A-3 POWER SYSTEM ANALYSIS

Table A-3-(1) Expansion Program for Generating Facilities

Year	Island	Power plant	No x MW	Available energy (GWh)
1979	Negros	Amlan Hydro	2 x 0.4	5
	Negros	Amlan Diesel	2 x 5.5	67
	Bohol	Loboc Hydro	3 x 0.4	7
	Bohol	Tagbilaran D.	2 x 5.5	67
	Cebu	Cebu Diesel	6 x 7.3	270
	Leyte	Tongonan Geo.	1 x 3	20
	Cebu	VECO Diesel	49.3	281
	Panay	Dingle Diesel	1 x 7.3	45
	Panay	Dingle Diesel	1 x 7.3	45
		Total		
1980	Panay	Panitan Diesel	11	67
	Negros	Talisay Diesel	14.6	89
	Negros	Bacolod Diesel	22.45	118
	Panay	Dingle Diesel	2 x 7.3	90
	Cebu	Rehab. of VECO. T.	10	61
	Cebu	Rehab. of Cebu D.	7.3	45
		Total		
1981	Cebu	Naga Thermal I	1 x 55	337
	Cebu	Cebu Diesel II	1 x 18	110
	Cebu	Retire VECO D.	(-9)	(-51)
	Cebu	Cebu Diesel II	1 x 18	110
	Negros	Palimpinon Geo.	2 x 1.5	20
	Cebu	Power Barge I	4 x 8	196
	Negros	Power Barge II	4 x 8	196
	Cebu	Cebu Diesel II	1 x 8	110
		Total		
1982	Negros	Sipalay Diesel	2 x 18	220
	Leyte	Tongonan Geo. 1	1 x 37.5	245
	Leyte	Tongonan Geo. 2	1 x 37.5	245
		Total		
1983	Cebu	Retire VECO. D	(-13.5)	(-77)
	Negros	Palimpinon Geo.	1 x 37.5	245
	Negros	Palimpinon Geo.	2 x 37.5	490
	Leyte	Tongonan Geo. 3	1 x 37.5	245
		Total		

Islands	Type of power plant							
	Hydro (GWh)	Geothermal (GWh)	Coal (GWh)	Sub-total (GWh)	Diesel (GWh)	Power barge (GWh)	Sub-total (GWh)	Total (GWh)
1979								
Panay	0	0	0	0	90	0	90	90
Negros	5	0	0	5	67	0	67	72
Cebu	0	0	0	0	551	0	551	551
Leyte	0	20	0	20	0	0	0	20
Samar	0	0	0	0	0	0	0	0
Bohol	7	0	0	7	67	0	67	74
Total	12	20	0	32	775	0	775	807
1980								
Panay	0	0	0	0	157	0	157	157
Negros	0	0	0	0	207	0	207	207
Cebu	0	0	61	61	45	0	45	106
Leyte	0	0	0	0	0	0	0	0
Samar	0	0	0	0	0	0	0	0
Bohol	0	0	0	0	0	0	0	0
Total	0	0	61	61	409	0	409	470
1891								
Panay	0	0	0	0	0	0	0	0
Negros	0	20	0	20	0	196	196	216
Cebu	0	0	337	337	279	196	475	812
Leyte	0	0	0	0	0	0	0	0
Samar	0	0	0	0	0	0	0	0
Bohol	0	0	0	0	0	0	0	0
Total	0	20	337	357	279	392	671	1,028
1982								
Panay	0	0	0	0	0	0	0	0
Negros	0	0	0	0	220	0	220	220
Cebu	0	0	0	0	0	0	0	0
Leyte	0	490	0	490	0	0	0	490
Samar	0	0	0	0	0	0	0	0
Bohol	0	0	0	0	0	0	0	0
Total	0	490	0	490	220	0	220	710
1983								
Negros	0	735	0	735	0	0	0	735
Cebu	0	0	0	0	(-77)	0	(-77)	(-77)
Leyte	0	245	0	245	0	0	0	245
Total	0	980	0	980	(-77)	0	(-77)	903

Table A-3-(2) Expansion Program for Generating Facilities

Year	Island	Power plant	No x MW	Available energy (GWh)
1984	Cebu	Naga Thermal	1 x 55	337
	Leyte	Tongonan Geo.	2 x 37.5	490
	Negros	Retire Bacolod D.	(-9)	(-47)
		Total		
1985	Negros	Negros Thermal I	1 x 55	337
	Leyte	Tongonan Geo.	1 x 37.5	245
		Total		
1986	Panay	Panay Thermal I	1 x 55	337
	Leyte	Tongonan Geo.	1 x 37.5	245
		Total		
1987	Negros	Bago HE	60	110
	Leyte	Tongonan Geo.	1 x 37.5	245
	Samar	Catubig HE	2 x 15	131
		Total		
1988	Negros	Negros Thermal II	1 x 55	337
	Cebu	Retire VECO D.	(-1.5)	(-86)
	Leyte	Tongonan Geo.	1 x 37.5	245
	Bohol	Upper Loboc HE	1 x 17.5	51
		Total		
1989	Negros	Mambucal Geo.	1 x 37.5	245
	Leyte	Tongonan Geo	1 x 37.5	245
		Total		
1990	Panay	Aklan HE	20	44
	Negros	Mambucal Geo.	1 x 37.5	245
	Leyte	Tongonan Geo.	1 x 37.5	245
	Negros	Retire Bacolod D.	(-8)	(-42)
		Total		

Islands	Type of power plant							
	Hydro (GWh)	Geothermal (GWh)	Coal (GWh)	Sub-total (GWh)	Diesel (GWh)	Power barge (GWh)	Sub-total (GWh)	Total (GWh)
1984								
Negros	0	0	0	0	(-47)	0	(-47)	(-47)
Cebu	0	0	337	337	0	0	0	337
Leyte	0	490	0	490	0	0	0	490
Total	0	490	337	827	(-47)	0	(-47)	780
1985								
Negros	0	0	337	337	0	0	0	337
Leyte	0	245	0	245	0	0	0	245
Total	0	245	337	582	0	0	0	582
1986								
Panay	0	0	337	337	0	0	0	337
Leyte	0	245	0	245	0	0	0	245
Total	0	245	337	582	0	0	0	582
1987								
Negros	110	0	0	110	0	0	0	110
Leyte	0	245	0	245	0	0	0	245
Samar	131	0	0	131	0	0	0	131
Total	241	245	0	486	0	0	0	486
1988								
Negros	0	0	337	337	0	0	0	337
Cebu	0	0	0	0	(-86)	0	(-86)	(-86)
Leyte	0	245	0	245	0	0	0	245
Bohol	51	0	0	51	0	0	0	51
Total	51	245	337	633	(-86)	0	(-86)	547
1989								
Negros	0	245	0	245	0	0	0	245
Leyte	0	245	0	245	0	0	0	245
Total	0	490	0	490	0	0	0	490
1990								
Panay	44	0	0	44	0	0	0	44
Negros	0	245	0	245	(-42)	0	(-42)	203
Leyte	0	245	0	245	0	0	0	245
Total	44	490	0	534	(-42)	0	(-42)	492

Table A-3-(2) Generator and Transformer Constants on Machine Base

		Po/Pg (MVA/MW)	M (sec)	Pf (%)	xd (%)	xd' (%)	xd'' (%)	Pt (MVA)	Xt (%)
CEBU-Is									
Naga	(T)	65/55	6.0	85	155	30	17.3	65	12.0
	"	65/55	6.0	85	"	"	"	65	"
	(D)	9.1/7.3	3.88	80	141	41.3	30.2		
	"	9.1/7.3	"	"	"	"	"		
	"	9.1/7.3	"	"	"	"	"		
	"	9.1/7.3	"	"	"	"	"	38x2	12.57
	"	9.1/7.3	"	"	"	"	"		
	"	9.1/7.3	"	"	"	"	"		
	"	9.1/7.3	"	"	"	"	"		
	(P.B)	10/8	1.78	80	170	31.5	19.0		
	"	"	"	80	"	"	"		
	"	"	"	80	"	"	"	42x1	10.75
	"	"	"	80	"	"	"		
	"	"	"	80	"	"	"		
Talavera	(D)	22.5/18	2.67	80	170	22.0	16.3	22.0	12.0
	"	"	"	"	"	"	"	"	"
	"	"	"	"	"	"	"	"	"
VECO	(D)	6.3/5	2.67	80	170	22.0	16.3		
	"	"	"	"	"	"	"		
	"	"	"	"	"	"	"		
	"	"	"	"	"	"	"		
	"	4.3/3.4	"	"	"	"	"	30x2	12.0
	"	"	"	"	"	"	"		
	(T)	5.9/5	6.0	85	170	22.0	16.3		
	"	"	"	"	"	"	"		

		Po/Pg (MVA/MW)	M (sec)	Pf (%)	xd (%)	xd' (%)	xd'' (%)	Pt (MVA)	Xt (%)
NEGROS-Is									
Amlan	(D)	6.9/5.5	2.67	80	115.4	32	23.8	10	9.0
	"	"	"	"	"	"	"	2.5	9.0
	"	"	"	"	"	"	"		
	"	"	"	"	"	"	"		
					(xq=60)				
	(L)	0.5/0.4	5.8	80	96.6	32.6	22.8	1 x 1	9.0
	"	"	"	"	"	"	"		
Palimpinon	(G)	1.9/1.5	6.0	80	170	22.0	16.3	1.9	9.0
	"	"	"	"	"	"	"	"	"
	(G)	46.9/37.5	6.0	80	170	22.0	16.3	46.9	12.0
	"	"	"	"	"	"	"	"	"
	"	"	"	"	"	"	"	"	"
Kabangkalan	(T)	64.7/55	6.0	85	170	22.0	16.3	64.7	12.0
Sipalay	(D)	22.5/18	2.67	80	170	22.0	16.3	50x1	9.0
	"	"	"	"	"	"	"		
Bacolod	(P.B)	10/8	1.78	80	170	31.5	19.0	42x1	10.75
	"	"	"	"	"	"	"		
	"	"	"	"	"	"	"		
	"	"	"	"	"	"	"		
Talisay	(D)	6.9/5.5	2.67	80	115.4	33	23.8	6.9	9.0
		"	"	"	"	"	"	"	"
		4.5/3.1	"	"	170	22	16.3	4.5	"
					(xq=60)				
Bago	(H)	12.5/10	5.8	80	96.6	32.6	22.8	12.5	12.0
	"	62.5/50	"	"	"	"	"	62.5	"
Mambucal	(G)	46.9/39.5	6.0	80	170	22	16.3	46.9	12.0
	"	"	"	"	"	"	"	"	"
Negros II	(T)	64.9/55	6.0	85	170	22	16.3	64.7	12.0

		Po/Pg (MVA/MW)	M (sec)	Pf (%)	xd (%)	xd' (%)	xd'' (%)	Pt (MVA)	Xt (%)
PANAY-Is									
Dingle	(D)	9.3/7.3	3.88	80	144	40.4	30	28x2	12.0
	"	"	"	"	"	"	"		
	"	"	"	"	"	"	"		
	"	"	"	"	"	"	"		
Panitan	(D)	6.9/5.5	2.67	80	115.4	33	23.8	10x1	9.0
	"	"	"	"	"	"	"		
					(xq=60)				
Aklan	(H)	12.5/10	5.8	80	96.6	32.6	22.8	12.5	9.0
	"	"	"	"	"	"	"	"	"
Panay	(T)	64.7/55	6.0	85	170	22	16.3	64.7	12.0

Note : (T) ; Coal Fire Thermal
(D) ; Diesel
(P.B) ; Power Berge
(H) ; Hydro
(G) ; Geothermal
Po ; Capacity of unit
Pg ; Output of unit
Pf ; Power factor
Pt ; Capacity of transformer

		Po/Pg (MVA/MW)	M (sec)	Pf (%)	xd (%)	xd' (%)	xd'' (%)	Pt (MVA)	Xt (%)
LEYTE-Is									
Bantigue	(P.B)	10/8	1.78	80	170	31.5	19.0	42x1	10.75
	"	"	"	"	"	"	"		
	"	"	"	"	"	"	"		
	"	"	"	"	"	"	"		
Tongonan	(G)	3.8/3	6.0	80	170	22	16.3	3.8	12.0
	"	46.9/37.5	6.0	80	170	22	16.3	46.9	12.0
	"	"	"	"	"	"	"	"	"
	"	"	"	"	"	"	"	"	"
	"	"	"	"	"	"	"	"	"
	"	"	"	"	"	"	"	"	"
	"	"	"	"	"	"	"	"	"
SAMAR-Is									
					(xq=60)				
Catubig	(H)	18.8/15	5.8	80	96.6	32.6	22.8	18.8	9.0
	"	"	"	"	"	"	"	"	"

Note : (P.B) ; Power Berge
(G) ; Geothermal
(H) ; Hydro
Po ; Capacity of unit
Pg ; Output of unit
Pf ; Power factor
Pt ; Capacity of transformer

Reactive power balance for Panay-Negros-Cebu Power System at the peak time of 1990 is as follows:

Table A-3-(3) Reactive Power Balance

Unit : (MVar)

	Equipment	Reactive power
Production	Transmission line 138 kV	71
	" 69 kV	26
	Generator	230 *1
	Total	327
Consumption	Load	275 *2
	Transmission line 138 kV	66
	" 69 kV	60
	Transfomer	100
	Total	501

Note: *1 Supply capability at power factor of 0.9

*2 Power factor of load = 0.9

Fig. A-3-(1) Static Stability in 1985

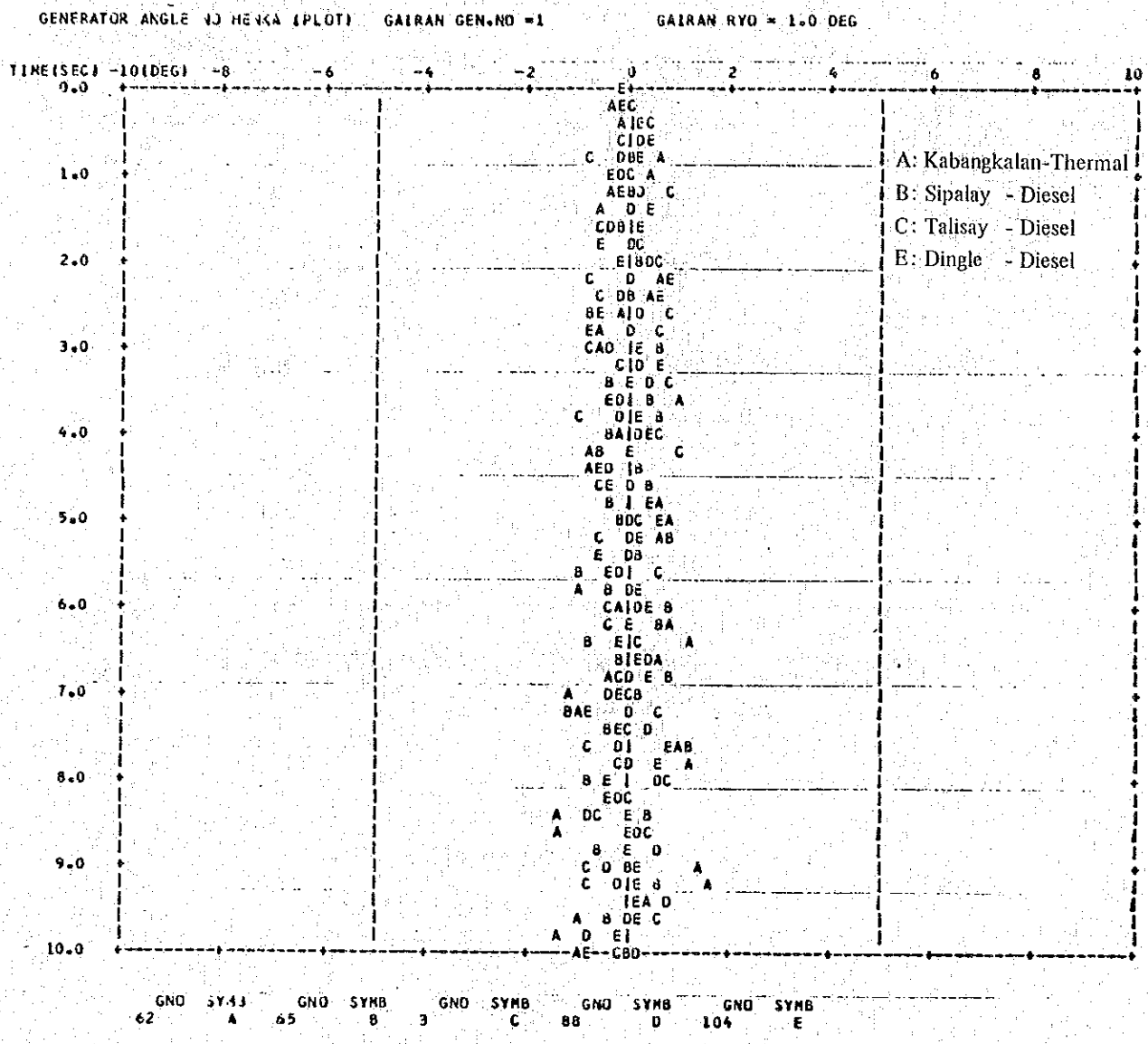


Fig. A-3-(2) Static Stability Peak in 1990

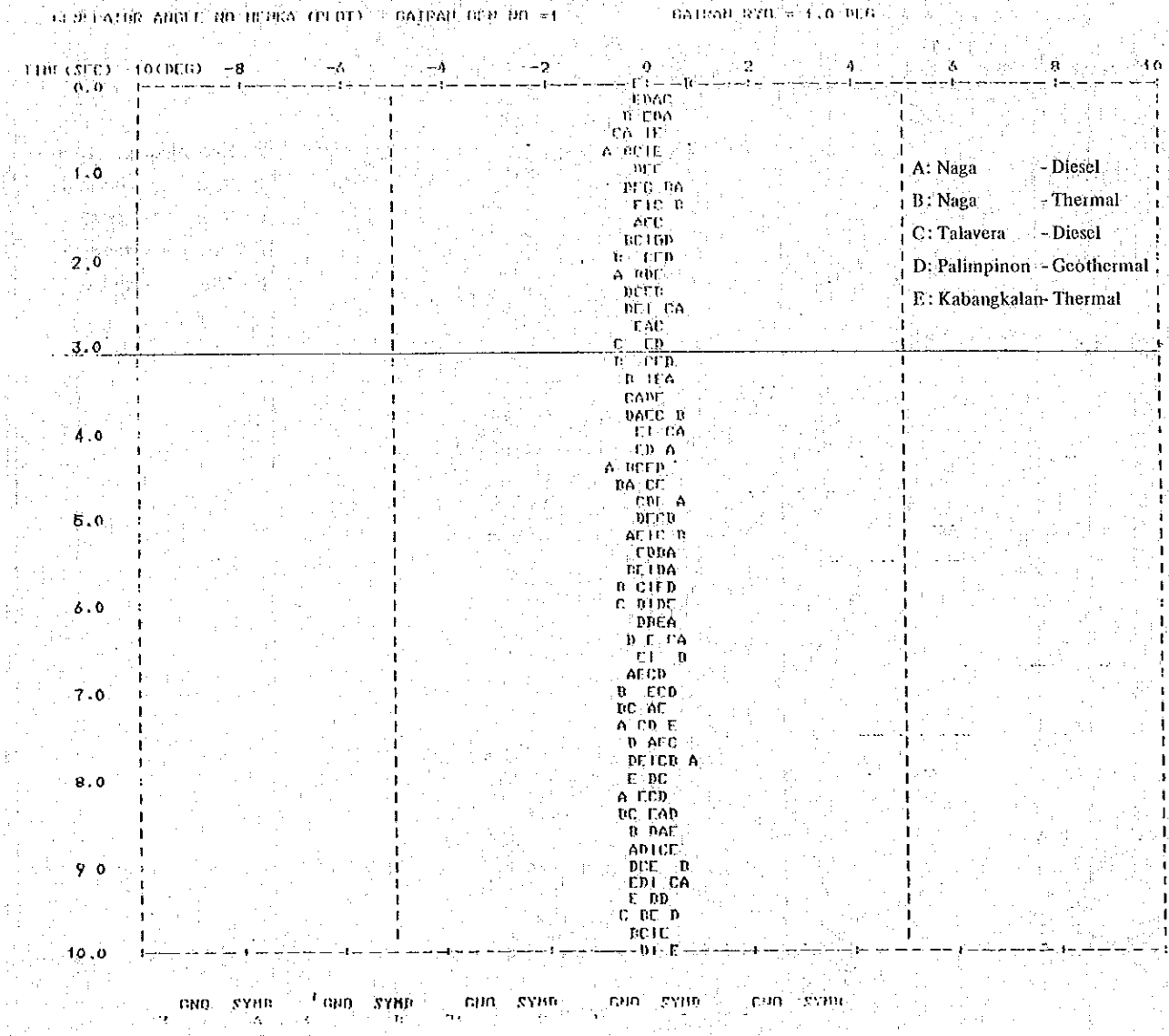


Fig. A-3-(3) Static Stability in 1990 (Base+100MW)

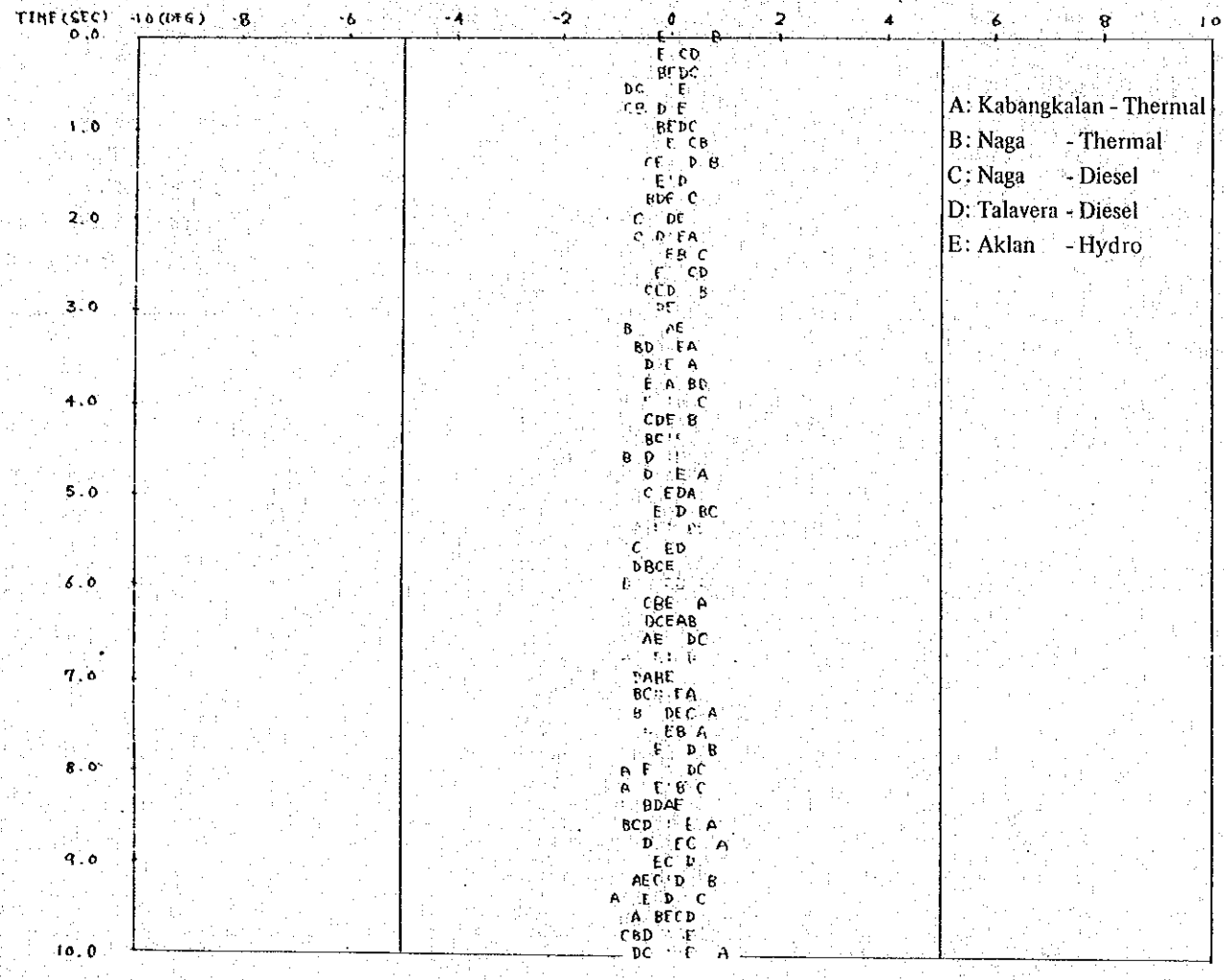


Fig. A-3-(4) Transient Stability in 1985

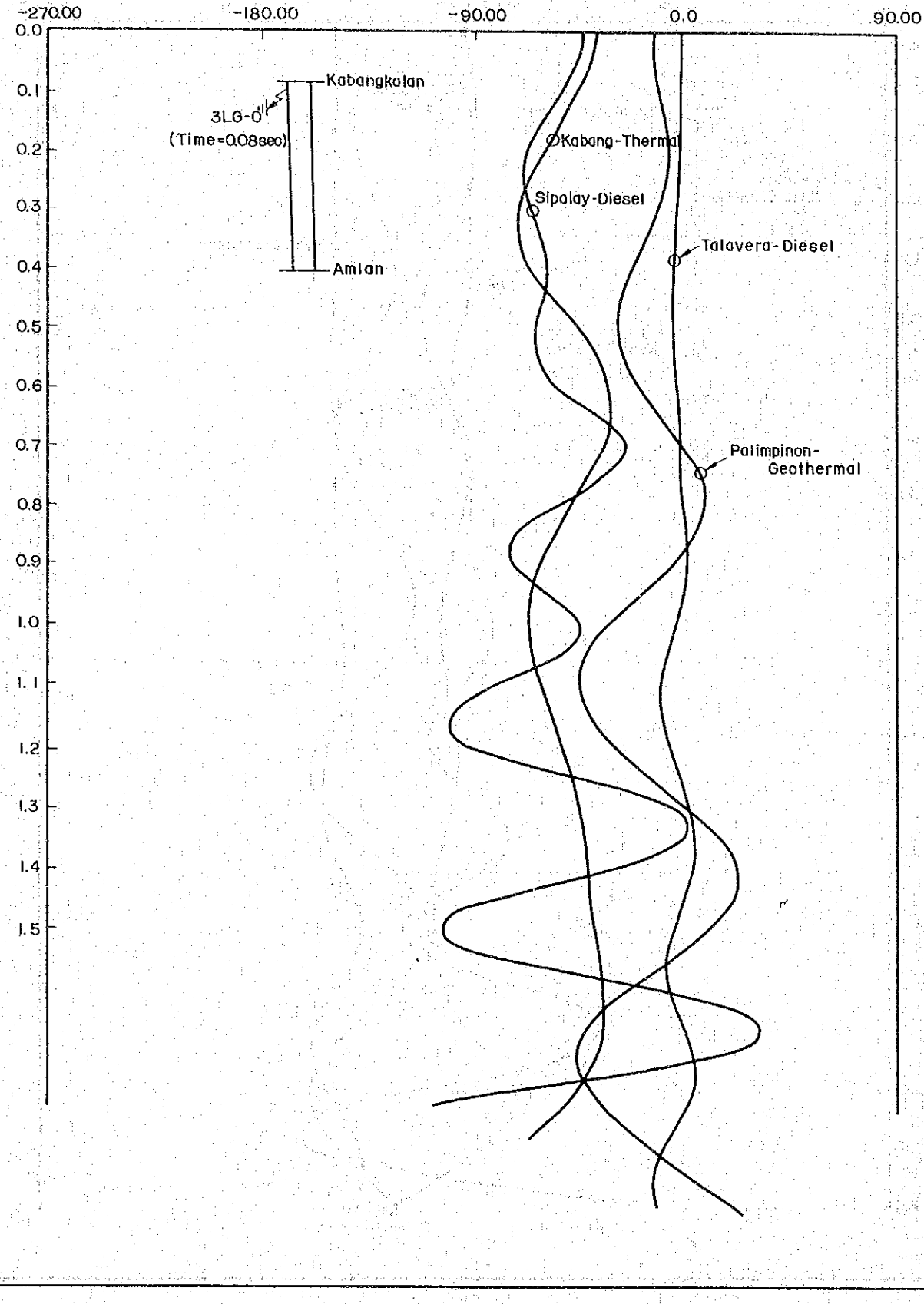


Fig. A-3-(5) Transient Stability Peak Time in 1985

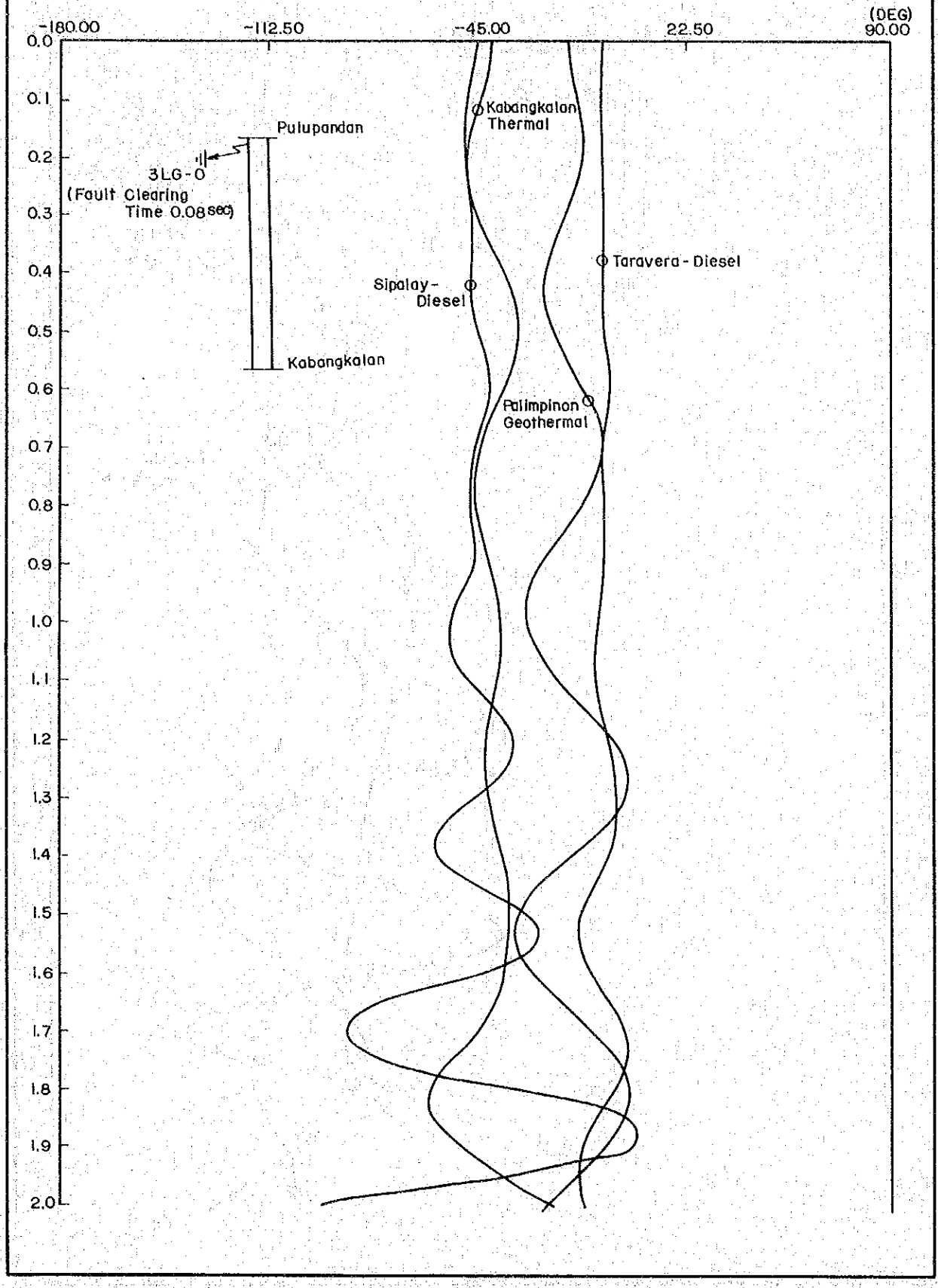


Fig. A-3-(6) Transient Stability in 1990

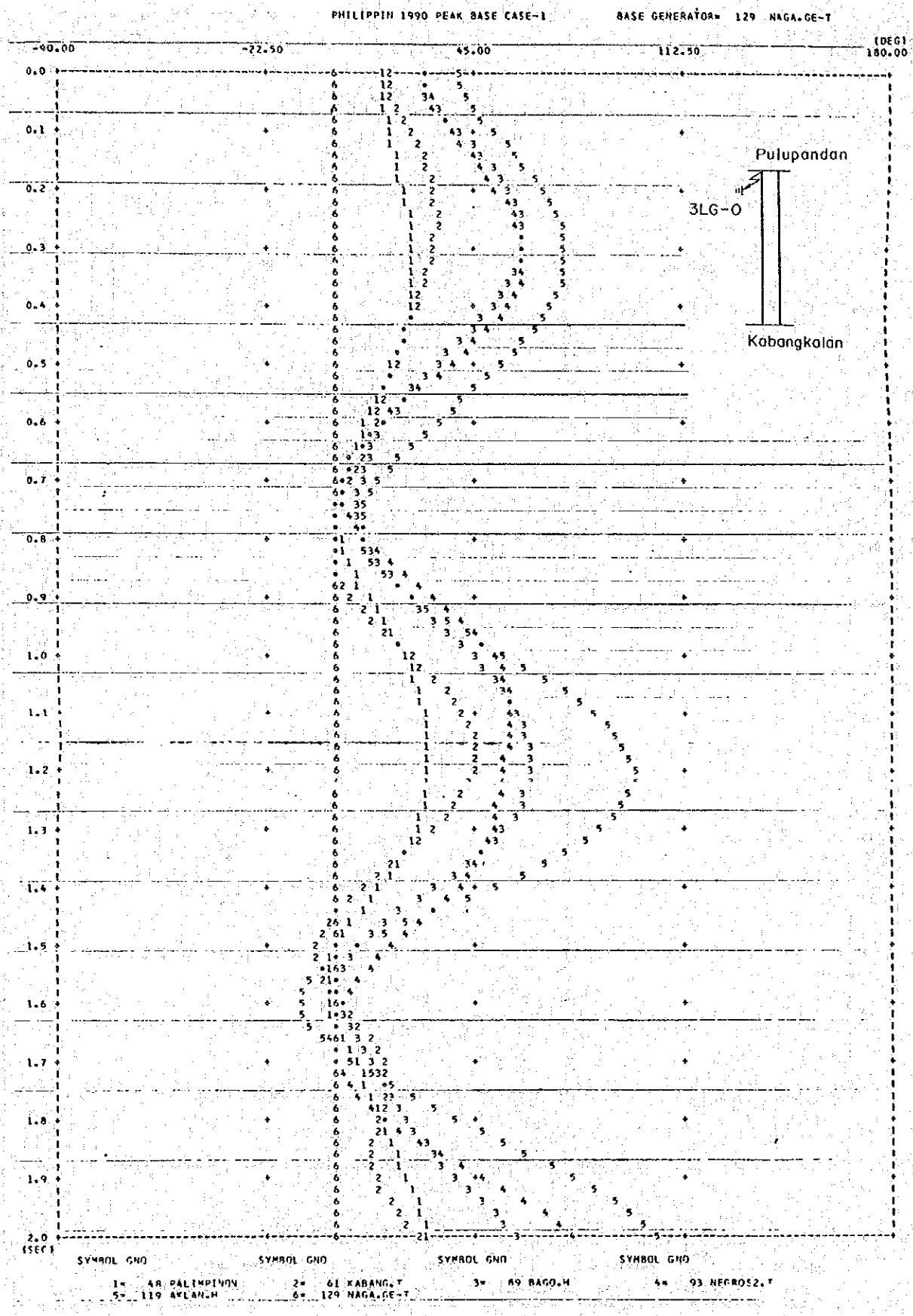


Fig. A-3-(7) Transient Stability in 1990 (Base+100MW)

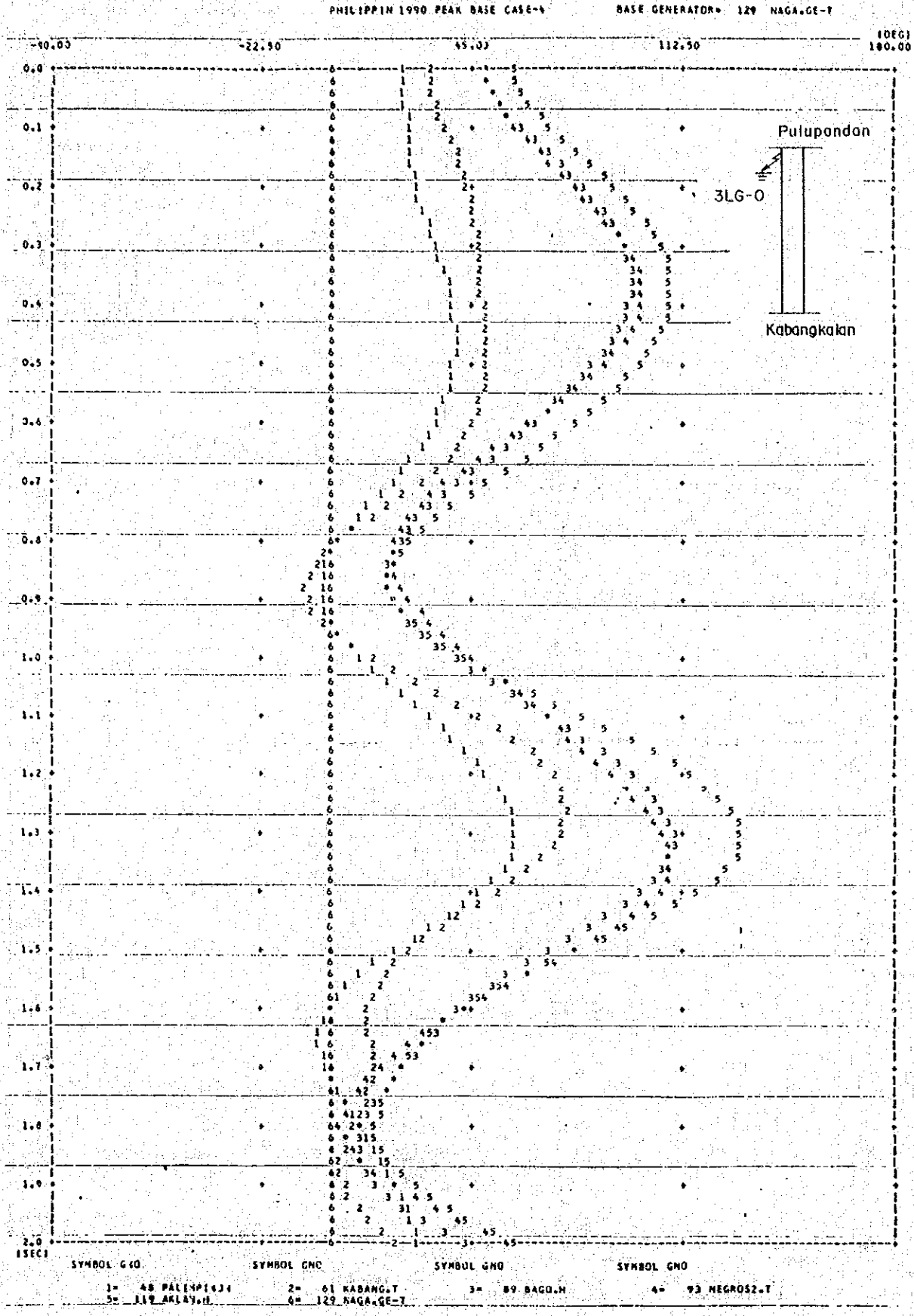


Fig. A-3-(8) Transient Stability Peak Time in 1990

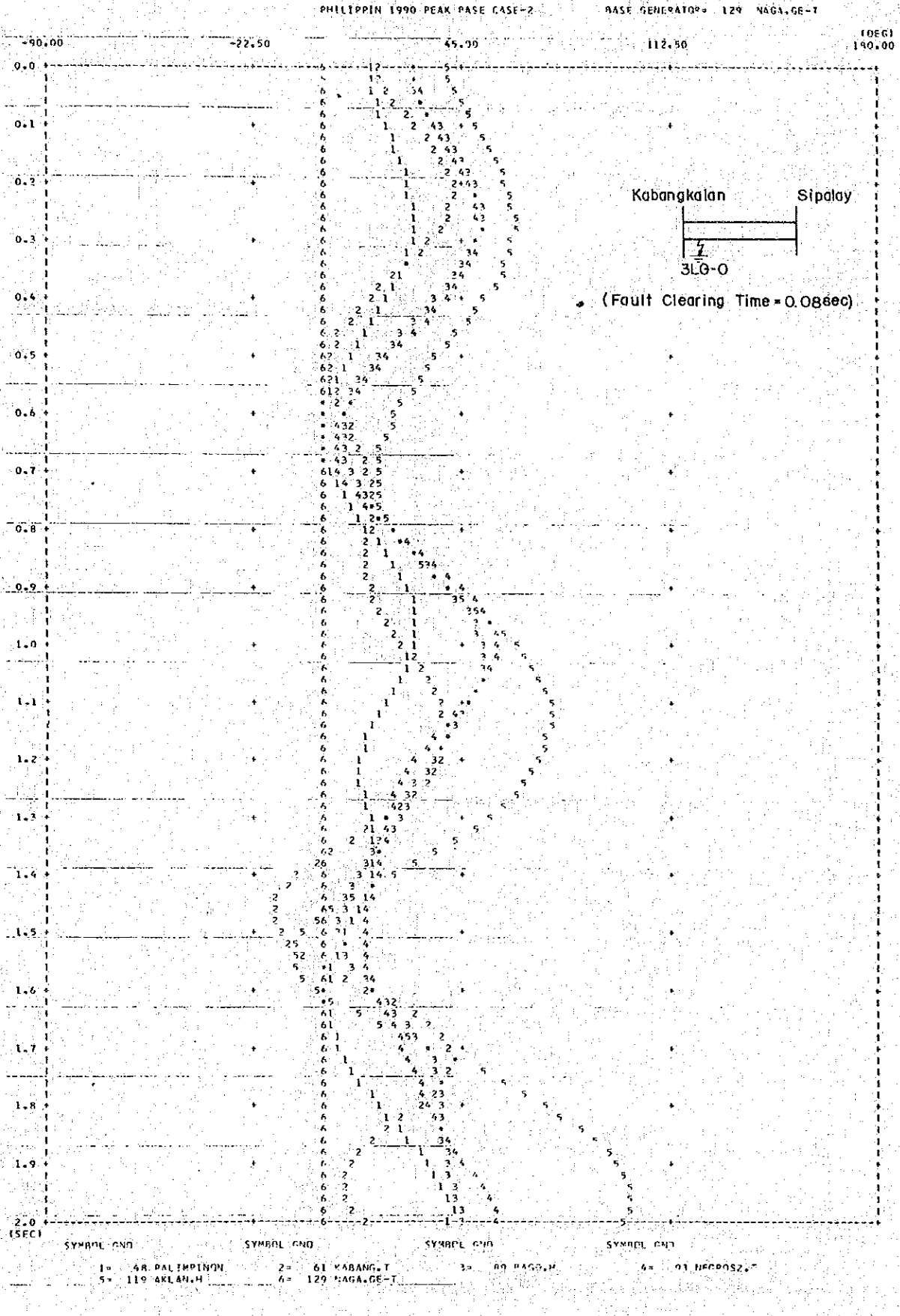


Fig. A-3-(9) Transient Stability Peak Time in 1990

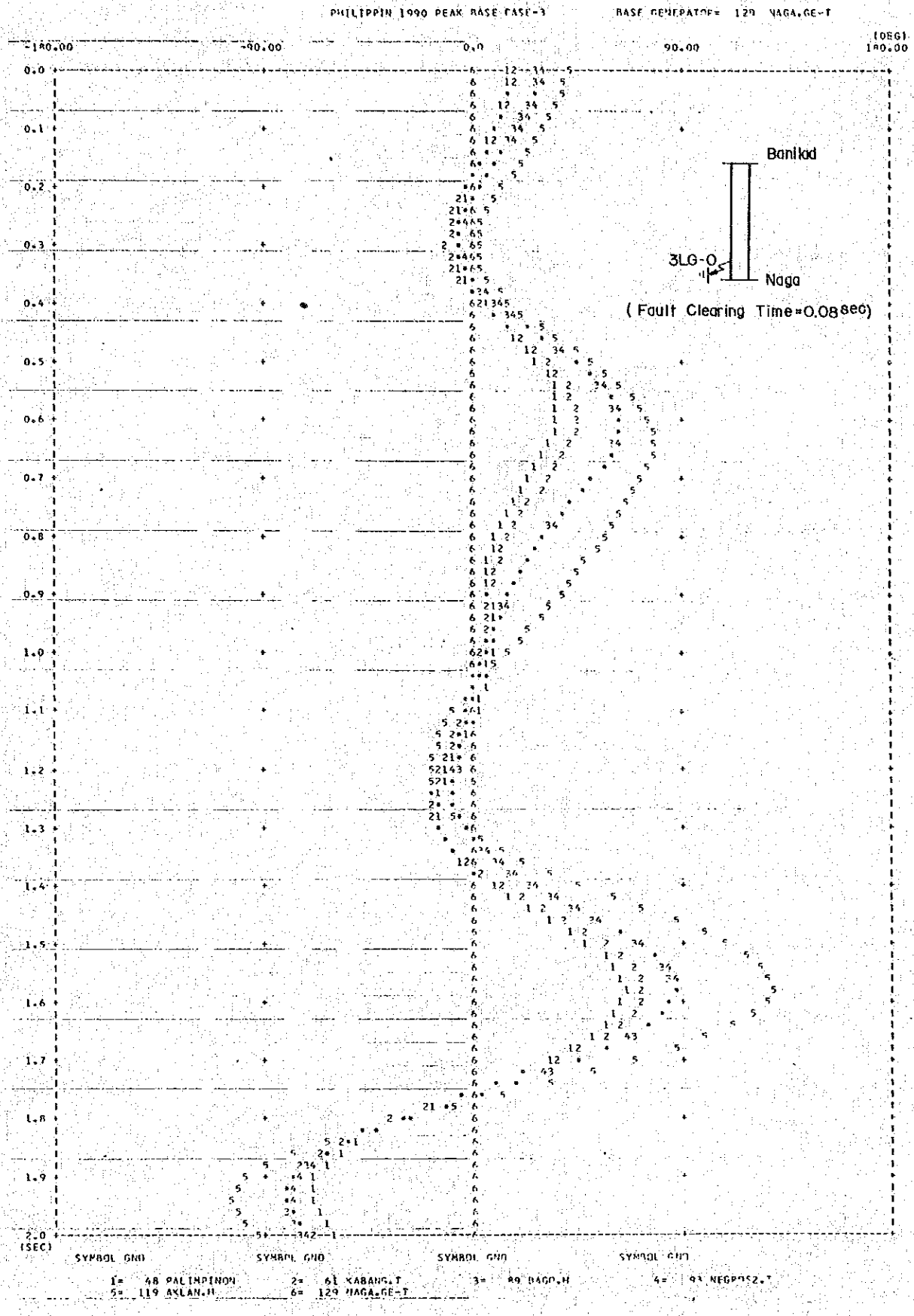


Fig. A-3-(10) Transient Stability Peak Time in 1990 (Base+100MW)

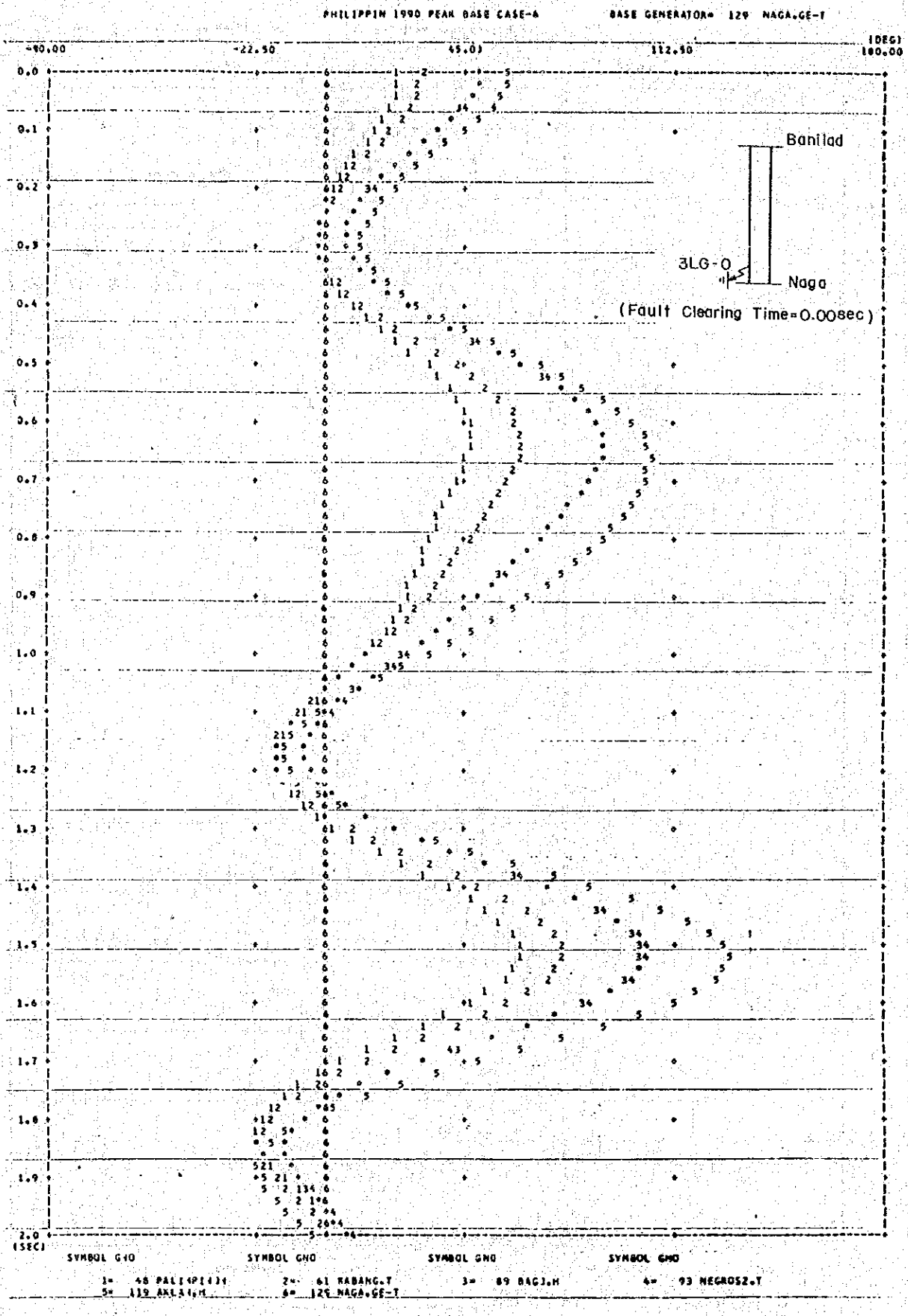
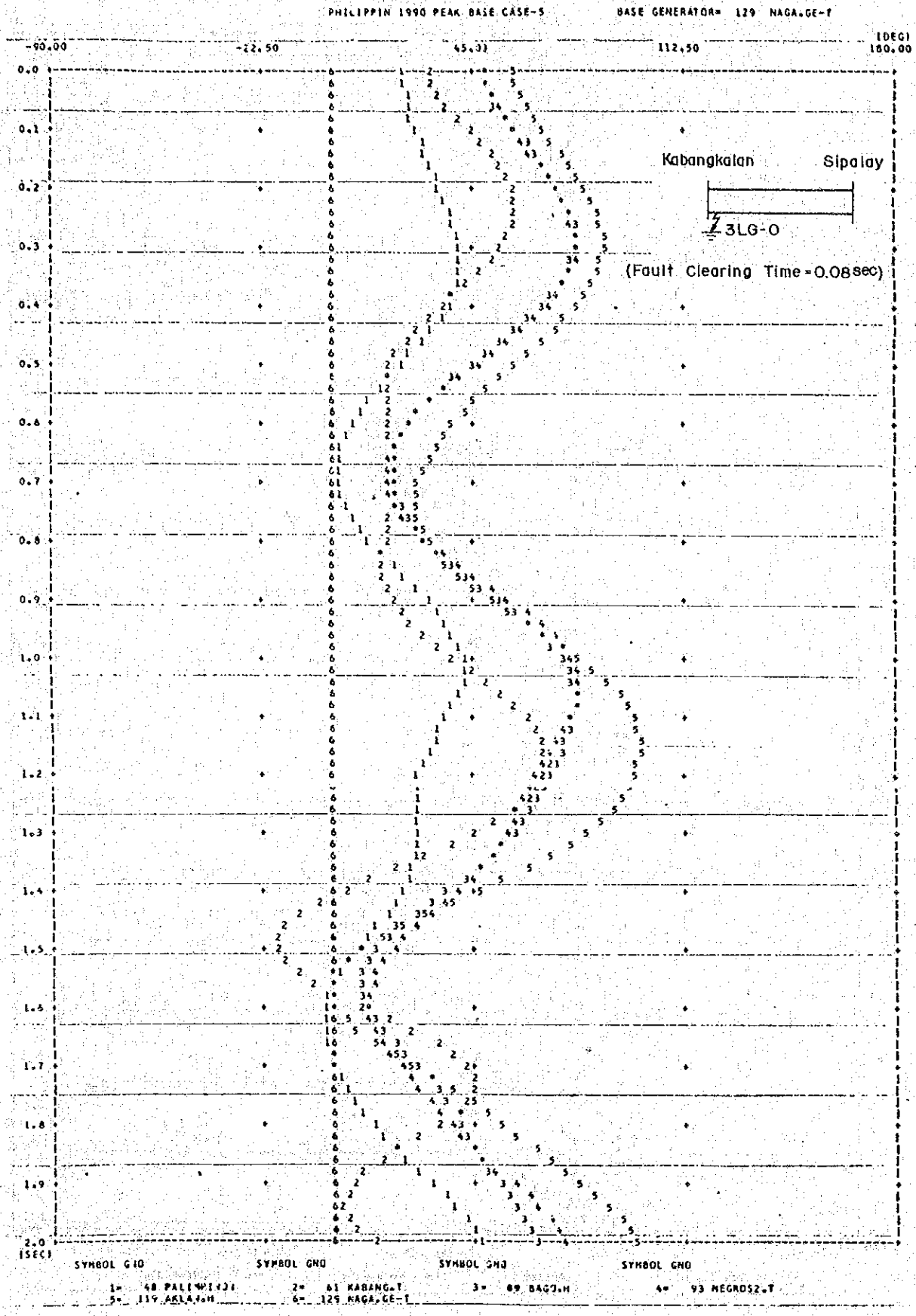


Fig. A-3-(11) Transient Stability Peak Time in 1990 (Base+100MW)



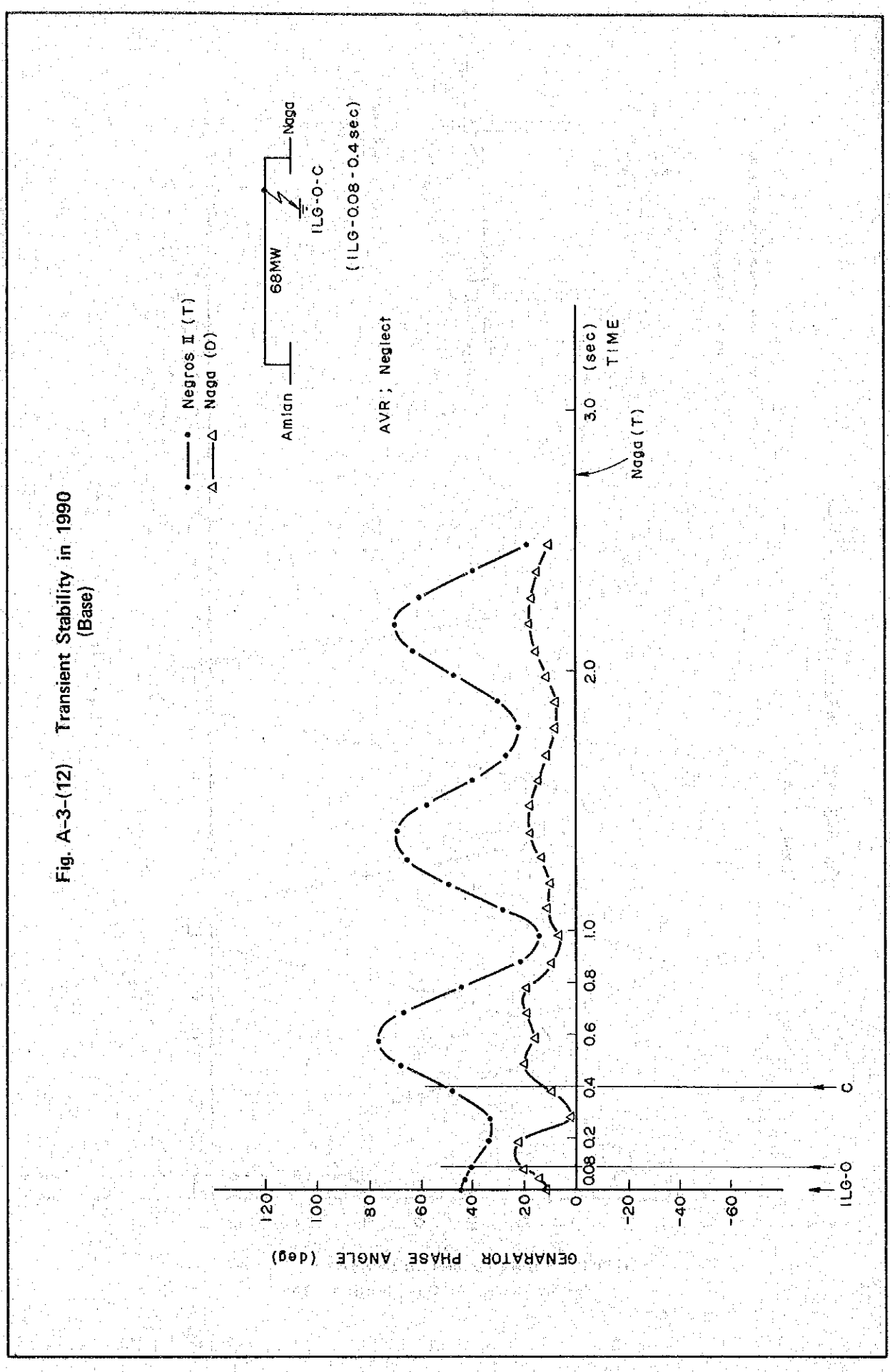


Fig. A-3-(12) Transient Stability in 1990
(Base)

Fig. A-3-(13) Transient Stability in 1990

(Base + 100MW)

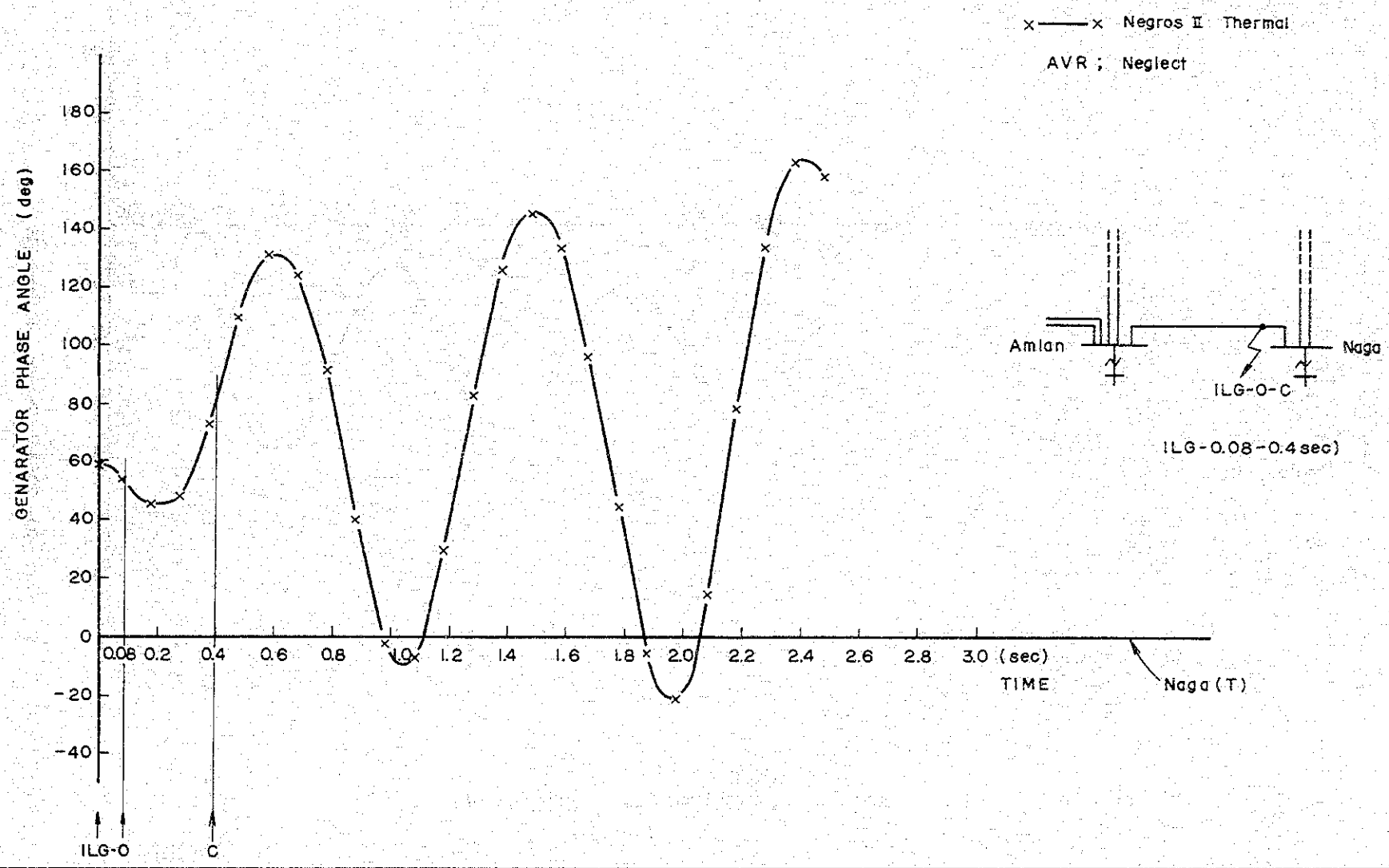
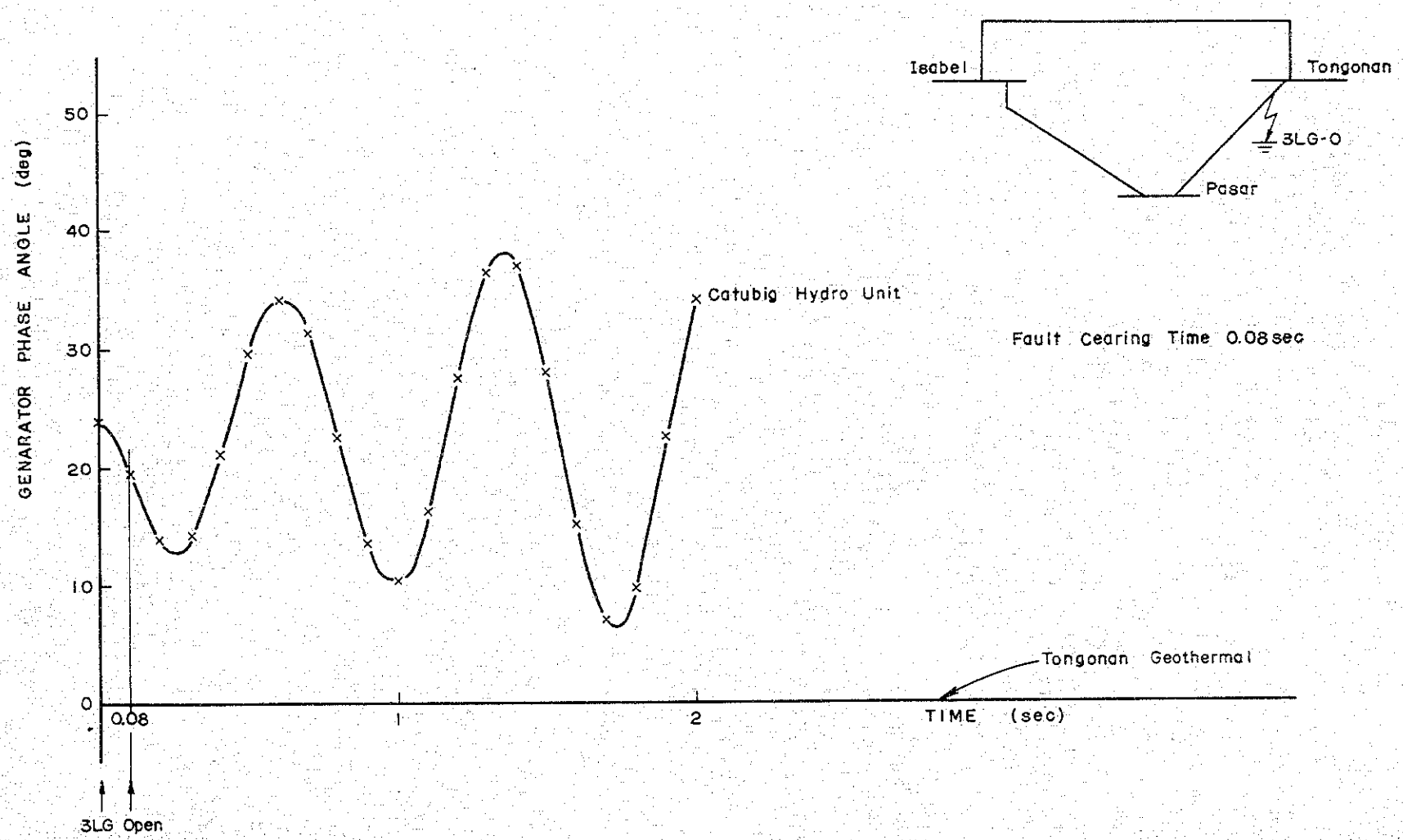


Fig. A-3-(14) Transient Stability in 1990
Leyte - Samar System (Peak)



A-4 FINANCING PLAN AND FINANCIAL ANALYSIS

Table A-4-(1) Investment Schedule for Generation Projects

	Installed capacity (MW)	Completion Year	Direct const. cost			Foreign currency					Local currency					Type of Plant	Economic life (Years)	Depreciation cost (10^3US$)
			F.C. (10^6US$)	L.C. (10^6US$)	Total (10^6US$)	1st yr. (10^6US$)	2nd yr. (10^6US$)	3rd yr. (10^6US$)	4th yr. (10^6US$)	Total (10^6US$)	1st yr. (10^6US$)	2nd yr. (10^6US$)	3rd yr. (10^6US$)	4th yr. (10^6US$)	Total (10^6US$)			
Panay																		
Panay Diesel	29.2	1979	14.1	5.2	19.3	4.2	9.9	-	-	14.1	1.6.	3.6	-	-	5.2	Diesel	18	1,072
Panay Thermal I	55.0	1986	40.1	17.3	57.4	10.0	20.1	10.0	-	40.1	4.3	8.7	4.3	-	17.3	Coal	30	1,913
Aklan Hydro	20.0	1990	13.0	8.8	21.8	3.3	3.3	3.9	2.5	13.0	2.2	2.2	2.6	1.8	8.8	Hydro	50	436
Panay Thermal I	55.0	1992	35.2	12.1	47.3	8.8	17.6	8.8	-	35.2	3.0	6.1	3.0	-	12.1	Coal	30	1,577
Sub-total	159.2		102.4	43.4	145.8	26.3	50.9	22.7	2.5	102.4	11.7	20.6	9.9	1.8	43.4			
Negros																		
Amlan Diesel	11.0	1977	4.4	1.2	5.6	1.3	3.1	-	-	4.4	0.4	0.8	-	-	1.2	Diesel	18	311
Palimpinon Geothermal	3.0	1981	8.5	0.8	9.3	2.1	4.3	2.1	-	8.5	0.2	0.4	0.2	-	0.8	Geother.	20	465
Power Barge	32.0	1981	16.7	0.9	17.6	5.0	11.7	-	-	16.7	0.3	0.6	-	-	0.9	Diesel	18	978
Sipalay Diesel	36.0	1983	14.9	5.0	19.9	4.5	10.4	-	-	14.9	1.5	3.5	-	-	5.0	Diesel	18	1,106
Palimpinon Geothermal	112.5	1984	63.5	23.1	86.6	15.9	31.7	15.9	-	63.5	5.8	11.5	5.8	-	23.1	Geother.	20	4,330
Negros Thermal I	55.0	1985	40.1	17.3	57.4	10.0	20.1	10.0	-	40.1	4.3	8.7	4.3	-	17.3	Coal	30	1,913
Bago Hydro	60.0	1987	29.4	24.2	53.6	7.4	7.4	8.8	5.8	29.4	6.1	6.1	7.3	4.7	24.2	Hydro	50	1,072
Negros Thermal II	55.0	1988	40.1	17.3	57.4	10.0	20.1	10.0	-	40.1	4.3	8.7	4.3	-	17.3	Coal	30	1,913
Mambucal Geothermal	112.5	1991	63.5	23.1	86.6	15.9	31.7	15.9	-	63.5	5.8	11.5	5.8	-	23.1	Geother.	20	4,330
Sub-total	477.0		281.1	112.9	394.0	72.1	140.5	62.7	5.8	281.1	28.7	51.8	27.7	4.7	112.9			
Cebu																		
Cebu Diesel I	51.1	1979	17.5	5.5	23.0	5.3	12.2	-	-	17.5	1.7	3.8	-	-	5.5	Diesel	18	1,278
Cebu Thermal I	55.0	1981	42.7	24.7	67.4	10.7	21.3	10.7	-	42.7	6.2	12.3	6.2	-	24.7	Coal	30	2,247
Cebu Diesel II	54.0	1981	22.4	7.5	29.9	6.7	15.7	-	-	22.4	2.3	5.2	-	-	7.5	Diesel	18	1,661
Power Barge	32.0	1981	16.7	0.9	17.6	5.0	11.7	-	-	16.7	0.3	0.6	-	-	0.9	Diesel	18	978
Cebu Thermal II	55.0	1984	35.2	12.1	47.3	8.8	17.6	8.8	-	35.2	3.0	6.1	3.0	-	12.1	Coal	30	1,577
Cebu Thermal III	55.0	1993	40.1	17.3	57.4	10.0	20.1	10.0	-	40.1	4.3	8.7	4.3	-	17.3	Coal	30	1,913
Sub-total	302.1		174.6	68.0	242.6	46.5	98.6	29.5		174.6	17.8	36.7	13.5	-	68.0			
Leyte-Samar																		
Tongonan Geothermal	3.0	1977	8.5	0.8	9.3	2.1	4.3	2.1	-	8.5	0.2	0.4	0.2	-	0.8	Geother.	20	465
Tongonan Geothermal	112.5	1983	63.5	23.1	86.6	15.9	31.7	15.9	-	63.5	5.8	11.5	5.8	-	23.1	Geother.	20	4,330
Catubig Hydro	30.0	1987	16.5	20.0	36.5	4.1	4.1	4.9	3.4	16.5	5.0	5.0	6.0	4.0	20.0	Hydro	50	730
Tongonan Geothermal	112.5	1993	63.5	23.1	86.6	15.9	31.7	15.9	-	63.5	5.8	11.5	5.8	-	23.1	Geother.	20	4,330
Sub-total	258.0		152.0	67.0	219.0	38.0	71.8	38.8	3.4	152.0	16.8	28.4	17.8	4.0	67.0			
Bohol																		
Tagbilaran Diesel	11.0	1977	4.4	1.2	5.6	1.3	3.1	-	-	4.4	0 4	0 8	-	-	1.2	Diesel	18	311
Upper Loboc Hydro	35.0	1988	27.7	20.9	48.6	6.9	6.9	8.3	5.6	27.7	5.2	5.2	6.3	4.2	20.9	Hydro	50	972
Sub-total	46.0		32.1	22.1	54.2	8.2	10.0	8.3	5.6	32.1	5.6	6.0	6.3	4.2	22.1			
Total	1,242.3		742.2	313.4	1,055.6	191.1	371.8	162.0	17.3	742.2	80.0	143.5	75.2	14.7	313.4			

Table A-4-(2) Investment Schedule for Transmission Line Projects

	Length (kV)/(km)	Completion Year	Direct const. cost F.C. (10^6US$)	L.C. (10^6US$)	Total (10^6US$)	Foreign currency 1st yr. (10^6US$)	2nd yr. (10^6US$)	3rd yr. (10^6US$)	4th yr. (10^6US$)	Total (10^6US$)	Local currency 1st yr. (10^6US$)	2nd yr. (10^6US$)	3rd yr. (10^6US$)	4th yr. (10^6US$)	Total (10^6US$)	Type of structure	Economic life (Years)	Depreciation cost (10^3US$)
Panay																		
Dingle - Panitan	138/57	1979	0.9	1.3	2.2	0.3	0.6	-	-	0.9	0.4	0 9	-	-	1.3	Wooden	30	73
Dingle - Potoan	69/11	1980	0.1	0.1	0.2	0	0.1	-	-	0.1	0	0.1	0	0	0.1	"	30	7
Dingle - Sta. Barbara	138/23	1979	0.3	0.5	0.8	0.1	0.2	-	-	0.3	0.2	0.3	-	-	0.5	"	30	27
Sta. Barbar - La Paz	69/15	1979	0.2	0.2	0.4	0 1	0.1	-	-	0.2	0.1	0.1	-	-	0.2	"	30	13
Sta. Barbara - Tigbauan	69/30	1980	0.3	0.4	0.7	0.1	0.2	-	-	0.3	0.1	0.3	-	-	0.4	"	30	23
Dingle - Banate	69/18	1981	0.2	0.2	0.4	0.1	0.1	-	-	0.2	0.1	0.1	-	-	0.2	"	30	13
Banate - Sara	69/40	1982	0.4	0.5	0.9	0.1	0.3	-	-	0.4	0.2	0.3	-	-	0.5	"	30	30
Dingle -Calinog	69/40	1982	0.2	0.3	0.5	0.1	0.1	-	-	0.2	0.1	0.2	-	-	0.3	"	30	17
* Sta. Barbara - Pulupandan	138/49	1985	11.7	0.7	12.4	2.3	5.9	3.5	-	11.7	0.1	0.4	0.2	-	0.7	Steel	50	248
Kalibo - Nabas	69/35	1983	0.4	0.4	0.8	0.1	0.3	-	-	0.4	0.1	0.3	-	-	0.4	Wooden	30	27
Altavas - Culasi	69/45	1983	0.5	0.5	1.0	2.2	0.3	-	-	0.5	0.2	0.3	-	-	0.5	"	30	33
Kalibo - Panitan	138/60	1986	0.9	1.3	2.2	0.3	0.6	-	-	0.9	0.4	0.9	-	-	1.3	"	30	73
Sub-total	/404		16.1	6.4	22.5	3.8	8.8	3.5		16.1	2.0	4.2	0.2		6.4			
Negros																		
Amlan - Dumaguete	69/25	1977	0.3	0.3	0.6	0.1	0.2	-	-	0.3	0.1	0.2	-	-	0.3	Wooden	30	20
Amlan - Bindoy	69/50	1981	0.6	0.6	1.2	0.2	0.4	-	-	0.6	0.2	0.4	-	-	0.6	"	30	40
Palimpinon - Dumaguete	69/16	1981	0.2	0.2	0.4	0.1	0.1	-	-	0.2	0.1	0.1	-	-	0.2	"	30	13
Palimpinon - Amlan	138/21	1983	0.3	0.5	0.8	0.1	0.2	-	-	0.3	0.2	0.3	-	-	0.5	"	30	27
* Amlan - Kabangkalan - Pulu.	138/148	1985	8.1	4.0	12.1	1.6	4.1	2.4	-	8.1	0.8	2.0	1.2	-	4.0	Steel	50	242
Kabangkalan - Sipalay	138/40	1983	0.6	0.9	1.5	0.2	0.4	-	-	0.6	0.3	0.6	-	-	0.9	Wooden	30	50
Kabangkalan-Negros Ther.I	138/30	1983	0.5	0.7	1.2	0.2	0.3	-	-	0.5	0.2	0.5	-	-	0 7	"	30	40
Sipalay - CDCP	69/46	1982	0.5	0.6	1.1	0.2	0.3	-	-	0.5	0.2	0.4	-	-	0.6	"	30	37
Sipalay - MMIC	69/10	1982	0.1	0.1	0.2	0	0.1	-	-	0.1	0	0.1	0	0	0.1	"	30	7
Sipalay - LCMC	69/12	1982	0.1	0.1	0.2	0	0.1	-	-	0.1	0	0.1	0	0	0.1	"	30	7
Pulupandan - Bago	138/39	1987	0.6	0.9	1.5	0.2	0.4	-	-	0.6	0.3	0.6	-	-	0.9	"	30	50
Bago - Negros Thermal I	138/61	1988	0.9	1.3	2.2	0.3	0.6	-	-	0.9	0.4	0.9	-	-	1.3	"	30	73
Pulupandan - Bacolod	69/27	1985	0.3	0.3	0.6	0.1	0.2	-	-	0.3	0.1	0.2	-	-	0.3	"	30	20
Bacolod - San Enrique	69/35	1981	0.4	0.4	0.8	0.1	0.3	-	-	0.4	0.1	0.3	-	-	0.4	"	30	27
CDCP - Bayawan	69/42	1983	0.5	0.5	1.0	0.2	0.3	-	-	0.5	0.2	0.3	-	-	0.5	"	30	33
Tap - Mabinai	69/25	1983	0.3	0.3	0.6	0.1	0.2	-	-	0.3	0.1	0.2	-	-	0.3	"	30	20
Talisay - San Carlos	69/60	1982	0.7	0.7	1.4	0.2	0.5	-	-	0.7	0.2	0.5	-	-	0.7	"	30	47
Mambucal Geo - Bago	138/5	1989	0.1	0.1	0.2	0	0.1	-	-	0.1	0	0.1	-	-	0.1	"	30	7
Sub-total	/692		15.1	12.5	27.6	3.9	8.8	2.4		15.1	3.5	7.8	1.2		12.5			
Cebu																		
Naga - Sigpit	138/18	1978	0.3	0.4	0.7	0.1	0.2			0.3	0.1	0.3			0.4	Wooden	30	23
Naga - Banilad (No. 1)	138/27	1979	0.4	0.6	1.0	0.1	0.3			0.4	0.2	0.4			0.6	"	30	33
Naga - Sibonga - Dumanjug	69/50	1980	0.6	0.6	1.2	0.2	0.4			0.6	0.2	0.4			0.6	"	30	40
Talavera - Sigpit	138/10	1981	0.2	0.2	0.4	0.1	0.1			0.2	0.1	0.1			0.2	"	30	13
Banilad - Mactan	69/6	1978	0.1	0.1	0.2	0	0.1			0.1	0	0.1			0.1	"	30	7
Banilad - Danao	69/27	1978	0.3	0.3	0.6	0.1	0.2			0.3	0.1	0.2			0.3	"	30	20

Note : * Project proposed by JICA.

Table A-4-(3) Investment Schedule for Transmission Line Project

	Length (kV)/(km)	Completion year	Direct const. cost F.C. (10^6US$)	L.C. (10^6US$)	Total (10^6US$)	Foreign currency 1st yr. (10^6US$)	2nd yr. (10^6US$)	3rd yr. (10^6US$)	4th yr. (10^6US$)	Total (10^6US$)	Local currency 1st yr. (10^6US$)	2nd yr. (10^6US$)	3rd yr. (10^6US$)	4th yr. (10^6US$)	Total (10^6US$)	Type of structure	Economic life (Years)	Depreciation cost (10^3US$)
Toledo - Talavera - Asturias	69/25	1981	0.3	0.3	0.6	0.1	0.2			0.3	0.1	0.2			0.3	Wooden	30	20
Naga - Banilad (No. 2)	138/27	1981	0.4	0.6	1.0	0.1	0.3			0.4	0.2	0.4			0.6	"	30	33
Danao - Sogod - Bogo	69/56	1980	0.6	0.7	1.3	0.2	0.4			0.6	0.2	0.5			0.7	"	30	43
Tap - Alegria	69/18	1982	0.2	0.2	0.4	0.1	0.1			0.2	0.1	0.1			0.2	"	30	13
Sibonga - Boljoon	69/47	1980	0.5	0.6	1.1	0.2	0.3			0.5	0.2	0.4			0.6	"	30	37
* Naga - Liloan Point	138/106	1985	4.0	2.3	6.3	0.8	2.0	1.2		4.0	0.5	1.2	0.6		2.3	Steel	50	126
* Liloan Point - Amlan	138/7	1985	3.0	1.8	4.8	0.6	1.5	0.9		3.0	0.4	0.9	0.5		1.8	"	50	96
Asturias - Tuburan	69/20	1983	0.2	0.2	0.4	0.1	0.1			0.2	0.1	0.1			0.2	Wooden	30	13
Sub-total	/444		11.1	8.9	20.0	2.8	6.2	2.1		11.1	2.5	5.3	1.1		8.9			
Leyte - Samar																		
Tongonan - Ormoc	69/20	1977	0.2	0.2	0.4	0.1	0.1			0.2	0.1	0.1			0.2	Wooden	30	13
Tongonan - Tunga	69/46	1981	0.5	0.6	1.1	0.2	0.3			0.5	0.2	0.4			0.6	"	30	37
Tongonan - Isabel	138/36	1981	0.5	0.8	1.3	0.2	0.3			0.5	0.2	0.6			0.8	"	30	43
Power Barge - Isabel	69/10	1981	0.1	0.1	0.2	0	0.1			0.1	0	0.1			0.1	"	30	7
Calbayog - Catarman	69/50	1981	0.6	0.7	1.3	0.2	0.4			0.6	0.2	0.5			0.7	"	30	43
Isabel - Palompon	69/15	1981	0.2	0.2	0.4	0.1	0.1			0.2	0.1	0.1			0.2	"	30	13
Tongonan - Pasar	138/51	1982	0.8	1.1	1.9	0.2	0.6			0.8	0.3	0.8			1.1	"	30	63
Isabel - Pasar	138/15	1982	0.2	0.3	0.5	0.1	0.1			0.2	0.1	0.2			0.3	"	30	17
Ormoc - Baybay	69/45	1982	0.5	0.5	1.0	0.2	0.3			0.5	0.2	0.3			0.5	"	30	33
Tongonan - Naval	69/75	1982	0.8	0.9	1.7	0.2	0.6			0.8	0.3	0.6			0.9	"	30	57
(*) Tongonan - Wright	138/113	1983	1.7	1.0	2.7	0.5	1.2			1.7	0.3	0.7			1.0	"	30	90
Wright - Sta. Rita	69/60	1983	0.7	0.8	1.5	0.2	0.5			0.7	0.2	0.6			0.8	"	30	50
Catanman - Allen	69/35	1983	0.4	0 4	0.8	0.1	0.3			0.4	0.1	0.3			0.4	"	30	27
Taft - Oras	69/30	1983	0.3	0.3	0.6	0.1	0.2			0.3	0.1	0.2			0.3	"	30	20
Borongan - Quinapundan	69/55	1983	0.6	0.7	1.3	0.2	0.4			0.6	0 2	0.5			0.7	"	30	43
Tap - Tabango	69/20	1983	0.2	0.2	0.4	0.1	0.1			0.2	0.1	0.1			0.2	"	30	13
Tap - St. Bernardo	69/40	1984	0.4	0.4	0.8	0.1	0.3			0.4	0.1	0.3			0.4	"	30	27
Catubig - Catarman	69/50	1987	0.6	0.7	1.3	0.2	0.4			0.6	0.2	0.5			0.7	"	30	43
Sub-total	/766		9.3	9.9	19.2	3.0	6.3			9.3	3.0	6.9			9.9			
Bohol																		
Tagbilaran - G. Hernandez	69/51	1978	0.6	0.7	1.3	0.2	0.4			0.6	0.2	0.5			0.7	Wooden	30	43
Tagbilaran - Tubigon	69/40	1978	0.4	0.4	0.8	0.1	0.3			0.4	0.1	0.3			0.4	"	30	27
G. Hernandez - Alicia	69/45	1981	0.5	0.5	1.0	0.2	0.3			0.5	0.2	0.3			0.5	"	30	33
Tubigon - Talibon	69/58	1981	0.7	0.8	1.5	0.2	0.5			0.7	0.2	0.6			0.8	"	30	50
Tap - Carmen	69/25	1983	0.3	0.3	0.6	0.1	0.2			0.3	0.1	0.2			0.3	"	30	20
Upper Loboc - Tagbilaran	69/22	1988	0.2	0.2	0.4	0.1	0.1			0.2	0.1	0.1			0.2	"	30	13
Sub-total	/241		2.7	2.9	5.6	0.9	1.8			2.7	0.9	2.0			2.9			
Total	/2,547		54.3	40.6	94.9	14.4	31.9	8.0	0	54.3	11.9	26.2	2.5	0	40.6			

Note : * Project proposed by JICA. (*) Project financed by OECF.

Table A-4-(4) Investment Schedule for Transmission Projects

	Installed capacity (MVA)	Completion year	Direct const. cost			Foreign currency					Local currency					Economic life (Years)	Depreciation cost (10^3US$)
			F.C. (10^6US$)	L.C. (10^6US$)	Total (10^6US$)	1st yr. (10^6US$)	2nd yr. (10^6US$)	3rd yr. (10^6US$)	4th yr. (10^6US$)	Total (10^6US$)	1st yr. (10^6US$)	2nd yr. (10^6US$)	3rd yr. (10^6US$)	4th yr. (10^6US$)	Total (10^6US$)		
Panay																	
La Paz S.S.	5	1979	0.1	0	0.1	-	0.1	-	-	0.1	-	-	-	-	0	25	4
Panitan S.S.	30	1980	0.6	0.6	1.2	0.2	0.4	-	-	0.6	0.2	0.4	-	-	0.6	25	48
Sta. Barbara S.S.	50	1980	1.1	0.9	2.0	0.3	0.8	-	-	1.1	0.3	0.6	-	-	0.9	25	80
Pototan S.S.	5	1980	0.1	0	0.1	-	0.1	-	-	0.1	-	0	-	-	0	25	4
Panay Diesel		1980	0.3	0.1	0.4	0.3	-	-	-	0.3	0.1	-	-	-	0.1	25	16
Panay Diesel		1982	0.2	0	0.2	0.2	-	-	-	0.2	0	-	-	-	0	25	8
* Sta. Barbara S.S.		1985	0.3	0	0.3	0.3	-	-	-	0.3	0	-	-	-	0	25	12
Panitan S.S.		1986	0.5	0.1	0.6	0.5	-	-	-	0.5	0.1	-	-	-	0.1	25	24
Altavas Switching Sta.		1990	0.6	0.1	0.7	0.6	-	-	-	0.6	0.1	-	-	-	0.1	25	28
Sub-total	90		3.8	1.8	5.6	2.4	1.4	-	-	3.8	0.8	1.0	-	-	1.8	-	224
Negros																	
Dumaguete S.S.	10	1978	0.5	0.2	0.7	0.2	0.3	-	-	0.5	0.1	0.1	-	-	0.2	25	28
Bacolod S.S.	20	1981	0.7	0.1	0.8	0.2	0.5	-	-	0.7	-	0.1	-	-	0.1	25	32
Dumaguete S.S.		1981	0.2	0	0.2	0.1	0.1	-	-	0.2	-	-	-	-	0	25	8
* Amlan S.S.	30	1985	1.7	0.5	2.2	0.5	1.2	-	-	1.7	0.2	0.3	-	-	0.5	25	88
* Kabangkalan S.S.	10	1985	2.8	0.8	3.6	0.8	2.0	-	-	2.8	0.2	0.6	-	-	0.8	25	144
Sipalay S.S.	50	1985	0.8	0.8	1.6	0.2	0.6	-	-	0.8	0.2	0.6	-	-	0.8	25	64
* Pulupandan S.S.	30	1985	1.6	0.4	2.0	0.5	1.1	-	-	1.6	0.1	0.3	-	-	0.4	25	80
Bacolod S.S.	40	1990	1.1	0.9	2.0	0.3	0.8	-	-	1.1	0.3	0.6	-	-	0.9	25	80
Kabangkalan S.S.		1987	0.5	0.1	0.6	0.5	-	-	-	0.5	0.1	-	-	-	0.1	25	24
Pulupandan S.S.		1987	0.5	0.1	0.6	0.5	-	-	-	0.5	0.1	-	-	-	0.1	25	24
Bago Hydro		1988	0.3	0.1	0.4	0.3	-	-	-	0.3	0.1	-	-	-	0.1	25	16
Bago Hydro		1989	0.2	0	0.2	0.2	-	-	-	0.2	-	-	-	-	0	25	8
Sub-total	190		10.9	4.0	14.9	4.3	6.6	-	-	10.9	1.4	2.6	-	-	4.0	-	596
Cebu																	
Banilad S.S.	97.7	1979	1.5	1.3	2.8	0.5	1.0	-	-	1.5	0.4	0.9	-	-	1.3	25	112
Mactan S.S.	10	1979	0.4	0.1	0.5	0.1	0.3	-	-	0.4	0	0.1	-	-	0.1	25	20
Sibonga S.S.	5	1979	0.3	0.1	0.4	0.1	0.2	-	-	0.3	0	0.1	-	-	0.1	25	16
Sigpit Switching Sta.		1979	0.1	0	0.1	-	0.1	-	-	0.1	-	0	-	-	0	25	4
Danao S.S.	5	1980	0.2	0	0.2	0.1	0.1	-	-	0.2	-	0	-	-	0	25	8
Sogod S.S.	5	1980	0.2	0.1	0.3	0.1	0.1	-	-	0.2	-	0.1	-	-	0.1	25	12
Bogo S.S.	5	1980	0.2	0	0.2	0.1	0.1	-	-	0.2	-	0	-	-	0	25	8
Boljoon S.S.	5	1980	0.2	0.1	0.3	0.1	0.1	-	-	0.2	-	0.1	-	-	0.1	25	12
Banilad S.S.		1981	0.2	0	0.2	0.2	-	-	-	0.2	-	-	-	-	0	25	8
Naga Switching Sta.		1982	0.5	0.1	0.6	0.5	-	-	-	0.5	0.1	-	-	-	0.1	25	24
Sigpit Switching Sta.		1983	0.5	0.1	0.6	0.5	-	-	-	0.5	0.1	-	-	-	0.1	25	24

Note : * Project proposed by JICA.

Table A-4-(5) Investment Schedule for Transmission Projects

	Installed capacity (MVA)	Completion year	Direct const. cost F.C. (10^6US$)	L.C. (10^6US$)	Total (10^6US$)	Foreign currency 1st yr. (10^6US$)	2nd yr. (10^6US$)	3rd yr. (10^6US$)	4th yr. (10^6US$)	Total (10^6US$)	Local currency 1st yr. (10^6US$)	2nd yr. (10^6US$)	3rd yr. (10^6US$)	4th yr. (10^6US$)	Total (10^6US$)	Economic life (Years)	Depreciation cost (10^3US$)
Talavera S.S.	30	1981	1.4	0.2	1.6	0.4	1.0	-	-	1.4	0.1	0.1	-	-	0.2	25	64
Toledo S.S.	5	1981	0.2	0	0.2	0.1	0.1	-	-	0.2	-	-	-	-	0	25	8
Naga Switching Sta.		1982	0.3	0.1	0.4	0.3	-	-	-	0.3	0.1	-	-	-	0.1	25	16
Sigpit Switching Sta.		1983	0.2	0.1	0.3	0.2	-	-	-	0.2	0.1	-	-	-	0.1	25	12
Banilad S.S.		1983	0.2	0	0.2	0.2	-	-	-	0.2	0	-	-	-	0	25	8
Naga Switching Sta.		1983	1.4	0.1	1.5	1.4	-	-	-	1.4	0.1	-	-	-	0.1	25	60
* Naga Switching Sta.		1985	0.5	0	0.5	0.5	-	-	-	0.5	0	-	-	-	0	25	20
Sub-total	167.7		8.5	2.4	10.9	5.4	3.1	-	-	8.5	1.0	1.4	-	-	2.4	-	436
Leyte - Samar																	
Isabel S.S.	40	1981	1.5	0.7	2.2	0.5	1.0	-	-	1.5	0.2	0.5	-	-	0.7	25	88
Wright S.S.	30	1983	1.2	0.5	1.7	0.4	0.8	-	-	1.2	0.2	0.3	-	-	0.5	25	68
Tongonan S.S.	50	1983	1.4	0.9	2.3	0.4	1.0	-	-	1.4	0.3	0.6	-	-	0.9	25	92
Catarman S.S.		1987	0.6	0.1	0.7	0.6	-	-	-	0.6	0.1	-	-	-	0.1	25	28
Sub-total	120		4.7	2.2	6.9	1.9	2.8	-	-	4.7	0.8	1.4	-	-	2.2	-	276
Bohol																	
G. Hernandez S.S.	5	1978	0.3	0.1	0.4	0.1	0.2	-	-	0.3	-	0.1	-	-	0.1	25	16
Total	572.7		28.2	10.5	38.7	14.1	14.1			28.2	4.0	6.5			10.5	-	1,548

Note : * Project proposed by JICA

A-5 DATA AND INFORMATION COLLECTED

A-5 LIST of DATA and INFORMATION COLLECTED

No.	Data and Information Collected		Remarks
1	Long-term Philippine Development Plan up to the year 2000 (Sep., 1977)	1 book	
2	Summary of the Five-year Philippine Development Plan, 1978 - 1982 (including the Ten-year Development Plan)	2 "	
3	Eastern Visayas (Region VI, VII and VIII) Five-year Development Plan, 1978 - 1982 (Sep., 1977)	3 books	
4	1974 Philippine Statistical Yearbook	1 book	
5	Regional Development Investment Program for Central Visayas (Region VII) (Sep., 1977)	1 "	
6	1975 Regional Economic Atlas of the Central Visayas	1 "	
7	Statistical Appendix to the Thirtieth Annual Report, 1978	1 "	
8	Philippine Economic Indicators	1 "	
9	The Tongonan Geothermal Field, Leyte, Philippines (Report on Exploration and Development)	1 "	
10	Climatic Temperature in the Visayas	1 "	submitted by NAPOCOR
11	Precipitation, Wind Velocity and Humidity in the Visayas	1 "	" "
12	Data on Typhoon	1 "	" "
13	Climatology and Wind Related Problems in the Philippines	1 "	
14	Tide and Current Tables, Philippins (1980)	1 "	
15	Name of Vessel passing Strait	1 "	

No.	Data and Information Collected		Remarks
16	Channels in the Philippines (Vol.2)	1 book	
17	Sea Map	1 "	
18	Geographical Maps (Panay, Negros and Cebu islands)	1 set	
19	Geographical Map of the Visayas	1	
20	Project Report of San Juanico Strait Bridge	1 set	
21	Power Development Program in the Visayas prepared by NAPOCOR	1 "	submitted by NAPOCOR
22	Data on Electric Cooperatives in the Visayas	1 "	
23	Report on the Power System Studies for the Visayas (Japan Consulting Institute, Aug., 1978)	1 book	
24	Battan Thermal Power Plant (NAPOCOR)	1 "	submitted by NAPOCOR
25	Data on Power Demand Forecast in the Visayas	1 "	" "
26	Data on Construction Cost of Transmission Line	1 "	" "
27	Data on Economic Evaluation for Power Facilities	1 "	" "
28	General Information on NAPOCOR	1 "	" "
29	Drawings of Arrangements of Equipment, Single Line Diagram and Principal Features	1 "	
30	Data collected from Electric Cooperatives	1 "	
31	Topographical Maps (Scale: 1 to 50,000, 1 to 250,000 and 1 to 100,000)	1 set	

JICA