPPING LINE AND GENERATOR OUTAGE		115-13.8	30			193	138	105
		127	B1 GENERATOR OUTAGE – Pittsburg Unit 7						193	138	105
		N1-30F	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	310		193	138	105
		N1-30D	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316		193	138	105
		237	TRANSFORMER Vaca-Dixon 500/230 kV			30	304-300		193	138	105
		N1-15	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308-316		193	138	105
		N1-30C	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		193	138	105
		N1-30E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310		193	138	105
		N1-22	OVERLAPPING LINE AND GENERATOR OUTAGE		115-13.8	30			193	138	105
		N1-9	OVERLAPPING LINE AND GENERATOR OUTAGE						193	138	105
		91	B2 LINE Tesla E - Newark D	1	230	30	311-316		192	137	104
		N1-18	OVERLAPPING LINE AND GENERATOR OUTAGE		230-9.11	30			192	137	104
		N1-17	OVERLAPPING LINE AND GENERATOR OUTAGE		9.11-230	30			192	137	104
		N1-16	OVERLAPPING LINE AND GENERATOR OUTAGE		230	30	308		190	136	103
		120	B2 LINE Newark F - Trimble		115	30	318-316		190	136	103

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Overloaded Facility		Contingency								Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone		MVA	Norm (%)	Emer (%)
		N1-25	B1 OVERLAPPING LINE AND GENERATOR OUTA		18-230	30	308		188	134	102
		213	B2 LINE McKee - Metcalf		115	30	318		188	134	102
		N1-30.	OVERLAPPING LINE AND GENERATOR OUTAGE -		230-9.11	30			185	132	100
									80 / 12		190.3
35616	SJ B E	35617	FMC JCT	1	115	30	318	NS	114	81	71
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		281	201	176
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		268	192	168
									2 / 0		175.9
35658	LS ESTRS	35610	MONTAGUE	1	115	30	318	NS	201	66	66
		197	B2 LINE Los Esteros - Trimble	1	115	30	318		332	108	108
									1 / 0		108.3
35658	LS ESTRS	35612	TRIMBLE	1	115	30	318	NS	280	91	91
		196	B2 LINE Los Esteros - Montague	1	115	30	318		401	131	131
		198	B2 LINE Nortech - Los Esteros	1	115	30	318		399	130	130
		199	B2 LINE Nortech - Kifer	1	115	30	318-321		390	127	127
		201	B2 LINE Montague - Trimble	1	115	30	318		324	106	106
									4 / 0		130.6

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Overloaded Facility		Contingency								Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone			MVA	Norm (%)	Emer (%)
35659	NORTECH	35658	LS ESTRS	1	115	30	318	NS		389	139	122
		195	B2 LINE Trimble - San Jose B	1	115	30	318			467	167	146
		197	B2 LINE Los Esteros - Trimble	1	115	30	318			454	162	142
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321			427	152	133
		196	B2 LINE Los Esteros - Montague	1	115	30	318			424	151	133
		193	B2 LINE Kiefer - FMC		115	30	321-318			422	151	132
		194	B2 LINE FMC - San Jose B		115	30	318			422	151	132
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321			419	150	131
		119	B2 LINE Newark F - Kiefer		115	30				419	150	131
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310			402	144	126
		201	B2 LINE Montague - Trimble	1	115	30	318			402	144	126
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396			398	142	125
		215	B2 LINE Swift - Metcalf	1	115	30	318			395	141	124
		186	B2 LINE Monta Vista - Britton	1	115	30	317			393	141	123
		204	B2 LINE San Jose A - El Patio	1	115	30	318			393	140	123
		213	B2 LINE McKee - Metcalf		115	30	318			393	140	123
		120	B2 LINE Newark F - Trimble		115	30	318-316			385	138	120
		N1-30,	OVERLAPPING LINE AND GENERATOR OUTAGE -		230-9.11	30				385	138	120
		N1-30E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	311-316			384	137	120
		93B	B2 LINE Newark - Ravenswood		230	30	316-310			382	136	119
		N1-30A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310			382	136	119
		95	B2 LINE Metcalf - Los Esteros	1	230	30	318			374	134	117
		N1-29(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316			350	125	109
		128E	B1 GENERATOR OUTAGE – Los Esteros Steam							347	124	108
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310			346	124	108
		N1-29A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310			346	124	108
		N1-30H	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-318			339	121	106
		192	B2 LINE Kiefer - Scott	1	115	30	321			337	120	105
		94	B2 LINE Newark E - Los Esteros	1	230	30	316-318			332	118	104
		110	B2 LINE Newark D - Los Esteros #1	1	230	30	316-318			332	118	104
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	318			327	117	102
										27 / 3		146.0

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Overloaded Facility		Contingency								Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone			MVA	Norm (%)	Emer (%)
35659	NORTECH	36850	KIFER	1	115	30	318-321	NS		356	116	116
		195	B2 LINE Trimble - San Jose B	1	115	30	318			433	141	141
		197	B2 LINE Los Esteros - Trimble	1	115	30	318			420	137	137
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321			393	128	128
		196	B2 LINE Los Esteros - Montague	1	115	30	318			391	127	127
		193	B2 LINE Kiefer - FMC		115	30	321-318			389	127	127
		194	B2 LINE FMC - San Jose B		115	30	318			389	127	127
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321			386	126	126
		119	B2 LINE Newark F - Kiefer		115	30				385	125	126
		201	B2 LINE Montague - Trimble	1	115	30	318			369	120	120
		136E	B3 TRANSFORMER Ravenswood 230-115 kV	1	115-230	30	310			369	120	120
		200	B2 LINE Los Esteros - Agnew		115-9.11	30	318-396			365	119	119
		215	B2 LINE Swift - Metcalf	1	115	30	318			362	118	118
		186	B2 LINE Monta Vista - Britton	1	115	30	317			361	117	118
		204	B2 LINE San Jose A - El Patio	1	115	30	318			360	117	117
		N1-27(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316			360	117	117
		136	B3 TRANSFORMER East Shore 230-115 kV	1	115-230	30	316			360	117	117
		N1-28(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316			360	117	117
		213	B2 LINE McKee - Metcalf		115	30	318			360	117	117
		136A	B3 TRANSFORMER East Shore 230-115 kV	2	115-230	30	316			360	117	117
		N1-30.	OVERLAPPING LINE AND GENERATOR OUTAGE -		230-9.11	30				352	115	115
		120	B2 LINE Newark F - Trimble		115	30	318-316			352	115	115
		N1-30E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	311-316			352	115	115
		93B	B2 LINE Newark - Ravenswood		230	30	316-310			349	114	114
		N1-30A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310			349	114	114
		95	B2 LINE Metcalf - Los Esteros	1	230	30	318			342	111	111
		N1-29(	OVERLAPPING LINE AND GENERATOR OUTAGE -		115	30	316			318	103	103
		128D	B1 GENERATOR OUTAGE -- Los Esteros Steam							314	102	102
		N1-29E	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310			314	102	102
		N1-29A	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-310			314	102	102
		N1-30H	OVERLAPPING LINE AND GENERATOR OUTAGE -		230	30	316-318			308	100	100
										25 / 5		140.9
36850	KIFER	35617	FMC JCT	1	115	30	321-318	NS		60	43	37
		198	B2 LINE Nortech - Los Esteros	1	115	30	318			226	162	141
		199	B2 LINE Nortech - Kifer	1	115	30	318-321			213	152	133
										2 / 0		141.4
36850	KIFER	36852	SCOTT	1	115	30	321	NS		146	87	76
		122	B2 LINE Newark D - Scott #1	1	115	30	316-321			242	145	127
		123	B2 LINE Newark F - Scott #2	2	115	30	316-321			232	139	121
										2 / 0		126.7

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Overloaded Facility		Contingency						Overloads		
From	Name	To	Name	Circuit	Base kV	Area	Zone	MVA	Norm (%)	Emer (%)
								180	/ 57	190.3

Notes:

1. Overloads are based on 100% of Rating 2
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 100%
4. Statistical Information (A/B Stats and Maximum Overload)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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Appendix 6-F
Project Dynamic Data

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Model Name: genrou

Description: Solid rotor generator represented by Equal mutual inductance rotor modeling

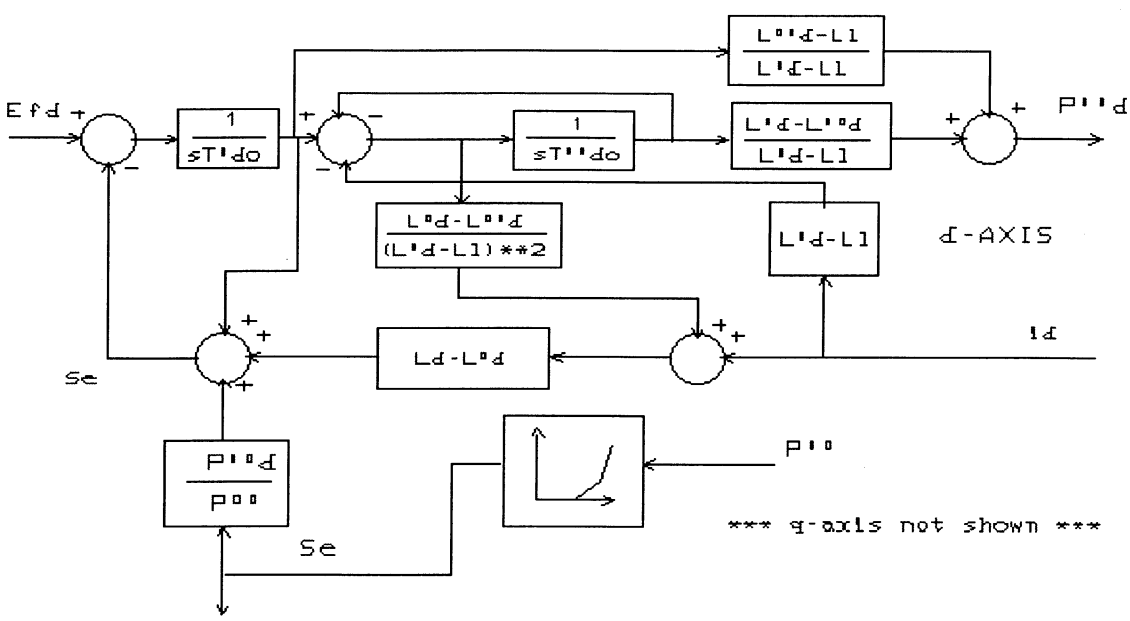
Invocation: genrou [<n>] {<name> <kv>} <id> :

Parameters:

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***
tpdo	D-axis transient rotor time constant	9.7000
tppdo	D-axis subtransient rotor time constant	0.0430
tpqo	Q-axis transient rotor time constant	1.0800
tppqo	Q-axis subtransient rotor time constant	0.0740
h	Inertia constant, sec	6.4200
d	Damping factor, pu	0.0000
ld	D-axis synchronous reactance	2.0774
lq	Q-axis synchronous reactance	2.0236
lpd	D-axis transient reactance	0.2367
lpq	Q-axis transient reactance	0.4002
lppd	D-axis subtransient reactance	0.1917
ll	Stator leakage reactance, pu	0.1640
s1	Saturation factor at 1 pu flux	0.0783
s12	Saturation factor at 1.2 pu flux	0.3496
ra	Stator resistance, pu	0.0000
rcomp	Compounding resistance voltage control, pu	0.0000
xcomp	Compounding reactance voltage control, pu	0.0000

Notes:



Model Name: exst1

Descriptions: IEEE type ST1 excitation system

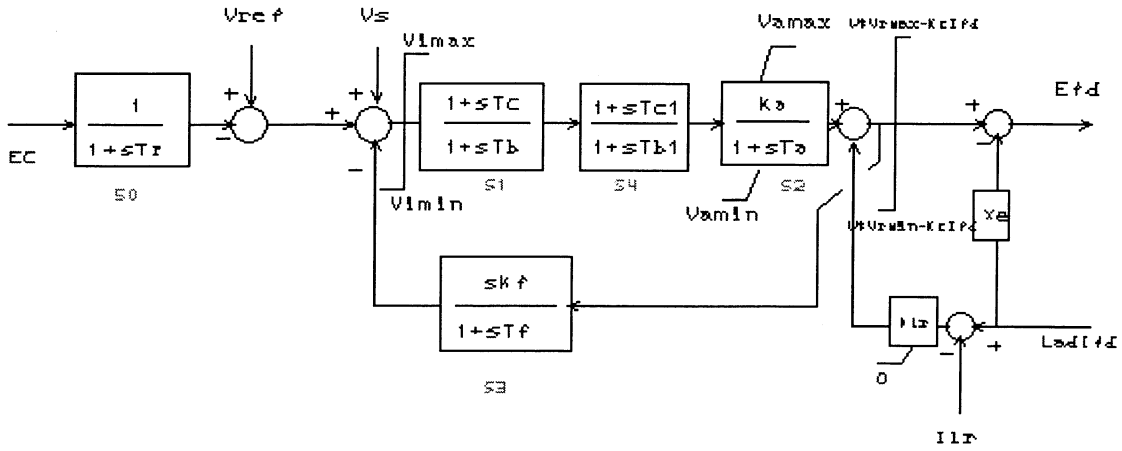
Invocation: exst1 [<n>] {<name> <kv>} <id> :

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***
tr	Filter time constant, sec	0.0000
vimax	Maximum error, pu	0.1700
vimin	Minimum error, pu	-0.1700
tc	Lead time constant, sec	1.0000
tb	Lag time constant, sec	8.0000
ka	Gain	250.0000
ta	Time constant, sec	0.0200
vrmax	Maximum controller output	7.1570
vrmin	Minimum controller output	-6.4420
kc	Excitation sys. regulation factor, pu	0.1090
kf	Rate feedback gain	0.0000
tf	Rate feedback time constant, sec	0.0000
tc1	Lead time constant, sec	0.0000
tb1	Lag time constant, sec	0.0000
vamax	Maximum control element output, p.u.	7.1570
vamin	Minimum control element output, p.u	-6,4420
xe	Excitation XFMR effective X, p.u.	0.0000
ilr	Maximum field current, p.u.	3.2000
klr	Gain on field current limit	0.0000

Notes:

a) This model can be used to represent a controlled-rectifier excitation system whose a.c. power source is a simple power transformer fed from the generator terminals. The voltage regulation of the excitation transformer and rectifier are approximated by the parameter Kc.


Vref
Vs
Vimax
Vamax
Vt+Vrmax-KcIfd
Efd
EC
1
1+sTr
S0
1+sTc
1+sTb
S1
1+sTc1
1+sTb1
S4
Ka
1+sTa
S2
Vimin
Vamin
Vt+Vrmin-KcIfd
Xe
sKf
1+sTf
S3
Kir
0
LadIfd
Ilr

Model Name: pss2a

Descriptions: Dual input Power system stabilizer (IEEE type PSS2A)

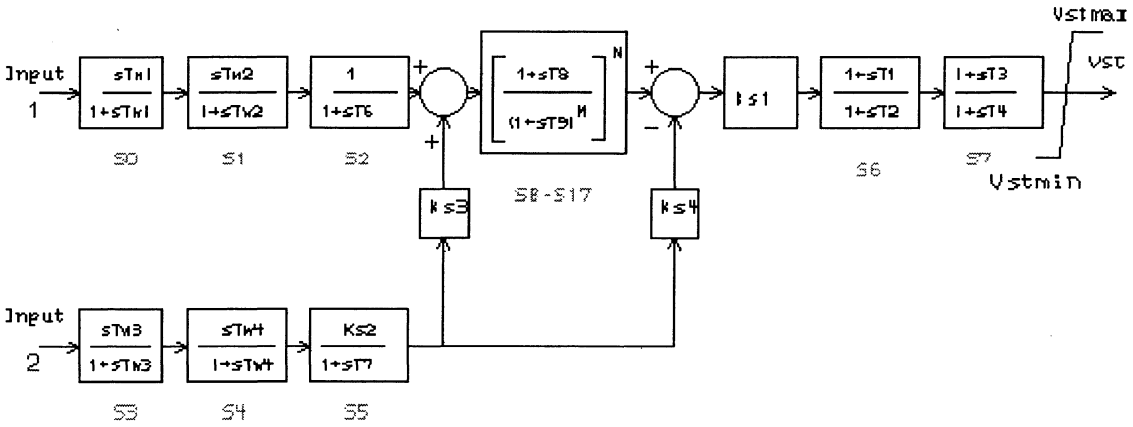
Invocation: pss2a [<n>] {<name> <kv>} <id> :

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***
j1	Input signal #1 code	1.0000
k1	Input signal #1 remote bus number	0.0000
j2	Input signal #2 code	3.0000
k2	Input signal #2 remote bus number	0.0000
tw1	First washout on signal #1, sec	2.0000
tw2	Second washout on signal #1, sec	2.0000
tw3	First washout on signal #2, sec	2.0000
tw4	Second washout on signal #2, sec	0.0000
t6	Time constant on signal #1, sec	0.0000
t7	Time constant on signal #2, sec	2.0000
ks2	Gain on signal #2	0.1558 (set to tw2/2H)
ks3	Gain on signal #2	1.0000
ks4	Gain on signal #2	1.0000
t8	Lead of ramp tracking filter	0.5000
t9	Lag of ramp tracking filter	0.1000
n	Order of ramp tracking filter	1.0000
m	Order of ramp tracking filter	5.0000
ks1	Stabilizer gain	10.0000
t1-t4	Lead/lag time constants, sec, 0.25, 0.04,	0.20, 0.03
vstmax	Stabilizer output max limit, p.u.	0.1000
vstmin	Stabilizer output min limit, p.u.	-0.1000

The input signal code, j, is

1	for shaft speed
2	for frequency of bus voltage
3	for generator electrical power
4	for generator accelerating power
5	for amplitude of bus voltage
7	for amplitude of branch current


Vstmax
Input
1
sTw1
1+sTw1
sTw2
1+sTw2
1
1+sT6
+
+
1+sT8
(1+sT9)^M
N
+
−
ks1
1+sT1
1+sT2
1+sT3
1+sT4
Vst
S0
S1
S2
S8-S17
S6
S7
Vstmin
ks3
ks4
Input
2
sTw3
1+sTw3
sTw4
1+sTw4
Ks2
1+sT7
S3
S4
S5

Model Name: gast

Description: Single shaft gas turbine

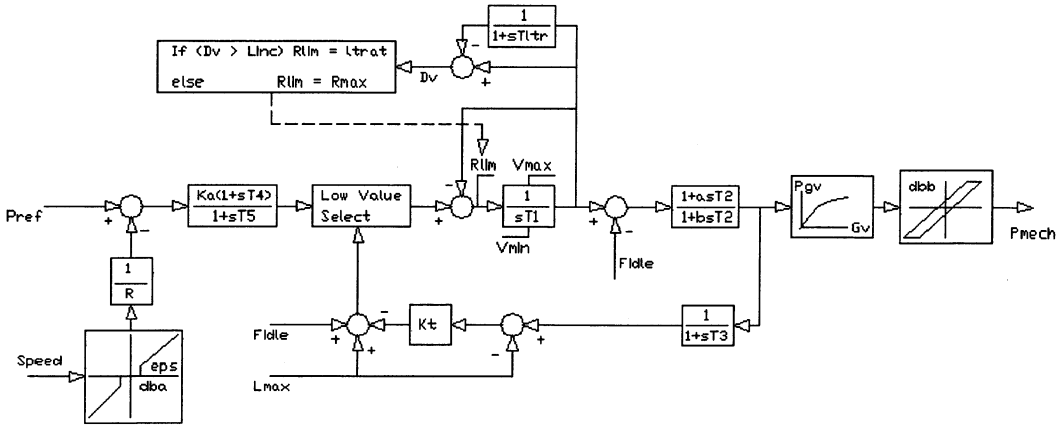
Invocation: gast [<n>] {<name> <kv>} <id> : [mwcap=<value>]

Parameters:

Variable	*Description*	***RCEC PROJECT DATA(see note 1)***
r	Permanent droop, pu	0.0400
t1	Governor mechanism time constant, sec	0.4000
t2	Turbine power time constant, sec	0.5000
t3	Turbine exhaust temp. time constant, sec	3.0000
lmax	Ambient temperature load limit	1.0000
kt	Temperature limiter gain	3.0000
vmax	Maximum turbine power, pu of mwcap	1.5000
vmin	Minimum turbine power, pu of mwcap	0.0000
dturb	Turbine damping coefficient, pu [NOT USED}	
fidle	Fuel flow at zero power output, pu	0.2000
rmax	Maximum fuel valve opening rate, pu/sec	0.0100
linc	Valve position change allowed at fast rate,pu	0.0500
tltr	Valve pos. averaging time constant, sec	5.0000
ltrate	Max. long term fuel valve rate,pu/sec	0.0005
a	Turb.pwr t-const. numerator scale factor	0.0000
b	Turb.pwr t-const. denominator scale factor	0.0000
db1	Intentional deadband width, Hz.	0.0000
eps	Intentional db hysteresis, Hz.	0.0000
db2	Unintentional deadband, MW	0.0000
gv1	Nonlinear gain point 1, p.u. gv	0.0000
pgv1	Nonlinear gain point 1, p.u. power	0.0000
gv2	Nonlinear gain point 2, p.u. gv	0.0000
pgv2	Nonlinear gain point 2, p.u. power	0.0000
gv3	Nonlinear gain point 3, p.u. gv	0.0000
pgv3	Nonlinear gain point 3, p.u. power	0.0000
gv4	Nonlinear gain point 4, p.u. gv	0.0000
pgv4	Nonlinear gain point 4, p.u. power	0.0000
gv5	Nonlinear gain point 5, p.u. gv	0.0000
pgv5	Nonlinear gain point 5, p.u. power	0.0000
gv6	Nonlinear gain point 6, p.u. gv	0.0000
pgv6	Nonlinear gain point 6, p.u. power	0.0000
ka	Governor gain	0.0000
t4	Governor lead time constant, sec	0.0000
t5	Governor lag time constant, sec	0.0000

Notes:

1) Used GE program defaults. No impact for analysis in time domain of interest for electrical dynamics analysis. BUT WOULD NOT BE ACCURATE FOR USE IN AN OPERATIONA STUDY(EXTENDED TIME DOMAIN ANALYSIS) SUCH AS TURBINE RESPONSE DUE TO DISPATCH ORDER TO RAMP UP/DOWN PLANT OUTPUT.


If (Dv > Linc) Rlim = ltrat
else Rlim = Rmax
1
1+sTltr
Dv
Rlim
Vmax
Vmin
Pref
Ka(1+sT4)
1+sT5
Low Value
Select
1
sT1
1+asT2
1+bsT2
Pgv
Gv
dbb
Pmech
Fidle
1
R
Speed
eps
dba
Fidle
Kt
1
1+sT3
Lmax

Model Name: genrou

Description: Solid rotor generator represented by Equal mutual inductance rotor modeling

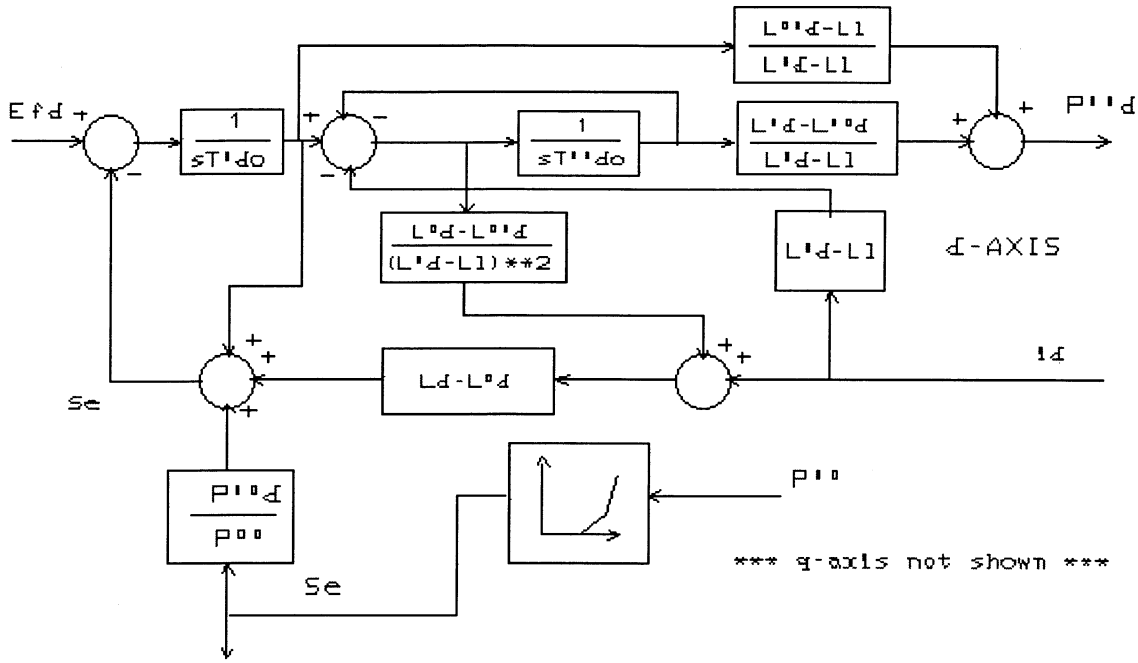
Invocation: genrou [<n>] {<name> <kv>} <id> :

Parameters:

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***
tpdo	D-axis transient rotor time constant	5.8850
tppdo	D-axis subtransient rotor time constant	0.0420
tpqo	Q-axis transient rotor time constant	0.6500
tppqo	Q-axis subtransient rotor time constant	0.0640
h	Inertia constant, sec	4.1340
d	Damping factor, pu	0.0000
ld	D-axis synchronous reactance	2.3164
lq	Q-axis synchronous reactance	2.2631
lpd	D-axis transient reactance	0.3440
lpq	Q-axis transient reactance	0.5132
lppd	D-axis subtransient reactance	0.2848
ll	Stator leakage reactance, pu	0.2425
s1	Saturation factor at 1 pu flux	0.1992
s12	Saturation factor at 1.2 pu flux	0.8690
ra	Stator resistance, pu	0.0000
rcomp	Compounding resistance voltage control, pu	0.0000
xcomp	Compounding reactance voltage control, pu	0.0000

Notes:


Efd
1
sT'do
1
sT''do
L''d-Ll
L'd-Ll
L'd-L''d
L'd-Ll
L''d-L'd
(L'd-Ll)**2
L'd-Ll
d-AXIS
Ld-L''d
Id
Se
P''d
P''o
P''o
Se
*** q-axis not shown ***

Model Name: exst1

Descriptions: IEEE type ST1 excitation system

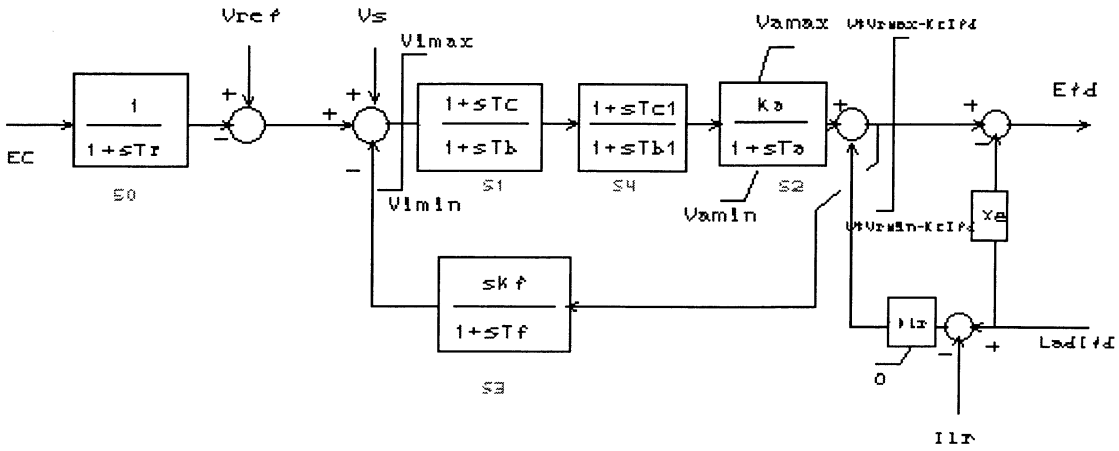
Invocation: exst1 [<n>] {<name> <kv>} <id> :

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***
tr	Filter time constant, sec	0.0000
vimax	Maximum error, pu	0.1700
vimin	Minimum error, pu	-0.1700
tc	Lead time constant, sec	1.0000
tb	Lag time constant, sec	8.0000
ka	Gain	250.0000
ta	Time constant, sec	0.0200
vrmax	Maximum controller output	7.1570
vrmin	Minimum controller output	-6.4420
kc	Excitation sys. regulation factor, pu	0.1090
kf	Rate feedback gain	0.0000
tf	Rate feedback time constant, sec	0.0000
tc1	Lead time constant, sec	0.0000
tb1	Lag time constant, sec	0.0000
vamax	Maximum control element output, p.u.	7.1570
vamin	Minimum control element output, p.u	-6,4420
xe	Excitation XFMR effective X, p.u.	0.0000
ilr	Maximum field current, p.u.	3.2000
klr	Gain on field current limit	0.0000

Notes:

a) This model can be used to represent a controlled-rectifier excitation system whose a.c. power source is a simple power transformer fed from the generator terminals. The voltage regulation of the excitation transformer and rectifier are approximated by the parameter Kc.


Vref
Vs
Vimax
Vamax
Vt+Vrmax-KcIfd
Efd
EC
1
1+sTr
S0
1+sTc
1+sTb
S1
1+sTc1
1+sTb1
S4
Ka
1+sTa
S2
Vimin
Vamin
Vt+Vrmin-KcIfd
Xe
skf
1+sTf
S3
Kir
0
LadIfd
Ilr

Model Name: pss2a

Descriptions: Dual input Power system stabilizer (IEEE type PSS2A)

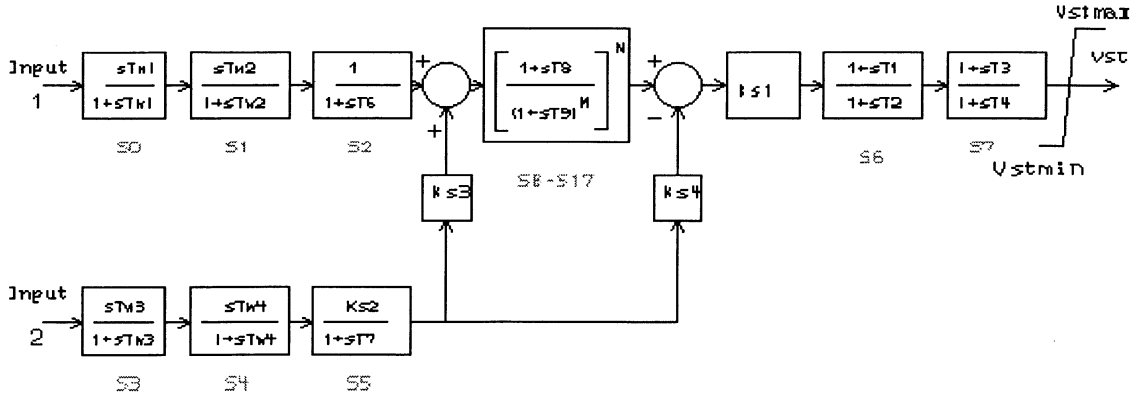
Invocation: pss2a [<n>] {<name> <kv>} <id> :

Parameters:

Variable	*Description*	***RCEC PROJECT DATA***
j1	Input signal #1 code	1.0000
k1	Input signal #1 remote bus number	0.0000
j2	Input signal #2 code	3.0000
k2	Input signal #2 remote bus number	0.0000
tw1	First washout on signal #1, sec	2.0000
tw2	Second washout on signal #1, sec	2.0000
tw3	First washout on signal #2, sec	2.0000
tw4	Second washout on signal #2, sec	0.0000
t6	Time constant on signal #1, sec	0.0000
t7	Time constant on signal #2, sec	2.0000
ks2	Gain on signal #2	0.2419 (set to tw2/2H)
ks3	Gain on signal #2	1.0000
ks4	Gain on signal #2	1.0000
t8	Lead of ramp tracking filter	0.5000
t9	Lag of ramp tracking filter	0.1000
n	Order of ramp tracking filter	1.0000
m	Order of ramp tracking filter	5.0000
ks1	Stabilizer gain	10.0000
t1-t4	Lead/lag time constants, sec, 0.25, 0.04,	0.20, 0.03
vstmax	Stabilizer output max limit, p.u.	0.1000
vstmin	Stabilizer output min limit, p.u.	-0.1000

The input signal code, j, is

1	for shaft speed
2	for frequency of bus voltage
3	for generator electrical power
4	for generator accelerating power
5	for amplitude of bus voltage
7	for amplitude of branch current


Vstmax
Input
1
sTw1
1+sTw1
sTw2
1+sTw2
1
1+sT6
+
+
1+sT8
(1+sT9)M
N
+
−
Ks1
1+sT1
1+sT2
1+sT3
1+sT4
Vst
S0
S1
S2
S8-S17
S6
S7
Vstmin
Ks3
Ks4
Input
2
sTw3
1+sTw3
sTw4
1+sTw4
Ks2
1+sT7
S3
S4
S5

Model Name: tgov1

Description: Basic steam turbine and governor

Invocation: tgov1 [<n>] {<name> <kv>} <id> : [mwcap=<value>]

Parameters

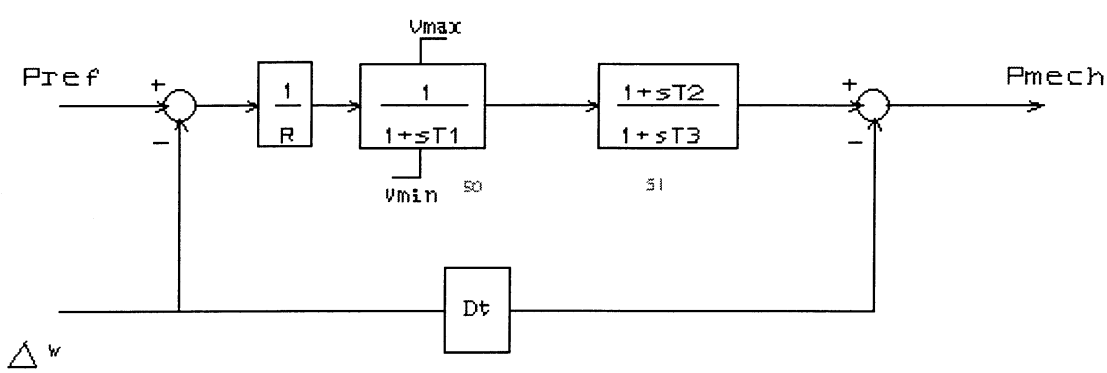
Parameters:

Variable	*Description*	***RCEC PROJECT DATA***	
r	Permanent droop, p.u.	0.0500	
t1	Steam bowl time constant, sec	1.0000	(see note 1)
vmax	Maximum valve position, p.u. of mwcap	1.0000	
vmin	Minimum valve position, p.u. of mwcap	0.0000	
t2	time constant of T2, T3 block, sec	2.1000	(see note 2)
t3	Reheater time constant, sec	7.0000	(see note 2)
dt	Turbine damping coefficient, p.u.		

Notes:

1) Project's specific turbine governor model included forward gain = 20. Set T1 per general governor time constant equation: Tgov = Gain*Droop = 20 * 0.05 = 1

2) Used GE program defaults. No impact for analysis in time domain of interest for electrical dynamics analysis. BUT WOULD NOT BE ACCURATE FOR USE IN AN OPERATIONA STUDY(EXTENDED TIME DOMAIN ANALYSIS) SUCH AS TURBINE RESPONSE DUE TO DISPATCH ORDER TO RAMP UP/DOWN PLANT OUTPUT.



Russell City Energy Center

Appendix 6-G
Plotted Dynamic Run Results

May 2001

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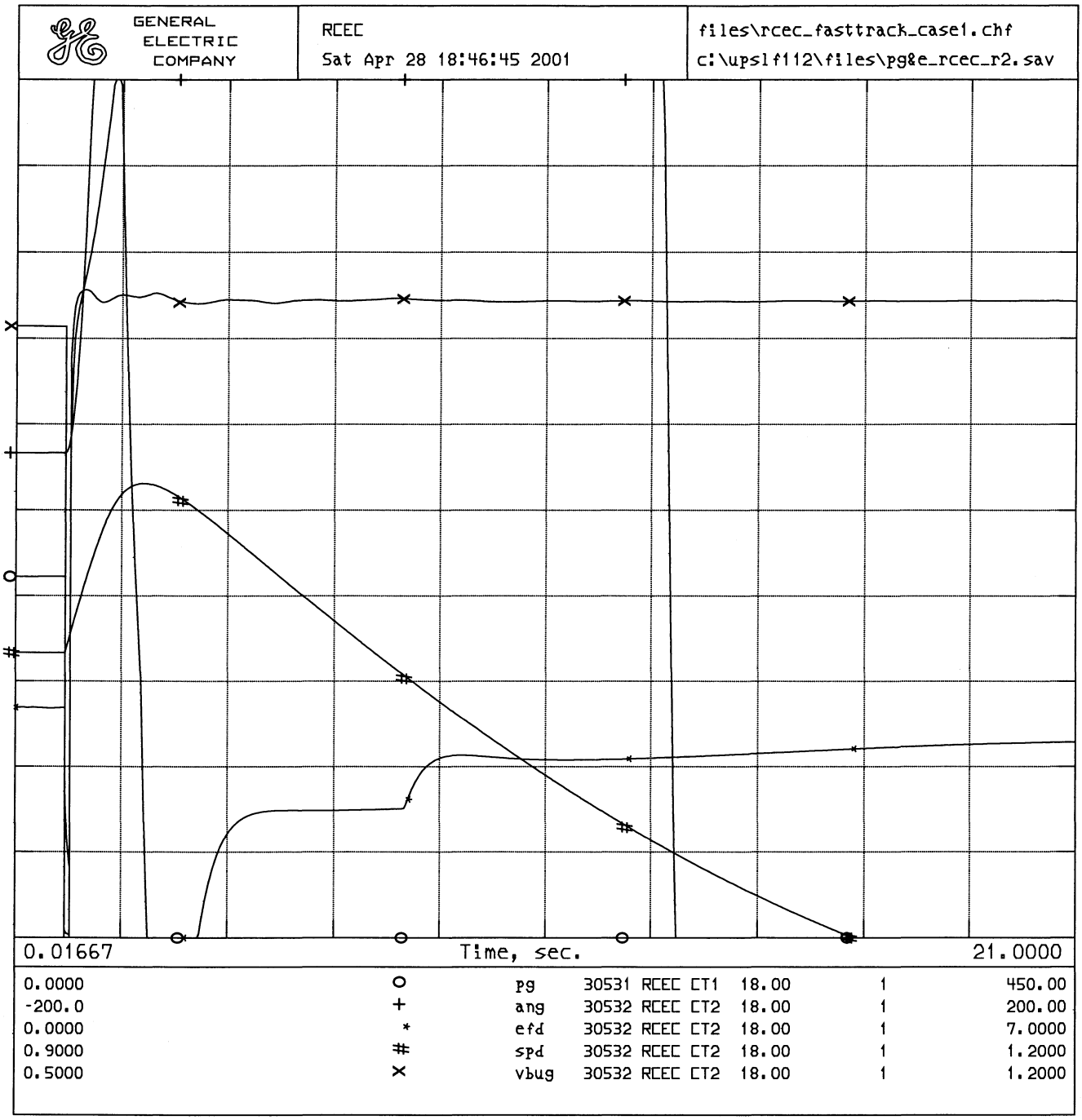
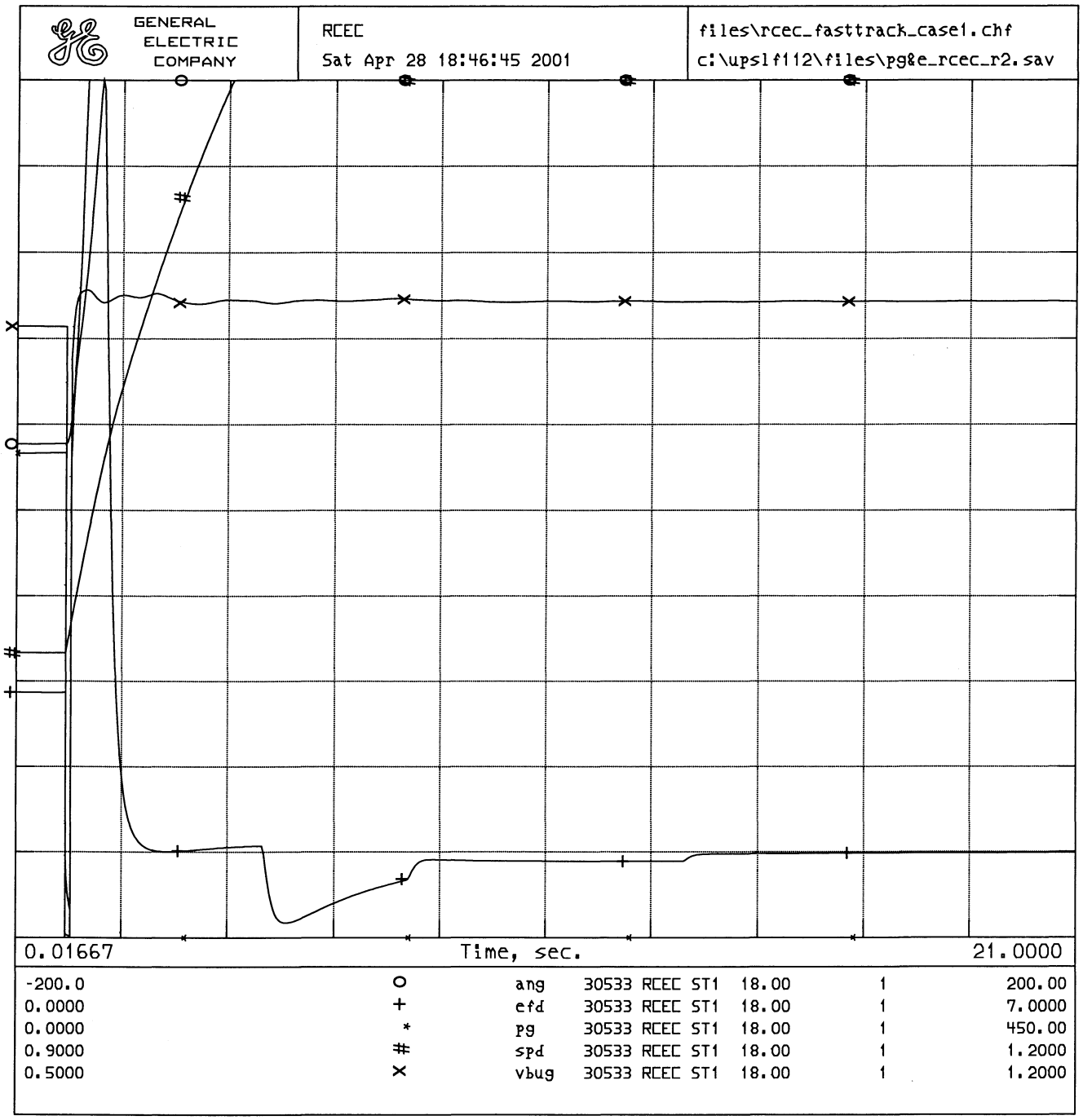
May 2001



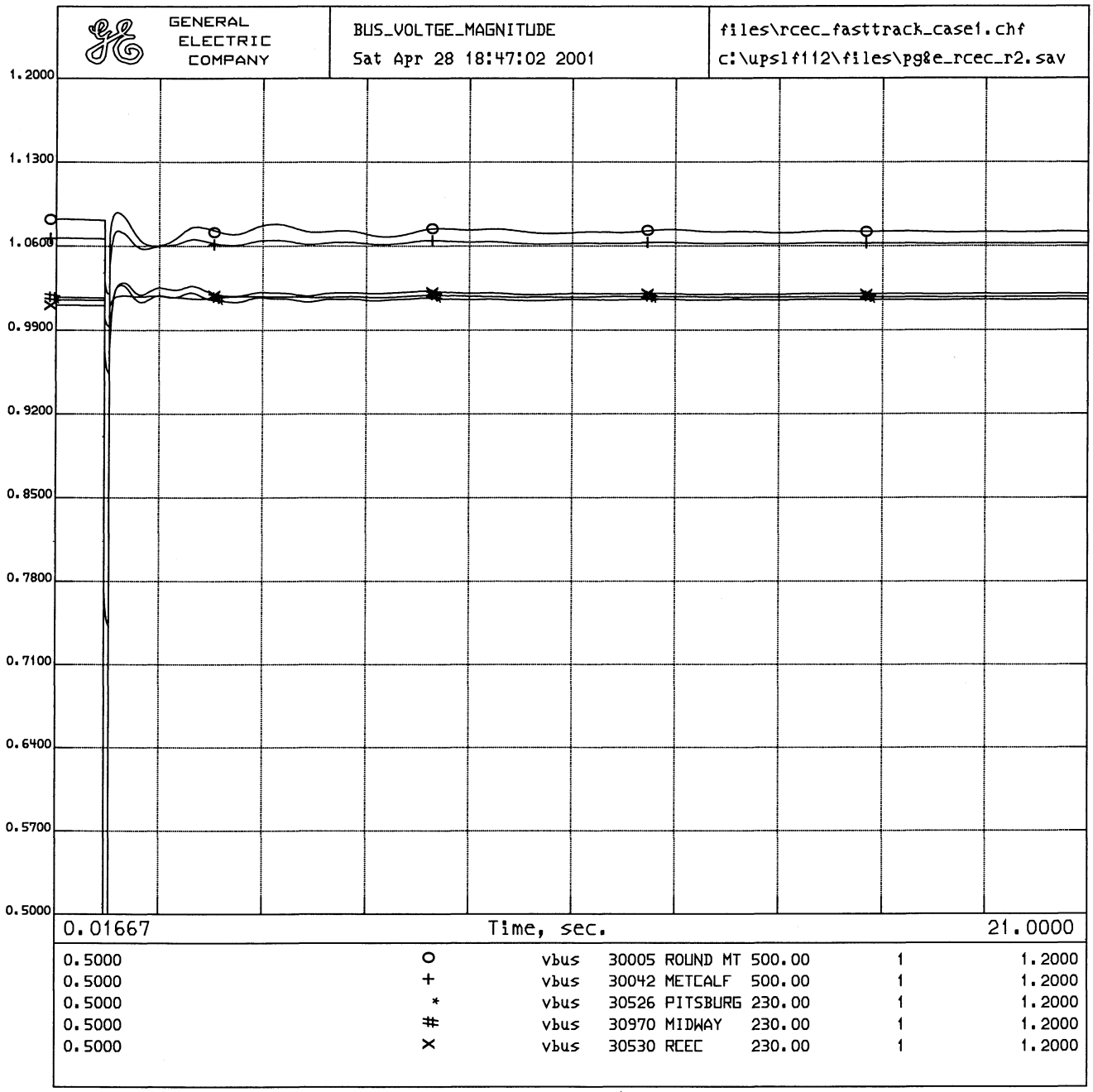
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



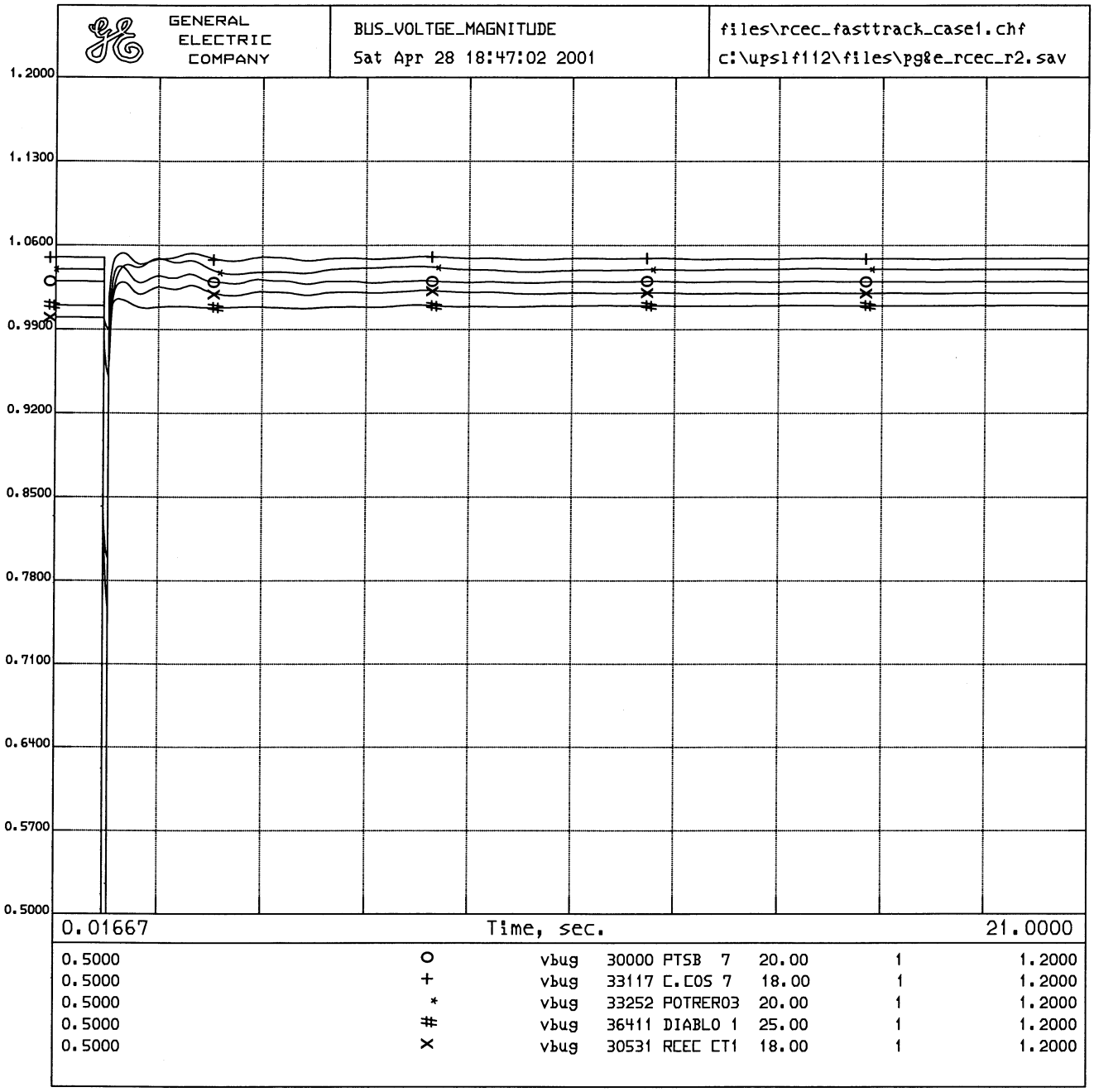
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



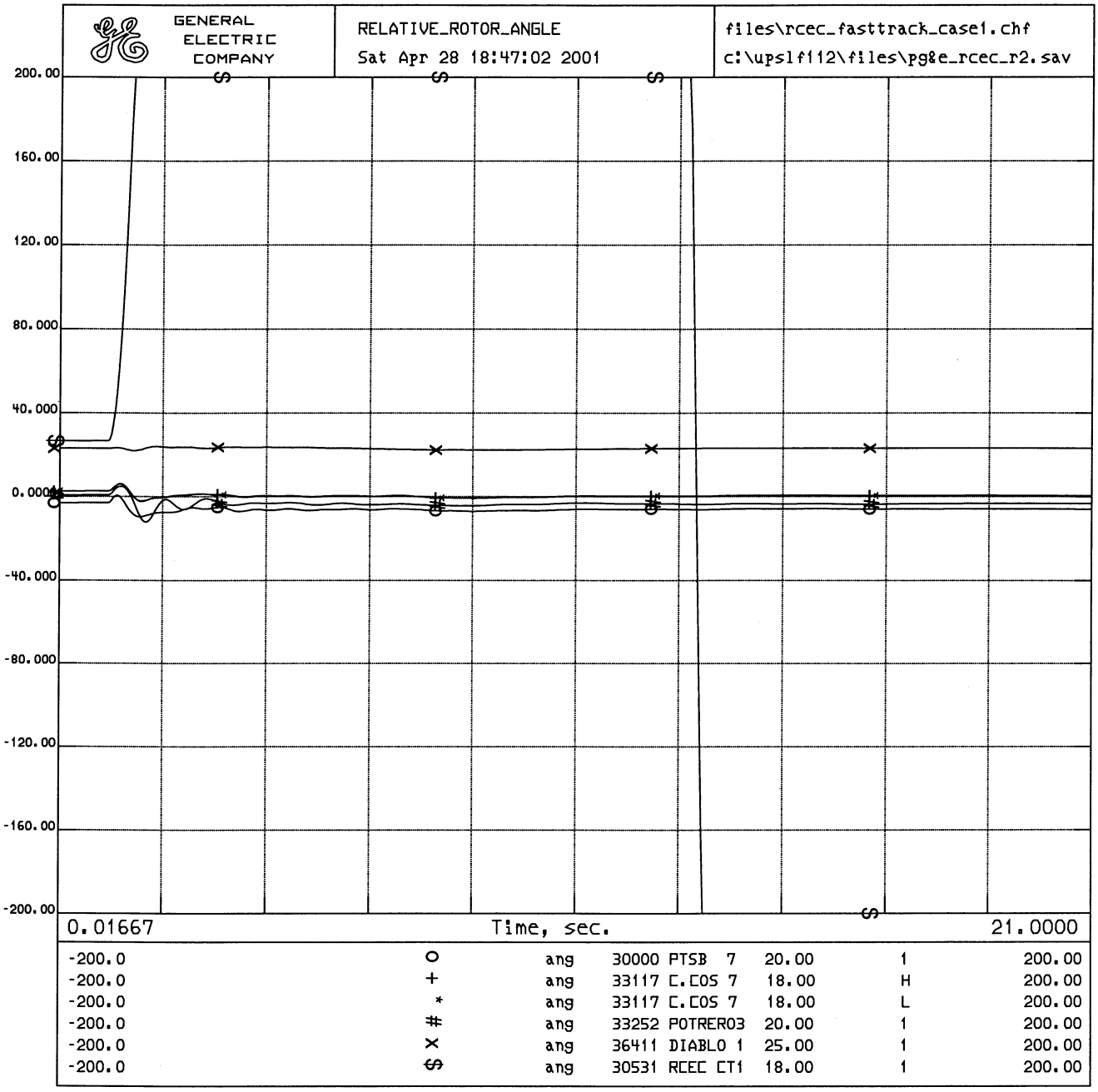
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



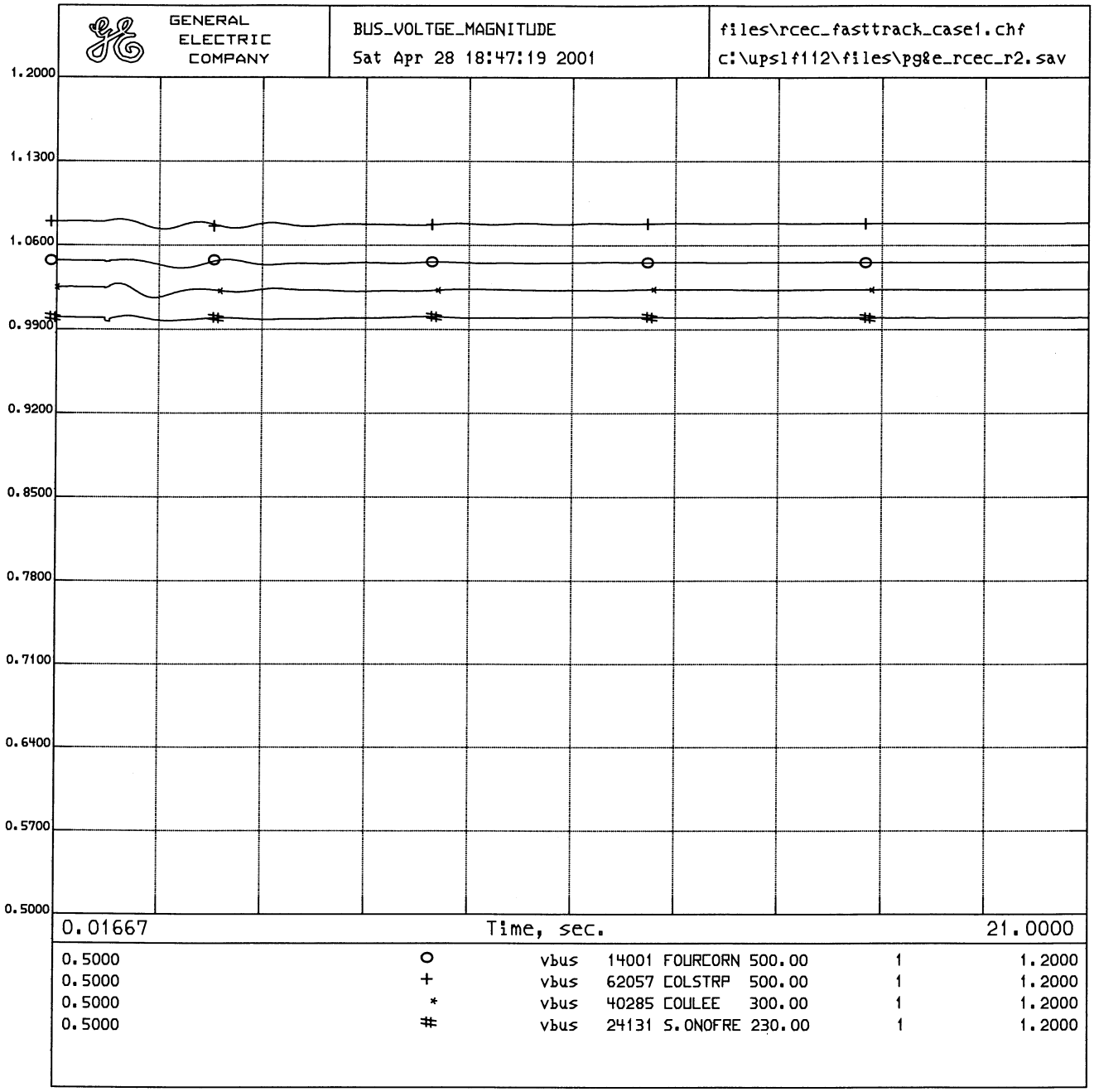
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



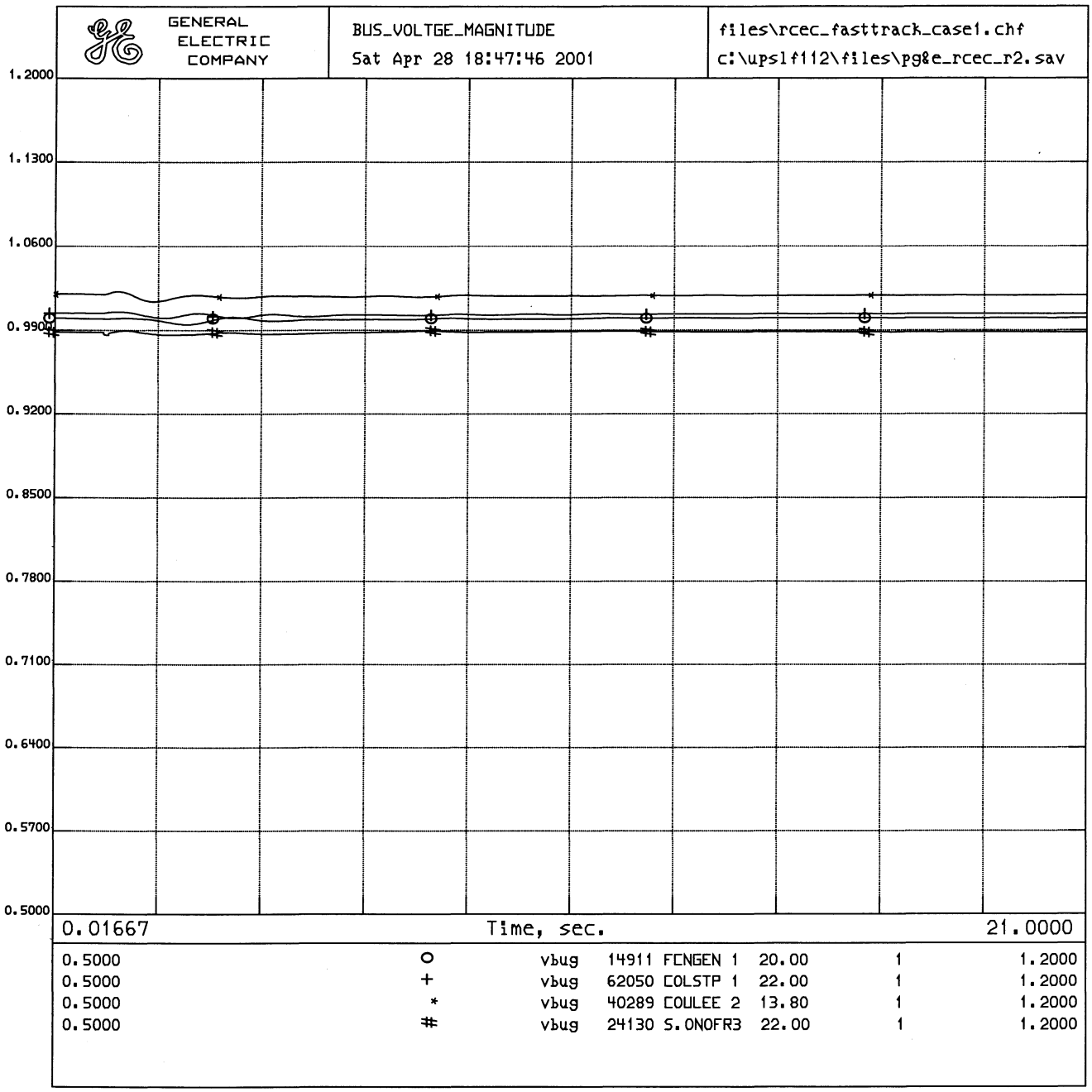
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



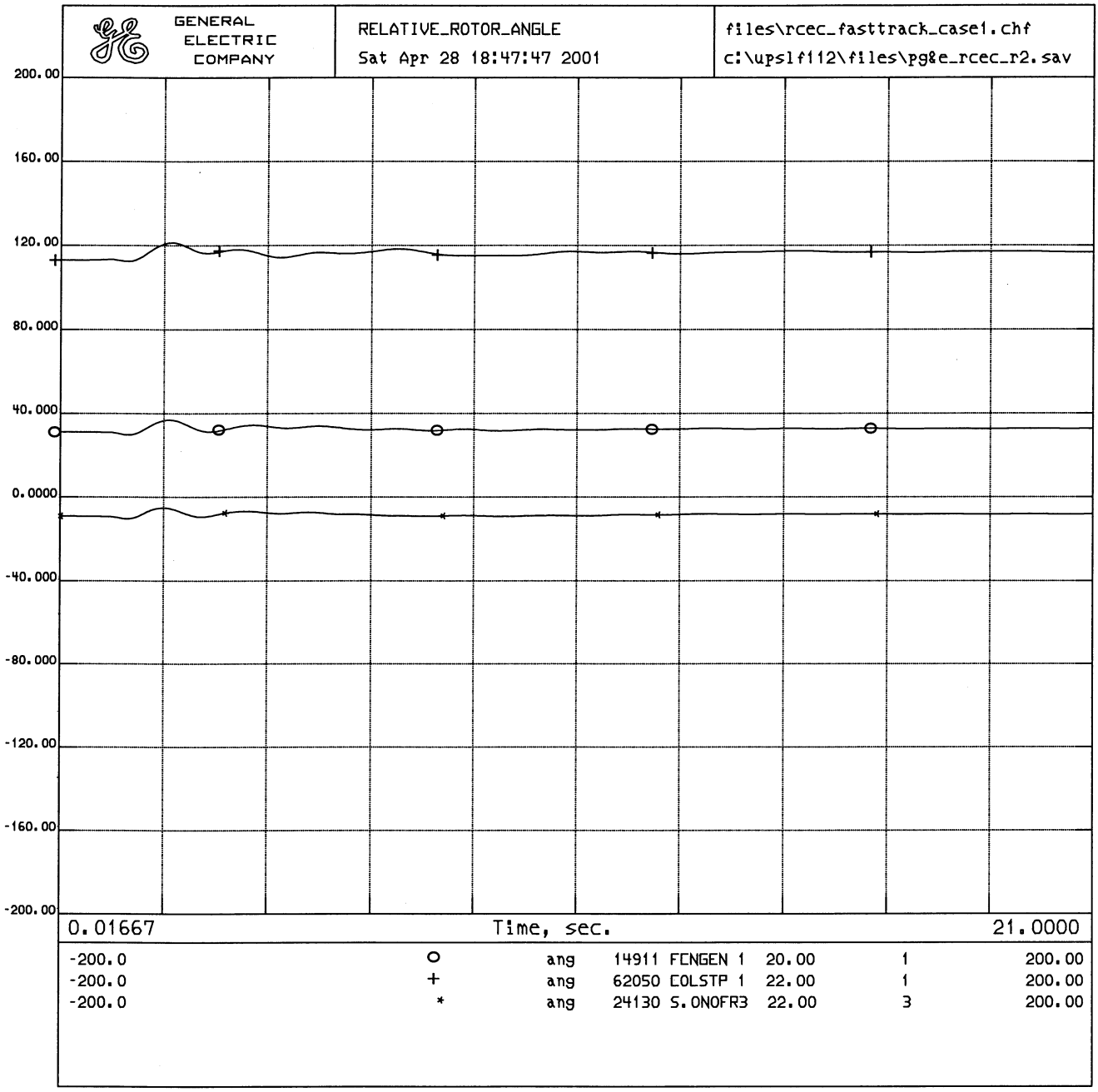
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY

RCEC
Thu Apr 26 23:11:07 2001

rcec_fasttrack_case2.chf
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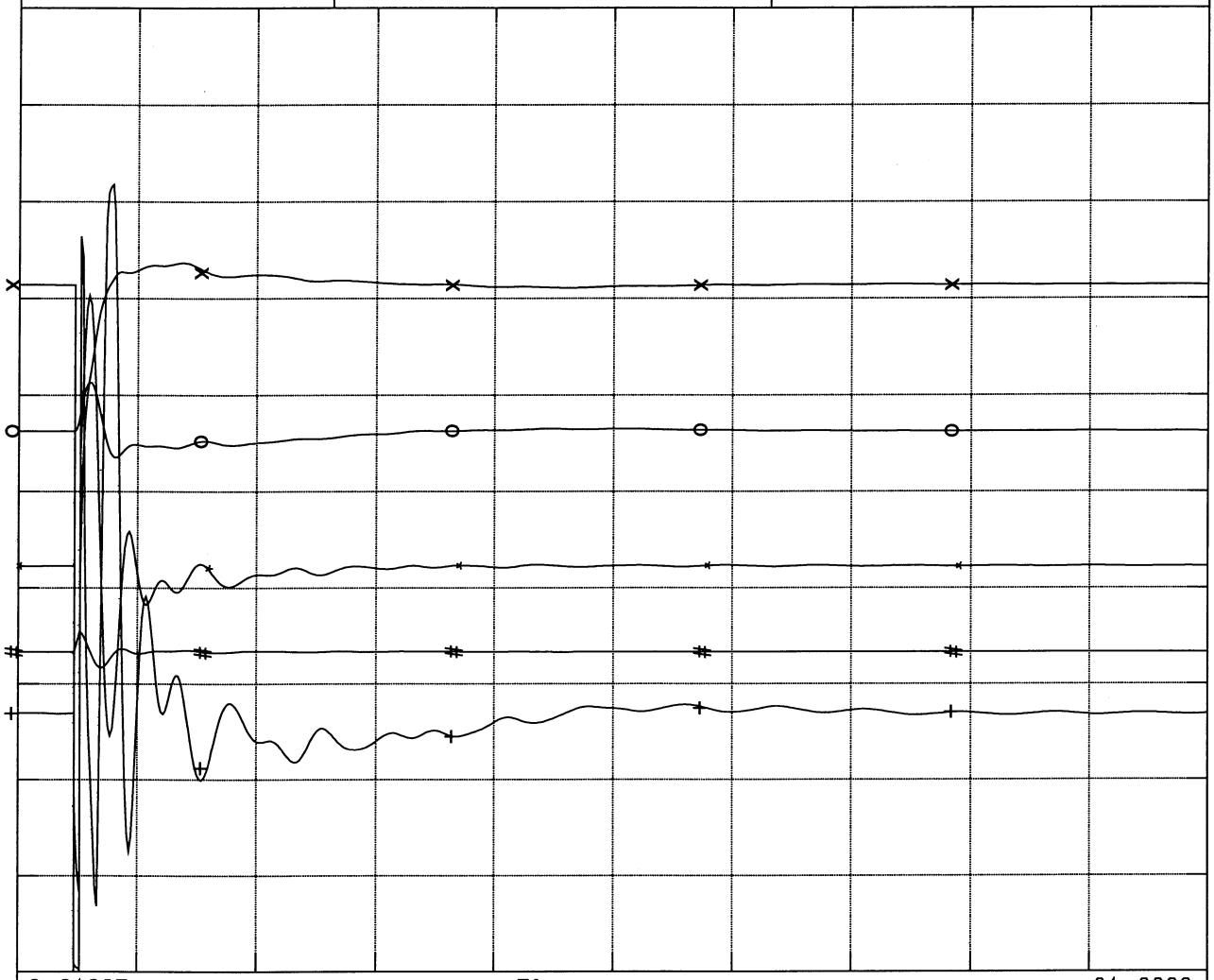

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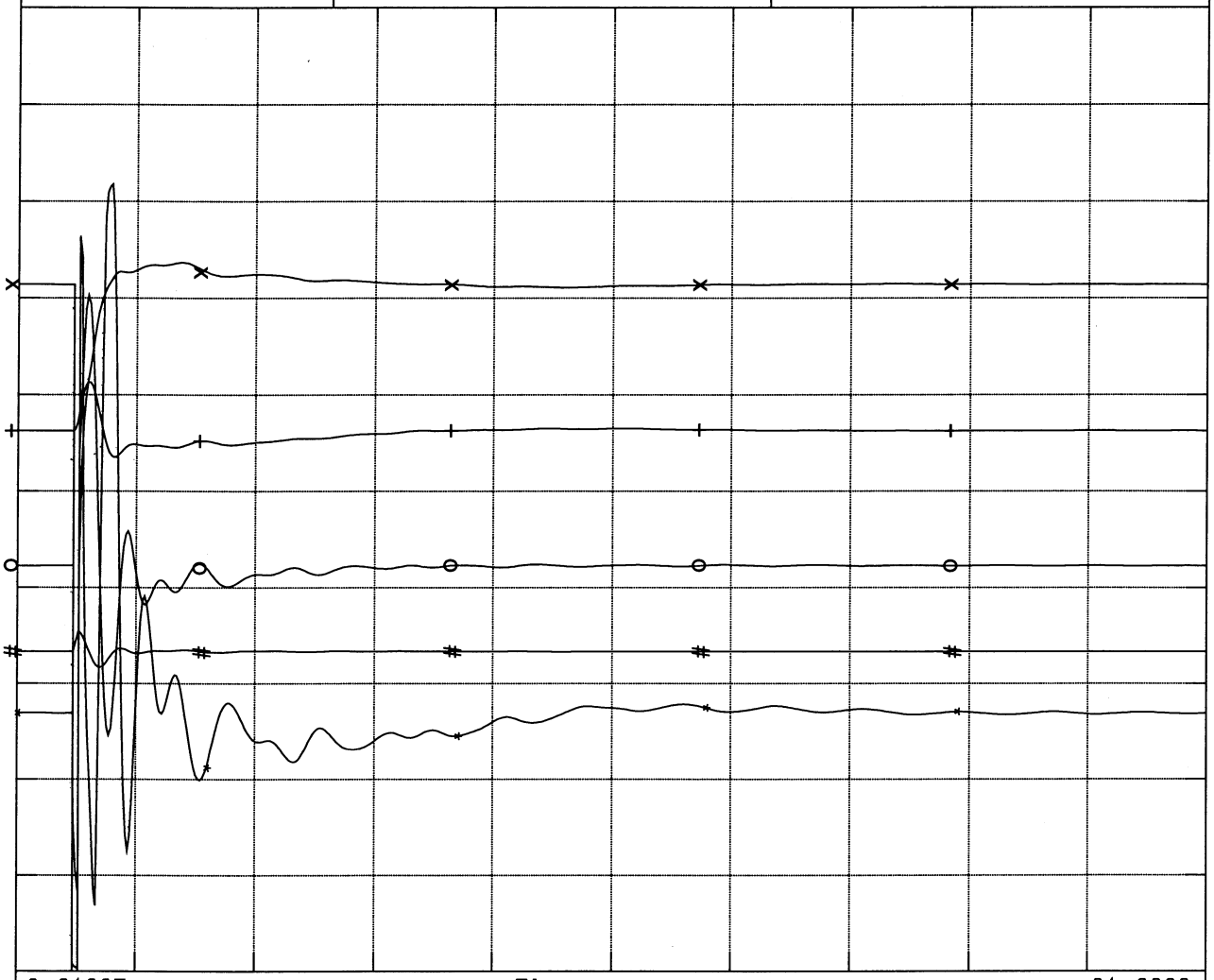
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY	RCEC Thu Apr 26 23:11:07 2001	rcec_fasttrack_case2.chf c:\upslf112\files\files\pg&e_rcec_r2.sav



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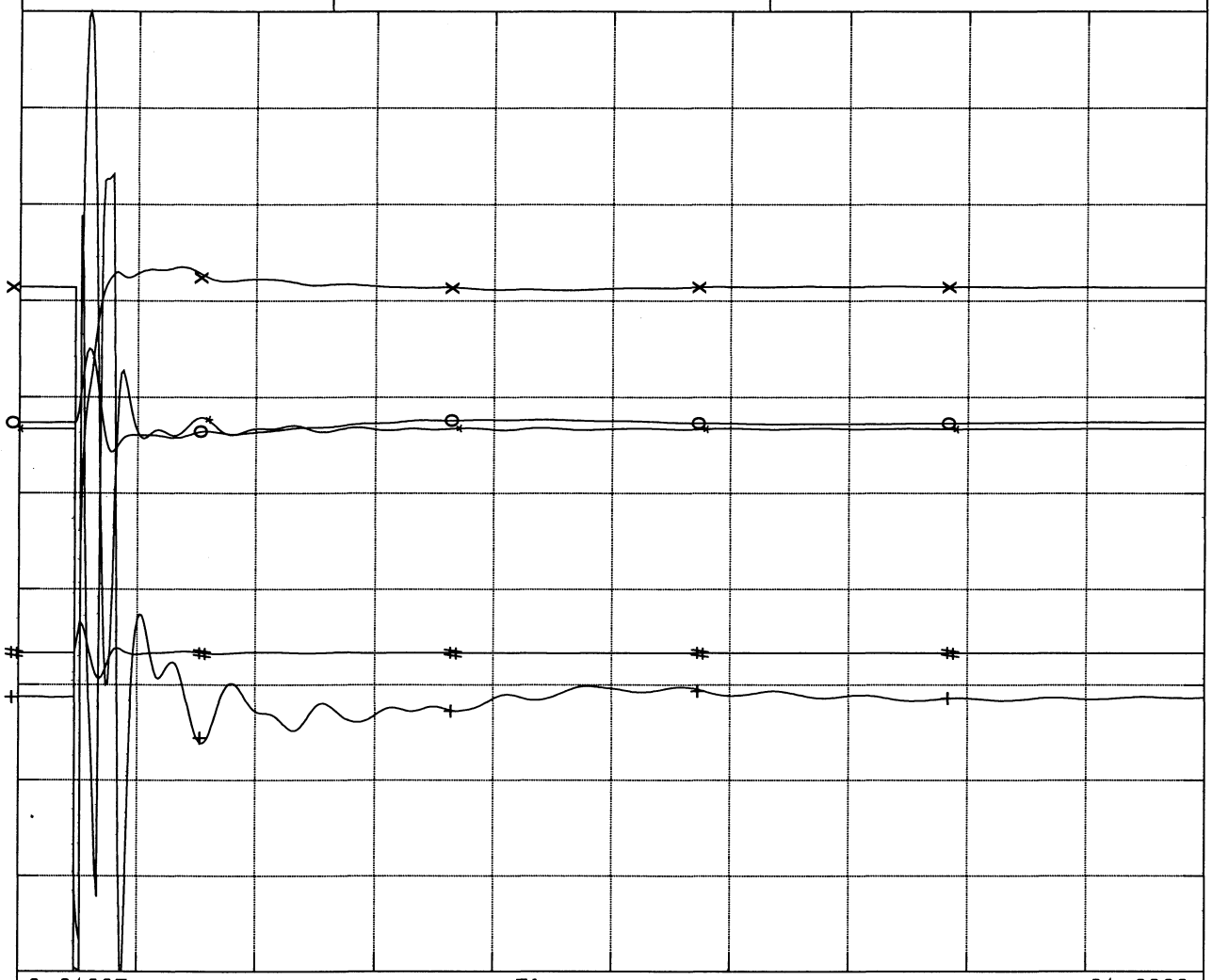
0.5000	x	vbug	30532 RCEC CT2	18.00	1	1.2000

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY	RCEC Thu Apr 26 23:11:07 2001	rcec_fasttrack_case2.chf c:\upslf112\files\files\pg&e_rcec_r2.sav



0.01667	Time, sec.	21.0000

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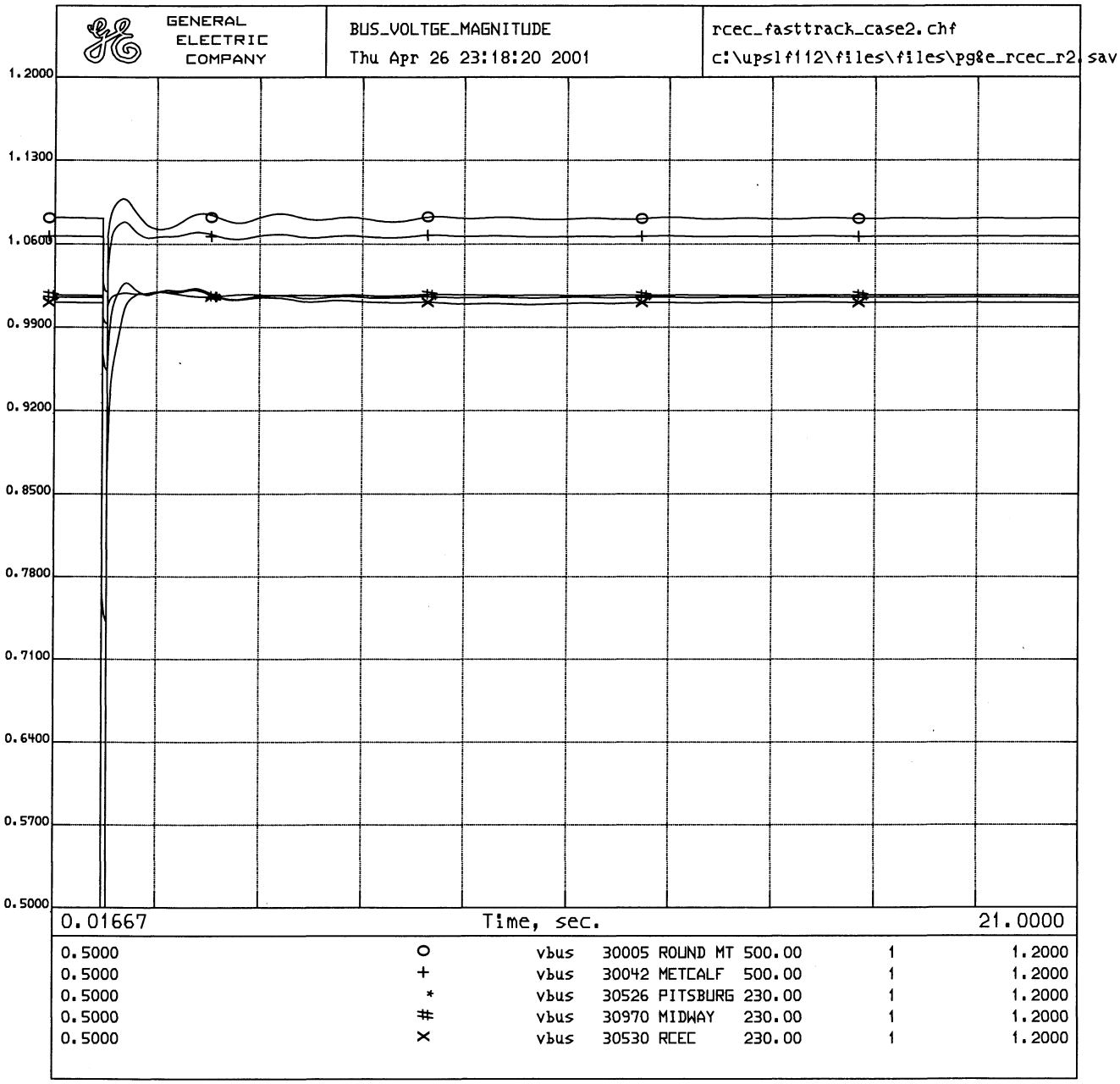
0.5000	x	vbug	30533	RCEC	ST1	18.00	1	1.2000

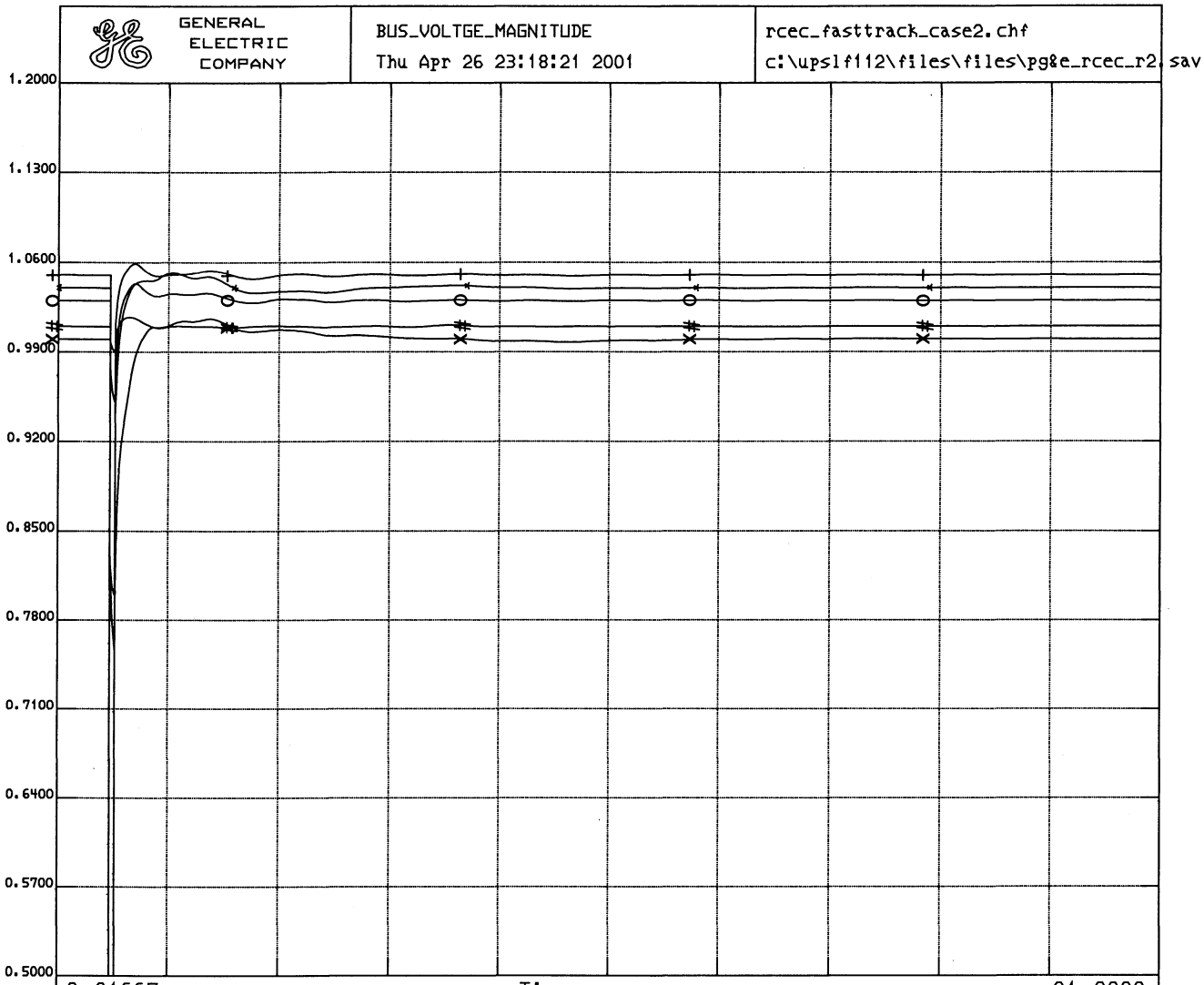
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



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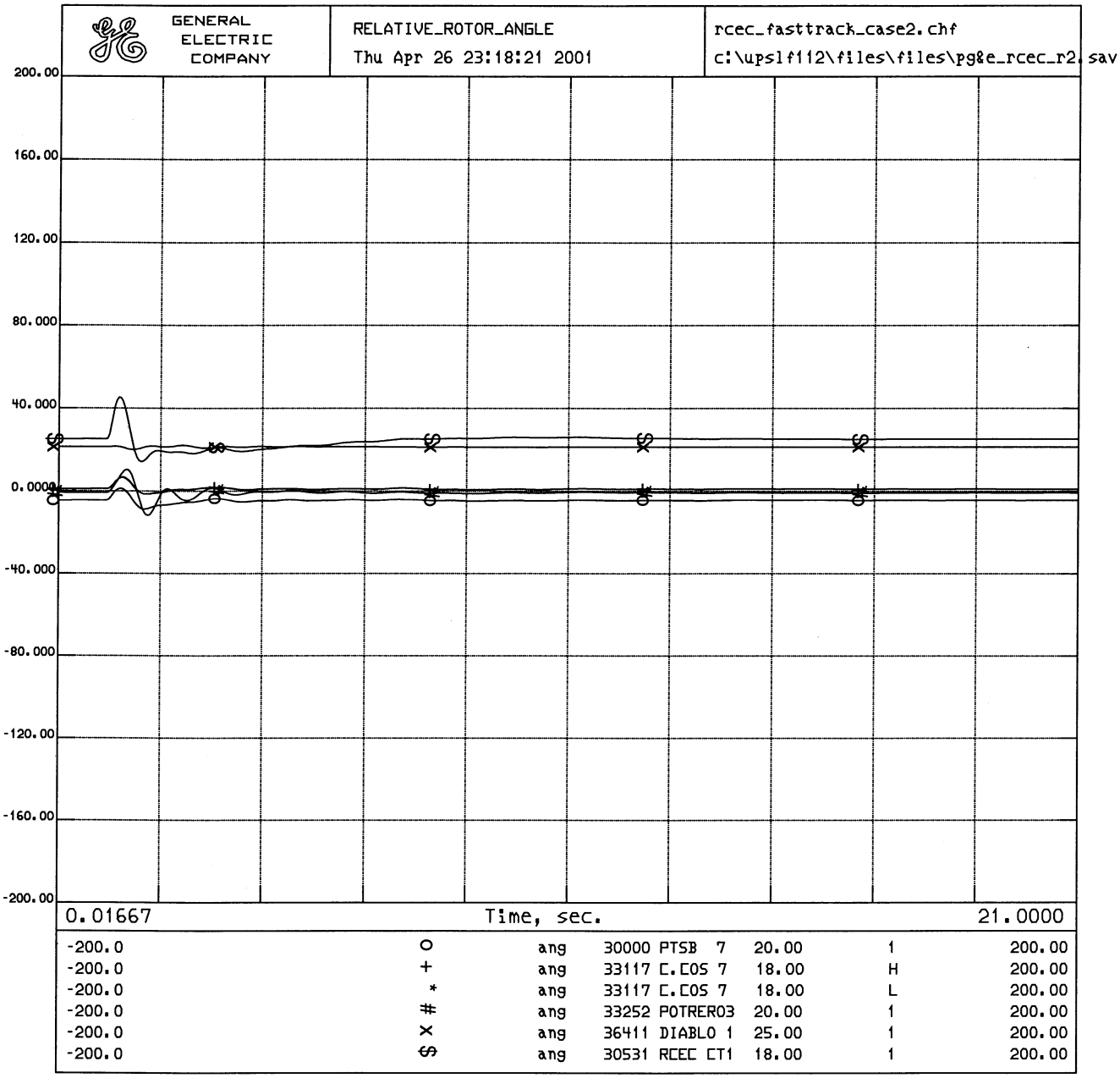
0.5000	*	vbug	33252 POTRERO3	20.00	1	1.2000
0.5000	#	vbug	36411 DIABLO 1	25.00	1	1.2000
0.5000	x	vbug	30531 RCEC CT1	18.00	1	1.2000

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

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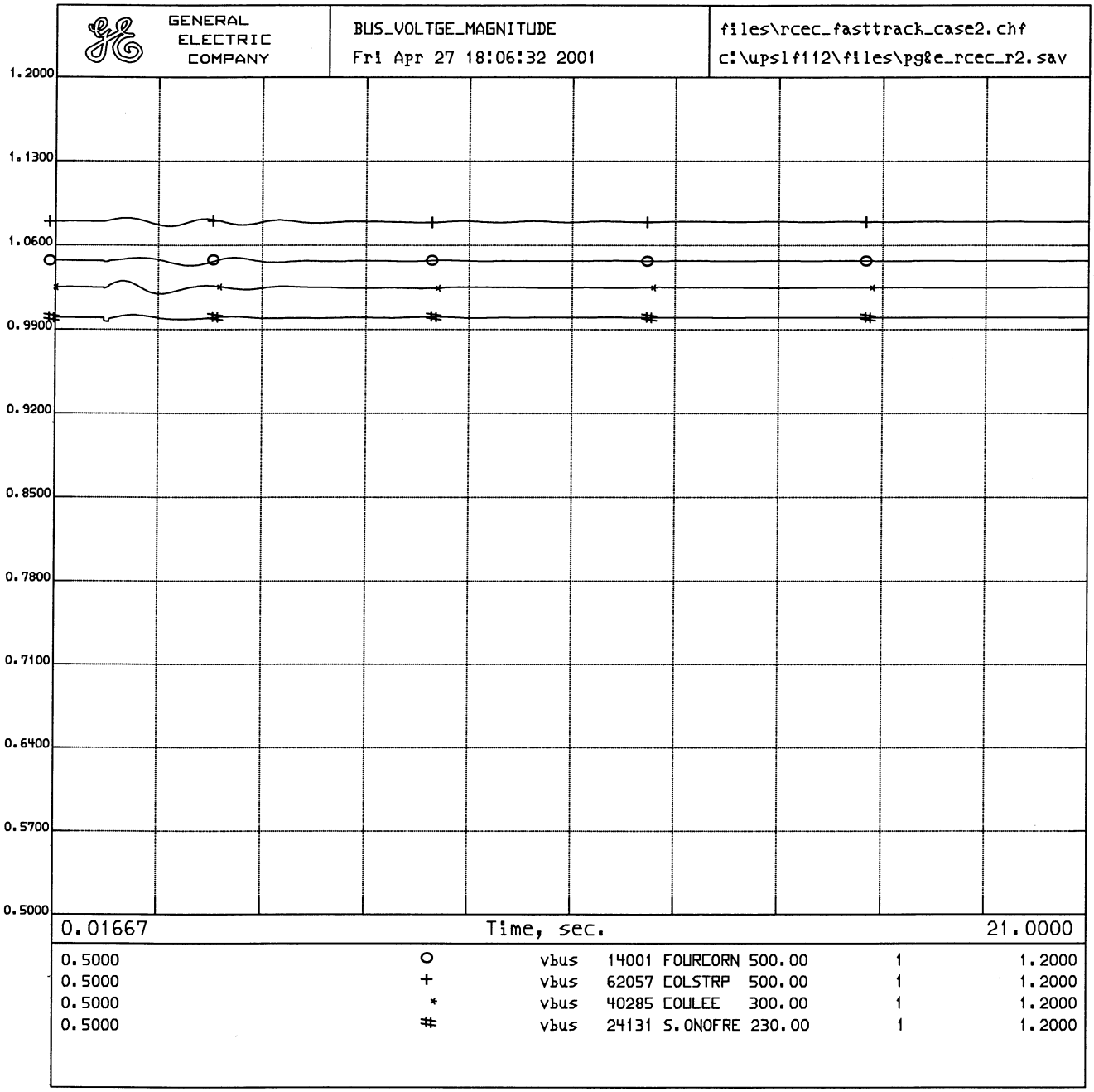
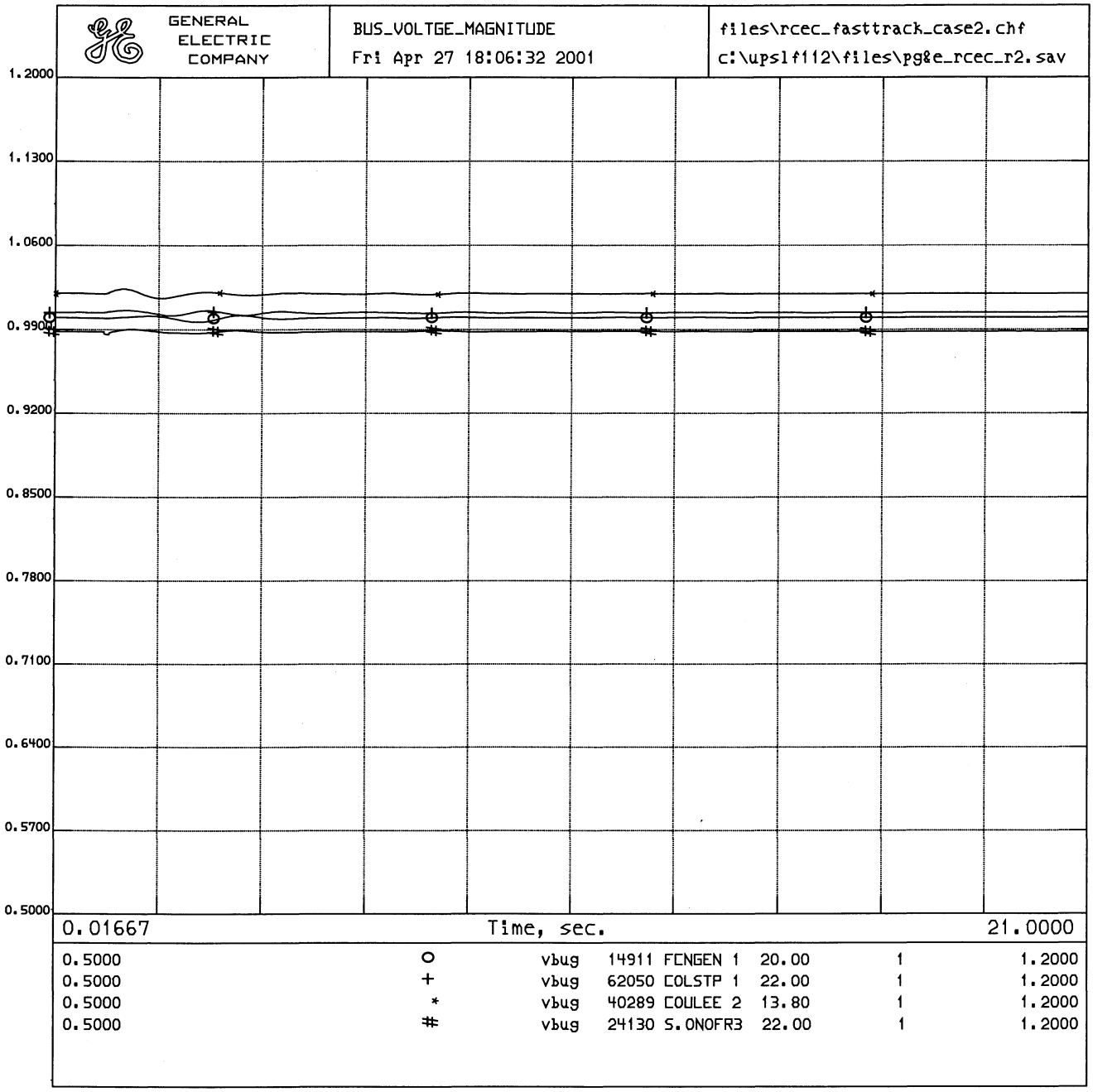


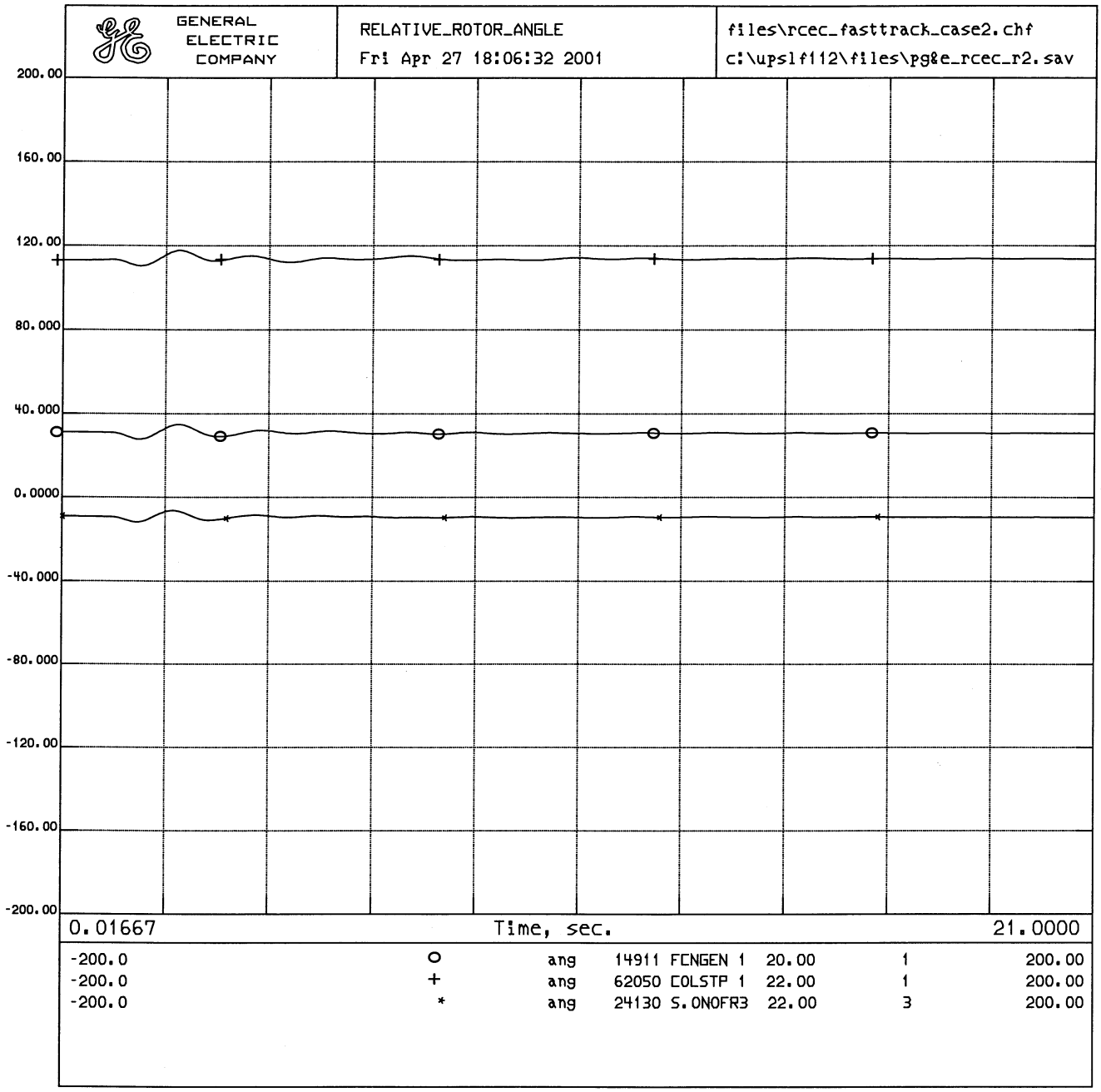
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

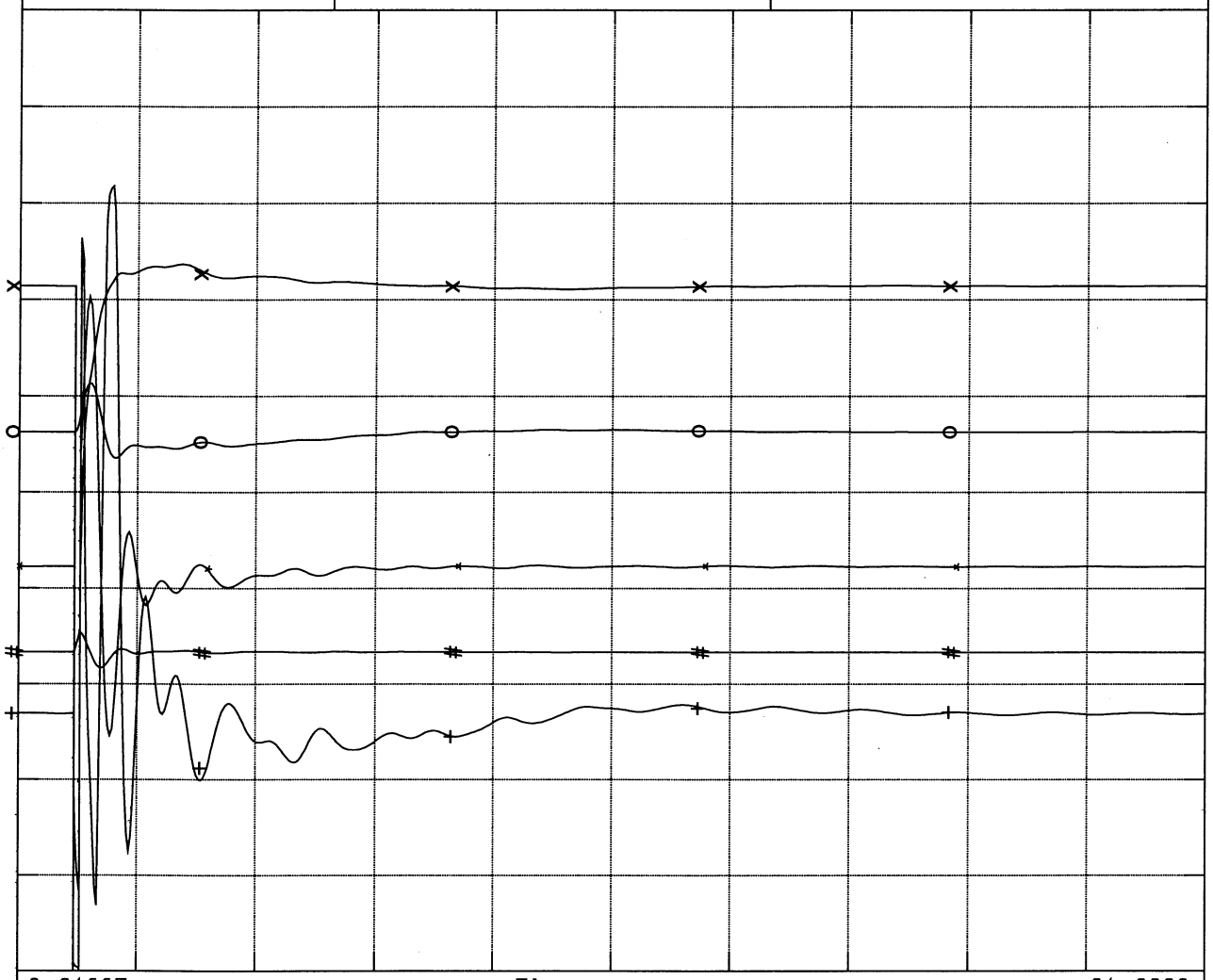
developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY	RCEC Thu Apr 26 23:11:07 2001	rcec_fasttrack_case2.chf c:\upslf112\files\files\pg&e_rcec_r2.sav



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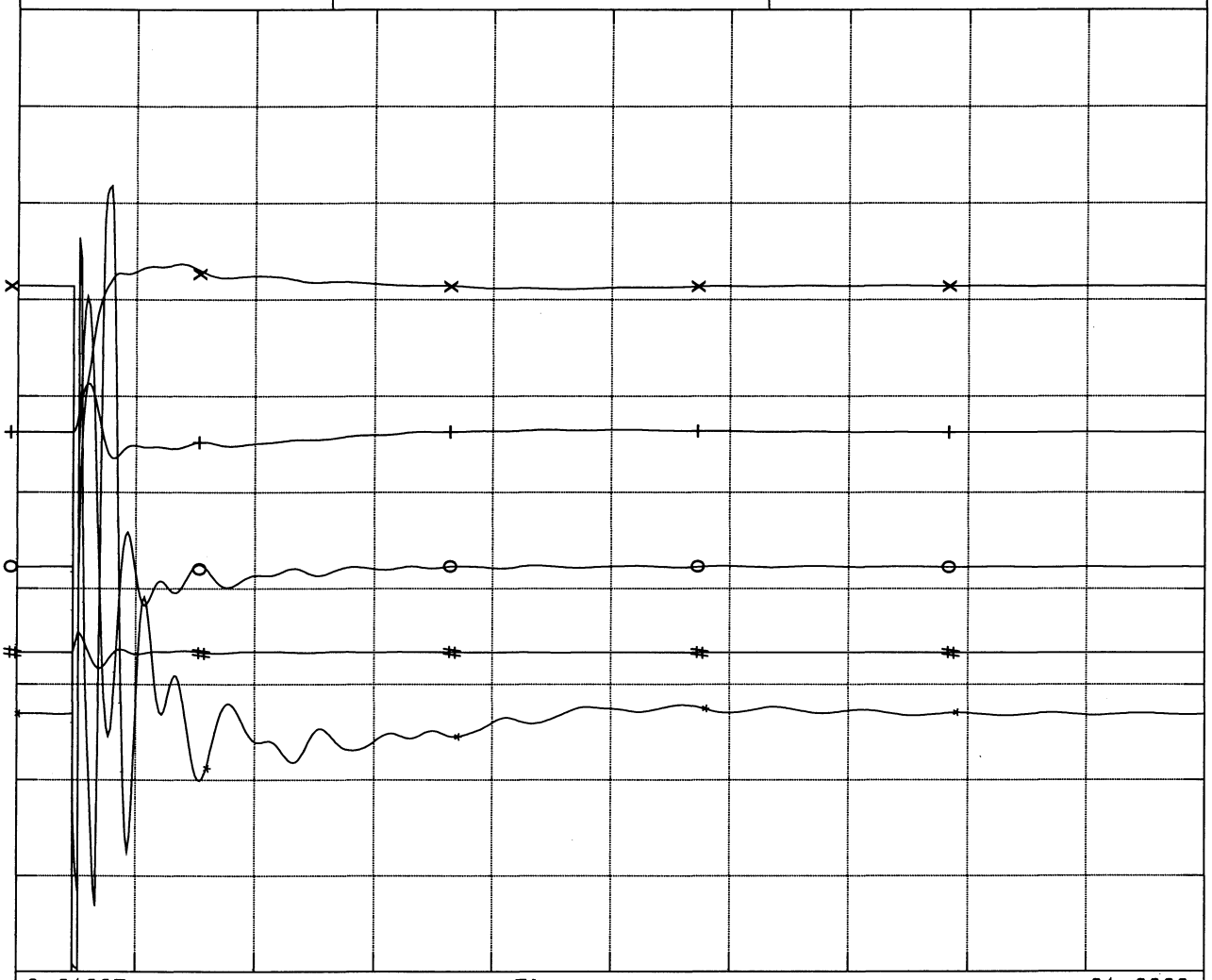
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY	RCEC Thu Apr 26 23:11:07 2001	rcec_fasttrack_case2.chf c:\upslf112\files\files\pg&e_rcec_r2.sav



0.01667 Time, sec. 21.0000

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0.9000	#	spd	30532 RCEC CT2	18.00	1	1.2000
0.5000	x	vbug	30532 RCEC CT2	18.00	1	1.2000

2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY

RCEC
Thu Apr 26 23:11:07 2001

rcec_fasttrack_case2.chf
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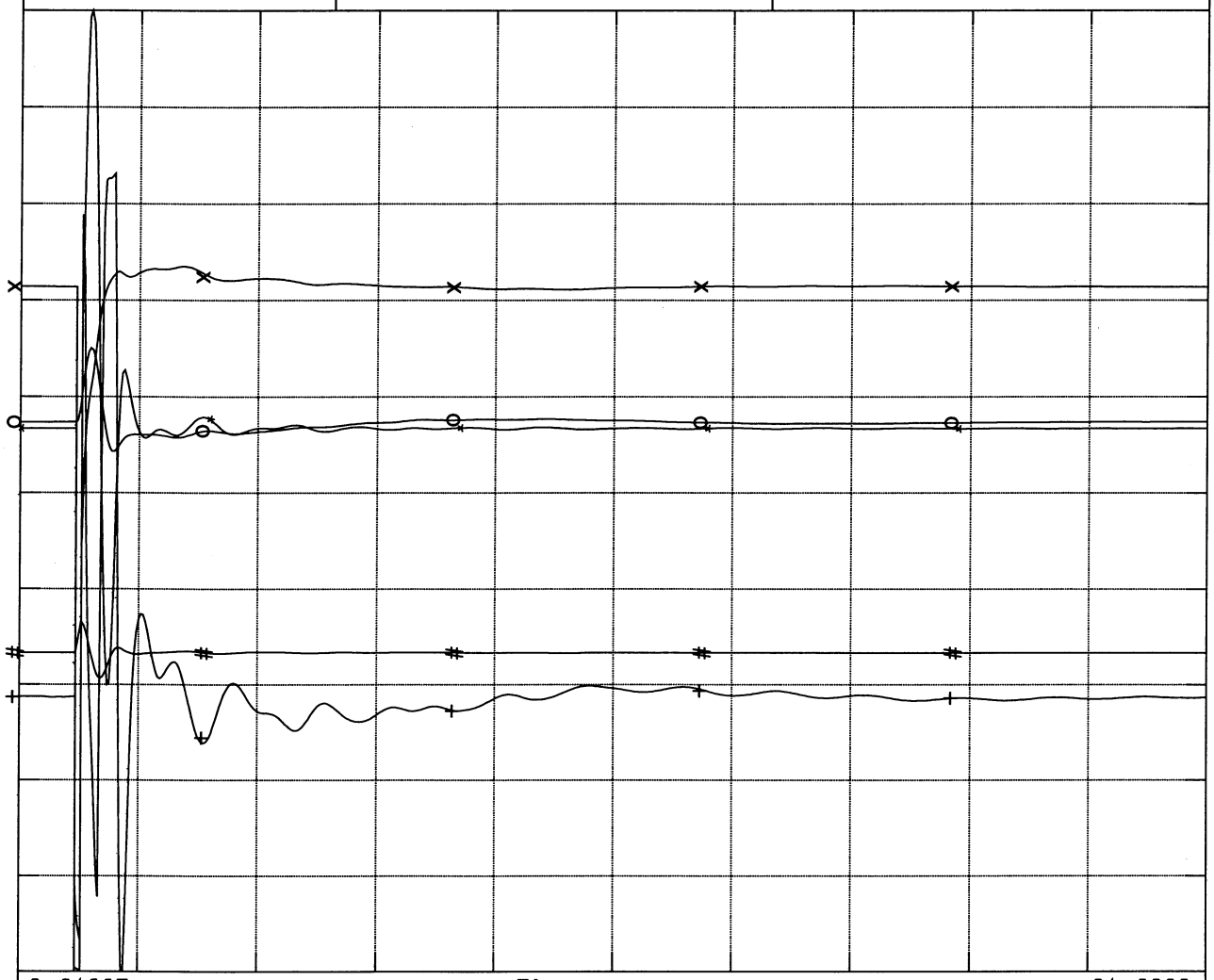

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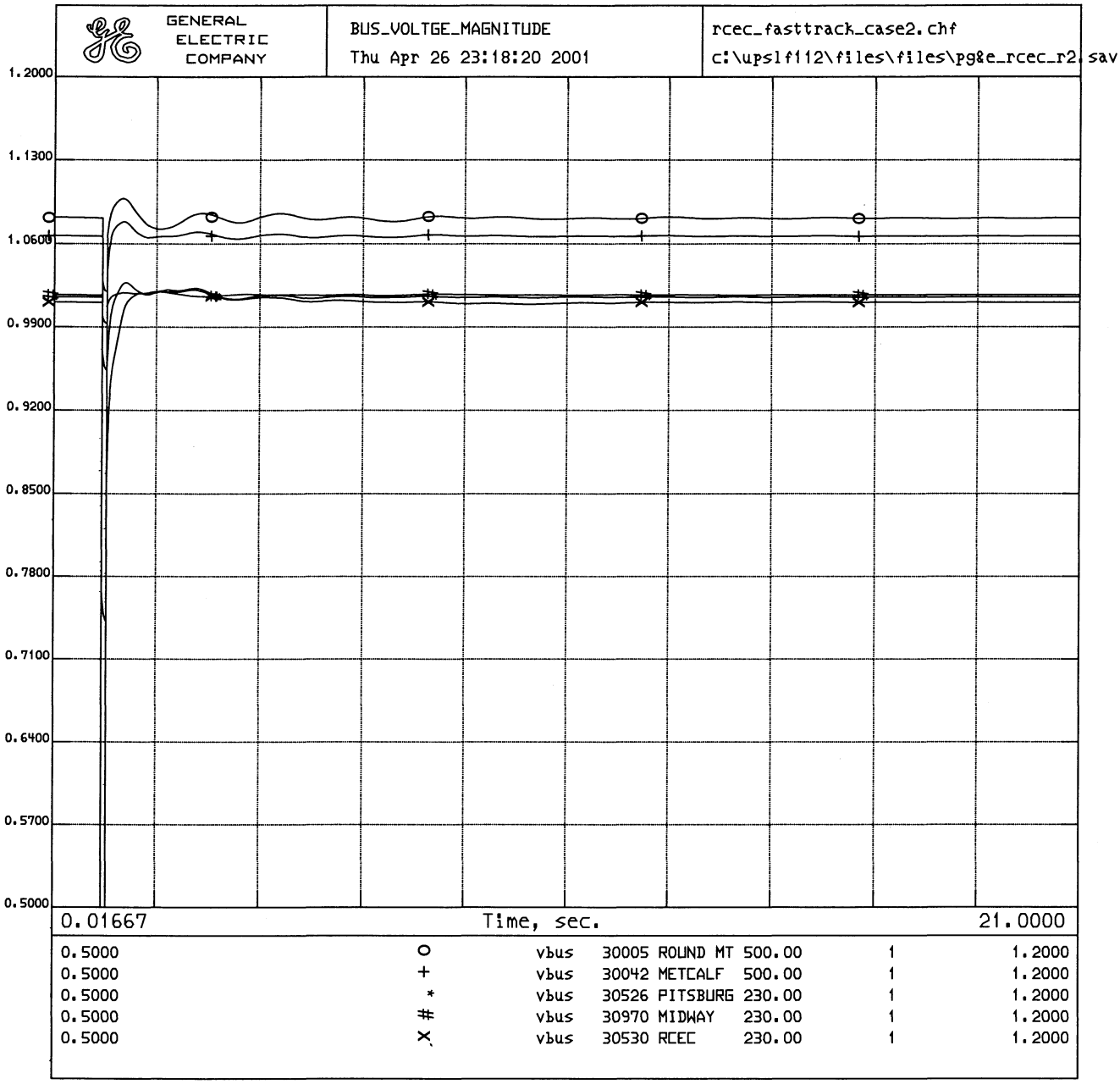
0.5000	x	vbug	30533 RCEC ST1	18.00	1	1.2000

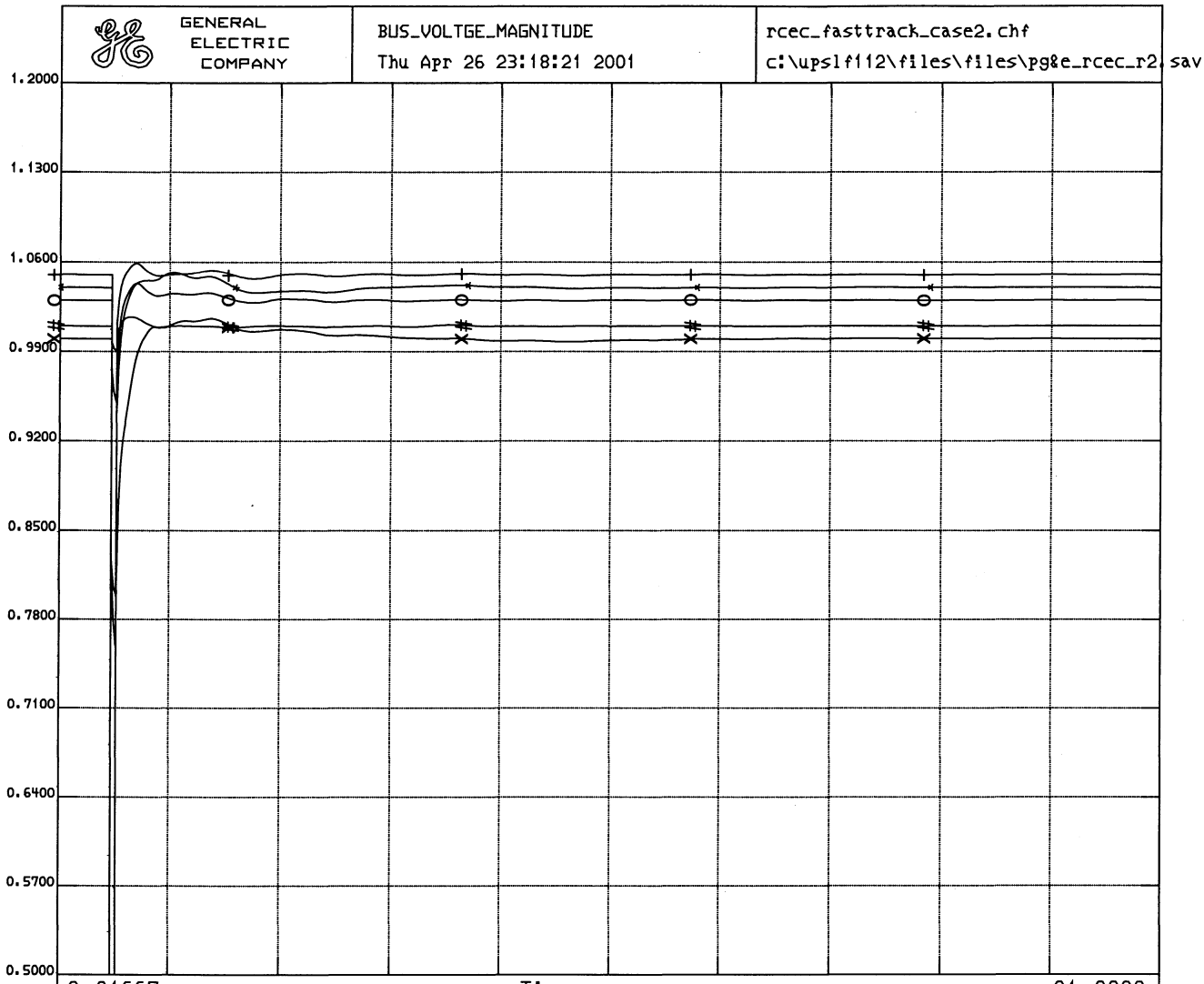
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



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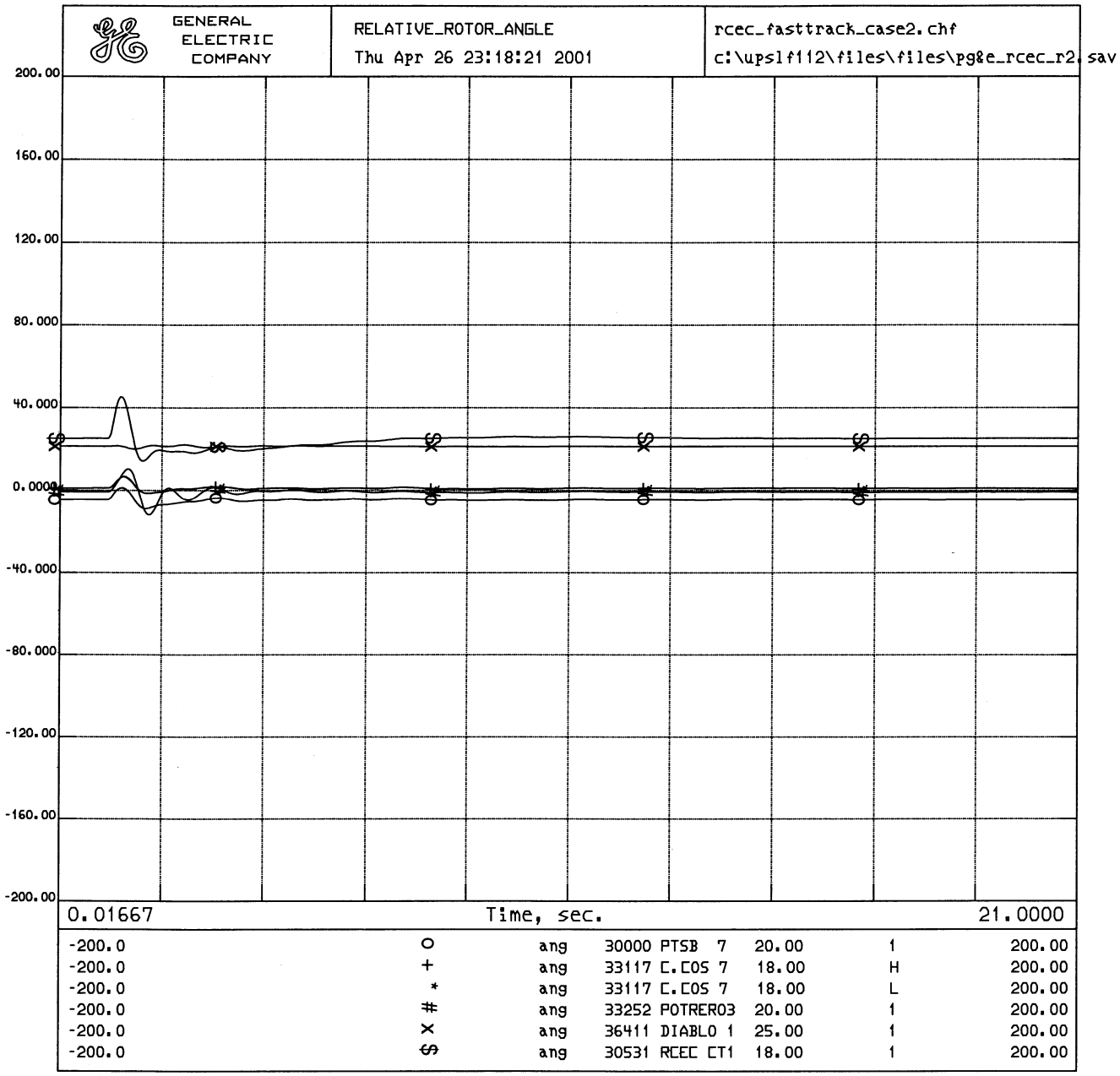
0.5000	#	vbug	36411 DIABLO 1	25.00	1	1.2000
0.5000	x	vbug	30531 RCEC CT1	18.00	1	1.2000

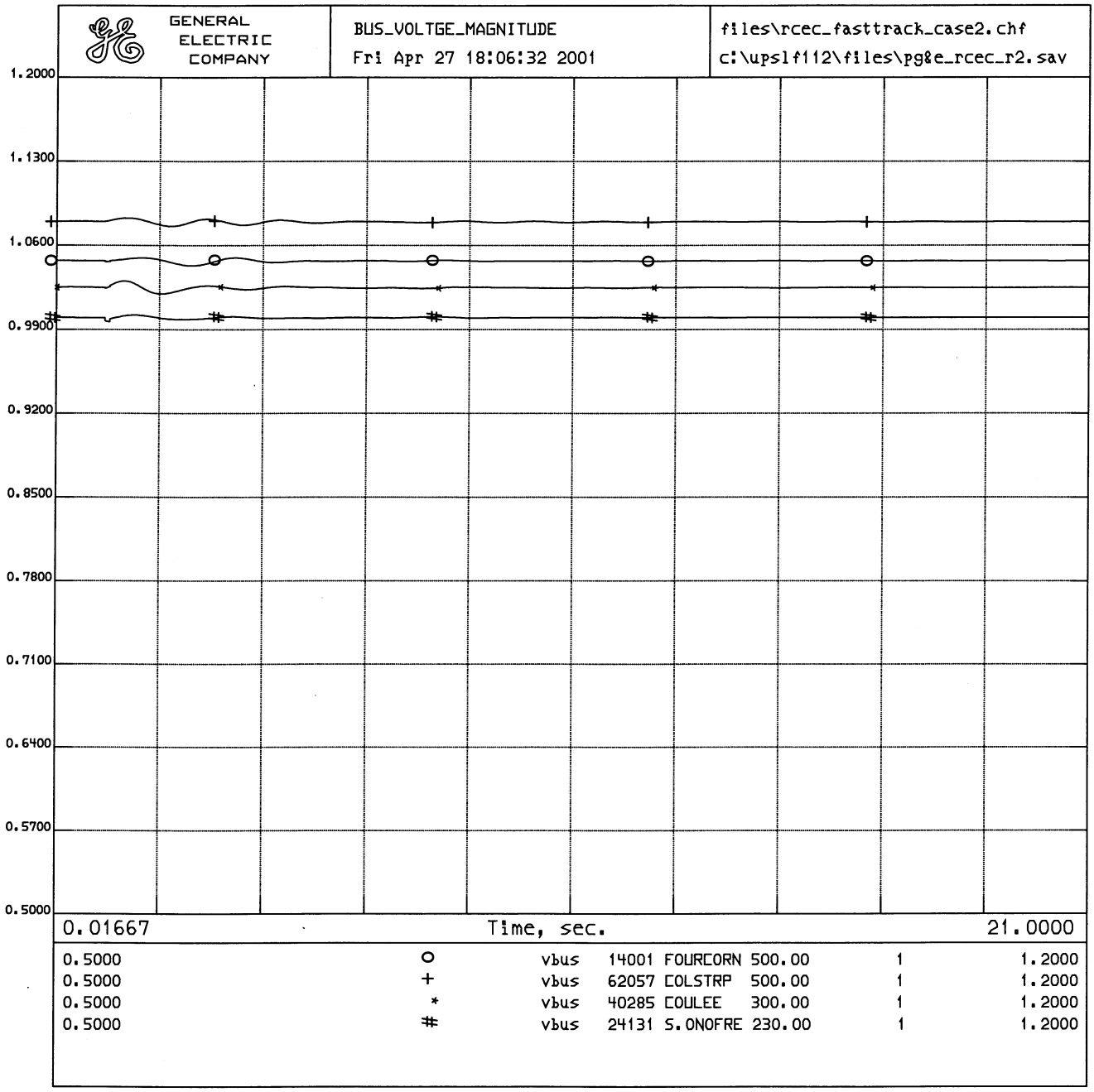
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



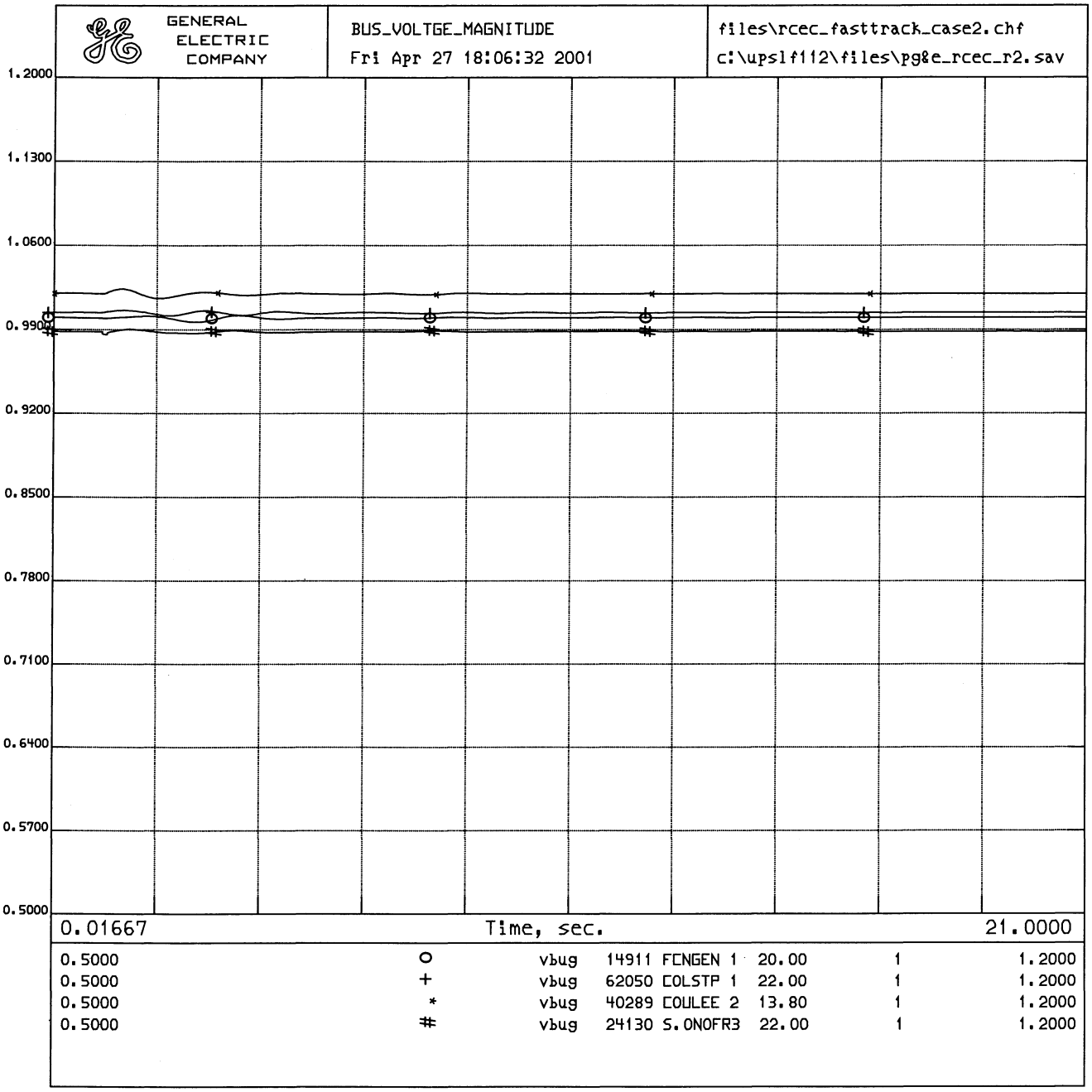
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



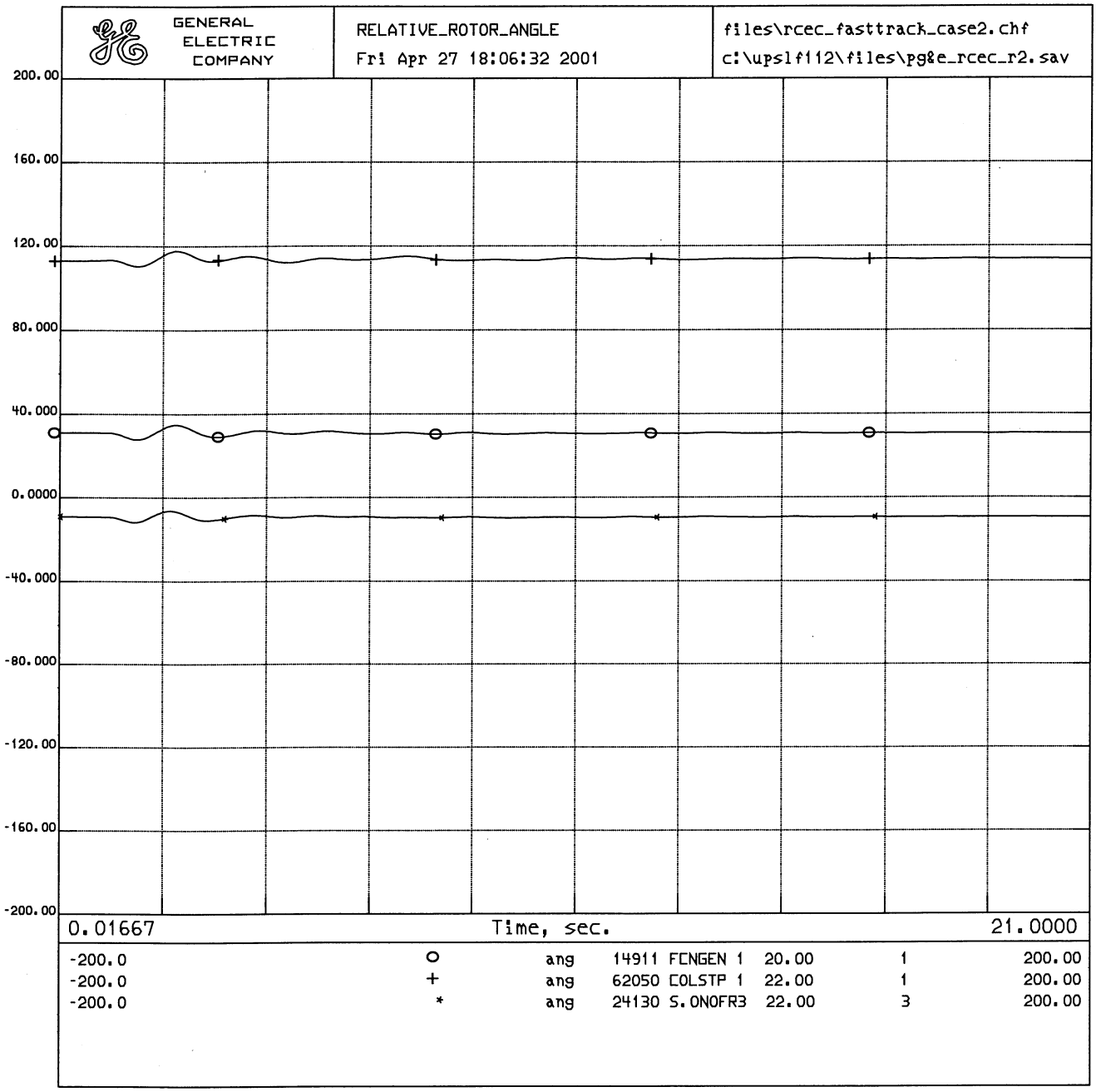
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

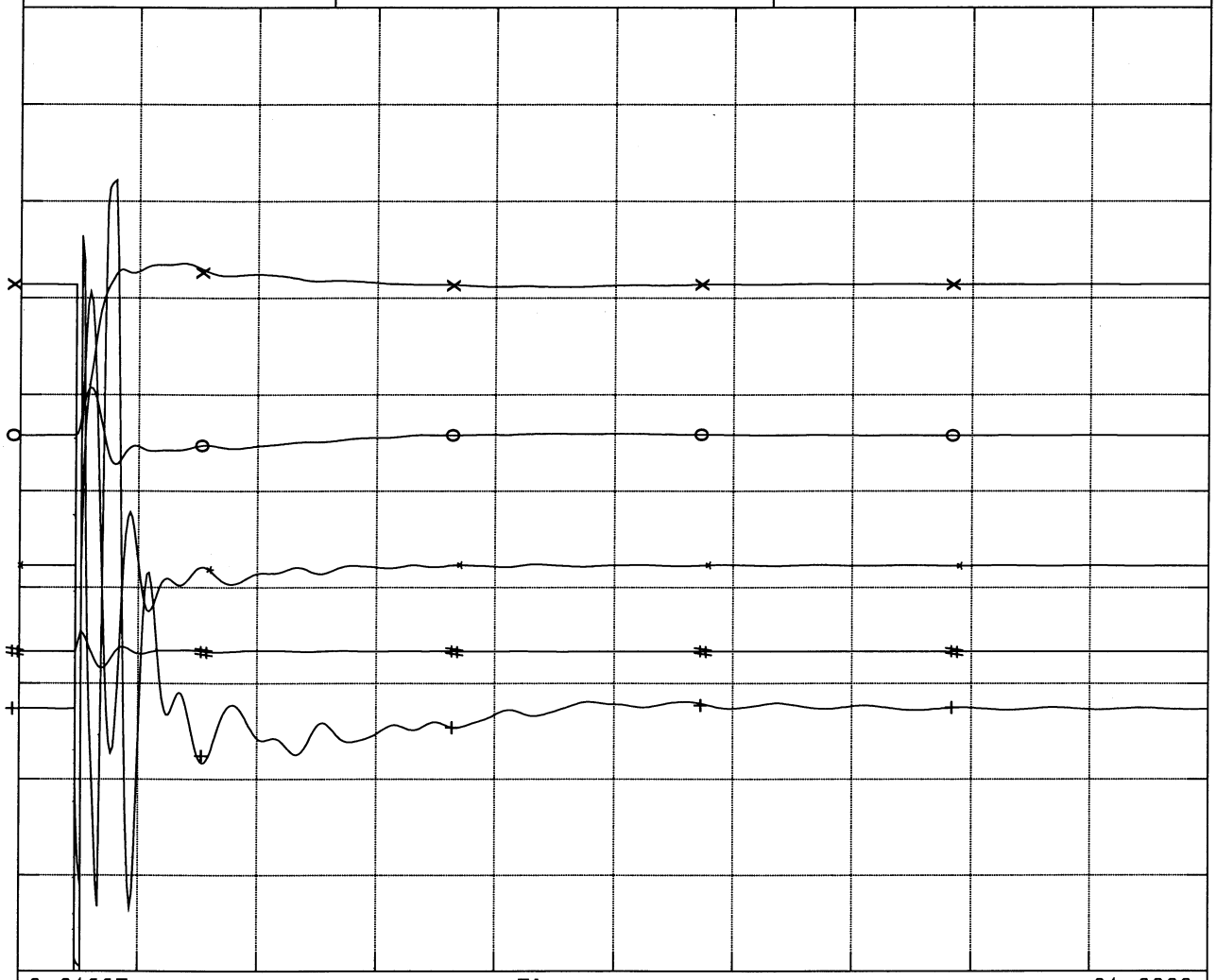
developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY	RCEC Sat Apr 28 18:58:09 2001	rcec_fasttrack_case3.chf c:\upslf112\files\files\pg&e_rcec_r2.sav



0.01667 Time, sec. 21.0000

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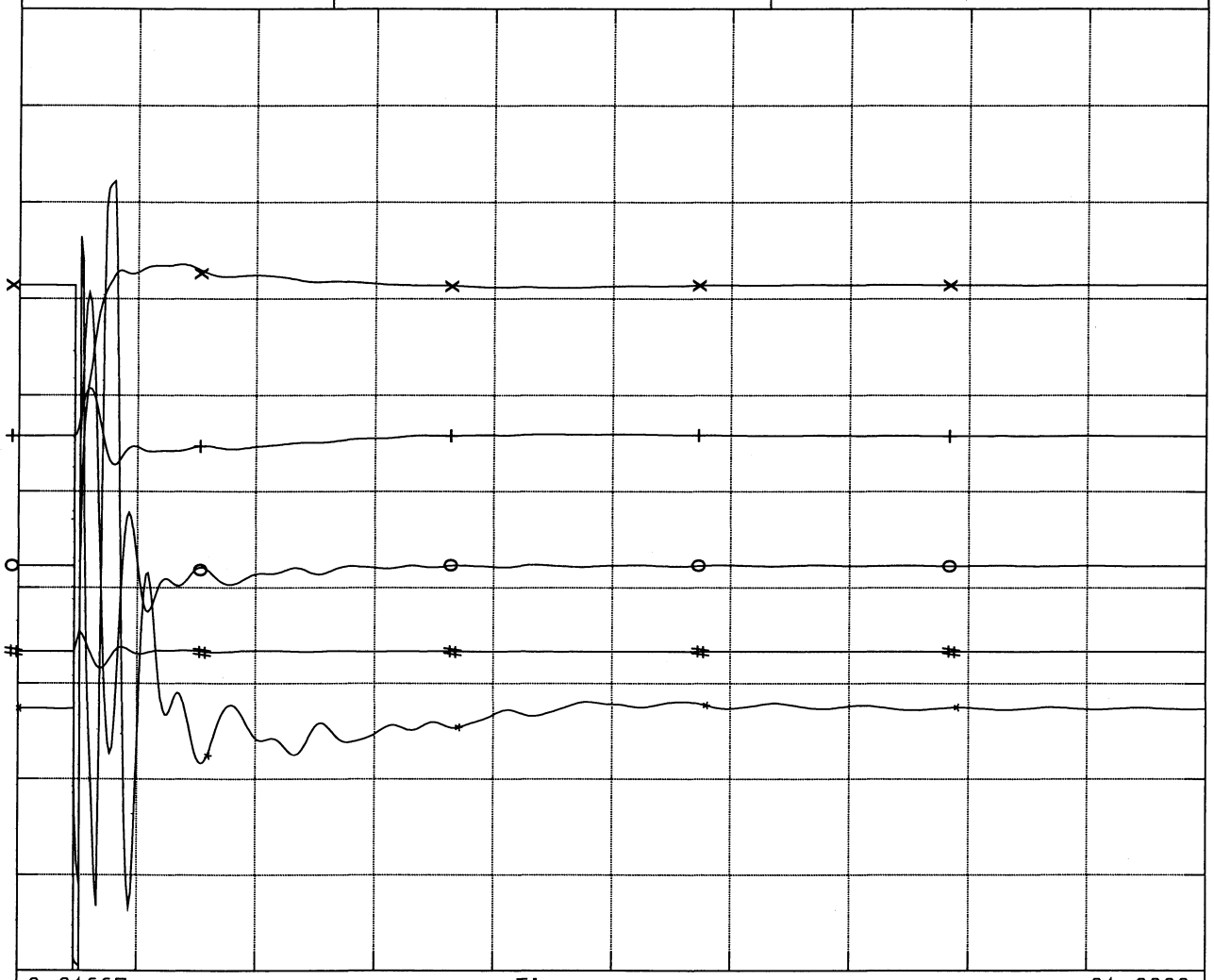
0.0000	*	pg	30531 RCEC CT1	18.00	1	450.00
0.9000	#	spd	30531 RCEC CT1	18.00	1	1.2000
0.5000	x	vbug	30531 RCEC CT1	18.00	1	1.2000

2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY	RCEC Sat Apr 28 18:58:09 2001	rcec_fasttrack_case3.chf c:\upslf112\files\files\pg&e_rcec_r2.sav



0.01667 Time, sec. 21.0000

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-200.0	+	ang	30532	RCEC	CT2	18.00	1	200.00
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0.9000	#	spd	30532	RCEC	CT2	18.00	1	1.2000
0.5000	x	vbug	30532	RCEC	CT2	18.00	1	1.2000

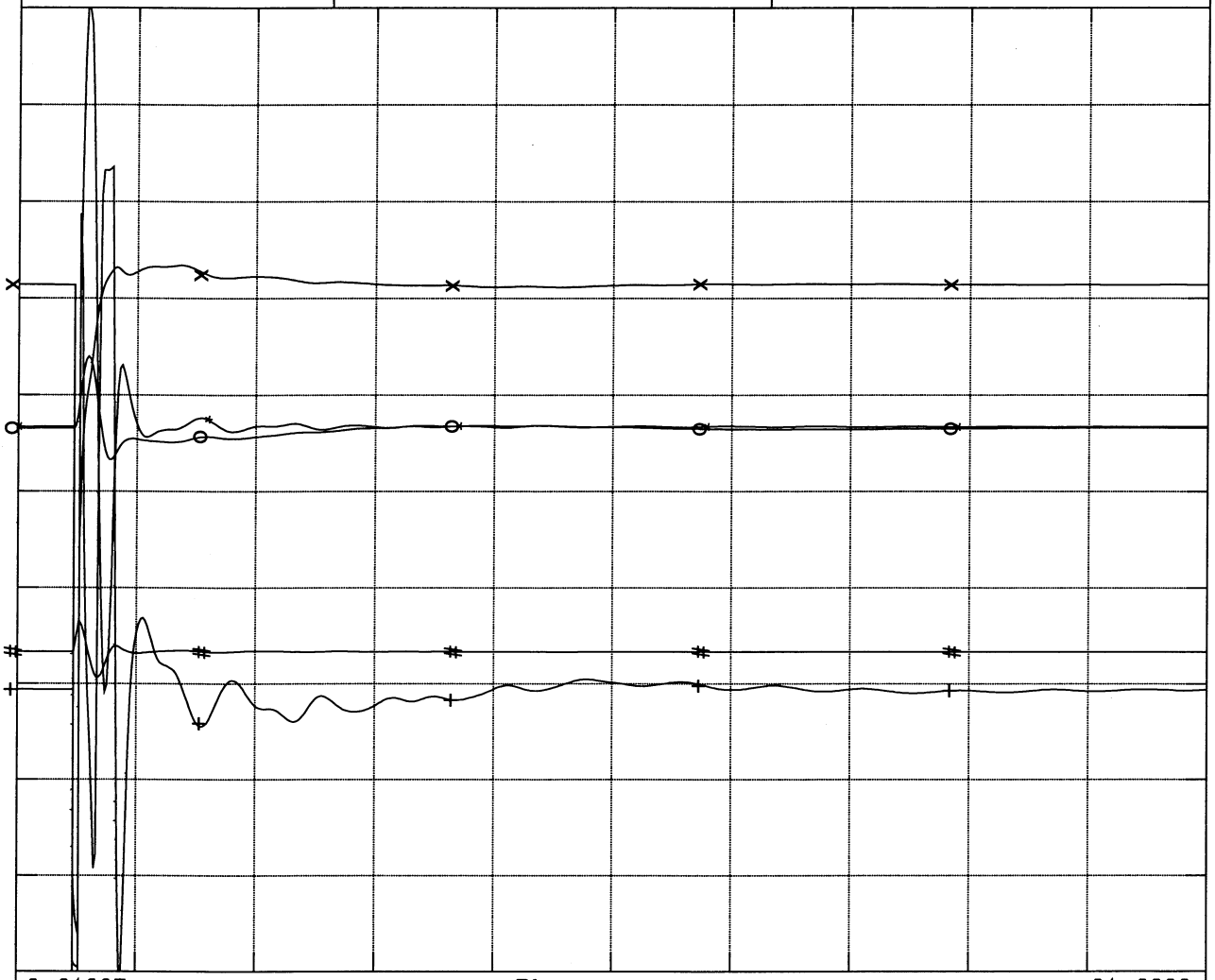
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY

RCEC
Sat Apr 28 18:58:10 2001

rcec_fasttrack_case3.chf
c:\upslf112\files\files\pg&e_rcec_r2.sav



0.01667 Time, sec. 21.0000

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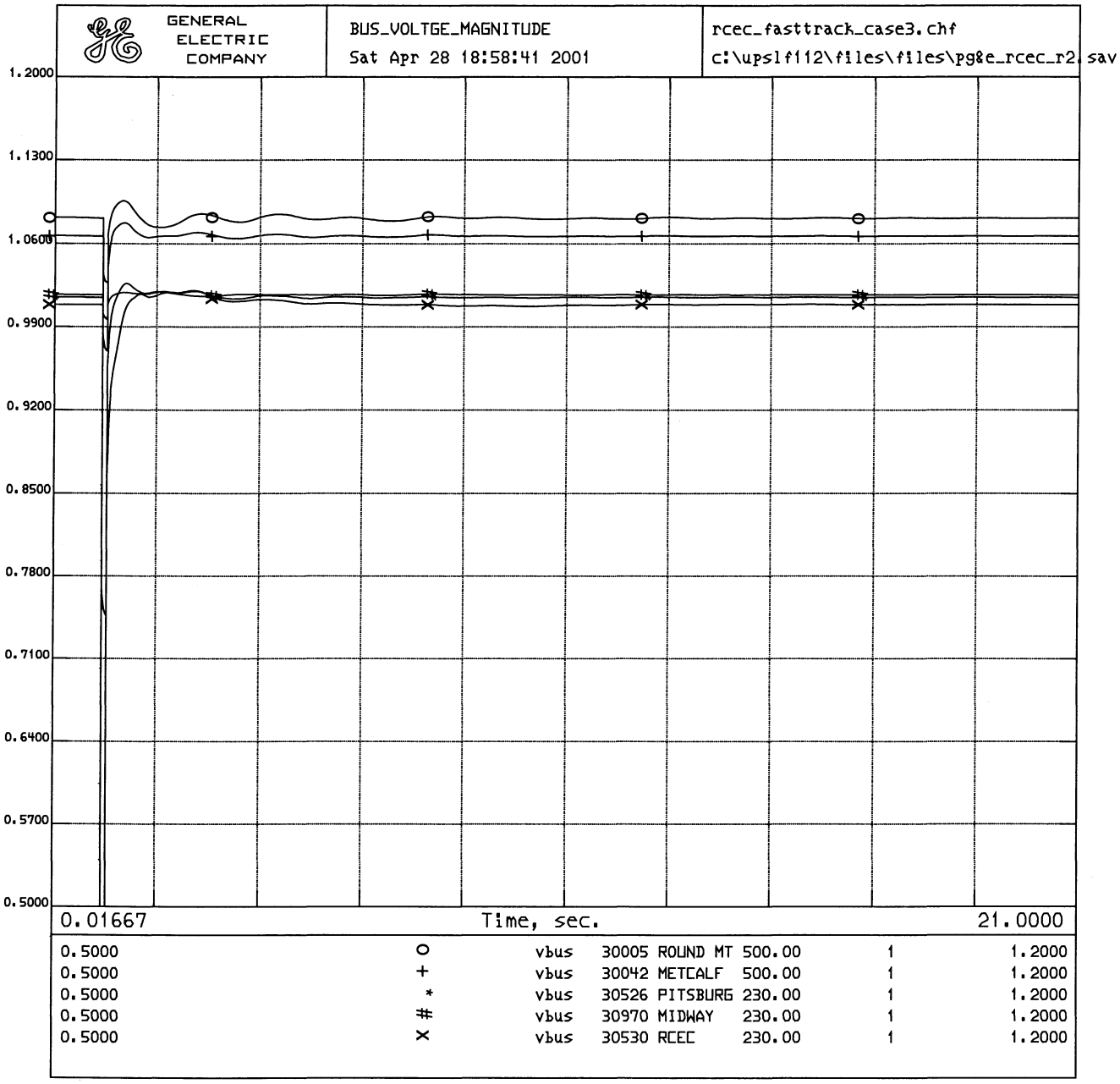
0.0000	*	pg	30533 RCEC ST1	18.00	1	450.00
0.9000	#	spd	30533 RCEC ST1	18.00	1	1.2000
0.5000	x	vbug	30533 RCEC ST1	18.00	1	1.2000

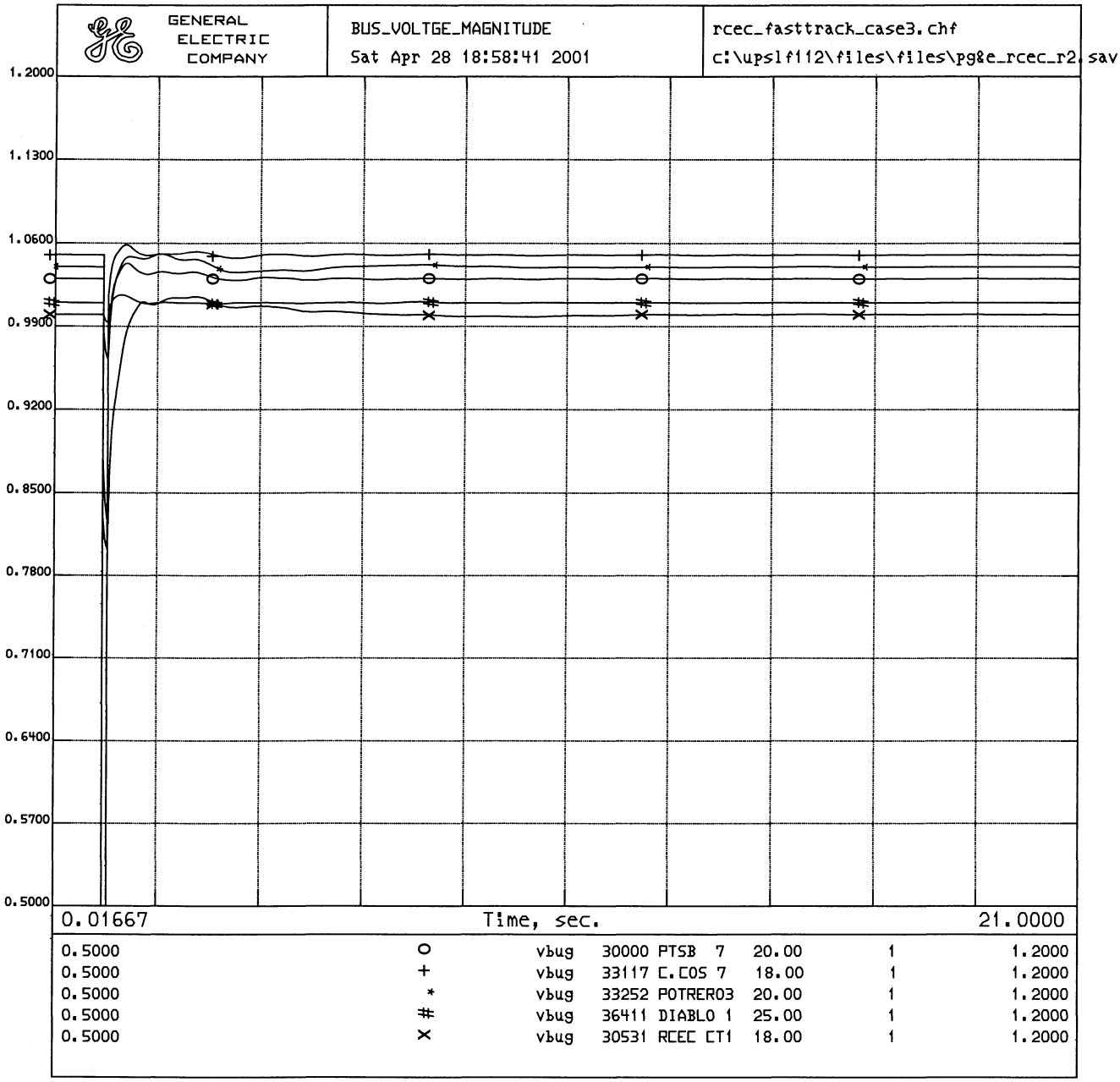
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



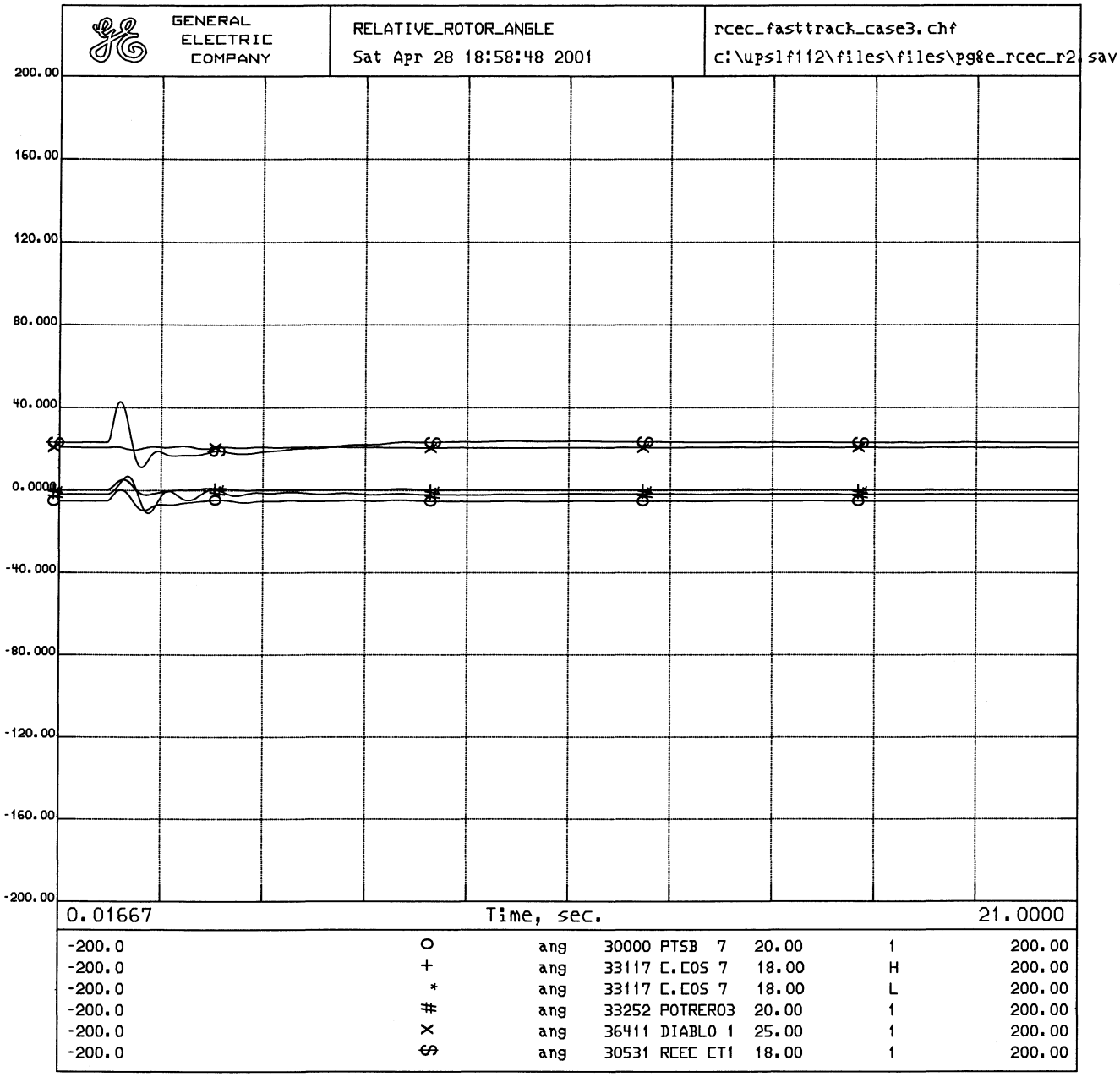
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

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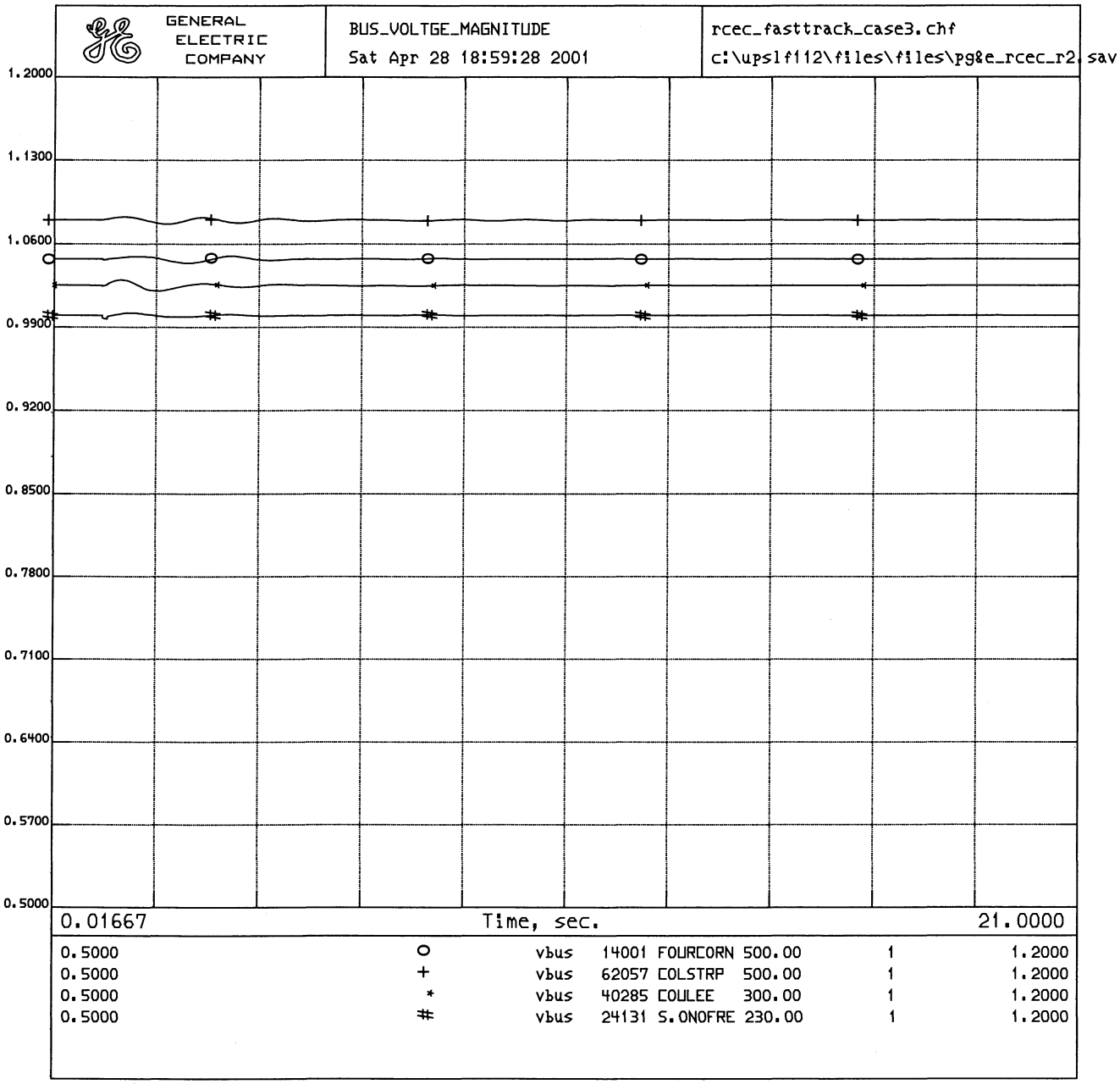
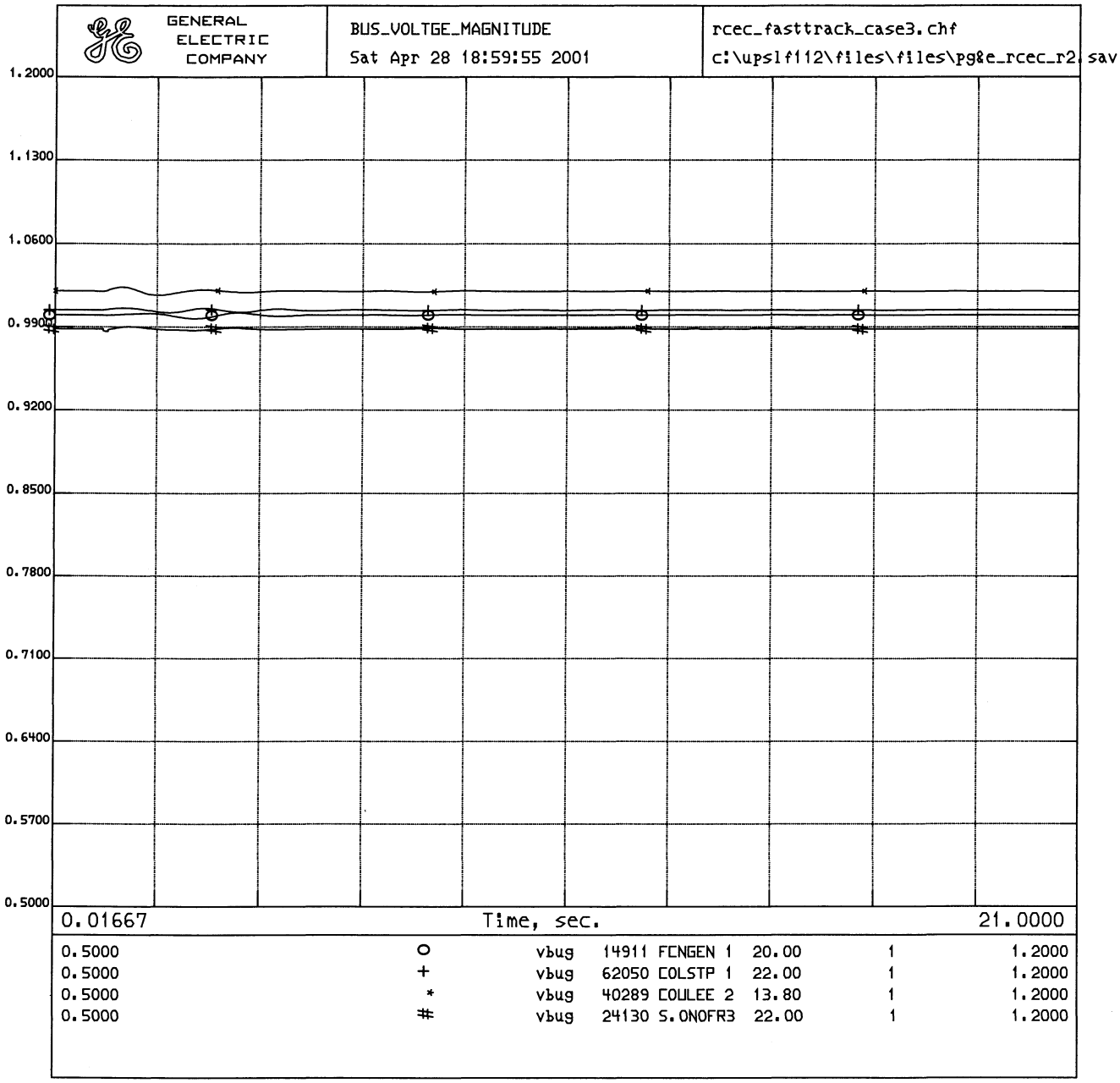


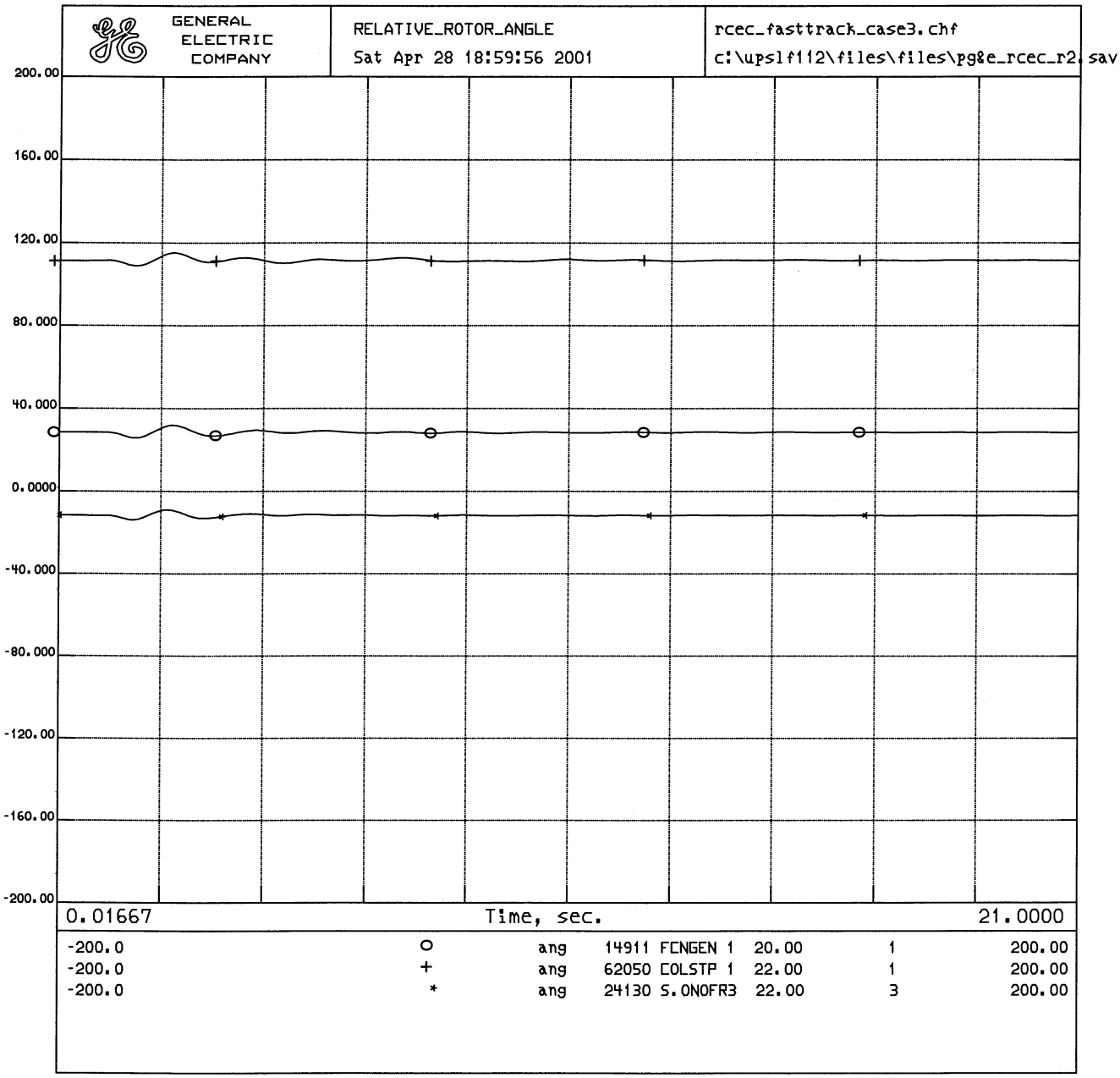
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



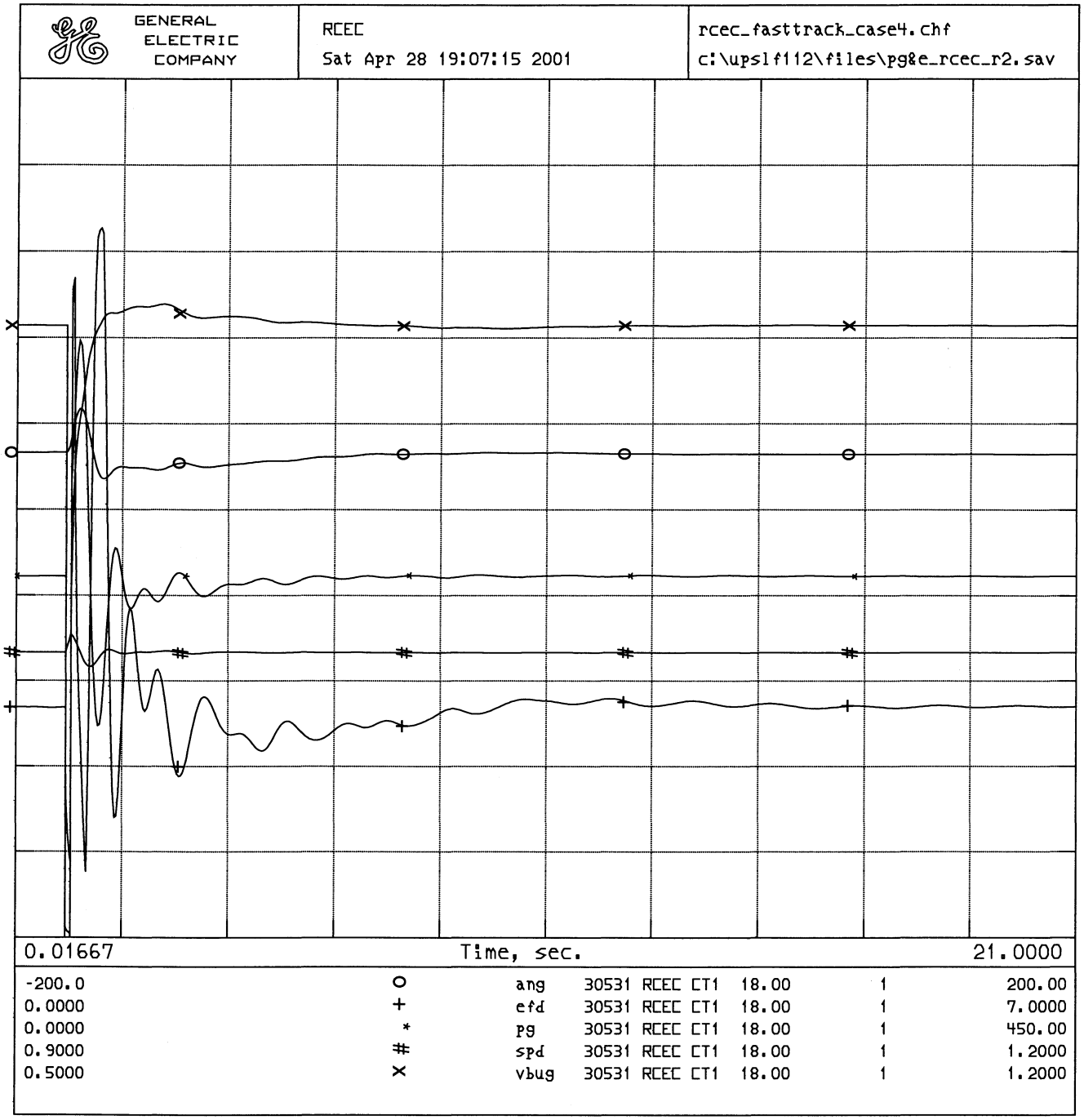
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



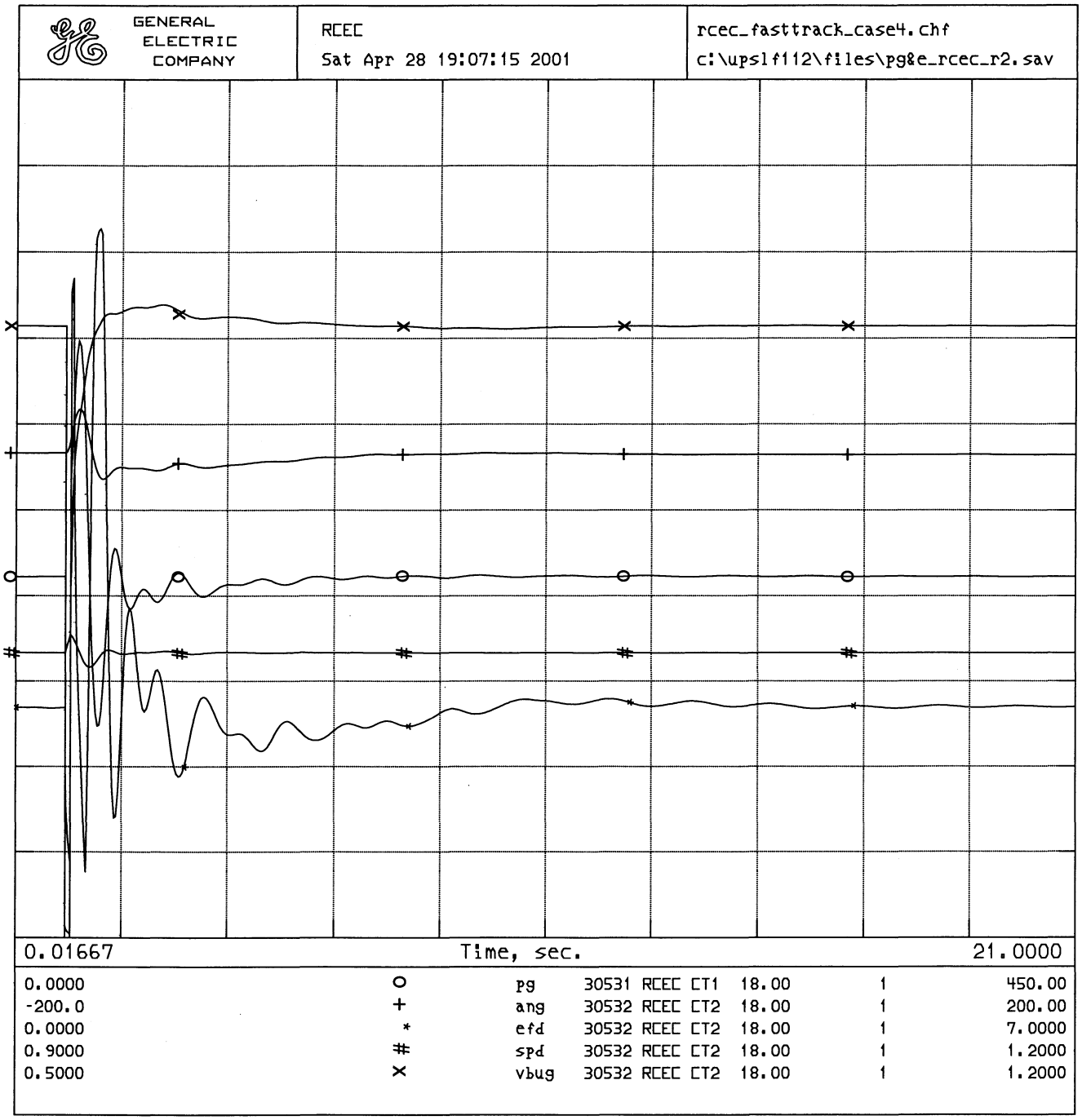
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



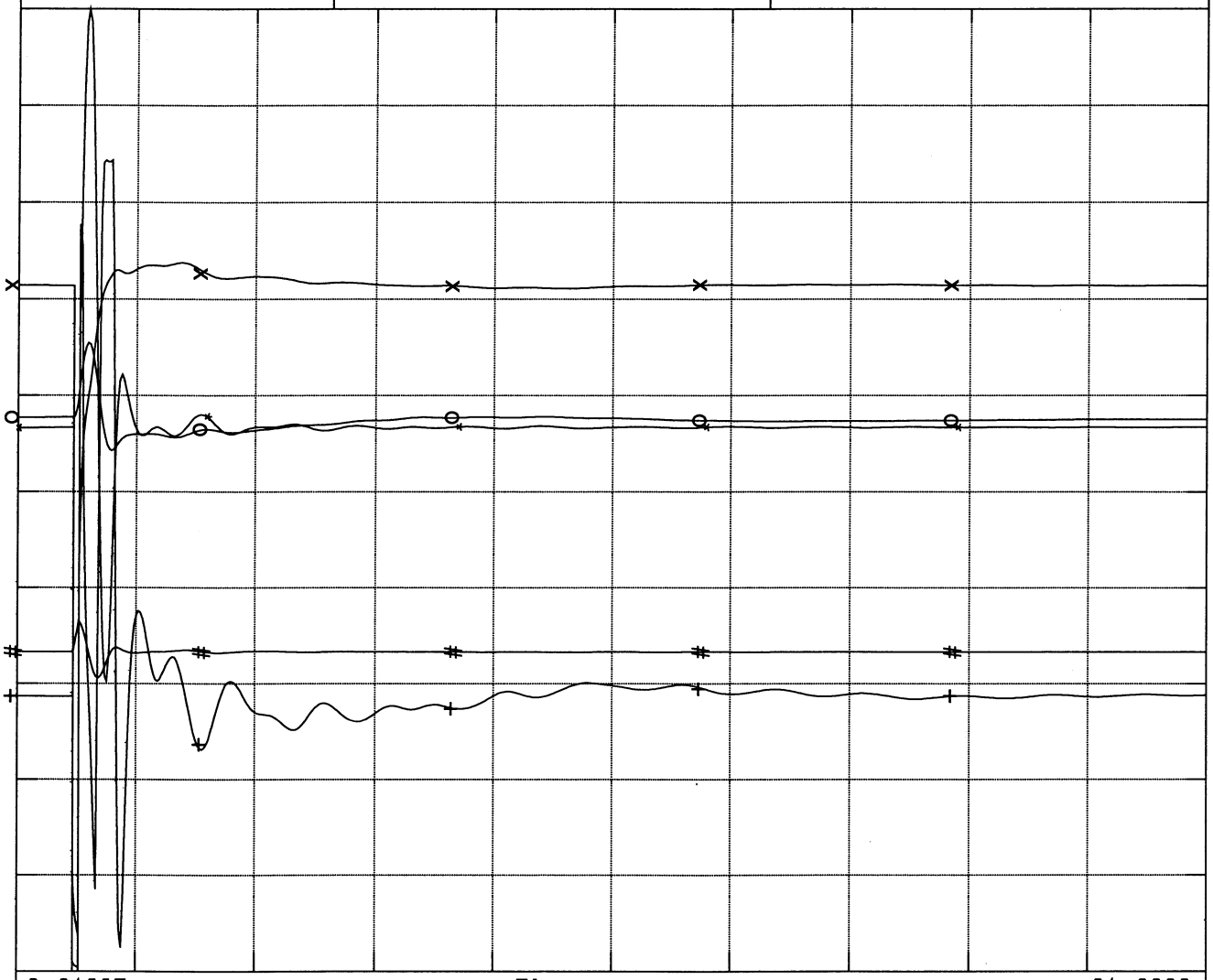
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY

RCEC
Sat Apr 28 19:07:15 2001

rcec_fasttrack_case4.chf
c:\upslf112\files\pg&e_rcec_r2.sav



0.01667 Time, sec. 21.0000

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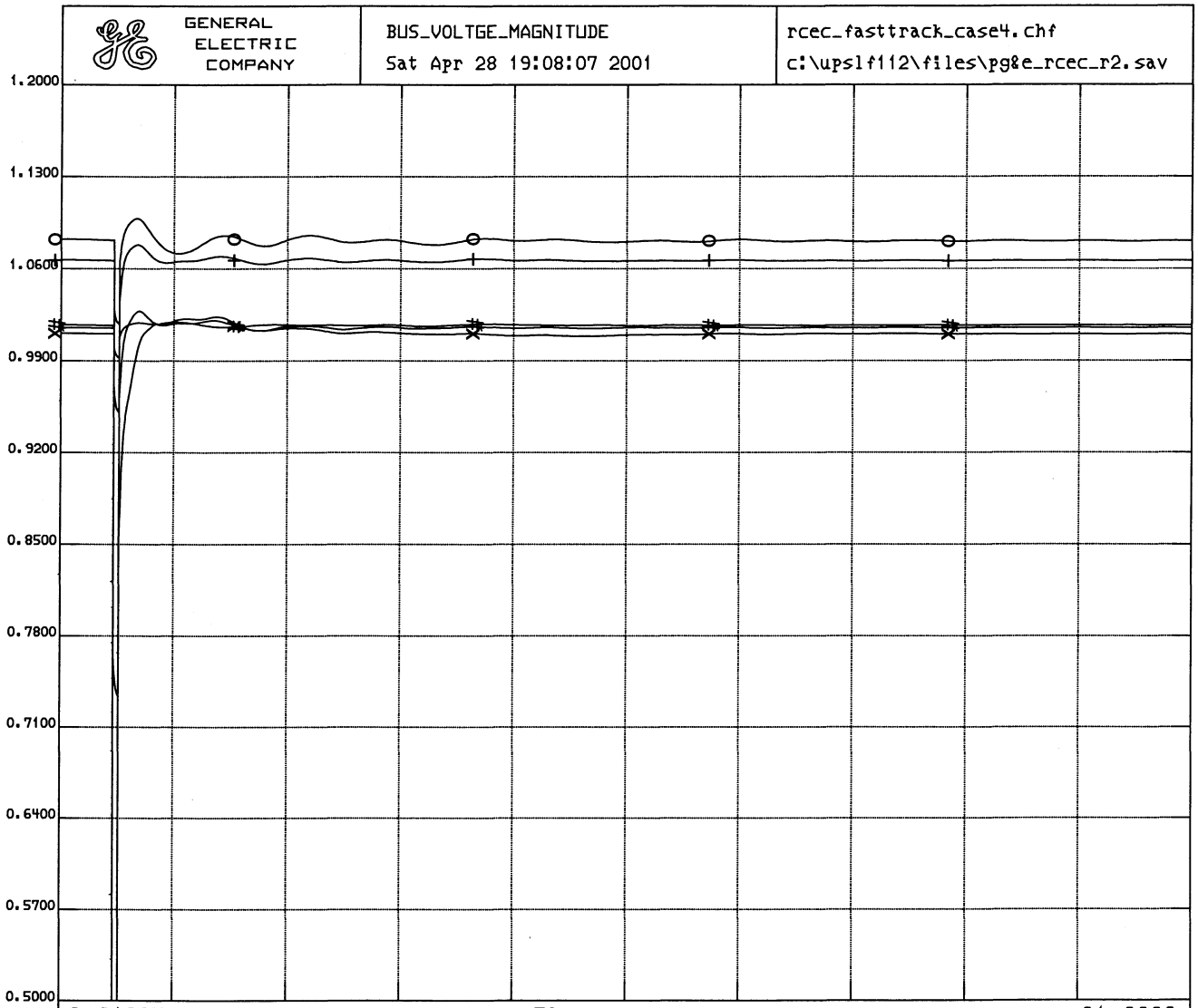
0.0000	+	efd	30533 RCEC ST1	18.00	1	7.0000
0.0000	*	pg	30533 RCEC ST1	18.00	1	450.00
0.9000	#	spd	30533 RCEC ST1	18.00	1	1.2000
0.5000	x	vbug	30533 RCEC ST1	18.00	1	1.2000

2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



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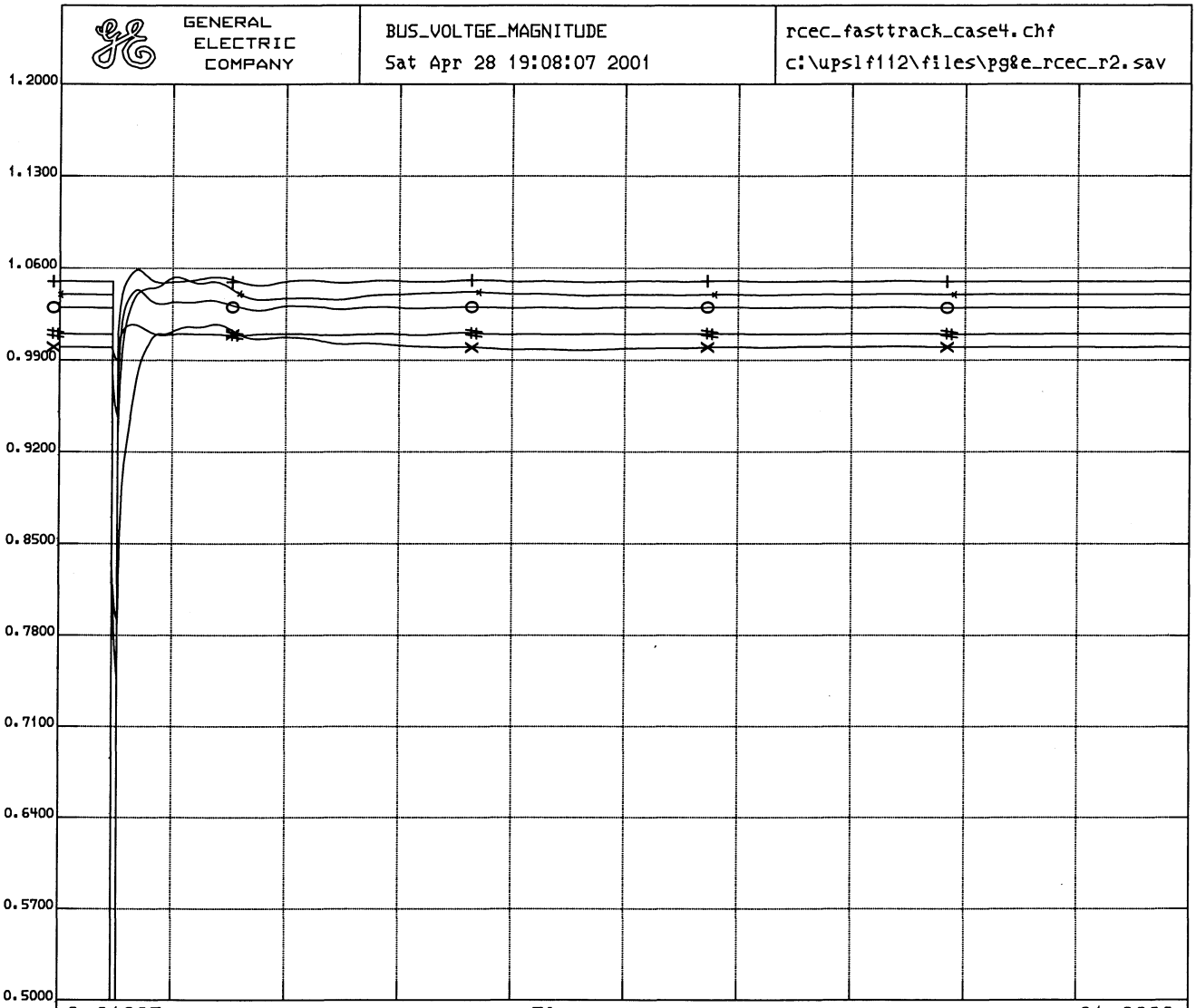
0.5000	+	vbus	30042 METCALF	500.00	1	1.2000
0.5000	*	vbus	30526 PITSBURG	230.00	1	1.2000
0.5000	#	vbus	30970 MIDWAY	230.00	1	1.2000
0.5000	x	vbus	30530 RCEC	230.00	1	1.2000

2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



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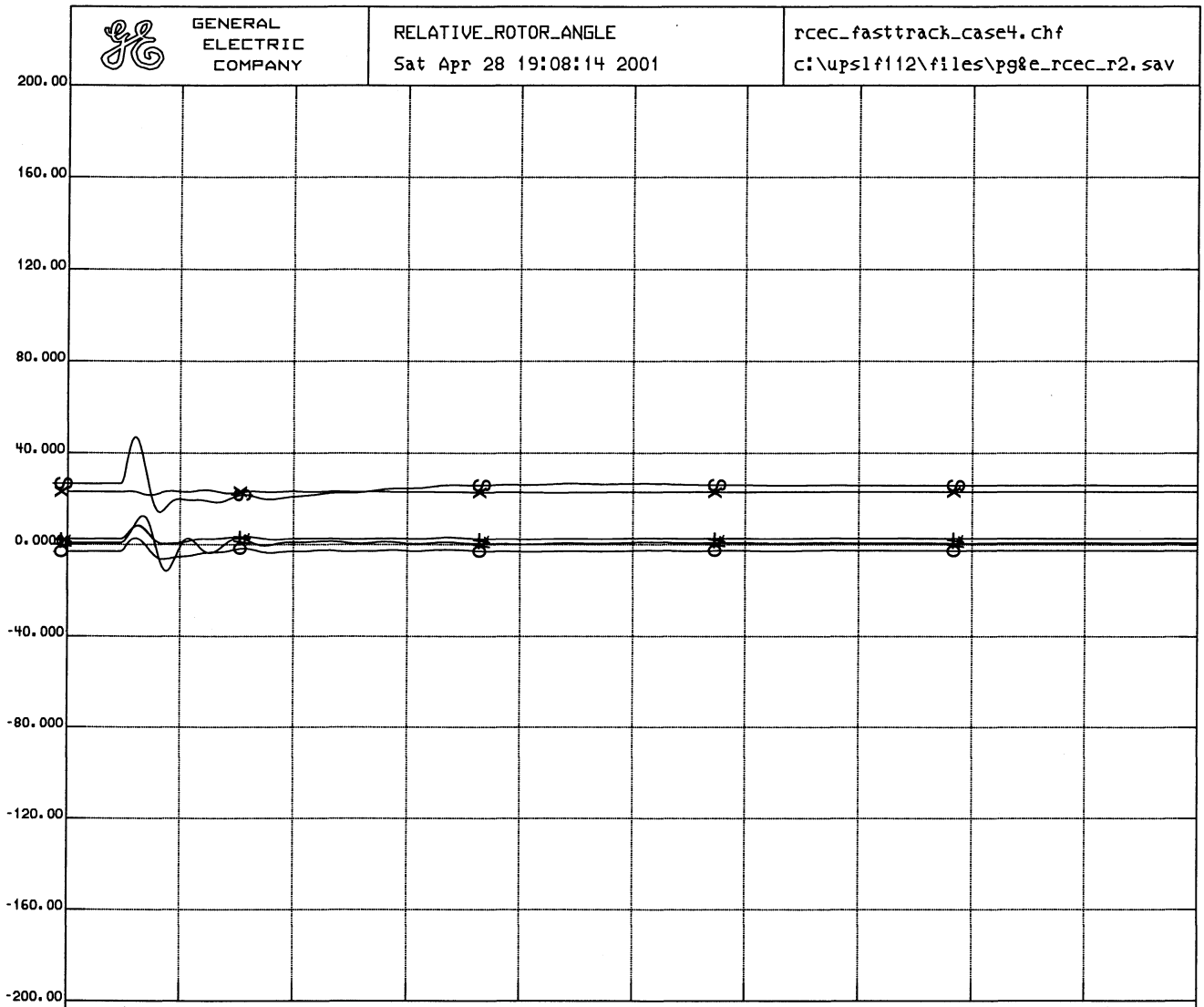
0.5000	+	vbug	33117 E.COS 7	18.00	1	1.2000
0.5000	*	vbug	33252 POTRERO3	20.00	1	1.2000
0.5000	#	vbug	36411 DIABLO 1	25.00	1	1.2000
0.5000	x	vbug	30531 RCEC CT1	18.00	1	1.2000

2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

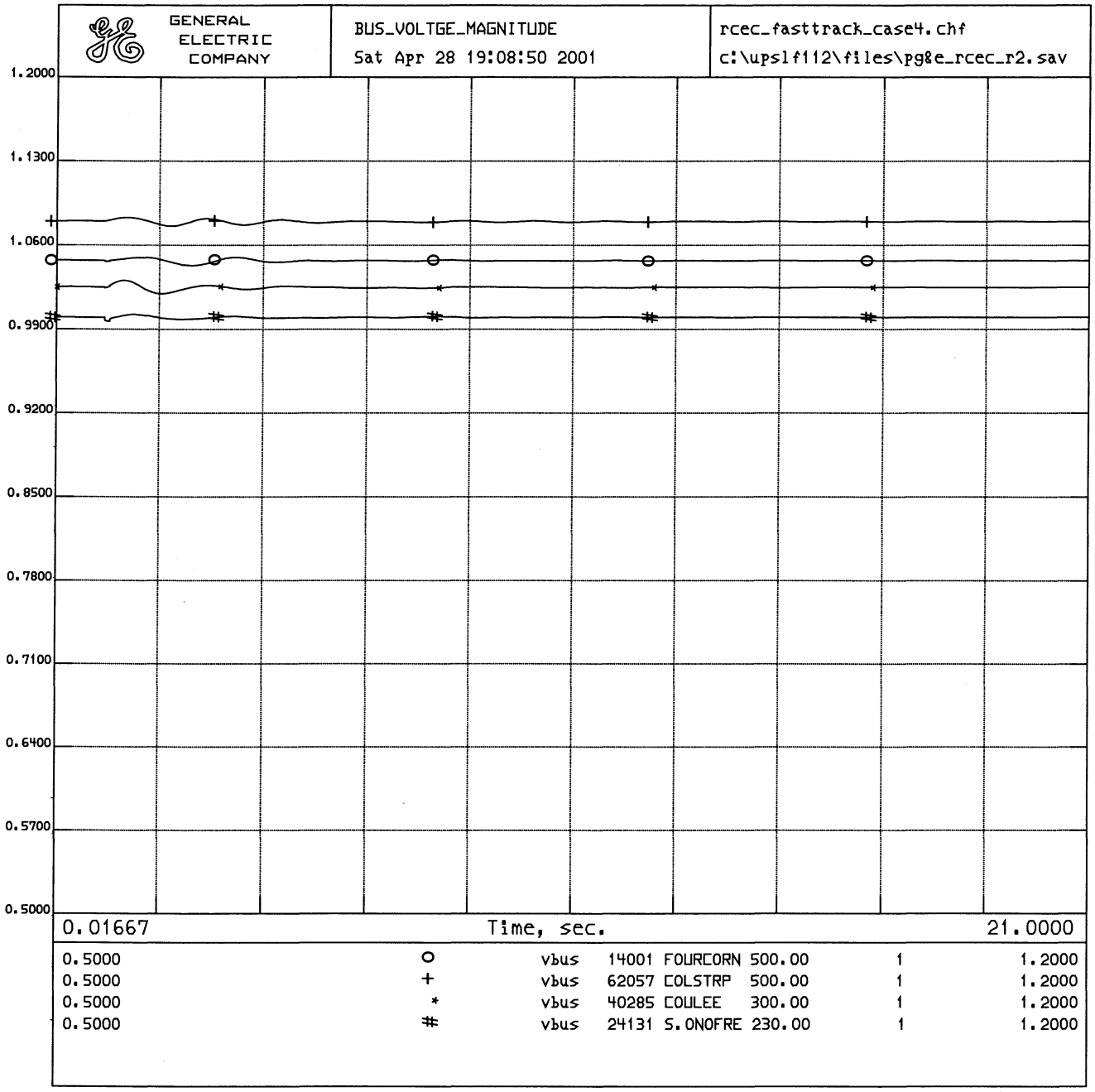
developed from a00sum2001.sav case, inserted smud detail into pg&e case.



-200.0	o	ang	30000 PTSB 7	20.00	1		200.00
-200.0	+	ang	33117 E.COS 7	18.00	H		200.00
-200.0	*	ang	33117 E.COS 7	18.00	L		200.00
-200.0	#	ang	33252 POTRERO3	20.00	1		200.00
-200.0	×	ang	36411 DIABLO 1	25.00	1		200.00
-200.0	⊗	ang	30531 RCEC CT1	18.00	1		200.00

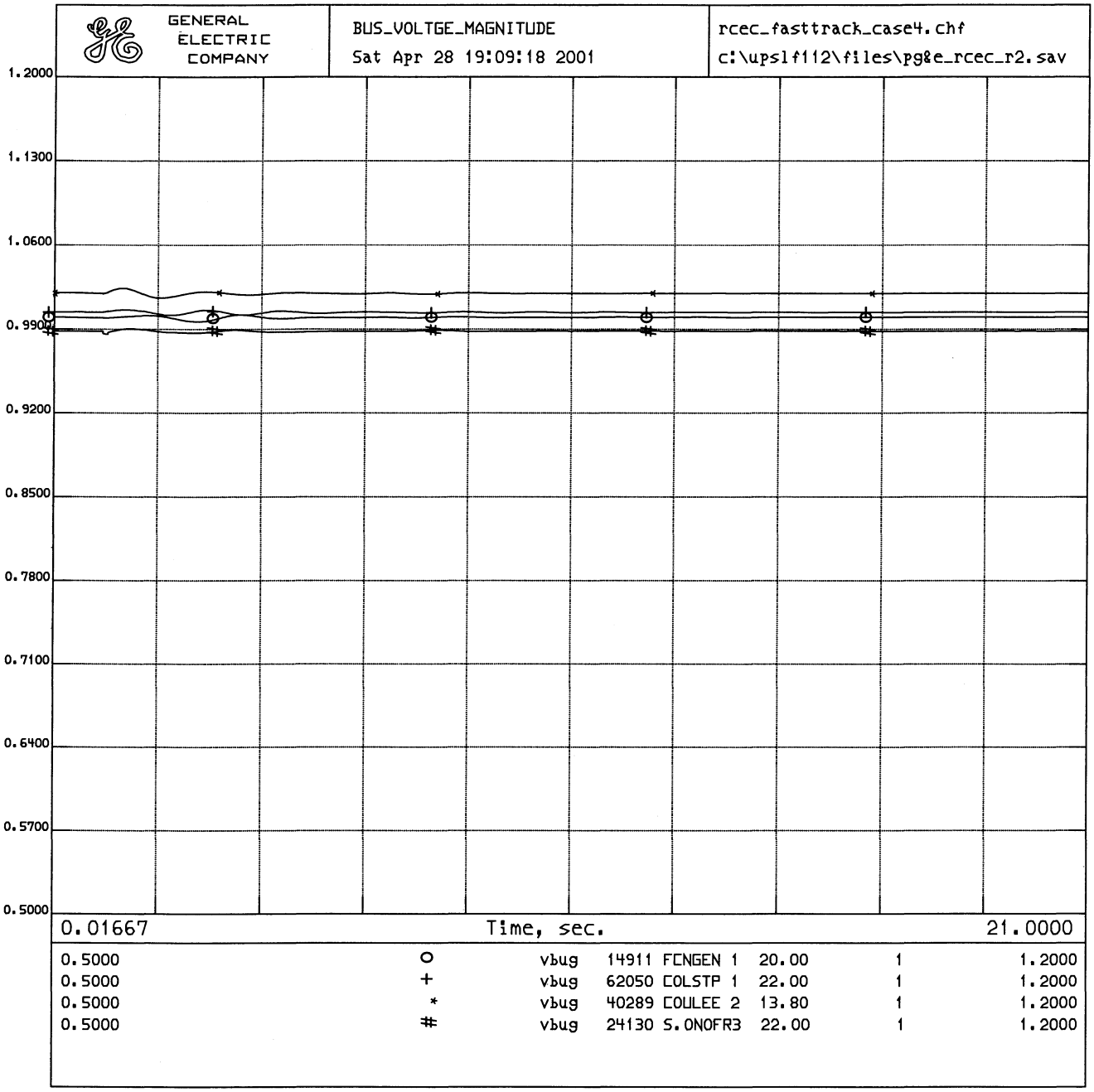
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



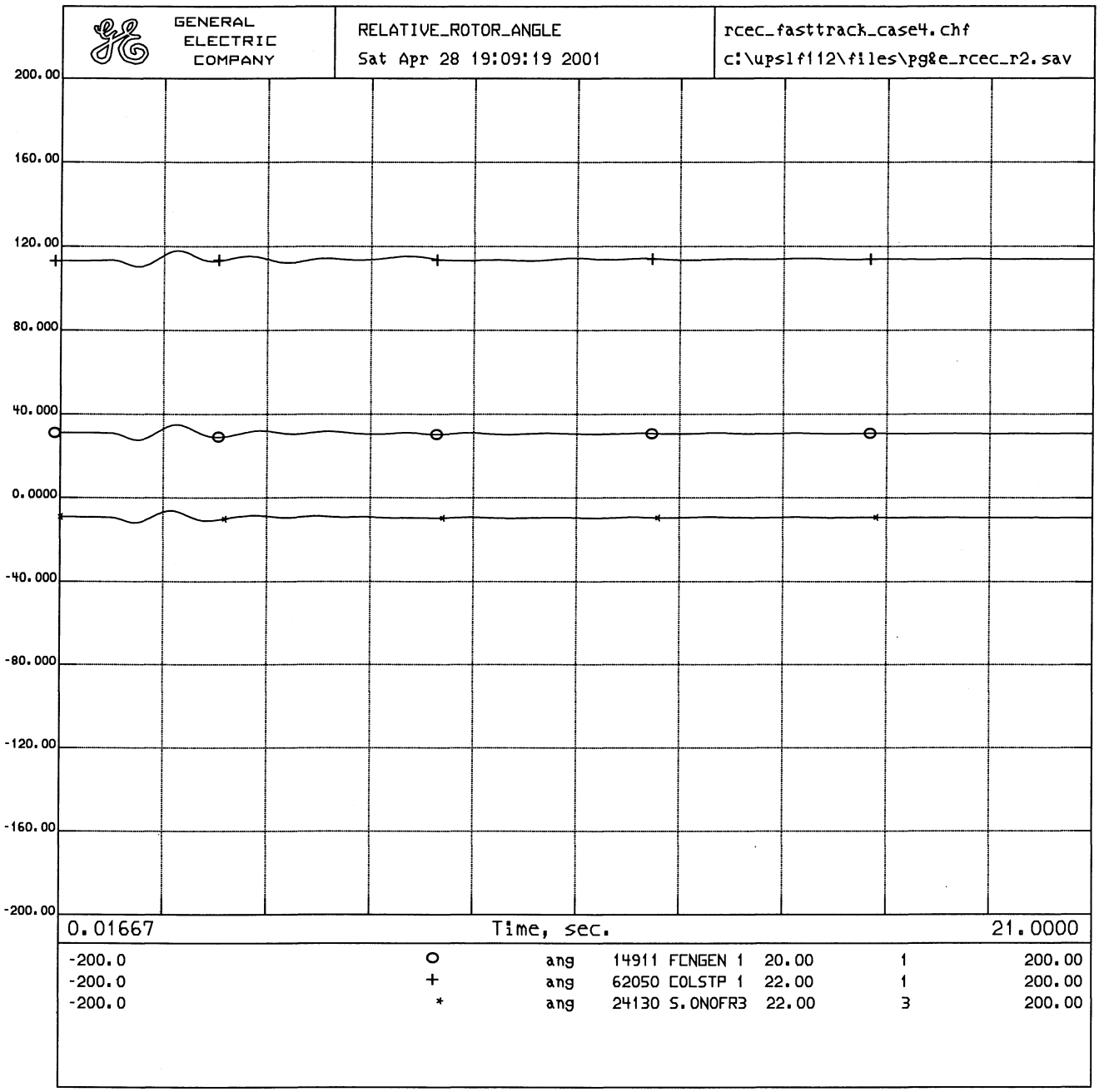
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

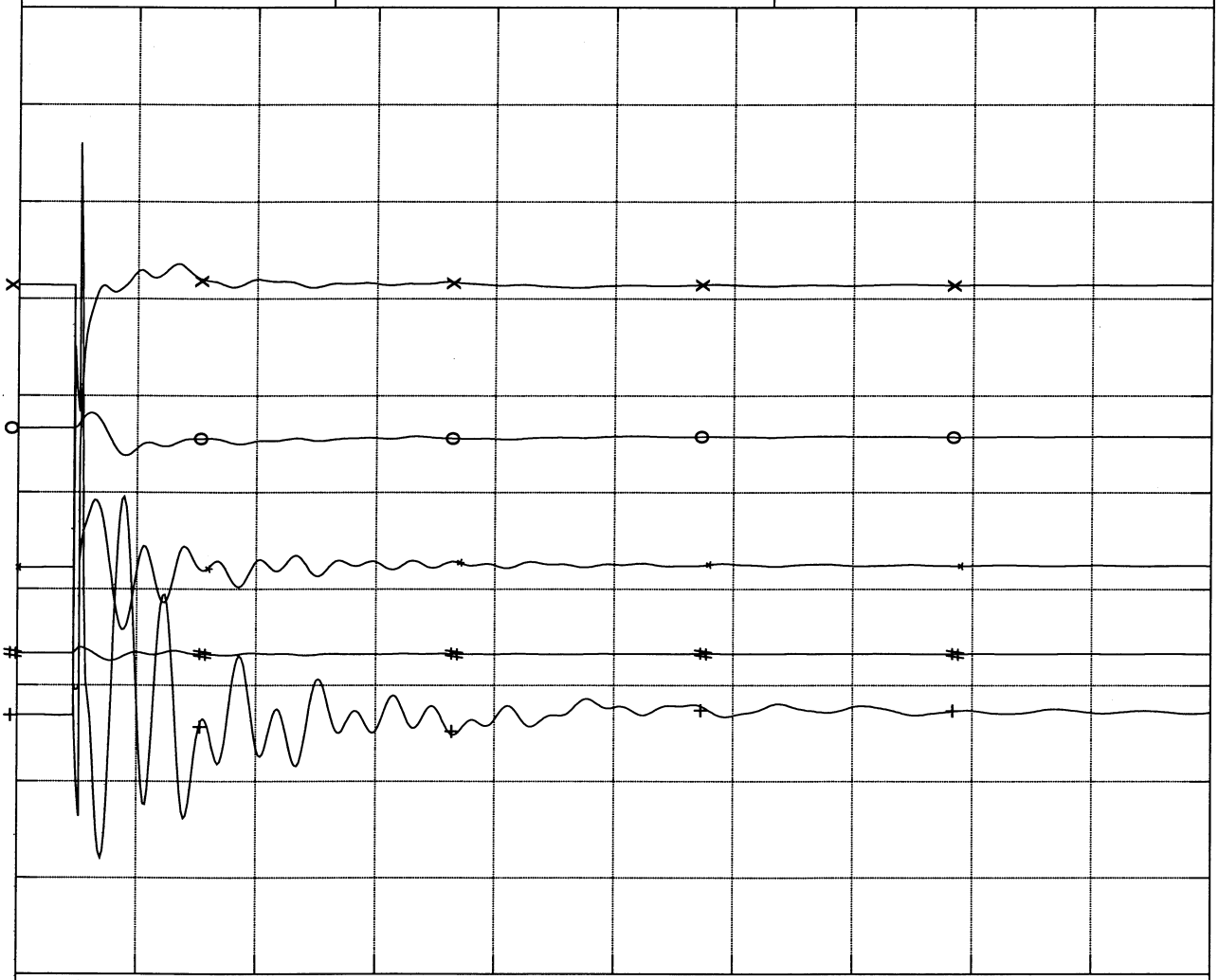
developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY	RCEC Sun Apr 29 15:19:56 2001	RCEC_fasttrack_case5.chf c:\upslf112\files\files\pg&e_rcec_r2.sav



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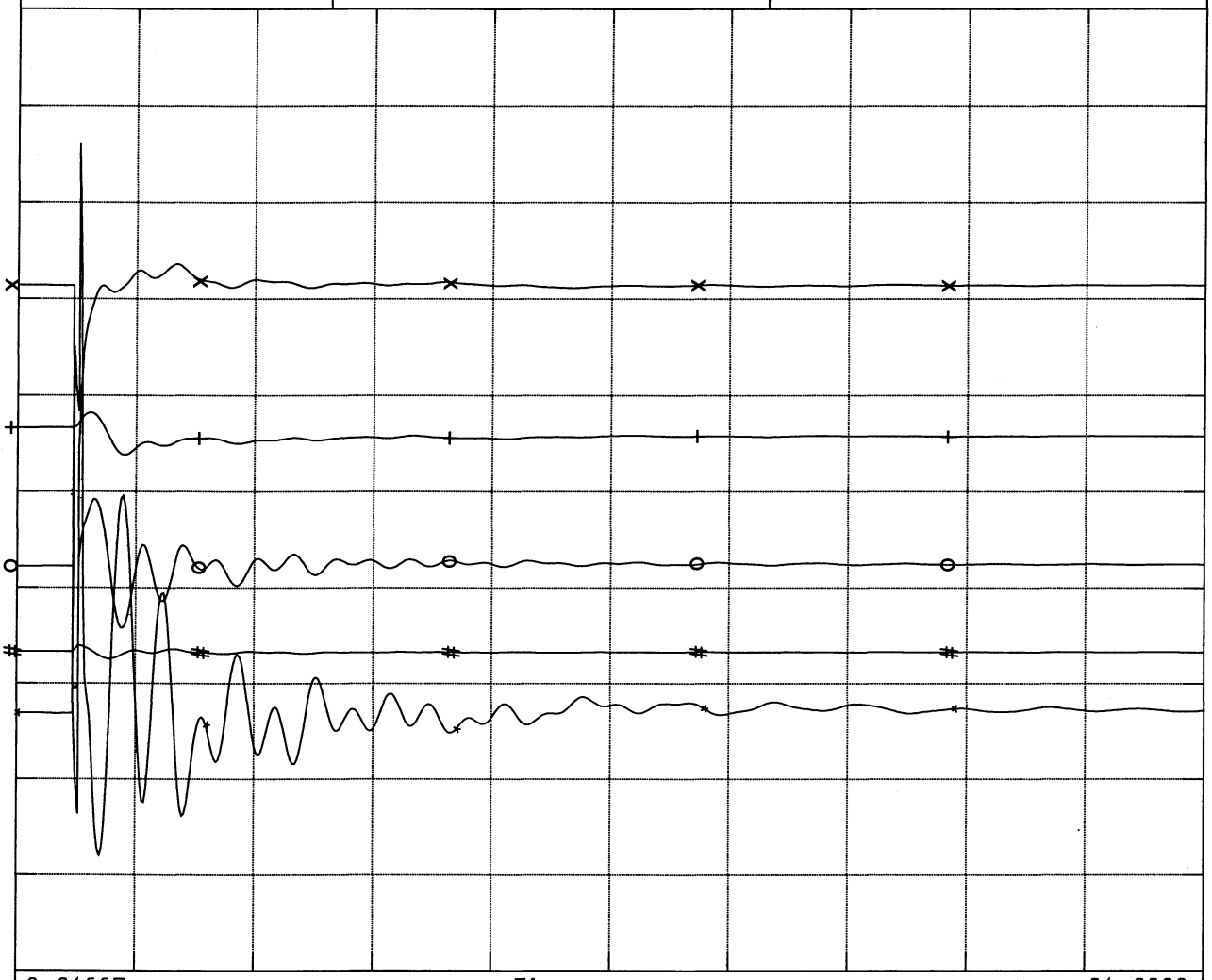
0.0000	+	efd	30531	RCEC	CT1	18.00	1	7.0000
0.0000	*	pg	30531	RCEC	CT1	18.00	1	450.00
0.9000	#	spd	30531	RCEC	CT1	18.00	1	1.2000
0.5000	x	vbug	30531	RCEC	CT1	18.00	1	1.2000

2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY	RCEC Sun Apr 29 15:20:05 2001	RCEC_fasttrack_case5.chf c:\upslf112\files\files\pg&e_rcec_r2.sav



0.01667 Time, sec. 21.0000

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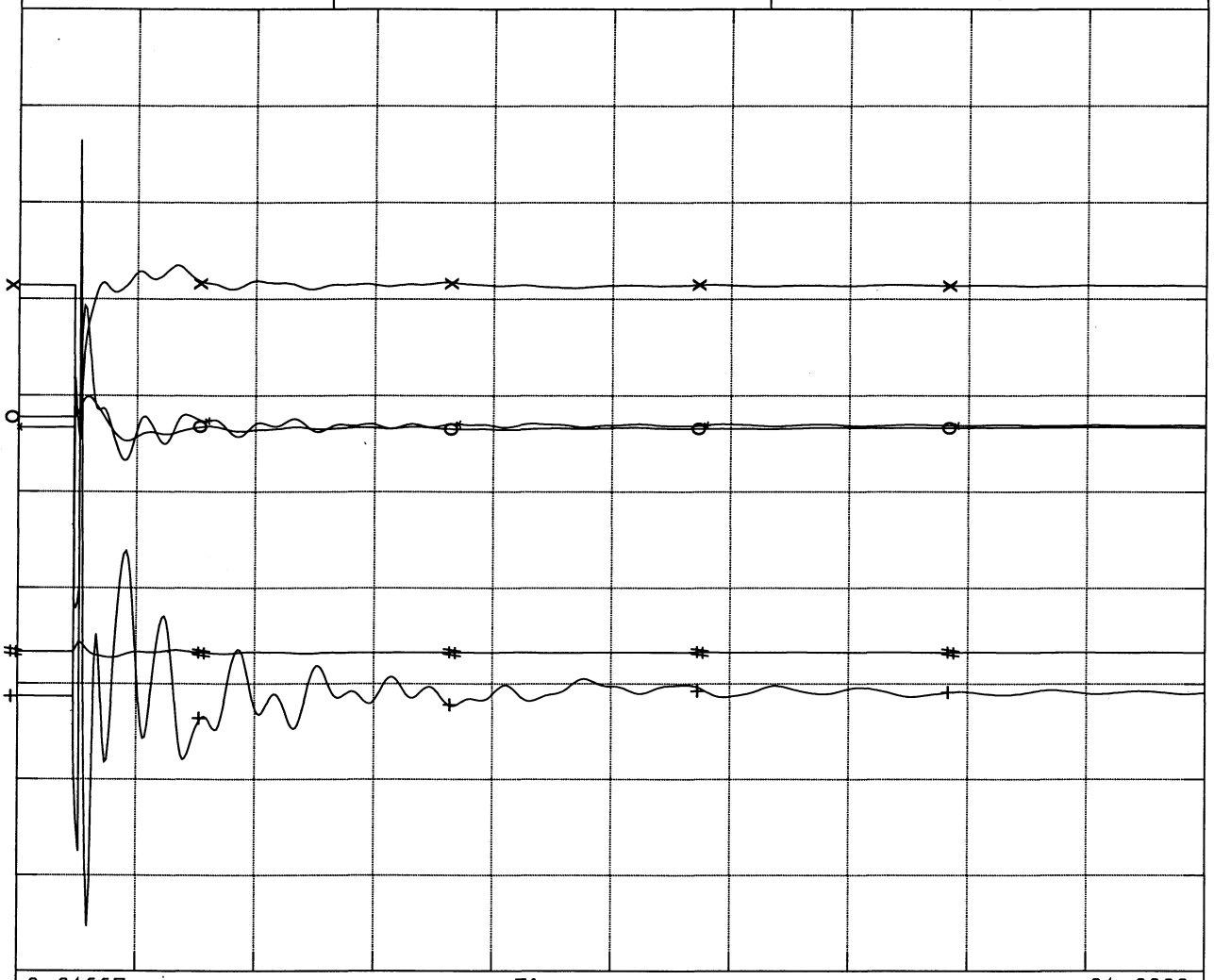
0.9000	#	spd	30532	RCEC	CT2	18.00	1	1.2000
0.5000	x	vbug	30532	RCEC	CT2	18.00	1	1.2000

2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

GENERAL ELECTRIC COMPANY	RCEC Sun Apr 29 15:20:06 2001	RCEC_fasttrack_case5.chf c:\upslf112\files\files\pg&e_rcec_r2.sav



0.01667 Time, sec. 21.0000

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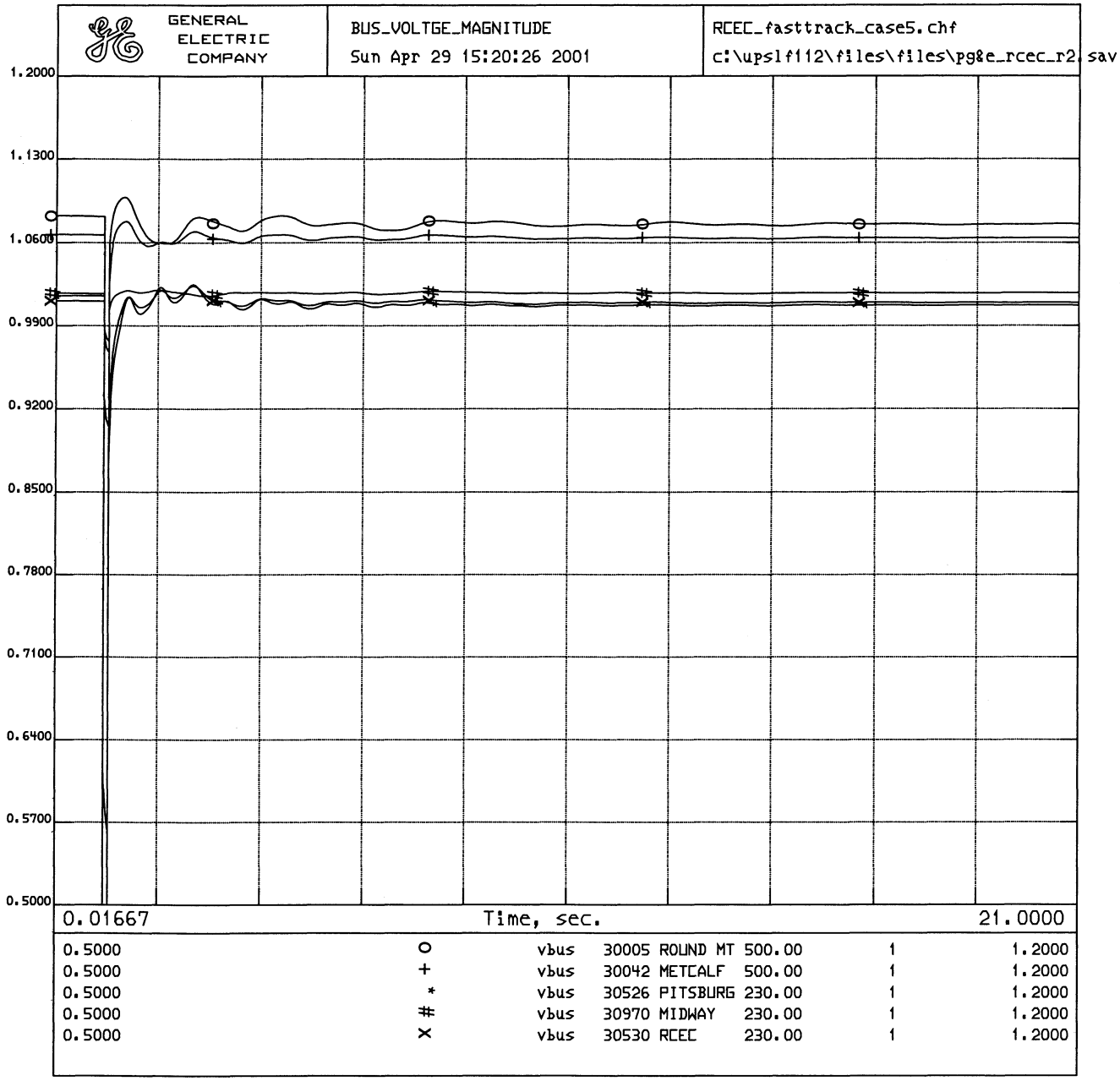
0.0000	*	pg	30533 RCEC ST1	18.00	1	450.00
0.9000	#	spd	30533 RCEC ST1	18.00	1	1.2000
0.5000	x	vbug	30533 RCEC ST1	18.00	1	1.2000

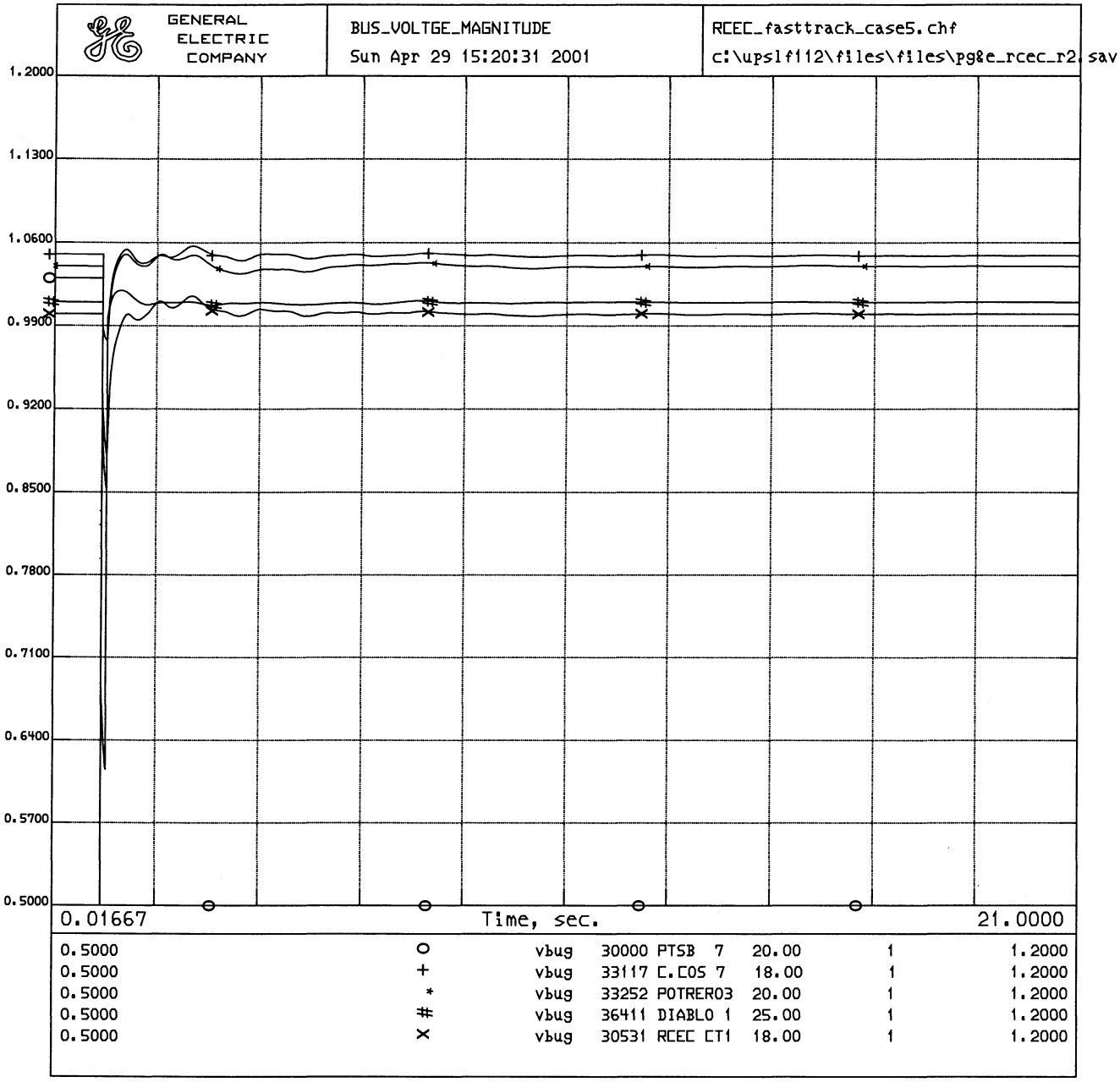
2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



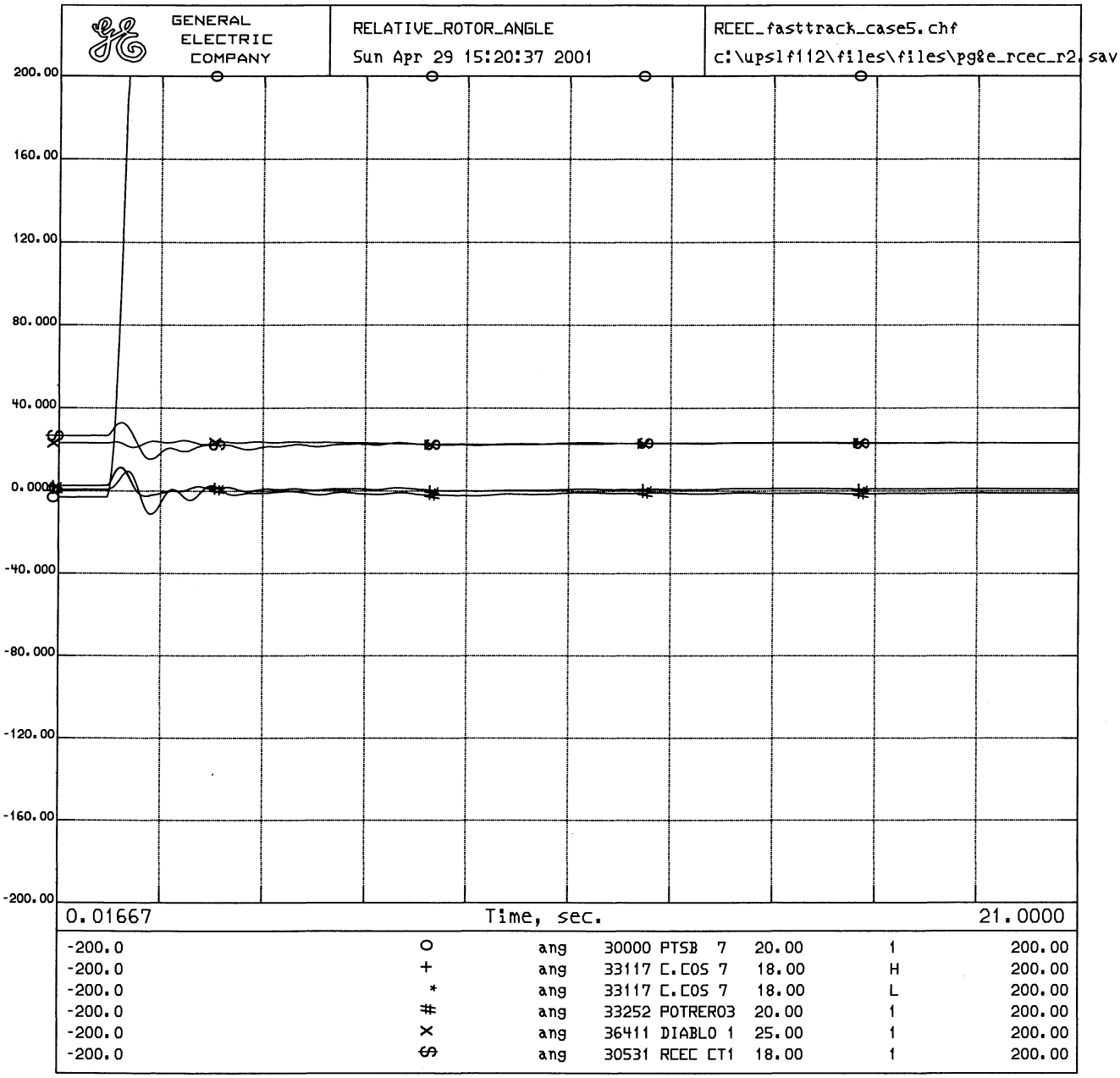
2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



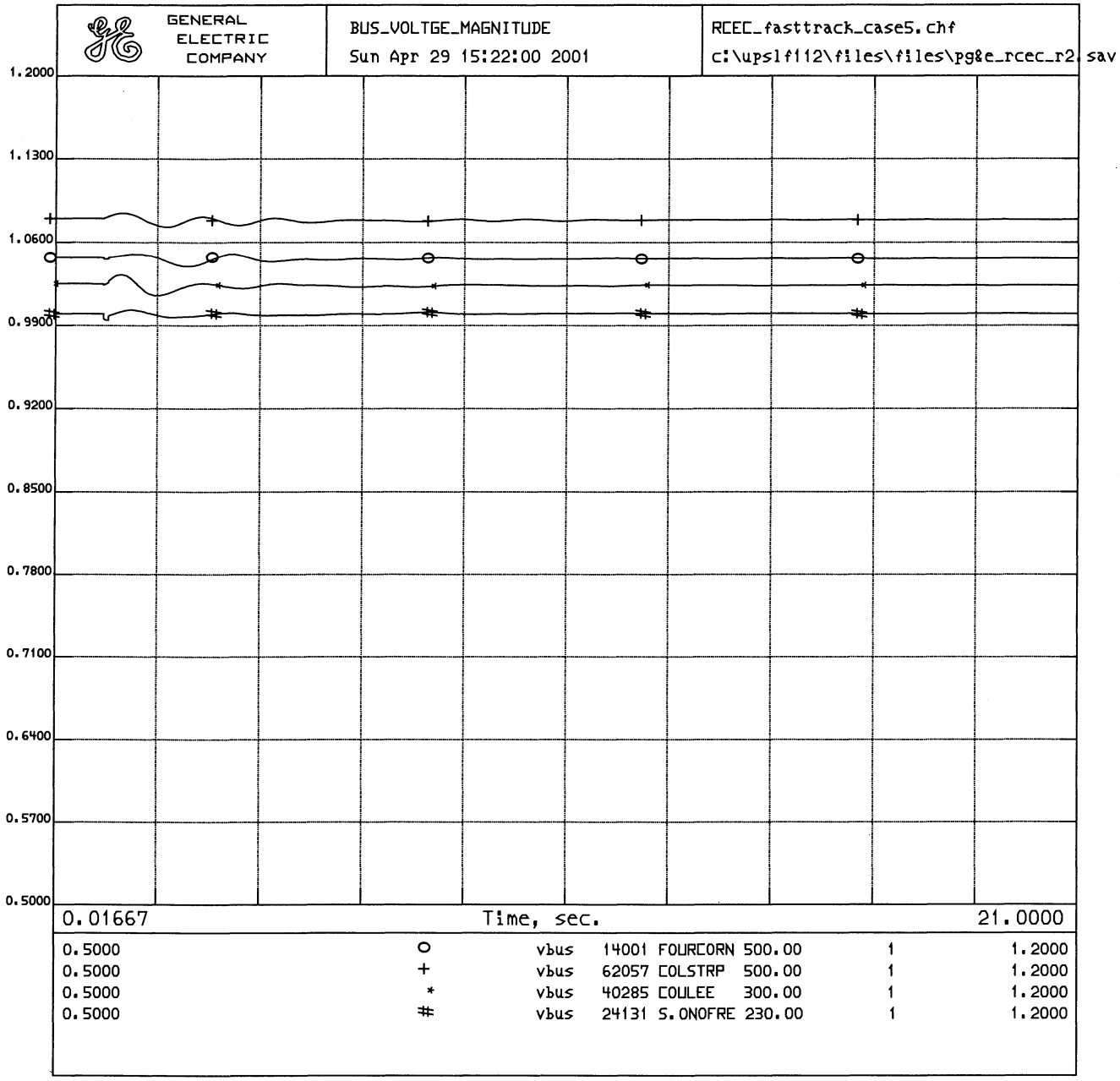
2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



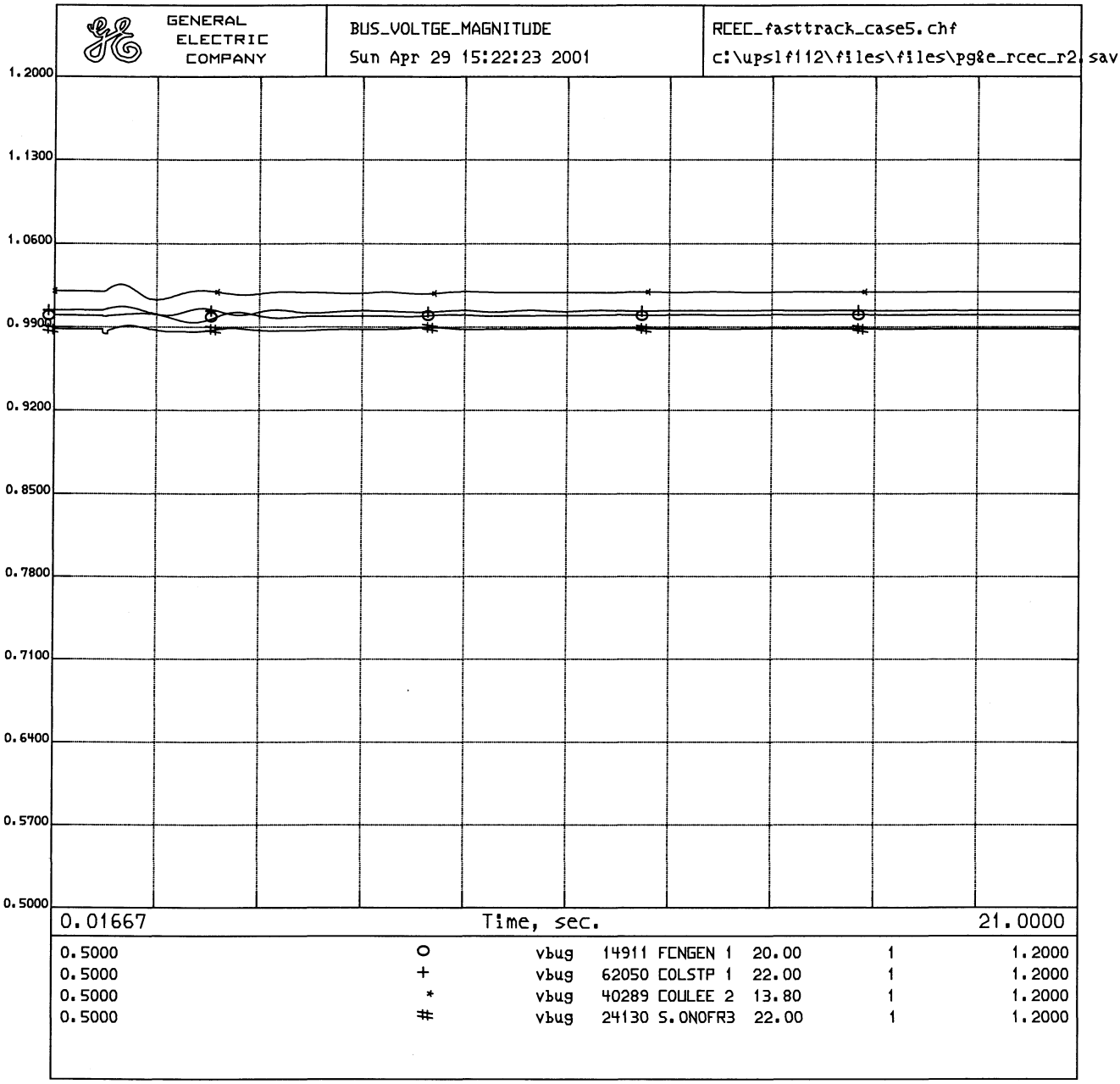
2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



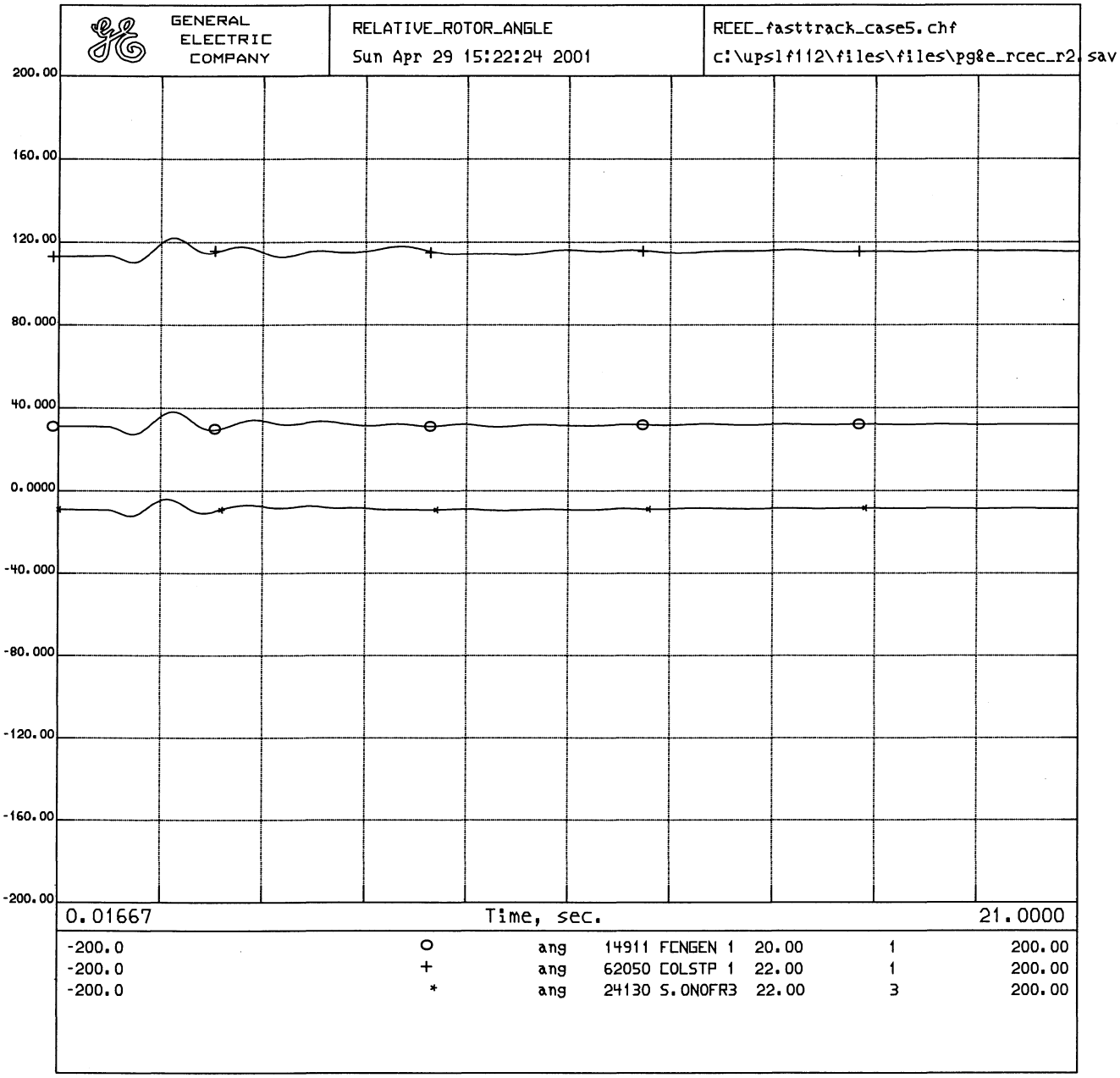
2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.



2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt

developed from a00sum2001.sav case, inserted smud detail into pg&e case.

Russell City Energy Center AFC

May 2001

Russell City Energy Center

Appendix 6-H
Dynamic Run Control Files

May 2001

Russell City Energy Center AFC

May 2001

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pg&e_rcec_r2.sav
pg&e_rcec_r4.dyd
TITLE
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - Full load drop of project generation
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case1.swt
RUN 20.0
CC ***********************************************
CC
CC
CC Fault RCEC 230kV Bus
CC
FB  0.0  "RCEC    " 230.
CC
CC  Clear fault
CC
CFB 6.0  "RCEC    " 230.
CC
CC Drop the project generators
CC
TG 6.0 "RCEC CT1" 18.0 "1 "
TG 6.0 "RCEC CT2" 18.0 "1 "
TG 6.0 "RCEC ST1" 18.0 "1 "
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```
pg&e_rcec_r2.sav
pg&e_rcec_r4.dyd
TITLE
2004 Summer
5-CYCLE 3-Phase Fault on RCEC 230-KV Bus
Contingency - N-1 RCEC-E.SHORE 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case2.swt
RUN 20.0
CC ************************************************
CC
CC
CC Fault RCEC 230kV Bus
CC
FB  0.0  "RCEC    " 230.
CC
CC  Clear fault
CC
CFB 6.0  "RCEC    " 230.
CC
CC Trip one RCEC-E.SHORE 230 kV line
CC
DL  6.0  "RCEC    " 230 "E. SHORE" 230 "1 "
```

```
pg&e_rcec_r2.sav
pg&e_rcec_r4.dyd
TITLE
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-San Mateo #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case3.swt
RUN 20.0
CC ************************************************
CC
CC
CC Fault E.SHORE 230kV Bus
CC
FB  0.0  "E. SHORE" 230.
CC
CC  Clear fault
CC
CFB 6.0  "E. SHORE" 230.
CC
CC Trip one E.SHORE-SAN MATEO 230 kV line
CC
DL  6.0  "E. SHORE" 230 "SANMATEO" 230 "1 "
```

```
pg&e_rcec_r2.sav
pg&e_rcec_r4.dyd
TITLE
2004 Summer
5-CYCLE 3-Phase Fault on E. Shore 230-KV Bus
Contingency - N-1 E.Shore-Pittsburg #1 230 kV line
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case4.swt
RUN 20.0
CC ************************************************
CC
CC
CC Fault E. SHORE 230kV Bus
CC
FB  0.0  "E. SHORE" 230.
CC
CC  Clear fault
CC
CFB 6.0  "E. SHORE" 230.
CC
CC Trip one E.SHORE-PITTSBURG 230 kV line
CC
DL  6.0  "PITSBURG" 230 "E. SHORE" 230 "1 "
```

```
pg&e_rcec_r2.sav
pg&e_rcec_r4.dyd
TITLE
2004 Summer
5-CYCLE 3-Phase Fault on Pittsburg 230-KV Bus
Contingency - "C" Bus Outage, Bus 1 Section E
RCEC 'fast track' Dynamics Analysis
pg&e_rcec_r2.sav + pg&e_rcec_r4.dyd + RCEC_Fasttrack_Case5.swt
RUN 20.0
CC ************************************************
CC
CC
CC Fault Pittsburg 230kV Bus
CC
FB  0.0  "PITSBURG" 230.
CC
CC  Clear fault
CC
CFB 6.0  "PITSBURG" 230.
CC
CC Trip all Pittsburg 230 kV Bus 1 Section E elements
CC
DL  6.0  "PITSBURG" 230 "TIDEWATR" 230 "1 "
DL  6.0  "ROSSTAP1" 230 "ROSSMOOR" 230 "1 "
DL  6.0  "PITSBURG" 230 "FLOWIND2" 230 "1 "
CC  xfmrs switched w/ alldyns command 'DL'
DL  6.0  "PTSB  7 " 20  "PITSBURG" 230 "1 "
DL  6.0  "PTSB  5 " 18  "PITSBURG" 230 "1 "
DL  6.0  "PTSB  5 " 18  "PITSBURG" 230 "2 "
CC
CC drop Pittsburg unit 7. Pittsburg 5 already off in the LF case
CC
TG  6.0  "PTSB  7 " 20.0 "1 "
```

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Appendix 6-I
Breaker Duties in the Vicinity of the RCEC

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Station	Breaker	kV	Symmetrical Interrupting Rating
Eastshore	202	230	40000
Eastshore	262	230	40000
Eastshore	252	230	40000
Eastshore	302	115	40000
Eastshore	312	115	40000
Eastshore	322	115	40000
Eastshore	332	115	40000
Eastshore	342	115	40000
Eastshore	372	115	40000
Eastshore	382	115	40000
Grant	122	115	16781
Grant	142	115	16781
Mt. Eden	142	115	40000
Mt. Eden	182	115	40000
Dumbarton	112	115	23973
Dumbarton	132	115	23973
Newark	100	115	42021
Newark	110	115	42021
Newark	120	115	42021
Newark	130	115	63000
Newark	140	115	63000
Newark	160	115	42021
Newark	170	115	63000
Newark	180	115	42021
Newark	190	115	42021
Newark	310	115	63000
Newark	320	115	63000
Newark	330	115	63000
Newark	340	115	63000
Newark	350	115	63000
Newark	360	115	63000
Newark	370	115	63000
Newark	380	115	63000
Newark	390	115	42021
Newark	420	115	47751
Newark	430	115	47751
Newark	460	115	50000
Newark	470	115	50000
Newark	480	115	63000
Newark	490	115	42021
Newark	510	115	63000
Newark	520	115	63000
Newark	530	115	42021
Newark	540	115	63000
Newark	720	115	63000
Newark	730	115	63000
Newark	750	115	63000
Newark	760	115	63000
Newark	770	115	47751
Newark	780	115	47751
Newark	910	115	63000
Newark	914	115	63000
San Mateo	212	230	45938

San Mateo	222	230	45938
San Mateo	252	230	45938
San Mateo	262	230	45938
San Mateo	272	230	50000
San Mateo	282	230	63000
San Mateo	312	230	63000
San Mateo	322	230	50000
San Mateo	332	230	50000
San Mateo	342	230	45938
San Mateo	372	230	45938
San Mateo	712	230	45938
San Mateo	722	230	45938
Contra Costa PP	400	230	63000
Contra Costa PP	410	230	63000
Contra Costa PP	420	230	63000
Contra Costa PP	470	230	63000
Contra Costa PP	480	230	63000
Contra Costa PP	500	230	63000
Contra Costa PP	510	230	63000
Contra Costa PP	520	230	63000
Contra Costa PP	570	230	34454
Contra Costa PP	580	230	63000
Contra Costa PP	590	230	63000
Contra Costa PP	600	230	63000
Contra Costa PP	610	230	63000
Contra Costa PP	620	230	63000
Contra Costa PP	630	230	45938
Contra Costa PP	640	230	45938
Contra Costa PP	650	230	50000
Contra Costa PP	660	230	50000
Contra Costa PP	670	230	50000
Contra Costa PP	680	230	50000
Contra Costa PP	690	230	50000
Contra Costa PP	810	230	63000
Contra Costa PP	820	230	63000
Pittsburg PP	402	230	45938
Pittsburg PP	432	230	45938
Pittsburg PP	442	230	45938
Pittsburg PP	452	230	50000
Pittsburg PP	472	230	45938
Pittsburg PP	482	230	45938
Pittsburg PP	492	230	63000
Pittsburg PP	502	230	45938
Pittsburg PP	512	230	45938
Pittsburg PP	522	230	45938
Pittsburg PP	532	230	63000
Pittsburg PP	542	230	63000
Pittsburg PP	572	230	45938
Pittsburg PP	582	230	45938
Pittsburg PP	612	230	45938
Pittsburg PP	622	230	45938
Pittsburg PP	672	230	45938
Pittsburg PP	812	230	63000
Pittsburg PP	822	230	63000

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Appendix 6-J
EMF and Power Line Concepts

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EMF CHARACTERISTICS

The power system frequency in the United States is 60 cycles per second or 60 hertz (Hz). At 60 Hz the electromagnetic field is calculated as two separate fields: an electric field and a magnetic field. These fields are a naturally occurring phenomenon associated with electricity. The electric and magnetic fields have the same frequency as the electricity that creates them. Thus, the fields, which are the subject of this report, are 60 Hz fields. Electric field concepts are presented below, followed by a discussion of magnetic fields.

Electric Fields

The quantity of electricity is defined in terms of electric charge. "Electric charge, like mass, length, and time, is accepted as a fundamentally assumed concept, required by the existence of forces measurable experimentally: other definitions of electromagnetic quantities are developed on the bases of these four concepts."[1]

The potential energy stored in an electric charge is measured in volts. Voltage on a wire is often described as analogous to water pressure in a pipe.

An electric field exists wherever there is an electric charge. The electric field is an invisible force that exists in space between positive and negative electric charges. An electric field has a direction associated with it, from positive charge to negative charge. It is measured in units of kilovolts per meter (kV/m). An electric field is present wherever there is electrical energy, including home wiring, appliances, and power lines. Electric fields have the following characteristics:

1. The strength of the electric field is proportional to the voltage of the electric system causing it. Thus, a high-voltage power line would have a higher electric field than low-voltage house wiring.

2. The strength of the electric field decreases as the distance from the source increases. Thus, moving farther from a power line will reduce the field.

3. An electric field is stopped by ground and can be shielded by enclosing it within a grounded metallic object. Trees, bushes, houses, etc., will also significantly attenuate electric fields.

4. Two electric fields may tend to add together or cancel each other depending upon whether they are in the same or opposite directions.

5. Electric fields will induce a charge on ungrounded metallic objects within the field. Thus, electric utilities take precautions to ground fences and metal buildings that are very close to transmission lines.

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[1] IEEE Standard Dictionary of Electrical and Electronics Terms

6. People are able to detect the presence of some electric fields by sensation of small body hairs. This detection depends upon the strength of the field and the sensitivity of the person.

Magnetic Fields

A magnetic field is produced whenever electric current flows. Current is the movement of electric charges and is measured in amperes (also called amps). The magnetic field is an invisible force that exists in space around the current source. The unit used to measure magnetic field is milliGauss (mG).

The characteristics of magnetic fields are listed below. In many ways, magnetic fields differ from electric fields described above.

1. The strength of a magnetic field is proportional to current. The relevance of this will be discussed in more detail in the section on power lines.

2. The strength of a magnetic field decreases as the distance from the source increases. Thus, moving farther from a power line will reduce the magnetic field, similar to the electric field.

3. A magnetic field is not stopped by ground and is not significantly attenuated by buildings, trees, etc. It is attenuated only if the current source is enclosed by a magnetic material.

4. Two magnetic fields may tend to add together or cancel each other depending upon whether they are in the same or opposite direction.

5. A magnetic field will induce current in a conducting metallic loop. This is a concern to electric utilities where pipelines or railroads are close to and parallel to power lines. Precautions are taken to prevent the induced currents from causing interference to the corrosion protection system on pipelines or to communication systems on railroads.

6. People are not able to sense the presence of a magnetic field.

A magnetic field will be found near household appliances and home wiring, as well as power lines.

To review the terminology, voltage is a measure of the potential energy of the electrical charge, analogous to the potential energy of water pressure inside a pipe. An electric field is associated with voltage. Current is the movement of electrical charge in a wire, analogous to the flow of water in a pipe. A lamp plugged into the household wall outlet will have voltage to the switch, but current will flow only when the switch is turned on. A magnetic field is associated with current.

Measurement and Calculation of EMF

The measurement of the strength of electric and magnetic fields is made with readily available meters. A different meter is needed to measure each. The Institute of Electrical and Electronic Engineers (IEEE) develops and publishes guidelines and standards for instrumentation and measurement procedures. Near power lines, the standards state that the fields are to be measured at 1 meter (3.28 feet) above ground. The field strengths given in this report are calculated at 1 meter above ground.

The electric and magnetic fields associated with a power line have a special orientation with regard to the power line. The electric field (near the power line) at 1 meter above ground is essentially vertical along the route of the power line. Magnetic fields, on the other hand, may have vertical and horizontal components. It is important, especially when making measurements, that orientation of the field be taken into consideration.

In this report, calculation of magnetic field strengths refers to the maximum field rather than a horizontal or vertical component.

POWER TRANSMISSION CONCEPTS

Power Line Voltages and Currents

The electric and magnetic fields are calculated for typical transmission line configurations. Transmission lines are almost always three-phase (three conductors servicing a particular load or customer). For the calculations in this report we have assumed the three phases to be balanced in voltage and current.

Electric utilities operate power lines at nearly constant voltage; normal operation is typically within 5 percent of the nominal voltage. Similarly, the voltage maintained within a house is nearly constant at 120 volts. The current over a power line, however, will vary considerably as power requirements change. This same situation occurs within a house. The electrical outlets in the home will all supply power at nearly 120 volts, but if no appliance is turned on, then no current flows. However, as refrigerators, lamps, and various appliances are turned on, more and more current flows to provide power. Thus, the current varies considerably depending upon the amount of power being used.

The electric field, which is proportional to voltage, will be nearly constant under a transmission line since the line is held at nearly constant voltage. On the other hand, the magnetic field, which is proportional to current, will vary greatly during the day as the power requirements on the transmission line vary. In discussing the magnetic field near a transmission line it is, therefore, important to distinguish the current that was used to determine the magnetic field level. In this report, discussion of magnetic fields will include reference to the associated current level.

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Appendix 6-K
Electric Field Data Sheets Cross Sections
A1, A2, B, and C

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Electric Field Data,
Cross Sections A1 and A2
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	Maximum Field, Cross Section Pre-RCEC (A1) (kV/m)	Maximum Field, Cross Section with RCEC (A2) (kV/m)
-100	0.014	0.330
-95	0.014	0.362
-90	0.015	0.398
-85	0.016	0.438
-80	0.017	0.482
-75	0.018	0.530
-70	0.018	0.582
-65	0.019	0.636
-60	0.019	0.691
-55	0.018	0.743
-50	0.017	0.785
-45	0.016	0.806
-40	0.016	0.789
-35	0.019	0.713
-30	0.031	0.562
-25	0.051	0.348
-20	0.081	0.165
-15	0.125	0.213
-10	0.186	0.285
-5	0.265	0.271
0	0.363	0.235
5	0.471	0.271
10	0.566	0.285
15	0.614	0.213
20	0.585	0.165
25	0.483	0.348
30	0.406	0.562
35	0.481	0.713
40	0.583	0.789
45	0.615	0.806
50	0.568	0.785
55	0.473	0.743
60	0.366	0.691
65	0.267	0.636
70	0.187	0.582
75	0.126	0.530
80	0.082	0.482
85	0.052	0.438
90	0.031	0.398
95	0.020	0.362
100	0.016	0.330

Electric Field Data,
Cross Section B
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	Maximum Field, Cross Section Pre- and/or with RCEC (kV/m)
-100	0.063
-95	0.065
-90	0.066
-85	0.066
-80	0.065
-75	0.061
-70	0.054
-65	0.043
-60	0.029
-55	0.031
-50	0.073
-45	0.139
-40	0.234
-35	0.366
-30	0.539
-25	0.751
-20	0.989
-15	1.224
-10	1.416
-5	1.536
0	1.577
5	1.536
10	1.416
15	1.224
20	0.989
25	0.751
30	0.539
35	0.366
40	0.234
45	0.139
50	0.073
55	0.031
60	0.029
65	0.043
70	0.054
75	0.061
80	0.065
85	0.066
90	0.066
95	0.065
100	0.063

Electric Field Data,
Cross Section C
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE
STUDY

LATERAL DISTANCE (feet)	Maximum Field, Cross Section Pre- and/or with RCEC (kV/m)
-100	0.042
-95	0.037
-90	0.028
-85	0.019
-80	0.030
-75	0.060
-70	0.106
-65	0.170
-60	0.260
-55	0.382
-50	0.546
-45	0.761
-40	1.032
-35	1.356
-30	1.704
-25	2.014
-20	2.188
-15	2.132
-10	1.814
-5	1.330
0	0.996
5	1.330
10	1.814
15	2.132
20	2.188
25	2.014
30	1.704
35	1.356
40	1.032
45	0.761
50	0.546
55	0.382
60	0.260
65	0.170
70	0.106
75	0.060
80	0.030
85	0.019
90	0.028
95	0.037
100	0.042

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Appendix 6-L
Audible Noise Data Sheets
Cross Sections A1, A2, B, and C

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AUDIBLE NOISE DATA SHEETS
CROSS SECTIONS A1, A2, B AND C
FOR CALPINE/BECHTEL RCEC

Audible Noise Data,
Cross Sections A1 and A2
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	L5 Rain, Cross Section Pre-RCEC (A1) (dB(A))	L5 Rain, Cross Section with RCEC (A2) (dB(A))
-100	41.6	45.0
-95	41.8	45.3
-90	41.9	45.5
-85	42.1	45.8
-80	42.4	46.1
-75	42.6	46.4
-70	42.8	46.7
-65	43.0	47.0
-60	43.3	47.3
-55	43.5	47.7
-50	43.7	48.1
-45	44.0	48.4
-40	44.3	48.8
-35	44.6	49.2
-30	44.9	49.5
-25	45.2	49.8
-20	45.5	50.0
-15	45.8	50.2
-10	46.2	50.4
-5	46.5	50.4
0	46.8	50.5
5	47.2	50.4
10	47.5	50.4
15	47.7	50.2
20	47.9	50.0
25	48.0	49.8
30	48.1	49.5
35	48.0	49.2
40	47.9	48.8
45	47.7	48.4
50	47.5	48.1
55	47.2	47.7
60	46.8	47.3
65	46.5	47.0
70	46.2	46.7
75	45.8	46.4
80	45.5	46.1
85	45.2	45.8
90	44.9	45.5
95	44.6	45.3
100	44.3	45.0

Audible Noise Data,
Cross Section B
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE
STUDY

LATERAL DISTANCE (feet)	L5 Rain, Cross Section Pre- and/or with RCEC (dB(A))
-100	41.5
-95	41.8
-90	42.0
-85	42.2
-80	42.5
-75	42.8
-70	43.0
-65	43.3
-60	43.6
-55	43.9
-50	44.3
-45	44.6
-40	44.9
-35	45.3
-30	45.6
-25	45.9
-20	46.2
-15	46.5
-10	46.7
-5	46.8
0	46.8
5	46.8
10	46.7
15	46.5
20	46.2
25	45.9
30	45.6
35	45.3
40	44.9
45	44.6
50	44.3
55	43.9
60	43.6
65	43.3
70	43.0
75	42.8
80	42.5
85	42.2
90	42.0
95	41.8
100	41.5

Audible Noise Data,
Cross Section C
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE
STUDY

LATERAL DISTANCE (feet)	L5 Rain, Cross Section Pre- and/or with RCEC (db(A))
-100	54.0
-95	54.2
-90	54.4
-85	54.6
-80	54.9
-75	55.1
-70	55.4
-65	55.7
-60	55.9
-55	56.2
-50	56.5
-45	56.8
-40	57.1
-35	57.4
-30	57.7
-25	58.0
-20	58.2
-15	58.4
-10	58.5
-5	58.5
0	58.6
5	58.5
10	58.5
15	58.4
20	58.2
25	58.0
30	57.7
35	57.4
40	57.1
45	56.8
50	56.5
55	56.2
60	55.9
65	55.7
70	55.4
75	55.1
80	54.9
85	54.6
90	54.4
95	54.2
100	54.0

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Appendix 6-M
Magnetic Field Data Sheets
Cross Sections A1, A2, B, and C

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Magnetic Field Data,
Cross Sections A1 and A2
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	RMS Resultant, Cross Section Pre-RCEC (A1) (mG)	RMS Resultant, Cross Section With RCEC (A2) (mG)
-100	0.27	9.09
-95	0.30	10.19
-90	0.34	11.47
-85	0.38	12.96
-80	0.42	14.70
-75	0.48	16.73
-70	0.54	19.09
-65	0.61	21.85
-60	0.70	25.05
-55	0.81	28.72
-50	0.94	32.89
-45	1.10	37.50
-40	1.29	42.40
-35	1.52	47.33
-30	1.82	51.91
-25	2.18	55.74
-20	2.63	58.63
-15	3.20	60.54
-10	3.91	61.57
-5	4.79	61.95
0	5.86	61.98
5	7.11	61.81
10	8.50	61.29
15	9.89	60.10
20	11.09	58.04
25	11.90	55.02
30	12.18	51.07
35	11.88	46.43
40	11.04	41.46
45	9.82	36.55
50	8.42	31.95
55	7.03	27.81
60	5.78	24.17
65	4.72	21.01
70	3.84	18.30
75	3.13	15.97
80	2.57	13.98
85	2.12	12.28
90	1.76	10.82
95	1.47	9.57
100	1.24	8.49

Magnetic Field Data,
Cross Section B
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	RMS Resultant, Cross Section Pre-RCEC (mG)	RMS Resultant, Cross Section with RCEC (mG)
-100	0.89	4.98
-95	0.98	5.45
-90	1.07	5.99
-85	1.18	6.60
-80	1.31	7.32
-75	1.46	8.14
-70	1.63	9.09
-65	1.83	10.21
-60	2.06	11.51
-55	2.34	13.04
-50	2.66	14.84
-45	3.03	16.92
-40	3.46	19.34
-35	3.95	22.07
-30	4.49	25.07
-25	5.05	28.19
-20	5.58	31.16
-15	6.03	33.64
-10	6.33	35.33
-5	6.49	36.21
0	6.53	36.46
5	6.49	36.23
10	6.34	35.36
15	6.04	33.68
20	5.59	31.22
25	5.06	28.26
30	4.51	25.15
35	3.97	22.15
40	3.48	19.42
45	3.05	17.00
50	2.67	14.91
55	2.35	13.11
60	2.07	11.58
65	1.84	10.27
70	1.64	9.14
75	1.47	8.18
80	1.32	7.36
85	1.19	6.64
90	1.08	6.02
95	0.98	5.48
100	0.90	5.00

Magnetic Field Data,
Cross Section C
CALPINE/BECHTEL
RCEC EMF and AUDIBLE NOISE STUDY

LATERAL DISTANCE (feet)	RMS Resultant, Cross Section Pre-RCEC (mG)	RMS Resultant, Cross Section with RCEC (mG)
-100	9.69	6.10
-95	10.54	6.90
-90	11.50	7.84
-85	12.59	8.95
-80	13.82	10.28
-75	15.22	11.85
-70	16.81	13.75
-65	18.63	16.03
-60	20.70	18.79
-55	23.05	22.13
-50	25.71	26.19
-45	28.68	31.09
-40	31.93	36.95
-35	35.35	43.83
-30	38.74	51.63
-25	41.78	59.97
-20	44.13	68.12
-15	45.64	75.11
-10	46.60	80.17
-5	47.70	83.04
0	49.52	83.81
5	51.99	82.63
10	54.35	79.40
15	55.54	74.03
20	54.88	66.83
25	52.36	58.57
30	48.54	50.20
35	44.11	42.43
40	39.59	35.62
45	35.31	29.84
50	31.43	25.03
55	27.97	21.07
60	24.93	17.81
65	22.28	15.13
70	19.98	12.92
75	17.97	11.10
80	16.22	9.58
85	14.69	8.32
90	13.35	7.26
95	12.17	6.36
100	11.13	5.60

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