


**THE FEASIBILITY STUDY REPORT
ON
THE RENOVATION OF THE PULP AND PAPER MILLS
OF
THE PAPER INDUSTRIES CORPORATION OF
THE PHILIPPINES
IN
THE REPUBLIC OF THE PHILIPPINES
SUMARY**

FEBRUARY.1985

JAPAN INTERNATIONAL COOPERATION AGENCY

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85-24

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SUMARY

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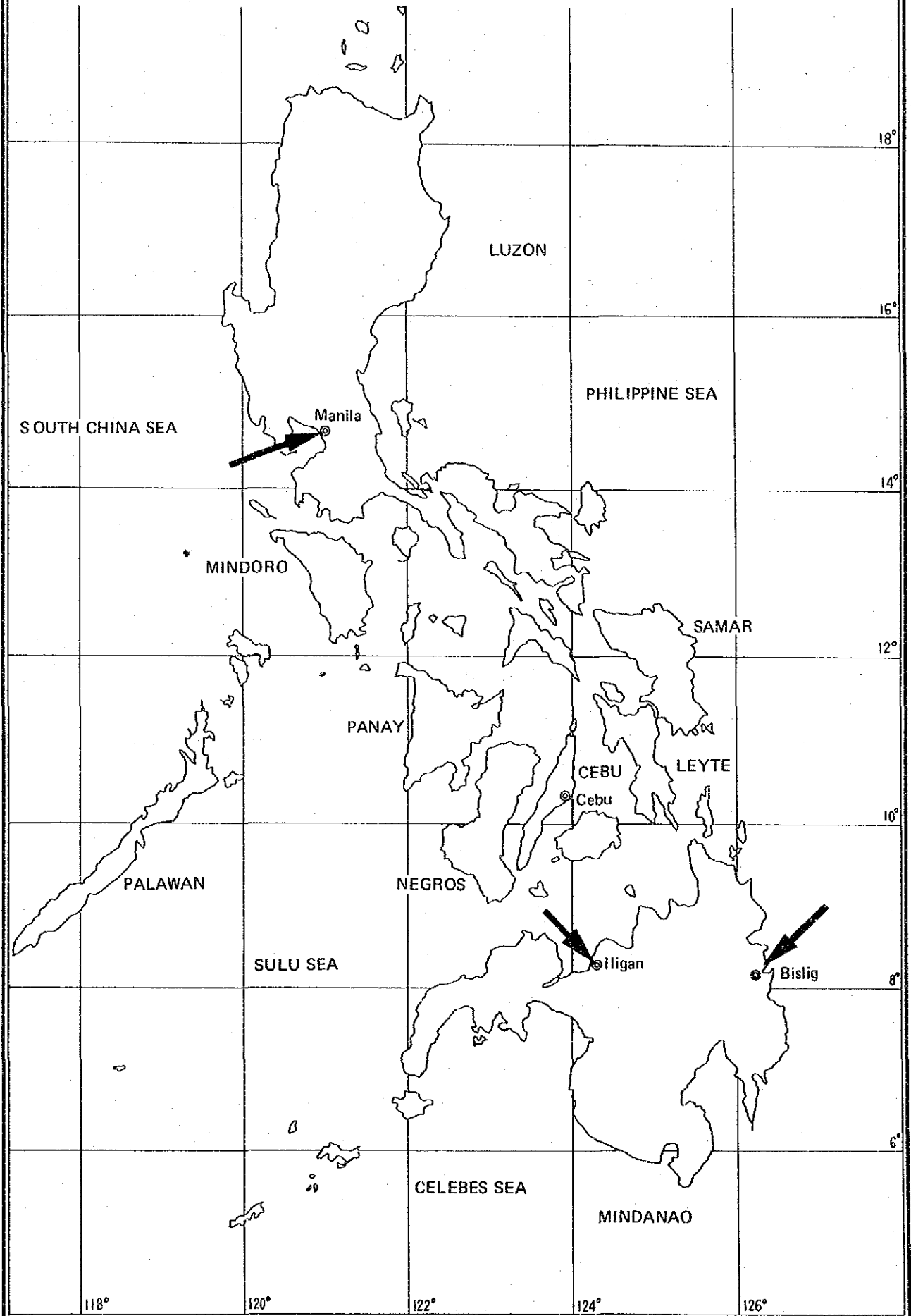
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JAPAN INTERNATIONAL COOPERATION AGENCY

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THE PHILIPPINES

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List of Abbreviation

Abbreviation	Definition
BOI	Board of Investments
CB	The Central Bank of the Philippines
DBP	Development bank of the Philippines
JICA	Japan International Cooperation Agency
NEDA	National Economic and Development Authority
PICOP	Paper Industries Corporation of the Philippines
Pulpapel	Pulp and Paper Manufacturers Association, Inc.
NPC	National Power Corporation
GDP	gross domestic product
GNP	gross national product
CIF	cost, insurance and freight
C&F	cost and freight
IRR	internal rate of return
L/C	letter of credit
MAAB	Memorandum to Authorized Agent Bank
ROI	return on investment
US\$	United States Dollars
P	Philippine Pesos
PPMD	pulp and paper manufacturing division
TMPD	timber products manufacturing division
¥	Japanese Yen
BKP	bleached kraft pulp
CM	corrugating medium
CTMP	chemi-thermomechanical pulp
EBK	easily bleachable kraft furnish
KF	kraft furnish
L	hardwood
LB	linerboard

Abbreviation	Definition
N	softwood
NP	newsprint
RGNP	rotogravure newsprint
RGP	refiner groundwood pulp
SBKP	semi bleached kraft pulp
SCP	semi-chemical pulp
STD.NP	standard newsprint
TMP	thermomechanical pulp
UKP	unbleached kraft pulp
AC	alternating current
AD	air dry
BD	bone dry
BOD5	biological oxygen demand (5 days)
CD	cross direction
COD	chemical oxygen demand
CSF	Canadian standard freeness
DC	direct current
DS	dry solid
JETRO	Japan External Trade Organization
JIS	Japanese Industrial Standard
MD	machine direction
max.	maximum
pH	hydrogen-ion concentration
PM	paper machine
Fig.	figure
ITP	industrial tree plantation
Mn	million
cm	centimeter

Abbreviation	Definition
ϕ	diameter
$^{\circ}\text{C}$	degree centigrade
D	diameter
d	day
g	gram
g/m^2	gram per square meter
H	height
h	hour
ha	hectare
HP	horse power
Hz	hertz
"	inch
kcal	kilocalorie
kg	kilogram
kg/cm^2	kilogram per square centimeter
$\text{kg}/\text{cm}^2\text{G}$	kilogram per square centimeter (gauge pressure)
kg/m^3	kilogram per cubic meter
kV	kilovolt
kW	kilowatt
kWh	kiloWatt hour
L	length
l	liter
m	meter
m^2	square meter
m^3	cubic meter
mg	milligram
ml	milliliter
mmHg	vacuum (pressure) millimeter of mercury
MVA	mega-volt-ampere
MWh	mega-watt-hour

Abbreviation	Definition
MW	megawatt
N	newton
%	percent
rpm	revolution per minute
s	second
scm	standard cubic meter (0°C, atmosphere)
t	ton (metric ton)
V	volt
yr or y	year

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I. BACKGROUND AND OBJECTIVE OF THE STUDY

I. BACKGROUND AND OBJECTIVES OF THE STUDY

1. Background of the Study

The Japanese Preliminary Survey Team for the renovation of the pulp and paper mills of the Paper Industries Corporation of the Philippines sent by Japan International Cooperation Agency (hereinafter referred to as "JICA"), an official agency responsible for the Government of Japan, visited the Republic of the Philippines (hereinafter referred to as "the Philippines") in June, 1984. The Team exchanged views with the Government of the Philippines and the officials of the Paper Industries Corporation of the Philippines (hereinafter referred to as "PICOP") regarding the implementation of the renovation of the mills of PICOP. At that time it was agreed to implement the Study on the Renovation of the Pulp and Paper Mills of PICOP (hereinafter referred to as "the Study") within the framework of "The Plant Renovation Cooperation Program between Japan and ASEAN Countries" and exchanged the Notes Verbals (Implementing Arrangement) with the Government of the Philippines concerning the implementation of the Study.

In response to the above-mentioned Notes Verbals, the Government of Japan has made a decision to despatch the team to implement the Study.

In accordance with the Notes Verbals, the JICA's study team (hereinafter referred to as "Study Team") visited the Philippines from September 10 to September 28, 1984 to conduct field surveys for the Study.

Towards the end of January 1985, JICA delivered the explicative team of draft final report and signed on agreement (Minutes of Meeting on the Draft Final Report) with regard to the report above.

2. Objectives

The objectives of the Study were as follows:

- 1) To diagnose the present situation of PICOP (operation, management and administration).
- 2) To investigate the possibility of the renovation from technical, financial and economical point of view.
- 3) To contribute to increase production efficiency and to improve quality of paper and paperboard products.

4) To formulate the renovation plan.

The Study was carried out in the following areas:

- 1) Modernization of the newsprint machine in Bislig Mill
- 2) Improvement of the containerboard machine in Bislig Mill.
- 3) Transfer and integration of Iligan Mill to Bislig Mill.

The above-mentioned scope of the Study did not include the Timber Products Manufacturing Division.

II. PULP AND PAPER INDUSTRY OF THE PHILIPPINES

4.33

4.34

II. PULP AND PAPER INDUSTRY OF THE PHILIPPINES

1. General

- 1) The pulp and paper industry has to be struggling against the difficulties under huge amount of financial deficit. The production of paper and paperboard in 1977 was 353,000 t/yr which followed by gradual decline until 292,000 t/yr in 1983.
- 2) As the background of the difficulties, the policy of free trading adopted by the government in 1981 has exerted a part of its cause in addition to the worldwide depression since the second half of 1980. That is, cheap pulp and paper products from the developed industrialized countries has rushed into the Philippine market, and likely defeated the local industry which is inherently of less competitive against overseas industries.
- 3) At the request of local industry in order to get rid of the difficulty, the government has decided to resume imports restriction of paper and paperboard since November 1982.

However, three times of big devaluation of Peso between 1983 and 1984 resulted price raise in imported raw materials, supplies, fuel, chemicals, etc., and expected improvement of financial situation has not been achieved.

Despite the circumstances, selling price in local market has been regulated since 1980 until at last price raise was approved in 1983 and followed by July 1984.

The evidence of financial recovery has commenced to be observed today.

2. Consumption of paper and paperboard

Pulp and paper manufacturers in the Philippines count 28 and integrated firms of pulp through to paper are only 5.

According to the Pulpapel statistics in 1983, the supply and demand situation is as follows:

Sales of domestic production	275,165 t/yr
Amount of imports	163,339 t/yr
<hr/>	
Gross total consumption	438,504 t/yr

About 50% of domestic production was supplied by PICOP in 1983 (138,431 t/yr).

3. Demand forecast

Separate calculations of newsprint and containerboard are carried out for demand forecast on the bases of demand trend as well as the GNP changes of the last decade.

Results are shown below.

	Newsprint (incl. printing and writing paper)	Containerboard
Annual growth rate	3.0%	1.47% *
Consumption	t/yr	t/yr
– 1983 (base)	131,221	179,621
– 1988	152,100	192,300
– 1993	176,400	207,000

Note: * Average annual growth rate between 1984 and 1996

III. PRESENT SITUATION OF PICOP

III. PRESENT SITUATION OF PICOP

In 1983, PICOP's production of paper and paperboard (Bislig Mill) was as follows:

Newsprint	74,803 t/yr	(No. 1 paper machine)
Kraft linerboard	34,600 t/yr	(No. 2 paper machine)
Corrugating medium	29,548 t/yr	(No. 2 paper machine)
<hr/>		
Total	139,011 t/yr	

Among them, newsprint furnish from 100% tropical hardwood is regarded as special feature of this company.

1. Financial position

PICOP has proceeded by fairly satisfactory financial balance by 1979. Deficit in finance took place since 1980, increased deficit up around 210 million Pesos in 1983 resulted in cumulative deficit of 518 million Pesos (refer to Fig. III-1-1).

The financial difficulties are due to the inflation caused by the oil crisis in 1980 as well as worldwide depression until 1982. Furthermore, acceleratedly PICOP has been influenced by the Peso devaluation in three times.

Interest payment amounted 283.5 million Pesos in 1983 shows the typical aspect of PICOP's situation, as well as the astronomical burden of foreign exchange loan.

Meanwhile the price raise was approved by the Government in 1983 and 1984, and sharp increase in sales revenue is expected in 1984 fiscal year.

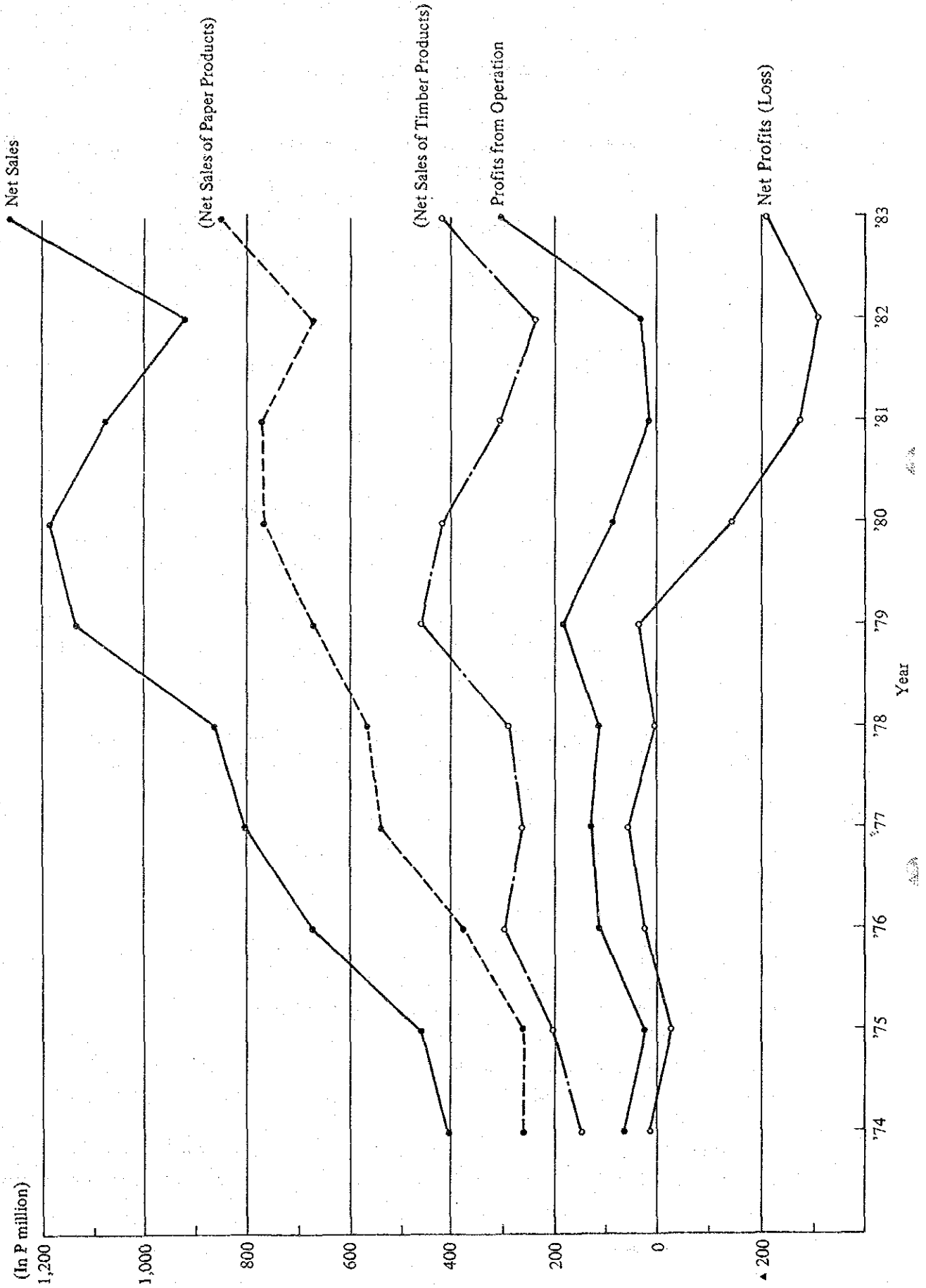
2. Technical Suggestions on the Present Operation of Bislig Mill

In comparison with other Southeast Asian countries, it is able to say that the management system in PICOP has been completed, the level of employees' skill is high, and superior operational technique is maintained.

However, low availabilities of equipment is due to the superannuation and insufficient maintenance results from the financial difficulties for past several years.

The Study Team held the conference in Bislig Mill and in Manila with the executive committee, regarding technical items to improve present operations. The major items are shown below.

Fig. III-1-2 PICOP Sales, Gross Profits and Net Profits -- Recent 10 years



- (1) Kraft pulping plant
Reducing Kappa Number of unbleached kraft pulp for newsprint should be evaluated in order to save bleaching chemicals. Also the utilization of digester waste heat may be considered for energy saving by means of cooking liquor heat-up in future.
- (2) RGP/TMP Plant
Improved unit power consumption and improved pulp qualities can be expected by the modification of flow so as to change power distributions in primary and secondary stages of refining.
- (3) No. 1 Paper machine
 - to blend softwood kraft pulp for the increase of wet-web strength.
 - to even cross direction moisture profile for improved quality.
- (4) No. 2 Paper machine
To rebuild press part for decreasing moisture content of wet-web out of press and for improving steam consumption.
- (5) Reausticizing
 - to install dregs washer for decreasing soda loss.
- (6) Evaporator
There is a need to increase concentration of product black liquor in order to maximize energy utilization of black liquor. In future, it is recommended to adopt plate type evaporator in order to decrease scaling and plugging trouble.
- (7) Kraft recovery process
 - The modification of wet bottom type electrostatic precipitator of recovery boiler, which has been suffered from its corrosion problem, into the new dry bottom type electrostatic precipitator is of high efficiency and contributes to lower soda loss.
 - The installation of wet cyclone scrubber at exhaust stack of dissolving tank is for the same purpose of soda recovery.
- (8) Power plant
 - stabilization of main steam pressure (1250 psig)
 - adopting suitable corrosion-resistant material for superheater tubes of boilers in order to minimize corrosion problems.

- modification of secondary air feed system at recovery boiler.
- to shift in-plant power generation to purchased power by minimizing condensing power generation, taking account of the fluctuation of steam demand.

(9) Utilities

- to save water consumption
- to establish countermeasures for improving unit consumption of process steam through the activities of Energy Conservation Program.

(10) Environment

The following countermeasures for cost reduction.

- Countermeasures for decrease of effluent pollutant load, which contribute to the improvement of production yield of pulp and paper.
- Countermeasures for decrease amount of process effluent.

3. Present Situation of Iligan Mill

1) Present situation of Mill equipment

In spite of the fact that the Mill has been in shutdown since 1980 by reason of shortage of wood resources and market condition, the equipment and facilities are in good condition except pulping department. Especially, the equipment related to the board machine and coater would become functional again if partial renovation and repairs were undertaken. But it is necessary for pulping equipment and facilities to be rebuilt extensively.

2) Renovation of equipment and facilities in Iligan Mill

The study team went over the following three points.

a) Restart of Iligan Mill

Since there is no future prospect of wood supply, restart of the Mill would be very difficult in the present condition.

b) Transfer to Manila district

It is not recommended to transfer to Manila district because inhabitants would oppose to new paper mill from the viewpoint of environmental protection. In addition, steam cost and electric power cost are higher in that district.

c) Transfer to Bislig Mill

Since there is no difficulty of wood supply and also utility division and technical services can be served for common use, this plan will be advantageous to mill management.

Based on these investigations, the Study Team has determined to take up the plan of transfer to Bislig Mill.

But transfer of coater in Iigan Mill would not be included in this plan because of the following reasons:

- the coater is not suitable for the current market needs
- the adequate quantity of demand is not expected.

Therefore, since it seems unprofitable at this moment, transfer of the coater should be planned when market needs would justify it.

3) Problems of board machine

Since the wet-web out of the press part of the board machine has extremely high moisture content, it incurs a large amount of drying steam consumption and high production cost. When the machine is reused, the press part must be replaced completely.

IV. WOOD RESOURCES

IV. WOOD RESOURCES

1. Supply Sources

- 1) PICOP has four main wood supply sources as follows.
 - a) Forest concessions
 - b) Industrial tree plantation
 - c) Agro-Forestry
 - d) Wood procurement division

- 2) PICOP has two forest concessions totalling up to 182,682 hectares in area, including 54,380 hectares of industrial tree plantation granted in 1982, and they are possible to be renewed at every 25 years.

- 3) The above industrial tree plantation locates inside PICOP's forest concessions, and is granted the plantation of fast growing trees on logged-over areas within the limit of 30% of the total concessions.

- 4) It is easy to carry out logging operation and to develop plantation in PICOP's industrial tree plantation areas because the areas are in hilly terrain with soil and climatic conditions suitable for plantation. PICOP is planting three species such as Falcata, Bagras and Ipil-ipil.

- 5) The following table shows the land utilization of PICOP's forest concessions and industrial tree plantation areas along with the forest types.

Forest type	Area		Estimated stand volume 1,000m ³	Output in 1984		
	ha.	%		logging system	m ³ /ha	1,000m ³ /yr
Operable areas						
Virgin forest	*1 10,019	6	3,200	Selective	129	324
2nd growth forest	88,320	48	16,200	Clearcut	179	540
Plantation	36,506	20	*2 3,000		*3 77	159
Kaingin, etc.	9,456	5	—			
Sub total	144,301	79	22,400			1,023
Inoperable areas	38,381	21				
Total areas	182,682	100				

- *1 Virgin forest, supply sources of superior quality logs with large diameter, is remaining now small areas only.
 - *2 Standing volume of plantation consists of the following ratios.
 - Falcata : about 60%
 - Bagras : about 30%
 - Others : about 10%
 - *3 Standing volume and output per hectare tend to decrease of the damage caused by Typhoon Akang.
- 6) PICOP has entered into agreement with nearly 5,300 farmers, who plant fast growing trees on their lands under PICOP's guarantees to buy all the woods produced, covering about 20,000 hectares at the end of 1983.
- 7) Wood Procurement Division which PICOP established recently is purchasing pulpwood from Iligan, Davao and so on throughout Mindanao.

2. Wood Supply Plan

The following table shows PICOP's wood supply plan.

Output of natural forest will drop sharply but output of industrial tree plantation will rise highly in the future.

	1980-1984 ave. yearly output	1985-1989 ave. yearly output	1990-1994 ave. yearly output
Natural forest	1,000 m ³	1,000 m ³	1,000 m ³
Sawtimber	484	235	113
Pulpwood	344	216	75
Fuelwood	108	218	69
Total	936	669	257
Industrial tree plantation			
Falcata	148	85	427
Bagras	9	27	174
Ipil-ipil	—	63	264
Total	157	175	865
Agro-Forestry			
Falcata	248	293	182
Ipil-ipil	—	6	121
Total	248	299	303
Wood procurement div.			
Sawtimber	—	5	33
Falcata	1	95	—
pulpwood	30	—	—
Total	31	100	33
Grand total	1,372	1,243	1,458

When PICOP made planting and harvesting plans of industrial tree plantation, PICOP excluded areas both damaged by Typhoon Akang and harvested until 1983, totalling up to about 15,000 hectares, from the wood supply plan. Furthermore, expecting yield volumes in harvesting plans seems to be underestimated.

V. RENOVATION PLAN

V. RENOVATION PLAN

1. Outline of Renovation Plan

For the purpose of improving and renovating existing installations which are superannuated on their availability, the following two alternative plans are proposed on the basis of mill diagnosis and demand forecast by the Study Team.

- Plan A : Renovation plan with regard to No. 1 paper machine (newsprint) and No. 2 paper machine (containerboard) in Bislig Mill. Transfer of Iligan board machine is not included.
- Plan B : Together with the renovation plan of Bislig Mill, transfer of Iligan board machine (referred to as No. 3 paper machine hereafter) and its modernization are included.

The schedule of executing the renovation work planned is as follows:

Place order and commencement of the work	Beginning of January, 1987
Completion of the work	
- No. 1 and No. 2 paper machine and concerned work	End of June, 1988
- No. 3 paper machine and concerned work	End of June, 1989
Start-up period	2 months
Recommencement of commercial operation	
- No. 1 and No. 2 paper machine	Beginning of September, 1988
- No. 3 paper machine	Beginning of September, 1989

2. Plant Cost and Others

Estimated plant cost and mill design condition such as products, production capacity, furnish ratio, etc. are summarized in Table V-2-1.

Table V-2-1 OUTLINE OF RENOVATION PLAN

	Plan A		Plan B		Difference B - A						
	Construction Work	Plant Cost (1,000US\$)	Construction Work	Plant Cost (1,000US\$)							
1. Construction Work and Investment Cost											
1) No.1 Paper machine	Rebuild	17,685	Same as Plan A	17,685							
2) No.2 Paper machine	Rebuild	2,866	Same as Plan A	2,866							
3) TMP Plant	Rebuild & 110 Bdt/d Expansion	10,755	Same as Plan A	10,755							
4) No.3 Paper machine	—	—	Transfer & Rebuild	10,793							
5) KP Plant, Recausticizing	Rebuild (KP Plant)	199	Rebuild Additional installation: Digester 1 set White liquor clarifire 1 set	2,795							
6) Evaporator	—	—	Expansion	3,355							
7) Auxiliary works	—	—	Warehouse expansion, Utilities, etc.	2,555							
8) Insurance, Bank charges, etc.		5,016		6,911							
9) Contingency		1,575		2,539							
Total		38,096		60,254	22,158						
: Foreign currency		26,336		36,285	9,949						
: Local currency		11,760		23,969	12,209						
2. Products and Production Capacity of Paper Machine	Product	Production Capacity(t/yr)		Product	Production Capacity(t/yr)		Increase				
		Present	After Renovation		Present	After Renovation					
	No.1 Paper machine	Newsprint & Wood-containing	86,000	118,000	Newsprint & Wood-containing	86,000	118,000	32,000			
	No.2 Paper machine	Linerboard	68,000	78,000	Linerboard	68,000	78,000	10,000			
	No.3 Paper machine	Corrugating medium	—	—	Corrugating medium	28,000	41,200	13,200			
	Total	154,000	196,000		182,000	237,200	55,200				
3. Projected Furnish Ratio	Present	After Renovation		Present	After Renovation						
		For Local Use	For Export Goods		For Local Use	For Export Goods					
	No.1 Paper machine	(Same as Plan A)									
	Newsprint										
	-RGP/TMP (Z)							55	40	—	
	-CTMP (Z)							—	30	—	
	-LBKP (Z)							45	20	—	
	-Purchased NBKP (Z)	—	10	—							
	No.2 Paper machine										
	Linerboard										
-LUKP (Z)	84	84	—	84	84	—					
-Purchased NUKP (Z)	16	16	—	16	16	—					
Corrugating medium											
-LUKP (Z)	100	100	—	100	100	100					
No.3 Paper machine											
Linerboard											
-LUKP (Z)	—	—	—	—	84	75					
-Purchased NUKP (Z)	—	—	—	—	16	25					

3. Pulpwood requirement

The following Table shows the comparison between pulpwood requirements of Renovation Plan A as well as Renovation Plan B and PICOP's pulpwood supply plan.

Unit: 1,000m³/yr

	1985	'86	'87	'88	'89	'90	'91	92	'93	'94
Requirements										
Plan A Falcata	450	450	450	324	451	494	507	507	507	507
Others	504	395	386	361	422	441	437	462	480	480
Plan B Falcata	450	450	450	324	451	494	507	507	507	507
Others	504	395	386	361	488	595	594	619	637	637
Supply Plan										
Falcata	450	450	451	499	511	610	638	637	620	540
Others	569	625	663	363	425	581	502	836	775	923
Difference										
Plan A Falcata	—	—	1	175	60	116	131	130	113	33
Others	65	230	277	2	3	40	65	374	295	443
Plan B Falcata	—	—	1	175	60	116	131	130	113	33
Others	65	230	277	2	-63	-114	-92	217	138	286

When Renovation Plan A is carried out, PICOP will be able to supply wood requirement of all species. When Renovation Plan B is carried out, there will be some shortage of "Others" including pulpwood for red chips from 1989 to 1991.

However, there will be the excess of "Others" over requirement from 1985 to 1988.

So it is possible to offset the shortage by postponing the cutting of excessive supply from 1985 to 1988 so as to meet requirement from 1989 to 1991.

VI. FINANCIAL ANALYSIS AND ECONOMIC EVALUATION

VI. FINANCIAL ANALYSIS AND ECONOMIC EVALUATION

1. Basic Conditions

In order to confirm the effectiveness of the renovation plans, the financial analysis is carried out only for expected increase in production with reference to the renovation works.

Expected profit increase = Increase in sales amount
– (Increase in variable cost, fixed cost, selling commission and excise tax + Interest on long term foreign loan)

2. Calculation Bases

- 1) The financial calculation is based on the budgetary prices in the second half of the year 1984, and indicated in the U.S. Dollars. Exchange rate to 1 U. S. Dollar = 18 Pesos, which is official rate as of September, 1984, and 245 Yen.
- 2) Production and sales schedules are described in chapter VI-2 of the main report, fund program is in chapter VI-3 of the main report, and they are summarized in Table VI-2-1 on the next page. The production and sales schedules are based on the plan prepared by the Study Team, in which productions in "without renovation" from 1987 forward are equal to the production in 1987, and production in "after renovation" from 1987 forward will reach to full production in 1991 with gradual increase in production.

Selling price is based on the PICOP's information.

However, as to the price of containerboard for export goods package purpose, alternative financial analysis (to be shortened as "ALT" hereafter) is carried out using cheaper selling price enough to compete with current discounted import price which is approved for packing agricultural products of export.

Table VI-2-1 Production & Sales Schedule, Total Capital Requirement and Raising Plan of Fund

	Without Renovation	Renovation Plan A	Renovation Plan B	Remarks
1. Production Schedule (Sales Amount)				
No.1 Paper machine				
Newsprint (STD NP)	65,400 t/yr	92,000 t/yr	92,000 t/yr	Selling price US\$/t board
Newsprint (RG NP)	16,300	23,000	23,000	700
Total	81,700	115,000	115,000	765 (for export agricultural products)
No.2 Paper machine				
Linerboard (For domestic market)	35,500	47,600	30,700	802
Corrugating medium (For domestic market)	31,500	31,700	35,400	749
Corrugating medium (For export goods)	—	—	11,200	600
Total	67,000	79,300	77,300	—
No.3 Paper machine				
Linerboard (For domestic market)	—	—	22,300	802
Linerboard (For export goods)	—	—	17,300	637
Total	—	—	39,600	—
Grand total	148,700	194,300	231,900	—
Increase	—	45,600	83,200	Expected increase by renovation
2. Sales Revenue				
Increase	110,315	143,913	164,469	Full production
3. Total Capital Requirement				
Plant investment cost	—	1,000US\$/y	1,000US\$/y	Expected increase by renovation
Foreign currency portion	—	26,336	36,285	
Domestic currency portion	—	11,760	23,969	
Total	—	38,096	60,254	
Pre-operation and start-up expenses	—	4,752	5,061	
Working capital	—	2,133	2,352	
Grand total	—	44,981	67,667	
4. Fund Raising Plan				
PICOP's own funds	—	1,000US\$/y	1,000US\$/y	Foreign currency portion
Long term foreign loan	—	22,575	36,805	85 % Long term foreign loan
Grand total	—	22,406	30,862	15 % PICOP's own funds
Domestic currency portion	—	44,981	67,667	Full PICOP's own funds

3) Total capital requirement	Plan A (1,000 US\$)	Plan B (1,000 US\$)
Plant investment cost		
Foreign currency portion	26,336	36,285
Domestic currency portion	11,760	23,969
Sub total	38,096	60,254
Pre-operation and start-up expenses	4,752	5,061
Working capital	2,133	2,352
Total capital requirement	44,981	67,667

Both the pre-operation and start-up expenses and the working capital are included in domestic currency portion of total capital requirement.

4) Raising plan of fund

Raising plan of fund is planned as follows in accordance with the policy of PICOP.

85% of foreign currency portion : by long term foreign loan
 15% of foreign currency portion : by own funds of PICOP
 Domestic currency portion : by own funds of PICOP

Based on the raising plan of fund above, sources of funds for each renovation plan are estimated as follows:

-- Plan A: (1,000 US\$)		
PICOP's own funds	22,575	(50.2%)
Long term foreign loan	22,406	(49.8%)
Total	44,981	(100.0%)
-- Plan B:		
PICOP's own funds	36,805	(54.4%)
Long term foreign loan	30,862	(45.6%)
Total	67,667	(100.0%)

5) Financing condition of long term foreign loan

Loan period : 10 years (2 years grace plus 8 years)
 Repayment : Semi-annual equal installment
 Rate of interest : 10.5% per annum

The interest rate above includes guarantee fee of the Central Bank of the Philippines.

- 6) Cost basis of each item of manufacturing cost is indicated in chapter VI-4 of the main report.

3. Financial Analysis

- 1) The financial calculation is carried out for the term of 11 years from the year 1987, when the renovation work is scheduled to commence, until 1997. That is, the term of commercial operation is 9 and a half years for No. 1 and No. 2 paper machines and 8 and a half years for No. 3 paper machine on practical revenue generation from financial aspect.

Following Table shows the result of financial calculation on returns.

	Average Rate of Return on Investment after Depreciation (ROI) %	Internal Rate of Return (IRR) %	Payback Period (Years)
Plan A Before income tax	30.3	26.7	4.5
After income tax	21.0	20.1	5.2
Plan B Before income tax	34.8	31.5	4.1
After income tax	23.8	23.3	4.9
Plan B (ALT.)			
Before income tax	28.4	26.5	4.6
After income tax	19.6	19.7	5.4

Note : ALT. means alternative case of Plan B, when selling prices of containerboard for exporting agricultural goods are adjusted to the imported containerboard prices.

The average ROI is very high both in Plan A and Plan B and the renovation project in each case is interpreted as feasible to implement. However, the ROI in the alternative case of Plan B drops to 28.4% before income tax and 19.6% after income tax.

The IRR exceeds 20% in Plan A and Plan B after income tax, and each renovation project is recognized as feasible too in terms of IRR.

Payback period is calculated on condition that the initial investment is paid back by cumulative returns which are composed of net profit before income tax (or after income tax), depreciation, amortization and interest on debt. Short payback period is expected in each case.

2) Discussions on Profitability of Investment

In Plan A of renovation work, improvement of operating efficiencies and unit consumption is expected by means of rationalized installation in addition to the production increases in the paper machines by the increase of running speed.

In Plan B, further output increase is expected by resuming the production of No. 3 paper machine.

Effectiveness of investment in both plans is high enough as shown in the preceding clause.

Cumulative net profit after income tax during 10 years from 1988 to 1997 is highest in Plan B as follows:

Cumulative net profit after income tax:

Plan A	US\$	60 million
Plan B	US\$	111 million
Plan B (Alternative case)	US\$	88 million

However, Plan A is more advantageous than Plan B since there is no competitive situation with regard to imported containerboard.

4. Prospective Income Account throughout PICOP

- 1) As described in section III-1-3 of the main report, PICOP's cumulative deficit in its balance sheet was about 518 million Pesos at the end of fiscal year 1983. Due to the rapid recovery of market for pulp and paper products as well as price rise supported by the Government in terms of tariff protection, management performance of PICOP will be improved remarkably. As stated in section VI-5-5 of the main report, the cumulative deficit will be made up during the fiscal year 1987. (Refer to Table VI-4-1).

However, PICOP will continue to have financial difficulties until 1988, because it must pay a large amount of financial expenses and industrial plantaion cost and repay its existing long term loan.

After the year 1991, rapid improvement in debt service ratio is expected and surplus funds will be available. (Refer to Table VI-4-1).

Table VI-4-1 Financial Projection without Renovation (PICOP's Estimation)

(Unit ; 1,000 US\$)

Year	Net Profit after Income Tax	Cumulative Net Profit after I.T.	Depreciatn and Amortizatn	Financial Expenses	Loan Repayment	Debt Service Ratio
1984	-10,645	-39,418	30,939	48,192	8,494	1.21
1985	14,994	-24,424	26,212	34,783	16,655	1.48
1986	18,469	- 5,955	22,806	26,798	22,365	1.38
1987	19,229	13,274	20,083	20,018	32,268	1.13
1988	18,349	31,623	16,585	15,946	24,176	1.27
1989	19,909	51,532	14,377	10,305	13,092	1.91
1990	22,176	73,708	9,514	7,671	13,092	1.90
1991	20,907	94,615	8,695	5,702	2,183	4.48
1992	21,593	116,208	10,222	4,826	2,385	5.08
1993	21,428	137,636	10,179	4,272	2,701	5.15
Total	166,409		169,612	178,513	137,411	1.63

Note ; Above financial projection is estimated at the constant price of 2nd semester in 1984.

- 2) According to PICOP's financial projection, the average net profit to sales ratio after income tax is estimated at 16.7% for the period between 1988 and 1997, in case there were no renovation work to be implemented.

In case of implementing renovation work of Plan A, the average net profit to sales ratio after income tax during the same period is estimated at 19.0%.

Cumulative net profit after income tax during the same period is estimated at 210 million U.S. Dollars in the case without renovation, and at 301 million U.S. Dollars in the case after renovation (Plan A). (Refer to Table VI-4-2).

Table VI-4-2 Financial Projection on Renovation of Plan A
(Team's Estimation)

(Unit : 1,000 US\$)

Year	Net Profit after Income Tax	Cumulative Net Profit after I.T.	Depreciat'n and Amortizat'n	Financial Expenses	Loan Repayment	Debt Service Ratio
1988	13,285	26,559	20,727	15,946	24,176	1.25
1989	25,416	51,975	19,946	10,305	13,092	2.38
1990	27,422	79,397	12,564	12,890	15,892	1.84
1991	31,452	110,849	11,551	7,687	4,983	4.00
1992	32,805	143,654	13,078	6,517	5,185	4.48
1993	33,756	177,410	13,035	5,669	5,501	4.70
1994	33,948	211,358	13,035	5,375	5,501	4.81
1995	34,139	245,497	13,035	5,081	5,501	4.94
1996	34,330	279,827	13,035	4,787	5,501	5.07
1997	34,521	314,348	13,035	4,493	5,507	5.20
Total	301,074		143,041	78,750	90,839	3.08

Note ; Above financial projection is estimated at the constant price of 2nd semester in 1984.

- 3) There is some concern about PICOP's own fund while the renovation project is carried out because PICOP has to invest its own fund to about 50% of total capital requirement for the implementation of both Plan A and Plan B, namely, PICOP has to invest about US\$ 23 million out of its own fund during two years : between 1987 and 1988 in Plan A and about US\$ 37 million during three years between 1987 and 1989 in Plan B. It seems difficult for PICOP to invest such amounts out of its own cash in hand because its cash balance at each year end is very low even the case renovation is not executed and as follows:

at the end of 1987:	about US\$ 15 million
" 1988:	" 12 "
" 1989:	" 24 "

Taking into consideration of such financial position, separate profitability calculation will be carried out by introducing different condition to PICOP's own fund.

That is, instead of investing about 50% of total capital requirement out of its own fund as described in Table VI-2-1 and clause VI-2-4), decrease in its own fund to 30% and the balance shall be provided by long term local loan as described below.

5. Discussion on Financing Plan

The following is calculated on the assumption that PICOP's own funds are 30% of total capital requirement and foreign loan amount and total amount are not changed.

<u>Year</u>	<u>1987</u> (1,000US\$)	<u>1988</u> (1,000US\$)	<u>1989</u> (1,000US\$)	<u>Total</u> (1,000US\$)
Plan A:				
PICOP's own funds	2,453	11,038		13,491 (30.0%)
Long term local loan	1,652	7,432		9,084 (20.2%)
Long term foreign loan		22,406		22,406 (49.8%)
Total	4,105	40,876		44,981 (100.0%)
Plan B:				
PICOP's own funds	3,241	14,910	2,148	20,299 (30.0%)
Long term local loan	2,511	11,652	2,343	16,506 (24.4%)
Long term foreign loan		30,862		30,862 (45.6%)
Total	5,752	57,424	4,491	67,667 (100.0%)

- Note: 1) Figures in parentheses show the raising ratio of each fund.
 2) Financing condition of long term local loan (assumed)
 Loan period 10 years (2 years grace plus 8 years)
 Repayment Semi-annual equal installment
 Interest rate 24% per annum
 3) Financing condition of long term foreign loan
 Refer to clause VI-2-5).

Table VI-5-1 shows the profitability indicators of renovation project in the alternative financing plan mentioned above. It shows that the rate of ROI after income tax drops by 1.8% in Plan A and 2.6% in Plan B in the alternative plan, compared with those of both renovation plans in the original financing plan in which no long term local loan is applied. But the indicators are high enough to make both renovation plans feasible even in the alternative financing plan. As

stated in the above table, about 13.5 million US Dollars shall be raised by PICOP between 1987 and 1988 in Plan A and about 20.3 million US Dollars between 1987 and 1989 in Plan B. It seems possible for PICOP to raise such amount of funds in spite of the increase in PICOP's debt.

Table VI-5-1 Profitabilities in Case of Partial Long Term Local Loan

	Alternative Financing Plan 1)	(Reference) Original Financing Plan 2)
Plan A ;		
IRR (%) Before income tax	26.6	26.7
After income tax	21.4	20.1
ROI (%) Before income tax	26.2	30.3
After income tax	19.2	21.0
Plan B ;		
IRR (%) Before income tax	31.3	31.5
After income tax	24.8	23.3
ROI (%) Before income tax	29.3	34.8
After income tax	21.2	23.8

- Note: 1) Total capital requirement = PICOP's own funds + Long term foreign loan + Long term local loan
 2) Total capital requirement = PICOP's own funds + Long term foreign loan

Remarks:

In accordance with "Minutes of Meeting on the Draft Final Report", the economic calculation based on the another financial plan of funding requested by PICOP is described in the appendix of the main report.

6. Economic Evaluation

As an economic result of this renovation project, saving of foreign currency is expected by means of increased production of newsprint and containerboard both for domestic market and for substitution of imports.

Aggregate saving of foreign currency accumulated during ten years between 1988 and 1997 is estimated in each case as follows:

Plan A	US\$ 74 million
Plan B	US\$ 195 million

The savings will make a great contribution to the Philippine economy.

VII. RECOMMENDATION (in Place of Finding)

VII. RECOMMENDATION (in Place of Finding)

- 1) Very high profitabilities are obtained as the result of financial calculation both in Plan A and Plan B (stated in part VI of the main report), however, they are on the preferential policy of the Philippine Government for the pulp and paper industry.

From the viewpoint of promoting and developing the pulp and paper industry, it is desired that the Philippine Government will continue to assist PICOP and other pulp and paper companies by its preferential treatment at an appropriate level, until they reform their financial structure and obtain international competitiveness of management as well. Above government policy seems inevitable to securing the survival of pulp and paper industry in the Philippines not only PICOP alone.

- 2) As mentioned in Part VI of the main report PICOP will have to invest PICOP's own fund to about 50% of total capital requirement for the implementation of both Plan A and Plan B, whichever plan may be chosen, that is, PICOP needs to invest about US\$ 23 million in Plan A and about US\$ 37 million in Plan B.

However, it is questionable whether PICOP would be able to invest such amount of PICOP's own fund, not only because PICOP would not have enough cash in hand during the period of renovation work, but also because it is forecasted that the profit rate of sales which is estimated in this report would fall in the future due to the rise in manufacturing cost affected by future inflation, and so on.

In such circumstances, an alternative financing plan, which described before, to introduce long term local loan for a portion of local currency, is recommendable.

Of course, the profit of Plan B is larger than that of Plan A, in both the original financing plan and the alternative financing plan. However, Plan A will make PICOP easier in its financial position during the period of renovation work.

Therefore, it is recommended that PICOP should carry out Plan A at first and then transfer No. 3 paper machine, when PICOP's financial position has been improved by the implementation of Plan A.

- 3) It is desired that PICOP's renovation work should be realized as soon as possible from national interest of the Philippines. That is, the work will not only increase an earning power of PICOP but also contribute to a big saving of foreign currency by supplying demand increase in newsprint and containerboard in future.

- 4) The ancillary equipment in Bislig Mill, which is not included in the renovation work in this report, will also superannuate in the near future and need to repair because the decade of time has elapsed since the Mill start-up.

In case of implementing the work above, it is necessary to avoid temporary investment and to concentrate the investment on the most profitable items which are fit for the long term business strategy.

- 5) Practical recommendations are stated in part III of the main report with regard to improving the efficiency of existing equipment as well as reducing production cost of present PICOP's operation.

The improvement of operation efficiency should be achieved by the complete execution of preventive maintenance and spare parts control in view of general superannuation in the Mill facilities.

- 6) Because the majority of future wood supply to Bislig Mill is from planted forest, "raising the least interest rate fund as possible" is necessary policy to reduce wood cost.

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