

Appendix B-3 Planting & Harvesting Plan of I.T.P. for Red Chips (Bagras)

V: 1,000 m<sup>3</sup>

Planted		Damaged by Akang HA	Harvested up to 1983 HA	Balance HA	1980			1981			1982			1983			1984			Sub-total			1985			1986			1987			1988			1989			1990			1991		
In	HA				HA	HA	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V				
1971																																											
72	385.53	325.00	54.81	5.72																																							
73	428.64	344.00	66.41	18.23																																							
74	302.00	302.00	-	-																																							
75	466.93	461.00	-	5.93																																							
76	162.51	55.00	-	107.51																																							
77	1,503.30	36.36	-	1,466.94																																							
78	2,565.78	1,211.00	-	1,354.78																																							
79	1,446.12	603.00	-	843.12																																							
80	1,106.99	1,027.00	-	79.99																																							
81	929.62	635.00	-	294.62																																							
82	102.00	-	-	102.00																																							
83	1,228.00	-	-	1,228.00																																							
84	2,032.00	-	-	2,032.00																																							
85	3,366.00	-	-	3,366.00																																							
86	3,380.00	-	-	3,380.00																																							
87	3,380.00	-	-	3,380.00																																							
88	3,380.00	-	-	3,380.00																																							
89																																											
90																																											
Total	26,165.42	4,999.36	121.22	21,044.84	-	-	121	83	10	616	20	12	1,054	19	20	34	19	1	1,825	24	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Thinning																																											
From mixed																																											
Grand total							121	83	10	616	20	12	1,054	19	20	34	19	1	1,825	24	43	-	-	164	61	10	175	40	7	1,545	39	61	1,726	32	56	1,343	46	62	371	111			























1983		1984		Sub-total		1985		1986		1987		1988		1989		1990		1991		1992		1993		1994		Sub-total							
V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V	HA	(Age) m <sup>3</sup> /ha	V			
															500	(4) 60	30																
																1,000	(4) 60	60															
																	1,500	(4) 60	90														
																					2,025	(4) 60	122										
																						2,025	(4) 60	122									
																							2,025	(4) 60	122								
																500	60	30															
																1,000	60	60															
																	1,500	60	90														
																						2,025	60	122									
																							2,525	60	152								
																							3,025	60	182								
																							10,575	60	636								



## Appendix B-9 天然林(択伐・皆伐合計)原木仕上り実績

	1981	1982	1983	1984 1月～5月	1984(1~5) 米ドル換算
扱 数 量 (m <sup>3</sup> )	855,158	797,430	1,028,140	339,273	339,273
作 業 費	P/m <sup>3</sup>	P/m <sup>3</sup>	P/m <sup>3</sup>	P/m <sup>3</sup>	US\$/m <sup>3</sup>
伐倒・柵切費	5.30	2.93	3.44	4.83	0.35
集材費	59.23	39.30	34.98	45.80	3.27
積込・陸送費	105.79	78.79	64.92	66.18	4.73
小 計	170.32	121.02	103.34	116.81	8.35
そ の 他 経 費					
林道費	40.19	22.74	19.56	17.97	1.28
管理費	75.34	34.88	29.34	57.01	4.07
補植費	—	—	0.80	1.76	0.13
木代金	15.95	13.13	1.53	—	—
小 計	131.48	70.75	51.23	76.74	5.48
総 計	301.80	191.77	154.57	193.55	13.83

1984年5月為替レート 1US\$ = 14 Peso

## Appendix B-10 天然林(択伐)原木仕上り実績

	1981	1982	1983	1984 1月～5月	1984(1~5) 米ドル換算
扱 数 量 (m <sup>3</sup> )	528,279	340,006	421,219	139,242	139,242
作 業 費	P/m <sup>3</sup>	P/m <sup>3</sup>	P/m <sup>3</sup>	P/m <sup>3</sup>	US\$/m <sup>3</sup>
伐倒・柵切費	4.77	2.69	3.14	4.42	0.32
集材費	57.83	42.07	32.06	41.81	2.99
積込・陸送費	138.00	119.46	92.89	87.30	6.24
小 計	200.60	164.22	128.09	133.53	9.55
そ の 他 経 費					
林道費	32.15	30.20	31.28	26.88	1.92
管理費	75.19	34.22	29.09	56.54	4.04
補植費	—	—	1.81	4.31	0.31
木代金	15.66	14.39	1.79	—	—
小 計	123.00	78.81	63.97	87.73	6.27
総 計	323.60	243.03	192.06	221.26	15.82

1984年5月為替レート 1US\$ = 14 Peso

## Appendix B-11 天然林(皆伐)原木仕上り実績

	1981	1982	1983	1984 1月～5月	1984(1~5) 米ドル換算
扱 数 量 (m <sup>3</sup> )	326,881	457,424	607,421	200,031	200,031
作 業 費	P/m <sup>3</sup>	P/m <sup>3</sup>	P/m <sup>3</sup>	P/m <sup>3</sup>	US\$/m <sup>3</sup>
伐倒・柵切費	6.16	3.11	3.65	5.08	0.36
集材費	61.49	37.25	37.01	45.44	3.25
積込・陸送費	53.74	48.57	45.51	52.24	3.73
小 計	121.39	88.93	86.17	102.76	7.34
そ の 他 経 費					
林 道 費	53.18	17.20	11.43	11.77	0.84
管 理 費	75.80	31.85	29.50	58.88	4.21
補 植 費	—	—	0.10	—	—
木 代 金	15.68	12.20	1.35	—	—
小 計	144.66	61.25	42.38	70.65	5.05
総 計	266.05	150.18	128.55	173.41	12.39

1984年5月為替レート 1US\$ = 14Peso

## Appendix B-12 企業造林(人工林)原木仕上り実績

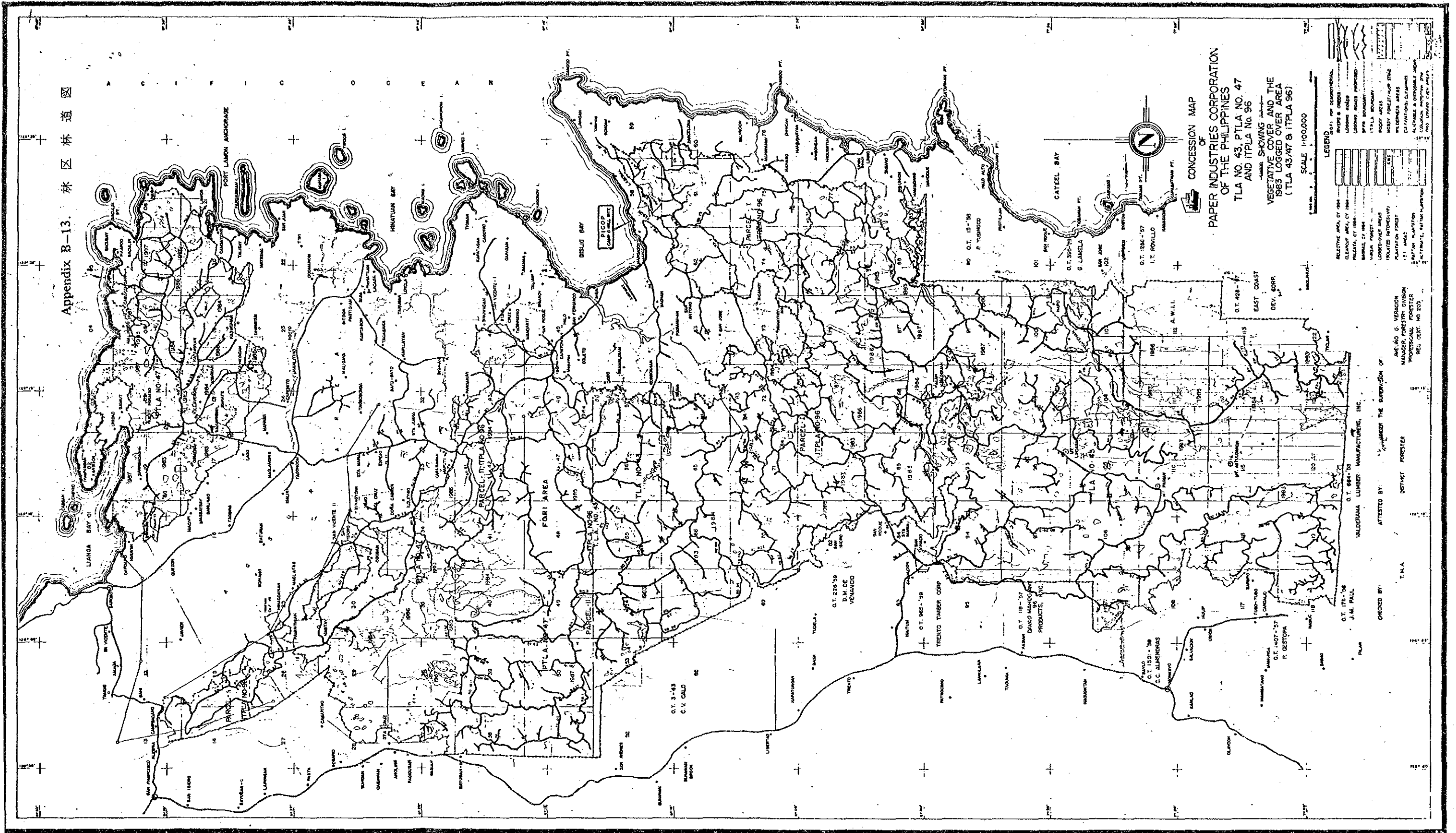
	1981	1982	1983	1984 1月～5月	1984(1~5) 米ドル換算
扱 数 量 (m <sup>3</sup> )	65,113	292,091	232,408	65,238	65,238
作 業 費	P/m <sup>3</sup>	P/m <sup>3</sup>	P/m <sup>3</sup>	P/m <sup>3</sup>	US\$/m <sup>3</sup>
伐倒・集材費	43.24	43.93	40.38	65.30	4.66
積込・陸送費	50.76	35.59	44.50	68.61	4.90
小 計	94.00	79.52	84.88	133.91	9.56
そ の 他 経 費					
林 道 費	15.57	15.64	4.19	16.38	1.17
管 理 費	75.41	39.02	33.42	53.58	3.83
木 代 金	—	13.12	15.11	26.19	1.87
小 計	90.98	67.78	52.72	96.15	6.87
総 計	184.98	147.30	137.60	230.06	16.43

1984年5月為替レート 1US\$ = 14Peso





Appendix B-13. 林区林造图



Appendix B-14 Estimated Logging Cost of Natural Forest (1984)

1US\$=18Peso=240Yen

No.	Item	Volume m <sup>3</sup> /y	Condition	Working days/year		Crew		Productivity		No. of machines & workers		Depreciation/machine			Maint. rep. .. etc. /machine		Fuel & lub.				Total		Wages		Grand total	G.T./ \$/m	
				Shift /D	days/year	No. of machines	No. of workers	m <sup>3</sup> /d	m <sup>3</sup> /y	Machines	Workers/d	Delivered price	Useful life	Dep. cost	\$/y	Cost	HP	Consumption	Unit price	Cost	Per machine per year	Total cost	Ave./man	Total cost			
		(1)			days							US\$1,000	Years	US\$1,000/y		US\$1,000/y		\$/Day	US\$/%	US\$1,000/y	US\$1,000	US\$1,000/y	US\$/d	US\$1,000/y	US\$1,000/y		
1	Felling by C.S.	324,000		1	300	1	2	55.0	16,500	19.64	39.27	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	2.2	3.37	66.2	3.3	38.9	105.1	0.3	
2	Felling by C.S.	538,000		1	300	1	2	50.0	15,000	35.87	71.73	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	2.2	3.37	120.9	3.3	71.0	191.9	0.3	
3	Tractor Skidding	269,000	Max. Distance 250 m *1	1	* 240	1	2	65.0	13,000	20.69	41.38	80.0	5.0	16.00	0.30	24.0	140.0	80.0	0.3	5.3	45.30	937.2	3.3	32.8	970.0	3.6	
4	Yarding & Stacking	324,000	250 m	1	* 220	1	8	65.0	14,300	22.66	181.26	130.0	8.0	16.25	0.12	15.6	500.0	90.0	0.3	5.9	37.75	855.4	3.3	143.6	999.0	3.0	
5	Yarding & Stacking	269,000	250 m	1	* 220	1	8	60.0	13,200	20.38	163.03	80.0	6.0	13.33	0.15	12.0	300.0	70.0	0.3	4.6	29.93	610.0	3.3	129.1	739.1	2.7	
6	Buck. by C.S.	269,000		1	270	1	2	65.0	17,550	15.33	30.66	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	1.9	3.07	47.1	3.3	27.3	74.4	0.2	
7	Buck. by C.S.	269,000		1	270	1	2	60.0	16,200	16.60	33.21	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	1.9	3.07	51.0	3.3	29.6	80.6	0.3	
8	Stack. by crane	269,000		1	270	1	2	200.0	54,000	4.98	9.96	80.0	6.0	13.33	0.15	12.0	100.0	30.0	0.3	2.4	27.73	138.1	3.3	8.9	147.0	0.5	
9	Loading by crane	324,000		1	300	1	4	1,100.0	330,000	0.98	3.93	140.0	3.0	46.67	0.35	49.0	175.0	140.0	0.3	12.6	108.27	106.1	3.3	3.9	110.0	0.3	
10	Loading by crane	538,000		2	300	1	4	550.0	165,000	3.26	13.04	80.0	3.0	26.67	0.35	28.0	100.0	80.0	0.3	7.2	61.87	201.7	3.3	12.9	214.6	0.4	
11	Hauling by truck	324,000	Average Distance 46 Km	2	300	1	4	96.0	28,800	11.25	45.00	80.0	2.3	34.78	0.75	60.0	335.0	265.0	0.3	23.9	118.68	1,335.2	3.3	44.6	1,379.8	4.2	
12	Hauling by truck	538,000	42 Km	2	300	1	4	90.0	27,000	19.93	79.70	80.0	2.5	32.00	0.65	52.0	335.0	230.0	0.3	20.7	104.70	2,086.7	3.3	78.9	2,165.6	4.0	
13	(Road cost)																										
14	(Overhead)																										
	Grand total	(2) 862,000									712.17											6,555.6		621.51	7,177.1		

\*1 include spur road construction

1US\$=18Peso=240Yen

Days/year	Crew		Productivity		No. of machines & workers		Depreciation/machine			Maint. rep. ... etc. /machine		Fuel & lub.				Total		Wages		Grand total	G.T./ (1) \$/m <sup>3</sup>	G.T./ (2) \$/m <sup>3</sup>	Remarks
	No. of machines	No. of workers	m <sup>3</sup> /d	m <sup>3</sup> /y	Machines	Workers/d	Delivered price	Useful life	Dep. cost	%/y	Cost	HP	Consumption	Unit price	Cost	Per machine per year	Total cost	Ave./man	Total cost				
days							US\$1,000	Years	US\$1,000/y		US\$1,000/y		ℓ/Day	US\$/ℓ	US\$1,000/y	US\$1,000	US\$1,000/y	US\$/d	US\$1,000/y	US\$1,000/y			
300	1	2	55.0	16,500	19.64	39.27	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	2.2	3.37	66.2	3.3	38.9	105.1	0.32	0.12	
300	1	2	50.0	15,000	35.87	71.73	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	2.2	3.37	120.9	3.3	71.0	191.9	0.36	0.22	
240	1	2	65.0	13,000	20.69	41.38	80.0	5.0	16.00	0.30	24.0	140.0	80.0	0.3	5.3	45.30	937.2	3.3	32.8	970.0	3.61	1.13	* Net yarding days/y.
240	1	8	65.0	14,300	22.66	181.26	130.0	8.0	16.25	0.12	15.6	500.0	90.0	0.3	5.9	37.75	855.4	3.3	143.6	999.0	3.08	1.16	The no. of days for calculation of fuel consumption is 220 days.
220	1	8	60.0	13,200	20.38	163.03	80.0	6.0	13.33	0.15	12.0	300.0	70.0	0.3	4.6	29.93	610.0	3.3	129.1	739.1	2.75	0.86	
270	1	2	65.0	17,550	15.33	30.66	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	1.9	3.07	47.1	3.3	27.3	74.4	0.28	0.09	
270	1	2	60.0	16,200	16.60	33.21	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	1.9	3.07	51.0	3.3	29.6	80.6	0.30	0.09	Sub total \$/m <sup>3</sup> PICOP Jan-May 3.67 3.62
270	1	2	200.0	54,000	4.98	9.96	80.0	6.0	13.33	0.15	12.0	100.0	30.0	0.3	2.4	27.73	138.1	3.3	8.9	147.0	0.55	0.17	
300	1	4	1,100.0	330,000	0.98	3.93	140.0	3.0	46.67	0.35	49.0	175.0	140.0	0.3	12.6	108.27	106.1	3.3	3.9	110.0	0.34	0.13	
300	1	4	550.0	165,000	3.26	13.04	80.0	3.0	26.67	0.35	28.0	100.0	80.0	0.3	7.2	61.87	201.7	3.3	12.9	214.6	0.40	0.25	
300	1	4	96.0	28,800	11.25	45.00	80.0	2.3	34.78	0.75	60.0	335.0	265.0	0.3	23.9	118.68	1,335.2	3.3	44.6	1,379.8	4.26	1.60	
300	1	4	90.0	27,000	19.93	79.70	80.0	2.5	32.00	0.65	52.0	335.0	230.0	0.3	20.7	104.70	2,086.7	3.3	78.9	2,165.6	4.03	2.51	Sub total \$/m <sup>3</sup> PICOP Jan-May 4.66 4.73
																						(1.28)	
																						(4.07)	
						712.17											6,555.6		621.51	7,177.1		8.33	Total 8.33 8.35 Exclusive of ( )

Appendix B-15 Estimated Logging Cost of Industrial Tree Plantation (1984)

1US\$=18Peso=240Yen

No.	Item	Volume m <sup>3</sup> /y	Condition	Working days/year		Crew		Productivity		No. of machines & workers		Depreciation/machine			Maint. rep. .. etc. /machine		Fuel & lub				Total		Wages		Grand total
				Shift /D	days/year	No. of machines	No. of workers	m <sup>3</sup> /d	m <sup>3</sup> /y	Machines	Workers/d	Delivered price	Useful life	Dep. cost	%/y	Cost	HP	Consumption	Unit price	Cost	Per machine per year	Total cost	Ave./man	Total cost	
		(1)										US\$1,000	Years	US\$1,000/y		US\$1,000/y		ℓ/Day	US\$/ℓ	US\$1,000/y	US\$1,000	US\$1,000/y	US\$/d	US\$1,000/y	US\$1,000/y
1	Felling by C.S.	95,000	include Debarking	1	300	1	6	25.0	7,500	12.67	76.00	0.8	1.5	0.5	0.50	0.4	5	6.0	0.6	1.10	2.00	25.34	3.0	68.4	93.74
2	Fell. & Buck. by man	64,000	include Debarking	1	300		4	5.5	1,650	0.00	155.15											2.9	134.9	134.98	
3	Tractor skidding	19,000	Max. distance 250 m *1	1	* 240	1	2	25.0	5,000	3.80	7.60	30.0	4.0	7.5	0.30	9.0	63	40.0	0.3	2.60	19.10	72.58	3.3	6.0	78.60
4	Yarding & Stacking	76,000	600 m	1	* 240	1	6	30.0	5,700	13.33	80.00	25.0	5.0	5.0	0.20	5.0	67	30.0	0.3	2.00	12.00	159.96	3.3	63.3	223.32
5	Cow Skidding	64,000	include pre-yarding		* 240	cow (2)	2	4.0	960	133.33	133.33											6.0	192.0	192.00	
6	Buck. at land. by C.S.	95,000		1	270	1	2	70.0	18,900	5.03	10.05	0.8	1.5	0.5	0.50	0.4	5	7.0	0.6	1.10	2.00	10.06	3.3	8.9	19.01
7	Stacking by crane	19,000		1	270	1	2	100.0	27,000	0.70	1.41	48.0	6.0	8.0	0.15	7.2	61	15.0	0.3	1.20	16.40	11.48	3.3	1.2	12.74
8	Stacking by man	64,000	No platform for loading	1	270		2	15.0	4,050	0.00	31.60											2.9	24.7	24.74	
9	Loading by crane	95,000	with grapple	2	300	1	4	360.0	108,000	0.88	3.52	48.0	2.5	19.2	0.40	19.2	61	55.0	0.3	4.95	43.35	38.15	3.3	3.4	41.63
10	Loading by crane	64,000	with grapple	2	300	1	4	300.0	90,000	0.71	2.84	48.0	3.0	16.0	0.35	16.8	61	50.0	0.3	4.50	37.30	26.48	3.3	2.8	29.29
11	Hauling by truck	95,000	Average Distance 30 Km	2	300	1	4	96.0	28,800	3.30	13.19	80.0	2.5	32.0	0.60	48.0	335	180.0	0.3	16.20	96.20	317.46	3.3	13.0	330.52
12	Hauling by truck	64,000	Average Distance 30 Km	2	300	1	4	28.0	8,400	7.62	30.48	23.0	2.3	10.0	0.70	16.1	130	100.0	0.3	9.00	35.10	267.46	3.3	30.1	297.64
13	(Road cost)																								
14	(Overhead)																								
	Grand total	(2) 159,000									545.17											928.97		549.24	1,478.21

\*1 include spur road construction

of Industrial Tree Plantation (1984)

1US\$=18Peso=240Yen

Shift D	Working days/year	Crew		Productivity		No. of machines & workers		Depreciation/machine			Maint. rep. .. etc. /machine		Fuel & lub				Total		Wages		Grand total	G.T./ (1) \$/m <sup>3</sup>	G.T./ (2) \$/m <sup>3</sup>	Remarks
		No. of machines	No. of workers	m <sup>3</sup> /d	m <sup>3</sup> /y	Machines	Workers/d	Delivered price	Useful life	Dep. cost	%/Y	Cost	HP	Consumption	Unit price	Cost	Per machine per year	Total cost	Ave./man	Total cost				
								US\$1,000	Years	US\$1,000/y		US\$1,000/y		ℓ/Day	US\$/ℓ	US\$1,000/y	US\$1,000	US\$1,000/y	US\$/d	US\$1,000/y				
1	300	1	6	25.0	7,500	12.67	76.00	0.8	1.5	0.5	0.50	0.4	5	6.0	0.6	1.10	2.00	25.34	3.0	68.4	93.74	0.987	0.59	
1	300		4	5.5	1,650	0.00	155.15												2.9	134.9	134.98	2.109	0.85	
1	* 240 200	1	2	25.0	5,000	3.80	7.60	30.0	4.0	7.5	0.30	9.0	63	40.0	0.3	2.60	19.10	72.58	3.3	6.0	78.60	4.137	0.49	* Net yarding days/y. The no. of days for calculation of fuel consumption is 220 days.
1	* 240 190	1	6	30.0	5,700	13.33	80.00	25.0	5.0	5.0	0.20	5.0	67	30.0	0.3	2.00	12.00	159.96	3.3	63.3	223.32	2.938	1.40	
1	* 240	cow (2)	2	4.0	960	133.33	133.33												6.0	192.0	192.00	3.000	1.21	
1	270	1	2	70.0	18,900	5.03	10.05	0.8	1.5	0.5	0.50	0.4	5	7.0	0.6	1.10	2.00	10.06	3.3	8.9	19.01	0.200	0.12	
1	270	1	2	100.0	27,000	0.70	1.41	48.0	6.0	8.0	0.15	7.2	61	15.0	0.3	1.20	16.40	11.48	3.3	1.2	12.74	0.671	0.08	
1	270		2	15.0	4,050	0.00	31.60												2.9	24.7	24.74	0.387	0.16	
2	300	1	4	360.0	108,000	0.88	3.52	48.0	2.5	19.2	0.40	19.2	61	55.0	0.3	4.95	43.35	38.15	3.3	3.4	41.63	0.438	0.26	
2	300	1	4	300.0	90,000	0.71	2.84	48.0	3.0	16.0	0.35	16.8	61	50.0	0.3	4.50	37.30	26.48	3.3	2.8	29.29	0.458	0.18	
2	300	1	4	96.0	28,800	3.30	13.19	80.0	2.5	32.0	0.60	48.0	335	180.0	0.3	16.20	96.20	317.46	3.3	13.0	330.52	3.479	2.08	
2	300	1	4	28.0	8,400	7.62	30.48	23.0	2.3	10.0	0.70	16.1	130	100.0	0.3	9.00	35.10	267.46	3.3	30.1	297.64	4.651	1.87	Sub total \$/m <sup>3</sup> 4.63 PICOP Jan-May 4.90
																							(1.17)	
																							(3.83)	
							545.17											928.97		549.24	1,478.21		9.29	Total 9.29 Exclusive of ( ) 9.56

\*1 include spur road construction



Appendix B-16 植林費による木代金試算 (Falcata)

植付本数 1,110本/ha, 伐期満8年, 無間伐

主伐収穫 242m<sup>3</sup>ub/ha, 萌芽更新 2回, 萌芽率 100%

年次	地抜・ 除伐	苗木	植付・ 補植	下刈・ 管理費	資材費	奨励金	合計	収穫量	前価係数 年10%	費用前価	収穫 前価
1	610	280	615		330	410	2,245		0.9091	2,041	
2		30	90	1,970	290	1,575	3,955		0.8264	3,268	
3				340			340		0.7513	255	
4				340			340		0.6830	232	
5				340			340		0.6209	211	
6				340			340		0.5645	192	
7				340			340		0.5132	174	
8				340			340		0.4665	159	
(9)	520	30	260		330	410	1,550	242	0.4241	657	103
10				1,970	290	1,570	3,830		0.3855	1,476	
11				340			340		0.3505	119	
12				340			340		0.3186	108	
13				340			340		0.2897	98	
14				340			340		0.2633	90	
15				340			340		0.2394	81	
16				340			340		0.2176	74	
(17)	520	30	260		330	410	1,550	242	0.1978	307	48
18				1,970	290	1,570	3,830		0.1799	689	
19				340			340		0.1635	56	
20				340			340		0.1486	51	
21				340			340		0.1351	46	
22				340			340		0.1228	42	
23				340			340		0.1117	38	
24				340			340		0.1015	35	
(25)								242	0.0923		22
	1,650	370	1,225	12,030	1,860	5,945	23,080	726		10,499	173

$$\text{木代金} = \frac{10499\text{P}}{173\text{m}^3} = 60.69\text{P}/\text{m}^3 \dots \div 18\text{P}/\$ = 3.37\$/\text{m}^3$$

Appendix B-17 植林費による木代金試算 (Bagras)

植付本数 1,110本/ha, 伐期満8年, 無間伐

主伐収穫 150m<sup>3</sup>ub/ha, 萌芽更新 2回, 萌芽率 50%

年次	地拔・ 除伐	苗木	植付・ 補植	下刈・ 管理費	資材費	奨励金	合計	収穫量	前価係数 年10%	費用前価	収穫 前価
1	610	350	720		330	440	2,450		0.9091	2,227	
2		35	100	2,410	80	920	3,545		0.8264	2,930	
3				340			340		0.7513	255	
4				340			340		0.6830	232	
5				340			340		0.6209	211	
6				340			340		0.5645	192	
7				340			340		0.5132	174	
8				340			340		0.4665	159	
(9)	520	210	430		330	440	1,930	150	0.4241	819	64
10				2,410	80	920	3,410		0.3855	1,315	
11				340			340		0.3505	119	
12				340			340		0.3186	108	
13				340			340		0.2897	98	
14				340			340		0.2633	90	
15				340			340		0.2394	81	
16				340			340		0.2176	74	
(17)	520	210	430		330	440	1,930	150	0.1978	382	30
18				2,410	80	920	3,410		0.1799	613	
19				340			340		0.1635	56	
20				340			340		0.1486	51	
21				340			340		0.1351	46	
22				340			340		0.1228	42	
23				340			340		0.1117	38	
24				340			340		0.1015	35	
(25)								150	0.0923		14
	1,650	805	1,680	13,350	1,230	4,080	22,795	450		10,347	108

$$\text{木代金} = \frac{10347 \text{ P}}{108 \text{ m}^3} = 95.81 \text{ P/m}^3 \dots \div 18 \text{ P/\$} = 5.32 \text{ \$/m}^3$$





Appendix B-18 Estimated Logging Cost of Natural Forest (1992)

1US\$=18Peso=240Yen

No.	Item	Volume m <sup>3</sup> /y	Condition	Working days/year		Crew		Productivity		No. of machines & workers		Depreciation/machine			Maint. rep. .. etc. /machine		Fuel & lub				Total		Wages		Grand total
				Shift /D	days/year	No. of machines	No. of workers	m <sup>3</sup> /d	m <sup>3</sup> /y	Machines	Workers/d	Delivered price	Useful life	Dep. cost	%/y	Cost	HP	Consump- tion	Unit price	Cost	Per machine per year	Total cost	Ave./man	Total cost	
		(1)			days							US\$1,000	Years	US\$1,000/y		US\$1,000/Y		l/day	US\$/l	US\$1,000/a	US\$1,000	US\$1,000/y	US\$/d	US\$1,000/y	US\$1,000
1	Felling by C.S.	207,000		1	300	1	2	50.0	15,000	13.80	27.60	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	2.2	3.37	46.5	3.3	27.3	73.8
2	Felling by C.S.	50,000		1	300	1	2	45.0	13,500	3.70	7.41	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	2.2	3.37	12.5	3.3	7.3	19.8
3	Yarding & Stacking	207,000	Max. Distance 250 m	1	* 240 220	1	8	58.0	12,760	16.22	129.78	130.0	8.0	16.25	0.12	15.6	500.0	90.0	0.3	5.9	37.75	612.3	3.3	102.8	715.1
4	Yarding & Stacking	50,000	250 m	1	* 220	1	8	50.0	11,000	4.55	36.36	80.0	6.0	13.33	0.15	12.0	300.0	70.0	0.3	4.6	29.93	136.2	3.3	28.8	165.0
5	Buck. by C.S.	50,000		1	270	1	2	50.0	13,500	3.70	7.41	1.0	1.5	0.67	0.50	0.5	10.0	11.0	0.6	1.8	2.97	11.0	3.3	6.6	17.6
6	Loading by crane	207,000		1	300	1	4	960.0	286,000	0.72	2.88	140.0	3.0	46.67	0.35	49.0	175.0	140.0	0.3	12.6	108.27	78.0	3.3	2.9	80.9
7	Loading by crane	50,000		2	300	1	4	460.0	138,000	0.36	1.45	80.0	3.0	26.67	0.35	28.0	160.0	80.0	0.3	7.2	61.87	22.3	3.3	1.4	23.7
8	Hauling by truck	207,000	Average Distance 42 Km	2	300	1	4	100.0	30,000	6.90	27.60	80.0	2.3	34.78	0.75	60.0	335.0	260.0	0.3	23.4	118.18	815.4	3.3	27.3	842.7
9	Hauling by truck	50,000	42 Km	2	300	1	4	82.0	24,600	2.03	8.13	80.0	2.5	32.00	0.65	52.0	335.0	225.0	0.3	20.3	104.30	211.7	3.3	8.0	219.7
10	(Road cost)																								
11	(Overhead)																								
	Grand total	(2) 257,000									248.62											1,945.9		212.4	2,158.3

Natural Forest (1992)

1US\$=18Peso=240Yen

Working days/year	Crew		Productivity		No. of machines & workers		Depreciation/machine			Maint. rep. . . etc. /machine		Fuel & lub				Total		Wages		Grand total	G.T./ (1) \$/m <sup>3</sup>	G.T./ (2) \$/m <sup>3</sup>	Remarks	
	days/year	No. of machines	No. of workers	m <sup>3</sup> /d	m <sup>3</sup> /y	Machines	Workers/d	Delivered price	Useful life	Dep. cost	%/y	Cost	HP	Consumption	Unit price	Cost	Per machine per year	Total cost	Ave./man					Total cost
days							US\$1,000	Years	US\$1,000/y		US\$1,000/Y		ℓ/Day	US\$/ℓ	US\$1,000/a	US\$1,000	US\$1,000/y	US\$/d	US\$1,000/y	US\$1,000/y				
300	1	2	50.0	15,000	13.80	27.60	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	2.2	3.37	46.5	3.3	27.3	73.8	0.36	0.29		
300	1	2	45.0	13,500	3.70	7.41	1.0	1.5	0.67	0.50	0.5	10.0	12.0	0.6	2.2	3.37	12.5	3.3	7.3	19.8	0.40	0.08		
* 240 220	1	8	58.0	12,760	16.22	129.78	130.0	8.0	16.25	0.12	15.6	500.0	90.0	0.3	5.9	37.75	612.3	3.3	102.8	715.1	3.45	2.78	The No. of days for calculation of fuel consumption is 220 days Sub total \$3.86/m <sup>3</sup>	
* 240 220	1	8	50.0	11,000	4.55	36.36	80.0	6.0	13.33	0.15	12.0	300.0	70.0	0.3	4.6	29.93	136.2	3.3	28.8	165.0	3.30	0.64		
270	1	2	50.0	13,500	3.70	7.41	1.0	1.5	0.67	0.50	0.5	10.0	11.0	0.6	1.8	2.97	11.0	3.3	6.6	17.6	0.35	0.07		
300	1	4	960.0	288,000	0.72	2.88	140.0	3.0	46.67	0.35	49.0	175.0	140.0	0.3	12.6	108.27	78.0	3.3	2.9	80.9	0.39	0.31		
300	1	4	460.0	138,000	0.36	1.45	80.0	3.0	26.67	0.35	28.0	100.0	80.0	0.3	7.2	61.87	22.3	3.3	1.4	23.7	0.47	0.09		
300	1	4	100.0	30,000	6.90	27.60	80.0	2.3	34.78	0.75	60.0	335.0	260.0	0.3	23.4	118.18	815.4	3.3	27.3	842.7	4.07	3.28		
300	1	4	82.0	24,600	2.03	8.13	80.0	2.5	32.00	0.65	52.0	335.0	225.0	0.3	20.3	104.30	211.7	3.3	8.0	219.7	4.39	0.85	Sub total \$4.53/m <sup>3</sup>	
						248.62											1,945.9		212.4	2,158.3		8.39	Total \$8.39/m <sup>3</sup>	



## 資料 C-1 調査団の編成

現地調査団は、総計9名からなり、その内訳は王子製紙8名、本州製紙1名である。その氏名と担当業務を下記する。

近藤哲朗	(団長, 総括)	王子製紙)
雨宮善	(財務, 市場)	王子製紙)
諸隈十衛	(原木)	王子製紙)
庄野秀哉	(板紙設備)	王子製紙)
森本進	(板紙操業)	本州製紙)
南福市	(調木, 原木)	王子製紙)
宮島俊雄	(パルプ, 品質)	王子製紙)
山田隆一	(動力, 環境, ユーティリティ)	王子製紙)
斎藤元	(新聞)	王子製紙)

上記9名の他、次の3名の国内作業専従者を含め総員12名で構成する。

小野寺勤	(設備, 生産管理)	王子製紙)
石井信行	(経済)	王子製紙)
玉井佳一	(板紙計画)	本州製紙)

## 資料 C-2 調査団の日程

現地調査団の主な行動は次の通りである。

- |                |   |            |   |                        |
|----------------|---|------------|---|------------------------|
| 1) 東京出発        | : | 9名全員       | - | 昭和59年9月10日             |
| 2) 工場診断        |   |            |   |                        |
| イリガン製紙工場       | : | 森本, 雨宮, 庄野 | - | 9月13日 - 9月15日          |
| ビスリグ製紙工場       |   |            |   |                        |
| 一紙・パルプ         | : | 近藤, 宮島, 山田 | - | 9月13日 - 9月22日          |
|                |   | 齋藤         | - | 9月13日 - 9月20日          |
|                |   | 森本, 雨宮     | - | 9月15日 - 9月20日          |
|                |   | 庄野         | - | 9月15日 - 9月22日          |
| 一原木資源          | : | 諸隈         | - | 9月13日 - 9月22日          |
|                |   | 南          | - | 9月13日 - 9月20日          |
| 3) 市場調査        | : | 雨宮         | - | 9月21日 - 9月25日          |
| (マニラにて)        |   | 森本, 南, 齋藤  | - | 9月21日 - 9月24日          |
| 4) プロGRESSレポート |   |            |   |                        |
| BOI提出及び協議      | : | 近藤, 雨宮, 宮島 | - | 9月25日                  |
| 5) ミニッツ交換      | : | 近藤, 雨宮, 宮島 | - | 9月27日                  |
| 6) 帰国          |   |            |   |                        |
| -第1陣(6名)       | : | 諸隈, 庄野, 森本 |   |                        |
|                |   | 南, 山田, 齋藤  | - | 9月25日(フィリピン<br>滞在16日間) |
| -第2陣(3名)       | : | 近藤, 雨宮, 宮島 | - | 9月28日(フィリピン<br>滞在19日間) |



現地調査日程

			A班：ビスリグ工場及び原木資源			B班：イリガン工場及び板紙関係			C班：市場調査
調査員			紙・パルプ工場：近藤，宮島，山田，斉藤 原木資源及び調木：諸隈，南		森本，雨宮，庄野		(工場調査後編成) 雨宮，森本，南，斉藤		
日順	月日	曜日	行程及び調査内容	宿泊地	行程及び調査内容	宿泊地	行程及び調査内容	宿泊地	
1	9/10	月	東京 PR431 → マニラ，日本大使館・マニラ JICA 表敬，打合せ	マニラ	同 左	マニラ			
2	9/11	火	PICOP 打合せ，NEDA 表敬	"	"	"			
3	9/12	水	PICOP 打合せ (PICOP 提供資料の討議)	"	"	セブ			
4	9/13	木	マニラ PR → セブ PR → ビスリグ，工場概要聴取	ビスリグ	マニラ PR → セブ セブ PR → イリガン，工場調査	イリガン			
5	9/14	金	工場調査，原木土場及び調木調査	"	工場調査	"			
6	9/15	土	工場調査，森林空査 (チャーター機)，林地視察 (全員)	"	イリガン <u>チャーター機</u> → ビスリグ，林地視察	ビスリグ			
7	9/16	日	(休日：資料整理)	"	(休日：資料整理)	"			
8	9/17	月	PICOP 資料 (工場，原木) 質疑応答，工場調査	"	ビスリグ板紙関係調査	"			
9	9/18	火	工場調査，ビスリグ幹部との技術討議 原木需給見通し，伐出及び植林作業調査	"	同 左	"			
10	9/19	水	工場調査，原木関係資料討議	"	"	"			
11	9/20	木	PICOP へ中間報告，工場調査 ビスリグ PR → セブ PR → マニラ (南，斉藤の2名のみ)	"	"	"		マニラ	
12	9/21	金	プログレスレポート作成	"	ビスリグ PR → セブ PR → マニラ (森本，雨宮の2名のみ) 同 左	"	Steniel, Atlas, Rex Printing, Bulletin Today 訪問調査	"	
13	9/22	土	ビスリグ PR → セブ PR → マニラ (近藤，諸隈，宮島，山田)	マニラ	ビスリグ → セブ → マニラ (庄野)	マニラ	PICOP Trading Corp. 調査	"	
14	9/23	日	プログレスレポート作成			マニラ	同 左	"	
15	9/24	月	プログレスレポート PICOP と事前討議，BOI 表敬			"	United Pulp & Paper, San Miguel Carton Plant 訪問調査	"	
16	9/25	火	BOI, NEDA 及び PICOP と打合せ (プログレスレポートドラフト提出) マニラ PR100 → 東京 (諸隈，庄野，森本，南，山田，斉藤の6名のみ)			"	Pulpapel 訪問調査	"	
17	9/26	水	PICOP Executive Committee と面談			"			
18	9/27	木	ミニッツ交換			"			
19	9/28	金	日本大使館，マニラ JICA へ報告 マニラ PR432 → 東京 (近藤，雨宮，宮島)			東京			





資料 C-3 フィリピン・カウンターパート及び主要面接者

1 フィリピン関係者

1. Philippine sides

A) Board of Investments (BOI)

Min. Edgardo Tordesillas	Vice-Chairman, Board of Investments
Mr. Hermenegildo Zayco	Supervising Governor, Agro-Industrial Dept.
Mrs. Ramona P. Miguel	Director, Agro-Industrial Department
Mrs. Angela M. Fernando	Chief, Pulp and Paper Division
Mr. Jaime R. Navarro	Asst. Chief, Pulp and Paper Division

B) National Economic and Development Authority (NEDA)

Mr. E. G. Corpuz	Assistant Director General
Mr. Alfred Feliciano	External Assistance Staff

C) Paper Industries Corporation of the Philippines (PICOP)

- Head Office

Mr. R. D. Stratton	President
Mr. R. C. Salazar	Executive Vice President
Mr. E. M. Narvaez, Jr.	Vice President-Finance
Mr. R. G. Lavadia	Asst. Vice President, Government Relations
Mr. R. C. Palpal-latoc	Director, Financial & Marketing Planning

- Marketing

Mr. P. M. Picornell	President, PICOP Trading Corporation (PTC)
Mr. P. M. Aragon	Vice President, Marketing
Mr. L. Y. Marty	Asst. Vice President, Marketing, PTC
Mr. W. A. Balabat	Manager, Newsprint Sales, PTC
Mr. H. A. Beltran	Manager, Containerboard Sales, PTC
Mr. E. R. Abesamis	Manager, Market Research and Development

- Bislig Mill

\* Pulp and Paper Manufacturing Group

Mr. S. E. Balmer	Vice President, Manufacturing
Mr. F. G. Balagtas	Director, Technical Planning, Corplan
Mr. A. L. Solis	Senior Member, Corplan
Mr. V. P. Banatao	Division Manager, PPMD
Mr. M. E. Marcojos	Department Manager, Pulp Mill
Mr. G. P. Porras	Department Manager, Chemical Plants
Mr. C. T. Pepino	Department Manager, Paper Mill
Mr. A. F. Tagudina	Division Manager, Energy Division
Mr. R. A. Gonzales	Department Manager, Steam and Power
Mr. V. S.J. San Jose	Division Manager, Maintenance and Engineering
Mr. A. F. Oropilla	Department Manager, Consolidated Shops
Mr. E. R. Roxas	Director, Research & Technical Services

\* Resource Management Group

Mr. R. G. Santiago	Vice President, Resource Management
Mr. R. A. Dormendo	Division Manager, Forestry Division
Mr. C. L. de la Cruz	Division Manager, Wood Supply
Mr. F. A. Cruz	Division Manager, Wood Procurement
Mr. M. L. Garcia	Department Manager, Industrial Tree Plantation Division
Mr. V.J. A. Ramos	Department Manager, Forest Research Department

\* Administration

Mr. C. B. Andres	Department Manager, Public Relations
------------------	--------------------------------------

D) Steniel Manufacturing Corporation

Mr. Henry Co See Cho      President

E) Atlas Lithographic Service, Inc.

Mr. Moises C. Chua      General Manager

F) Rex Printing Company, Inc.

Mr. J. F. Fontelera      Proprietor

G) Bulletin Publishing Corporation

Mr. E. S. Vicente      Plant Superintendent

H) San Miguel Corp. Carton Plant, Falola Compound

Mr. Virgil Send      Production Engineer

I) Pulp and Paper Manufacturers Association, Inc.

Mr. Francisco P. Monge      President

2 日本関係者

A) 日本大使館

寺坂信明      一等書記官

B) JICA マニラ事務所

御手洗 章 弘      所 長  
坂 田 武 穂      所長代理  
岡 崎 有 二      担 当

## Appendix D

### Profitability of Plan A Renovation on Alternative Raising Plan of Funds (Requested by the Minutes of Meeting on the Draft Final Report)

#### 1. Total Capital Requirement

Sources of Funds	Raising Amount of Funds (1,000 US\$)			
	1987	1988	Total	
PICOP's own funds	1,724	9,521	11,245	( 24.7%)
Long term local loan Investment related	1,134	6,266	7,400	
Interest during construction	9	487	496	
Sub total	1,143	6,753	7,896	( 17.4%)
Long term foreign loan	1,247	25,089	26,336	( 57.9%)
Total capital requirement	4,114	41,363	45,477	(100.0%)

Note: 1) In the above estimation, interest during construction on long term local loan is raised by the additional borrowing of long term local loan.

2) Financing conditions of long term loans;

– Long term local loan

Loan period	10 years including 2 years grace period
Repayment	Semi-annual equal installment (17 times)
Interest rate	24% per annum
Interest during construction	Not graced

– Long term foreign Loan

Loan period	10 years including 2 years grace period
Repayment	Semi-annual equal installment (16 times)
Interest rate	10.5% per annum

The payment of interest during the grace period is postponed until commencement of principals repayment.

2. Profitability Indicator

	Before Income Tax	After Income Tax
IRR (%)	26.4	21.3
ROI (%)	25.1	18.5
Cumulative net profit after income tax (US\$ million)	—	51







JICA