ORIGINAL

Kissimmee Utility Authority
Florida Municipal Power Agency
Docket No. 990963-EM
Applicant Witness: Steve L. Schwiesenau
Exhibit No. ___ (SLS-3)

[redacted]

BLACK & VEATCH LLP

Kissimmee Utility Authority
Florida Municipal Power Agency
Cane Island Unit 3 Transmission Impact Study

Contents

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Cane Island Unit 3 Transmission Impact Study

1.0 Introduction

This study investigates the transmission improvements associated with the addition of Cane Island 3.

2.0 Objectives

The objectives of this study will be to assess the transmission impacts on surrounding transmission systems resulting from the addition of these facilities and determine the transmission improvements necessary to transfer this capacity to the identified locations within the State of Florida.

Load flow analysis will be performed using the FY 1998 base case databases available from the Florida Reliability Coordinating Council (FRCC). Load level base case to be used will be 2001 Summer Peak.

3.0 Criteria and Assumptions

This section will address the criteria and assumptions to be used in the load flow studies and other analyses. These include:

- Operating Criteria and Assumptions
- System Planning Criteria
- Contingencies
- Economic Criteria

3.1 Operating Criteria and Assumptions

The following operating criteria and assumptions will apply during the performance of the load flow cases.

Shunt Reactive Power Sources: Switchable capacitors and seasonally switched capacitors will be shown in service during the summer peak cases and not in service for the off-peak cases, as long as normal voltage ranges can be maintained.

Operation of LTC: Transformer LTC's will be placed in operation to control the appropriate bus voltages during the running of base cases and contingency cases.

3.2 System Planning Criteria

The criteria used in this study for identifying potential transmission system problems are as follows:

Normal Operating Conditions

Transformer and transmission line loadings will not exceed 100%[1] of normal rating (Rate A)

Minimum allowable transmission system voltage will be 95 % of nominal voltage (0.95 per unit (PU))

Contingency Conditions (Loss of Generation, Load, or Transmission)

Transformer and transmission line loadings will not exceed 100%[1] of emergency rating (Rate B)

Minimum allowable transmission system voltage will be 90 % of nominal voltage (0.90 per unit (PU))

Single contingency would not cause cascading to neighboring utilities.

Note (1): 100% represents the percent current loading of the system element with reference to its base rating.

3.3 Contingencies

Load flow analyses will be used to examine the reaction of the system to single contingencies surrounding Cane Island. This will include outages of 230 kV lines, 69 kV lines, and transformers.

3.4 Economic Criteria

The following are the economic criteria for use in evaluating the addition of transmission facilities for Cane Island 3.

Annual Escalation Rates:

General and Capital Costs:	2.5%
O&M Costs:	3.0%

Bond Interest Rate:	5.5%
Present Worth Discount Rate:	5.5%
Fixed Charge Rate:	8.2%
Period of Economic Analysis:	1998-2017

4.0 Load Flow Analysis

4.1 Description of Study

The load flow study was performed using the FY98 base case for the year 2001 from the Florida Reliability Coordinating Council (FRCC). Net Area (Interchange) Totals from the load flow base case are tabulated for each utility entity in the Florida system and are shown in Appendix A. This table indicates a load of 245 MW for Kissimmee Utility Authority for the Summer 2001 Peak base case. This is less than the 257 MW peak base demand for KUA without the Expo Center as shown in the Need for Power Application for Cane Island 3.

This study is intended to investigate the need for construction of the Cane Island to Intercession City 230 kV as an additional outlet line from the plant into the Florida system. The alternative plans studied were as follows:

1. Addition of Cane Island - Intercession City 230 kV line.
2. No Cane Island - Intercession City 230 kV line.
3. No Cane Island - Intercession City 230 kV line, with the addition of a Second Clay Street 230-69 kV Transformer.

Load flow cases were performed for each of the alternative plans listed above. The load flow cases included a base case for each plan and single contingency outages of each 230 kV line leaving Cane Island and the 69 kV lines leaving the KUA Clay Street Substation.

4.2 Summary of Study Results

Load flow diagrams showing the flows in KUA circuits and voltages at KUA buses are included in Appendix B.

1. Contingency cases for Alternative Plan 1 do not result in any overloads or voltage problems.

2. Alternative Plan 2 shows an overload of the Clay Street transformer during an outage of the Cane Island - Taft 230 kV line. For this reason, an alternative plan which included the installation of a second Clay Street transformer was considered (Plan 3).

3. Alternative Plan 3 shows an overload of the Clay Street - Hansel 69 kV line during an outage of the Cane Island - Taft 230 kV line. The Clay Street - Airport 69 kV line is almost overloaded during this outage, also. This plan would require the addition of a second Clay Street - Hansel 69 kV line, or the reconductoring of this circuit. This plan would also require the addition of a second Clay Street - Airport 69 kV line, or the reconductoring of this circuit within a few years.

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5.0 Capital Cost

The capital cost for the Cane Island - Intercession City 230 kV transmission line and the additional Clay Street transformer and reconductoring of the Clay Street - Hansel 69 kV line and the Clay Street - Airport 69 kV line are presented below.

Cane Island - Intercession City 230 kV Line	$4,657,492
Clay Street Transformer	$3,837,893
Clay Street - Hansel Reconductoring	$2,111,580
	$5,989,263
Clay Street - Airport Reconductoring	$2,191,140
	$8,140,613

As shown, the capital cost for the Cane Island - Intercession City 230 kV line is $1.3 million lower in cost than the Clay Street Transformer and the Clay Street - Hansel Reconductoring The capital cost for the Cane Island - Intercession City 230 kV line is $3.5 million less when the reconductoring of the Clay Street - Airport line is included. Reconductoring of this line will be required about one year after the Clay Street - Hansel line

Appendix A

Net Area Interchange Totals

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E THU, JUN 11 1998 9:07
2001 SUMMER BASE CASE - FY1998 - REVISION 3 AREA TOTALS
IN MW/MVAR

AREA	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
1	15478.9	18551.9	0.0	0.1	0.0	-3489.1	415.9	-3490.1
FPL	3245.2	5519.8	-4091.9	-1359.4	3456.5	426.9	6206.0	
2	8460.4	9207.4	0.0	0.0	0.0	-957.9	211.1	-957.5
FPC	2459.3	2835.6	-1878.1	0.0	1110.9	125.7	2486.6	
3	93.9	108.0	0.0	0.0	0.0	-15.8	1.7	-15.8
FTP	-17.6	17.0	-20.4	0.0	1.4	-23.0	10.2	
4	405.2	410.5	0.0	0.0	0.0	-9.4	4.1	-9.4
GVL	58.5	26.3	-25.9	0.0	13.1	22.4	48.9	
5	33.0	60.0	0.0	0.0	0.0	-27.2	0.2	-27.2
EST	32.0	11.7	0.0	0.0	4.7	20.7	4.3	
6	2881.3	2594.9	0.0	0.0	0.0	244.0	42.4	244.0
JEA	902.8	1002.0	-389.1	0.0	218.6	-106.1	614.6	
7	-0.2	121.5	0.0	0.0	0.0	-127.3	5.6	-127.5
KEY	25.9	18.2	-39.4	0.0	5.7	16.5	36.2	
8	336.3	245.0	0.0	0.0	0.0	88.6	2.7	86.8
KIS	-47.3	27.7	0.0	0.0	8.7	-112.1	45.9	
9	54.1	83.0	0.0	0.0	0.0	-28.9	0.1	-28.9
LWU	35.1	13.6	0.0	0.0	1.3	18.8	4.0	
10	17.6	77.0	0.0	0.0	0.0	-59.4	0.0	-59.4
NSB	12.3	11.7	0.0	0.0	0.5	0.4	0.7	
11	1333.4	1040.0	0.0	0.0	0.0	276.0	17.3	276.2
OUC	293.9	205.3	0.0	0.0	212.3	46.7	254.2	
12	1354.7	290.2	0.0	0.0	0.0	1040.3	24.3	1040.1
SEC	250.2	95.4	-41.0	0.0	112.0	-166.0	473.7	
13	883.2	563.0	0.0	0.0	0.0	314.4	5.8	357.2
LAK	57.4	78.2	0.0	0.0	12.3	-99.5	91.0	
14	0.0	14.4	0.0	0.0	0.0	-14.4	0.0	-14.4
STK	0.0	2.5	0.0	0.0	0.0	-2.8	0.3	

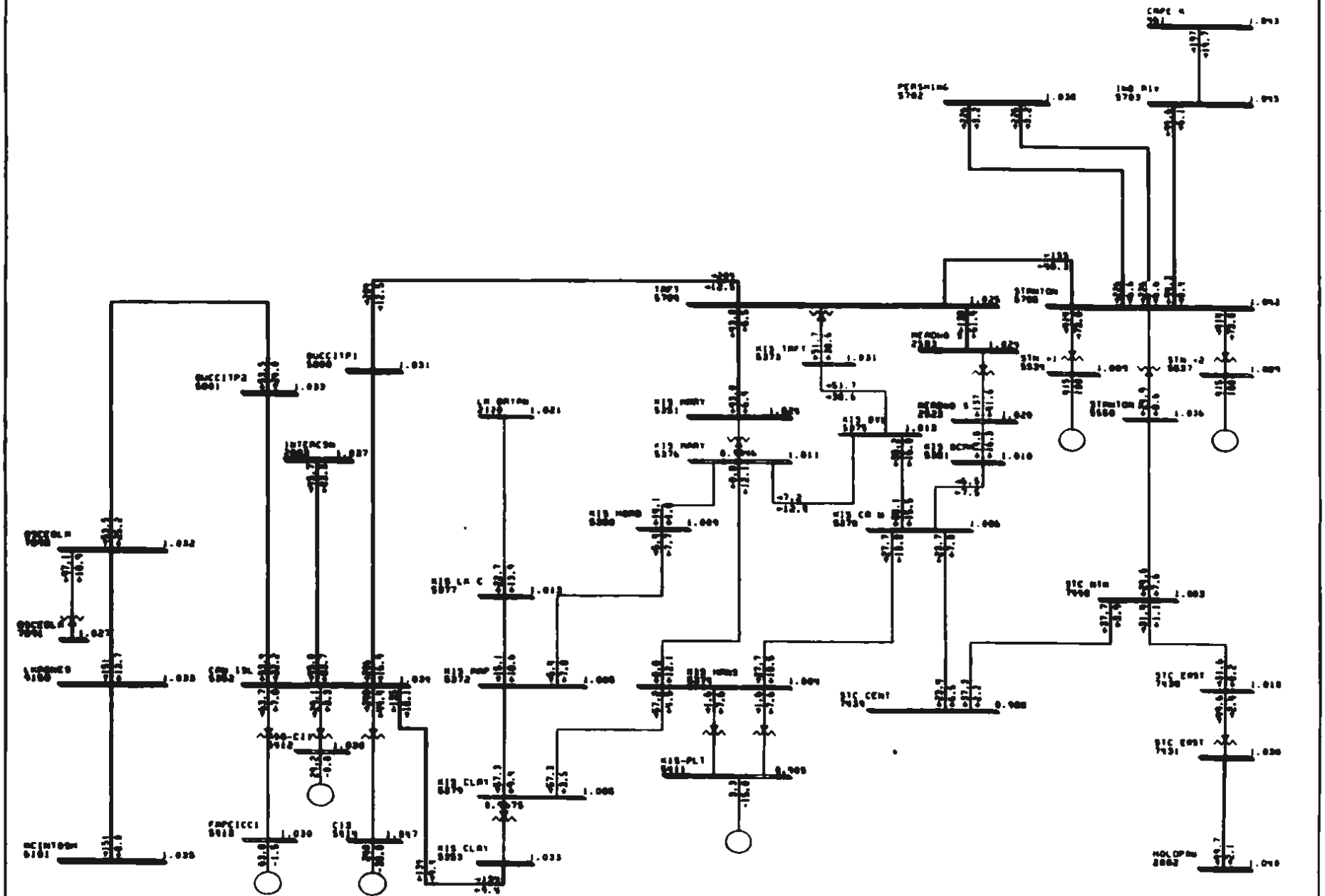
15	504.6	532.0	0.0	0.0	0.0	-35.8	8.4	-35.8
TAL	124.8	127.4	-90.3	0.0	33.3	22.8	98.1	
16	3625.5	3273.6	0.3	0.0	0.0	302.3	49.3	302.2
TEC	1024.5	959.3	-673.3	0.0	160.5	126.4	772.7	
17	150.3	141.4	0.0	0.0	0.0	6.9	2.0	6.9
FMP	-21.0	23.6	-31.6	0.0	2.9	-29.1	19.0	

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E THU, JUN 11 1990 9:07
2001 SUMMER BASE CASE - FY1990 - REVISION 3 AREA TOTALS
IN MW/MVAR

AREA	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
18	250.7	0.0	0.0	0.0	0.0	250.0	0.7	250.0
NUG	66.2	0.0	0.0	0.0	0.0	44.2	22.0	
19	0.0	177.3	0.0	0.0	0.0	-177.7	0.4	-177.1
RCU	0.0	62.0	-78.9	0.0	6.9	22.2	1.6	
30	93657.2	88399.6	785.8	9.5	0.0	2420.4	2041.8	2379.6
SCS	17730.4	28226.8	-19494.4	-975.1	17649.1	-355.1	27977.6	
TOTALS	129520.2	125890.7	786.1	9.6	0.0	0.0	2833.8	-0.1
	26232.6	39264.1	-26854.3	-2334.5	23011.0	0.0	39167.8	

Appendix B

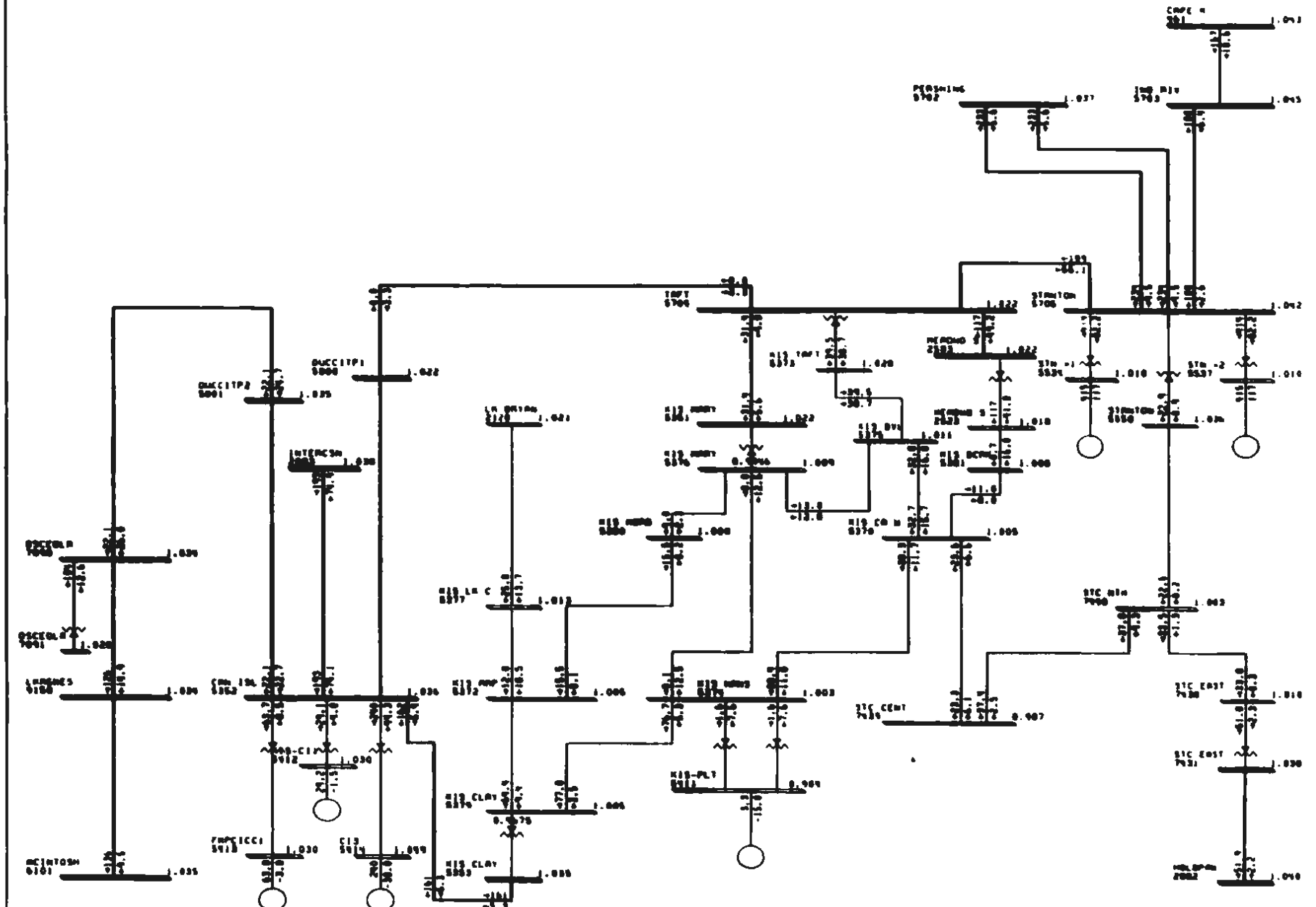
Load Flow Diagrams



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITH INTERCESSION CITY TIE IN SERVICE - INITIAL CONDITIONS
WED. JUN 10 1998 16:24

LOG% AREA
0.950 LV 1.050 DV
KV: <100 .<200 .<300

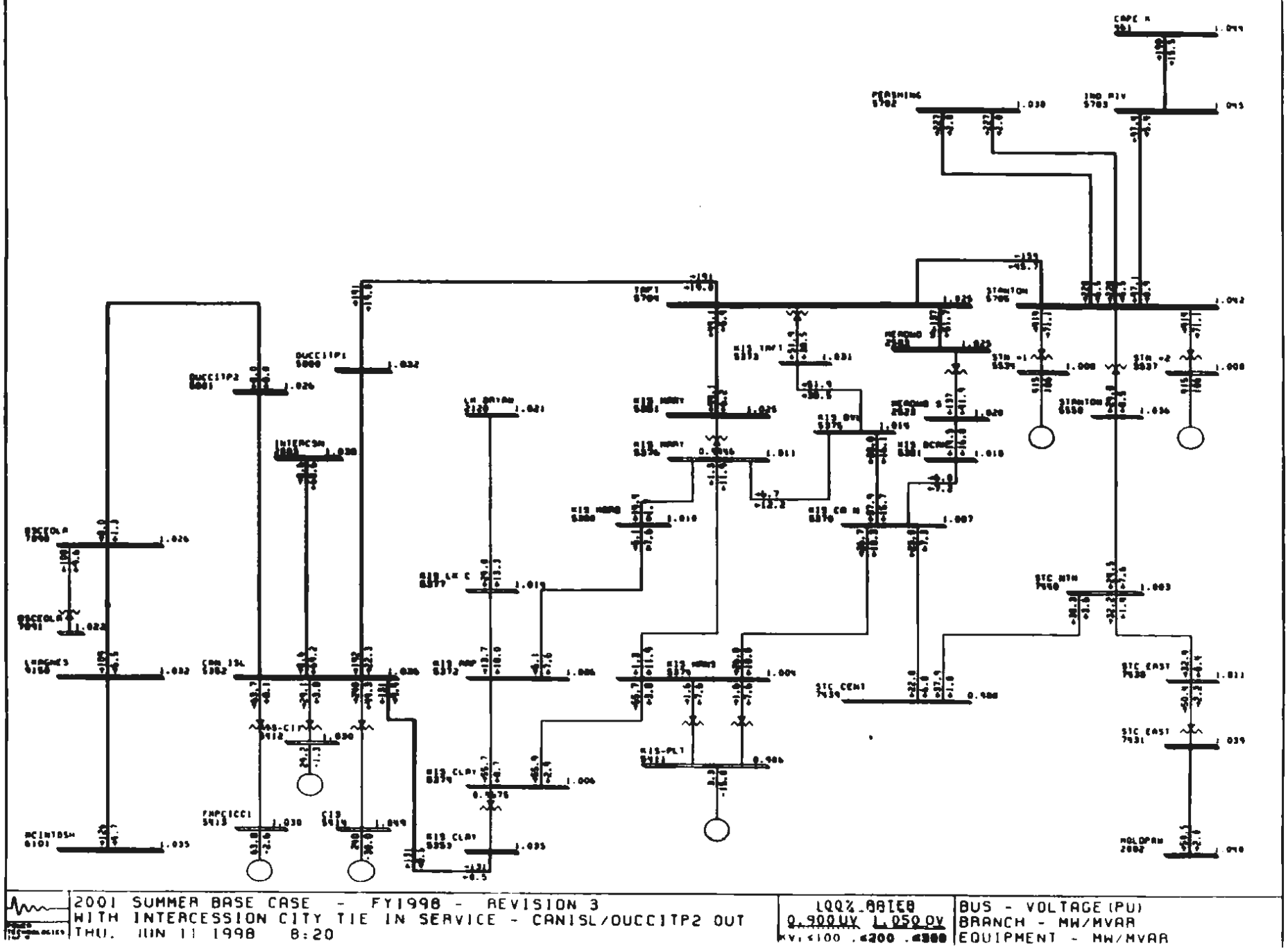
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR

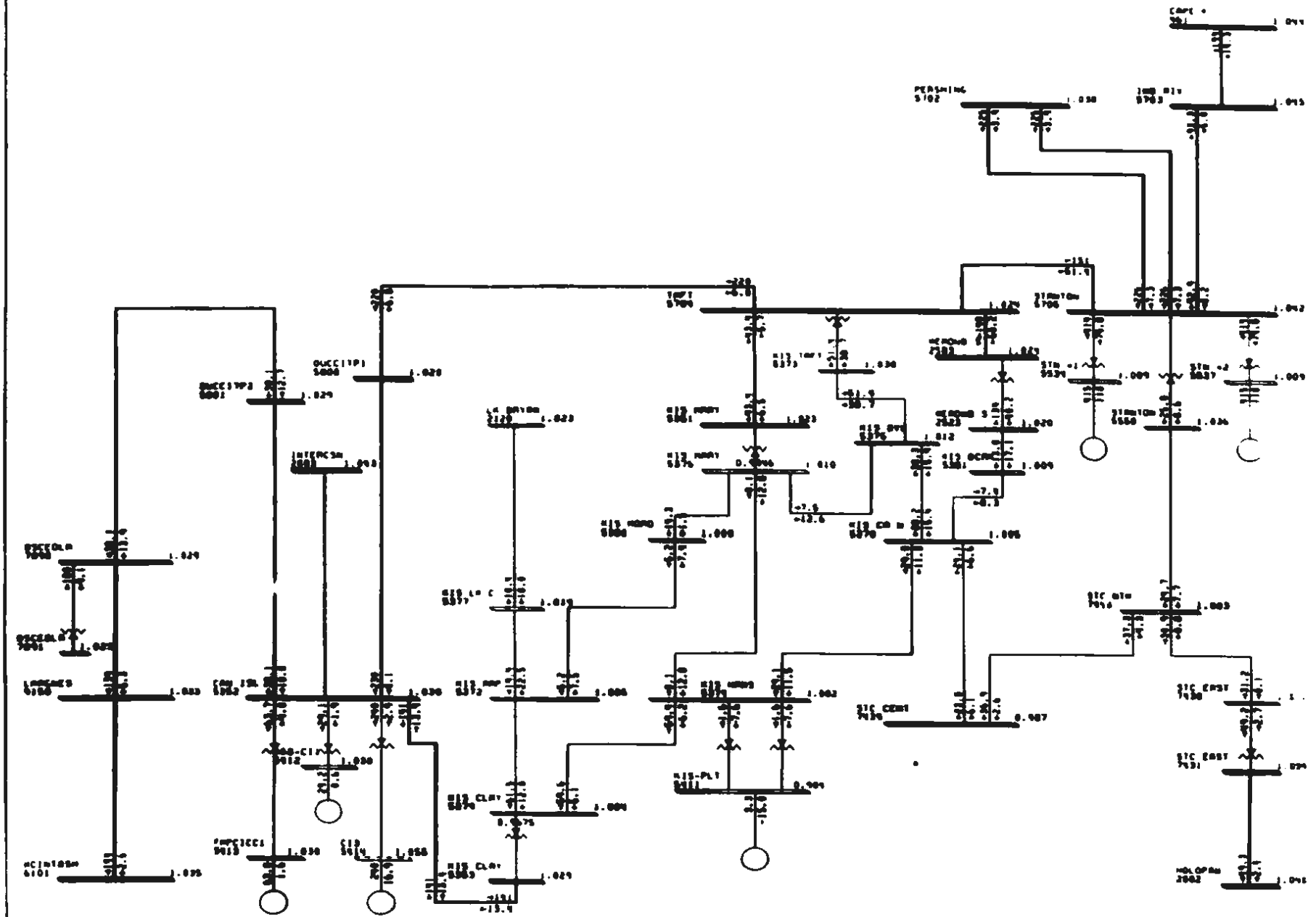


2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITH INTERCESSION CITY TIE IN SERVICE - CANISL/OUCCITP1 OUT
THU. JUN 11 1998 8:17

LOG_BASE0
0.900 KV 1.050 KV
KV: ≤100 .≤200 .≤300

BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR

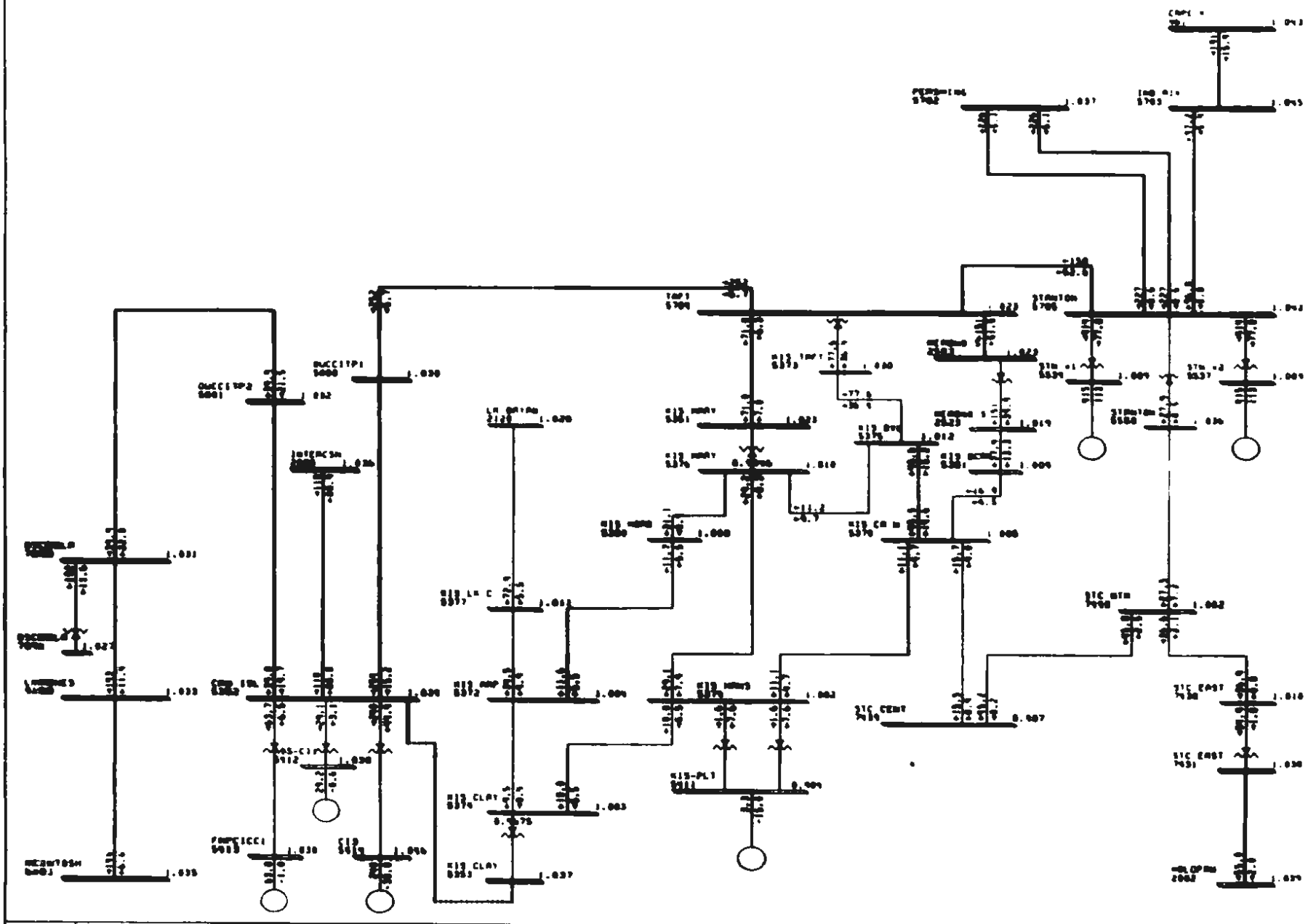

2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITH INTERCESSION CITY TIE IN SERVICE - CANISL/OUCCITP2 OUT
THU, JUN 11 1998 8:20
LOG%_ABIEB
0.900UV 1.050OV
BUS - VOLTAGE(PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITH INTERCESSION CITY TIE IN SERVICE - CANISL/INTERCSN OUT
THU. JUN 11 1998 8:25

LOG% ABIEB
0.900 UV 1.050 OV
KV: 6100 .6200 .6300

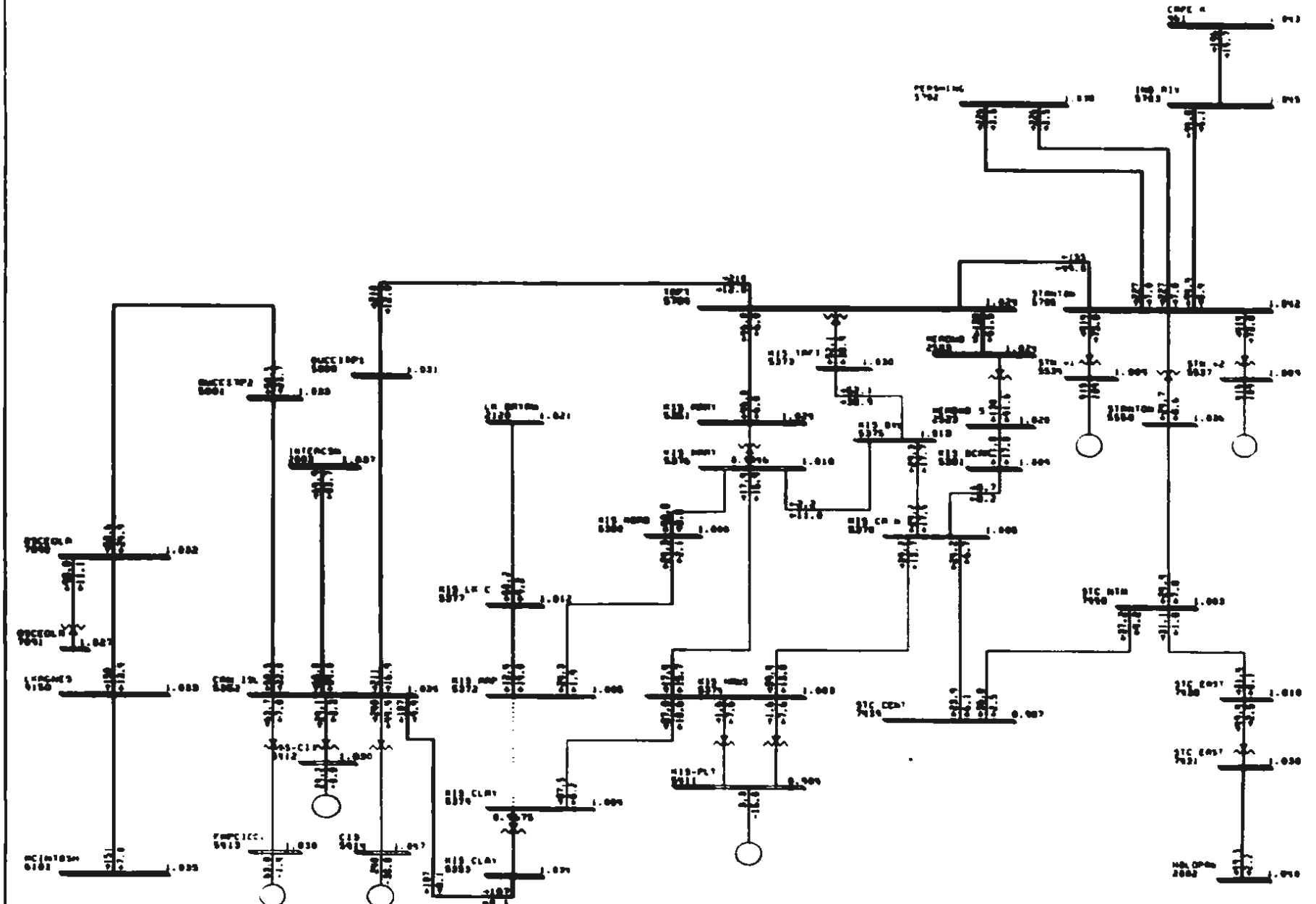
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITH INTERCESSION CITY TIE IN SERVICE - CANISL/CLAY OUT
THU. JUN 11 1998 8:28

LOAD_BASED
0.900 PU 1.050 PU

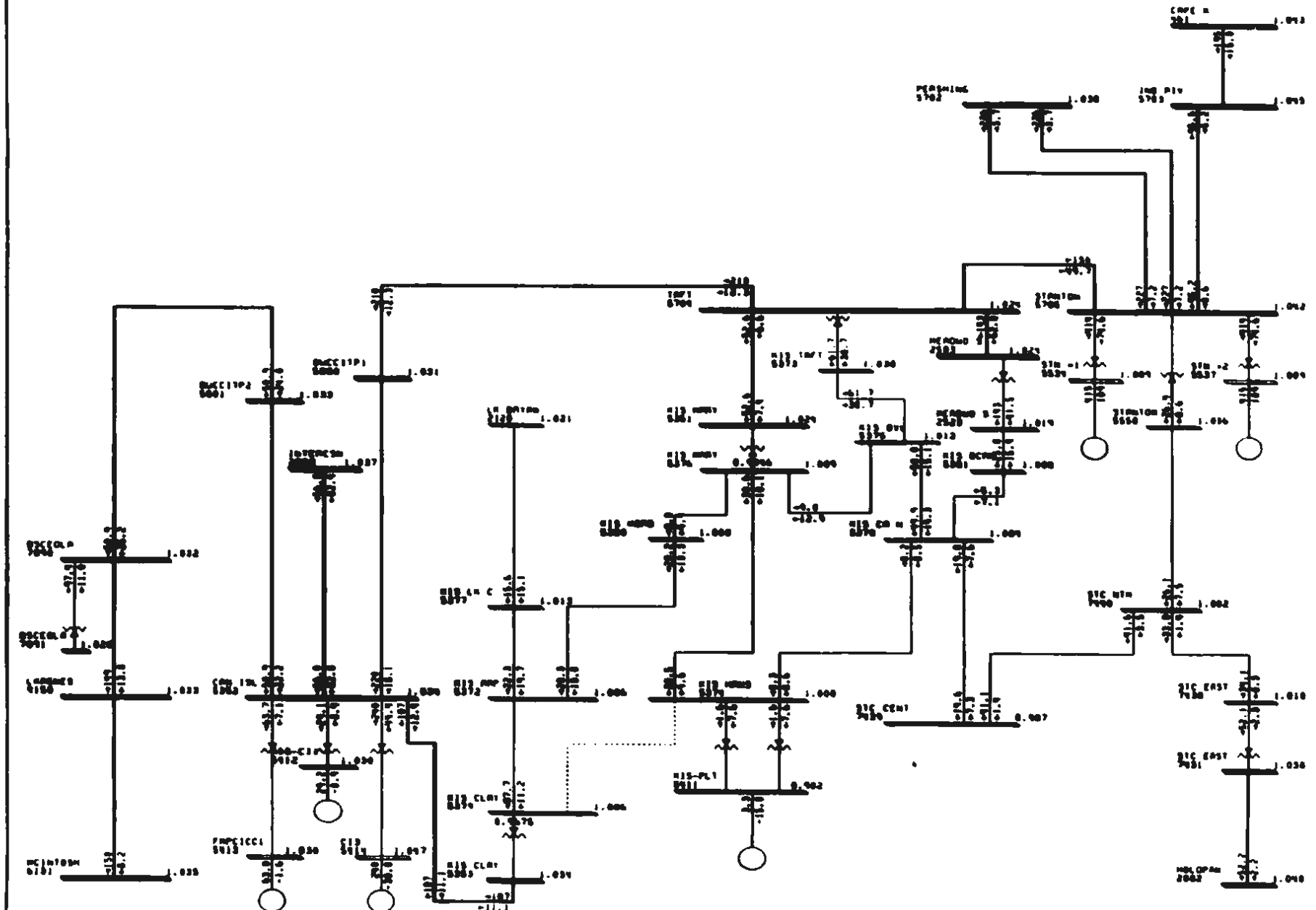
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITH INTERCESSION CITY TIE IN SERVICE - CLAY/AIRPORT OUT
THU, JUN 11 1998 8:30

LOAD BANDS
0.900 PU 1.050 PU
KV: <100 >200 >300

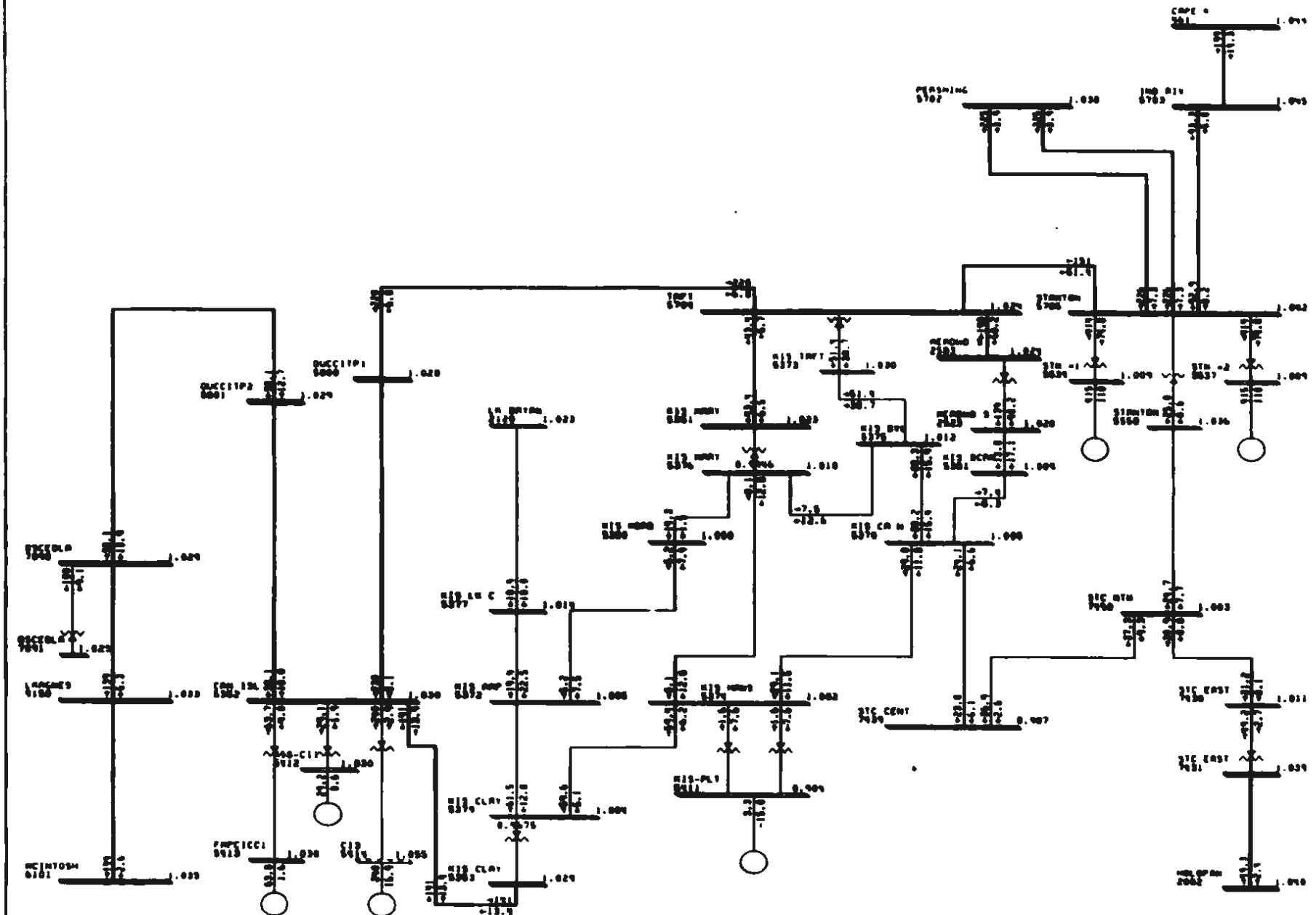
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITH INTERCESSION CITY TIE IN SERVICE - CLAY/HANSEL OUT
THU. JUN 11 1998 8:37

LOG% RATES
0.900 UV 1.050 OV
kV: <100 .<200 .<300

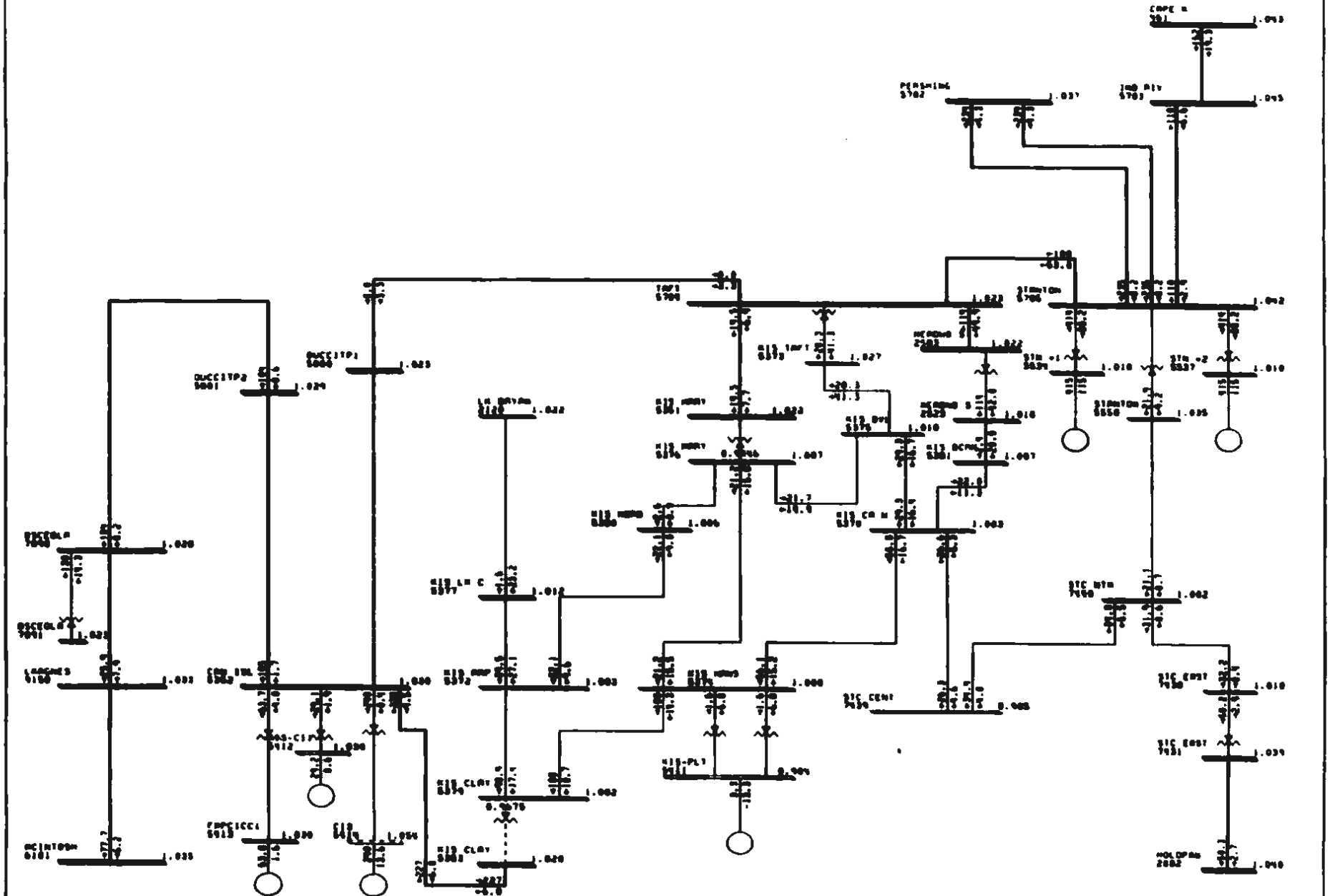
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - INITIAL CONDITIONS
WED. JUN 10 1998 16:43

LOG% BASED
0.950 UV 1.050 OV
KV: <100 .<200 .<300

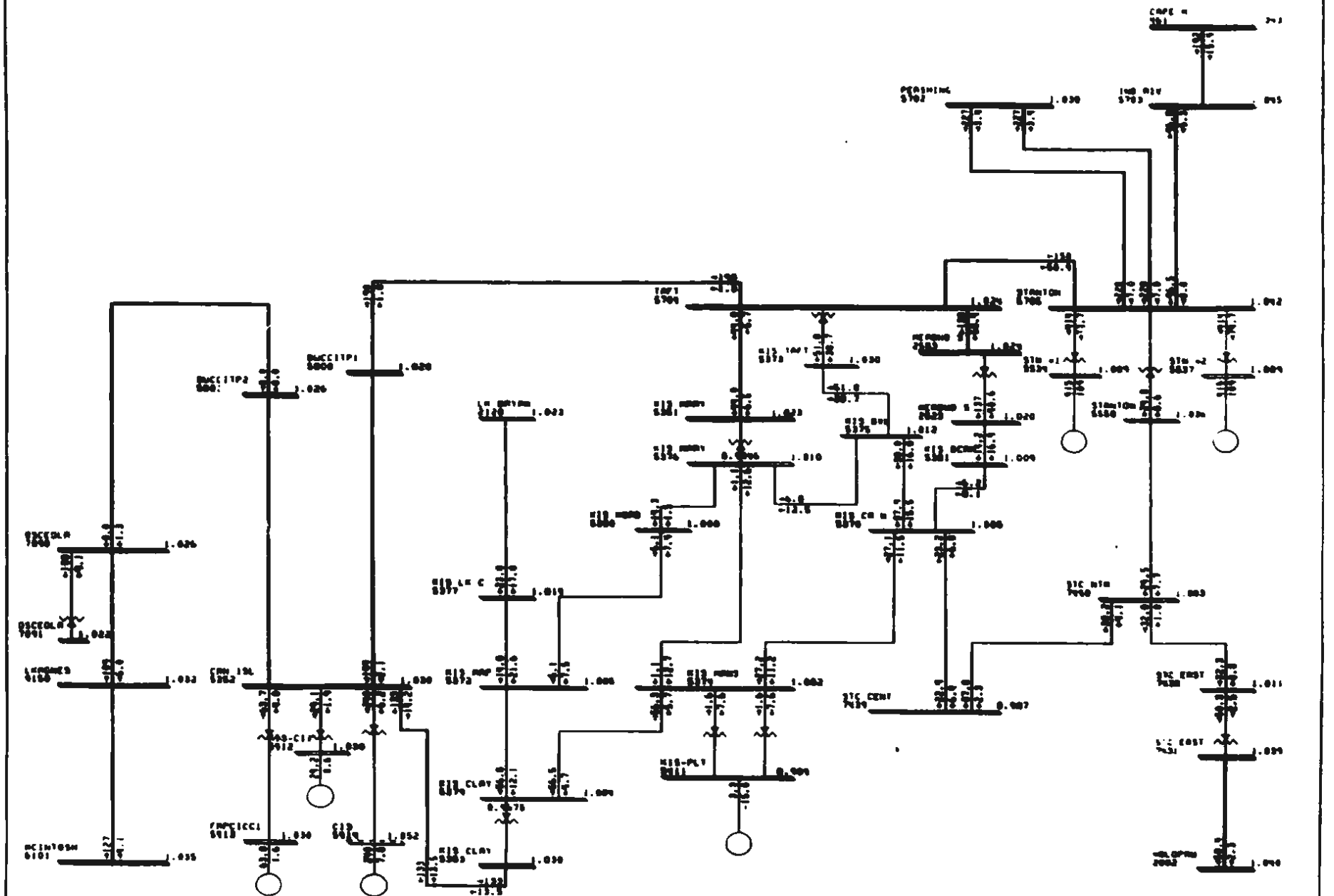
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - CANISL/OUCCITP1 OUT
THU. JUN 11 1998 8:41

LOG% AREA
0.900 PU 1.050 PU
KV: <100 .<200 .<300

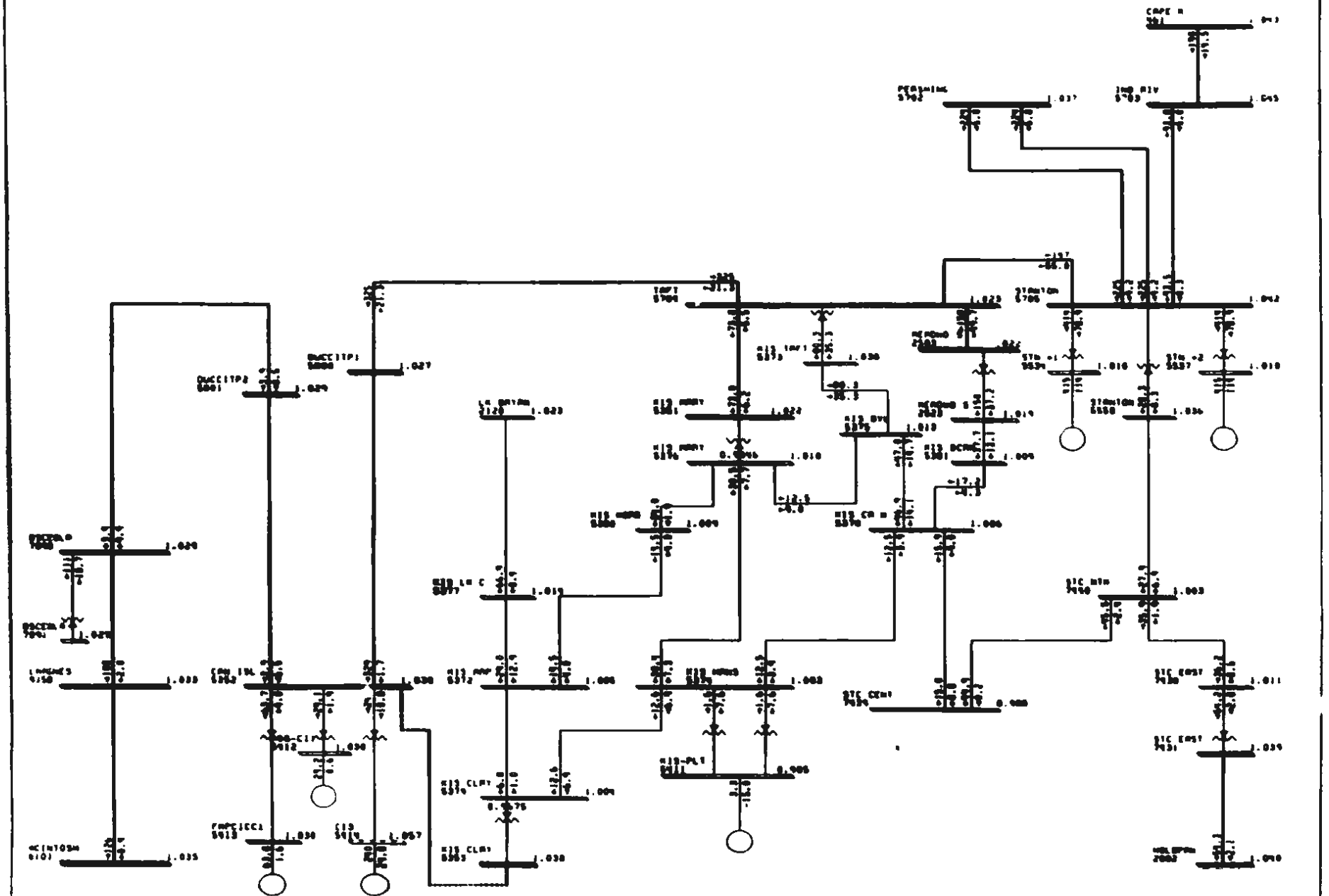
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - CANISL/DUCCITP2 OUT
THU. JUN 11 1998 8:42

LOG%_BASE0
0.900 LV 1.050 OV
KV: 100 .4200 .4800

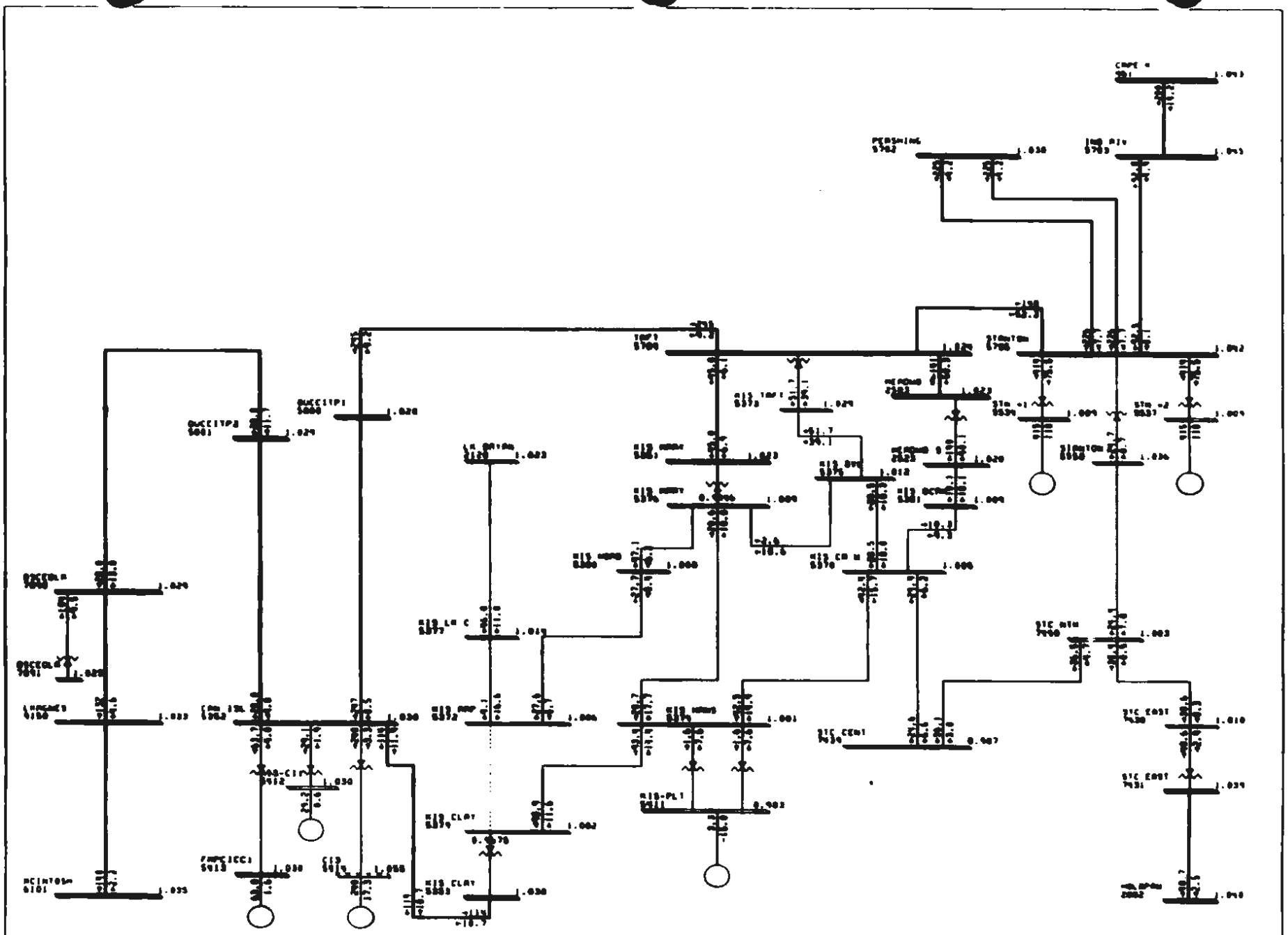
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - CANISL/CLAY OUT
THU, JUN 11 1998 8:45

LOG% RATED
0.900KV 1.050 PU
KV: 100 200

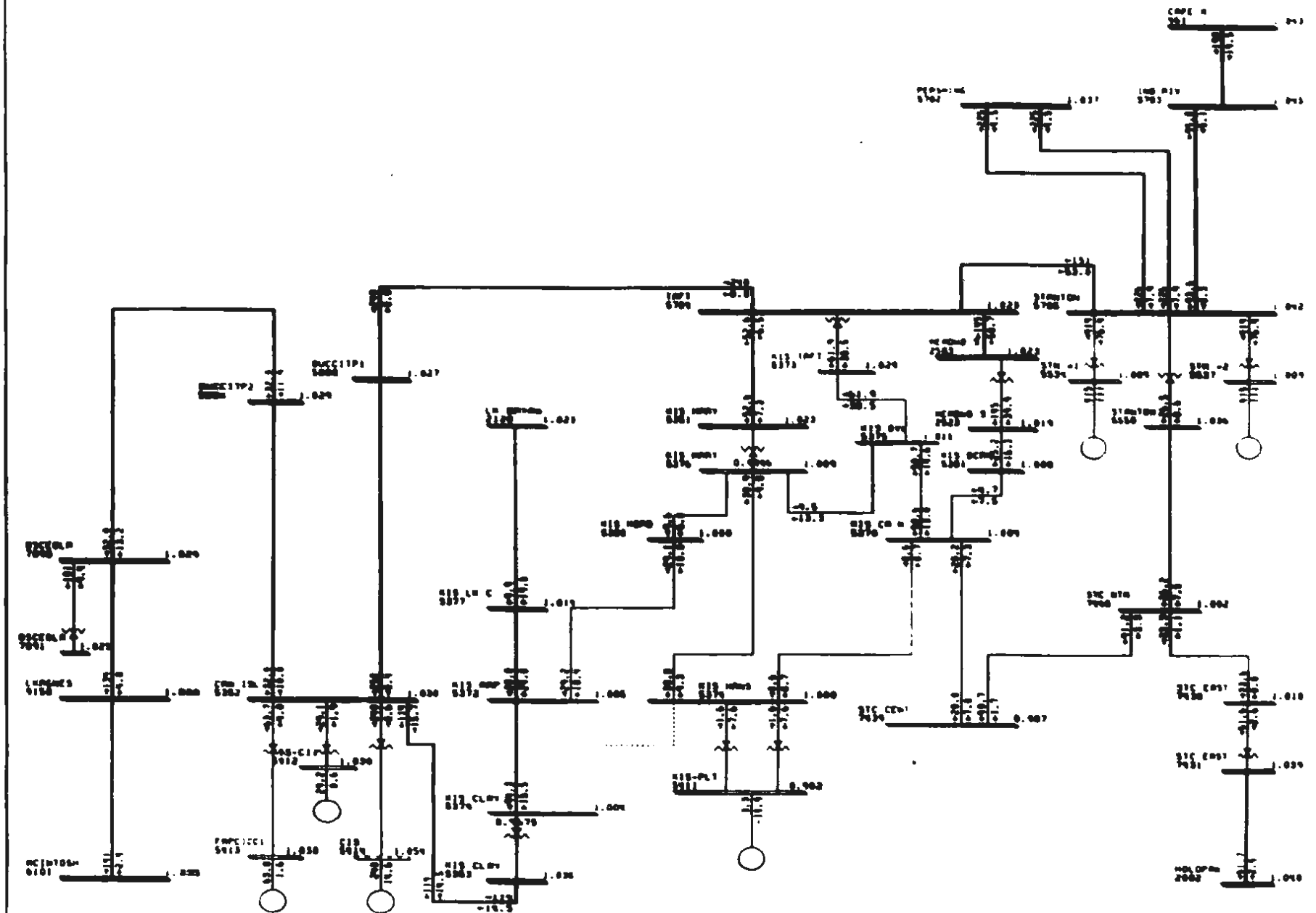
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR

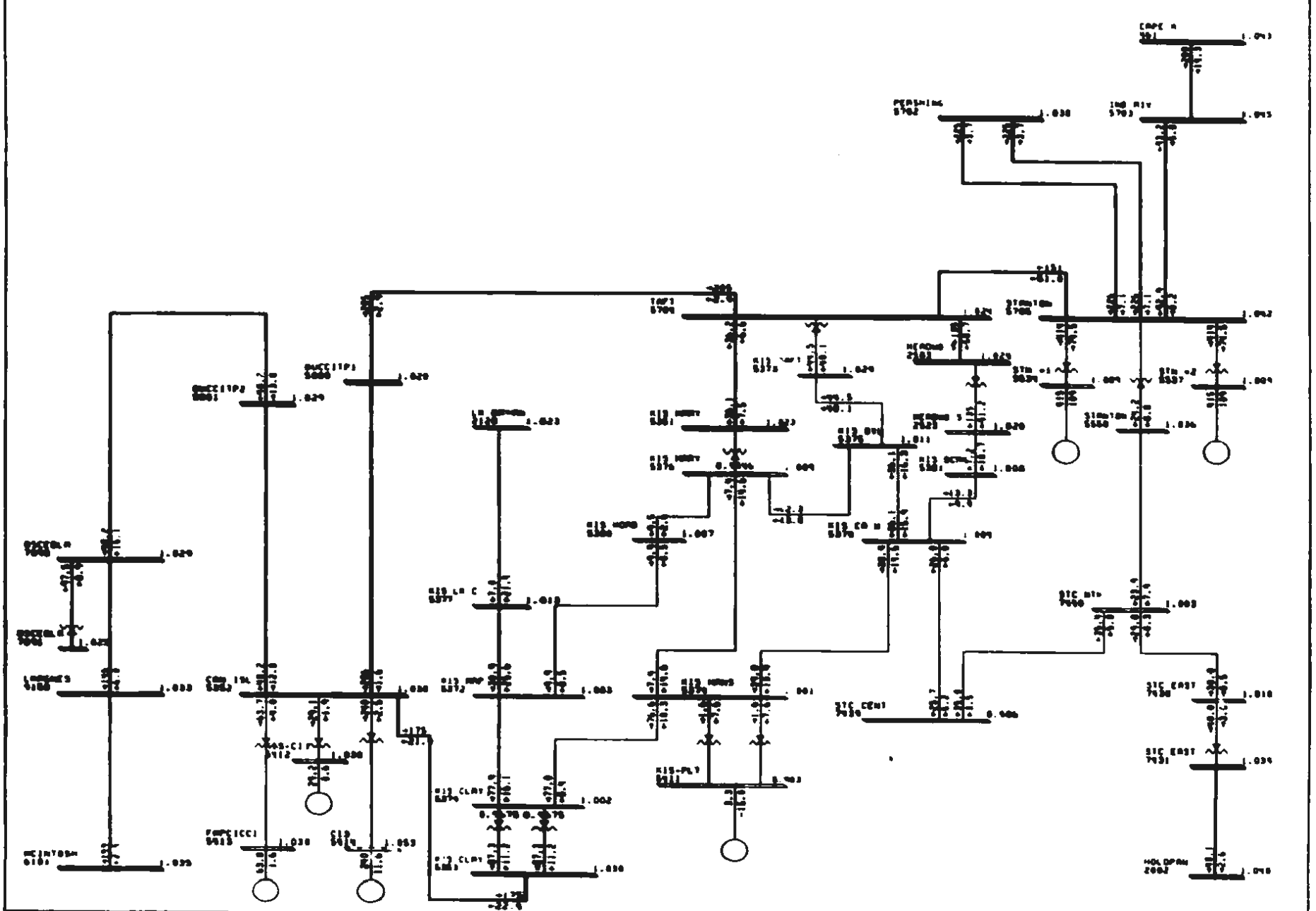


2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - CLAY/AIRPORT OUT
THU. JUN 11 1998 8:46

LOG% RATED
0.900 LV 1.050 OV
KV: <100 .<200 .<300

BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW MVAR

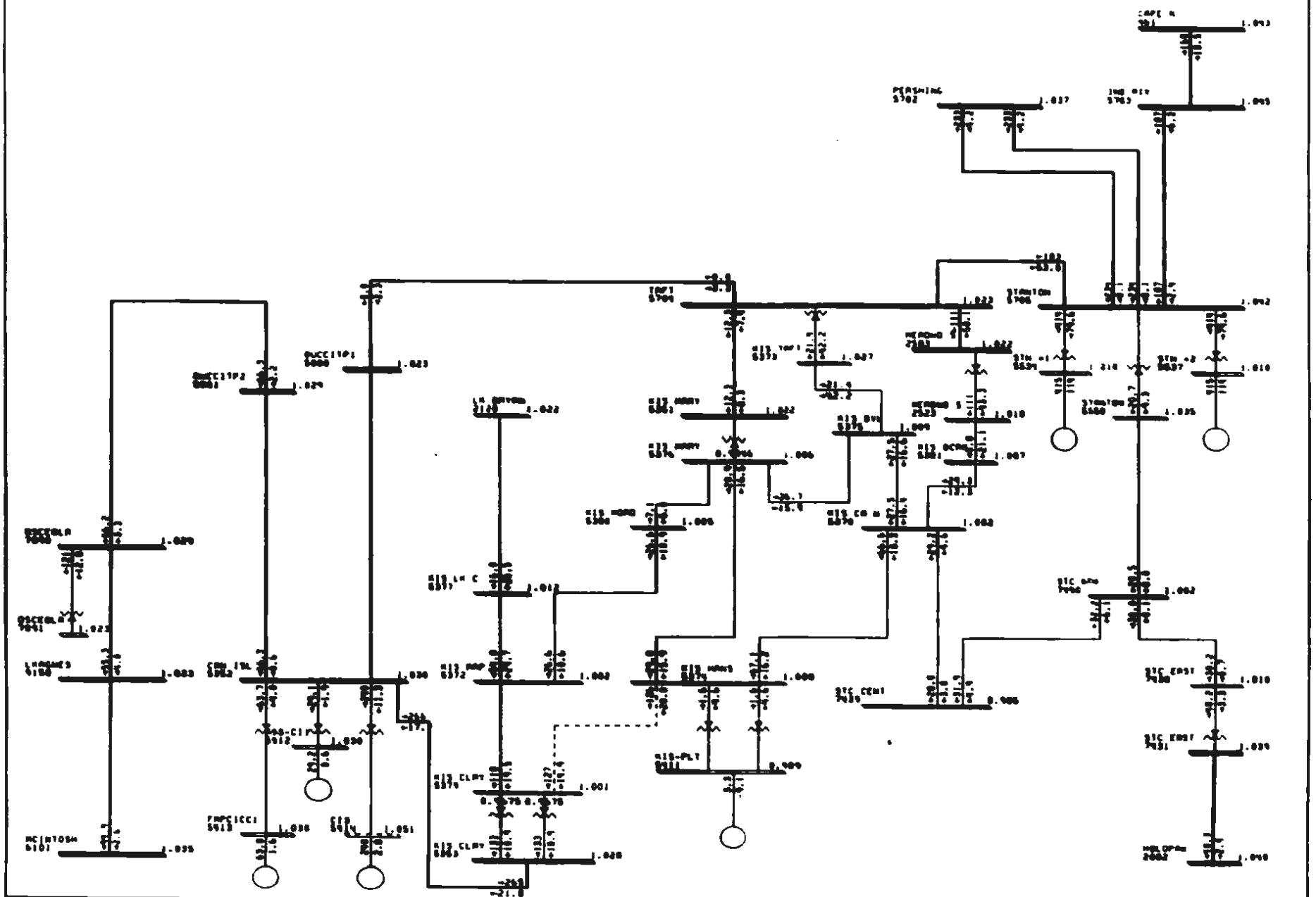

2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - CLAY/HANSEL OUT
THU, JUN 11 1998 8:47
LOGABLE
0.900 1.050 PU
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR

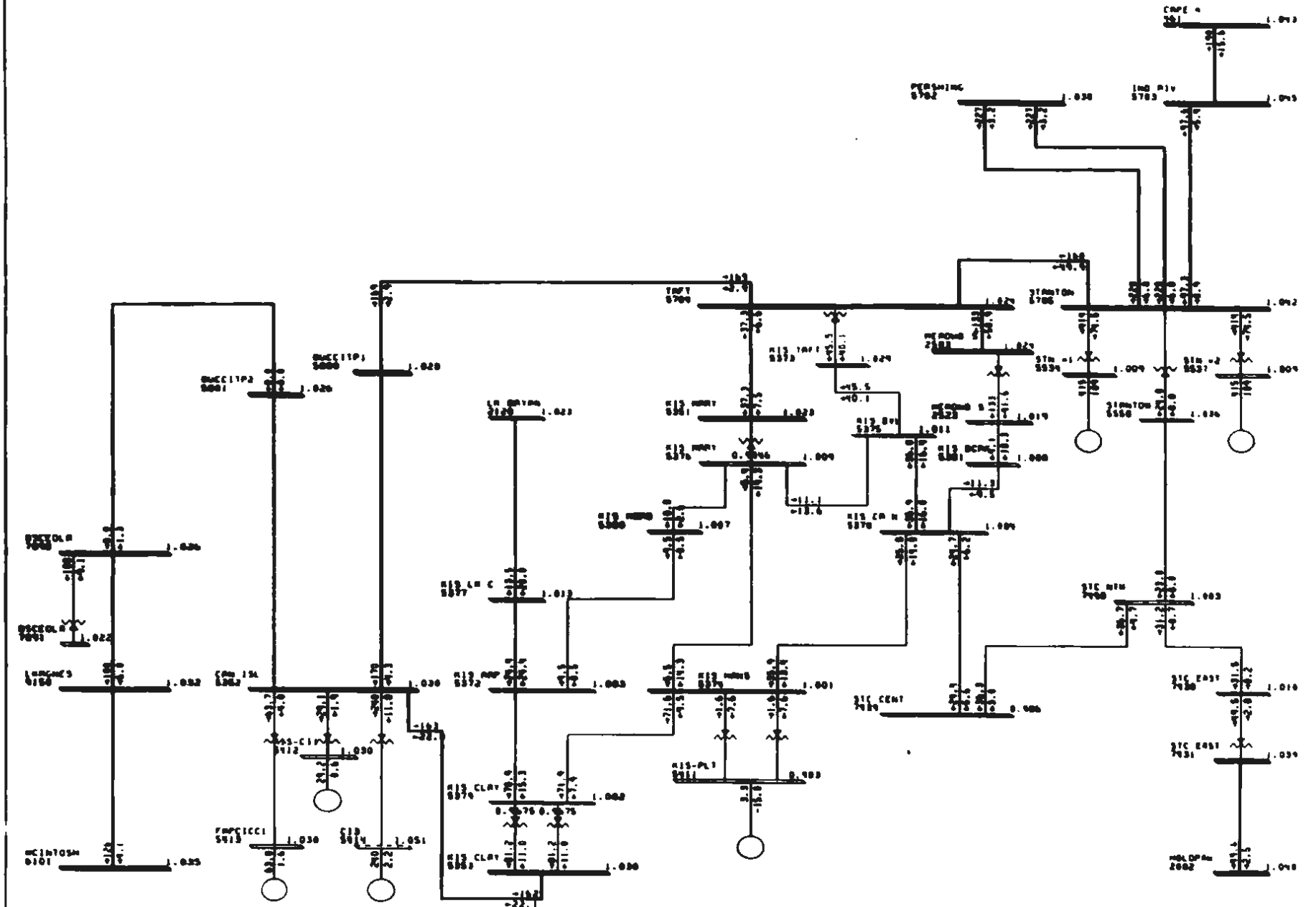


20C. SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - NEW TRANS @ CLAY - INITIAL
THU JUN 11 1998 8:09

100% AREA
0.950 LV 1.050 LV
KV: 100 200

BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR

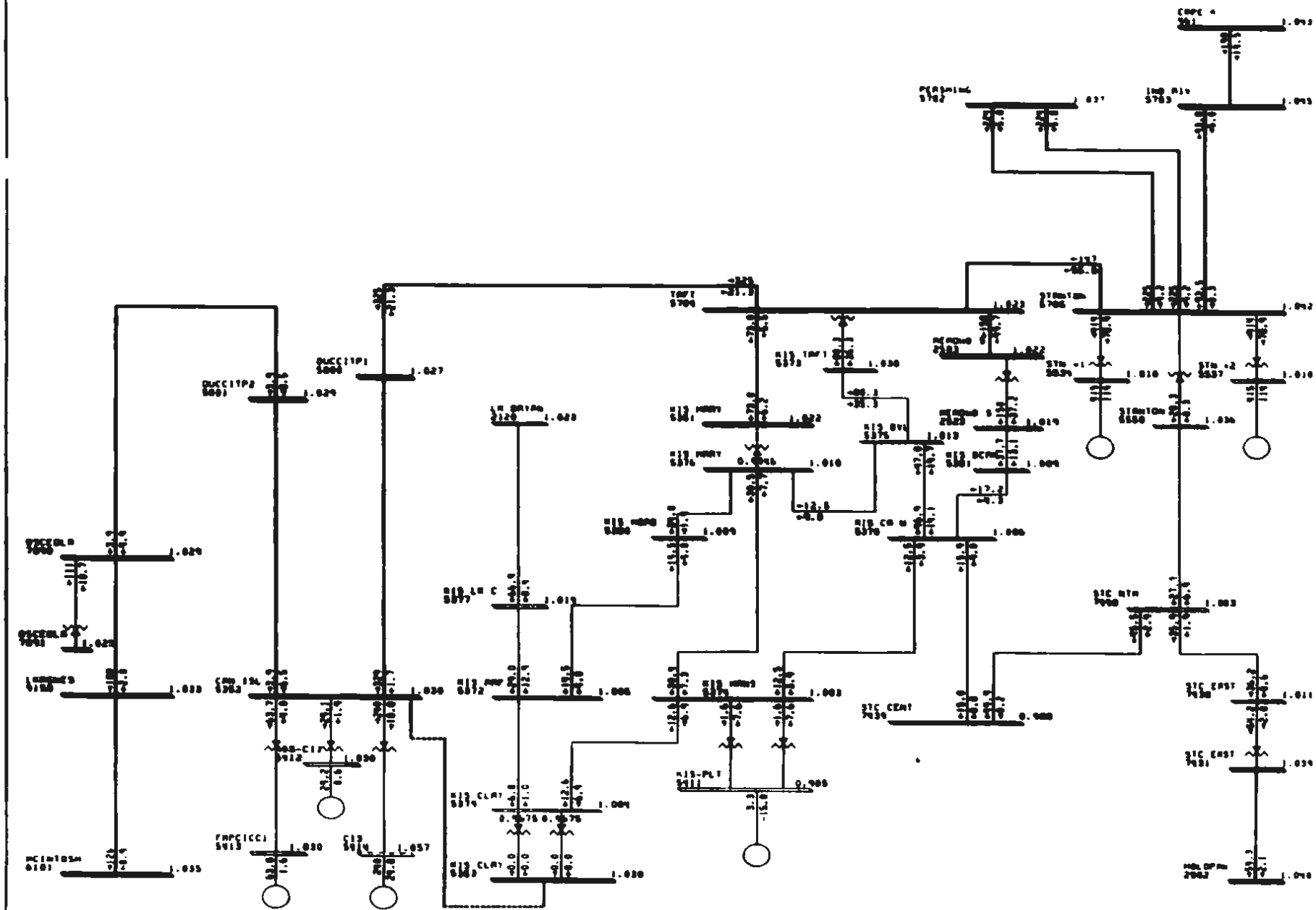

2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - NEW TRANS @ CI/OUCTPI OUT
TH JUN 11 1998 8:55
LOOZ_BASE8
0.900UV 1.050 OV
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - NEW TRANS @ CI/OUCTP2 OUT
THU, JUN 11 1998 8:56

LOG% BASED
0.900 UV 1.050 OV

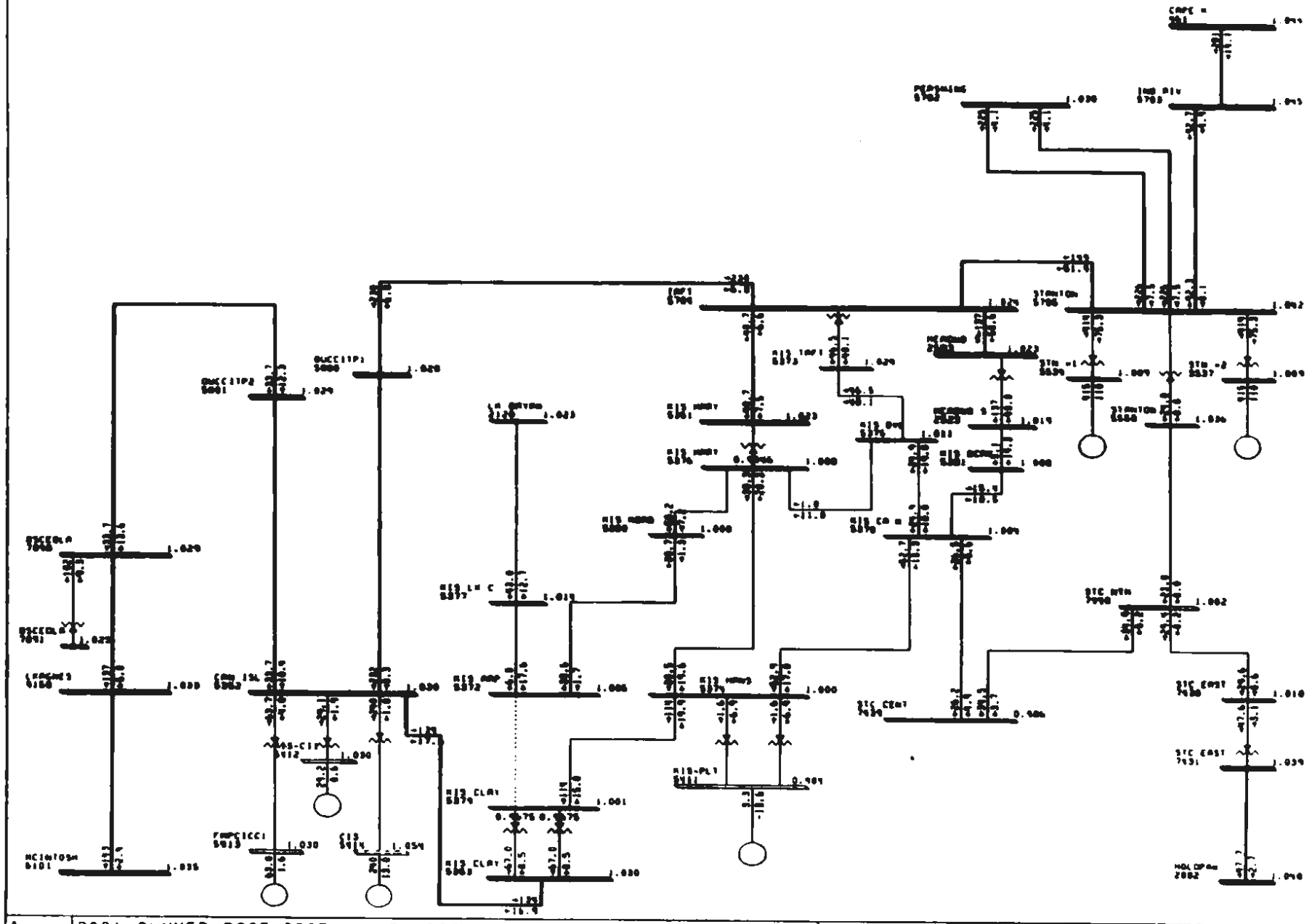
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - NEW TRANS @ CI/CLAY OUT
THU. JUN 11 1998 8:57

LOG% ABIES
0.900 UV 1.050 OV
KV: <100 .<200 .<300

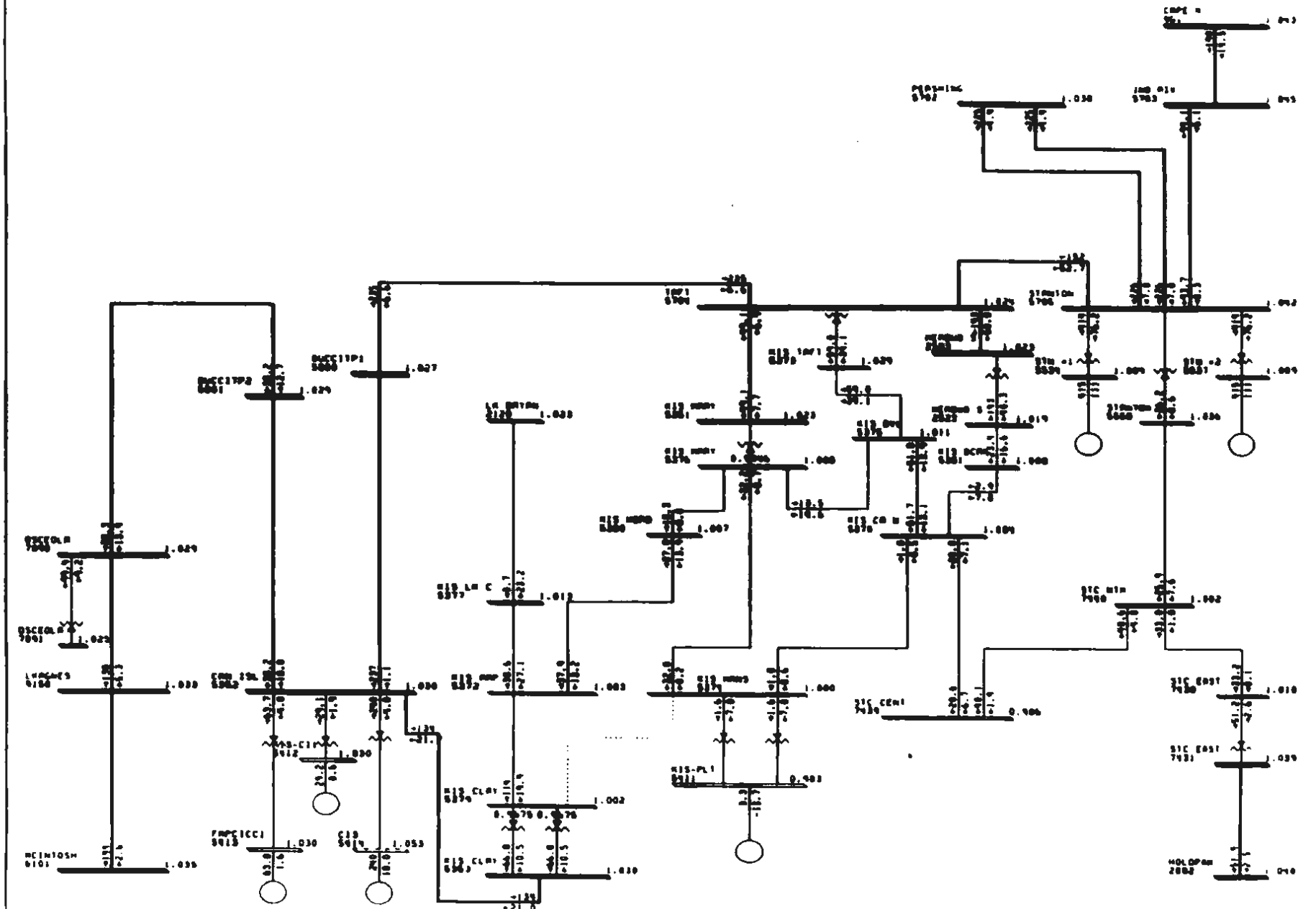
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - NEW TRANS @ CLAY/AIRPORT OU
THU. JUN 11 1998 8:58

100% RATES
0.900 UV 1.050 OV
KV: <100 .<200 .<300

BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR



2001 SUMMER BASE CASE - FY1998 - REVISION 3
WITHOUT INTERCESSION CITY TIE - NEW TRANS ● CLAY/HANSEL OUT
THU, JUN 11 1998 8:59

100% RATED
0.900 PU 1.050 PU
.0100 .0200 .0300

BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR