CHAPTER A6

POWER SYSTEM ANALYSIS AND SYSTEM RELIABILITY STUDIES

Table A6.1.1-1 Abbreviation of Node Name

No.	Node name	Bus Voltage (kV)	Abbreviation
1	Aguruwella 132	132	AGURU-I
2	Aguruwella 132	33	AGURU-3
3	Ambalangoda 132	132	AMBAL-1
4	Ambalangoda 33	33	AMBAL-3
5	Ampara 132	132	AMPA-1
6	Ampara 33	33	AMPA-3
7	Angoda 132	132	ANGODA-1
8	Angoda 33	33	ANGODA-3
9	Aniyakanda 132	132	ANIYA-1
10	Aniyakanda 33	33	ANIYA-3
11	Anuradhapura 132	132	ANURA-1
12	Anuradhapura 220	220	ANURA-2
13	Anuradhapura 33	33	ANURA-3
14	Athurugiriya 132	132	ATHUR-1
15	Athurugiriya 33	33	ATHUR-3
16	Avissawella 132	132	AVISS-1
17	Avissawella 33	33	AVISS-3
18	Avissawella 66	66	AVISS-6
19	Avissawella T-branch-l	132	AVIS-1T1
20	Avissawella T-branch-l	66	AVIS-6T1
21	Avissawella T-branch-2	132	AVIS-1T2
22	Avissawella T-branch-2	66	AVIS-6T2
23	Badulla 132	132	BADUL-1
24	Badulla 33	33	BADUL-3
25	Badulla 33A	33	BADUL-3A
26	Badulla 33B	33	BADUL-3B
27	Badulla 66	66	BADUL-6
28	Balangoda 132	132	BALAN-I
29	Balangoda 33	33	BALAN-3
30	Baticola 132	132	BATIC-1
31	Baticola 33	33	BATIC-3
32	Biyagama 132	132	BIYAG-1
33	Biyagama 220	220	BIYAG-2
34	Biyagama 33	33	BlYAG-3
35	Bolawatta 132	132	BOLAW-1
36	Bolawatta 33	33	BOLAW-3
37	Bolawatta T-branch-1	132	BOLAW-TI
38	Bolawatta T-branch-2	132	BOLAW-T2
39	Boossa 132	132	BOOS-1
40	Boossa 220	220	BOOS-2
41	Boossa 33	33	BOOS-3
42	Boossa Gen.	11	BOOS-G
43	Bowatenna 132	132	BOWAT-1
- 1	Bondoma 156	1.75	50111111

Table A6.1.1-1 Abbreviation of Node Name

No.	Node name	Bus Voltage (kV)	Abbreviation		
44	Bowatenna Gen.	12.5	BOWAT-G		
45	Canyon 132	132	CANYO-1		
46	Canyon Gen.	12.5	CANYO-G		
47	Chillaw 132	132	CHILL-1		
48	Chillaw 33	33	CHILL-3		
49	Chillaw T-branch-1	132	CHILL-TI		
50	Chillaw T-branch-2	132	CHILL-T2		
51	Chunnakam 132	132	CHUNN-1		
52	Chunnakam 33	33	CHUNN-3		
53	Chunnakam Gen	11	CHUNN-G		
54	Dehiwala 132	132	DEHIWA-1		
55	Dehiwala 220	220	DEHIWA-2		
56	Dehiwala 33	33	DEHIWA-3		
57	Dehiwala Transformer Tertially	33	DEHIW-TT		
58	Deniyaya 132	132	DENIY-1		
59	Deniyaya 33	33	DENIY-3		
60	Deniyaya T-branch-1	132	DENIY-TI		
61	Deniyaya T-branch-2	132	DENIY-T2		
62	Eheliyagoda 132	132	EHELI-1		
63	Eheliyagoda 33	33	EHELI-3		
64	Embilipitiya 132	132	EMBIL-1		
65	Embilipitiya 33	33	EMBIL-3		
66	Fort 11	11	FORT-11		
67	Fort 132	132	FORT-1		
68	Fort 132 Dummy	132	FORT-D		
59	Galle 132	132	GALLE-1		
70	Galle 33	33	GALLE-3		
71	Galle SVC	5.9	GALLE-SV		
72	Gonawala 132	132	GONAWA-1		
73	Gonawala 33	33	GONAWA-3		
74	Habarana 132	132	HABAR-1		
75	Habarana 33	33	HABAR-3		
76	Hambantota 132	132	HAMBAN-1		
77	Hambantota 33	33	HAMBAN-3		
78	Horana 132	132	HORAN-1		
79	Horana 33	33	HORAN-3		
30	Horana dummy 1	132	HORAN-DI		
31	Horana dummy 2	132	HORAN-D2		
32	Jmbulgoda 132	132	IMBULG-1		
3	Imbulgoda 33	33	IMBULG-3		
34	Inginiyagara 132	132	INGIN-I		
35	Inginiyagara 33	33	INGIN-3		
86	Inginiyagara Gen.	6.9	INGIN-G		

Table A6.1.1-1 Abbreviation of Node Name

No.	Node name	Bus Voltage (kV)	Abbreviation
87	Kahawatta 220	220	KAHAWA-2
88	Katana 132	132	KATANA-1
89	Katana 33	33	KATANA-3
90	Kegalla 132	132	KEGAL-1
91	Kegalla 33	33	KEGAL-3
92	Kelanitissa 132	132	KELAN-1
93	Kelanitissa 220	220	KELAN-2
94	Kelanitissa 33	33	KELAN-3
95	Kelanitissa 33A	33	KELAN-3A
96	Kelanitissa 33B	33	KELAN-3B
97	Kelanitissa Gen. Combined Cycle 1	11	KELA-CC1
98	Kelanitissa Gen. Combined Cycle 2	11	KELA-CC2
99	Kelanitissa Gen. Gas (114MW)	15	KELA-GT3
100	Kelanitissa Gen. Gas (26 MW)	11	KELA-GT4
101	Kelanitissa Gen. Gas New	15	KELA-GTN
102	Kelanitissa Gen. Gas-1 (existing)	11	KELA-GT1
103	Kelanitissa Gen. Gas-2 (existing)	11	KELA-GT2
104	Kelanitissa Gen. Gas-3 (existing)	11	KELA-GT3
105	Kelanitissa Gen. Steam	11	KELAN-ST
106	Kelanitissa Transformer Tertiary	33	KELAN-TT
107	Kelaniya 132	132	K-NIYA-1
108	Kelaniya 33	33	K-NIYA-3
109	Kesbewa 132	132	KESBE-1
110	Kesbewa 33	33	KESBE-3
111	Kesbewa dummy 1	132	KESBE-D1
112	Kesbewa duminy 2	132	KESBE-D2
113	Kesbewa dummy 3	132	KESBE-D3
114	Kesbewa dummy 4	132	KESBE-D4
115	KHD Power 132	132	KHD-1
116	KHD Power 33	33	KHD-3
117	KHD Power Gen.		KHD-G
118	Kilinochchi 132	132	KILIN-1
119	Kilinochchi 33	33	KILIN-3
120	Kilinochchi T-branch-1	132	KILIN-T1
121	Kilinochchi T-branch-2	132	KILIN-T2
122	Kiribathkumbura 132	132	KIRIB-1
123	Kiribathkumbura 33	33	KIRIB-3
124 -	Kollupitiya 11	11	KOLLU-11
125	Kollupitiya 132	132	KOLLU-1
126	Kolonnawa 132	132	KOLON-1
127	Kolonnawa 220	220	KOLON-2
128	Kolonnawa 33	33	KOLON-3
129	Kolonnawa 33A	33	KOLON-3A

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Table A6.1.1-1 Abbreviation of Node Name

No.	Node name	Bus Voltage (kV)	Abbreviation
130	Kolonnawa 33B	33	KOLON-3B
131	Kolonnawa 66	66	KOLON-6
132	Kolonnawa Transformer Tertially	33	KOLON-TT
133	Kotmale 132	132	KOTMA-1
134	Kotmale 220	220	KOTMA-2
135	Kotmale Gen1	13.8	KOTMA-GI
136	Kotmale Gen2	13.8	KOTMA-G2
137	Kotugoda 132	132	KOTUG-1
138	Kotugoda 220	220	KOTUG-2
139	Kotugoda 33	33	KOTUG-3
140	Kukule 132	132	KUKULE-1
141	Kukule Gen.	11	KUKULE-G
142	Kuliyapitiya 132	132	KULIYA-1
143	Kuliyapitiya 33	33	KULIYA-3
144	Kurunegala 132	132	KURUN-1
145	Kurunegala 33	33	KURUN-3
146	Laxapana 132	132	LAX-1
147	Laxapana 66	66	LAX-6
148	Laxapana Dummy	66	LAX-DI
149	Laxapana Dummy	66	LAX-D2
150	Laxapana Gen.	11	LAX-G
151	Matale 132	132	MATAL-1
152	Matale 220	220	MATAL-2
153	Matara 132	132	MATAR-I
154	Matara 33	33	MATAR-3
155	Matugama 132	132	MATUG-1
156	Matugama 220	220	MATUG-2
57	Matugama 33	33	MATUG-3
158	Matugama Transformer Tertially	33	MATUG-TT
59	Medegama 132	132	MEDEGA-1
60	Medegama 33	33	MEDEGA-3
61	Mewella P/S 220	220	MAWEL-2
62	Mewella P/S Gen.	11	MAWEL-G
63	Muthragawella 220	220	MUTHR-2
64	Muthragawella 33	33	MUTHR-3
65	Muthragawella Gen.	11	MUTHR-G
66	New Anuradhapura 132	132	N-ANUR-1
67	New Anuradhapura 220	220	N-ANUR-2
68	New Chillaw 132	132	N-CHIL-1
69	New Chillaw 220	220	N-CHIL-2
70	New Galle 132	132	· · · · · · · · · · · · · · · · · · ·
<u></u> 71 →	New Galle 132	132	N-GALL-1
	nen Galle 152	132	N-GALL-1

Table A6.1.1-1 Abbreviation of Node Name

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No.	Node name	Bus Voltage (kV)	Abbreviation				
173	New Galle 33	33	N-GALL-3				
174	New Galle Gen.	11	N-GALL-G				
175	New Habarana	220	N-HABA-2				
176	New Laxapana 132	132	N-LAX-1				
177	New Laxapana Gen.	12.5	N-LAX-G				
178	New Polpitiya 132	132	N-POLP-1				
179	New Polpitiya 220	220	N-POLP-2				
180	Nuwara Eliya 132	132	NUWAR-1				
181	Nuwara Eliya 33	. 33	NUWAR-3				
182	Nuwara Eliya 66	66	NUWAR-6				
183	Nuwara Eliya T-branch-1	66, 132	NUWAR-TI				
184	Nuwara Eliya T-branch-2	66, 132	NUWAR-T2				
185	Oruwala 132	132	ORUWA-1				
186	Oruwala 33	33	ORUWA-3				
187	Oruwala T-branch-l	132	ORUWA-TI				
188	Oruwala T-branch-2	132	ORUWA-T2				
189	Paddiruppu 132	132	PADDIR-1				
190	Paddiruppu 33	33	PADDIR-3				
191	Padukka 220	220	PADUK-2				
192	Padukka 33	33	PADUK-3				
193	Padukka 66	66	PADUK-6				
194	Padukka T-branch-1	66	PADUK-TI				
195	Padukka T-branch-2	66	PADUK-T2				
196	Palekelle 132	132	PALEK-1				
197	Palekelle 33	33	PALEK-3				
198	Panadura 132	132	PANAD-1				
199	Panadura 33	33	PANAD-3				
200	Panadura dummy 1	132	PANAD-D1				
201	Panadura dummy 2	132	PANAD-D2				
202	Panadura dummy 3	132	PANAD-D3				
203	Panadura dummy 4	132	PANAD-D4				
204	Panadura T-branch-1	132	PANAD-TI				
205	Panadura T-branch-2	132	PANAD-T2				
206	Pannala 132	132	PANNA-1				
207	Pannala 33	33	PANNA-3				
208	Pannipitiya 132	132	PANNI-1				
209	Pannipitiya 220	220	PANNI-2				
210	Pannipitiya 33	33	PANNI-3				
211	Pannipitiya Static Capacitor	33	PANNI-SC				
212	Polonnaruwa 132	132	POLON-I				
213	Polonnaruwa 33	33	POLON-3				
214	Polpitiya 132	132	POLPI-1				
215	Polpitiya Gen.	12.5	POLPI-G				
410	a Ospiniya Ovin	1010					



Table A6.1.1-1 Abbreviation of Node Name

No.	Node name	Bus Voltage (kV)	Abbreviation
216	Puttalam 132	132	PUTTA-1
217	Puttalam 33	33	PUTTA-3
218	Puttalam P/S 132	132	PUTTA-PI
219	Puttalam P/S 220	220	PUTTA-P2
220	Puttalam P/S Gen.	11	PUTTA-PG
221	Randenigala 220	236	RANDE-2
222	Randenigala Gen.	12.5	RANDE-G
223	Rantembe 132	138	RANTE-I
224	Rantembe 220	220	RANTE-2
225	Rantembe 33	34.5	RANTE-3
226	Rantembe Gen.	12.5	RANTE-G
227	Ratmalana 132	132	RATMA-1
228	Ratmalana 33	33	RATMA-3
229	Ratmalana 33A	33	RATMA-3A
230	Ratmalana 33B	33	RATMA-3B
231	Ratnapura 132	132	RATNA-1
232	Ratnapura 33	33	RATNA-3
233	Samanalawewa 132	132	SAMAN-1
234	Samanalawewa Gen.	10.5	SAMAN-G
235	Sapugaskanda 132	132	SAPUG-1
236	Sapugaskanda 132A	132	SAPUG-1A
237	Sapugaskanda 132B	132	SAPUG-1B
238	Sapugaskanda 33	33	SAPUG-3
239	Sapugaskanda 33A	33	SAPUG-3A
240	Sapugaskanda 33B	33	SAPUG-3B
241	Sapugaskanda Gen. existing	11	SAPUG-G
242	Sapugaskanda Gen. new 1	11	SAPU-GN1
243	Sapugaskanda Gen. new 2	11 : :	SAPU-GN2
244	Sapugaskanda Gen 1	11	SAPUG-G1
45	Sapugaskanda Gen 2	11	SAPUG-G2
246	Sapugaskanda P/S 132	142	SAPUG-1P
247	Sapugaskanda T-branch-1	132	SAPUG-TI
48	Sapugaskanda T-branch-2	132	SAPUG-T2
49	Sithawakapura 132	132	SITHA-I
:50	Sithawakapura 33	33	SITHA-3
51	Sri Jaya'pura 132	132	SRIJA-1
52	Sri Jaya'pura 33	33	SRIJA-3
53	Sub-B 11	11	SUB-B-11
54	Sub-B 132	132	SUB-B-1
55	Thulhiriya 132	132	THULH-1
56	Thulhiriya 33	33	· · · · · · · · · · · · · · · · · · ·
55	Thulhiriya T-branch-1	132	THULH-3
58	Thulhiriya T-branch-2	132	THULH-T1 THULH-T2







Table A6.1.1-1 Abbreviation of Node Name

No.	Node name	Bus Voltage (kV)	Abbreviation
259	Town Hall 132	- 132	TOWN-1
260	Town Hall 33	33	TOWN-3
261	Trincomalee 132	132	TRINC-1
262	Trincomalee 33	- 33	TRINC-3
263	Trincomalee P/S 132	132	TRINC-P1
264	Trincomalee P/S 220	220	TRINC-P2
265	Trincomalee P/S Gen.	11	TRINC-G
266	Ukuwela 132	132	UKUWE-1
267	Ukuwela 33	33	UKUWE-3
268	Ukuwela Gen.	12.5	UKUWE-G
269	Valaichchenai 132	132	VALAI-I
270	Valaichchenai 33	33	VALAI-3
271	Vavunia 132	132	VAVUNI-1
272	Vavunia 33	33	VAVUNI-3
273	Veyangoda 132	132	VEYAN-1
274	Veyangoda 132	33	VEYAN-3
275	Veyangoda 220	220	VEYAN-2
276	Victoria 220	236	VICTO-2
277	Victoria Gen.	12.5	VICTO-G
278	Wariyapola Switching Station	220	WARIYA-2
279	Wimalasurendra 132	132	WIMAL-1
280	Wimalasurendra 33	33	WIMAL-3
281	Wimalasurendra Gen.	11	WIMAL-G

Table A6.1.1 - 2 Operating Temperature of Existing Transmission Lines

2L.1. 2L.2. 2L.3. 2L.4. 2L.5. 1U1. 1U2. 1U3. 1L.1. 1L.2. 1L.3. 1L.4.	Biyagama - Kotugoda Biyagama - Kotmale Kotmale - Victoria Victoria - Randenigala Randenigala - Rantembe Kelanitissa - Fort Fort - Kollupitiya	220 220 220 220 220 220	2 2 2	Zebra 2 x Zebra	75
2L2. 2L3. 2L4. 2L5. 1U1. 1U2. 1U3. 1L1. 1L2. 1L3. 4L4.	Biyagama - Kotmale Kotmale - Victoria Victoria - Randenigala Randenigala - Rantembe Kelanitissa - Fort Fort - Kollupitiya	220 220 220	2		15
2£3, 2£4, 2£5, 1U1, 1U2, 1U3, 1£1, 1£2, 1£3,	Kotmale - Victoria Victoria - Randenigala Randenigala - Rantembe Kelanitissa - Fort Fort - Kollupitiya	220 220		2 X ZCOG	26
2L4. 2L5. 1U1. 1U2. 1U3. 1L1. 1L2. 1L3. 1L4.	Victoria - Randenigala Randenigala - Rantembe Kelanitissa - Fort Fort - Kollupitiya	220	2	1 m 7 db	75
2L5. 1U1. 1U2. 1U3. 1L1. 1L2. 1L3. 1L4.	Randenigala - Rantembe Kelanitissa - Fort Fort - Kollupitiya		1	2 x Zebra	75
IUI. IU2. IU3. IL1. IL2. IL3. IL4.	Kelanitissa - Fort Fort - Kollupitiya	220	-	2 x Zebra	75
1U2, 1U3, 1L1, 1L2, 1L3, 1L4,	Fort - Kollupitiya	132	1	2 x Zebra	75
1U3. IL1. IL2. IL3. IL4. IL5.	- •	132	1	UG, (Cu 500)	
IL1. IL2. IL3. IL4. IL5.	Kollupitiya - Kolonnawa	132	1	UG, (Cu 350)	•
IL2. IL3. IL4. IL5.	Biyagama - Pannipitiya	132	2	UG, (Cu 500) Zebra	75
11.3. 11.4. 11.5.	Biyagama - Kelanitissa	132	2	2 x Goat	75
IL4. IL5.	Biyagama - Sapugaskanda PS	132	2	Lynx	54
ILS.	Kolonnawa - Kelanitissa	132	2	Zebra	54
	Kolonnawa - Pannipitiya	132	2	Lynx	54 54
IL6.	Kolonnawa -Sapugaskanda(T)	132	2	Coyote	54
L7.	Sapugaskanda (T) - Kotugoda	132	2	Coyote	54
L8.	Sapugaskanda (T) - SS	132	2	Coyote	54
L9.	Kotugoda - Bolawatta	132	2	· · · · · · · · · · · · · · · · · · ·	54
Lio.	Bolawana - Chilaw (T)	132	2	Coyote	54
LII.	Chilaw (T) - Puttalam	132	2	Lynx	54
1.12.	Chilaw (T) - SS	132	2	Lynx	and the second s
L13.	Kolonnawa - Oruwala (T)	132	2	Lynx	75
L14.	Oruwala (T) - SS	132	2	Lynx	54
L15.	Oruwala (T) - Thulhiriya (T)	132	2	Lynx	54
L16.	Thulhiriya (T) - SS	132	2	Lynx	54
L17.	Thulhiriya (T) - Polpitiya	132	2	Lynx	54
L18.	Kolonnawa - Avissawella (T)	132	2	Lynx	54
L19.	Avissawella (T) - SS	132	2	Lynx	54
L20.	Avissawella (T) - Polpitiya	132	2	Lynx	75
L21.	Pannipitiya - Ratmalana	132	2	Lynx	54
L22.	Pannipitiya - Panadura (T)	132	2	Lynx Cont	54
L23.	Panadura (T) - Matugama	132	2	Goat Goat	75
1.24.	Panadura (T) - SS	132	2		75 75
L25.	Polpitiya - Laxapana	132	2	Lynx	75
L26.	Laxapana - Wimalasurendra	132	2	Lynx	54 54
L27.	Laxapana - New Laxapana	132	2	Lynx	54
L28.	New Laxapana - Polpitiya	132	2	Lynx	54
L29.	New Laxapana - Canyon	132	_	Lynx	54
L30.	Polpitiya - Kotmale	132	1	Lynx	54
L31.	Kotmale - Kiribatkumbura	132	1	Lynx	54
L32.	Kiribatkumbura - Aneradhapura	132	:	Lynx	54
L33.	Polpitiya - Ukuwela	132	- ;	Lynx	54
	Ukuwela - Habarana	132]	Lynx	54
	Habarana - Anuradhapura	132	ì	Lynx	54
	Ukuwela - Bowatenna	. 132	-	Lynx	54
	Kiribathkumbra - Kurunegala	132	i 2	Lynx Lynx	54 54
	Habarana - Valaichchenai	132	i I	•	54 75
	Anuradhapura - Trincomalee	132	2	Lynx	73 54
	New Laxapana - Balangoda	132	2	Lynx	
	Balangoda - Samanatawewa	132	2	Lynx Zebra	54 75
	Samanalawewa - Embilipitiya	132	2		75 75
	Balangoda - Deniyaya (T)	132	2	Lynx Tiges	75 \$4
	Deniyaya (T) - Galle	132	2	Tiger	54 54
	Rantembe - Badulla	132		Tiger	54 35
	Badulla - Inginiyagala	132	1	Lynx Oriola	75 54
	Anuradhapura - Kilinochchi(T)			Oriole	54
	Kilinochchi (T) - Chunnakam	132 132	2 2	Lynx Lynx	54 54

Table A6.1.1 · 3 Maximum Current Rating of Conductors

Conductors of Existing Lines

Code Name Type	Tiger ACSR	Coyote ACSR	Oriole ACSR	Lynx ACSR	Goat ACSR	Zebra ACSR
Current Rating at 54 °C Evening(A)	178 365		199 432		244 658	253 750
Current Rating at 75 °C Day (A) Evening(A)	379 487		444 578	464 607	656 882	726 987
Current Rating at 90 °C Emergency (A)	554	550	658	690	1005	1112
Fault Current 1sec (kA)	12.7	11.9	16.5	17.8	31.5	34.3

Proposed Conductors for Future Lines

Code Name Type		Lynx ACSR	Bear ACSR	Goat ACSR	Zebra ACSR	Grackie ACSR	Pheasant ACSR	Parrot ACSR
Current Rating at 54 °C	Day (A) Evening(A)	204 453		244 658	253 750			
Current Rating at 75 °C	Day (A) Evening(A)		579 771	656 882				1029 1447
Current Rating at 80 °C	Day (A) Evening(A)	505 636	632 809					1131 1513
Current Rating at 90 °C E	mergency (A)	690	878	1005	1112	1394	1457	1633
Fault Current Isec (kA)		17.8	23.3	31.5	34.3	48.3	51.5	61.1

Note: Current ratings in the tables were calculated assuming the following conditions;

		Day	Evening	Emergency
Solar radiation	(W/m²)	1200	0	0
Ambient temperature	(°C)	35	30	30
Wind Speed	(°C)	0.6	0.6	0.6

Table A6.1.1 • 4 Data of Existing Transmission Lines as of November 1995

No.	T/L	ъ	ranch	Malara	Candina				<u>.</u>					
110.	Ref.		to		Conductor	-	cci		X	Y	R	X	<u>Y</u>	Note
Partesta				(kV)	 	(km)		· (Ω)	(Ω)	(mS)	100	MVA Ba	SE (%)	
Existin		· · · · · · · · · · · · · · · · · · ·	rember 28, 199						<u> </u>					
1	2L1	BIYAG-2	KOTUG-2	220	Zebra	19.6	2	1.4818	7.9576	0.0568	0.3061	1.6441	2.7497	
2		BIYAG-2	KOTUG-2	220	Zebra	19.6		1.4818	7.9576	0.0568	0.3061	1.6441	2.7497	
3	2L2	BIYAG-2	KOTMA-2	220	2 x Zebra	70.5	2	2.6649	21.1500	0.2670	0.5506	4.3698	12.9250	
_4		BIYAG-2	KOTMA-2	220	2 x Zebra	70.5		2.6649	21.1500	0.2670	0.5506	4.3698	12.9250	:
5_	2L3	KOTMA-2	VICTO-2	220	2 x Zebra	30.1	2	1.1378		0.1127	0.2351	1.8844	5.4563	
6		KOTMA-2	VICTO-2	220	2 x Zebra	30.1		1.1378		0.1127	0.2351	1.8844	5.4563	
7	21.4	VICTO-2	RANDE-2	220	2 x Zebra	16.4	ı	0.6199	5.1660	0.0590	0.1281	1.0674	2.8553	
8	2L5	RANDE-2	RANTE-2	220	2 x Zebra	3.1	1	0.1172		0.0112	0.0242	0.2018	0.5397	
9	IUI	KELAN-I	FORT-1	132	Cu 500	4.9	1	0.1999	0.4645	0.6311	0.1147		10.9971	
10		FORT-1	FORT-D	132	Cu 350	0.0			0.107	V.V11	0.0000	0.0500	0.0000	
11		FORT-D	KOLLU-1	132	Cu 350	2.7	•	0.1509	0.2673	0.0003	0.0866	0.1534	0.0053	
12	1113	KOLLU-1	KOLON-1	132	Cu 500	5.4	1	0.2203	0.5119	0.6955			12 1192	
13		BIYAG-I	PANNI-I	132	Zebra						0.1265		·	
14	101	BIYAG-1	PANNI-I			15.5	2	1.1718	6.2930	0.0438	0.6725	3.6117	0.7629	
15	11.3			132	Zebra	15.5		1.1718	6.2930	0.0438	0.6725	3.6117	0.7629	
	ILZ	BIYAG-I	KELAN-1	132	2 x Goat	12.5	2	0.6238		0.0468	0.3580	2.1737	0.8157	···-
16		BIYAG-I	KELAN-1	132	2 x Goat	12.5		0.6238		0.0468	0.3580	2.1737	0.8157	·
17	IL3	BIYAG-I	SAPUG-1P	132	Lynx	2.1	2	0.3717		0.0059	0.2133	0.4905	0.1031	
18		BIYAG-1	SAPUG-1P	132	Lynx	2.1		0.3717	0.8547	0.0059	0.2133	0.4905	0.1031	
-19	IL4	KOLON-1	KELAN-1	132	Zebra	2.2	2	0.1663		0.0065	0.0955	0.4874	0.1141	
20		KOLON-I	KELAN-I	132	Zebra	2.2		0.1663	0.8492	0.0065	0.0955	0.4874	0.1141	
21	ILS	KOLON-I	PANNI-1	132	Lynx	12.9	2	2 2833	5.2116	0.0365	1.3104	2.9910	0.6367	
22		KOLON-I	PANNI-1	132	Lynx	12.9		2.2833	5.2116	0.0365	1.3104	2.9910	0.6367	
23	11.6	KOLON-1	SAPUG-T1	132	Coyote	6.6	2	1.6170	2.7984	0.0178	0.9280	1.6061	0.3108	****
24		KOLON-I	SAPUG-T2	132	Coyote	6.6		1.6170		0.0178	0.9280	1.6061	0.3108	
25	IL7	SAPUG-TI	KOTUG-1	132	Coyote	16.7	2	4.0915		0.0451	2.3482	4.0638	0.7861	
26		SAPUG-T2	KOTUG-I	132	Coyote	16.7		4.0915		0.0451	2.3482	4.0638	0.7864	
27	1L8	SAPUG-TI	SAPUG-IA	132	Lynx	4.6	2	0.8142		0.0130	0.4673	1.0666	0.2271	
28		SAPUG-T2	SAPUG-1B	132	Lynx	4.6	•	0.8142		0.0130	0.4673	1.0666	0.2271	
29	IL9	KOTUG-1	BOLAW-TI	132	Coyote		2	5.1450		0.0568		5.1102		
30		KOTUG-L	BOLAW-T2	132	Coyote	21.0	•			0.0568			0.9889	
31		BOLAW-TI	BOLAW-1	132	Demmy		2	3.1430	0.5040	0.0303		5.1102	0.9889	
32		BOLAW-T2		132			۷.					0.0500	0.0000	
	11.10	BOLAW-TI			Dummy	0.0		10000				0.0500	0.0000	
34	1610	BOLAW-T2		132	Lynx	22.6	2			0.0633		5.3050	1.1030	
	11 11			132	Lynx	22.6	_			0.0633		5.3050	1.1030	
		CHILL-T1	PUTTA-1	132	Lynx	61.4	2	10.8678			6.2373 1		2.9967	
36		CHILL-T2	PUTTA-1	132	Lynx	61.4		10.8678		0.1720	6.2373 1	4.4126	2.9967	
		CHILL-TI	CHILL-I	132	Lynx	6.8	2			0.0190	0.6908	1.6001	0.3310	. = -
38		CHILL-T2	CHILL-I	132	Lynx	6.8				0.0190	0.6908	1.6001	0.3310	
		KOLON-I	ORUWA-TI	132	Lynx	14.0	2	2.4780	5.7260	0.0391	1.4222	3.2863	0.6814	
_40			ORUWA-T2	132	Lynx	14.0			5.7260		1.4222		0.6814	
<u>-41, 1</u>		ORUWA-TI		132	Lynx	3.4	2	0.6018	1.3906	0.0095	0.3454	0.7981	0.1655	·———
_42		ORUWA-T2		132	Lynx	3.4			1.3906				0.1655	
43 1	ILI5	ORUWA-TI	THULH-TI	132	Lynx	36.0	2		14.7240				1.7521	
44		ORUWA-T2		132	Lynx	36.0	-		14.7240				1.7521	
45 1			THULH-1	132	Lynx	23.9	2			0.0677			1.1797	
46	-		THULH-1	132	Lynx	23.9		4.2303		0.0677		5.5416		
			POLPI-1	132	Lynx		2	4.9560					1.1797	
48		THULH-T2		132	Lynx	28.0	• -						1.3628	
			AVIS-1T1	132					11.4520	· · · - - · · - · - · - · - · - · - · -		6.5725	1.3628	
50			AVIS-111		Lynx	31.9	2 _	5.6463					1.5746	
				132	Lynx	31.9	_		2.8876				1.5746	
	_		AVISS-1	132	Lynx		2 _	0.0885					0.0243	
52		AVIS-1T2	AVISS-I	132	Lynx	0.5		0.0885				0.1177	0.0243	
			POLPI-I	132	Lynx	<u>34.4</u>	2 _	6.0888					1.6980	
. 54			POLPI-1	132	Lynx	34.4		6.0888			3.4945	7.9761	1.6980	
	F31 Î	PANNI-I	RATMA-1	132	Lynx	6.9	2	1.2213					0.3406	
.56		PANNI-I	RATMA-1	132	Lynx	6.9	;	1.2213					0.3406	
57 1	L22		PANAD-TI	132	Goat		2	1.2300					0.6303	
58	_		PANAD-T2	132	Goat	12.3			4.7970 (
			MATUG-1	132	Goat		2	2.9100					0.6303	
60	_		MATUG-1	132	Goat	29.1	-	2.9100 1					1.4913	
		ches. Not in oper				# F. E !		4.71W	377U (1.0000	1.6701 (6.5134	1.4913	

Note: Shaded branches; Not in operation

Table A6.1.1 - 4 Data of Existing Transmission Lines as of November 1995

14010	7001	1 7 2 4444	t of transmis											
No.	T/L	Bra	ınch	·Voltage	Conductor:	Length	cct	. R .	Х	Y	R	X	Y	Note
•••	Ref.	from	to	(kV)		(lon)		(Ω)	(Ω)	(mS)	100	MVA Bas	e (%)	
													0.2288	
61	1L24	PANAD-TI		132		4.7	Z	0.8319						
62		PANAD-T2	PANAD-1	132	Lynx	4.7		0.8319	1.9270	0.0131	0.4774	1.1059	0.2288	
63	1L25	POLPI-1	LAX-1	132	Lynx	8.3	2	1.4691	3.3947	0.0232	0.8431	1.9483	0.4040	
61	1		LAX-1	132	Lyax			1.4691	3.3947	0.0232	0.8431	1.9483	0.4040	
					Lynx	5.1	2	0.9027	2.0859	0.0142	0.5181	1.1971	0.2482	
65			WIMAL-I	132			ž.						0.2482	
66			WIMAL-1	132	Lynx	5.1			2.0859		0.5181	1.1971		
67	1L27	LAX-1	'N-LAX-I	132	Lynx	0.6	2	0.1062	0.2454	0.0017	0.0610	0.1408	0.0292	
68		LAX-1	N-LAX-1	132	Lynx	0.6		0.1062	0.2454	0.0017	0.0610	0.1408	0.0292	
69			POLPI-1	132	Lynx	8.0	2	1.4160	3.2720	0.0223	0.8127	1.8779	0.3894	
			POLPI-I			8.0	-	1.4160	3.2720		0.8127	1.8779	0.3894	
70				132	Lynx									
71	1L29	N-LAX-1	CANYO-1	132	Lynx	10.0	1	1.7700	4.1600		1.0158	2.3875	0.4787	
72	1L30	POLPI-1	KOTMA-L	132	Lynx	29.5	1		11.9180		2.9967	6.8400	1.4561	
73	1L31	KOTMA-I	KIRIB-1	132	Lynx	22.5	1	3.9825	9.0900	0.0637	2.2856	5.2169	1.1106	
74		KIRIB-1	ANURA-I	132	Lynx	143.9	1				14.6179	33.3652	7.1029	
						59.3	1	10.4961				13.7495	2.9270	
75		POLPI-I		132	Lynx									
76	1L34	UKUWE-I	HABAR-I	132	Lynx	82.3	<u> 1</u>		33.2492			19.0824	4.0623	
77	IL35	HABAR-1	ANURA-1	132	Lynx	48.9	1		19.7556			11.3382	2.4137	
78		UKUWE-1	BOWAT-1	132	Lynx	30.0	1	5.3100	12.4500	0.0826	3.0475	7.1453	1.4400	
79		KIRIB-1	KURUN-I	132			2	. 6.1242			3.5148	8.1218	1.6840	
1	11.37						-		14.1514			8.1218	1.6840	
80		KIRIB-I	KURUN-I	132	Lynx									
81	1L38	HABAR-1	VALAI-1	132	Lynx			17.6469					4.7725	
82	IL39	ANURA-1	TRINC-1	132	Lynx	103.3					10.4936		5.0559	
83		ANURA-1	TRINC-3	132	Lynx	103.3		18.2841	42.0431	0.2902	10.4936	24.1294	5.0559	
		N-LAX-1	BALAN-I	132	Lynx	43.9	2		17.9551			10.3048	2.1426	
84	1540						-					10.3048	2.1426	
85		N-LAX-1	BALAN-I	132	Lynx	43.9		7.7703						
86	1L41	BALAN-I	SAMAN-I	132	Zebra	19.0	2		7.4480		0.8244	4.2746	0.9708	
87		BALAN-I	SAMAN-1	132	Zebra	19.0		1.4364	7.4480	0.0557	0.8244	4.2746	0.9708	
88	11.47	SAMAN-I	EMBIL-1	132	Lynx	38.0	2	6.7260	15.7700	0.1050	3.8602	9.0507	1.8290	
	ILAL		EMBIL-1	132	Lynx	38.0	-		15.7700		3.8602	9.0507	1.8290	
89		SAMAN-I											2.0985	
90	11.43	BALAN-I	DENIY-TI	132	Tiger	44.2	Z	10.9174				10.6289		
91		BALAN-I	DENIY-T2	132	Tiger	44.2			18.5198	0.1204		10.6289	2.0985	
92		DENIY-TI	DENIY-1	132 1	Dummy	0.0	2	i			0.0000	0.0500	0.0000	
93		DENIY-T2	DENIY-1	132	Dummy	0.0					0.0000	0.0500	0.0000	
						57.3	2	14.1531	24 0097	0.1561		13.7791	2.7204	
94	1L44	DENIY-TI	GALLE-1	132	Tiger		- 2							
95		DENIY-T2	GALLE-I	132	Tiger	57.3			24.0087			13.7791	2,7204	
96	11.45	RANTE-!	BADUL-1	132	Lynx	37.0		6.5490	15.5770	0.1005	3.7586		1.7519	
97	11.46	BADUL-I	INGIN-I	132	Oriole	79.9	ı	15.1810	35.0761	0.2075	8.7127	20.1309	3.6160	
98		ANURA-I	KILIN-TI	132		128.8	2	22.7976					6.3575	
							-				13.0840		6.3575	
99			KILIN-T2	132		128.8		22.1910	32.0332	0.3049	13.0040	45.5011		
100	11.48	KILIN-TI	CHUNN-1	132	Lynx	67.2	2	11.8944						
101		KILIN-T2	CHUNN-1	132	Lynx	67.2		11.8944	27.1488	0.1904	6.8264	15.5813	3.3170	
102		BADUL-6	NUWAR-TI	66	Coyote	34.9	2	\$.5642	13.8981	0.1001	19.6607	31.9057	0.4358	
103		BADUL-6	NUWAR-T2	66	Coyote	34.9					19.6607		0,4358	
				·			_	. O.AF72	13.3701	1/11/01	0.0000		0.0000	
101		NUWAR-TI		66	Dummy	0.0	2		<u> </u>	· · ·				
105		NUWAR-T2	NUWAR-6	66	Dummy	0.0					0.0000		0.0000	
106		NUWAR-TI	LAX-D1	66	Coyote	37.5	2	9.1973	14.9255	0.1074	21.1141	34 2643	0.4680	
107		NUWAR-T2		66 .	Coyole	37.5		9.1973	14.9255	0.1074	21.1141-	34.2643	0.4680	
		KOLON-6	PADUK-TI	66	Coyote	28.5	2				16.0553		0.3559	
801							4						0.3559	
109		KOLON-6	PADUK-T2	66_	Coyote	28.5			11.5435	0.0817	16.0553			
110		PADUK-T1		66	Dummy	0.0	2					0.0500	0.0000	
111		PADUK-T2	PADUK-6	66	Dummy	0.0					0.0000	0.0500	0.0000	
112		PADUK-TI		66	Coyote	19.1	2	4.6870	7.6061	0.0548	10.7598	17.4613	0.2385	
		PADUK-T2		66	Coyote	19.1	-	4,6870			10.7598		0.2385	
113								7.0010	1.4401	V.V./711	0.0000	0.0500	0.0000	
114		AVISS-TI	AVISS-6	- 66	Dummy	0.0	2							
115		AVISS-T2	AVISS-6	66	Dummy	0.0		:			0.0000		0.0000	
116		AVISS-T1	LAX-6	66	Coyote	36.2	2	8.8832	14.4158	0.1038	20.3930	33.0942	0.4521	
117	:	AVISS-T2	LAX-D2	66	Coyote	36.2					20.3930		0.4523	
		-1-155 11				_								

Table A6.1.1 - 5 Data of Existing Transformers as of November 1995

	\mathcal{I}	:	*		#	•		*	#	-		-			#	-	•	*		;				1	 -	•	·	·	-w <u></u> ,
	Nos.	13	<u></u>			13		5	۰	8		51	77	:	٥	<u></u>	7	1	77	73	12	2	17	1		77	21	- 21	17
Tap (%, nos)	OWCN		-5.0		-5.0	-5.0		-15.0	-5.0	5.0		-15.0	-15.0	·	-5.0	-15.0	-10.0	-10.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0
Tap) [2]	0							:		-									-		,							
Hia	3	M 15.0	L 15.0		M 15.0	15.0		H 15.0	7.5	1 5.0	:	15.0	15.0		15.0	5.0		10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	5.0
	- -			;	*		+		<u> </u>	Σ.		==	Σ.		<u> </u>	_ <u>_</u> _		<u> </u>	*	<u> </u>	<u> </u>			Ξ	I	Ξ	Ξ.	_ <u>I</u>	Ξ
nce Voltage / Unit (%)	Sept Co. In: An	5.52	36.52	62.52	5.60	36.40	62.40	11.90	125.00	36.23	84.00	15.22	17.78	11.33	11.67	34.41	35.60	35.60	33.00	33.00	20.00	100.00	100.00	33.33	100.00	100.00	100.00	34.17	65.45
Impedance Voltage / Unit (%)	///	13.80 (250.0)	91.30 (250.0)	56.30 (250.0)	14.00 (250.0)	00 (250.0)	56.00 (250.0)	2.50 (105.0)	(10.0)	12.50 (34.5)	8.40 (10.0)	13.70 (90.0)	(0.06) 00.91	(0.06) 02	(0.06) 0	(31.5)	(20.0)	7.80 (50.0)	(30.0)	(30.0)	(20.0)	(0.01) 0	(0.01) 0	(30.0)	(0.01) 0	(0.01) 0	(0.01) 0	0 (31.9)	0 (16.5)
Impeda n	-	13.8	2	156	<u>4</u>	91.00	156.0	2	12.	2	86	13.7	16.0	10.20	10.50	10.84	17.80	17.8	66	9:90	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.90	10.80
l between		π Σ	H-L	×. ∴	¥.	H-L	Σ 1	H-M	H-M	H	Μ-L	H	H-L	×	Ŧ	Ŧ	7.	H-L	H-L	H-1	H.	Ŧ	H	Ŧ	H-T	H-L	X.	H	J.H
(MVA)		250.0			250.0			105.0	10.0			0.06					:	:	;	j	į		!		. :				
Rated Capacity (MVA)		0.09	-		0.09		:		34.5	•	:	0.06			0.06	31.5	50.0	50.0	30.0	30.0	20.0	10.0	10.0	30.0	10.0	10.0	10.0	31.5	16.5
Rated C		250.0			250.0		•	105.0	34.5			0.06	:		800	31.5	20.0	20.0	30.0	30.0	20.0	10.0	10.0	30.0	0.0	10.0	10.0	31.5	16.5
₹ ∑		132.0		-	132.0			132.0	34.5	:		132.0			. !	•						1	*				:		
Rated Voltage (kV)	- - 	33.0			33.0				12.5			13.8	,		13.8	33.0	0.11	0.1	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Rated		220.0			220.0			220.0	138.0		*	220.0		-	220.0	132.0	142.0	142.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
No. of Unit	I	71			C)				7					-	7	74	-	-	73	-	2	7	7	7	_	8	71	71	7
(M)addle Voltage	28, 1995	BIYAG-1			KOTUG-1			RANTE-1	RANTE-3			KOTMA-1					:	•	1									•	
Nede (Hygh Voltage (Lyw Voltage (Myddle Voltage	Existing System as of November 28, 1995	BIYAG-3			KOTUG-3				RANTE-G			KOTMA-GI KOTMA-1	:		KOTMA-G2	BOLAW-3	SAPUG-G1	SAPUG-G2	SAPUG-3A	SAPUG-3B	PUTTA-3	ANURA-3	TRING-3	CHUNN-3	CHUNN-3	HABAR-3	VALAI-3	KIRIB-3	KURUN-3
(H)igh Voltage	ng System as	BIYAG-2			KOTUG-2			RANTE-2	RANTE-I			KOTMA-2	:	• •	KOTMA-2	BOLAW-1	SAPUG-1P	SAPUG-1P	SAPUG-1A	SAPUG-18	PUTTA-1	ANURA-1	TRINC-1	CHUNN-1	CHUNN-1	HABAR-1	VALAI-1	KIRIB-1	KURUN-1
ž	Existi				64			т.	4			'n			9	۲-	∞	σ.	<u>°</u>	=	2	Ξ.	4	Σ.	9	12	<u>∞</u>	6	2

Notes;

i) Sources; *: CEB's record, **: Name plate at the site, none: Assumed value 2) Shaded nodes; Not in operation

Table A6.1.1 - 5 Data of Existing Transformers as of November 1995

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		#		*								#		*	,								*				•	•	4	•
_	Nos.	17	ø	91	17	2	13	r:	7	23	13	13	17	ន			11	21	.53.	12	21	13	13	2	13	13	21	21	21	21
Tap (%, nos)	Lowest	-15.0	-5.0	-15.0	-15.0	-5.0	-5.0	-5.0	-5.0	-15.0	-15.0	-15.0	-15.0	-5.5	•		-15.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0	-5.0	-15.0	-15.0	-15.0	-15.0	-15.0
T.	Highest	5.0	7.5	10.0	5.0	10.0	0.01	10.0	10.0	5.0	5.0	5.0	5.0	15.5			5.0	10.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.01	0.01	5.0
-	-	I	工	I	×	I	ı	I	I	x	x	x	Œ	Σ			I	I	z	r	Œ	x	Œ	I,	x	I	I	I	Ξ	H
		•	*	*			1							*	#	*					•	!			•	•	*		4	
	I(K) MVA base	00'29	45.56	32.70	25.00	25.00	38.33	20.37	20.37	34.38	36.67	36.67	40.33	29.67	34.44	19.52	50.00	33.33	133.33	158.73	33.00	31,43	31.68	40.33	38.94	32.70	114.00	106.00	110.00	56.83
oltage	(base MVA)	(15.0)	(27.0)	(31.5)	(60.0)	(0.09)	(28.7)	(27.0)	(27.0)	(32.0)	(30.0)	(30.0)	(30.0)	(30.0)	(31.5)	(31.5)	(15.0)	(30.0)	(7.5)	(6.3)	(30.0)	(31.5)	(31.5)	(30.0)	(32.1)	(31.5)	(10.0)	(10.0)	(10.0)	(31.5)
pedance V	(pase	10.05 (12.30 (10.30	15.00	15.00 (0	11.00	5.50 (5.50 (8.11	11.00	8.11	12.10	06.71	10.85	6.15 (7.50 (10.00	10.00	10.00	9.90	9.90		12.10_(12.50 (10.30	11.40	10.60	11.00	17.90
E-	between	H·L	H-L	H-L	7÷.	٦.	± γ	17	7 . F	H.	H-L	T.	H.	Σ	H-L	X-L	J H	H-L	H.	H-L	H.	H.	H.L.	H-L	H.L	H·L	H.	7 . T	H J	H-M
MVA)	Σ			,		:		:			;			30.0			!		<u> </u>			1		!	:	:		. :		31.5
Rated Capacity (MVA)	ے۔	15.0	27.0	31.5	0.09	0.09	28.7	27.0	28.7	32.0	30.0	30.0	30.0	30.0	:		15.0	30.0	7.5	6.3	30.0	31.5	31.5	30.0	32.1	31.5	10.0	10.0	10.0	31.5
Rated C.	Ŧ	15.0	27.0	31.5	0.09	0.09	28.7	27.0	28.7	32.0	30.0	30.0	30.0	30.0		;	15.0	30.0	7.5	6.3	30.0	31.5	31.5	30.0	32.1	31.5	10.0	10.0	10.0	31.5
(kV)	Σ				-						:	;	:	0.08	:	:				İ								:		66.0
Rated Voltage (kV)		33.0	12.5	33.0	33.0	33.0	11.0	11.0	0.1	11.0	0.11	11.0	33.0	33.0	. :	:	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	11.0	33.0	33.0	33.0	33.0	33.0
Rated	=	132.0	132.0	132.0	132.0	132.0	132.0	33.0	33.0	132.0	132.0	132.0	132.0	132.0			0.00	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
	Unit	2	7	7	-	-	-	т	71	7	7	7	ъ.	_		:	7	-	77		7	-	~	7	7	7	~	m	7	2
	(L)ow Voltage (M)iddle Voltage												:	KOLON-6	:		:	***************************************		:					!		•			BADUL-6
Node	(L.)ow Voltage	UKUWE-3	UKUWE-G	тносн-3	KELAN-3A	KELAN-38	KELA-GTI	KELA-GT2	KELA-CT3	KELAN-ST	FORT-11	KOLLU-11	KOLON-3A	KOLON-3			KOLON-3B	RATMA-3A	RATMA-3B	ORUWA-3	PANNI-3	PANNI-3	MATUG-3	GALLE-3	WIMAL-G	WIMAL-3	BALAN-3	DENIY-3	EMBIL-3	BADUL-3A
	(H)igh Voltage	UKUWE-1	UKUWE-1	THULH-1	KELAN-1	KELAN-1	KELAN-1	KELAN-3A	KELAN-3B	KELAN-I	FORT-1	KOLLU-1	KOLON-1	KOLON-1			KOLON-6	RATMA-1	RATMA-I	ORUWA-1	PANNI-1	PANNI-1	MATUG-1	GALLE-1	WIMAL-1	WIMAL-1	BALAN-1	DENIY-1	EMBIL-1	BADUL-1
Ċ.		21	22	ล	8	ĸ	92	2	82	8		3	32	33	į	i	8	35	8	37	38	33	6	3	4	4	4	45	\$	47
		L										<u> </u>		~ -																

1) Sources; *: CEB's record, **: Name plate at the site, none: Assumed value

Notes:

Table A6.1.1 - 5 Data of Existing Transformers as of November 1995

PADUL-3B		-	Node		No. of	Rated	Rated Voltage (kV)	Rated	Rated Capacity (MVA)	MVA)	Ē	pedance	Voltage	Impedance Voltage / Unit (%)	_		T. 10, 10%	133		_
6 8ADUL-38	t) igh	Voltage	(L.xw Voltage	(M)iddle Voltage	Unit	工	L M	H	. T		hetween	(Pas	c MVA)	100 MVA base	-0	High	Highest Lowest	r Nos.		
6 BADUL-38											H-L		(31.5)	34.44	-	<u> </u>		_	1-	T-
6 BADUL-38				_	-					•	Σ		(31.5)	19.52		_				
INGIN-3	MADU		BADUL-3B		₽	0.99	33.0	3.0	3.0		H-L		(3.0)	250.00						
INGIN-G 1 33.0 6.9 10.0 10.0 H-L 5.50 (10.0) 1 1 1 1 1 1 1 1 1	NCIN		INGIN-3		7	132.0	33.0	15.0	15.0		H-1-		(15.0)	73.33		10.01	.150			
INGIN-G 1 33.0 6.9 5.0 5.0 H-L 5.50 (5.0) 1 3.0 6.9 3.0 3.0 3.0 H-L 5.50 (5.0) 3.0 4 66.0 33.0 3.0 3.0 H-L 9.20 (3.0) 3.0 4 66.0 33.0 3.0 3.0 H-L 9.20 (3.0) 3.0 3.0 4.L 15.00 (86.0) 3.0 3.0 3.0 4.L 15.00 (86.0) 3.0 3.0 3.0 3.0 4.L 10.00 (31.5) 3.0 3.0 3.0 3.0 3.0 4.L 10.00 (31.5) 3.0 3.0 3.0 4.L 10.00 (3.0) 3.0 3.0 4.L 10.00 (3.0) 3.0 3.0 3.0 4.L 10.00 (3.0) 3.0 3.0 4.L 10.00 (3.0) 3.0 3.0 3.0 3.0 3.0 4.L 10.00 (3.0) 3.0 3.0 3.0 4.L 10.00 (3.0) 3.0 3.0 4.L 3.50 (3.0) 3.0 3.0 4.L 3.50 (3.0) 3.0 3.0 4.L 3.50 (3.0) 3.0 3.0 3.0 4.L 3.50 (3.0) 3.0 3.0 4.L 3.50 (3.0) 3.0 3.0 3.0 4.L 3.50 (3.0) 3.0 3.0 4.L 3.50 (3.0) 3.0 3.0 4.L 3.50 3.0 3.0 4.L 3.0 3.0 3.0 4.L 3.0 3.0 4.L 3.0 3.0 3.0 3.0 4.L 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	NGN		INGIN-G		_	33.0	6.9	10.0	10.0		H-L		(0.01)	55.00				:		
-6 NUWAR-3 4 66.0 33.0 3.0 3.0 H-L 9.20 (3.0) 6 PADUK-4 4 66.0 33.0 3.0 3.0 4H-L 9.20 (3.0) 1 VICTO-G 3 236.0 12.5 96.0 96.0 H-L 15.00 (36.0) 1 PANAD-3 2 132.0 33.0 31.5 31.5 H-L 15.00 (36.0) 2 132.0 12.5 81.0 81.0 H-L 14.00 (31.5) 1 SAMAN-G 2 132.0 12.5 53.7 81.0 H-L 11.00 (71.0) 1 BOWAT-G 1 132.0 12.5 50.0 50.0 H-L 10.00 (16.0) LAX-G 2 132.0 11.0 16.0 16.0 H-L 10.00 (16.0) LAX-G 3 132.0 12.5 38.0 38.0 H-L 10.80 (16.0) <td>NCIN</td> <td></td> <td>D-NIDNI</td> <td></td> <td>_</td> <td>33.0</td> <td>6.9</td> <td>5.0</td> <td>5.0</td> <td></td> <td>H-1-</td> <td></td> <td>(2.0)</td> <td>110.00</td> <td></td> <td></td> <td></td> <td>:</td> <td></td> <td></td>	NCIN		D-NIDNI		_	33.0	6.9	5.0	5.0		H-1-		(2.0)	110.00				:		
6 PADUK-4 6 VICTO-G 3 236.0 12.5 96.0 96.0 H-L 15.00 (96.0) 1 PANAD-3 2 132.0 12.5 96.0 96.0 H-L 15.00 (96.0) 2 132.0 12.5 81.0 H-L 10.00 (31.5) POLPI-G 2 132.0 12.5 53.7 53.7 H-L 12.10 (53.7) POLPI-G 2 138.0 10.5 71.0 71.0 H-L 10.00 (16.0) LAX-G 2 132.0 11.0 16.0 H-L 10.00 (16.0) LAX-G 2 132.0 11.0 16.0 H-L 10.00 (16.0) LAX-G 2 132.0 11.0 13.3 13.3 H-L 10.00 (18.3) PLAX-G 2 132.0 12.5 38.0 38.0 H-L 10.80 (38.0)	V A O N		NUWAR-3		4	0.0	33.0	3.0	3.0		H.C		(3.0)	306.67	*		:	:		
1 VICTO-G 3 236.0 12.5 96.0 96.0 H-L 15.00 (96.0) 1 PANAD-3 2 132.0 33.0 31.5 31.5 H-L 10.00 (31.5) 2 236.0 12.5 81.0 81.0 H-L 14.50 (81.0) 1 SAMAN-G 2 132.0 12.5 53.7 H-L 11.00 (71.0) 1 SAMAN-G 2 138.0 10.5 71.0 71.0 H-L 11.00 (71.0) 1 BOWAT-G 1 132.0 12.5 50.0 50.0 H-L 10.00 (50.0) LAX-G 2 132.0 11.0 16.0 16.0 H-L 10.00 (16.0) N-LAX-G 3 132.0 11.0 13.3 H-L 10.00 (16.0) N-LAX-G 2 132.0 12.5 38.0 H-L 10.80 (38.0) AVISC-3 3 12.5 38.0 H-L 10.80 (38.0)	PADU		PADUK-4		4	0.99	33.0	3.0	3.0		H-L		(3.0)	306.67				:	-	
1 PANAD-3 2 132.0 33.0 31.5 13.5 14.0 (31.5) 2 236.0 12.5 81.0 81.0 14.5 (81.0) POLPI-G 2 132.0 12.5 53.7 12.1 (53.7) 1 SAMAN-G 2 138.0 10.5 71.0 71.0 11.0 (71.0) 1 BOWAT-G 1 132.0 12.5 50.0 50.0 14.L 10.00 (30.0) LAX-G 2 132.0 11.0 16.0 14.L 10.00 (16.0) LAX-G 3 132.0 11.0 16.0 14.L 10.00 (16.0) N-LAX-G 2 132.0 12.5 38.0 14.L 10.50 (16.0) AVISC3 2 132.0 12.5 38.0 14.L 10.80 (38.0)	VICTC		VICTO-G		m,	236.0	12.5	0.96	800		H-L	15.00	(0.96)	15,63	*	H 10.0	.50			
2 RANDE-G 2 236.0 12.5 81.0 81.0 H-L 14.50 (81.0) POLPI-G 2 132.0 12.5 53.7 53.7 H-L 12.10 (53.7) 1 SAMAN-G 2 138.0 10.5 71.0 71.0 H-L 11.00 (71.0) 1 BOWAT-G 12.5 50.0 50.0 H-L 10.00 (16.0) LAX-G 2 132.0 11.0 15.3 13.3 H-L 10.00 (18.3) 1 CANYO-G 2 132.0 12.5 38.0 38.0 H-L 10.80 (38.0)	ANA		PANAD-3		۲۱	132.0	33.0	31.5	31.5		H. H.	10.00	(31.5)	31.75	******		-150			
POLPI-G 1 SAMAN-G 2 132.0 12.5 53.7 53.7 H-L 12.10 (53.7) 1 SAMAN-G 2 138.0 10.5 71.0 71.0 H-L 11.00 (71.0) 1 132.0 12.5 50.0 50.0 H-L 10.00 (16.0) LAX-G LAX-G 2 132.0 11.0 15.0 16.0 H-L 10.00 (16.0) N-LAX-G N-LAX-G 1 CANYO-G 2 132.0 12.5 38.0 38.0 H-L 10.80 (38.0)	AND	ç	RANDE-G		~	236.0	12.5	81.0	81.0		H.L	14.50	(81.0)	17.90	*	:	-5.0	ی :		•
1 SAMAN-G 1 BOWAT-G 1 132.0 12.5 50.0 50.0 H-L 11.00 (71.0) LAX-G 2 132.0 11.0 16.0 H-L 10.00 (16.0) LAX-G 2 132.0 11.0 15.3 13.3 H-L 10.00 (18.3) N-LAX-G 1 CANYO-G 2 132.0 12.5 38.0 38.0 H-L 10.80 (38.0)	OLP!		POLPI-G		7	132.0	12.5	53.7	53.7		H-L	12.10	(53.7)	22.53		10.0	5.0	, ~		·
LAX-G	AMA		SAMAN-G		7	138.0	10.5	71.0	71.0	:	H-L	8:	(0.17)	15.49	-	7.5	-2.5	· ·		
LAX-G LAX-G LAX-G LAX-G LAX-G N-LAX-G 13.0 11.0 16.0 16.0 H-L 10.00 (16.0) N-LAX-G 1 2 132.0 12.5 72.0 72.0 H-L 10.80 (38.0) AVISE3 AVISE3	V N N	•	BOWAT-G			132.0	12.5	20.0	20.0		H.L	0.00	(20.0)	20.00	<u> </u>	i 1	-5.0	~	:	- ,
LAX-G 3 132.0 11.0 13.3 13.3 H-L 10.00 (13.3) N-LAX-G 2 132.0 12.5 72.0 H-L 13.50 (72.0) CANYO-G 2 132.0 12.5 38.0 H-L 10.80 (38.0)	AX-		LAX-G		71	132.0	0.11	16.0	16.0		H.	10.00	(16.0)	62.50	-	<u>:</u>	.5.0		 -	
I CANYO-G 2 132.0 12.5 72.0 72.0 H-L 13.50 (72.0) 12.5 38.0 38.0 H-L 10.80 (38.0)	AX-I		D-XV		3	132.0	0.11	13.3	13.3		7-	10.00	(13.3)	75.15			.5.0			
CANYO-G 2 1320 12.5 38.0 38.0 H-L 10.80 (38.0)	Š	-	V-LAX-G	-	7	132.0	12.5	72.0	72.0		7.	13.50	72.0)	18.75		!	C	. · ·	: -	
AVISC.2	ANY		CANYO-G		7	132.0	12.5	38.0	38.0		H-L	10.80	38.0)	28.42			0.5		-	·
CVISORS 4 00.0 33.0 6.0 H-L 750 (6.0)	AVISS-6		AVISS-3		7	0.99	33.0	0.0	0.0		 	7.50	(0.9)	125.00	I	-	-15.0	. 2	-	

Sources: *: CEB's record, **: Name plate at the site, none: Assumed value
 Shaded nodes; Not in operation



No.	Node	Type		i	Rated Capacity		Xd"
			Unit	(kV)	(MVA)	(MW)	(%)
Existi	ng System as of Nove	mber 28	1995		:		
	Laxapana P/S Total				58.80	49.99	
	LAX-G	hydro	3	11.0	9.80	8.33	20.0
	LAX-G	hydro	2	11.0	14.70	12.50	16.0
2	New Laxapana P/S			11.0	125.00	100.00	
	N-LAX-G	hydro	2	12.5	62.50	50.00	15.0
3	Wimalasurendra P		-	12.3	62.60	50.00	
	WIMAL-G	hydro	2	11.0	31.30	25.00	14.7
4	Canyon P/S Total	nyaro		11.0	75.00	60.00	
	CANYO-G	hydro	2	12.5	37.50	30.00	18.0
5	Polpitiya P/S Total	iiyato	-	1	93.80	75.00	
	POLPI-G	hydro	2	12.5	46.90	37.50	12.9
6	Ukuwela P/S Total	117010			42.80	38.00	
	UKUWE-G	hydro	2	12.5	21.40	19.00	22.0
7	Bowatenna P/S Tot			12.0	47.00	40.00	
	IBOWAT-G	hydro	,	12.5	47.00	40.00	13.0
8	Victoria P/S Total	nydio	i •	12.0	247.50	210.00	
	VICTO-G	hydro	3	12.5	82.50	70.00	16.5
9	Randenigala P/S To			1	162.00	122.00	
	RANDE-G	hydro	2	12.5	81.00	61.00	18.5
10	Kotmale P/S Total	11/0.0	<u> </u>		270.00	201.00	
	IKOTMA-GI	hydro	2	13.8	90.00	67.00	17.0
	IKOTMA-G2	hydro	1	13.8	90.00	67.00	17.0
11	Rantembe P/S Tota		!	1	64.00	49.00	
	RANTE-G	hydro	2	12.5	32.00	24.50	18.5
12	Samanalawewa P/S		:		141.20	120.00	
:::	SAMAN-G	hydro	2	10.5	70.60	60.00	12.0
13	Inginiyagara P/S To			<u> </u>	12.50	11.25	
	INGIN-G	hydro	2	6.9	2.75	2.48	22.0
	INGIN-G	hydro	2	6.9	3.50	3.15	22.0
14	Kelanitissa P/S Tota		!	1	229.70	170.00	
- · · · · -	KELAN-ST	steam	2	11.0	31.30	25.00	12.0
	KELA-GT1	gas	1	11.0	28.70	20.00	12.0
	KELA-GT2	gas	3	11.0	27.00	20.00	15.0
	KELA-GT3	gas	2	11.0	28.70	20.00	14.7
15	!Sapugaskanda P/S	·	 	1	102.40	72.00	
	SAPUG-G1	diesel	2	11.0	25.60	18.00	21.0
	ISAPUG-G2	diesel	2	11.0	25.60	18.00	21.0
16	Chunnakam P/S To		i		18.20	14.00	
	CHUNN-G	diesel	5	11.0	2.60	2.00	22.0
	CHUNN-G	diesel	4	11.0	1.30	1.00	22.0

Table A6.1.1 - 7

Data of Existing Reactive Power Sources as of November 1995

No.	Node	Rated Voltage	Rated Capacity	Remarks
		(kV)	(MVA)	and the state of t
	ANURA-3	22	00.00	
2	KOTUG-3	33	20.00	SC SC
3	GALLE-3	33	20.00	SC
)	:		
Total	:		60.00	

SC: Static Capacitor

48	,
饕	

No.	T/L	Bra	inch	Voltage	Conductor		cct	R	X	Y	R	<u>X</u>	Y	Note
	Ref.	from	· to	(kV)	· · · · · · · · · · · · · · · · · · ·	(km)	:	<u>(Ω)</u>	{Ω}	(mS)	100	MVA Bas	e (%)	
)ata r	nodifica	tion for the	system in 200	0 year	· · · · · ·									
)elete	•													
1		V branches		•										
2		-	KOTMA-I	132	Lynx	29.5	1 .							
3		OLPI-1	UKUWE-1	132		59.3	1							
4		-	KIRIB-1	132		22.5			,					
5			ANURA-I			143.9	1							
_ _			BOLAW-TI		Coyote	21.0								
7			BOLAW-T2		Coyote	21.0	Ĩ,						-	
							2					· · · · · · · · · · · · · · · · · · ·		
8		BOLAW-TI		;	Dummy	0.0	4 :		·		·			
9		BOLAW-T2		132	Dummy		:							
	_	BOLAW-TI		132	Lynx	22.6	2							
11		BOLAW-T2		132	Lynx	22.6	<u>i</u>							
12		BIYAG-1	PANNI-1	132	Zebra	15.5	2 !			 :			•	
13		BIYAG-I	PANNI-1	132	Zebra	15.5			· · · · · · · ·		- 			
14	-	BIYAG-I	KELAN-I	132		12.5	2				-			
15	<u> </u>	BIYAG-I	KELAN-I	132	2 x Goat	12.5	:						-	·
16	IL6 E	KOLON-1	SAPUG-TI	132	Coyote		2							
17	i	(OLON-1	SAPUG-T2	132	Coyote	6.6	i		:					
18	IL7 S	APUG-T1	KOTUG-1	132	Coyote	16.7	2		•					
19	5	APUG-T2	KOTUG-1	132	Coyote	16.7	- 1							
20	IL8 S	APUG-T1	SAPUG-IA	132	Lynx ·	4.6	2						-	
21	5	APUG-T2	SAPUG-IB	132	Lyax	4.6	:							
22		AVIS-ITI		132	Lynx	34.4	2 :							
23		VIS-IT2	POLPI-I	132	Lynx	34.4								
24		DRUWA-TI		132		3.4	2							
25			ORUWA-1	132	Lynx	3.4								
26		BALAN-I	DENIY-TI	132		44.2	2							
27		BALAN-I	DENIY-T2	132	Tiger	44.2								
				132		0.0	2		. :					
28		DENIY-TI	DENIY-1		Dummy									
<u> 29</u> _		DENIY-T2		132	Dummy	0.0								
30		ENIY-TI	GALLE-I	132	Tiger	57.3	2		•					
<u> 31</u> _		DENIY-T2	GALLE-1	132	Tiger	57.3			·					
32		(OLON-1	PANNI-I	132	Lynx	12.9	2							
33		(OLON-1		132	Lynx	12.9			** .		 -			·····
34		BIYAG-1	SAPUG-1P	132	Lynx	2.1	2							
35		BIYAG-I	SAPUG-1P	132	Lynx	2.1								
36		(OLON-I	ORUWA-TI	132	Lynx	14.0	2			<u> </u>				
37		(OLON-1	ORUWA-T2	132	Lynx	14.0				·	· · ·			
38		RUWA-TI	THULH-TI	132	Lynx	36.0	2				* -			
39		RUWA-T2	THULH-T2	132	Lynx	36.0								.
											1.4			
													· ·	
ienty	Add				-									
	11.49 I	.AX-I	NUWAR-TI	132	Lynx	38.8	2	6.8676	15.9080	0.1084	3.9415	9.1299	1.8884	
41	_	AX-I	NUWAR-T2		Lynx	38.8			15.9080	0.1084	3.9415	9.1299	1.8884	
42		. <u>^^`I</u> WWAR∙TI		132	Lynx	35,4	2		14.5140	0.0989	3.5961	8.3299	1.7229	
		IUWAR-T2	· · · · · · · · · · · · · · · · · · ·	132	Lynx	35.4	-		14.5140	0.0989	3.5961	8.3299	1.7229	
43				/	1.5111	33.4		0.4036	14.7140	ひ.ひとひろ	2.2301	0 1477		



Table A6.1.2-1 Data of Planned Transmission Lines by the End of 2000

No.	T/L		ranch		Conductor		cet	R	Х	Y	R	· X	Y	Note
	Ref.	from	10	(kV)	·	(km)		(Ω)	(Ω)	(m\$)	100	MVA Ba	se (%)	
45		NUWAR-T	2 NUWAR-1	132	Lynx	0.0						0010.0		Dummy branch
46	_ IL51	PUTTA-1	ANURA-1	132	Lynx	75.0	2	13.2750	31.1250	0.2072	7.6188	17.8633	3.6099	· · · · · · · · · · · · · · · · · · ·
47		PUTTA-1	ANURA-I	132	Lynx	75.0		13.2750	31.1250	0.2072	7.6188	17,8633	3.6099	
48	1L52	EMBIL-1	MATAR-1	132	Lynx	52.0	2	9.2040	21.5800	0.1436	5.2824	12.3852	2.5029	
49		EMBIL-I	MATAR-1	132	Lynx	52.0		9.2040	21.5800	0.1436	5.2824	12.3852	2.5029	
50	IL30	POLPI-1	KOTMA-1	132	Lynx	29.5	2	5.2215	11.9180	0.0836	2.9967	6.8400	1.4561	· ·
_51		POLPI-I	KOTMA-1	132	Lynx	29.5	·	5.2215	11.9180	0.0836	2.9967	6.8400	1.4561	
52	1L31	KOTMA-1	KIRIB-1	132	Lynx	22.5	2	3.9825	9.0900	0.0637	2.2856	5.2169	1.1106	
53		KOTMA-I	KIRIB-1	132	Lynx	22.5	· .	3.9825	9.0900	0.0637	2.2856	5.2169	1.1106	·
54	IL32	KIRIB-I	UKUWE-1	132	Lynx	29.9	2	5.2923	12.0796	0.0847	3.0374	6.9327	1.4759	
_55		KIRIB-1	UKUWE-1	132	Lynx	29.9		5.2923	12.0796	0.0847	3.0374	6.9327	1.4759	
56	1L33	UKUWE-1	ANURA-1	132	Lynx	131.2	1	23.2224	53.0048	0.3717	13.3278	30.4206	6.4760	
57	IL54	KOTUG-I	BOLAW-1	132	Zebra	22.0	2	1.6607	8.4407	0.0656	0.9531	4.8443	1.1424	
58		KOTUG-1	BOLAW-2	132	Zebra	22.0		1.6607	8.4407	0.0656	0.9531	4.8443	1.1424	
59	IL10	BOLAW-I	CHILL-TI	132	Lynx	22.6	2	4.0002	9.2434	0.0633	2.2958	5.3050	1.1030	
60		BOLAW-I	CHILL-T2	132	Lynx	22.6		4.0002	9.2434	0.0633	2.2958	5.3050	1.1030	
61	1L57	RANTE-1	BADUL-1	132	Lynx	33.0	1_		13.4533	0.0923	3.3430	7.7212	1.6087	
62	2L6	KOTMA-2	N-ANUR-2	220	Zebra	163.0	2	12.3045	67.3511	0.4497	2.5423	13.9155	21.7653	
63		KOTMA-2	N-ANUR-2	220	Zebra	163.0		12.3045	67.3511	0.4497	2.5423	13.9155	21.7653	
64	11.68	N-ANUR-1	ANURA-1	132	Zebra	1.5	2	0.1132	0.5755	0.0045	0.0650	0.3303	0.0779	
65		N-ANUR-I	ANURA-1	132	Zebra	1.5		0.1132	0.5755	0.0045	0.0650	0.3303	0.0779	
_66	2L7	BIYAG-2	KELAN-2	220	2 x Goat	12.5	2	0.6238	3.7971	0.0463	0.1289	0.7845	2.2421	
67		BIYAG-2	KELAN-2	220	2 x Goat	12.5		0.6238	3.7971	0.0463	0.1289	0.7845	2.2421	
68_	2L8	BIYAG-2	PANNI-2	220	Zebra	15.5	2	1.1701	6.4046	0.0428	0.2417	1.3233	2.0697	
69		BIYAG-2	PANNI-2	220	Zeora	15.5		1.1701	6.4046	0.0428	0.2417	1.3233	2.0697	
70	1L58	KOTUG-1	VEYAN-I	132	2 x Zebra	20.0	2	0.7549	6.0142	0.0749	0.4332	3.4517	1.3049	220 kV design
71		KOTUG-1	VEYAN-1	132	2 x Zebra	20.0		0.7549	6.0142	0.0749	0.4332	3.4517	1.3049	
72	IL59	KOLON-I	K-NIYA-I	132	Zebra	6.6	2	0.4982	2.5322	0.0197	0.2859	1.4533	0.3427	
73		KOLON-I	K-NIYA-1	132	Zebra	6.6		0.4982	2.5322	0.0197	0.2859	1.4533	0.3427	
	1L60	ANIYA-1	KOTUG-1	132	Zebra	13.3	2	1.0040	5.1028	0.0396	0.5762	2.9286	0.6907	
75		ANIYA-I	KOTUG-1	132	Zebra	13.3		1.0040	5.1028	0.0396	0.5762	2.9286	0.6907	
	11.61	KHD-I	SAPUG-1	132	Lynx	1.0	2	0.1765	0.4077	0.0028	0.1013	0.2340	0.0487	
77		KHD-1	SAPUG-1	132	Lynx	1.0		0.1765	0.4077	0.0028	0.1013	0.2340	0.0487	:
78		AVIS-1T2	SITHA-1	132	Lynx	10.0	1	1.7651	4.0768	0.0280	1.0130	2.3397	0.4875	
79		AVIS-1T1	AVISS-1	132	Lynx	0.5	2	0.0883	0.2038	0.0014	0.0507	0.1170	0.0244	· .
80		AVIS-1T2	AVISS-1	132	Lynx	0.5		0.0883	0.2038	0.0014	0.0507	0.1170	0.0244	
81_	1L64	SITHA-I	POLPI-I	132	Lynx	24.0	1	4.2363	9.7842	0.0671	2.4313	5.6154	1.1699	
82		AVIS-ITI	POLPI-I	132	Lynx	34.0	1		13.8610	0.0951	3.4443	7.9551	1.6574	
		INGIN-1	AMPA-1	132	Lynx	25.0	ı,	4.4128	10.1919	0.0699	2.5326	5.8494	1.2187	
		AMPA-1	VALAI-I	132	Lynx	75.0	1	13.2384	30.5758	0.2098	7.5978	17.5481	3.6561	
		BALAN-I	DENIY-I	132	Tiger	44.2	ì	10.9174	18.5198	0.1204	6.2657	10.6289	2.0985	
86		BIYAG-I	SAPUG-1P	132	Zebra	2.1	2	0.1585	0.8057	0.0063	0.0910	0.4624	0.1091	
87		BIYAG-I	SAPUG-1P	132	Zehra	2.1		0.1585	0.8057	0.0063	0.0910	0.4624	0.1091	
		MATUG-I	N-GALL-I	132	Zebra	64.0	2	4.8312	24.5546	0.1907	2.7727	14.0924	3.3234	
89		MATUG-I	N-GALL-1	132	Zebra	64.0		4.8312	24.5546	0.1907	2.7727	14.0924	3.3234 -	
		DENIY-I	N-GALL-1	132	Tiger	47.3	1	11.6831	19.8187	0.1289	6.7052	11.3744	2.2457	
		BALAN-I	N-GALL-1	132	Tiger	91.5	1	22.6005	38.3385	0.2493	12.9709	22.0033	4.3441	
92		RATNA-1	BALAN-I	132	Zebra	40.0	2	3.0195	15.3466	0.1192	1.7330	8.8078	2.0771	
93		RATNA-I	BALAN-I	132	Zebra	40.0		3.0195	15.3466	0.1192	1.7330	8.8078	2.0771	

Table A6.1.2-1 Data of Planned Transmission Lines by the End of 2000

No.	T/L	Bı	anch	-	Conductor		cct	R	X	Y	R		<u>Y</u>	Note
1	Ref. f	rom	to	(kV)	:	(km)		(Ω)	(Ω)	(mS)	100	MVA Bas	e (%)	
94	1L43 N-G/	ALL-1	GALLE-I	132	Tiger	10.0	2	2.4700	4.1900	0.0272	1.4176	2.4047	0.4748	
95	N-G/	ALL-I	GALLE-1	132	Tiger	10.0		2.4700	4.1900	0.0272	1.4176	2.4047	0.4748	
96	KOL	ON-1	ATHUR-1	132	Lynx	14.0	2	2.4712	5.7075	0.0392	1.4183	3.2756	0.6825	
97	KOL	ON-1	ATHUR-1	132	Lynx	14.0		2,4712	5.7075	0.0392	1.4183	3.2756	0.6825	
98	ATH	UR-1	THULH-T1	132	Lyax	28.0	2	4.9423	11.4150	0.0783	2.8365	6.5513	1.3649	
99	ATH	UR-I	THULH-T2	132	Lynx	28.0		4.9423	11.4150	0.0783	2.8365	6.5513	1.3649	
100	ATR	UR-1	ORUWA-1	132	Lynx	3.4	2	0.6001	1.3861	0.0095	0.3444	0.7955	0.1657	
101	ATH	UR-I	ORUWA-1	132	Lynx	3,4		0.6001	1.3861	0.0095	0.3444	0.7955	0.1657	
102	KOT	UG-2	MUTHR-2	220	2 x Zebra	18.0	2	0.6794	5.4128	0.0674	0.1404	1.1184	3.2623	
103	KOT	UG-2	MUTHR-2	220	2 x Zebra	18.0		0.6794	5.4128	0.0674	0.1404	1.1184	3.2623	
104	ANI		K-NIYA-I	132	Zebra	10.8	2	0.8153	4.1436	0.0322	0.4679	2.3781	0.5608	
105	ANI		-K-NJYA-1	132	Zebra	10.8		0.8153	4.1436	0.0322	0.4679	2.3781	0.5608	
106	K-NI	YA-1	SAPUG-1	132	Zebra	4.6	2	0.3472	1.7649	0.0137	0.1993	1.0129	0.2389	
107	K-NI		SAPUG-1	132	Zebra	4.6		0.3472	1.7649	0.0137	0.1993	1.0129	0.2389	
108	SAP	JG-I	SAPUG-1P	132	Zebra	1.5	2	0.1132	0.5755	0.0045	0.0650	0.3303	0.0779	
109	SAP	UG-1	SAPUG-1P	132	Zebra	1.5		0.1132	0.5755	0.0045	0.0650	0.3303	0.0779	
110	KOL	ON-1	SRIJA-1	132	Zebra	6.0	2	0.4529	2.3020	0.0179	0.2599	1.3212	0.3116	
111	KOL	ON-1	SRIJA-1	132	Zebra	6.0		0.4529	2.3020	0.0179	0.2599	1.3212	0.3116	
112	SRIJ	A-1	PANNI-1	132	Zebra	7.0	2	0.5284	2.6857	0.0209	0.3033	1.5414	0.3635	
113	SRIJ		PANNI-1	132	Zebra	7.0		0.5284	2.6857	0.0209	0.3033	1.5414	0.3635	
114	PAN		DEHIWA-1	132	2 x Zebra	7.5	2	0.2831	2.2553	0.0281	0.1625	1.2944	0.4893	220 kV design
115	PAN		DEHIWA-1	132	2 x Zebra	7.5		0.2831	2.2553	0.0281	0.1625	1.2944	0.4893	220 kV design
							,							
					:									

Table A6.1.2 - 2 Data of Planned Transformers by the End of 2000

	_		-			,	-				-		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			200.00	ê
	(H)igh Voltage		(L)ow Voltage (M)iddle Voltage	Unit	H	٦	Σ	=		<u>2</u>	between	(base MVA)	100 MVA base		Highes	Highest Lowest	No.
Data	modification	for the system	Data modification for the system in 2000 year											_		-	<u>.</u>]
Delete	- U						 				*						
giranija	All 66kV Transformers	ansformers											:				
7		;														:	· <u></u>
() () () () () () () () () ()	Newly Add (new construction)	onstruction)				•											
	AMPA-1	AMPA-3		7	132.0	33.0		31.5	31.5	·	٦ ±	10.00 (31.5)	31.75	- Z	2.0	-15.0	77
73	NUWAR-1	NUWAR-3		2	132.0	33.0		31.5	31.5		그	10.00 (31.5)	31.75	Z.		-15.0	17
6	MATAR-1	MATAR-3		C1	132.0	33.0		31.5	31.5		 	10.00 (31.5)	31.75		· 	-15.0	12
4	SITHA-1	SITHA-3		61	132.0	33.0		31.5	31.5	i	H.	10.00 (31.5)	31.75			-15.0	
'n	AVISS-1	AVISS-3		71	132.0	33.0		31.5	31.5	;	ij	10.00 (31.5)	31.75			-15.0	
9	ATHUR-I	ATHUR-3		73	132.0	33.0		31.5	31.5		H.L.	10.00 (31.5)	31.75		:	-15.0	
7	SRIJA-1	SRIJA-3		71	132.0	33.0		31.5	31.5		:	10.00 (31.5)	31.75	<u> </u>		-15.0	
∞	ANIYA-1	ANIYA-3		۲ì	132.0	33.0	 :	31.5	31.5		H-L	10.00 (31.5)	31.75	 H		-15.0	
٥	VEYAN-1	VEYAN-3		7	132.0	33.0		31.5	31.5		÷	10.00 (31.5)	31.75		·	-15.0	1
2	CHILL-1	CHILL-3		7	132.0	33.0		31.5	31.5		±.	10.00 (31.5)	31.75		<u> </u>	-15.0	. 60
=	RATNA-1	RATNA-3		61	132.0	33.0	;	31.5	31.5	ì	ب ب	10.00 (31.5)	31.75	<u> </u>	5.0	-15.0	12
2	N-ANUR-2	: :	N-ANUR-1	2	220.0		132.0	150.0		150.0	H-M	12.00 (150.0)	8.00	I	15.0	-15.0	21
<u> </u>	PANNI-2	PANNI-SC	PANNI-1	7	220.0	33.0	132.0	250.0	80.0	250.0	H. W.	6.00 (250.0)	2.40	I	15.0	-15.0	2
į			:	·	:		:	1		:	H-L	(0.08) 00.9	7.50				
:		:	:	- 1	•	· ·	:	•	:	1	N-L	4.00 (80.0)	5.00				
4:	KELAN-2	KELAN-TT	KELAN-1	64	220.0	33.0	132.0	150.0	0.09	150.0	H.M	6.00 (150.0)	4.00	r	15.0	-15.0	21
		1	:		-	.:					H-L	(0.09) (0.09)	10.00				
:		1	:								M-t.	4.00 (60.0)	29.9				
2	KHD-1	KHD-G		7	132.0	11.0		36.0	36.0		M.H.	10.00 (36.0)	27.78	=	10.0	-5.0	13
16	SAPUG-1P	SAPU-GNI			0 0 0			-			-			_			

1) Sources; *: CEB's record, **: Name plate at the site, none: Assumed value 2) Shaded nodes; Not in operation

Table A6.1.2 - 2 Data of Planned Transformers by the End of 2000

1

è.		Node		No. of	Rated	Rated Voltage (kV)		Kalea Kalea	pacity	Rated Capacity (MVA)	dui	Impedance Voltage / Unit (%)	/ Unit (%)		-	Tap (%. nos)	
	(Hiigh Voltage		(L)ow Voltage (M)iddle Voltage	Unit	I I	٠.	Σ	Ŧ	١	Σ	between	(base MVA) 100	100 MVA base.		Highest	Highest Lowest	Nos.
17	SAPUG-1P	SAPU-GN2			142.0	0.11		50.0	50.0		H.	17.80 (50.0)	35.60	Œ	0.01	-10.0	17
81	MUTHR-2	MUTHR-G		_	220.0	0.11		175.0	175.0		H-L	13.00 (175.0)	7.43	I	10.0	-5.0	13
6	KELAN-2	KELA-CC2		_	220.0	0		175.0	175.0		Т-Н	13.00 (175.0)	7.43	I	10.0	-5.0	13
8	KELAN-1	KELA-GT3			132.0	15.0		140.0	140.0	-	H-L	10.00 (140.0)	7.14	I	10.0	-5.0	13
2	KELAN-1	KELA-GT4			132.0	11.0	:	30.0	30.0		H-L	10.00 (30.0)	33.33	I	10.0	-5.0	13
23	BADUL-1	BADUL-3		m	132.0	33.0		31.5	31.5		H-L	10.00 (31.5)	31.75	I	5.0	-15.0	11
ន	VALAI-1	VALAI-3		71	132.0	33.0		31.5	31.5		H-L	10.00 (31.5)	31.75	π.	5.0	-15.0	17
25	THULH-1	тницн-3		m	132.0	33.0		31.5	31.5		H-L	10.30 (31.5)	32.70	I	10.0	-15.0	16
23	N-CALL-1	N-GALL-3		7	132.0	33.0		31.5	31.5		7-H	10.00 (31.5)	31.75	I	5.0	-15.0	17
8	GALLE-1	GALLE-SV		_	132.0	5.9	•	20.0	20.0	•	H-L	10.00 (20.0)	50.00		; ;		:
72	DEHIWA-2	DEHIWA-3	:	7	220.0	33.0	: :	63.0	63.0	:	H-L	13.00 (63.0)	20.63	I	5.0	-15.0	77
28	K-NIYA-I	K-NIYA-3		73	132.0	0.1		63.0	63.0	:	7-H	10.00 (63.0)	15.87	X	5.0	-15.0	17
-				:	:		!	- :	;	. ;						:	i
Repla	Replacement or Augmentation	gmentation	:		:						:				:		
83	EMBIL-1	EMBIL-3		7	132.0	33.0	:	31.5	31.5	!	H-L	10.00 (31.5)	31.75	I	2.0	-15.0	17
စ္က	BALAN-1	BALAN-3		7	132.0	33.0	!	31.5	31.5	:	Ŧ	10.00 (31.5)	31.75	Œ	2.0	-15.0	17
3	UKUWE-1	UKUWE-3		2	132.0	33.0	1	31.5	31.5		H-L	10.00 (31.5)	31.75	x	5.0	-15.0	17
8	HABAR-1	HABAR-3		2:	132.0	33.0		31.5	31.5		7-H	10.00 (31.5)	31.75	I	2.0	-15.0	12
33	TRINC-1	TRINC-3		4	132.0	33.0	:	31.5	31.5		H-L	10.00 (31.5)	31.75	I	5.0	-15.0	11
#	ANURA-1	ANURA-3	:	7	132.0	33.0		31.5	31.5		H-L	10.60 (31.5)	33.65	I	5.0	-15.0	17
35	KURUN-1	KURUN-3	:	77	132.0	33.0		31.5	31.5	•	H.	10.00 (31.5)	31.75	r	2.0	-15.0	17
36	PUTTA-1	PUTTA-3		2	132.0	33.0		31.5	31.5		H-L	10.00 (31.5)	31.75	I	2.0	-15.0	17
31	KIRIB-1	KIRIB-3		რ	132.0	33.0		31.5	31.5		7-H	(31.9)	34.17	=	5.0	-15.0	17
88	BOLAW-1	BOLAW-3		i.e.	132.0	33.0		31.5	31.5		H.	10.84 (31.5)	34.41	I	5.0	-15.0	13
33	KOLON-1	KOLON-3		m	132.0	33.0		30.0	30.0		1	12.10 (30.0)	70 33	3	v	0.51	Ĭ.

1) Sources; *: CEB's record, **: Name plate at the site, none: Assumed value 2) Shaded nodes; Not in operation

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Table A6.1.2 - 2 Data of Planned Transformers by the End of 2000

ž	·	Node		No. of	Rated	Rated Voltage (kV)	Rated	Rated Canacity (MVA)	VA)	Imper	Impedance Voltace / Dais	11/00	1,0%	-	*	1		
	(H)igh Voltage	e (1.)ww Voltage	(H)1gh Voltage (1,1898 Voltage (M)1ddle Voltage	Unit	I		I			between	(base M	(base MVA) 100			Highest I owest	lap (%, nos)	S Z	
\$	KOLON-1	KOLON-3		2	132.0	33.0	31.5	31.5	-	¥	12.10 (30.0)	<u>[</u>	40.33	=	5.0	-150	17]
4	MATUG-1	MATUG-3		"	132.0	33.0	31.5	31.5		ı, İ	(2.1.5)	ં જે	31.68		10.0	150	<u>:</u>	*
\$	RATMA-1	RATMA-3		61	132.0	33.0	30.0	30.0		규	10.00 (30.0)	(0:	33.33		5.0	-15.0	<u> </u>	
43	RATMA-1	RATMA-3		_	132.0	33.0	31.5	31.5	- -	구	10.00 (31.5)	્કે	31.75	I	5.0	-15.0	: ::	
4	SAPUG-1	SAPUG-3		m	132.0	33.0	30.0	30.0	- -	1-T	9.90 (30.0)	6	33.00	I *	10.0	-15.0	21	*
45	SAPUG-1	SAPUG-3		_	132.0	33.0	31.5	31.5			10.00 (31.5)	(5:	31.75	I	10.0	-15.0	21	
9	FORT-1	FORT-11		С	132.0	11.0	30.0	30.0	- -	+ 	11.00 (30.0)	ô.	36.67	X	5.0	-15.0	3	*
47	KOLLU-1	KOLLU-11		т	132.0	11.0	30.0	30.0		H.	11.00 (30.0)	6	36.67	Ξ	5.0	-15.0	<u> </u>	*
2 4	CHUNN-3	CHUNN-G		m	33.0	0.11	12.5	12.5	 -	H.C.	5.50 (12.5)	-3	8.4	Σ	10.0	-5.0	7	
				******												:		
Char	Changing node name only	ne only											:		;			
from	from SAPUG-1P	SAPUG-GI		-	142.0	0.11	20.0	50.0		:		<u>:</u>	;		:	-	!	
	SAPUG-1P	SAPUG-G2			142.0	0.11	20.0	50.0	•	- 		· · · · · · · · · · · · · · · · · · ·			:	:	:	:
5	SAPUG-1P	SAPUG-G		7	142.0	11.0	50.0	50.0		-	•		!		:	i		
	- 1			1			· · · · · · · · · · · · · · · · · · ·			: 		<u> </u>	:			:	1	
form	KELAN-1	KELAN-3A	÷ .		132.0	33.0	0.09	0.09	: :	:	; ;	· 	:	:	· :	1 1		
;	KELAN-1	KELAN-3B		'	132.0	33.0	0.09	0.09				: 	1		:	!	:	
2	KELAN-1	KELAN-3		C1,	132.0	33.0	0.03	0.09				:	:			!	:	
:			:	:	:			<u>-</u>			!	: 	2			,		
from	KELAN-3A KELA-GTZ	KELA-GT2	:	т.	33.0	0.11	27.0	27.0		·	i .	i				:	-	
;	KELAN-3B	KELA-GT3	-	7	33.0	0.11	28.7	28.7	<u> </u>		•	:						••••••••••••••••••••••••••••••••••••••
2	KELAN-3	KELA-GT2		m	33.0	0.11	27.0	27.0				 						
•	KELAN-3	KELA-G72		73	33.0	11.0	28.7	28.7	·						•			· · · · - ·
								-			İ			·				
												l						7

Notes:
1) Sources; **: CEB's record, **: Name plate at the site, none: Assumed value
2) Shaded nodes; Not in operation

Table A6.1.2 - 3 Data of Planned Generators by the End of 2000

No.	Node	Туре	No. of Unit	Rated Voltage (kV)	Rated Capacity (MVA)	Rated Output (MW)	Xd" (%)
Data	modification fo	r the syste	m in 200	0 year			
Delete	e	·	•	·			
	Inginiyagara P	'S	:	i - 			
Newly	y Add (new con	struction)	and repl	acement	:		
1	Kelanitissa P/	S Total	1	t !	342.00	290.00	
	KELA-CC1	gas	1	11.0	118.00	100.00	16.0
	KELA-CC1	steam	. 1	11.0	59.00	50.00	16.0
	KELA-GT3	gas	1	15.0	135.00	115.00	16.0
:	KELA-GT4	gas	1	11.0	30.00	25.00	16.0
2	Muthragawell	a P/S Tot	al		177.00	150.00	
	MUTHR-G	gas	1	11.0	118.00	100.00	16.0
	MUTHR-G	steam	. 1	11.0	59.00	50.00	16.0
3	Sapugaskanda	a P/S Tota	al		157.20	131.04	
	SAPU-GN1	diesel	1	11.0	47.00	40.00	16.0
	SAPU-GN2	diesel	. 1	11.0	47.00	40.00	16.0
	KHD-G	diesel	8		7.90	6.38	16.0
4	Chunnakam I	P/S Total			37.50	30.00	
	CHUNN-G	diesel	3	11.0	12.50	10.00	16.0
	(replacement)				:		

Table A6.1.2-4

Data of Planned Reactive Power Sources by the End of 2000

No.	Node	Rated Volta	ge Rai	ed Capacity	Remarks
		(kV)		(MVA)	
Data n	nodification for t	he system in 20	000 year		
Newly	Add		:		
. 1	KIRIB-3	33	:	10.00	
2	KURUN-3	33	1	10.00	
3	HABAR-3	33		10.00	
4	KELAN-TT	33	. 1	60.00	
5	GALLE-SV	5.9	- 1	20.00	SVC; -20 to +20 MVA
6	PANNI-SC	33		100.00	
		<u> </u>			
		,	i		
Total			:	210.00	

SVC: Static Var Compensator





Table A6.1.2-5 Generator Output Schedule for 2000 System

No.	Node	Туре	Scheduled O	utput (MW)	Max Output *4)
	•		Rainy Season *2)	Dry Season *3)	(MW)
	:	j l			
1	LAX-G	hydro	50.00	33.00	50.00
2	N-LAX-G	hydro	100.00	65.00	100.00
3	WIMAL-G	hydro	50.00	33.00_	50.00
4	CANYO-G	hydro	60.00	30.00	60.00
5	POLPI-G	hydro	75.00	49.00	75.00
6	UKUWE-G	hydro	38.00	25.00	38.00
7	BOWAT-G	hydro	40.00	26.00	40.00
8	VICTO-G	*1) hydro	210.00	120.00	210.00
9	RANDE-G	: hydro	122.00	79.00	122.00
10	KOTMA-G1	hydro	134.00	131.00	134.00
11	KOTMA-G2	: hydro	67.00	0.00	67.00
12	RANTE-G	hydro	49.00	32.00	49.00
13	SAMAN-G	hydro	120.00	78.00	120.00
14	KELAN-ST	steam	0.00	45.00	45.00
15	KELA-GT1	gas	0.00	18.00	18.00
16	KELA-GT2	gas	0.00	90.00	90.00
17	KELA-GT3	gas	97.00	102.60	102.60
18	KELA-GT4	gas	0.00	23.40	23.40
19	KELA-CC1	*1) c.c.	128.00	135.00	135.00
20	MUTHR-G	c.c.	0.00	135.00	135.00
21	SAPUG-G	diesel	0.00	64.80	64.80
22	SAPU-GN1	diesel	34.00	36.00	36.00
23	SAPU-GN2	diesel	34.00	36.00	36.00
24	KHD-G	diesel	34,00	46.00	46.00
25	CHUNN-G	diesel	18.00	27.00	27.00
				804.00	1117.00
	o total		1115.00	701.00	1115.00
	nal total	· · · · · · · · · · · · · · · ·	345.00	758.80	758.80
Total	of system		1460.00	1459.80	1873.80

Notes:

- *1) Slack node: VICTO-G for rainy season, KELA-CC1 for dry season
- *2) Scheduled output = Maximum output, for hydro stations
- *3) Scheduled output = Maximum output, for thermal stations
- *4) Maximum output = Rated output, for hydro stations

 Maximum output = Rated output x 0.9, for thermal stations

Table A6.1.2-6 Dynamic Stability Data for 2000 System

Oct. 3, 1996

Condition of Dynamic Stability Analysis

for the CASE 2000, Rainy Season

1. Fault and Fault Location

Three phase fault on the Kotamale - Biyagama 220 kV "

rale side.

2. Reclosing

Three phase reclosing of single

.0 kV line.

Reclosing sequence

Fault ----- trip signal to C 80 ms

me) -- CB reclose

1) Successful Reclosing Fault --- (160 ms) --- CBs trip

ing fault and CBs Close

2) Unsuccessful Reclosing xxx. Fault -- (160 ms) -- CBs trip -- (

s Close -- (160 ms) -- CBs trip

- 3. Generators to be Observed
 - 1) Kotmale (KOTMA-GI)

 - 2) Victoria (VICTO-G)3) Kelanitissa (KELA-CCI)
 - 4) New Laxapana (N-LAX-G)
- 4. Factors to be Observed
 - 1) Phase Angle (reference generator : Chunnakam)
 - 2) Terminal Voltage
 - 3) Output Power
- 5. Integration Time Step

0.001 sec

6. Duration of the Calculation

3.0 sec

Table A6.1.2-6 Dynamic Stability Data for 2000 System

THAT HYORO

THE FOWER SYSTEM SHOULATOR

GERSAL

(Salient Pole Generator Hodel)

COXª	. 1	Value	Description
3	K	5.2	7' (>0) (sec)
J11	V	0.068	·14 (>0) (sec)
315	\ \	0.12	T" (>0) (sec)
J+3	-	3.0	Inertla H
JIQ	V	0.5	Speed Damping D
J+5	/	1-1	x _d
J+6	·	0.66	×q
J17	V	0.32	x;
J18	V	0.16	χ" • χ" d q
119	0.10	0.14	xr
J+10	V	0.03	\$(1.0)
J+11	₽	0.25	S(1.2)

the above MBASE.

SIAICS	1	Description
K		E'
KIL		\$kd
K+2		f."
X+3		& Speed (p.v.)
Ken		Angle (radians)

 $\mathbf{x_d}$, $\mathbf{x_q}$, $\mathbf{x_d}$, $\mathbf{x_q}$, $\mathbf{x_\ell}$, \mathbf{B} , and \mathbf{B} are in p.u., machine HVA base. $\mathbf{x_q}$ must be equal to $\mathbf{x_d}$.

Table A6.1.2-6 Dynamic Stability Data for 2000 System

TLAHT HYORO

FIL FORER SYSTEM STRULATOR

CEPSAL

(Salient Fole Cenerator Hodel)

CALL GENSAL (IBUS, TH, KOUNT, J, K)	N-LAX-1			
This model is located at system bus machine This model uses counter and COUs starting with and STATEs starting with	1 /// 0 TBUS, 1	FHECH EED VOLT at Terminal bus	GENSAL	SFEED 150RCE Source Current ETERM Terminal Voltage ANGLE > Angle
The machine HVA base is 125 for units = 125 HBASE. 250RCE for this machine is 0 + the above HBASE.				

CONs	. ,	Value	Description
J	Y	7.3	T' (>0) (sec)
J+1	V	0.056	· t (>0) (sec)
J12	\	0.12	T" (>0) (sec)
J13	V	4.3	Inertia H
314	L	0.5	Spend Demping D
J15	<u>ا</u>	1.03	χ _δ
J46	V	0.63	X _Q
J+7	٧	0.29	x;
Jie	V	0.15	ייע = ייע ס ס
J+9	0.10	0त्र	Xį
J+10	١	0.03	\$(1.0)
J+11	~	0.25	\$(1.7)

STATES	•	Description
K		£'q
K+1		∮kď
K+2		f."
Ki3		Δ Speed (p.u.)
K+4		Angle (radians)

 $X_{\mathbf{d}}, Y_{\mathbf{q}}, X_{\mathbf{d}}^{1}, X_{\mathbf{d}}^{n}, X_{\mathbf{q}}^{n}, X_{\mathbf{f}}^{n}$, H, and D are in p.u., machine MVA base. $X_{\mathbf{q}}^{n}$ must be equal to $X_{\mathbf{d}}^{n}$.

PLANT HYORO

PTI TOHER SYSTEM SHIULATOR

GERSAL

(Salient Pole Generator Hodel)

CALL GERSAL (IBUS, IH, KOURT, J.K) WIMAL-1 1//20 18US, THECH This model is located at system bus € 1° 38. ELD KOURIT, YOUT at tereinal This model uses counter GENSAL and COMs starting with and STATEs starting with The machine HVA base in 13 for each of / units = 63 HOASE. 250RCE for this machine is 0 + 10.147 on . the above MBASE.

CONS	. 1	Yalue	Description
J	,,	5.2	Ti (>0) (mec)
J+1	l-	0.074	-1" (>0) (sec)
3+2	·	0.13	1': (>0) (sec)
J+3		3.0	Inertia H
J+4		0.5	Speed Damping D
J15		1.1	x,
J16		0-66	×
J17		0.32	x;
J+8		0.147	X" = X" d q
J19	0.10	0-14	×ŧ
J+10		0.03	S(1.0)
J+11		0.25	\$(1.2)

STATES	J	Description
K		E'q
KIL		fkd
X+2		f."
K13		å Spead (p.u.)
Kip		Angle (radians)

$$7_{4}'' = 0.034$$

 $\chi_{6}' = 0.57$

 X_d , X_q , X_d^1 , X_d^2 , X_q^2 , X_k , H, and D are in p.u., machine HVA base. X_q^n must be equal to X_d^n .

\bigcirc

Table A6.1.2-6 Dynamic Stability Data for 2000 System

HANT HYORO

TI FOVER SYSTEM SHIPLATOR

CERSAL

(Sallent Fole Generator Hodel)

CALL GENSAL (1805,111,KOUNT,J,K)	POLPZ-1			
This model is located at system bus	1130 IBUS.	thich 1		srcco _
machine	fn.	ELD		ISORCE Source
This model uses counter	fkoust,	V VOLT at	GENSAL	Current EILNS Terminal
and CONs starting with	1J,	I terminal bus	00,1320	Yoltege
and STATEs starting with	<u>г.</u> к.	,		ANGLE - Angle
The machina HVA base is 94 for a unite a 94 HDASE. ZSORCE for this machine is 0 + the above HBASE.	•]
THE MOUSE HOUSE!				

вчоэ	. 1	Value	Description
J		5.2	71 (>0) (sec)
J+1		0.084	-1" (>0) (sec)
J+2	V	0.15	1 ⁴ (>0) (82C)
J13		3.0	Inertis H
314		0.5	Speed Dompling D
J15], [X&
J+6		0.66	×q
317		0.32	x'
Jen		0.129	X" = X" d q
J+9	0.10	0-17	× _t
J+10		0.03	\$(1.0)
J+11		0.25.	8(1.2)

Х

STATES	,	Description	
x		E,	
K+1		fkd	
K+2		₽" q	
K+3		& Speed (p.u.)	
K14		Angle (radians)	

$$7d'' = 0.034$$
$$2d'_{R} = 0.52$$

Xd. Xq. Xd. Xd. Xd. Xd. Xg. H. and D are in p.u., machine MVA base. Xd must be equal to Xd.

1

1

HART HYORO

THE FORER SYSTEM SHIPLATOR

GEHSAL

(Salient Fole Generator Hodel)

CALL GENSAL (IEUS,IH,KOUHT,J,K)	CANYO-1	,		
This model is located at system bus	1/140 100s.	Fliccit		STEED
machine	<u>/ / </u> IR.	EFD		ISORCE Source
This model uses counter	#xount,	V VOLT at	GENSAL	ETERN Terminal
and Colls starting with	11,	enq testinar		Yoltage
and STATEs starting with	,K.			ANGLE Angle
The machine HVA base is 25 for				,

CONT	. 1	Value	Description
J		5.2	T1 (>0) (see)
J+1	V	0.060	·T ⁿ (>0) (sec)
J12	~	0.11	I" (>0) (sec)
J13		3.0	inertia H
Jit		0.5	Speed Damping D
J+5		1.1	× _d
J+5		0.66	X _q
J17		0.32	x,
J18		0.18	X" = X"
J19	0.10	ofti	×ę
J+10		0.03	S(1.0)
J111		0.15	S(1.2)

STATES	1	Description
к		E'q
K+1		\$ k₫
K+2		ψ ₁ "
K+3		A Speed (p.u.)
K14		'Angle (radians)

 $\mathbf{x_d}$, $\mathbf{x_q}$, $\mathbf{x_d}$, $\mathbf{x_d}$, $\mathbf{x_q}$, $\mathbf{x_d}$, \mathbf{H} , and D are in p.u., machine HVA base. $\mathbf{x_q}$ must be equal to $\mathbf{x_d}$.

Table A6.1.2-6 Dynamic Stability Data for 2000 System

PLANT HYDRO

til fover system simulator

GENSAL

(Salient Fole Generator Hodel)

CALL GERSAL (IBUS, IN, KOUNI, J, K)				•
	SAMAN-1	-		
This model is located at system bus	1/170 TBUS.	FIECH		SECTO
machine	/	ELD		ISORCE Source
This model uses counter	kount,	V VOLT at	GENSAL	ETERN - Termina
and CONs starting with	JJ,	pna I getwiest i		Yollage
and STATEs starting with	<u>, </u>			ANGLE Angle
The machine HVA bose is 14/ for a	each of	· •		.
ZSORCE for this machine is +	1 0.12 on	- 4		•
the above MBASE.				

CONP	. 3	Value	Description
J	,	6.7	T1 (>D) (esc)
J+1	V	0.070	19 (>0) (sec)
J12	~	0.15	I" (>0) (sec)
J13		4.3	Inertia II
3+4		0.5	Speed Damping D
J15		1.03	× _d
J16		0.63	X _q
J17		0.29	x
J18		0.12	X" + X" d q
J+9	0.10	付到	×t
J+)0		0.03	\$(1.0)
J111		0.25	\$(1.2)

γ

STATES	 Description
K	 E.
K+1	 1kd
K+2	 t"
K+3	 & Speed (p.u.)
KIN	 Angle (radions)

 $\mathbf{X_d}, \ \mathbf{X_q}, \ \mathbf{X_d^s}, \ \mathbf{X_d^s}, \ \mathbf{X_q^s}, \ \mathbf{X_{g_s}}$ H, and D are in p.v., machine MVA base. $\mathbf{X_q^s}$ must be equal to $\mathbf{X_d^s}$.

Table A6.1.2-6 Dynamic Stability Data for 2000 System

PLANT HYORO

THE FOVER STATES SIMULATOR

GEHSAL

(Salient Pole Generator Hodel)

CALL GENSAL (IBUS, 1H, KOUNII, J, K)	UKUWE-1			
This model is located at system bus	1/200 IBUS.	PHECH		SIECO
machine	<u> </u>	ELD .		ISORCE Source
This model uses counter	kount,	V VOLT at	GEHSAL	ETERN Termina
and CONs starting with	fJ,	pna 1 ffimiron		Yoltage
and STATEs starting with	<u>x.</u>			ANGLE Angle
The machine HVA base is 43 for units = 43 HBASE, ZSORCE for this machine is 0 4 the above HDASE.				

COMe	. 1	Value	Description
J		5.2	T! (>0) (**c)
3+1	ジ	0.061	T" (>0) (sec)
J+2	~	0.11	T" (>0) (sec)
J+3		3:0	inertia il
314		0.5	Speed Damping D
J+5		1.1	x _a
J+6		0.66	× _q
J17		0.32	χ¦
J+8		0.177	X" * X" d q
J+9	0.10		×į
J+10		0.03	S(1.0)
J+11		0.25	\$(1.2)

STATES #		Description
×		E'd
K+1		1kd
K+2		f q
K+3		& Speed (p.u.)
K+4		Angle (redians)

Xd. Xq. Xi, Xi, Xi, Xi, H, and D are in p.u., machine HVA base. Xi must be equal to Xi.

Table A6.1.2-6 Dynamic Stability Data for 2000 System

FLANT HYDRO

FTE FOVER SYSTEM STRULATOR

GENSAL

(Salient Cole Generator Hodel)

CALL GERSAL (IBUS, IN, KOURIT, J, K) BOWAT - 1 This model is located at mystem bus 1 12 1 0 10US. PRECI 1 1 II. machine This model uses counter kount. GENSAL and COMs starting with hus and STATES starting with κ. ANGLE The machina HVA base is 47 for each of L'units . 47 MBASE. 250RCE for this machine is 0 + 10.149 on. the above MBASE.

	COHe	. 1	Yelus	Description
	J	,	5.2	7; (>0) (esc)
	J+1	1 ~	0.073	-1" (>0) (sec)
	J12	V	0.13	7" (>0) (sec)
	Jij	<u> </u>	3.0	Inertia H
	J+4		0.5	Speed Damping D
	J+5		1.1	x ^q
	J16		0.66	X _q
l.	J17		0.32	Χέ
L	Jig		0.149	χ" ε χ"
L	Jŧş	0.10	D-PY	x ^f
	J+10		0.03	5(1.0)
L	J111		0.25	5(1.2)

STATES	Description	
ĸ	r'	
K+1	f kd	
K+2	1"	
K+3	 & Speed (p.u.)	
Kith	 Angle (radians)	

$$T_{d}^{*} = 0.034$$
 $x_{j}' = 0.57$

 x_d , x_q , x_d^q , x_d^q , x_q^q , x_L , n, and p are in p.u., machine NVA base. x_q^q must be equal to x_d^q .

Table A6.1.2-6 Dynamic Stability Data for 2000 System

PLANT HYDRO

PIL FOWER SYSTEM STRUCKTOR

GERSAL

(Salient Pole Generator Hodel)

CALL GENSAL (IBUS, IH, KOUNT, J,K)	KITMA -	2		
This model is located at mystem bus	2220 IBUS,	THECH		SPECO
machine	f <u>/</u> 18.	EFD.,		ISORCE Source
This model uses counter	fKount,	V VOLT at	GENSAL	ETERN - lerminal
and COHs starting with	ij.	bus		Voltage
and STATEs starting with	řK.			ANGLE Angle
The machine HVA base is 180 for a	each of	•-		
ZSORCE for this machine is +	1 0 1 7 on .			٠.
the above MBASE.				

_			
CONS	1	Value	Description
J	,	6.7	T' (>0) (sec)
J+1	V	0.049	-1" (>0) (sec)
J+2	~	0.11	T" (>0) (sec)
J+3		4.3	Inertis H
3+4		0.5	Speed Dampling D
J+5		1.03	×a
J+6		0.63	Xq
J17		0.29	x
J18		0.17	χ'' ε χ'' σ q
J19	0.10	4-13	ף
J+10	·	0.03	\$(1.0)
J:11		0.25	S(1.2)

7

STATES	1	Description		
×		E',		
K+1		(kd		
K12		f''		
K+3		& Speed (p.u.)		
KI4		Angle (codians)		

 $x_{d^{\pm}}$ $x_{q^{\pm}}$ $x_{d^{\pm}}^{a}$, $x_{q^{\pm}}^{a}$, $x_{\chi^{\pm}}^{a}$ B, and D are In p.u., machine HYA base. x_{q}^{a} must be equal to $x_{d^{\pm}}^{a}$.

Dynamic Stability Data for 2000 System Table A6.1.2-6

GENSAL

(Salient Fole Generator Hodel)

CALL GENSAL (IBUS, IH, KOURT, J.K) KOTMA-2 1222018US, This model is located at system bus THECH SPEED , 2 ₁₄. machine This model uses counter KOURT, GEHSAL and COMs starting with I____J, and STATEs starting with The machine HVA base is 90 for each of 2SORCE for this machine is 0 . 10./77 on . the above HBASE.

CONs	. 1	Value	Description
J	,	6.7	T ₀₀ (>0) (sec)
J+1	~	0.048	-1" (>0) (sec)
J+2	L	0.10	T" (>0) (sec)
J+3		4.3	Inertia II
J+4		0.5	Speed Damping D
J+5		1.03	x _d
J+6		0.63	xq
J+7		0.29	x
J+8		0.177	אין ד אין d q
J+9	0.10	anti	×t
J+10		0.03	S(1.0)
J111		0.25	S(1.2)

STATES	ı	Description
К		E'q
k+1		(%)
K+2		f''
K+3		A Speed (p.u.)
Ken		Angle (radions)

$$T_1'' = 0.029$$

Xd. Xq. Xd. Xd. Xd. Xd. Xt. II. and D are in p.u., machine HVA base. Xd must be equal to Xd.



FLANT HYORO

PTI FOYER SYSTEM SIMULATOR

GENSAL

(Salient Fole Generator Hodel)

CALL GENSAL (IBUS, HI, KOUNT, J,K)				
	DICTO-2			
This model is located at system bus	12230 IBUS.	FILECII		SPERO
machine	J	ELD		1SORCE Source
This model uses counter	theox.	V Volt at	GENSAL	ETERN - Terminal
and CONs starting with	JJ.	bus		Voltage
and SIATEs starting with	<u> </u>			ANGLE Angle
The machine HVA base is 248 for	each of			-
/ unlts =248 HBASE.				
ZSORCE for this machine is +	3.0.165 on.			
the above HBASE.				

COKs	. 1	Value	Description
J	,	6.7	T) (>0) (sec)
J+1	~	0.051	· Tn (>0) (sec)
J+2	~	0.11	T ⁿ (>0) (sec)
J+3		4.3	Inertia H
J+4		0.5	Speed Damping D
JES		1.03	X _d
J+6		0.63	X q
3+7		0.29	χį
JiB		0.165	X" = X" d = q
J+9	0.10	研》	x
J+10		0.03	S(1.0)
J111		0.15	\$(1.7)

STATES	•	Description
ĸ		E,
K+1		ikd
K4 2		ψ",
K13		& Speed (p.u.)
K14		Angle (radians)

$$T_{3}'' = 0.029$$

 $X_{3}' = 0.64$

 $x_{d}, \ x_{q}, \ x_{d}^{*}, \ x_{d}^{*}, \ x_{q}^{*}, \ x_{L}^{*}, \ H, \ \text{and D are in p.u., mochine MVA base.} \quad X_{q}^{*} \ \text{must be equal to } X_{d}^{*}.$

FLANT 175010

TTE FORER SYSTEM SHOULATOR

GENSAL

(Salient Pole Generator Hodel)

CALL GENSAL (IBUS, IN, KOUNT, J, K) KANDE - 2 This model is located at system bus 12240 10US. PHECH machine This model uses counter .____Kount, GENSAL and COHs starting with and STATEs starting with ANGLE The machine HVA base is 162 for each of ZSORCE for this machine is _O + j0.2/ on. the above MBASE.

,			
COhs	. #	Value	Description
J	,	6.7	Ti (>0) (sec)
J+1	~	0.040	-T ⁿ (>0) (sec)
J+2	~	0.088	T" (>0) (sec)
J+3		4.3	Inertia II
J+4		0.5	Speed Damping D
J+5		1.03	x _g
J+6		0.63	X
J17		0.29	X.
J+8		0.2/	y'' = χ''' σ q
J+9	5.10	0=73	×t
J+10		0.03	\$(1.0)
J111		0.25	\$(1.2)

STATES	,	Description
ĸ		E,
K12		†kd
K+2		f."
X13		å Speed (p.v.)
K+9		Angle (radions)

$$T_{3}' = 0.029$$
 $x_{3}' = 0.64$

Xd, Xq, Xd, Xd, Xd, Xq, II, and D are In p.u., machine MYA base. Xd must be equal to Xd.

PLANT HYORO

PTI POWER SYSTEM SIMULATOR

GENSAL

(Salient Pole Generator Hodel)

CALL GENSAL (1805,18,KOUNT,J,K)				
	RANTE-GI			
This model is located at system bus	1425/1805.	PHECH		SPEED
machine	//_18.	EFD		ISORCE Source
This model uses counter	KOUNT	V VOLT at	GENSAL	ETERH Terminal
and CONs starting with	lJ,	pra :		Voltage
and STATEs starting with	<u> </u>			ANGLE Angle
The machine HVA base is 32 for	each of			,
ZSORCE for this machine is	10.185 on.	•		
the above MBASE.				•

CONs	. #	Value	Description
J	,	5.2	T' (>0) (see)
J+1	~	0.059	1" (>0) (sec)
3+5	~	0./0	1" (>0) (sec)
J+3		3.0	Inertia H
Jak		0.5	Speed Damping D
J+5		1.1	x _d
J+6		0.66	Xq
3+7		0.32	x;
J+8		0.185	X" = X" q
J+9	0.10	研	× _t
J+10		0.03	\$(1.0)
J+11		0.25	\$(1.2)

STATES	Description
ĸ	 E'q
K+1	∉kđ
K+2	\$°,
K+3	 å Speed (p.u.)
K+4	 Angle (radians)

$$7_{8}' = 0.03 \mu$$
 $x_{8}' = 0.57$

 $x_d^{\dagger}, x_q^{\dagger}, x_d^{\dagger}, x_d^{\dagger}, x_q^{\dagger}, x_{\underline{t}}^{\dagger}$, H, and D are in p.u., machine HVA base. X_q^{\dagger} must be equal to X_d^{\dagger} .

PLANT HYORO

PTI FOWER SYSTEM SINULATOR

GENSAL

(Salient Pole Generator Hodel)

CALL GENSAL (IBUS, IH, KOUNT, J,K)	RANIE . 97					
This model is located at system bus	142521BUS,	PRECH		SPEED		
machine	18.	ELD		ISORCE Source		
This model uses counter	KOUNT,	y VOLT at	GENSAL	ETERM Terminal		
and CONs starting with	jJ,	f terminal		Voltage		
and STATEs starting with	<i>t</i> x.			ANGLE - Angle		
The machine HVA base is 32 for each of						
unite = 3.2 Hease.						
ZSORCE for this machine is 0 . 10.185 on						
the above MBASE.						

CONS	,	Value	Description
J	"	5.2	Ti (>0) (sec)
J+1	V	0.059	1" (>0) (sec)
J+2	V	0.10	1" (>0) (sec)
J+3		3.0	Inertia H
Jili		0.5	Sceed Damping D
J+5		1.1	x _a
J+6		0.66	X ₃
J+7		0.32	X,
J+B		0.185	χ" = X"
J+9	0.10	4.14	xe
J+10		0.03	\$(1.0)
J+11		0.25	5(1.2)

STATES	,	Description	
к		E'q	
K+1		₩kd	
K+2		f _q "	
X+3		& Speed (p.u.)	
X+4		Angle (radians)	

 x_d , x_q , x_d^* , x_d^* , x_q^* , x_L , H, and D are in p.u., machine HVA base. x_q^* must be equal to x_d^* .

PLANT STEAM

PTI POVER STATEM SIMULATOR

GENROU

(Round Rotor Generator Model)

This model is located at system bus | | 301 | IBUS.

machine

This model uses counter

And CONS. starting with

And STATES starting with

The machine HVA base is 63 for each of

Located at system bus | 301 | IBUS.

Whech

PRECH

PRECH

PRECH

PRECH

PRECH

SPEED

Speed

SOURCE

Current

Terminal bus

NGLE

Angle

Angle

To ll on

The machine HVA base is 63 for each of

Located at system bus | 301 | IBUS.

PRECH

PRECH

PRECH

PRECH

SPEED

SOURCE

Current

Current

Terminal bus

NGLE

Angle

Angle

The machine HVA base is 63 for each of

Located at system bus | 1301 | IBUS.

PRECH

PRECH

PRECH

PRECH

PRECH

SPEED

SOURCE

Current

Current

Terminal bus

NGLE

Angle

Angle

The machine HVA base is 63 for each of

Located at system bus | 1301 | IBUS.

PRECH

PRECH

PRECH

SPEED

SOURCE

Current

Current

Terminal bus

NGLE

Angle

Angle

CONS	,	Yaive	Description
. J	V	6.97	T' (sec.>0) do
J+1	0.036	0-073	Tn (sec.>0)
J+2	1.09	226	T' (sec.>0)
J+3	0.19	2=28	T'' (sec.>0)
J+4	V	4.0	Inertia X
J+5	V	0.5	Speed Damping D
J+6	V		x _d
J+7	1		×q
J+8	レ	0.23	x
J+9	レ	1.20.	X' _q
J+10	~	0.12-	X4 * X4
J+11	0.10	0-13	xt
J+12	V		\$(1.0)
J+13	٧	0.40	5(1.2)
	J+1 J+2 J+3 J+4 J+5 J+6 J+7 J+8 J+9 J+10 J+11 J+12	J	J

-

STATES	. 1	Description	
K		E' q	
K+3		E.	
X+2		1kd	
K+3		Yką	
X+4		A Speed (p.u.)	
K+5		Angle (radians)	

$$T_{d}' = 1.58 \quad 0.76$$

$$T_{d}'' = 0.018 \quad 0.019$$

 $\chi_d,~\chi_d,~\chi_d^*$, χ_q^* , χ_q^* , χ_g^* , χ_g , H, and D are in p.u., machine KYA base. χ_q^* must be equal to χ_g^* .

$$T_{g'} = T_{d'}$$

$$T_{go} = \frac{\chi_{g}}{\chi_{g'}} T_{g'}$$

$$T_{go}'' = \frac{\chi_{g'}}{\chi_{g'}} T_{g''}$$

$$T_{d''} = \frac{\chi_{d'}}{\chi_{d''}} T_{d''}$$

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PLANT GAS

TI POWER SYSTEM SINULATOR

CENTROL

(Round Rotor Generator Model)

CALL GENROU (IBUS, IH, KOURT, J, K) KELAN-1 11300 18US, This model is located at system bus PHECH PHECH 1 / IH. __KOUNT, This model uses counter GENROU and CONs starting with YOUT AT and STATEs starting with The machine HVA base is 29 for each of _ / units = 29 HBASE. ZSORCE for this machine is 0 + j0.147 on the above HBASE.

	CONS	ı	Value	Description
	J	~	6.97	7' (sec.>0)
×	J+1	D. 030	0-059	T" (sec.>0)
X	J+2	1.09	7.76	T' _{qo} (sec.>0) -
X	J+3	0.16	0-37	T ⁴ (sec.>0)
	Jŧu	レ	4.5	Inertia H
	J+5	v	0.5	Speed Damping D
	J+6	ν	1.77	^X d
1	J+7	1. "	1.72	Xq
	J+8	V	0.23	x³
	J19	ı	1-20	X¹ q
	J+10	~	0.147	Xq x Xq
	J+11	0.10	时	Υt
[J+12	ı	0.03	\$(1.0)
[J+13	V	0.40	\$(1.7)

wachine	MYA base.	χή.	X" must	X ₁ , H, a be equal	nd 0 are to X3 -	In p.u.,

STATES	i	Description	
х		E' q	
K+1		ε'n	
K+2		nkd	
K+3		1kq	
K+4		& Speed (p.v.)	
K+5		Angle (radians)	

AVM & OOL

Dynamic Stability Data for 2000 System Table A6.1.2-6

GAS

PTI POVER SYSTEM SINULATOR

(Round Rotor Generator Hodel)

CALL GENROU (IBUS, IH, KOUNT, J, K)						
	KETWY-1			[1	
This model is located at system bus	1 300 taus.		PHECH		SPECO .	
machine	<u>ј 3</u> тн.	PRECH	£11641			Speed
This model uses counter	KOUNT,	619	ELD	GENROU	ISORCE	Source Current
and CONs starting with	<u>.</u> J,	v _T	VOLT AT terminal bus		ETERM	Terminal Voltage
and STATEs starting with	,x.				1	
The machine HVA base is $13\frac{1}{4}$ for e	ach of				UNGLE	Angle
units * 13 4 HBASE.					-	-
ZSORCE for this machine is O	1 <u>0.16</u> on					٠
the above MBASE.						

	CONS	I	Value	Description
	. 3	V	6.85	T' (sec.>0)
	J+1	0.032	0.059	T" (sec.>0)
	J+2	v	1.00	T' (sec.>0) .
×	J+3	0.16	0.29	T [#] (sec.>0)
ĺ	J+4	Ł.	4.5	Inertia H
i	J+5	V	0.5	Speed Damping D
	J+6	L	1.75	x _d
	J+7		1.72	x q
Ì	J+8	ı	0.27	X's
	J+9	Ų	1.3].	X'q
	J+10	ل ـــ	0.16	xg = xg
ĺ	J:11	0.10	0.45	×ŧ
Ì	J+12	-	0.03	\$(1.0)
[J+13		0.40	5(1.2)

""	"	10.5	Speed company of
J+6	レ	1.75	x
J+7		1.72	×a
J+8	L	0.27	X;
J+9	L	1.3].	X'q
J+10	L	0.16	xq * xq
J:11		0-45	× _t
J+12	-	0.03	\$(1.0)
		,	-41

STATES 1		Description		
K		E,		
X+1		ε'd		
K+2		Ykd		
K+3		Tkq		
K+4		& Speed (p.u.)		
X+5		Angle (radians)		

PLANT GAS

TI POWER SYSTEM SIMULATOR

GENROU

(Round Rotor Generator Model)

CACL GENROU (IBUS, IH, KOUNT, J, K)						
	KBrun-1		•	r	7	
This model is located at system bus	13001805,				Į.	
nachine	1_4_18.	S HECT	H SKECH		SPEE0 -	Speed
This model uses counter	xount,	e ^{LD}	EFD	GENROU	ISORCE	Source Current
and CONs starting with	JJ,	· v _T	VOLT AT		ETERH	Terminal
and STATEs starting with	/x.	•	terminal bus			Voltage
The machine HVA base is 31 for ea	sch of				ANGLE -	Angle
units • 3 _ HBASE.					}	
ZSORCE for this machine is 0 +	0.16 on					
the Thore MRICE						

	CONs	*	Value	Description
	J	~	6.97	T' (sec.>0) ₹
x	3+1	0.07	0.055	In (sec.>0)
χ	J+2	1.09	2=16	T' (sec.>0)
٧	J+3	0.14	0.29	T" (sec.>0)
	Jŧu	۲	4.5	Inertia H
	Jes	1	0.5	Speed Damping D
ĺ	316	-	1.79	x _d
	J+7	~	1.72	P
	J+8	-	0.23	Xå
	J+9	L	1.20.	X'q
[J+10	し	0.16	X ⁿ x X ⁿ
l	J+11	0.10	却	ף
	J+12		0.03	5(1.0)
· (J+13		0.40	\$(1.2)

	J					
X _d , X _q , machine	X'd , X'd , NVA base.	X", "	(" . Xe	, H, ar equal	nd Dare to X!	In p.v.,

STATES	1	Description
ĸ		E'
K#1		ε'd
K+2		Ykd
K+3		Ikq
K+4		& Speed (p.u.)
K+5		Angle (radians)

$$T_8' = 758 0.76$$

$$T_3' = 0578 0.019$$

PLANT C. C.

PTI POVER SYSTEM SINULATOR

GENROU

(Round Rotor Generator Hodel)

CALL GENROU (IBUS, IN, KOURT, J, K) KELAN-2 12300 18US. This model is located at system bus PHECH SPEED PHECH J____1H. machine **∮** KOUNT, This model uses counter EFD GENROU YOLT AT terminal bus and CONs starting with and STATEs starting with The machine HVA base is 177 for each of 250RCE for this machine is 0 + 10.16 on the above MBASE.

	·			
	COMS		Yalue	Cescription
	J		6.85	T' (sec.>0)
x	J+1	0.032	2059	T" (sec.>0)
	J+2	レ	1.00	I' (sec.>0)
ኦ	J+3	0.16	0-19	I" (sec.>0)
	J+u		4.0	Inertia H
i	Jes		0.5	Speed Damping D
	J+6		1.75	x ₃
	J+7	•	1.72	x q
- 1	J+8		0.27	xi
	J+9		1.31	χ
	J+10		0.16	X] · Xq
	J+11	0.10	0.75	Žį
	J+12	1.14	0.03	\$(1.0)
	J+13		0.40	\$(1.2)

X d. Xq.	χ_q^i , χ_q^i ,	X", X"	X _e , H, and D are the equal to X _a -	in p.v.,
machine	HYA base.	X" must	, be equal to X3 -	

STATES	 Description
ĸ	E'q
K+1	Ε̈́́
X+5	Ykd
К+3	 Ykq
K+4	 A Speed (p.u.)
K+5	Angle (radians)

PLANT GAS

PTI FOWER SYSTEM SIMULATOR

GENROIA

(Round Rotor Generator Hodel)

CALL GENROU (IBUS, IH, KOUNT, J,K)						
	KEMY-3				1	
This model is located at system bus	1 <u>330/</u> 1805,					
machine	118.	HECH	PHECH	į	SPEED	Speed
This model uses counter	KOUNT,	EFD	tro	GENROU	ISORCE	Source Current
and COMs starting with	Ij,	V _T	VOLT AT		ETERN	Termina)
and STATEs starting with	I K.	•	terminal bus		}	Voltage
The machine NVA base is 138 for ea	sch of				ANGLE	Angle
/ units = 138 HBASE.			}		J	
ZSORCE for this machine is + j	0.149on					
the above HBASE.						

	CONs	1	Value	Description
	. 3		6.97	T' (sec.>0)
ኢ	J+1	0.029	0=057	I" (sec.>0)
y	J+2	1.09	276	T' (sec.>0) ·
×	J+3	0.15	研	T" (sec.>0)
	Jiu		4.5	Inertia H
	J+5		0.5	Speed Damping D
ĺ	JIS		1.79	х _d
	J+7	•	1.72	X
	J+8		0.23	X
	J+9		1.20.	X'q
	J+10		0.149	Xä • Xä
	J+11	6.10	071	Xt
	J+12		0.03	S(1.0)
	J+13		0.40	5(1.2)

X X	XL. XL.	X% .	Х".	X. H. and D are in p.u
machine	MVA hase	Ŷ.,	40143	X _E , K, and D are in p.u., be equal to X' ₃ :
		^ q		or referr to vi

STATES	1	Description
κ		ξ'q
X+1		E,
X+5		Ykd .
K+3		Ykq
XI4		& Speed (p.u.)
K+5		Angle (radians)



PLUMI DG

PTI POWER SYSTEM SIMULATOR

GENROU

(Round Rator Generator Hodel)

CALL GENROU (18US, 1H, KOUNT, J, K)						
	CHONH -}			Γ	7	
This model is located at system bus	1 <u>3736</u> reus,		Buros		SPEE0 .	•
machine	₹ <u>/</u> IH.	PHECI	PHECH		Preco.	Speed
This model uses counter	KOURT,	ELD	013	GENROU	ISORCE	Source Current
and CONs starting with	1	v _T	VOLT AT		ETERH	Terminal Voltage
and STATEs starting with	f K.					
The machine MVA base is 38 for each	sch of				VIGLE	Angle
units = 38 HBASE.					J	
ZSORCE for this machine is + ;	0.16 on					
the above KBASE.						

	CONS	1	Value	Description
	J		6.97	T' (sec.>0)
ĸ	J+1	0.027	arst	T" (sec.>0)
X	J+2	1.09	2-76	T' (sec.>0) .
Y	J+3	0.14	0.29	Ti (sec.20)
	J+4		4.0	Inertia H
i	J+5		0.5	Speed Damping D
[J+5		1.79	x _a
	J+Ż		1.72	X _q
- {	J+8		0.23	x
ĺ	J+9		1.20.	X'q
ſ	J+10		0.16	X'' * X''
	J+11	0.10	0=13	xt
Ì	J+12		0.03	\$(1.0)
Į	J+13		0.40	\$(1.2)

L	11	DI K.	
x 3, x 0,	Xa, Xa	, x",	$X_{\tilde{\mathbf{Q}}}^{n}$, $X_{\tilde{\mathbf{Q}}}$, $X_{\tilde{\mathbf{Q}}}$, $X_{\tilde{\mathbf{Q}}}$, and 0 are in p.u., must be equal to $X_{\tilde{\mathbf{Q}}}^{n}$
rachine	HYA base	. X	must be equal to X%.

STATES	I	Description
K		E',
K+1		E,
K+3		9kd
K+3		7kq
K44		& Speed (p.u.)
X+5		Angle (radians)

Tg': 258 0.76
Td': 0.038 0.019



PLANT C. C.

PTI FOVER SYSTEM SIMULATOR

GENROU

(Round Rotor Generator Hodel)

CALL GENROU (IBUS, IH, KOUNT, J, K)						
	KELAW . G			r	7	
This model is located at system bus	4305 IBUS				1	
machine	<u> </u>	Р _{НЕСН}	РИЕСИ		BPEED	Speed
This model uses counter	s kount,	£ ^{ED}	ELD	GEHROU	SORCE	Source
and COMs starting with	/ J,	y _t	VOLT AT	•	ETERH	Terminal Yoltage
and STATEs starting with	fK.	•	terminal bos			TOTCERE
The machine MVA base is 177 for ea	ich of				VIGLE	Angle
			l		J	
ZSORCE for this machine is 0 + j	0.16 on			-		
the above MBASE.						

STATES

K+1

K+2

X+4

X+5

	CONS	,	Value	Description
	J		6.85	7 (sec.>0)
X	J+1	0.032	0.059	T" (sec.>0)
	J+2	~	1.00	T' (sec.>0) .
×	J+3	0.16	0-29	T" (sec.>0)
	Jeu		4.0	Inertia H
	J+5		0.5	Speed Damping D
	J+6		1.75	x4
	J+7		1.72	Xq
	J+6		0.27	x
	J+9		1.31	Χ'q
	J+10		0.16	X' * X''
	J+11	0.10	0.75	xi
	J+17		0.03	\$(1.0)
[J:13		0.40	5(1.2)

T ₁ ' =	0.76	• •	
- 4		1.2	

Description

& Speed (p.u.)

Angle (radians)

Ε'n

Ykd Ykq

X_d, X_d, X_d, X_d, X_d, X_d, X_d, X_e, H, and D are in p.u.,



MANT 1) 67

PTI POWER SYSTEM SIMULATOR

GENROU

(Round Rotor Generator Hodel)

CALL GENROU (IBUS,IH,KOUNT,J,K)						
	SAIU-GN2			ſ	7	
This model is located at system bus	1431 180s,				İ	
nschine	/tн.	PECF	PHECH	ł	SPECO	Speed
This model uses counter	fkount,	EED	E10	GEHROU	ISORCE	Source Current
and COMs starting with	 J,	ΥŢ	VOLT AT		ETERM	Termina. Voltage
end STATEs starting with	<u>г</u> к,	• .	CELMINAL DOS		į	1011484
The machine HVA base is 47 for ea	ach of				ANGLE	Angle
units = 47 MBASE.					J	
ZSORCE for this machine is 0 +	0.16 00					
the shove HRASE.						

	COKs	1	Value	Cescription
	ţ,		6.97	T' (sec.>0)
X.	J+1	2027	0.055	1" (sec.>0)
×	J+2	1.09	2-76	I' (sec.>0) .
Y	J+3	0.14	the f	I" (sec.>0)
	J+4		4.0	Inertia H
	J+S		0.5	Speed Damping D
- [J46		1.79	xg
	J+7		1.72	PX
	J+B		0.23	x
• [J19		1.20	X,
	J+10		0.16	χ'' ε X''
ĺ	J+11	0.10	4-13	X ₂ .
[J+12		0.03	5(1.0)
[3+13		0.40	5(1.2)

1

1

	K+2		1kd
	K+3		Ykq
	K+4		& Speed (p.u.
	K+5		Angle (radian
,		L	· · · · · · · · · · · · · · · · · · ·
	7	- / - =	K58 0.
	•	l	1420 V

Description

 X_d , X_q , X_d , X_q , X_d , X_q , X_q , X_q , X_q , X_q , and 0 are in p.u., machine MVA base. X_q^q must be equal to X_q^q .

PLANT 1) 67

PTI POWER SISTEM SIMULATOR

GENROU

(Round Rotor Generator Hodel)

CALL GENROU (IBUS, 1H, KOUNT, J, K)						
	5APU .GN1			ſ	7	
This model is located at system bus	14312 TBUS,			ĺ	1	
machine	<u>/ / 1</u> 8,	PHECE	PHECH H		SPEED	Speed
This model uses counter	KOUNT,	£ ¹⁰	EED	GENROU	ISORCE	Source Current
and COMs starting with	<i>j</i> j,	Υ _τ	VOLT AT		ETERH	Terminal
and STATEs starting with	<i>t</i> к.	τ	terminal bus			Voltage
The machine MVA base is $\frac{47}{}$ for each	ich of			. •	ANGLE	Angle
units = 47 HBASE.					J	
ZEORCE for this machine is O + j	0.16 on					
the above KBASE.						

	CONs	i	Value	Description
į	. J		6.97	T' (sec.>0)
x	J+1	0.027	0-05\$	T" (sec.>0)
×	J+2	1.09	226	T' (sec.>0) .
Y	J43	0.14	279	T" (sec.>0)
	J44		4.0	Inertia R
[J+5		0.5	Speed Damping D
	J+6		1.79	×a
	J+7		1:72	Xq
	J+6		0.23	Χ'n
	J+9		1.20	X'q
	J+10		0.16	X" · X"
	J111	0.10	研引	xt
ſ	J+12		0.03	5(1.0)
[J+13		0.40	\$(1.2)

Xd. Xo.	X' Y'	Χ'n,	х".	Xg. H. and D are in p.u.,
machine	HVA base.	χ̈́	must	X_{ξ} , H , and D are in p.u., be equal to X_{d}^{n} .

STATES	1	Description
K		E' q
K+1		E,
K+2		Ykd
K+3		1kq
X+4		& Speed (p.u.)
K+S	•	Angle (radians)

PLANT 1) GT

PTI FOVER SYSTEM SIMULATOR

GENRO

(Round Rotor Generator Hodel)

CALL GEHROU (IBUS, IN, KOUNT, J, K)						
	SAPUG-G			<u></u>	7	
This model is located at system bus	4313 18US,		******	İ	SPEED	
machine	<u> </u>	PECH	PHECH		Prieu	Speed
This model uses counter	KOUNT,	ELD	013	GEHROU	ISORCE	Source Current
and CONs starting with	JJ,	ν _τ	VOLT AT		ETERH	Terminal Voltage
and STATEs starting with	<u>к.</u>				·	
The machine HVA base is 94 for e	sch of				ANGLE	Angle
mits . 94 HBASE.				L	J	
ZSORCE for this machine is 0 +	1_0.16 on					
the above BBASE.						

	CORs	ı	Value	Description
į	J.		6.97	I' (sec.>0)
	J+1	0.027	0.055	In (sec.>0)
/	J+2	1.09	2-16	T ^e (sec.>0)
Y	J+3	0.14	0.29	T" (sec.>0)
	3+4		4.0	Inertia H
	J+5		0.5	Speed Damping D
ļ	J#6		1.79	x _d
ĺ	3+7		1.72	Xq
	J+8		0.23	×å
Ì	J+9		1.20.	χ'q
ı	J+10		0.16	X' * X''
ĺ	J+11	0.10	研	Xį
	J+17		0.03	\$(1.0)
	J+13		0.40	5(1.2)

0113	0	. Kn .			
			-		
X _d , X _q ,	X'd, X'd	x3. x3.	. X ₁ . B. an	d Dare i	ln p.u.,

STATES	i	Description
к		E'q
X+1		E,
X+2		*kd
K+3		Ykq
K+4		& Speed (p.u.)
X+5		Angle (radiens)

$$T_8' = 1580.76$$

$$T_d' = 0.0380.019$$



MART 1967

TI POVER SYSTEM SIMULATOR

GENROU

(Round Rotor Generator Hodel)

CALL GENROU (IBUS, IN, KOUNT, J, K)						
This model is located at system bus	KHM-9 1459518US,		РИЕСН		SPEED .	
machine	<u>i1</u> 8.	PHEC	H #			Speed
This model uses counter	KOUNT,	ŧ _{fō}	ELD 013	GENROU	ISORCE	Source Current
and CONs starting with	JJ,	¥T	VOLT AT		ETERH	Terminal
and STATEs starting with	1x.	•	(eiminal Doz		1	Voltage
The machine MVA base is 63 for ea	ich of				NIGEE	Angle
/ units * 63 HBASE.					J	
250RCE for this machine is 0 + j	0.16 on			•		
the above MBASE.				-		

i	CONS	1	Value	Description
i	j		6.97	T' (sec.>0)
	J+1	01027	0-055	†" (sec.>0)
×	J+2	1.09	2.56	T' (sec.>0) .
λ	J+3	0.14	0-29	T" (sec.>0)
	Jeu		4.0	Inertia H
	J+5		0.5	Speed Damping D
[J16		1.79	x
[J+7	<i>1</i> ·	1.72	Хq
	J+8		0.23	x,
	J+9		1.20.	X'q
	J+10		0.16	X'' * X''
	J+11	0.10	243	X ₁
	J+12		0.03	\$(1.0)
[J+13		0.40	5(1.2)

Xd, Xd, Xd, Xd,	χä,	Х".	X ₁ , H, and D are	In p.u.,
X _d , X _q , X _d , X _q , nachine NVA base.	Ϋ́	must	be equal to X4.	

STATES	1	Description
K		ε,
K+1		£;
K+2		1kd
K+3		Ykq
K#4		& Speed (p.u.)
K+5		Angle (radians)

for all the generators

Table A6.1.2-6 Dynamic Stability Data for 2000 System

PTT POWER SYSTEM SIMULATOR

SEXS

(Simplified Excitation System)

CALL SEXS (1805, IH, KOUNT, J.K)

8

This model is connected at system bus	IBUS,	
machine	IH. ECOMP	EFD
This model uses counter	KOUNT, VOIHSG	SEXS
and CONs starting at	J, Signals	
and STATEs starting at	€x.	

CONs	ł	Value	Description
J		0.1	τ _λ /τ ₈
J+1		10	T ₃ (>0) (sec)
J+2	٩	200	K
J+3		0.05	I _E (sec)
J+4		0	E _{MIN} (p.u. EFO base)
J+5		3	E _{KAX} (p.u. EFD base)

STATES	f	Description
Х		First integrator
X+1		Second integrator

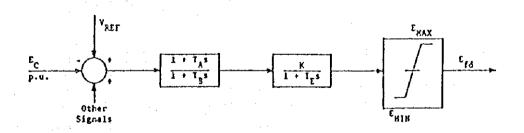


Table A6.1.3 - 1 Data of Planned Transmission Lines by the End of 2005

No.		B	ranch		Conductor	Length	cct	R	X	Y		<u> </u>	Y	Note
	Ref. from	n	' to	(kV)	·	(km)	:	(Ω)	(Ω)	(mS)	100	MVA Ba	se (%)	
							 _	•				_ .		
		or t	he system in 2	005 year				:		· 	·			
ieu ly													· · · · · · · · · · · · · · · · · · ·	
1	EMBIL.		'HAMBAN-I		Bear	23.1	2		9.1519		1.6229	5.2524	1.1601	
	EMBIL-		'HAMBAN-1	· · · · · ·	Bear	23.1			9.1519	0.0666	1.6229	5.2524	1.1601	
3			MATAR-1	132	Bear	34.1	2		13.5099	0.0983	2.3958	7.7536	1.7125	
4			MATAR-1	132	Bear	34.1		• • • • • • • • • • • • • • • • • • • •	13.5099		2.3958	7.7536	1.7125	
5			KUKULE-1			26.4	2		10.1288		1.1438	5.8131	1.3709	
6			KUKULE-1			26.4				0.0787	1.1438	5.8131	1.3709	
7			RATNA-I	132	Zebra !	24.2	2		9.2847	0.0721	1.0484	5.3287	1.2567	
8			RATNA-1	132	Zebra	24.2			9.2847	0.0721	1.0484	5.3287	1.2567	
9			PALEK-I	132		16.8	2		6.4456	0.0501	0.7278		0.8724	
10			PALEK-1	132	Zebra	16.8		1.2682		0.0501	0.7278	3.6993	0.8724	
11	THULH		KEGAL-1	132	Zebra	18.7	2		7.1746	0.0557	0.8102	4.1176		
12	THULH		KEGAL-1	132	Zebra	18.7			7.1746	0.0557	0.8102		0.9711	
13	THULH		VEYAN-1	132	Zebra	24.2	2		9.2847	0.0721	1.0484	5.3287	1.2567	
14	THULH		VEYAN-I	132	Zebra	24.2			9.2847			5.3287	1.2567	-
15	VEYAN		N-CHIL-2	220	3 x Zebra	42.0	2		11.0551	0.1785	0.2184	2.2841	8.6410	
16	VEYAN	.2	N-CHIL-2	220	3 x Zebra	42.0		1.0568		0.1785	0.2184	2.2841	8.6410	
17	N-CHIL		PUTTA-P2	220	3 x Zebra :	43.0	2	1.0820	11.3183	0.1828	0.2236	2.3385	8.8167	·
18	N-CHIL	-2	PUTTA-P2	220	3 x Zebra	43.0		1.0820	11.3183	0.1828	0.2236	2.3385	8.8467	
19	PUTTA	Pl	PUTTA-1	132	2 x Zebra	21.5	2	0.8115	5.8304	0.0895	0.4657	3.3462	1.5601	
20	PUTTA	Pl	PUTTA-I	132	2 x Zebra	21.5		0.8115	5.8304	0.0895	0.4657	3.3462	1.5601	
21	N-CHIL	- i	KULIYA-I	132	Zebra	18.0	2	1.3588	6.9060	0.0536	0.7798	3.9635	0.9347	
22	N-CHIL	-1	KULIYA-1	132	Zebra	18.0		1.3588	6.9060	0.0536	0.7798	3.9635	0.9347	·
23	HORAN	٠Dl	HORAN-1	132	Bear	11.0	1	1.3466	4.3580	0.0317	0.7728	2.5012	0.5524	·
24	HORAN	·D2	HORAN-1	132	Bear	11.0	1	1.3466	4.3580	0.0317	0.7728	2.5012	0.5524	
25	PANAD	-D3	PANAD-1	132	Lynx	4.7	1	0.8296	1.9161	0.0131	0.4761	1.0997	0.2291	
26	PANAD	-D4	PANAD-I	132	Lynx	4.7	1	0.8296	1.9161	0.0131	0.4761	1.0997	0.2291	
27	KOLON	<u>·1</u>	TOWN-1	132	Cu 500	4.2	1	0.1714	0.3982	0.5410	0.0984	0.2285	9.4261	
				·				· · · · · ·				·		
lodifi	cation													
28	BADUL	-1	MEDEGA-1	132	Oriole	28.0	1	5.3124	11.4792	0.0779	3.0489	6.5881	1.3570 r	eplace "BADUL-I
29	MEDEG	A٠I	INGIN-I	132	Oriole	51.9		9.8469	21.2775	0.1444	5.6513	12.2116		NGIN-I" line
30	VALAI-	1	POLON-1	132	Lynx	55.8	1	9.8494	22.7484	0.1561		13.0558		eplace "VALAI-I
3 i	POLON-	1	HABAR-I	132	Lynu	43.9	1	7.7489	17.8970	0.1228		10.2715		ABAR-I" line
32	MATUG	i-1	AMBAL-I	132	Bear	28.0	2	3.4276	11.0932	0.0807	1.9672			eplace "MATUG-1
33	MATUG	i-1	AMBAL-I	132	Bear	28.0			11.0932	0.0807	1.9672	6.3666		N-GALL-1" line
34	AMBAL	-1	N-GALL-I	132	Bear	36.0	2		14.2626	0.1038		8.1856	1.8079	
35	AMBAL	-1	N-GALL-I	132	Bear	36.0			14.2626	0.1038	2.5293	`	1.8079	
36	PANNI-		PANAD-DI	132	Goat	12.3	2		4.7942	0.0361	0.7016			eplace 'PANNI-I -
37	PANNI-		PANAD-D2	132	Goat	12.3		1.2277	4.7912	0.0361	0.7046			
38			PANAD-1	132	Lynx	4.7	2	0.8296			_	2.7515		ANAD-TI, T2" lii
39			PANAD-1	132		-	٠.		1.9161	0.0131	0.4761	1.0997		place "PANAD-TI, T.
40					Lynx	4.7		0.8296	1.9161	0.0131	0.4761	1.0997		ANAD-I" lines
41	PANAD		PANAD-D3	132	Lynx	4.7	_2	0.8296	1.9161	0.0131	0.4761	1.0997	0.2291	- ditto -
	PANAD-		PANAD-D4	132	Lynx	4.7		0.8296		0.0131	0.4761	1.0997	0.2291	- ditto -
42			HORAN-DI	132	Goat	1.0		0.0998		0.0029	0.0573	0.2237		place "PANAD-T1, T2
43	PANAD-	D4	MATUG-1	132	Goat	29.1	_1	2.9046	11.3423	0.0853	1.6670	6.5096	1.4865 -	MATUG-I* lines







Table A6.1.3 • 1 Data of Planned Transmission Lines by the End of 2005

No.	T/L	Br	anch		Conductor		cct :	R	X	Y	R	X	Y	Note
	Ref.	from	to	(kV)		(km)		(Ω)	(Ω)	(mS)	100	MVA Bas	e (%)	
44		HORAN-D2	MATUG-1	132	Goat	28.1	1	2.8048	10.9526	0.0824	1.6097	6.2859	1.4354	
45		KOŁON-I	TOWN-I	132_	Cu 500	4.2	1	0.1714	0.3982	0.5410	0.0984	0.2285	9.4261	replace "KOLON-1 -
46		TOWN-I	KOLLU-1	132	Cu 500	1.2	1	0.0490	0.1138	0.1546	0.0281	0.0653	2.6932	KOLLU-I" lines
47		KELAN-2	KOLON-2	220	2xGoat	2.2	2	0.1098	0.6683	0.0082	0.0227	0.1381	0.3946	upgrade 132 kV line to
48		KELAN-2	KOLON-2	220	2xGoat	2.2		0.1098	0.6683	0.0082	0.0227	0.1381	0.3946	220 kV line
49		KOTUG-1	KATANA-I	132	Zebra	11.3	2	0.8530	4.3354	0.0337	0.4896	2.4882	0.5868	replace "KOTUG-1 -
50		KOTUG-I	KATANA-I	132_	Zebra	11.3		0.8530	4.3354	0.0337	0.4896	2.4832	0.5868	BOLAW-1" lines
51		KATANA-I	BOLAW-1	132	Zebra	10.7	2	0.8077	4.1052	0.0319	0.4636	2.3561	0.5556	
52		KATANA-1	BOLAW-1	132	Zebra :	10.7		0.8077	4.1052	0.0319	0.4636	2.3561	0.5556	
53		BOLAW-I	N-CHIL-1	132	Lynx	22.6	2	3.9892	9.2135	0.0632	2.2895	5.2878	1.1017	replace "BOLAW-1 -
54		BOLAW-1	N-CHIL-1	132	Lynx	22.6		3.9892	9.2135	0.0632	2 2895	5.2878	1.1017	PUTTA-1" lines
55		N-CHIL-1	PUTTA-1	132	Lynx	61.4	2	10.8378	25.0314	0.1718	6.2201	14.3660	2.9931	
56		N-CHIL-I	PUTTA-1	132	Lynx	61.4		10.8378	25.0314	0.1718	6.2201	14,3660	2.9931	
57		N-CHIL-1	CHILL-I	132	Lynx	6.8	2	1.2003	2.7722	0.0190	0.6889	1.5910	0.3315	replace "CHILL-T1, T2.
58		N-CHIL-1	CHILL-I	132	Lynx	6.8		1.2003	2.1722	0.0190	0.6889	1.5910	0.3315	CHILL-1" lines
59	-	KOTUG-2	VEYAN-2	220	2 x Zebra	20.0	2	0.7549	6.0142	0.0749	0.1560	1.2426	3.6247	upgrade 132 kV line t
60		KOTUG-2	VEYAN-2	220	2 x Zebra	20.0		0.7549	6.0142	0.0749	0.1560	1.2426	3.6247	220 kV line
61		ANURA-I	VAVUNI-I	132	Lynx	54.7	2	9.6552	22.2999	0.1530	5.5413	12.7984	2.6665	replace "ANURA-1 -
62		ANURA-1	VAVUNI-1	132	Lynx	54.7		9.6552	22.2999	0.1530	5.5413	12.7984	2.6665	KILIN-T1, T2" lines
63		VAVUNI-1	KILIN-TI	132	Lynx	74.1	2	13.0795	30.2089	0.2073	7.5066	17.3375	3.6122	
64		VAVUNI-1	KILIN-T2	132	Lyax	74.1		13.0795	30.2089	0.2073	7.5066	17.3375	3.6122	
65		POLPI-I	AVISS-1	132	Lynx	34.5	1	6.0897	14.0649	0.0965	3.4950	8.0721	1.6818	replace "POLPI-1 -
66		AVISS-1	KOTMA-1	132	Lynx	32.4	1	5.7190	13.2087	0.0906	3.2822	7.5808	1.5794	AVIS-ITI - KOLOW-I"
67	-	K-NIYA-1	GONAWA-	132	Zebra	2.3	2	0.1736	0.8824	0.0069	0.0996	0.5064	0.1194	replace "K-NIYA-1
68		K-NIYA-1	GONAWA-	132	Zebra	2.3		0.1736	0.8824	0.0069	0.0996	0.5064	0.1194	SAPUG-1*
69	-	GONAWA-	SAPUG-1	132	Zebra	2.3	2	0.1736	0.8824	0.0069	0.0996	0.5064	0.1194	replace "K-NIYA-I
70			I SAPUG-1	132	Zebra	2.3		0.1736	0.8824	0.0069	0.0996	0.5064	0.1194	SAPUG-1"



T

Table A6.1.3 - 2 Data of Planned Transformers by the End of 2005

ģ		Node		No. of	Rated	Rated Voltage (kV)	(KV)	Rated C.	Rated Capacity (MVA)	MVA)	Imp	dance V	Impedance Voltage / Unit (%)	Unit (%)	-		Tap (%, nos)	(%)	
	(H) gh Vollage	(1.)ow Voltage	(High Volinge (t.)ow Voltage (Mjiddle Voltage	Unit	H	۲,	Σ	I	L ,	Σ	between	(pa	(base MVA) 100	100 MVA base		Highest	Lowest	Nos.	
Data n	nodification f	Data modification for the system in 2005 year	in 2005 year							·					_				I_{-}
Newly	Newly Add (new construction)	nstruction)							<u> </u>										
-	HAMBAN-1	HAMBAN-3		7	132.0	33.0	,	10.0	10.0		., .,	10.00	(10.0)	100.00		5.0	-15.0	2	
71	MEDEGA-1	MEDEGA-3		2	132.0	33.0		10.0	10.0		H-L	10.00	(10.0)	100.00			-15.0	- 2	
w	VAVUNI-1	VAVUNI-3			132.0	33.0		10.0	10.0	-	7-H	10.00	(10.0)	100:00			-15.0	17	
4	POLON-I	POLON-3		۲۱	132.0	33.0		16.0	16.0		H-L	10.00	(16.0)	62.50	<u> </u>	<u>. </u>	-15.0	17	
Ŋ	PALEK-1	PALEK-3		۲۱	132.0	33.0		31.5	31.5		H-L	10.00	(31.5)	31.75	<u>π</u>		-15.0		
9	KEGAL-I	KEGAL-3		2	132.0	33.0		31.5	31.5	:	H.	10.00	(31.5)	31.75	x	5.0	-15.0	. 4	
7	AMBAL-1	AMBAL-3		7	132.0	33.0	 	31.5	31.5	:	H.	10.00	(31.5)	31.75	T.	5.0	-15.0	17	
∞	HORAN-1	HORAN-3		71	132.0	33.0		31.5	31.5		H.	10.8	(31.5)	31.75	H	5.0	-15.0	17	
٥	KATANA-1	KATANA-3		7	132.0	33.0		31.5	31.5	:	H.	10.00	(31.5)	31.75	Σ.	5.0	-15.0	17	
0	KULIYA-1	KULIYA-3		71	132.0	33.0		31.5	31.5	;	1) 11	10.00	(31.5)	31.75	H	5.0	-15.0	17	
	GONAWA-1	GONAWA-1 GONAWA-3		М	132.0	33.0		31.5	31.5		7-1	10.00 (31.5)	(31.5)	31.75	I	5.0	-15.0	17	
12	TOWN-1	TOWN-3		~	132.0	33.0		63.0	63.0		H-1.	10.00	(63.0)	15.87	H		-15.0		
£13	KOLON-2	KOLON-TT	KOLON-1	73	220.0	33.0	132.0	250.0	80.0	250.0	H X	6.00	6.00 (250.0)	2.40	Ξ.		-15.0	77	•
	:		:	:	•	:	:				감	8.0	(0'08) 00'9	7.50					
	:			;	-			1			M-L	8.8	5.00 (80.0)	625			1		
7.	VEYAN-2		VEYAN-I	7	220.0	33.0	132.0	150.0	20.0	150.0	X-X	6.00	6.00 (150.0)	4.00	Ξ.	15.0	-15.0	21	
ž.	N-CHIL-2		N.CHIL.:	73	220.0	33.0	132.0	150.0	800	150.0	H.K	6.00 (6.00 (150.0)	4.00	<u> </u>	15.0	-15.0	21	
9	PUTTA-P2		PUTTA-PI	7	220.0	33.0	132.0	150.0	20.0	150.0	Σ	6.00	6.00 (150.0)	4.00	Ξ.	15.0	-15.0	53	*****
12	N-CALL-1	N-CALL-G	•		132.0	11.0		82.0	82.0	:	¥.	10.00 (82.0)	(82.0)	12.20	<u> </u>	10.0	-5.0	E	
18	KUKULE-1	KUKULE-G		7	132.0	11.0	:	46.0	46.0		H-L	10.00 (46.0)	(46.0)	21.74	<u> </u>	10.0	-5.0	13	
61	PUTTA-P2	PUTTA-PG		7	220.0	0.11	:	175.0	175.0	:	7 . H	13.00 (175.0)	(0.571	7.43	Ξ.	10.0	-5.0	2	
8	PUTTA-P2	PUTTA-PG		7	220.0	0.11	 : !	350.0	350.0		H-1.	13.00 (350.0)	350.0)	3.71	<u> </u>	10.0	-5.0	13	
77	MUTHR-2	MUTHR-3		7	220.0	33.0	:	63.0	63.0	:	H-1.	13.00	(63.0)	20.63	=	5.0	-15.0	1.1	
ì	:						:		:	:			:						
· ;	:		1 1			•		1	!		1	:							
								-	1										

Notes:

1) Sources; *: CEB's record, **: Name plate at the site, none: Assumed value
2) Shaded nodes; Not in operation

Table A6.1.3 - 2 Data of Planned Transformers by the End of 2005

Š		Node		No. of	Rated	Rated Voltage (kV)		Rated Capacity (MVA)	pacity (A	AVA)	Jul	Impedance Voltage / Unit (%)	sc/Un	it (%)		F	Tap (%, nos	
	(H)igh Voltage	(H)igh Voltage (L)xw Voltage (M)iddle Voltage	(M)iddle Voltage	Unit	ェ	٦	Σ	x	٦	Σ	between	(base M	(base MVA) 100	O MVA base		Highest	Lowest	Nos.
cpla	eplacement or Augmentation	gmentation							 									
22	22 N-GALL-1 N-GALL-3	N-GALL-3		6	132.0	33.0		31.5	31.5		H-L	10.00 (31.5)	જ	31.75	<u> </u>	5.0	-15.0	11
23	23 GALLE-1	GALLE-3		73	132.0	33.0		30.0	30.0		ب ۲	12.10 (30.0)	() ()	40.33	Ξ	10.0	-15.0	2
75	24 GALLE-1	GALLE-3			132.0	33.0		31.5	31.5	<u>.</u>	H-L	10.00 (31.5)	ণ	31.75	I	5.0	-15.0	11
X	SRIJA-1	SRIJA-3		4	132.0	33.0		31.5	31.5		H.	10.00 (31.5)	<u>े</u>	31.75	エ	5.0	-15.0	22
56	KILIN-1	KILIN-3		ч	132.0	33.0		10.0	10.0		H-1	10.00 (10.0)	<u> </u>	100.00	r	5.0	-15.0	۵,
23	KOLON-1	KOLON-3	-	'n	132.0	33.0		31.5	31.5	- !	.; ±	10.00 (31.5)	<u>ે</u>	31.75	I	5.0	-15.0	1
87	28 PANNI-1	PANNI-3		2	132.0	33.0		30.0	30.0	!	-	10.00 (30.0)	6	33.33	1	5.0	-15.0	12
8	29 PANNI-1	PANNI-3	•	2	132.0	33.0		31.5	31.5	:		10.00 (31.5)	<u>ج</u>	31.75	I	5.0	-15.0	2
30	30 RATMA-1	RATMA-3		7	132.0	33.0		30.0	30.0		HL	10.00 (30.0)	6	33.33	I	5.0	-15.0	12
31	31 RATMA-1	RATMA-3		~	132.0	33.0	:	31.5	31.5		H-L	10.00 (31.5)	<u>े</u>	31.75	エ	5.0	-15.0	2
letir.	i Setirements					:		:					:		; ,			-
:	SAPUG-IP SAPUG-G	SAPUG-G		-	142.0	0.11		20.0	20.0	:	7-1	17.80 (50.0)	6	35.60	,	!		
į	KELAN-1	KELAN-ST		7	132.0	11.0		32.0	32.0		H-L	11.00 (32.0)	6	34.38				
				,						1		1						

Table A6.1.3 - 3 Data of Planned Generators by the End of 2005

No.	Node	Туре	No. of	Rated Voltage	Rated Capacity	Rated Output	Xd"
	·	!	Unit	(kV)	(MVA)	(MW)	(%)
Data	modification for	r the syste	em in 200	5 year			
Newl	y Add (new con	struction))		i		
1	'New Galle P/S	Total	•		82.35	70.00	
	N-GALL-G	gas	1	11.0	82.35	70.00	16.0
2	Kukule P/S To	i otal			92.00	78.20	
	KUKULE-G	hydro	2	11.0	46.00	39.10	16.0
3	Puttalam P/S	Fotal			1058.82	900.00	
	PUTTA-PG	steam	2	11.0	176.47	150.00	16.0
	PUTTA-PG	steam	2	11.0	352.94	300.00	16.0
Retir	emen t				·		
1	Sapugaskanda P/S Total				51.20	36.00	
	SAPUG-G1	diesel	2	11.0	25.60	18.00	
2	Kelanitissa P/S	Total	:		62.60	50.00	
·	KELAN-ST	steam	2	11.0	31.30	25.00	
			· · · · · · · · · · · · · · · · · · ·	-	:		· ·
					· · · · · · · · · · · · · · · · · · ·		

Table A6.1.3 - 4

Data of Planned Reactive Power Sources by the End of 2005

No.	Node	Rated Voltage	Rated Capacity	Remarks
	<u>.</u>	(kV)	(MVA)	
Data modif	ication for	the system in 200	5 year	
Newly Add		!		
1 C	HUNN-3	33	20.00	
			4	
		*		
Total			20.00	

Table A6.1.3 - 5 Generator Output Schedule for 2005 System

!	i		utput (MW)	Max Output *4
		Rainy Season *2)	Dry Season	(MW)
LAX-G	hydro	50.00	30.00	50.00
				100.00
	·			
				50.00
				60.00
		1		75.00
				38.00
	· · · · · · · · · · · · · · · · · · ·	. · - -	······································	40.00
· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·	210.00
· · · · · · · · · · · · · · · · · · ·				122.00
				134.00
				07.00
·				49.00
				120.00
				78.20
			· · · · · · · · · · · · · · · · · · ·	18.00
				90.00
				102.60
	gas		23.40	23.40
	c.c.	128.00	135.00	135.00
	c.c.	128.00	135.00	135.00
	gas	60.00	63.00	63.00
- 	diesel	0.00	32.40	32.40
	diesel	29.00	36.00	36.00
SAPU-GN2	diesel	29.00	36.00	36.00
KHD-G	diesel	0.00	46.00	46.00
CHUNN-G	diesel	18.00	27.00	27.00
PUTTA-PG	*1) steam	567.00	810.00	810.00
total		1193.20	715.00	1193.20
al total				1554.40
of system				2747.60
	N-LAX-G WIMAL-G CANYO-G POLPI-G UKUWE-G BOWAT-G VICTO-G RANDE-G KOTMA-G1 KOTMA-G2 RANTE-G SAMAN-G KUKULE-G KELA-GT1 KELA-GT2 KELA-GT3 KELA-GT4 KELA-CC1 MUTHR-G N-GALL-G SAPUG-G SAPU-GN1 SAPU-GN2 KHD-G CHUNN-G PUTTA-PG	N-LAX-G hydro WIMAL-G hydro CANYO-G hydro POLPI-G hydro UKUWE-G hydro UKUWE-G hydro VICTO-G hydro RANDE-G hydro KOTMA-G1 hydro KOTMA-G2 hydro RANTE-G hydro SAMAN-G hydro KELA-GT1 gas KELA-GT1 gas KELA-GT2 gas KELA-GT3 gas KELA-GT4 gas KELA-CC1 c.c. MUTHR-G c.c. N-GALL-G gas SAPU-GN1 diesel SAPU-GN2 diesel CHUNN-G diesel CHUNN-G diesel PUTTA-PG *1) steam	N-LAX-G hydro 100.00 WIMAL-G hydro 50.00 CANYO-G hydro 60.00 POLPI-G hydro 75.00 UKUWE-G hydro 38.00 BOWAT-G hydro 40.00 VICTO-G hydro 210.00 RANDE-G hydro 122.00 KOTMA-G1 hydro 134.00 KOTMA-G2 hydro 67.00 RANTE-G hydro 49.00 SAMAN-G hydro 120.00 KUKULE-G hydro 78.20 KELA-GT1 gas 0.00 KELA-GT2 gas 0.00 KELA-GT3 gas 97.00 KELA-GT4 gas 22.00 KELA-GT4 gas 22.00 KELA-GT4 gas 20.00 MUTHR-G c.c. 128.00 N-GALL-G gas 60.00 SAPU-GN1 diesel 0.00 SAPU-GN2 diesel	N-LAX-G hydro 100.00 60.00 WIMAL-G hydro 50.00 30.00 CANYO-G hydro 60.00 36.00 POLPI-G hydro 75.00 45.00 UKUWE-G hydro 38.00 23.00 BOWAT-G hydro 40.00 24.00 VICTO-G hydro 122.00 73.00 KOTMA-GI hydro 134.00 80.00 KOTMA-G2 hydro 49.00 29.00 SAMAN-G hydro 120.00 72.00 KUKULE-G hydro 78.20 47.00 KUKULE-G hydro 78.20 47.00 KELA-GT1 gas 0.00 90.00 KELA-GT2 gas 0.00 90.00 KELA-GT3 gas 97.00 102.60 KELA-GT4 gas 22.00 23.40 KELA-CC1 c.c. 128.00 135.00 MUTHR-G c.c. 128.00 135.00 N-GALL-G gas 60.00 63.00 SAPU-GN1 diesel 29.00 36.00 SAPU-GN1 diesel 29.00 36.00 PUTTA-PG *1) steam 567.00 810.00

Notes:

^{*1)} Slack node

^{*2)} Scheduled output = Maximum output, for hydro stations

^{*3)} Scheduled output = Maximum output, for thermal stations

^{*4)} Maximum output = Rated output, for hydro stations

Maximum output = Rated output x 0.9, for thermal stations

Condition of Dynamic Stability Analysis

for the CASE 2005, Rainy and Dry Seasons

1. Fault and Fault Location

Rainy Season
Three phase fault on the Kotmale - Biyagama 220 kV line at Kotmale side.

Dry Season Three phase fault on the Puttalam P/S - New Chillaw 220 kV line at Puttalam side.

2. Reclosing

Three phase reclosing of single circuit of the Kotmale - Biyagama 220 kV line for rainy season and of the Puttalam P/S - New Chillaw 220 kV line for dry season.

Reclosing sequence

Fault ----- trip signal to CB ----- CB trip -- (no voltage time) -- CB reclose 80 ms 500 ms

- 1) Successful Reclosing
 Fault --- (160 ms) --- CBs trip --- (500 ms) --- clearing fault and CBs Close
- 2) Unsuccessful Reclosing
 Pault -- (160 ms) -- CBs trip -- (500 ms) -- CBs Close -- (160 ms) -- CBs trip
- 3. Generators to be Observed
 - 1) Puttalam (PUTTA-PG)
 - 2) Victoria (VICTO-G)
 - 3) Kelanitissa (KELA-CCI)
 - 4) New Laxapana (N-LAX-G)
- 4. Factors to be Observed
 - 1) Phase Angle (reference generator: Chunnakam)
 - 2) Terminal Voltage
 - 3) Output Power
- 5. Integration Time Step

0.001 sec

6. Duration of the Calculation

3.0 sec

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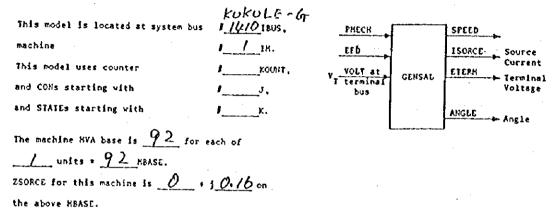
PLANT HYORO

PTI FOVER SYSTEM STHULATOR

GENSAL

(Salient Pole Generator Hodel)

CALL GENSAL (IBUS, IH, KOURT, J, K)



		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
Colls	,	Value	Description
J	· ,	5.2	Tdo (>0) (sec)
J+1		0.068	T" (>0) (sec)
J+2		0.12	I" (>0) (sec)
J+3		3.0	Inertia X
J+4		0.5	Speed Camping D
J+5		1.1	Хd
J+6		0.66	X
317		0.32	X.5
J18		0.16	X" = X"
J+9		0.10	×,
J+10		0.03	\$(1.0)
J+11		0,25	\$(1.2)

STATES	Description
ĸ	E'q
K+1	ýkď
K+2	f''
K+3	å Speed (p.u.)
K+4	Angle (radians)

Xd, Xq, X1, Xd, X1, X1, X1, H, and D are in p.u., machine HVA base. X1 must be equal to X3.

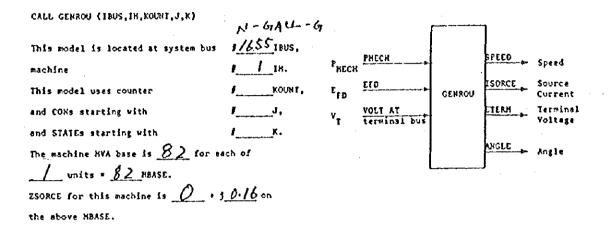
Power : Technologies, Inc.

PLANT GAS.

PTI POVER SYSTEM SINULATOR

GENRO

(Round Rotor Generator Hodel)



CONs	1	Yalue	Description
.3		6.97	T' (sec.>0)
J+1	,	0.027	7" (sec.>0)
J+2		1.09	T' (sec.>0)
J+3		0.14	T ⁴ (sec.>0)
Jeu		4.0	Inertia R
J+S		0.5	Speed Damping D
J+6		1.79	×d
J+7		1.72	^X q
J18		0.23	χį
J+9		1.20.	χ'g
J+10		0.16	Xg = Xg
J+11		0.10	×ι
J+12		0.03	\$(1.0)
J+13		0.40	S(1.2)

$\mathbf{x}_{\mathbf{x}_{1}}, \mathbf{x}_{\mathbf{x}_{2}}$	XL XL,	Х",	х,	$X_{\underline{f}}$, H , and 0 are in p be equal to $X_{\underline{d}}^{n}$.	,
machine	MVA base.	Ĭ.,	must	be equal to X1	
		Q			

STATES	. 1	Description
X		E'q
K+1		E.q.
K+2		Ykd
K+3		Ykq
K+4		& Speed (p.u.)
K+S		Angle (radians)

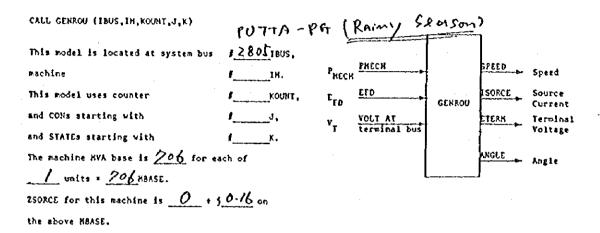
fover' Technologies, Inc.

PLANT STEAM

FTI POVER SYSTEM SIMULATOR

GENROU

(Round Rotor Generator Hodel)



CONs	,	Value	Description
J		6.85	T' (sec.>0)
J+1	<u> </u>	0.032	1" (sec.>0)
J+2		1.00	T' (sec.>0) .
3+3	<u> </u>	0.16	T" (sec.>0)
J+q		4.5	Inertia H
J+S		0.5	Speed Damping D
J+5		1.75	X
J+7		1.72	Xq
J+8		0.27	χį
J+9		1.3/.	X'q
J+10		0.16	X¼ = Xq
J+11		0.10	x [£]
J+12		0.03	\$(1.0)
J+13		0.40	\$(1.2)

Xd. Xq. Xd. Xd. Xd. Xd. xd. must	, X_{ξ} , H , and D are in p.u., the equal to X_{d}^{η} .
----------------------------------	------------------------------------------------------------------------

STATES	1	Description
ĸ		£',
K+1	.:	e,
K+3	:	Ykd
K+3		Ykq
K+4		& Speed (p.u.)
X+5		Angle (radians)

$$T_{g}' = 0.76$$

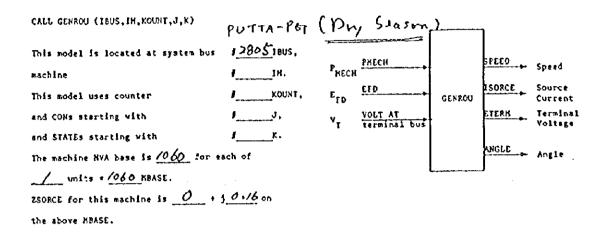
Payer Technologies, Inc.

PLANT STEAM

PTI FOWER SYSTEM SIMULATOR

GENROU

(Round Rator Generator Hodel)



CONS	1	sviav	Description
.0		6.85	f) (sec.>0)
J+1		0.032	T" (sec.>0)
J+2		1.00	T1 (sec.>0)
J+3		0.16	T'' (sec.>0)
J+u		4.5	Inertia H
J+S		0.5	Speed Damping D
J+6		1.25	x ₃
J+7		1.72	Xq
J+8		0.27	X
J+9		1.31	X' q
J+10		0.16	X4 * X1
J:11		0.10	×ŧ
J+12		0.03	\$(1.0)
J+13		0. KO	5(1.2)

STATES	1	Description
ĸ		ε'
K+1		£,
K+2		Ykd
K+3		Tkq
K+4		& Speed (p.v.)
K+5		Angle (radians)

X_d, X_q, X_d, X_q, X_q, X_q, X_t, N, and 0 are in p.u. machine NVA base. X_q must be equal to X_d.

Table A6.1.3-6

Dynamic Stability Data for 2005 System for all the generators

Power Technologies, Inc.

Technologies,

\$EXS

(Simplified Excitation System)

CALL SEXS (IBUS, IN, KOUNT, J, K)

This model is connected at syst	en bus 11805,	-	
machine	th.	ECORP	r _r
This model uses counter	JKOUNT,	VOTHSG SEXS	
and CONs starting at	J.	Signals	
and STATEs starting at	#X.	•	

CONs	+	Value	Description
J		0.1	T _A /T _B
J+1		10	T _B (>0) (sec)
J+2	,	200	x
J+3	·	0.05	T _E (sec)
J+4		0	ENIN (p.o. EFD base)
J+5		3	E _{MAX} (p.u. ETD base)

STATES	•	Description
ĸ		first integrator
K+1		Second integrator

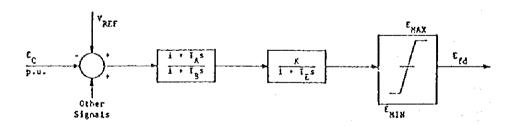


Table A6.1.4 . 1 Data of Planned Transmission Lines by the End of 2010

lo.	T/L	Bra	anch	_	Conductor .		cct	R	X	Υ :	<u>R</u>	X	<u>Y</u>	Note
	Ref.	from	to	: (kV)	·	(lcm)		(Ω)	(Ω)	(mS)	100	MVA Ba	se (%)	
						· :		· · · · · · · · · · · · · · · · · · ·						
	Add	ation for the	system in 201	to year_				·						
j	AUG.	AVISS-1	EHELI-1	132	Bear	17.0	2	2.0811	6.7351	0.0490	1.1944	3.8654	0.8538	
2		AVISS-I	EHELI-I	132	Bear	17.0		2.0811	6.7351	0.0490	1.1944	3.8654	0.8538	
3		EHELI-1	RATNA-1	132	Bear	25.0	2		9.9046	0.0721	1.7564	5.6845	1.2563	
4		EHELI-1	RATNA-1	132	Bear	25.0		3.0604	9.9046	0.0721	1.7564	5.6845	1.2563	
5		TRINC-1	KILIN-I	132	Lynx	140.0	2	: 24.7117.	57.0748	0.3917	14.1826	32.7561	6.8250	
6		TRINC-1	KILIN-1	132	Lynx	140.0			57.0748	0.3917	14.1826	32.7564	6.8250	
7		KESBE-DI		132	Lynx	1.0	2	0.1765	0.4077	0.0028	0.1013	0.2340	0.0488	
8		KESBE-D2		132	Lynx	1.0		0.1765	0.4077	0.0028	0.1013	0.2340	0.0488	
9		KESBE-D3	-	132	Lynx	1.0	2	0.1765		0.0028	0.1013	0.2340	0.0488	
10		KESBE-D4		132	Lynx	1.0		0.1765		0.0028	0.1013	0.2340	0.0488	
		BIYAG-I	IMBULG-1	132	Zebra	12.0	2	0.9059		0.0358	0.5199	2.6423	0.6238	
11_	-	BIYAG-I	IMBULG-I	132	Zebra	12.0		0.9059		0.0358	0.5199	2.6423		
		VEYAN-1	PANNA-1	132	Zebra	20.0	2	1.5098		0.0596	0.8665	4.4039	1.0385	
13	•	VEYAN-I	PANNA-1	132	Zebra	20.0		1.5098		0.0596	0.8665	4.4039	1.0385	
14			N-HABA-2	220	4 x Zebra			1.7928		0.4331	0.3704		20.9620	
15	•	TRINC-P2	N-HABA-2		4 x Zebra		-		23.2247	0.4331	0.3704		20.9620	
16		TRINC-P2				12.0		0.4529		0.0500	0.2599	1.8677		
17	-	N-GALL-I	BOOS-I	132	2 x Zebra 2 x Zebra	12.0		0.4529	··	0.0500	0.2599	1.8677		
18		N-GALL-I	BOOS-I	132	2 x Zebra	12.0	•	0.4529		0.0500	0.2599	1.8677	0.8712	
19	-	N-GALL-I	BOOS-I	132		-		0.0755		0.0083		0.3113		
20		TRINC-PI	TRINC-1	132	2 x Zebra	2.0	•	0.0755			0.0433		0.1446	
21		TRINC-PI	TRINC-I	132	2 x Zebra	80.0			19.5576	0.3647	0.3119		17.6515	···
22	-	N-HABA-2	WARIYA-2		4 x Zebra	80.0	•	-	19.5576				17.6515	
23			WARIYA-2		4 x Zebra				15.8906		0.2535		14.3409	
24	-	WARIYA-2		220	4 x Zebra	65.0 65.0	7		15.8906		0.2535		14.3409	
25		WARIYA-2		220	4 x Zebra		•		11.2466			2.3237		
26	-	VEYAN-2	PADUK-2	220	2 x Zebra	37.4	-		11.2466		0.2917	2.3237		
27		VEYAN-2	PADUK-2	220	2 x Zebra	37.4			12.0285		0.3119	2.4852		
28	-	VICTO-2	N-POLP-2	220	2 x Zebra	40.0	-		12.0285			2.4852		
29		VICTO-2	N-POLP-2	220	2 x Zebra	40.0								
30	-	N-POLP-2	PADUK-2	220	2 x Zebra	60.0	_		18.0427					
31		N-POLP-2	PADUK-2	220	2 x Zebra	60.0			18.0427					
_32	-	PADUK-2	PANNI-2	220	4 x Zebra	18.0	-						3.9736	
33		PADUK-2	PANNI-2	220	4 x Zebra	18.0			4.4005				3.9736	
34	-	MATUG 2	PANNI-2	220_	2 x Zebra	45.0	-		13.5320				8.1554	
35		MATUG-2	PANNI-2	220_	2 x Zebra	45.0			13.5320				8.1554	
36	-	BOOS-2	MATUG-2	220	2 x Zebra	53.7	•		16.1482				9.7332	
37	-	BOOS-2	MATUG-2	220	2 x Zebra	53.7			16.1482				9.7332	
38		KELAN-I	SUB-B-I	132	Cu 500	•			0.3318					
39		N-POLP-I	POLPI-I	132	2 x Zebra	4.0	-		1.0847				0.2910	
40		N-POLP-1	POLPI-I	132	2 x Zebra	4.0		0.1510	1.0847	0.0167	0.0867	0.6225	0.2910	

1

Table A6.1.4 • 1 Data of Planned Transmission Lines by the End of 2010

No.	T/L	Br	anch	Voltage	Conductor	Length	çct	R	X .	Y	R	X	· Y	Note
	Ref.	from	. lo	(kV)		(km)		(Ω)	(Ω)	(mS)	100	MVA Ba	se (%)	
			<u> </u>	:				<u> </u>						
Modifi	cation					:		;				···		
41	P/	ANNI-I	KESBE-D1	132	Goat	6.0	2	0.5989	2.3386	0.0176	0.3437	1.3422	0.3067	Replacement of
42	P/	ANNI-I	KESBE-D2	132	Goat	6.0		0.5989	2.3386	0.0176	0.3437	1.3422	0.3067	PANAD-D1 & 2 to
43	K	ESBE-D3	PANAD-DI	132	Goat	6.3	2	0.6288	2.4556	0.0185	0.3609	1.4093	0.3223	PANNI-1 lines
44	K	ESBE-D4	PANAD-D2	132	Goat	6.3	<u>-</u>	0.6288	2.4556	0.0185	0.3609	1.4093	0.3223	
45	KI	ELAN-1	SUB-B-1	132	Cu 500	3.5	1	0.1428	0.3318	0.4508	0.0820	0.1904	7.8547	Replacement of
46	sı	/B-B-1	FORT-1	132	Cu 500	1.4	1	0.0571	0.1327	0.1803	0.0328	0.0762	3.1415	KELAN-I - FORT-I I
47	N-	HABA-2	N-ANUR-2	220	Zebra	50.0	2	3.7744	20.6599	0.1379	0.7798	4.2686	6.6744	
48	N-	HABA-2	N-ANUR-2	220	Zebra	50.0		3.7744	20.6599	0.1379	0.7798	4.2686	6.6744	
49	N-	HABA-2	MATAL-2	220	Zебга	60.0	2	4.5293	24.7918	0.1655	0.9358	5.1223	8.0102	
50	N-	HABA-2	MATAL-2	220	Zebra	60.0		4.5293	24.7918	0.1655	0.9358	5.1223	8.0102	
51_	<u>M</u>	ATAL-2	KOTMA-2	220	Zebra	53.0	2	4.0009		0.1462	0.8266	4.5247	7.0761	
52	M.	ATAL-2	KOTMA-2	220	Zebra	53.0		4.0009	21.8994	0.1462	0.8266	4.5247	7.0761	
53	M.	ATAL-I	UKUWE-1	132	Lynx	26.0	2		10.5996		2.6339	6.0833		Replacement of
54	·M	ATAL-1	UKUWE-1	132	Lynx	26.0		4.5893	10.5996	0.0727	2.6339	6.0833		UKUWE-I - HABAR-
55	M.	ATAL-1	HABAR-1	132	Lynx	56.3	1		22.9522		5.7034			UKUWE-I - ANURA-
56	M	ATAL-1	ANURA-1	132	Lynx	105.2	1	18.5691			10.6572		5.1279	
57	Αì	GODA-1	AVISS-1	132	Lynx	25.4	2	4.4834			2.5731		1.2388	
58	A١	GODA-1	AVISS-1	132	Lynx	25.4		4.4834			2.5731		1.2388	
59	A۱	/ISS-1	N-POLP-1	132	Lynx	39.0	1	6.8840	·	0.1091	3.9509	9.1250		Replacement of
60	A۱	/155-1	SITHA-I	132	Lynx	10.0	1	1.7651		0.0280	1.0130	2.3398	0.4879	reprocessed of
61	SIT	ΓHA-1	N-POLP-1	132	Lynx	29.0	1	5.1188		0.0811	2.9378	6.7852		SITHA-1 - POLPI-I
62	AN	GODA-1	KOLON-1	132	Lynx	6.5	2	1.1473	2.6499	0.0182	0.6585	1.5208		AVIS-ITT -POLPI-1 lines
63	AN	GODA-1	KOLON-1	132	Lynx	6.5		1.1473		• • • • • • • • • • • • • • • • • • • •		1.5208		AVIS-TEL TOLET TIMES
	No	de name "1	THULH-TI" an	d "THUL	H-T2" shall	be replace	d by	*AGURU-	1".		-	 -		
			KILIN-TI" and											

Table A6.1.4-2 Data of Planned Transformers by the End of 2010

1

No.	· 	Node		No, of	Rated '	Sated Voltage (kV)	(k.V.)	Rated C.	Rated Capacity (MVA)	MVA	Jul	cdance 1	Impedance Voltage / Unit	Unit (%)		ζ-	Tap (%, nos)	s)
	(H)igh Voltage	(H)igh Voltage (L)nw Voltage (M)tidle Voltage	thirdle Voltage	Unit	I	۔۔۔	Σ	ı	د	Σ	between	ġ.	(base MVA) 100	100 MVA base		Highest	Highest Lowest	Nos.
Data	modification 6	Data modification for the system in 2010 year	2010 year		-	·										- 		
Newi	Newly Add (new construction)	nstruction)																
	PANNA-1	PANNA-3		~	132.0	33.0		31.5	31.5		H-L	10.00	(31.5)	31.75	I	5.0	-15.0	11
~	IMBULG-I	IMBULG-3		47	132.0	33.0		31.5	31.5		H-L	10.00	(31.5)	31.75	=	5.0	-15.0	12
۳	ANGODA-1	ANGODA-3		m	132.0	33.0		31.5	31.5	,	H-L	10.00	(31.5)	31.75	x	5.0	-15.0	17
4	KESBE-1	KESBE-3		т	132.0	33.0		31.5	31.5		H-L	10.00	(31.5)	31.75	Ι.	5.0	-15.0	17
'n	AGURU-1	AGURU-3		7	132.0	33.0		31.5	31.5		H	10.00	(31.5)	31.75	<u> </u>	5.0	-15.0	17
٠	EHECI-1	Енеп-3		61	132.0	33.0		31.5	31.5	-	H	10.00	(31.5)	31.75	x	5.0	-15.0	11
^	\$UB-8-1	SUB-8-11	** 1	7	132.0	11.0		63.0	63.0		H-L	10.00	(63.0)	15.87	I	5.0	-15.0	17
90	TRINC-P2	TRING-G		ю.	220.0	11.0		350.0	350.0	;	H-L	13.00	(350.0)	3.71	x	10.0	-5.0	5
•	TRINC-P2		TRING-PI	7	220.0	33.0	132.0	150.0	20.0	150.0	X.	9.00	(150.0)	4.00	Ξ_	15.0	-15.0	21
2	MATAL-2		MATAL-1	~1	220.0	33.0	132.0	150.0	20.0	150.0	×	6.00	(150.0)	4.00	<u> </u>	15.0	-15.0	77
=	MATUG-2	MATUG-TT N	MATUG-1		220.0	33.0	132.0	150.0	20.0	150.0	X	8.9	(150.0)	4.00	<u> </u>		-15.0	ក
					:	į	:	:	:	!	H-L	8.9	(20.0)	12.00		:	:	
1					·	:	i		:		Z.	5.00	(20.0)	10.00			!	
2	B00S-2	8	B008-1	7	220.0	33.0	132.0	150.0	50.0	150.0	H-M	8.9	6.00 (150.0)	4.00	Ι.	15.0	-15.0	21
53	B00S-1	B00S-3		81	132.0	33.0	:	31.5	31.5	:	1.	0.01	(31.5)	31.75	x .	5.0	-15.0	17
7	B00S-2	BOOS-G	:		220.0	11.0	3	350.0	350.0		H.	13.00	(3.00 (350.0)	3.71	x	10.0	-5.0	13
5	N-POLP-2	2	N-POLP-1	7	220.0	33.0	132.0	150.0	20.0	150.0	1 1	6.00	(150.0)	4.00	Ξ.	15.0	-15.0	21
	, ;			!	:	!						1		:		:	:	
Rep	Replacement or Augmentation	gmentation	:		 	:	:		:		!	1	!	:				;
2	CHUNN-1	CHUNN-3			132.0	33.0	:	31.5	31.5		H.L	10.00	(31.5)	31.75	<u> </u>	5.0	-15.0	11
2	CHUNN-1	CHUNN-3		2	132.0	33.0	:	30.0	30.0	:	H-L	10.00	(30.0)	33.33	Ξ	5.0	-15.0	17
81	CHILL-I	CHILL-3	:	w.	132.0	33.0		31.5	31.5	-	H-L	10.00	(31.5)	31.75	<u> </u>	10.5	-15.0	18
61	KULIYA-1	KULIYA-3	:	6	132.0	33.0	:	31.5	31.5		H-L	10.00	(31.5)	31.75	Ξ	5.0	-15.0	17
20	KATANA-1	KATANA-3		m	132.0	33.0	:	31.5	31.5		H-L	10.00	(31.5)	31.75	I	5.0	-15.0	17
77	ANIYA-1	ANIYA-3		6	132.0	33.0		31.5	31.5	:	H-L	10.00	(31.5)	31.75	Ξ	5.0	-15.0	17
2	K-NIYA-1	K-NIYA-3	:	w	132.0	11.0		63.0	63.0	:	H.L.	10.00	(63.0)	15.87	I	5.0	-15.0	17
23	CONAWA	GONAWA-1 GONAWA-3	:	4	132.0	33.0	:	31.5	31.5	:	J.	0.0	(31.5)	31.75	Ξ	5.0	-15.0	17
ĸ	ATHUR-1	ATHUR-3		3	132.0	33.0		31.5	31.5		H-L	10.00	(31.5)	31.75	- E	5.0	-15.0	1.7

Notes:
1) Sources: * : CEB's record, **: Name plate at the site, none: Assumed value
2) Shaded nodes: Not in operation

Table A6.1.4-2 Data of Planned Transformers by the End of 2010

ģ		Node	_	No. of	Rated	Rated Voltage (kV)	(k V)	Rated C.	Rated Capacity (MVA)	MVA)	dail	Impedance Voltage / Unit (%)	Unit (%)	ļ		Tap (%, nos)		_
	(Hygh Voltage	(L)ow Voltage	(High Voltage (Livow Voltage (Middle Veltage	Chit	I	رد	Σ	I	_,	Σ	between	(base MVA)	100 MVA base		Highest	Lowest	Nos.	
25	KEGAL-1	KEGAL-3		т	132.0	33.0		31.5	31.5		H:L	10.00 (31.5)	31.75	I	5.0	-15.0	17	<u> </u>
56	DEHIWA-2	DEHIWA-3		ю	220.0	33.0		63.0	63.0		H-L	13.00 (63.0)	20.63	Σ	5.0	-15.0	11	
22	MATAR-I	MATAR-3		т	132.0	33.0		31.5	31.5		구	10.00 (31.5)	31.75	==	5.0	-15.0	11	
82	RATNA-1	RATNA-3		6	132.0	33.0		31.5	31.5		H-L	10.00 (31.5)	31.75	I	5.0	-15.0	13	
જ્ઞ	DENIY-1	DENIY-3		-	132.0	33.0		10.0	10.0		1 - #.	10.60 (10.0)	106.00	x	10.0	-15.0	73	
8	DENIY-1	DENIY-3			132.0	33.0		31.5	31.5	:	H-L	10.00 (31.5)	31.75	Œ	5.0	-15.0	2	
E E	PANAD-1	PANAD-3		m	132.0	33.0	:	31.5	31.5		.; :-:	(3.1.5)	31.75	Σ	10.0	-15.0	12	
32	PANNI-2	PANNI-SC	PANNI	ю	220.0	33.0	132.0	250.0	80.0	250.0	H-M	6.00 (250.0)	2.40	I	15.0	-15.0	77	
	-									:	H	(0.08) (0.09)	7.50					
					-						M-L	5.00 (250.0)	2:00					
33	VEYAN-2		VEYAN-1	~	220.0	33.0	132.0	150.0	20.0	150.0	Ŧ.X	6.00 (150.0)	4.00	Σ	15.0	-15.0	21	
×	KOTUG-2	KOTUG-3	KOTUG-1	60	220.0	33.0	132.0	250.0	00	250.0	H-M	14.00 (250.0)	2.60	Œ	15.0	-5.0	₽	
			:	:	1	 :	1			<u> </u>	7-1	91.00 (250.0)	36.40				:	
. :			;		:	:	· · ·		:		Σ	156.00 (250.0)	62.40					
35	N-CHIC-2		N-CHIL-1	3	220.0	33.0	132.0	1.50.0	50.0	150.0	H-M	6.00 (150.0)	4.00	Ξ	15.0	-15.0	77	
36	BIYAG-2	BIYAG-3	BIYAG-1	<u>ش</u>	220.0	33.0	132.0	250.0	8	250.0	Σ	13.80 (250.0)	5.52	Ξ	15.0	-5.0	. 13	
				1		- -	1	:	•		H.	91.30 (250.0)	36.52					
:				. :				· :	:		Z.	156.30 (250.0)	62.52		•			<u>.</u>
37	VAVUNI-1	VAVUNI-3	:	71	132.0	33.0		10.0	10.0	:	7 H	10.00 (10.0)	100:00	I	5.0	-15.0	11	·
88	MUTHR-2	MUTHR-3	:		220.0	33.0	!	63.0	63.0		7	13.00 (63.0)	20.63	I	5.0	-15.0	11	
	- 1			:		-	 :			•	 ;				:	:	:	
Retire	Retirements				• •					:							·	
٠	SAPUG-IP SAPUG-G	SAPUG-G		_	142.0	11.0		20.0	20.0		H-L	17.80 (50.0)	35.60			:		· · ·
-							_											

1) Sources; ": CEB's record, "": Name plate at the site, none; Assumed value 2) Shaded nodes; Not in operation

Notes:

Table A6.1.4 - 3 Data of Planned Generators by the End of 2010

No.	Node !	Туре	No. of	Rated Voltage	Rated Capacity	Rated Output	Xd"
		· · · · · · · · · · · · · · · · · · ·	Unit	(kV)	(MVA)	(MW)	(%)
Data	modification for (the syst	em in 201	0 year			
Newl	y Add (new const	ruction)		1		
1	Trincolalee P/S	Total		i	1058.82	900.00	
	TRINC-G	coal	3	11.0	352.94	300.00	16.0
	ŧ			1	•		
2	Boosa P/S Total		:	i i	352.94	300.00	
	BOOS-G	c.c.	1	11.0	352.94	300.00	16.0
	:			:	: :		
Retir	ement		:	1	:	,	
1	Sapugaskanda I	P/S		i	51.20	36.00	
	SAPUG-G2	diesel	2	11.0	25.60	18.00	
	:			!			

Table A6.1.4 - 4

Data of Planned Reactive Power Sources by the End of 2010

No.	Node	Rated Voltage	Rated Capacity	Remarks
		. (kV)	(MVA)	
Data m	odification for t	he system in 201	0 year	
Newly A	Add	!		
1	VALAI-3	33	10.00	
2	AMPA-3	33	10.00	
3	THULH-3	33	40.00	
4	KEGAL-3	33	20.00	
5	DEHIWA-3	33	60.00	
6	INGIN-3	33	10.00	e e e e e
7	K-NIYA-3	33	60.00	
8	KOTUG-3	33	40.00	Total: 60 MVA
9	BIYAG-3	33	60.00	
10	KOLON-TT	33	120.00	
11	MATUG-TT	33	80.00	
12	CHUNN-3	33	20.00	Total: 40 MVA
Total			530.00	



Table A6.1.4 • 5
Generator Output Schedule for 2010 System

No.	Node	Туре	Scheduled Outpu	t Max Output *2
			(MW)	(MW)
1	LAX-G	hydro	45.00	50.00
2	N-LAX-G	hydro	90.00	100.00
3	WIMAL-G	hydro	45.00	50.00
4	CANYO-G	hydro	54.00	60.00
5	POLPI-G	hydro	68.00	75.00
6	IUKUWE-G	hydro	34.00	38.00
7	BOWAT-G	hydro	36.00	40.00
8	'VICTO-G	hydro	189.00	210.00
9	:RANDE-G	hydro	110.00	122.00
10	KOTMA-G1	hydro	121.00	134.00
11	KOTMA-G2	hydro	60.00	67.00
12	RANTE-G	hydro	44.00	49.00
13	'SAMAN-G	hydro	108.00	120.00
14	KUKULE-G	hydro	70.00	78.20
15	KELA-GTI	gas	14.00	18.00
16	KELA-GT2	gas	72.00	90.00
17	KELA-GT3	gas	82.00	102.60
18	KELA-GT4	gas	19.00	23.40
19	KELA-CC1	c.c.	135.00	135.00
20	MUTHR-G	c.c.	135.00	135.00
21	N-GALL-G	gas	50.00	63.00
22	SAPU-GN1	diesel	29.00	36.00
23	SAPU-GN2	diesel	29.00	36.00
24	KHD-G	diesel	37.00	46.00
25	CHUNN-G	diesel	22,00	27.00
<u>2</u> 6	PUTTA-PG	•1) steam	540.00	540.00
27	TRINC-G	steam	810.00	810.00
28	BOOS-G	c. c.	270.00	270.00
Hydro te	otal		1074.00	1193.20
Therma	total		2244.00	2332.00
Total of	Generation		3318.00	3525.20

Notes:

- *1) Stack node and one unit under maintenance
- *2) Maximum output = Rated output, for hydro stations

 Maximum output = Rated output x 0.9, for thermal stations

Total Demand = 3214 (MW)

Maintenance = 300 (MW)

Total Reserve = 6.45 (%)

Spinning Res. = 3.71 (%)

Hot Reserve = 2.74 (%)

Net supply (MW) = 3218.46

(considering 3% loss of generation)

Condition of Dynamic Stability Analysis

for the CASE 2010 (low 2 A 3)

1. Fault and Fault Location

Three phase fault on;

1) the Trincomalee P/S - New Habarana 220 kV line at Trincomalee side,
2) the Victoria - New Polpitiya 220 kV line at Victoria side, and
3) the Boossa - Matugama 220 kV line at Boossa side.

(S1, S2)

(S3, S4)

2. Reclosing

Three phase reclosing of single circuit of the above 220 kV lines.

Reclosing sequence

Fault ----- trip signal to CB ----- CB trip -- (no voltage time) -- CB reclose 80 ms 80 ms 500 ms

- 1) Successful Reclosing
 Fault --- (160 ms) --- CBs trip --- (500 ms) --- clearing fault and CBs Close
- 2) Unsuccessful Reclosing
 Fault -- (160 ms) -- CBs trip -- (500 ms) -- CBs Close -- (160 ms) -- CBs trip

3. Generators to be Observed

- 1) Puttalam (PUTTA-PG)
- 2) Victoria (VICTO-G)
- 3) Kelanitissa (KELA-CCI)
- 4) Trincomalee (TRINC-G)
- 5) Boossa (BOOS-G)

4. Factors to be Observed

Phase Angle (reference generator : Chunnakam)
 Terminal Voltage

3) Output Power

5. Integration Time Step

0.001 sec

6. Duration of the Calculation

3.0 sec

for all the generators

Power Technologies, Inc.

8

Pover Technologies, Inc.

PTI POVER SYSTEM SIMULATOR

SEXS

(Simplified Excitation System)

CALL SEXS (IBUS, IH, KOUNT, J.K)

This model is connected at system bus | IBUS,

ECOMP | IH. | ECOMP | SEXS

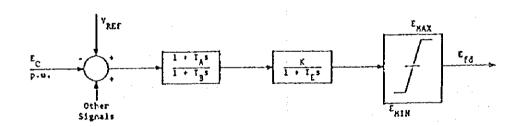
This model uses counter | KOUNT, VOINSG | Other |

and CONs starting at | J, Signals |

And STATEs starting at | K.

COHs	1	Value	Description
J		0.1	t _A /t _B
J+1		10	T _B (>0) (sec)
J+2	7	200	Χ
J+3		0.05	I _E (sec)
J+4	-	0	E _{MIN} (p.u. EFD base)
J+5		3	E _{KAX} (p.u. EFD base)

STATES	,	Description
K		First integrator
K+1		Second integrator



Power Technologies, Inc.

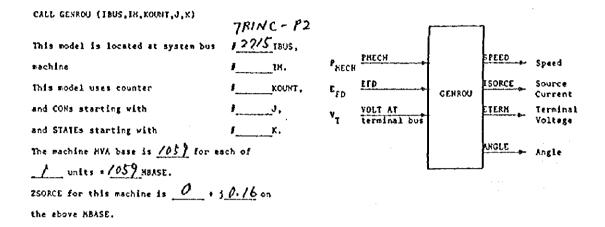
Power : Technologies, Inc.

PLANT STEAM

PTI POVER SYSTEM SIMULATOR

GENROL

(Round Rotor Generator Hodel)



			·
CORS		Value	Description
J		6.85	T' (sec.>0)
J+1	,	0.032	T" (sec.>0)
3+2		1.00	T' _{qo} (sec.>0) -
J+3		0.16	T" (sec.>0)
3+4		4.5	Inertia H
J+5		0.5	Sceed Damping D
J+6		1.75	x _a
J+7		1.72	PX
J+8		0.27	x;
J+9		1.3/	X' _q
J+10		0.16	X4 * X4
J+11		0.10	×t
J+12		0.03	5(1.0)
J+13		0.40	5(1.2)

x 4. x 4.	Xi , Xi ,	Xi,	х,	X ₁ , H, and D are	in p.v.,
machine	HVA base.	λ''α	กบริธ	X ₁ , H, and D are be equal to X _d -	

STATES	1	Cescription
х		E'q
K+1		E'd
K+2		Ykd
K+3		Ykq
K+4		& Speed (p.u.)
X+5		Angle (radians)

Power Technologies, Inc.

Fover Technologies, Inc.

PLANT C.C.

PTI POVER SYSTEM SIMULATOR

GENROU

(Round Rotor Generator Hodel)

CALL GEHROU (IBUS, IH, KOUNT, J, K)	13005-2		1		ו	
This model is located at system bus	12360 Taus,		РИЕСН		SPECO .	
machine	/ta.	PHECH	1			Speed
This model uses counter	KOUNT,	E ^{ED}	EFD	GEHROU	ISORCE	Source Current
and CONs starting with	1	y _T	VOLT AT	•	ETERH	Termina Voltage
and STATEs starting with	ſĸ.	•	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			_
The machine HVA base is 353 for ea	sch of				ANGLE	Angle
L unite & 353 MBASE.				L	٥	
2SORCE for this machine is + :	1.0.16 on					
the shows MBASE.						

CONs	i	Value	Description
J.		6.85	T' (sec.>0)
J+1	,	0.032	T" (sec.>0)
J+2		1.00	71 (sec.>0) .
J+3		0.16	T" (sec.>0)
Jit		4.5	Inertia H
J+5		0.5	Speed Damping D
J+6		1.75	x _d
J+7		1. 72	Xq
J+B		0.27	x
J+9		1.31.	Χ'q
J+10		0.16	X'' * X''
J+11		0.10	χ _t
J+12		0.03	\$(1.0)
J+13		0.40	S(1.2)

Xd. Xq.	X', X'q KVA base.	X",	X", must	X ₁ , II, be equa	and D	are K%	in	p.v.,

STATES	j	Description
x		E'q
K+1		E'd ,
K+5		Ykd
K+3		Ykq
Kł4		A Speed (p.u.)
K+5		Angle (radians)

Table A6.1.5 - 1 Data of Planned Transmission Lines by the End of 2015

										:
U		•				;			:	:
Note			:							:
									:	;
× (%) :			19,8588	19.8588	22.0653	22.0653	14.1093	14.1093	-	
100 MVA Base (%)			4.5459 19.8588		5.0510 22.0653	5.0510 22.0653	3.9220 14.1093	3.9220 14.1093	•	
R 100	:		0.3509	0.3509	0.3899	0.3899	0.5459	0.5459		:
Y (mS)		:	0.4103	0.4103	0.4559	0.4559	0.2915	0.2915		:
× Ĝ			.6985 22.0023	.6985 22.0023	.8872 24.4470	.8872 24.4470	2.6421 18.9827	2.6421 18.9827		
я <u>(д</u>			1.6985	1.6985	1.8872	1.8872	2.6421	2.6421		
cct			7		7		71			
Length (km)			90.0	90.0	100.0	100.0	70.0	70.0		
Voltage Conductor (kV)			4 x Zebra	4 x Zebra	4 x Zchra	4 x Zebra	2 x Zebra	2 x Zcbra		
Voltage (kV)	year		220	220	220	220	220	220		
Branch to	ystem in 2015		PADUK-2 KAHAWA-2	KAHAWA-2	MAWEL-2	MAWEL-2	MAWEL-2	MAWEL-2		
from	Data modification for the system in 2015 year		PADUK-2	PADUK-2	KAHAWA-2 MAWEL-2	KAHAWA-2 MAWEL-2	BOOS-2	BOOS-2		
T/L Ref.	odific	γdd								
No.	Data n	Newly Add	p	7	m	4	'n	\$		

Table A6.1.5 - 2 Data of Planned Transformers by the End of 2015

No.		Node		No. of	Rated	Rated Voltage (kV)		Rated Capacity (MVA)	pacity (1	MVA)	7ml A	Impedance Voltage / Unit (%)	tage / Ur	nit (%)		r-	Tap (%, nos))S)
	(H)igh Voltage	(L)ow Voltage	(L)ow Voltage (M)iddle Voltage	Cnit	I	د	Σ	Ξ	د	Σ	between	(base	(base MVA) 100	OO MVA base		Highest	Lowest	Nos.
Data 1	Data modification for the system in 2015 year	or the system i	in 2015 year															
		· · ·					,											
Newly	Newly Add																-	
-	MAWEL-2	MAWEL-G		74	220.0	0.1	·· ·	350.0	350.0		H-L	13.00 (350.0)	50.0)	3.71	I	10.0	-5.0	5
71	BALAN-1	BALAN-G			132.0	0.11		82.0	82.0		H-L	10.00	(82.0)	12.20	工	10.0	-5.0	~
т	ATHUR-1	ATHUR-G			132.0	0.11		82.0	82.0		H-L	10.00 (8	(82.0)	12.20	I	10.0	-5.0	7
													:			:	•	1
Ликт	Augmentation											:					:	
4	BOOS-2	800S-G		7	220.0	11.0		350.0	350.0		7-H	13.00 (3	(350.0)	3.71	I	10.0	-5.0	Ω.
S	TRINC-P2	TRINC-G		4	220.0	1:0		350.0	350.0		1-H	13.00 (3	(350.0)	3.71	x	10.0	-5.0	<u> </u>
%	CHUNN-3	CHUNN-G			33.0	11.0		82.0	82.0		H-L	5.50 (8	(82.0)	6.71	I	10.0	-5.0	7
۲.	CHUNN-3	CHUNN-G		w	33.0	11.0		12.5	12.5	•	H.		(12.5)	44.00	x	10.0	-5.0	,
∞	MUTHR-2	MUTHR-G			220.0	11.0	 ;	350.0	350.0		끍	13.00 (3	(350.0)	3.71	x	10.0	-5.0	2
٥	MUTHR-2	MUTHR-G			220.0	11.0	:	175.0	175.0		井	13.00 (175.0)	75.0)	7.43	=	10.0	-5.0	2
2	KELAN-2	KELA-CCI			220.0	11.0	•	350.0	350.0	-	규	13.00 (3	(350.0)	3.71	X	10.0	-5.0	13
Ξ,	KELAN-2	KELA-CCI		:	220.0	11.0	:	175.0	175.0	:	7-1	13.00 (175.0)	75.0)	7.43	II.	10.0	-5.0	Ω,
				:	:	:			:		:		-		:			
	(hereinafter to	(hereinafter total transformers capacity)	rs capacity)	,	:			!			!					!	:	:
2	ATHUR-1	ATHUR-3	4.	;	132.0	33.0		126.0	126.0	-	H-L	10.00 (126.0)	26.0)	7.94	x	5.0	-15.0	12
13	POLON-1	POLON-3	24		132.0	33.0		63.0	63.0		H. L	10.00 (63.0)	53.0)	15.87	X	5.0	-15.0	77
4	CHUNN-1	CHUNN-3			132.0	33.0	i !	123.0	123.0		J.H.	10.00 (123.0)	23.0)	8.13	I	5.0	-15.0	=======================================
5	KILIN-1	KILIN-3		-	132.0	33.0	:	30.0	30.0		H-L	10.00	(30.0)	33.33	Ξ	5.0	-15.0	17
2	UKUWE-1	UKUWE-3			132.0	33.0		94.5	94.5	!	1-H	10.00	(94.5)	10.58	I	5.0	-15.0	72
11	KURUN-I	KURUN-3		_	132.0	33.0	:	94.5	94.5	•	H:L	10.00	(64.5)	10.58	I	5.0	-15.0	17
∞:	PUTTA-I	PUTTA-3	:	<u></u>	132.0	33.0		94.5	94.5	:	H-L	00'01	(94.5)	10.58	<u> </u>	5.0	-15.0	17
6	BOLAW-1	BOLAW-3			132.0	33.0	i . ,	126.0	126.0	;	H-L	10.00	(126.0)	7.94	Ξ	5.0	-15.0	7:
ន	CHILL-1	CHILL-3	:	_	132.0	33.0		126.0	126.0	•	H-L	10.00 (126.0)	26.0)	7.94	I	5.0	-15.0	11
77	KULIYA-1	KULIYA-3	:	_	132.0	33.0	:	126.0	126.0		H-L	10.00 (126.0)	26.0)	7.94	I	5.0	-15.0	12
8	PANNA-1	PANNA-3			132.0	33.0	:	126.0	126.0		H-L	10.00 (126.0)	26.0)	7.94	x	5.0	-15.0	2
ដ	SAPUG-1	SAPUG-3		-	132.0	33.0		220.5	220.5		H-L	10.00 (2	(220.5)	4.54	I	2.0	-15.0	12

Notes:

1) Sources: *: CEB's record, **: Name plate at the site, none: Assumed value