Table VI-25

* * * PULP PROJECT IN URUGUAY * * *
FINANCIAL RATE OF RETURN (IN CONSTANT PRICE)
CASE 3 - LBKP: 100% (GLOBULUS) - (USD 1000)

YEAR	FIXED CAPITAL EXPEND.	CHANGE IN WORKING CAPITAL	(1) GROSS CAPITAL EXPENDTR	OPERATING PROFIT	DEPRECIATN	(2) GROSS CASH IN-FLOW	(3) INCOME TAX	(4) BFR-TAX NET IN-FLOW (2)-(1)	(5) AFT-TAX NET IN-FLOW (4)-(3)	DEFLATOR
1991	114965.	1572.	116537.	0.	0.	0.	0.	-116537.	-116537.	1.000
1992	150066.	2217.	152282.	0.	0.	0.	0.	-152282.	-152282.	1.050
1993	99091.	1333.	100424.	0.	0.	0.	0.	-100424.	-100424.	1.102
1994	23956.	122.	24078.	0.	0.	0.	0.	-24078.	-24078.	1.158
1995	18667.	27546.	46213.	10497.	13834.	24331.	110.	-21882.	-21993.	1.216
1996	0.	11219.	11219.	46411.	26350.	72761.	1859.	61542.	59683.	1.276
1997	0.	5104.	5104.	65793.	25095.	90889.	8248.	85784.	77536.	1.340
1998	0.	124.	124.	68520.	23900.	92420.	9613.	92296.	82683.	1.407
1999	0.	-163.	-163.	70074.	22762.	92836.	11717.	92999.	81282.	1.477
2000	0.	1911.	1911.	60183.	21678.	81861.	10611.	79950.	69340.	1.551
2001	0.	-292.	-292.	61396.	20646.	82042.	12679.	82334.	69654.	1.629
2002	0.	-268.	-268.	63502.	19663.	83165.	14871.	83434.	68563.	1.710
2003	0.	-246.	-246.	65452.	18727.	84179.	16880.	84425.	67545.	1.796
2004	0.	-225.	-225.	67254.	17835.	85089.	18718.	85315.	66596.	1.886
2005	0.	-206.	-206.	68918.	16986.	85903.	20398.	86109.	65711.	1.980
2006	0.	-187.	-187.	70451.	16177.	86627.	21135.	86815.	65680.	2.079
2007	0.	-170.	-170.	71861.	15406.	87267.	21558.	87437.	65879.	2.183
2008	0.	-154.	-154.	73156.	14673.	87828.	21947.	87982.	66036.	2.292
2009	-34683.	-49236.	-83919.	74342.	13974.	88316.	22303.	172235.	149932.	2.407
	372062.	-0.	372061.	937810.	287705.	1225513.	212646.	853453.	640807.	

INTERNAL RATE OF RETURN

ON (4) BFR-TAX NET IN-FLOW (2)-(1) 11.92 PER CENT

ON (5) AFT-TAX NET IN-FLOW (4)-(3) 9.95 PER CENT

Table VI-26 * * * PULP PROJECT IN URUGUAY * * *

FINANCIAL RATE OF RETURN (IN CURRENT PRICE)

CASE 3 - LBKP: 100% (GLOBULUS) - (USD 1000)

YEAR	FIXED CAPITAL EXPEND.	CHANGE IN WORKING CAPITAL	(1) GROSS CAPITAL EXPENDTR	OPERATING PROFIT	DEPRECIATN	(2) GROSS CASH IN-FLOW	(3) INCOME TAX	(4) BFR-TAX NET IN-FLOW (2)-(1)	(5) AFT-TAX NET IN-FLOW (4)-(3)
1991	114965.	1572.	116537.	0.	0.	0.	0.	-116537.	-116537.
1992	157567.	2406.	159975.	0.	0.	0.	0.	-159975.	-159975.
1993	109248.	1668.	110916.	0.	0.	0.	0.	-110916.	-110916.
1994	27732.	423.	28156.	0.	0.	0.	0.	-28156.	-28156.
1995	22690.	33786.	56476.	12759.	16815.	29574.	134.	-26901.	-27036.
1996	0.	16311.	16311.	59233.	33630.	92863.	2372.	76552.	74180.
1997	0.	9649.	9649.	88169.	33630.	121799.	11053.	112150.	101097.
1998	0.	3466.	3466.	96414.	33630.	130044.	13527.	126578.	113052.
1999	0.	3223.	3223.	103531.	33630.	137161.	17311.	133938.	116627.
2000	0.	6590.	6590.	93363.	33630.	126993.	16461.	120404.	103943.
2001	0.	3479.	3479.	100007.	33630.	133637.	20653.	130158.	109504.
2002	0.	3670.	3670.	108610.	33630.	142240.	25434.	138571.	113137.
2003	0.	3870.	3870.	117542.	33630.	151172.	30313.	147302.	116989.
2004	0.	4081.	4081.	126818.	33630.	160448.	35296.	156367.	121071.
2005	0.	4302.	4302.	136452.	33630.	170082.	40386.	165779.	125394.
2006	0.	4535.	4535.	146461.	33630.	180091.	43938.	175556.	131617.
2007	0.	4780.	4780.	156862.	33630.	190492.	47059.	185712.	138653.
2008	0.	5038.	5038.	167673.	33630.	201303.	50302.	196265.	145963.
2009	-83469.	-112848.	-196318.	178911.	33630.	212541.	53673.	408859.	355185.
	348735.	-0.	348734.	1692804.	487634.	2180436.	407913.	1831704.	1423792.

INTERNAL RATE OF RETURN

ON (4) BFR-TAX NET IN-FLOW (2)-(1) 17.15 PER CENT

ON (5) AFT-TAX NET IN-FLOW (4)-(3) 15.04 PER CENT

Table VI-27

* * * PULP PROJECT IN URUGUAY * * *
NET PRESENT VALUE (IN CONSTANT PRICE)
CASE 3 - LBKP: 100% (GLOBULUS) - (USD 1000)

YEAR	FIXED CAPITAL EXPEND.	CHANGE IN WORKING CAPITAL	(1) GROSS CAPITAL EXPENDTR	OPERATING PROFIT	DEPRECIATN	(2) GROSS CASH IN-FLOW	(3) INCOME TAX	(4) BFR-TAX NET IN-FLOW (2)-(1)	(5) AFT-TAX NET IN-FLOW (4)-(3)	DISCOUNT RATE
1991	114965.	1572.	116537.	0.	0.	0.	0.	-116537.	-116537.	1.000
1992	136424.	2015.	138439.	0.	0.	0.	0.	-138439.	-138439.	1.100
1993	81894.	1101.	82995.	0.	0.	0.	0.	-82995.	-82995.	1.210
1994	17999.	92.	18090.	0.	0.	0.	0.	-18090.	-18090.	1.331
1995	12750.	18814.	31564.	7170.	9449.	16618.	75.	-14946.	-15021.	1.464
1996	0.	6966.	6966.	28817.	16361.	45179.	1154.	38213.	37059.	1.611
1997	0.	2881.	2881.	37139.	14166.	51304.	4656.	48423.	43767.	1.772
1998	0.	64.	64.	35162.	12265.	47426.	4733.	47362.	42429.	1.949
1999	0.	-76.	-76.	32690.	10619.	43309.	5466.	43385.	37919.	2.144
2000	0.	810.	810.	25524.	9194.	34717.	4500.	33907.	29407.	2.358
2001	0.	-113.	-113.	23671.	7960.	31631.	4888.	31743.	26855.	2.594
2002	0.	-94.	-94.	22257.	6892.	29149.	5212.	29243.	24031.	2.853
2003	0.	-78.	-78.	20855.	5967.	26822.	5378.	26900.	21522.	3.138
2004	0.	-65.	-65.	19481.	5166.	24647.	5422.	24713.	19291.	3.452
2005	0.	-54.	-54.	18148.	4473.	22621.	5371.	22675.	17304.	3.797
2006	0.	-45.	-45.	16865.	3873.	20738.	5060.	20783.	15723.	4.177
2007	0.	-37.	-37.	15639.	3353.	18992.	4692.	19029.	14337.	4.595
2008	0.	-30.	-30.	14473.	2903.	17376.	4342.	17407.	13065.	5.054
2009	-6238.	-8855.	-15094.	13371.	2513.	15884.	4011.	30978.	26967.	5.560
	357792.	24867.	382659.	331263.	115152.	446415.	65162.	63755.	-1406.	

Table VI-28 * * * PULP PROJECT IN URUGUAY * * *

PROFITABILITY AND FINANCIAL INDICATORS

CASE 3 - LBKP: 100% (GLOBULUS) - (USD 1000)

YEAR	(1) AFT TAX PROFIT -TO- SALES REV (PCT)	(2) AFT TAX PROFIT -TO- S/H EQUITY (PCT)	(3) BFR TAX PROFIT -TO- INVESTMENT (PCT)	(4) AFT TAX PROFIT -TO- S/CAPITAL (PCT)	(5) CURRENT RATIO	(6) QUICK RATIO	(7) DEBT SERVICE RATIO	(8) L/T DEBT -TO- S/H EQUITY	(9)* PROFIT B.E.P. CAPACITY UTILIZE (PCT)	(10)* CASH B.E.P. SALES PRICE (PRICE)	(11)* CASH B.E.P. CAPACITY UTILIZE (PCT)
1995	0.6	0.2	0.1	0.2	8.51	5.57	2.39	70 / 30	35.3	532.2	22.4
1996	3.4	2.9	1.4	3.0	7.72	5.54	1.76	69 / 31	85.3	523.8	61.8
1997	13.0	12.0	6.5	14.1	1.88	1.39	2.16	65 / 35	77.3	474.4	56.2
1998	15.0	12.8	7.9	17.2	1.11	0.83	1.42	58 / 42	73.5	593.6	71.7
1999	18.3	14.1	10.1	22.0	1.16	0.86	1.12	49 / 51	67.7	740.7	89.8
2000	16.6	11.8	9.6	21.0	1.25	0.92	1.11	40 / 60	71.6	797.3	92.7
2001	19.8	12.9	12.1	26.3	1.29	0.96	1.22	29 / 71	65.0	782.7	85.0
2002	23.2	13.7	14.8	32.4	1.34	1.00	1.38	17 / 83	57.0	769.0	78.0
2003	26.3	14.0	17.7	38.6	1.39	1.03	1.56	6 / 94	53.4	756.4	71.6
2004	29.2	14.1	20.6	44.9	2.44	1.82	1.78	0 / 100	48.3	744.8	65.6
2005	31.8	13.9	23.6	51.4	7.84	5.85	4.00	0 / 100	43.7	579.8	42.4
2006	33.0	13.1	25.6	55.9	7.81	5.84	********	0 / 100	41.7	479.1	28.2
2007	33.6	12.3	27.5	59.9	7.79	5.84	********	0 / 100	40.5	498.0	27.7
2008	34.2	11.6	29.4	64.0	7.77	5.83	********	0 / 100	39.4	518.2	27.2
2009	34.8	11.0	31.3	68.3	7.75	5.83	********	0 / 100	38.4	539.9	26.8
AVERAGE1	22.2	11.4	15.9	34.6	4.47	3.27	********	27 / 73	56.0	622.0	56.5
AVERAGE2	25.3	11.4	13.7	29.4	2.41	1.77	2.33	30 / 70			

(AVERAGE1) : SUM OF ANNUAL FIGURES OF PERCENTAGE AND RATIO IS DIVIDED BY NO. OF YEARS(SIMPLE AVERAGE)
(AVERAGE2) : AVERAGE FIGURES ARE CALCULATED BY ACTUAL VALUES ACCUMULATED OVER THE PROJECT LIFE(WEIGHTED AVERAGE)
* NOTE FOR (9)(10)(11)
WHEN THERE ARE TWO OR MORE PRODUCTS, AND DURING THE YEARS WHEN ALL OF PRODUCTS ARE NOT PRODUCED AT THE SAME RATE OF CAPACITY UTILIZATION, ABOVE BREAK-EVEN-POINTS CANNOT GIVE CORRECT FIGURES.

Table IV-29 * * * PULP PROJECT IN URUGUAY * * *

ECONOMIC RATE OF RETURN (IN CONSTANT PRICE)

ECONOMIC - LBKP: 100% (GLOBULUS) - (USD 1000)

YEAR	FIXED CAPITAL EXPEND.	CHANGE IN WORKING CAPITAL	(1) GROSS CAPITAL EXPENDTR	OPERATING PROFIT	DEPRECIATN	(2) GROSS CASH IN-FLOW	(3) INCOME TAX	(4) BFR-TAX NET IN-FLOW (2)-(1)	(5) AFT-TAX NET IN-FLOW (4)-(3)	DEFLATOR
1991	123369.	1572.	124941.	0.	0.	0.	0.	-124941.	-124941.	1.000
1992	162316.	2217.	164532.	0.	0.	0.	0.	-164532.	-164532.	1.050
1993	107180.	1333.	108513.	0.	0.	0.	0.	-108513.	-108513.	1.102
1994	25912.	122.	26034.	0.	0.	0.	0.	-26034.	-26034.	1.158
1995	20191.	26834.	47025.	15996.	10502.	26497.	0.	-20527.	-20527.	1.216
1996	0.	11209.	11209.	62024.	20003.	82027.	0.	70818.	70818.	1.276
1997	0.	5126.	5126.	82215.	19051.	101266.	0.	96140.	96140.	1.340
1998	0.	147.	147.	84739.	18143.	102882.	0.	102736.	102736.	1.407
1999	0.	-142.	-142.	86030.	17279.	103309.	0.	103451.	103451.	1.477
2000	0.	-29.	-29.	86666.	16457.	103123.	0.	103151.	103151.	1.551
2001	0.	-25.	-25.	87209.	15673.	102882.	0.	102907.	102907.	1.629
2002	0.	-21.	-21.	87712.	14927.	102639.	0.	102660.	102660.	1.710
2003	0.	-18.	-18.	88177.	14216.	102393.	0.	102411.	102411.	1.796
2004	0.	-15.	-15.	88606.	13539.	102145.	0.	102160.	102160.	1.886
2005	0.	-12.	-12.	89001.	12894.	101895.	0.	101907.	101907.	1.980
2006	0.	-9.	-9.	89362.	12280.	101642.	0.	101651.	101651.	2.079
2007	0.	-6.	-6.	89692.	11695.	101387.	0.	101393.	101393.	2.183
2008	0.	-3.	-3.	89992.	11139.	101130.	0.	101133.	101133.	2.292
2009	-40025.	-48279.	-88304.	90262.	10608.	100870.	0.	189174.	189174.	2.407
	398942.	-0.	398941.	1217682.	218406.	1436087.	0.	1037147.	1037147.	

INTERNAL RATE OF RETURN

ON (4) BFR-TAX NET IN-FLOW (2)-(1) 12.99 PER CENT

ON (5) AFT-TAX NET IN-FLOW (4)-(3) 12.99 PER CENT

Table VI-30 * * * PULP PROJECT IN URUGUAY * * *

ECONOMIC RATE OF RETURN (IN CURRENT PRICE)

ECONOMIC - LBKP: 100% (GLOBULUS) - (USD 1000)

YEAR	FIXED CAPITAL EXPEND.	CHANGE IN WORKING CAPITAL	(1) GROSS CAPITAL EXPENDTR	OPERATING PROFIT	DEPRECIATN	(2) GROSS CASH IN-FLOW	(3) INCOME TAX	(4) BFR-TAX NET IN-FLOW (2)-(1)	(5) AFT-TAX NET IN-FLOW (4)-(3)
1991	123369.	1572.	124941.	0.	0.	0.	0.	-124941.	-124941.
1992	170432.	2406.	172838.	0.	0.	0.	0.	-172838.	-172838.
1993	118166.	1668.	119834.	0.	0.	0.	0.	-119834.	-119834.
1994	29996.	423.	30419.	0.	0.	0.	0.	-30419.	-30419.
1995	24542.	32920.	57462.	19443.	12765.	32208.	0.	-25254.	-25254.
1996	0.	16255.	16255.	79160.	25530.	104690.	0.	88434.	88434.
1997	0.	9632.	9632.	110176.	25530.	135706.	0.	126074.	126074.
1998	0.	3450.	3450.	119236.	25530.	144765.	0.	141315.	141315.
1999	0.	3207.	3207.	127105.	25530.	152634.	0.	149428.	149428.
2000	0.	3532.	3532.	134447.	25530.	159977.	0.	156444.	156444.
2001	0.	3713.	3713.	142053.	25530.	167583.	0.	163870.	163870.
2002	0.	3902.	3902.	150016.	25530.	175546.	0.	171644.	171644.
2003	0.	4101.	4101.	158353.	25530.	183882.	0.	179781.	179781.
2004	0.	4311.	4311.	167080.	25530.	192609.	0.	188298.	188298.
2005	0.	4531.	4531.	176214.	25530.	201744.	0.	197213.	197213.
2006	0.	4763.	4763.	185777.	25530.	211306.	0.	206543.	206543.
2007	0.	5006.	5006.	195785.	25530.	221315.	0.	216309.	216309.
2008	0.	5262.	5262.	206261.	25530.	231790.	0.	226528.	226528.
2009	-96325.	-110655.	-206980.	217225.	25530.	242754.	0.	449735.	449735.
	370179.	-0.	370179.	2188327.	370179.	2558506.	0.	2188328.	2188328.

INTERNAL RATE OF RETURN

ON (4) BFR-TAX NET IN-FLOW (2)-(1) 18.33 PER CENT

ON (5) AFT-TAX NET IN-FLOW (4)-(3) 18.33 PER CENT

Table VI-31 * * * PULP PROJECT IN URUGUAY * * *

ECONOMIC NET PRESENT VALUE (IN CONSTANT PRICE)

ECONOMIC - LBKP: 100% (GLOBULUS) - (USD 1000)

YEAR	FIXED CAPITAL EXPEND.	CHANGE IN WORKING CAPITAL	(1) GROSS CAPITAL EXPENDTR	OPERATING PROFIT	DEPRECIATN	(2) GROSS CASH IN-FLOW	(3) INCOME TAX	(4) BFR-TAX NET IN-FLOW (2)-(1)	(5) AFT-TAX NET IN-FLOW (4)-(3)	DISCOUNT RATE
1991	123369.	1572.	124941.	0.	0.	0.	0.	-124941.	-124941.	1.000
1992	147560.	2015.	149575.	0.	0.	0.	0.	-149575.	-149575.	1.100
1993	80579.	1101.	89680.	0.	0.	0.	0.	-89680.	-89680.	1.210
1994	19468.	92.	19559.	0.	0.	0.	0.	-19559.	-19559.	1.331
1995	13791.	18328.	32118.	10925.	7173.	18098.	0.	-14020.	-14020.	1.464
1996	0.	6960.	6960.	38512.	12420.	50933.	0.	43973.	43973.	1.611
1997	0.	2894.	2894.	46408.	10754.	57162.	0.	54268.	54268.	1.772
1998	0.	75.	75.	43485.	9310.	52795.	0.	52720.	52720.	1.949
1999	0.	-66.	-66.	40134.	8061.	48195.	0.	48261.	48261.	2.144
2000	0.	-12.	-12.	36755.	6979.	43734.	0.	43746.	43746.	2.358
2001	0.	-10.	-10.	33623.	6043.	39666.	0.	39675.	39675.	2.594
2002	0.	-8.	-8.	30743.	5232.	35974.	0.	35982.	35982.	2.853
2003	0.	-6.	-6.	28096.	4530.	32626.	0.	32631.	32631.	3.138
2004	0.	-4.	-4.	25666.	3922.	29588.	0.	29592.	29592.	3.452
2005	0.	-3.	-3.	23437.	3395.	26832.	0.	26835.	26835.	3.797
2006	0.	-2.	-2.	21393.	2940.	24332.	0.	24335.	24335.	4.177
2007	0.	-1.	-1.	19520.	2545.	22065.	0.	22066.	22066.	4.595
2008	0.	-1.	-1.	17804.	2204.	20008.	0.	20009.	20009.	5.054
2009	-7199.	-8683.	-15882.	16234.	1908.	18142.	0.	34025.	34025.	5.560
	385567.	24240.	409807.	432734.	87415.	520150.	0.	110344.	110344.	

Figure VI-1 ORGANIZATION OF PAPER COMPANY AND PLANTATION COMPANY

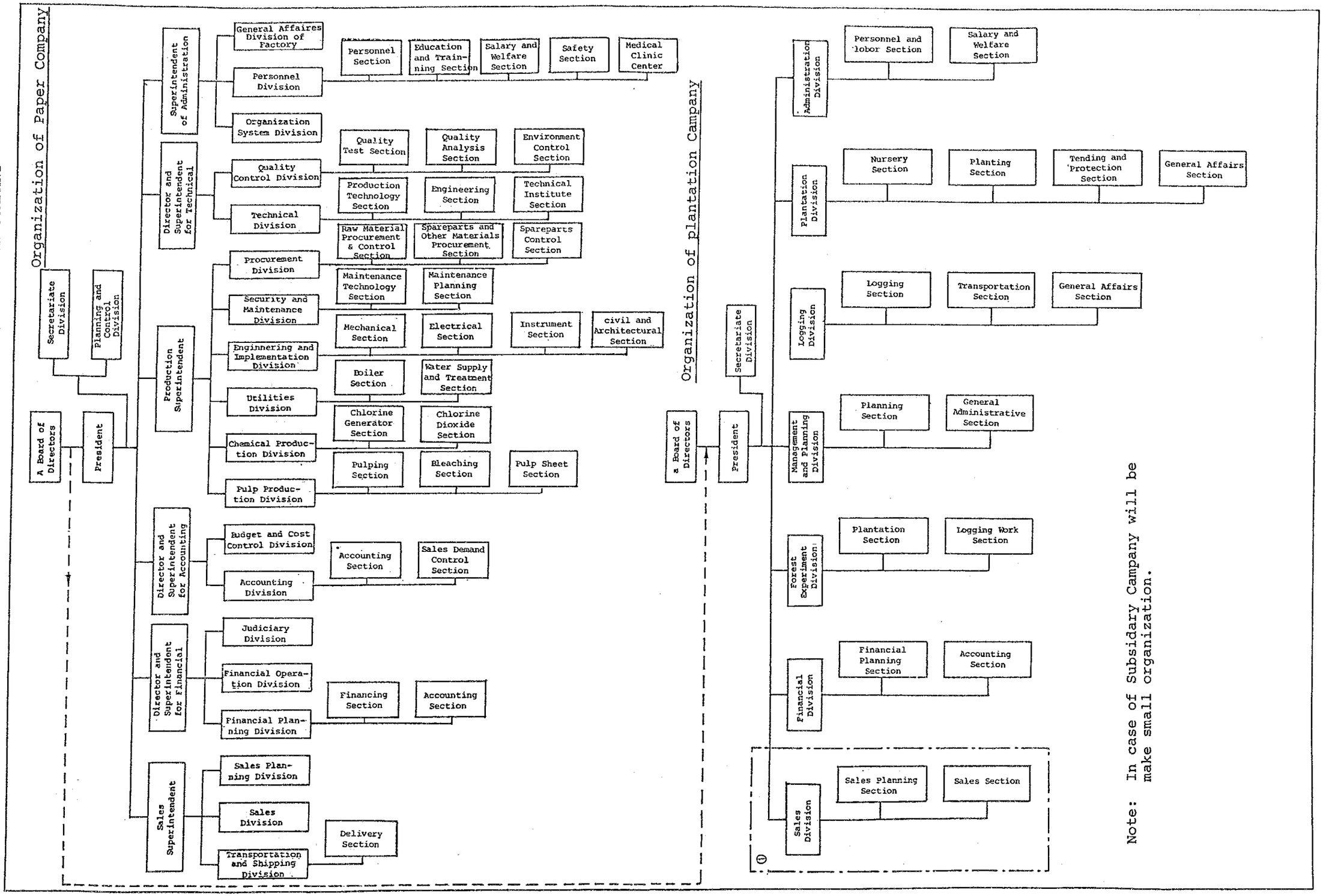


Figure VI-2 SENSITIVITY ANALYSIS ON THE MAJOR FINANCIAL FACTORS
(AFTER TAX FOR CASE 3)

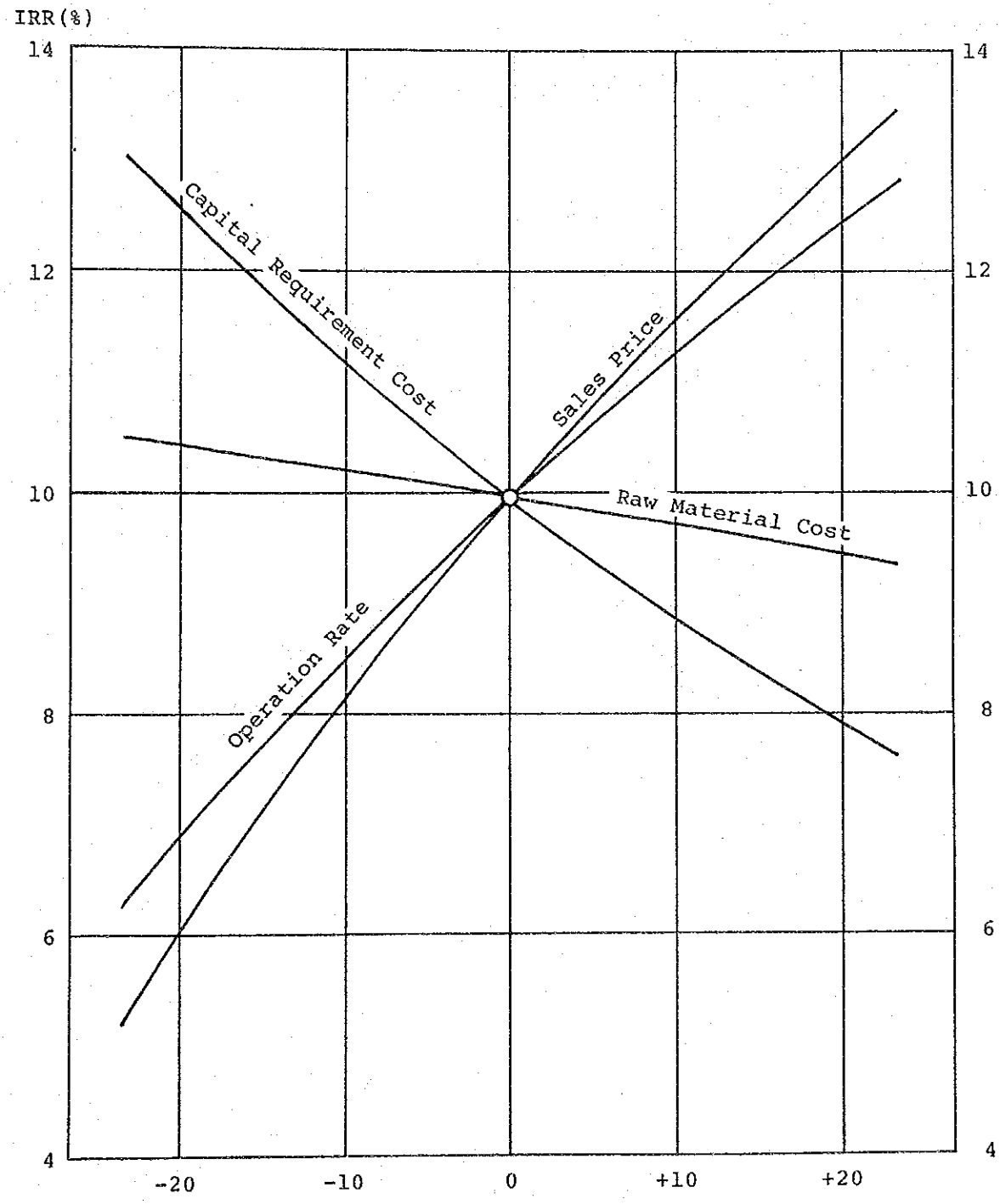
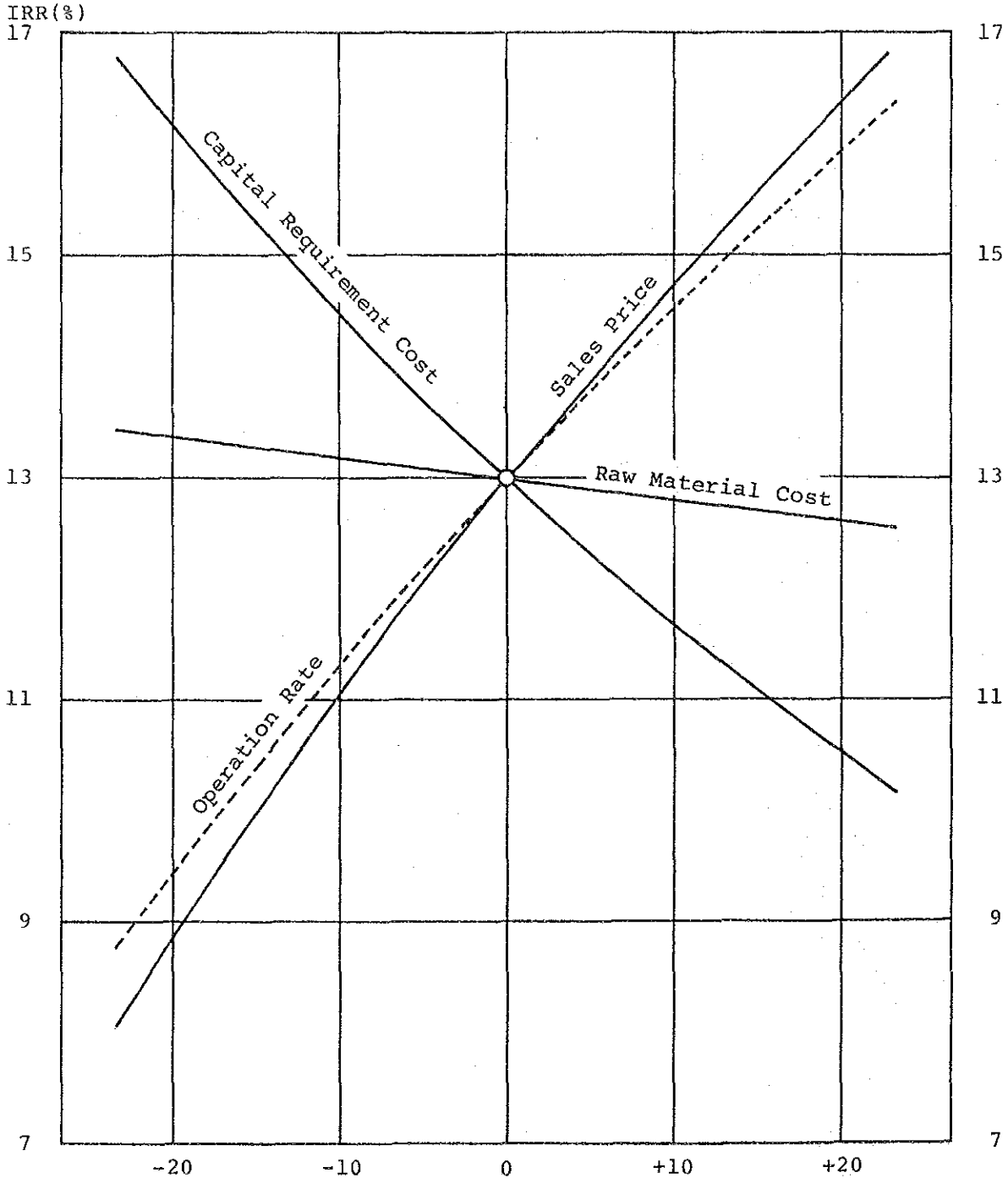


Figure VI-3 SENSITIVITY ANALYSIS ON THE MAJOR ECONOMIC FACTORS
(AFTER TAX FOR CASE 3)



第 Ⅶ 編

結 論 と 勧 告

第Ⅶ編　結論と勧告

以上，市場調査，森林資源と原木供給，プラントの基本設計，所要資金及び財務・経済分析を各編別に述べてきましたが，ここにその結論と勧告を述べます。

第1章　結　　論

（１）　パルプの生産基地の国際的変動の流れの中でウルグァイでのパルプ生産計画は国際市場を対象とする場合，妥当性をもっています。

また，国際的市場性からみてBKPの西欧への輸出，国際競争力を確保する意味から750T/Dの規模決定も妥当と考えられます。

（２）　立地はFray Bentosが最適と考えられます。これは原木の入手性，出来た製品の輸出用港湾設備設置の関係，敷地が確保出来る等の理由からです。

（３）　今回の建設方式はバージ方式が通常方式に対して建設費が高くなりMeritがないことから機器組立てを現地で行う通常方式を採用しました。

（４）　6種類の原木のパルプ化テストを日本で行いましたが，いずれもパルプ生産に適しています。しかし，成長率，比重，薬品の原単位及び工場着価格には下記のように大幅な相異があります。

	グロブラス	グランディス	ポプラ	L材平均	テーダマツ	エリオッテマツ	N材平均	L 50% N 50%
容積重 t/m³	0.555	0.410	0.361	0.481	0.375	0.355	0.365	
工場着価格[1] US$/m³	15.39 (13.64	15.39 13.64	14.59 12.84)	15.23	20.15 (16.16	20.15 16.16	20.15 16.16)	
US$/t	27.73	37.54	40.42	31.64	53.73	56.76	55.21	
生産量ADt/d	805	805	805	805	705	705	705	
必要木材量 BD t/d	1,607	1,607	1,607	1,672	1,672	1,672	1,672	
原単位 BDt/ADt	2.00	2.00	2.00	2.00	2.37	2.37	2.37	
必要木材量 m³/d	2,895	3,920	4,451	3,341	4,459	4,710	4,581	
必要面積[2] ha	48,025	63,788	73,938	—	129,938	143,688	—	95,908

(注) 1) 割引率12%, ( )の内割引率8%使用, いずれも土地価格225USドル/ha

2) 植林面積は全面積の80%でこの面積はFray Bentosから150 km以内のRio Negro, Soriano, Colonia 3県の植林奨励地域面積397,807haに充分入るものであります。

(5) パルプの1985年FOB価格はLBKP 407USドル/T, NBKP 439USドル/Tを設定しました。

(6) 比較検討のため次のケースについてStudyを行いました。即ち1980年に行われた紙パルプ産業開発計画調査報告書において提案されたBKP 750T/D(N:L=50:50)をBase Caseとして, 次の4つのケースにつき検討しました。

Base Case：原木のN：L比＝50：50(L材は4樹種併用)

Case 1 ：原木のN：L比＝50：50(L材はグラプラスのみ)

Case 2 ：原木のN：L比＝ 0：100 (L材は4樹種併用)

Case 3 ：原木のN：L比＝ 0：100 (L材はグロプラスのみ)

樹種別年間生産能力は下記のようになります。

	Production Capacity (ADt/D)	Annual Working Days (days)	Annual Production (ADt/Y)	Pulpwood Volume (M^3/D)	Consumption Weight (BDt/D)
Base Case					
N in average	705	181	127,500	4,581	1,672
L in average	805	159	127,500	3,341	1,607
Total	750	340	255,000		
Case 1					
N in average	705	181	127,500	4,581	1,672
L was globulus	805	159	127,500	2,895	1,607
Total	750	340	255,000		
Case 2					
L in average	805	340	273,700	3,341	1,607
Case 3					
L was globulus	805	340	273,700	2,895	1,607

尚，LとNの成長率からL材のみの場合は8年後，N材の場合は11年後から伐採が可能となりますので，N材を含む場合については1998年からBKP生産が行われるのに対し，L材のみの場合は1995年から生産に入れると想定しています。

（8） 総所要資金

各ケースの総所要資金は下記に示す通り，Base Project Costではどのケースでも，ほとんど変りありません。しかしながら，N：L比＝50:50のケースとL＝100%のケースとではPrice Contingency, Interest During Constructionに大きな差が出ます。これは，運転開始時期に3年間の差があるためです。

ESCALATED CAPITAL COST ESTIMATE

(Unit : Million US$)

Case / Product	Base Case N : L=50 : 50			Case 1 N : L=50 : 50			Case 2 L=100			Case 3 L=100		
1. Base Project Cost	F	L	T	F	L	T	F	L	T	F	L	T
	220.2	68.12	288.32	220.2	68.02	288.22	220.2	67.22	287.42	220.2	66.92	287.12
2. Physical Contingency	22.1	6.8	28.9	22.1	6.8	28.9	22.1	6.8	28.9	22.1	6.7	28.8
3. Price Contingency	144.3	48.1	192.3	144.3	48.0	192.3	91.9	30.9	122.8	91.9	30.8	122.7
4. Initial Working Capital	0	38.9	38.9	0	38.9	38.9	0	33.5	33.5	0	33.5	33.5
5. Interest During Construction	161.4	0	161.4	161.2	0	161.2	138.9	0	138.9	138.9	0	138.9
Total	548.0	161.92	709.82	547.8	161.72	709.52	473.1	138.42	611.52	473.1	137.92	611.02

（９） 財務分析の結果

各ケースについてのFRR及びNPVの計算結果を示すと第Ⅶ編の表Ⅶ－６のようになります。表Ⅶ－６からも判明するようにLBKPはNBKPより製品価格は安いにもかかわらず，L100%の方がN50%混合する場合より有利であり，特にグロプラス100%の場合が最も有利であることがわかります。これはL材の原木価格が安いためと年間生産量が高いことが影響しているためです。混合するBase CaseとCase 1については，Constant PriceでAfter tax 8 %を下廻り収益面から困難と判断されますが，L100%の場合は資金コストの関係もありますが，一般的にフィージブルの範囲に入ります。資金面から見ると，グロプラス100%の場合長期借入金返済（プラントスタート後３年据置き，７年返済）が始まって数年，財務比率（借入金返済能力1.11），資金繰り（当座比率）が低下していますが，一応全ライフ期間を過ぎて問題ありません。感度分析の結果は図Ⅶ－２に示します。この図からわかることは，FRRに最も大きな影響を与えるのはSales Priceで，次にCapital CostとOperation Rateがあり，Raw Materil Costの変化はあまり大きくないことです。これは生産コストの中では，原材コストが低いためです。ブラジルのケースのように，稼動率向上（750 T/Dの設計が900 T/Dに上る）が計られればその結果は大きいし，又逆に低稼動率の場合はFRR

は大幅に低下します。今回それを防ぐため，操業時に充分の費用を見込んでいます。

製品価格は今回想定した価格を中心として大幅に変化することが予想されます。資金繰りから見た販売価格分岐点は長期資金返済開始時期の1999年，2000年に想定価格の89.8%，92.7%となりますが，それ以外は大体80%以下であり，1999年，2000年を除けば価格変動にも耐えられると考えられます。しかし，よりソフト（長期低利）の資金を導入することが出来れば，安定性を増加することが出来ます。

（10） 経済分析の結果

財務分析に対して，法人所得税等の税金を除外すること，原木価格を燃料用として15USドル／BDTと評価すること，建設及び運転用の未熟練労働者の労働費を50%と評価すること，一方，道路，病院，住宅等の建設費を見込むことにより経済分析を行った結果，グロプラス100%の場合1991年コンスタント価格で，ERRは12.99%となりました。

このERR 13%は決して高いものではありませんが，十分フィージブルな範囲といえるでしょう。割引率10%の場合，経済的純現在価値は1991年コンスタント価格で110.3百万USドルと極めて大きいものです。また年間255,000トン輸出するとすると，1983年の価格（USドル369／t）で94百万USドル輸出となり，1983年総輸出額の9%にもなり，輸出拡大に大きく寄与することも明らかです。純外貨獲得額（外貨流入－外貨流出）も運転開始後10年間で累計1,299百万USドルとなり，ウルグァイの外貨保有高増加に大きく貢献することは確実です。

本計画の今一つの効果は，雇用促進にあります。すなわち，プラントの操業に1,021人，植林に約2,000人の人が雇用されます。また建設中（3.5年）に延145万人／日が雇用される見通しです。関係産業や各種サービス業もこの計画に伴い発展することによる雇用増も期待されます。

これらの外に利用度の低い土地を有効に利用し，且つそれにより土壌流出等の土地の荒廃を防止する等の効果もあります。

第2章　勧　　告

L100%のBKPを生産する場合，本プロジェクトは財務的にも経済的にも経済性があることが認められました。

しかし，以下のことを留意する必要があります。

（１）　パルプ工場は原料資源が十分にある地域に建設されるのが一般的であり，将来，原木の安定的供給を確保するためには植林の相当部分（ユーカリの場合50%，マツの場合35%以上）をパルプ工場が自ら行うことが望ましいし，また一方自己植林以外の部分については近隣土地所有者の協力が必要で，植林作業の確実な実行の保証とパルプ工場への確実な納入の保証力が絶対必要条件であります。

また植林を促進するためには税制，金融等他方面からの政府支援が望ましいことはいうまでもありません。

（２）　パルプ工場への投資額だけでBase project Costは約3億USドルを必要とし，その上50,000（グロブラス単独）～100,000ha（L50%, N50%）の土地の購入と植林費用，伐木，輸送設備等への投資額が必要であります。

また，財務評価において最も経済性の高いグロブラスの場合でも税引前11.92%，税引後9.95%の内部収益率になっています。この数字は決して高いものではなく，ソフトの金融が得られることが望ましいことを示しています。また過去の実績が示すようにパルプの市場価格は大幅に変動しますので，最低に下った時も資金的にShortしないこと，とくに長期返済が開始される数年間のことを考える必要があります。この面から，ソフトの金融を得ておくことが望ましいことは勿論です。

一方，経済分析で見られるように，本プロジェクトは輸出増進，それに伴う外貨の獲得，雇用の増大，土地の有効利用等，国家経済にとっては，極めて大きい効果をもつことが明らかです。

これらの点から政府の出資比率は20%以下に押えるにしても，このプロジェクト推進に当っては政府の強力なリーダーシップが求められます。

ブラジルの実績で述べたようにこのプロジェクトを実現するためには，技術面，市場面，資金面から見て他の国の政府または企業が国際機関の協力を得ることが望ましい。

外部組織との協力の方法についてはいくつかの形があるが，もし合弁をプロジェクト推進の方法として取り上げる場合は，ウルグァイ政府として，適正価格でパルプ用材が充分入手出来るための植林促進政策の確立，投下資本の非国有化や元本，金利，利益の送金保証など外資導入のための条件を整える必要があります。これは企業ベースでのメリットもありますが，それ以上にこのプロジェクトはウルグァイ経済にとってより大きな効果があります。

（３）　経済評価においては，病院，道路，社宅等の投資を含めて検討していますが，港湾については，１ケ月に２回程度の利用であることもあり，その投資額は含めていません。地域開発の面で，本プロジェクトも含め，検討していただきたいと存じます。

（４）　樹種選定については，L材の場合，グロブラス100%でもその他のL材との混合の場合でも経済評価に大きい影響はありません。従って，樹種選定については指定域内での供給安定性の面から，今後の調査が確認されることが望ましいと考えます。

（５）　本調査は現時点における調査であり，植林計画の実施期間を考えると，実際のプラント建設に着工するのは約７年後となります。従って，プラント建設のフィージビリティースタディーは実際の建設時期を勘案し，再度行うことを提案致します。

付　　録

A N N E X I

Annex I-1

SCOPE OF WORK FOR THE FEASIBILITY STUDY ON THE ESTABLISHMENT OF PAPER PULP MILL IN THE ORIENTAL REPUBLIC OF URUGUAY

Annex I-1

SCOPE OF WORK
FOR
THE FEASIBILITY STUDY
ON
THE ESTABLISHMENT OF PAPER PULP MILL
IN
THE ORIENTAL REPUBLIC OF URUGUAY
AGREED UPON BETWEEN
PLANNING, COORDINATION AND INFORMATION SECRETARIAT
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Montevideo, September 6 , 1984

Jorge PELUFO
Director of International
Cooperation Division
Planning, Coordination and
Information Secretariat
(SEPLACODI)

Fumio WADA
Team Leader
Preliminary Study Team
The Japan International
Cooperation Agency
(JICA)

I. INTRODUCTION

In response to the request of the Government of the Oriental Republic of Uruguay (hereinafter referred to as URUGUAY), the Government of Japan has decided to implement the feasibility study on the Establishment of Paper Pulp Mill (hereinafter referred to as "the Study") in URUGUAY in accordance with relevent laws and regulations in force in Japan.

The Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will extend the Study, in close cooperation with the authorities of URUGUAY.

The present document sets forth the Scope of Work for the Study.

II. OBJECTIVE OF THE STUDY

The objective of the Study is to examine the technical, economic and financial feasibility on establishment of a paper pulp mill for export oriented in URUGUAY.

III. SCOPE OF THE STUDY

In order to achieve the above objective, the Study will cover the following items:

1. The National Policy on the Pulp and Paper Industry
2. Market
   - (1) Present State of Demand and Supply
   - (2) Market Price
   - (3) Forecast of Demand and Supply
3. Forest Resources
   - (1) Field Survey
   - (2) Pulping Test (6 species)
   - (3) Selection of Suitable Trees

4. Evaluation of Forestation Plan
5. Raw Materials
6. Plant Site
   (1) Natural Conditions
   Meteorology, Geology, Topography, Land
   (2) Socio-economic Conditions:
   Labour Force, Wages, Population,
   Supporting Industries
   (3) Infrastructure:
   (3)-1 Port
   (3)-2 Road
   (3)-3 Railways
   (3)-4 Others
   (4) Utilities
   (4)-1 Electric Power
   (4)-2 Water
   (4)-3 Fuel Oil
   (4)-4 Chemical
   (4)-5 Others
   (5) Selection of Site
7. Plant Capacity
8. Conceptual Design
   (1) Design Standard
   (2) Process
   (3) Plant Layout
9. Environmental Impact
10. Organization and Manpower Plan
11. Construction and Operation Plan
12. Capital Requirements
13. Financial Analysis
14. Economic and Social Evaluation
15. Conclusions and Recommendations

IV. STUDY SCHEDULE

The Study will be carried out in accordance with the tentative schedule attached in Annex

V. REPORTS

The following reports will be prepared in English and submitted to the Government of URUGUAY in accordance with the above mentioned Study Schedule

1.	Inception Report	5 copies
2.	Progress Report	10 copies
3.	Draft Final Report (including the Spanish summary)	20 copies
4.	Final Report (including the Spanish summary)	50 copies

VI. UNDERTAKINGS OF THE GOVERNMENT OF URUGUAY

1. The Government of URUGUAY shall take following neccesary measures to facilitate the smooth implementation of the Study:
   (1) to inform the members of the Study team of any existing risk in the study area and (take any measures deemed necessary to) secure the safety of the members of the Team.
   (2) to permit the members of the Team to enter, leave and sojourn in URUGUAY for the duration of their assignment therein, and exempt them from alien registration requirements.
   (3) to exempt the members of the Team from taxes, duties, and other charges on equipment, instrument and other materials brought into URUGUAY for the implementation of the Study.

(4) to exempt the members of the Team from income tax and other charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Study.

(5) to provide necessary facilities to the Team for the remittances as well as utilization of the fund introduced into URUGUAY from Japan in connection with the implementation of the Study.

(6) to make arrangement for entry into private properties for the conduct of the Study.

(7) to secure permission to take all data and documents necessary for the Study (including photographs) out of URUGUAY to Japan by the Team.

(8) to facilitate the quick and smooth customs clearance of the equipment and materials brought into URUGUAY by the Team for their field study.

(9) to arrange the recruitment of local staff such as laborers etc.

(10) to arrange medical services for the Team during its stay in URUGUAY as needed.

2. Planning, Coordination and Information Secretariat (hereinafter referred to as SEPLACODI) shall act as a counterpart agency to the Team and also as a coordinating body in relation with other government and non-governmental organizations concerned with the smooth implementation of the Study.

3. SEPLACODI shall, at its own expense, provide the Team with the following, in cooperation with other relevant organizations.

(1) available data and information related to the Study

(2) counterpart personnel

(3) suitable office space with necessary supplies and equipment in Montevideo.

(4) credentials or identification cards

(5) vehicles with driver necessary for the Study

4. The Government of URUGUAY shall bear claims, if any arises against the members of the Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Team.

VII. UNDERTAKING OF JICA

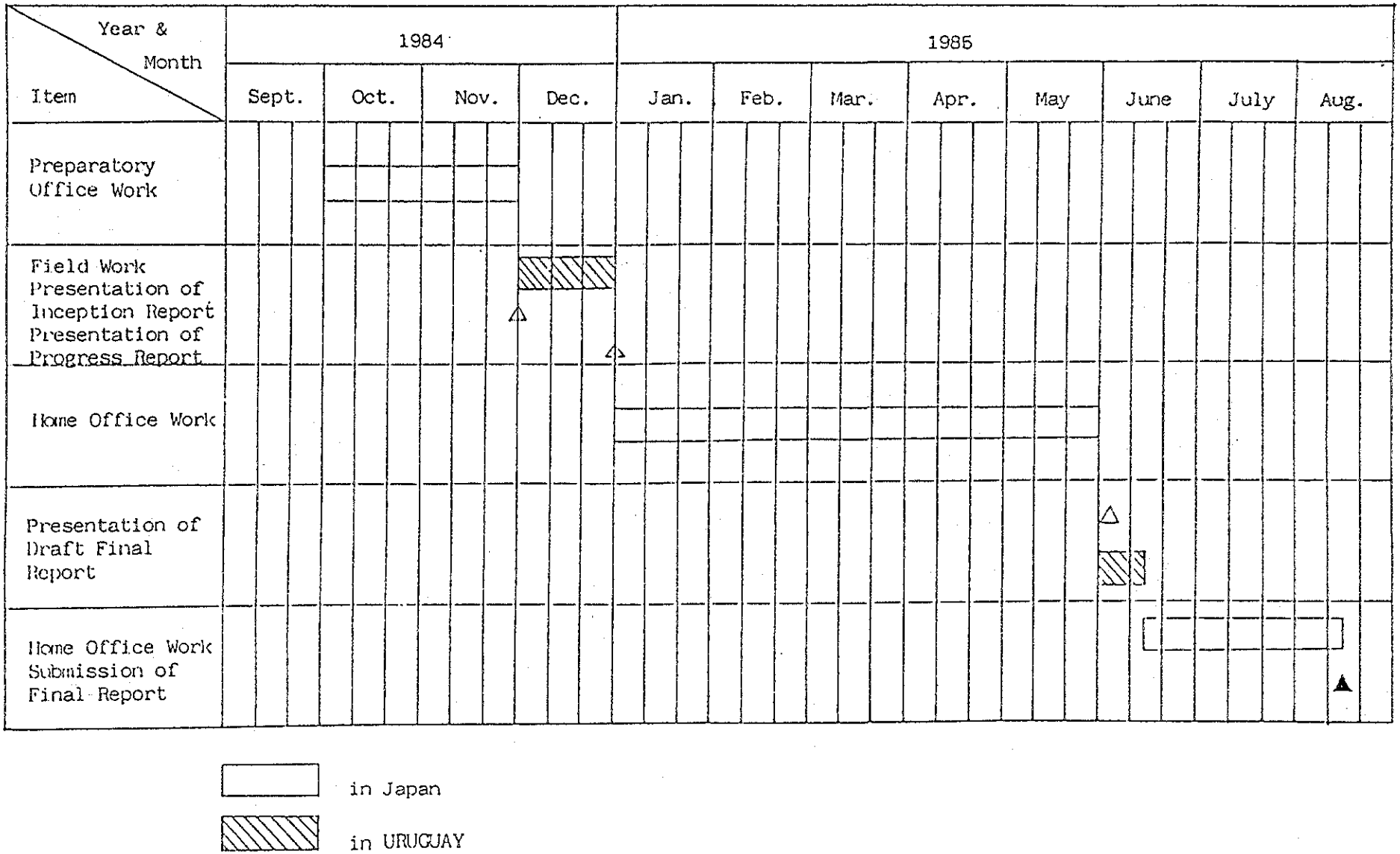
For the implementation of the Study, JICA will take the following measures.

1. To dispatch, at its own expense, Study teams to URUGUAY.
2. To pursue technology transfer to the Uruguayan counterpart personnel in the course of the Study.

VIII. MUTUAL CONSULTATION

JICA and SEPLACODI will consult with each other in respect of any matter that may arise from or in connection with the Study.

Tentative Schedule of the Study



Annex I-2

MINUTES OF MEETING
(SEPTEMBER 6, 1984)

Annex I-2

Minutes of Meeting

The Japanese preliminary Survey Team (the Team) sent by the Japan International Cooperation Agency (JICA) and the Planning, Coordination and Information Secretariat (SEPLACODI) exchanged views and had a series of discussions during the period from August 29th to September 6th, 1984 on the Scope of Work (S/W) for the Feasibility Study on the establishment of a paper pulp mill in the Oriental Republic of Uruguay.
As a result of the discussions, both parties agreed with the S/W attached hereto as ANNEX.
Further, the following points were additionally agreed between JICA and SEPLACODI.

1. Regarding Article 3 of Item III of S/W agreed upon between JICA and SEPLACODI, sampling method will be selected in mutual agreement.
   JICA will, at its own expense, carry out the pulping test necessary for selection of suitable trees, in Japan.
   SEPLACODI will take necessary measures in Uruguay to send the sample logs to Japan for the test.

2. Regarding Article 5 of Item III of S/W , quality, price and quantity of raw materials necessary for cost analysis should be decided by consultation between JICA and SEPLACODI

3. Regarding Article 6 of Item III of S/W , candidate sites are the following
   (1) Juan Lacaze
   (2) Fray Bentos
   (3) Casablanca

4. SEPLACODI requested the training of the counterpart personnel in Japan during the Study period.
The JICA Team promised to convey this request to the authorities concerned in Japan.

5. SEPLACODI strongly requested the technical cooperation for making the forestation plan as an another Project.
The JICA Team promised to convey this request to the authorities concerned in Japan for its favourable consideration.

Montevideo, September 6 , 1984

F. Wada.

Fumio WADA
Team Leader
Preliminary Study Team
The Japan International
Cooperation Agency
(JICA)

Jorge PELUFO
Director of International
Cooperation Division
Planning, Coordination and
Information Secretariat
(SEPLACODI)

Annex I-3

INTERIM REPORT FOR THE FEASIBILITY STUDY ON THE ESTABLISHMENT OF A PAPER AND PULP PLANT IN THE ORIENTAL REPUBLIC OF URUGUAY

(DEC. 21, 1984)

INTERIM REPORT FOR THE FEASIBILITY STUDY ON THE ESTABLISHMENT OF A PAPER AND PULP PLANT IN THE

ORIENTAL REPUBLIC OF URUGUAY

DEC. 21, 1984

JAPAN INTERNATIONAL COOPERATION AGENCY

MONTEVIDEO URUGUAY

Montevideo December 21st. 1984

In compliance with the requirement of the Scope of Work dated, September 6, 1984 , exchanged between the goverment of the Oriental Republic of Uruguay and the Japan International Cooperation Agency, the study team has submitted 10 copies of the Interim Report (Progress Report), which shows the results of the feasibility study survey in URUGUAY by the study team, during November 29th. 1984 to December 21st. 1984, on the establishment of paper pulp mill in the Oriental Republic of Uruguay.

The Uruguayan counterpart has received the above Interim Report with thanks and confirmed that the contents of the report was made based on the opinion of the both parties.

Sr. Jorge Pelufo
SEPLACODI

Sr. Y. Mikami
JICA Study Team Leader

C O N T E N T S

CHAPTER I

PREFACE

The study mission team of Japan International Cooperation Agency (JICA) for the feasibility study on the establishment of a paper and pulp plant in Uruguay has started study activities on Nov. 29, 1984 in Montevideo, Uruguay by 1st. Team.

The study activities in Uruguay were carried out in collaboration with the Uruguay counterparts of SEPLACODI.

SEPLACODI assigned the staffs from the following organization for guiding and assisting the study as acting counter parts.

SEPLACODI
MINISTRY OF INDUSTRY AND ENERGY
MINISTRY OF AGRICULTURE AND FISHERY
UNIVERSITY OF AGRICULTURE OF REPUBLIC
LATU

The study team submitted the Inception Report on Nov.30, 1984 at the 1st general meeting to explain the concept of overall study plan.

During 1st and 2nd. General Meeting, basic concept and rough schedule of study in Uruguay were settled.

Then, data and information collection in Montevideo were made in three fields i.e. Economic Analysis including Domestic market, plantation and Plant Construction by 1st Team.

2nd team was arrived on Dec. 8, 1984 and the study team visited various organization and candidate sites of plant and plantations which are out of Montevideo after 3rd. General Meeting Held on Dec 10, 1984.

The study team summarized the result of survey in Uruguay which is the base of works in Tokyo and discussed with counter part on Dec 20th and 21st. 1984 and confirmed the results as follows.

The main points were as follows.

(1) Object of the study is the export oriented paper and pulp plant which is recomended by JICA as phase III in the Master plan.

And phase I (Renovation of Existing plant) and phase II (Newsprint-Domestic Use) are excluded from the study

(2) BKP 750 t/d is recommended by Team as the plant to be studied from the view point of the world market situation and was accepted by Uruguay side however this will be re-checked during the study in consideration of world market, plantation plan and others during the study.

(3) Uruguay side explained and the survey team is agreed that this project is aim for the export oriented plant and the domestic market size is relatively small in comparison with the estimated capacity,therefore the analysis of domestic market is not so important.

(4) In the Market Analysis,the following items should be included.
   (a) Bleached Kraft pulp
   (b) Unbleached Kraft Pulp
   (c) papers
   (d) paper boards
   (e) chips

(5) As the candidate plant site, undermentioned three places have been selected before starting the site survey.

A) CASA BLANCA
B) FRAY BENTOS
C) JUAN LACAZE

After site survey has been completed the result is summerized in chapter No. 8
The study team considers FRAY BENTOS as the most suitable place for the project.

NUEVA PALMIRA is just checked as reference.

(6) The kind of Trees to be tested in Japan was selected by Uruguay side as follows before starting the sampling works.

Kinds of Trees	Location and/or owner
GRANDIS (EUCALYPTUS)	CAJA BANCARIA
GLOBULUS (EUCALYPTUS)	FNP
MAIDENI (EUCALYPTUS)	FNP
TAEDA (PINES)	CAJA BANCARIA
ELLIOTTI (PINES)	CAJA BANCARIA
POPULUS	CAJA BANCARIA

The samples (each about 20 kg) from each kind of trees were satisfactorily collected during site survey and arranged for aim freighting to Japan.

(7) The study team has visited the following locations to see and study the plantation conditions.

A) FNP plantation area
B) PAMER plantation area
C) CAJA BANCARIA plantation area
D) RIVERA
E) TACUAREMBO
F) MELO

The result of local survey is summaried in chapter Nº4

(8) The conditions on the Financial and Economical Analysis are discussed and summarized in chapter Nº9

The study team received various informations and documents which are required to examine the technical, financial and economic feasibility study of the proposed project for which the Study team thanks very much for the cooperation of the URUGUAY side.

The study team expresses sincere apreciation for guidance and assistance extended by SEPLACODI, MINISTRY OF INDUSTRY AND ENERGY, MINISTRY OF AGRICULTURE, UNIVERSITY OF AGRICULTURE and LATU, from the begining to the end of the study survey in URUGUAY.

CHAPTER 2

PROJECT TO BE STUDIED. (Refer to minutes of meeting)

The URUGUAY side confirmed that the object of this study is limited to the export oriented paper and pulp plant which corresponds to the phase III of the Master Plan submitted by JICA on 1981 but is not includes phase I (short-term plan- Naionalization of the existing plants) and phase II (medium-term plan-newspaper plant for domestic market)

The study team explained that 750 t/d BKP plant which was recommended in the Master plan is the most suitable one as the export oriented project.

The URUGUAY side agreed it but requested to be checked from the view point of World Market and the availability of wood.

CHAPTER 3

MARKET STUDY (Refer to minutes of meeting)

Uruguay side requested to study the world market of the following products but not only BKP and the study team has accepted.

(A) unbleached kraft pulp

(B) papers

(C) paper board

(D) chips

Domestic market is assumed as relatively small in comparison with the expected capacity, therefore the study of domestic market will be analyzed by analyzing staticties only but not through interview of clients and manufacturers.
As the reference, marketing situation of pulp (especially in case of Brazil) will be studied.

Chapter 4

Wood Supply

a) Study on plantation (Confirmation of availability of wood to the pulp plant)

According to the master plan made by JICA on February, 1981, it is necessary for the pulp mill to secure about 100.000 ha. of plantation. Soil type 7.8.and 9 have enough areas to allot its land to plantation required by the pulp mill respectively.

On the other hand, since existing plantation areas in soil type 7, 8 and 9 are short of plantation areas required by the pulp plant, it is inevitable to develop new plantation which will be able to supply pulpwood required by the pulp plant.

Although it is recommendable for the pulp plant to have its pulpwood supply sources as near as possible, Study Team will work out a plantation development program as a sample on condition that 50 % of new plantation locates within 100 km form the pulp plant, having average transportation distance of 75 km, and another 50% locates within 150 km from the pulp plant, having average transportation distance of 125 km.

b) Cost and price of pulpwood at the plant site.

Calculation shall be made on the following basis.

i) Price of land: U$S 225/ha

ii) Cost of plantation, cutting age and harvesting volume

Years	Pine	E. and Populus
0	N$ 6.193,50	8.503.50
1	619,40	850,30
2	619,40	850,30
3	619,40	850,30
:	-	-
8	-	500,00 ($25m^3$/ha/year)
:	-	
11	($15m^3$/ha/year)	-
:		
14		500,00 ($30m^3$/ha/year)
:		:
20		500,00 ($30m^3$/ha/year)
:		:
28		500,00 ($25m^3$/ha/year)
:		:
36		: ($25m^3$/ha/year)

iii) Interest rate: according to the agreement between Counterparts and Study Team based on LIBOR.

iv) Logging cost:

Pine : N$ 150/ton, including loading cost, with bark conversion: 0.8 t/m^3

E. and Populus: N$ 250/m^3, including loading cost, without bark. conversion: E = 1, t/m^3, Populus = 0.8 t/m^3

In spite of the above actual logging cost, Study Team would like to increase logging cost in consideration of depreciation cost, and logging road maintenance cost, if necesary, not only because it seems difficult to extract the whole of volume required by the pulp plant by traditional logging method only, but also because it seems necessary to introduce mechanical logging system in order to handle a huge amount of pulpwood volume.

v) Transportation cost

up to 150 km : N$ 3.00/ton/km

more than 150 km : N$ 2.70/ton/km

c) Log samples to be studied in Japan

By the sample collection team, the following six kinds samples collected according to the agreement made by the meeting held on December 10th. 1984

Sample No.	Species	Collected locations
No. 1	Eucalyptus Maideni	FNP
No. 2	Eucalyptus Globulus	FNP
No. 3	Pinus taeda	CAJA BANCARIA
No. 4	Populus	CAJA BANCARIA
No. 5	Pinus, Elliotti	CAJA BANCARIA
No. 6	Eucalyptus Grandis	CAJA BANCARIA

All of the above samples were delivered to Montevideo for the arrangement for airfreighting to Japan.
Upon arrival all of the sample above to Japan, we are scheduled to carry out the pulp test according to the rule of Japanese Industrial Standard (JIS).
The datailed report for above sampling works please refer to the survey report made by the sample collection team.

CHAPTER 5

OTHER RAW MATERIAL THAN WOOD

Pulp factory requires chemicals other than raw woods.

Chemicals	Objective
Salt (NaCl)	Production of caustic soda (NaOH) and chlorine (Cl_2) by electrolysis.
Salt Cake (Na_2SO_4)	Make-up for cooking liquor.
Lime stone ($CaCO_3$)	Used for causticizer process to recover caustic soda.
Sulfuric acid (H_2SO_4)	Production of chloride dioxide (ClO_2).

Above chemicals other than lime stone are imported from other country under the condition of import tax exemption because of export oriented factory.

CHAPTER 6

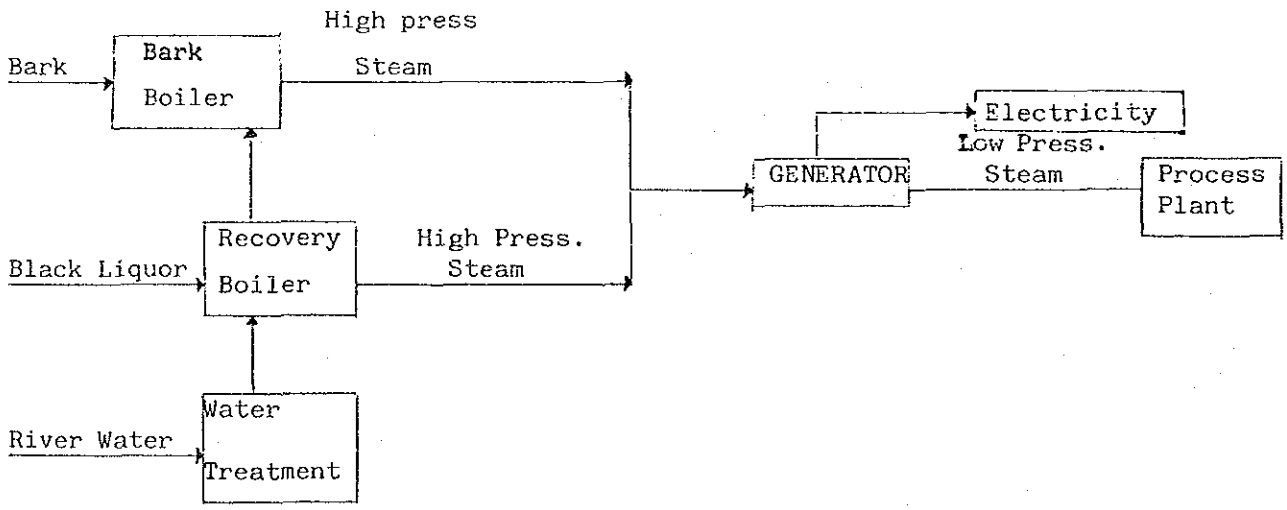
UTILITIES OF PLANT

Pulp factory consumes much utility such as steam, water, electricity and so on.
In general utility of steam and electricity in pulp factory only is almost in balance supplying energy from bark and black liquor.
80% of electricity is possibly generated from above energy and 20% is purchased from outside.

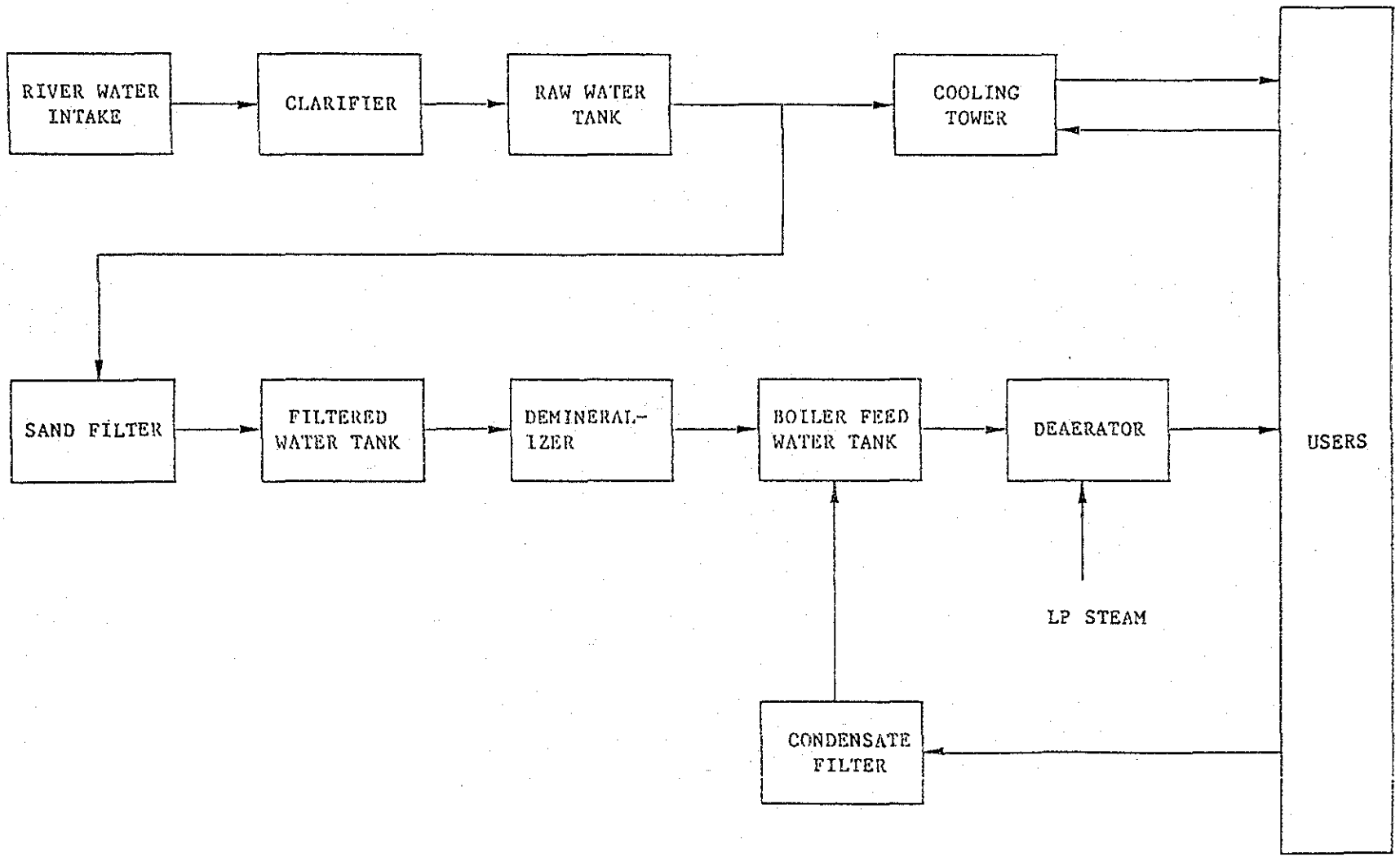
Water treatment method of river water is decided taking into account of raw water quality and however same method adopted in the pulp factories in Uruguay will be applied to this project.

Utility flow diagram for pulp factory is attached:

UTILITY FLOW

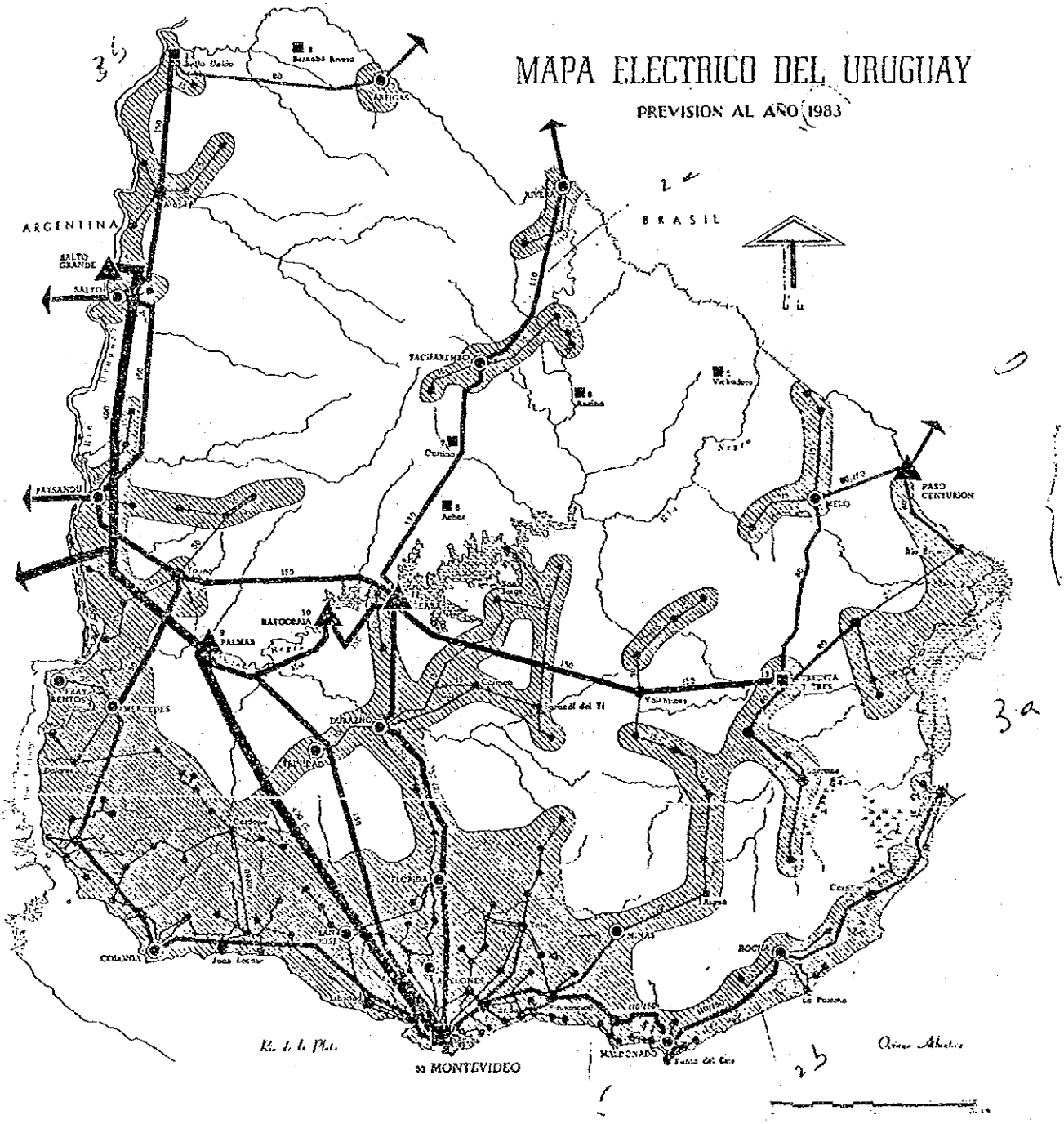


WATER SYSTEM



電力供給図.

12/8.
from Mrs. Cazzadori



UNIT. KV.

150 KV → 30 KV
use transformer.
30 KV → 15 KV usually.

50 KV. some place
50 cycle
(60) usually.

CHAPTER 7

REGULATION AND CODE

Based upon below-mentioned codes and regulations, the plan for facilities, layout, construction and operation for the pulp factory is provided:

a) Plant location and facilities installation
b) Labor safety, maintenance, fire
c) Insurance and tax
d) Land, road, fishery
e) Industrial standards for facilities and materials
f) Necessary law, standard, regulation code.

In case above codes and regulations are not sufficiently stipulated, in this study international prevailing code and regulation shall be applied.

CHAPTER 8

PROJECT SITE SELECTION AND PLANT CONSTRUCTION

8-1 Project site selection

(1) General Discussion

The selection of the location and site for pulp plant is carried out by the comparison study of three possible candidates, (i) Juan Lacaze (ii) Fray Bentos, and (iii) Casa Blanca. In this study the site selection is to be decided taking into account of following criteria:

(a) General criteria

* Facing to river because of export oriented factory from the viewpoint of products transportation.
* Ample space for plant site considering future expansion.
* Possible utilization of existing infrastructure.
* Accordance with regional development plan.

(b) Special criteria for pulp plant

* Availability of good quality and large amount of water.
* Adjacent to plantation site from the viewpoint of logs transportation, ranging up to 100-150 Km.
* Possibly taking environmental measures against waste effluent, noise, vibration and ordor.

(2) Individual conditions for three candidates

(a) Juan Lacaze

This site is located at west of Montevideo and 120 Km far from it. In this city the biggest paper & pulp factory, FNP, is under operation. However there is no port available for international transportation of products. This city does not have any plan to develop industrial area and there are many residential houses around the FNP Factory. And also this site is far from the promotional plantation area.

(b) Fray Bentos

Fray Bentos is located in north west direction far about 300 Km from Montevideo and faces to the Uruguay River.

They prepare about 140 ha area for future industrial promotion and also closed meat factory area 90 ha which has own berth.

And the wharf for grain transportation has experience that 52.000 ton of vessel (ship name EUTHALIA) moored there loading 18.350 ton of cargo.

Water depth around the wharf is about 7-8 m.

The planned industrial zone is on the mild slope and its land height averages 5-15 m from the river level.

This area is adjacent from the promotional plantation area and therefore it is advantageous for log gathering and transportation.

With regard to wharf , whether the existing wharf is used or newly instllation of it, shall be contemplated from the idea of newly common wharf for industries or environmental factor of truck transportation from factory to the existing wharf.

According to the industrial development plan, in future the railway is expected to extend to this planned industrial area.

Natural gas from Argentina through the San Martín bridge is expected to introduce to this country and it is also expected to use for industry and household purposes. As clean energy natural gas is possibly used for kiln fuel in causticizer process.

In this industrial area purchasing electricity from outside is also available.

(c) Casa Blanca

This town near Paysandú is located at 70 Km upstream of the Uruguay River from Fray Bentos.

150 ha of industrial area has been planned and however any practical plan for land preparation and road preparation are not provided so far.

Near the planned industrial area, good port construction for international transportation is not expected so far.

At the 60 Km downstream of Casa Blanca, there is San Martín bridge crossing the Uruguay River. As this bridge height from surface of river is about 40m , the restriction of height is taken consideration in case of industrial platform type for pulp plant.

The condition of logs gathering and transportation is same as Fray Bentos.

(3) Selection of project site

Detail comparison study shall be conducted in Japan.

However from the viewpoint of available port construction or utilization of existing port at which is possibly moored at least about 20.000 DWT occean vessel, Fray Bentos is considered as the most favourable site so far. In addition to the above, Fray Bentos has a relatively practical industrial development plan and prepares future industrial area including the space of the closed meat factory which faces to the Rio Uruguay.

8-2 Plant design and construction

To design and construct projected pulp plant, following considerations and steps are taken into consideration:

i) Plant conceptual design

* Set up for design basis such as code /regulation and process design basis
* Selection of suitable pulp manufacturing process and decission of production capacity.
* Basis design of pulping process taking account of kinds of raw material, technology reliability, operational economics, products quality to meet market and flexible production for market demand change, (a) material balance, (b) block flow diagram of pulping process, (c) utility and chemicals consumption are obtained as out put.

ii) Basic plan for plant facilities

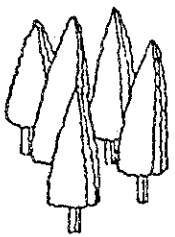
In order to estimate plant cost and consider plant layout, transportation plan of equipments and construction plan, the basic plan of plant facilities is prepared as follows:

* On-site facilities (KP plant and chemical production plant)
* Utility faciiities (Boiler, receiving of elctricity, water intake, etc)
* Offsite facilities (Loading/unloading, chip yard facilities, hydrants, environmental facilities, etc.)
* Building (Building for pulp machine, administration office, laboratory, control room, warehouse, employees' houses, etc.)

iii) Plant Layout

Plant layout for pulp factory is prepared based upon location condition such as natural conditions, topography, road, railway, port. In this step, following items are contemplated:

WOOD AND CHIP HANDLING



WOOD HARVEST-ING

LOG SORTING

TRANS-PORTATION

STOR-ING

BARK-ING

CHIPP-ING

SCREEN-ING

CHIP BING OR SILOS

PULPING PROCESS

ROLL-ING

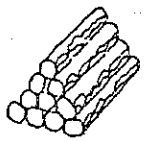
WRAPP-ING

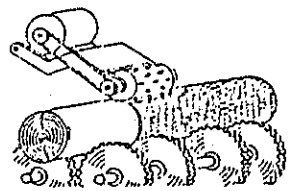
SHIPP-ING

WOOD YARD

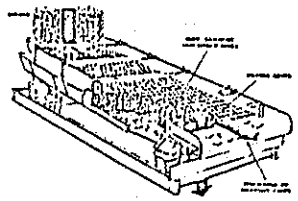
WATER OR LAND TRANS-PORTATION

PULP FACTORY

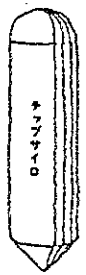


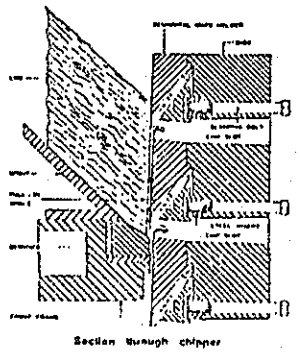


Rosser head barker configuration



Conventional chip screen





Section through chipper

(a) To play good performance of process line and auxiliary facilities.
(b) To keep easy maintenance.
(c) To consider construction procedure.
(d) To consider future expansion plan.
(e) To consider efficient material handling such as receiving raw materials (logs, chips, chemicals), discharging products pulp, storing materials.

iv) Construction Method

There are two construction method, one is conventional the other module method (or Barge-mounted method).
The selection of constructions method depends on following factors:
(a) Characteristics of plant
(b) Site conditions
(c) Project schedule, etc.

This study illustrates pros and cons of two construction methods considering above mentioned factors.

v) Environmental conservation

According to the factories survey, they flow out their waste water almost directly to river.
In this study based upon Uruguay's envirnmental regulations and refering Japanese regulations which is believed as the most severe in the world, environmental facilities are planned.

Chapter 9

Basis for financial and Economic Analysis for proposed project

1) Scope of investment

In the Financial Analysis, Processing plant, utilities facilities and Maintenance shop will be considered but infrastructure (Expansion or improvement of Port or load) and Housing Colony are excluded

In the Economical Analysis, investment on the infrastructure and Housing Colony are considered.

2) Object of F/S of the export oriented pulp plant is to give the indication to the plantation plant, about the possibility of use of wood to pulp plant.

Therefore, in this study location of plantation will not be definitly mentioned.

3) Investment Body

The export oriented pulp plant is a huge plant which is necessary to be supported by the government and also the project involved Government investment has the possibility to get soft loan from abroad.

However, in general, the government own factory is not operated economically, therefore even Goverment Investment is required, the share of Goverment should be limited within 20%.

The investment of the existing paper and pulp company to the export oriented pulp plant is desireable to utilize their experience, however 5% will be the limit in consideration of the required investment amount and financial status of the existing companies.

There is no restriction in Uruguay to the Investment by the Foreign Companies, therefore at the stage of realization of project, it must be considered.

4) Debt Equity Ratio

Equity Ratio is assumed as 30%

5) Project Financing Schedule

For the Foreign Currency, Consultant will study the possibility of several finance resources.

The following banks are there in Uruguay, but Banco República and Foreign Banks are considered as the source of finance

- Central Bank
- Banco República (BROU)
- Banco Comercial
- Banco Caja Obrera
- Foreign banks

*1)

The rate of interest of Banco República could be LIBOR + 2 or 2.5%

6) Project Life span

This will be decided by consultant

7) Depreciation and Amortization

Building 50 years: negotiable to reduce to 25 years

Machine and Equipment 10 - 20 years

Patents and other amortization: 5 years

8) Taxes and Levies

Corporate Income Tax	30%
Value Added Tax	20% but not over exports
Commodity Tax	0% in the case of export of product
Import duty of Machine and material	10% but 0% if National Investment project but the following charge will be adopted

6.25% in case use port (by ship) but not if used plane or truck
1.00% Bank (private)
0.75% Exchange Agent (private)
0.75% Port Agent (private)
1.00% Other charge
9.75% ≒ 10%

Tax on Net Assets 4% Tax holiday (5 years)
Local Tax
i) Building Tax 1.5% Tax holiday (5 years)
ii) Revenue Tax -
iii) Stamp Duty -
No other tax is charged

* 2)

9) Escalation and Exchange rate

In order to keep the competitiveness, Cpl ratio between Uruguay and World should be less or equal to the changing ratio of foreign currency exchange rate.

10) Shadow price

At present, shadow price is not applied in Uruguay.

* 1) List of Bank is received
* 2) Tax on the revenue of employment should be considered

11) Project Financing Schedule

(1) Long term loan

1) Possible financial conditions for long term credit will be applied for the foreingn currency portion which may be consisting of imported equipment and materials, licence and know how fee, engineering service, construction supervision, commissioning and start-up, etc.
As a security for such long term credit, guarantee by the goverment authorities will be provided.

2) The rest of required loan portion will be assumed to be financial by local financial institutes such as BROU and Foreign Banks.
Major conditions by local financiers for long term credit are as follows:

Grace period : 3 years
Total period : 10
Repayment : 7 years (14 times)
Interest rate: Libor + 2 or 2,5%+0,25%

12) Short term loan

If it caused shortage in the cash flow during the operation of the plant, such shortage will be maintained by short term credit by local financiers of which financial conditions are assumed to be as follows:

Period: less than 12 months
Interest rate: Libor + 3 or 3,5% p.a.

Currency and Exchange rate

All financial and economic analysis and evaluations are made U.S. Dollar basis, and its exchange rate applicable for conversion from the local currency is assumed as follows.

All costs and expenses incurred in Uruguay pesos are converted into US. Dollars at an exchange rate on Dec. 20, 1984 or the date of the information given is new pesos.

13) Escalation Rates used in the Study

(1) For imported supplies and services
Escalation rate for the imported goods and services are assumed based on the price escalation data of industrial products for export from Japan or U.S.A. in the recent years which may be in the range of 4 to 6 percent annum.

(2) For domestic supplies and services
In consideration of item 9, escalation rates for domestic supplies and servlces in term of U.S. is assumed as same as for imported supplies.

(3) For pulp price for export
It will be studied in Japan by analysis of the past record.

(14) Account Payable & Account Receivable.

(1) Account payable for major items are assumed as follows
a) Domestic supplies: 30 days
b) Imported supplied: D/p 90 days

(2) Account receivable for the products from the plant is assumed as follows
a) Exported good: D/p 90 days
b) Domestic market: 30 days

(15) Sales Expences
0,2% of the total revenues is assumed to be the sales.

	Charge on the enterprise	Charge on the employee
Social Benefits contributions	10%	13%
Social health contributions	4%	3%
Tax on salaries	1%	1%
		2%

LIST OF BANKING INSTITUTIONS

Name and Address	Telephones
BANCO LA CAJA OBRERA 25 de Mayo 500	95 95 01 95 41 14
BANCO COMERCIAL Cerrito 400	95 31 74 95 08 01 95 32 01
BANCO FINANCIERO SUDAMERICANO-BAFISUD Rincón 550	91 76 31
BANCO DE CREDITO 18 de Julio 1451	40 41 41 40 41 40 40 91 80
BANCO DE MONTEVIDEO Misiones 1393	95 52 00 95 41 26 95 04 60
TRADE DEVELOPMENT BANK (URUGUAY) Constituyente 1402	98 62 14
BANCO EXTERIOR S.A. (URUGUAY) Sarandí 402	95 05 55
DISCOUNT BANK (LATIN AMERICA) Rincón 390	95 05 07 95 14 00
BANCO DE SANTANDER S.A. (BANSANDER) 18 de Julio 1271	90 78 07 90 48 06
BANCO PAN DE AZUCAR Rincón 518	91 09 21 91 22 41 91 19 28 90 05 00
BANCO DEL PLATA Zabala 1427	95 69 02 95 69 52 95 02 11
BANCO REAL DEL URUGUAY 18 de Julio 999	91 90 17

UNION DE BANCOS DEL URUGUAY 25 de Mayo 401	95 15 19 95 19 79 95 23 47 95 30 20 95 63 68
BANCO DO BRASIL Río Negro 1396	91 66 81 91 66 82 91 66 83 91 66 84
CITY BANK Cerrito 455	95 03 71 95 11 49 95 26 79
BANCO SUDAMERIS Rincón 500	95 12 50 95 05 16 95 33 27
Aguada	29 70 85
BANCO HOLANDES UNIDO 25 de Mayo 501	91 42 31 91 42 32 91 42 33 91 42 34
THE FIRST NATIONAL BANK OF BOSTON Zabala 1463	95 60 18 95 58 91
BANCO DE LONDRES Y AMERICA DEL SUD Zabala 1500	95 11 48 95 13 48 95 13 84 95 21 39 95 14 84
CENTROBANCO 25 de Mayo 528	98 47 38 90 26 60 98 59 24
BANK OF AMERICA 25 de Mayo 552	98 69 61 98 69 62 98 69 63 98 69 64
BANCO DE LA NACION ARGENTINA Juan Carlos Gómez 1372	91 96 12 91 96 13 91 96 14
FINACORP CASA BANCARIA S.A. Ituzaingó 1419	90 00 49 91 08 14
INVEST BANCA S.A. CASA BANCARIA Treinta y Tres 1383	95 51 05 95 24 05 95 14 11

HAPOALIM (LATIN AMERICA) CASA BANCARIA S.A. Florida 1251	98 68 08
HISPANO AMERICA CASA BANCARIA S.A. 18 de Julio 985 P. 1 Esc. 101	91 77 15 91 77 16 91 77 17
LEUMI LE ISRAEL (LATIN AMERICA) CASA BANCARIA 25 de Mayo 549	90 35 50 90 22 43 91 49 23 90 38 80
COMPAÑIA GENERAL DE NEGOCIOS CASA BANCARIA S.A. Plaza Independencia 811 P.B.	98 79 87 91 45 00
EISA CASA BANCARIA S.A. 25 de Mayo 553	98 76 15 98 77 17 90 34 58
EXTERBANCA CASA BANCARIA S.A. Plaza Independencia 743	98 10 80 90 08 90
ITALSUD S.A. CASA BANCARIA Misiones 1472	95 48 83 95 64 31 95 64 95 95 67 14
CASA BANCARIA RIVER TRADE Zabala 1377	95 52 52 95 32 00
CASA BANCARIA INTERCONTINENTAL Colonia 999	91 22 20 90 60 60
TRANSAMERICA CASA BANCARIA S.A. Misiones 1373	95 59 06 95 54 07 95 15 79
EXPRINTER CASA BANCARIA S.A. Sarandí 700	90 45 97 90 14 40
UNITED MIZRAJI CASA BANCARIA - UMB 25 de Mayo 471	95 33 05 95 33 93 95 33 94
CASA BANCARIA DE LA PROVINCIA DE BS. AIRES Misiones 1375	95 55 63 95 55 29 95 48 28
SURINVEST CASA BANCARIA S.A. Piedras 450	95 41 87 95 41 41 95 50 86

COLUMBIA CASA BANCARIA S.A. Plaza Independencia 822 Esc. 801	98 71 60 91 63 51
CASA BANCARIA FINANCIERA INTERNAC. S.A. Juncal 1327 D. Ap. 901	91 05 50

Reference data received from the URUGUAY side

(1) Canto Nacional de tecnología y productividad industrial
Actualización del diagnóstico inter-empresarial de la rama de fabricación de rastra para papel, papel y cartón (1983)

(2) Encuesta Anual de Actividad Económica
Industrias Manufactureras Año 1983

(3) Uruguay 1983 - Anuario Estadístico

(4) Ley de inversiones extranjeras, Ley 14.179

(5) List of Banking institutions

(6) Invertir en Uruguay 1984

(7) La leña como combustible en calderas

Chapter 10

COST AND PRICES

1) Equipment and Machinery to be imported on the assumption of that this plant will be approved by the Uruguay government as a National project, import duty on equipment and machinery is estimated to be exempted but approximate 10% on CIF VALUE will be added to cover the port charge, bank charge and others.

2) Material to be imported
Chemicals such as salt, salt cake, sulphuric acid will be imported. The price at the plant site will be estimated as CIF value plus 10 - 15% which includes unloading charge, transportation cost and financial cost but not import duty because main part of product will be exported.
Attached chemicals prices is at the factory in this country as of December 1984.

3) Material obtained in Uruguay
Lime stone is produced in this country, Minas.
Prices are also shown in attached table.

4) Electric power cost as of Dec. 1st. 1984

Range monthly	Cost N$/KW
- 10.000 KW	2.81
10.000 - 50.000 KW	2.14
50.000 -	1.81
Fixed cost	11.280 N$
Plus	10% tax

For example (80.000 KW)

10.000 x 2.81 =	28.100	N$
40.000 x 2.14 =	85.600	N$
30.000 x 1.81 =	54.300	N$
Fixed cost =	11.280	N$
Tax 10 % =	17.930	N$
	197.210	N$

5) Water cost as of Dec 1st. 1984

Range (monthly)	Cost N$/$m^3$
- 1000 m^3	19.0
1000 -	15.7
Fixed cost (>1" tube)	1957 N$

6) Land Cost

225 U$S/ha

7) Construction material as of Dec. 1984

Sand and stone required for construction is available in Uruguay and their cost are shown below.

Prices other construction materials such as cement, re-bar etc. are base on "CAMARA DE LA CONSTRUCCION DEL URUGUAY" .

Price of some construction materials

	U$S/$m^3$
Granitic sand	7.22
Gravel size 0.5 - 1°cm	11.97
size 1° - 2°cm	11.02
size 2° - 3°cm	9.47
size 3° - 5°cm	9.47

Broken stone for breakwater 5.10 U$S/Ton

Broken stone for breakwater 5-15 cm 8,55 U$S/$m^3$

Ballast 0.95 U$S/$m^3$

8) Petroleum product prices

Kind	N$/litre
1) Heavy fuel oil	15.01
2) Gas oil (diesel)	26.50
3) Kerosene	26.61
4) Super gasoline	47.30
5) Regular gasoline	39.20

Purchase Price of chemicals — December 1984

a) Salt Supplier - Deambrosis	-	U$S 100/ton
b) Sulphuric acid 98% Supplier - ISUSA	-	U$S 114/ton Trucks of 4,8 or 12 tons (U$S 5 per truck for unloading chig)
c) Salt cake Na_2SO_4	-	BROU - U$S 167/ton 1983
d) Limestone Supplier: Calera Minas	-	U$S 71.6/ton Price doesn't include freight from Minas to Montevideo

Temporary Import

International Price CIF + 10-15%

9) Labor wage

a) Factory operational wage* (in June 1984)

Class	Man hour cost (N$/h)		
	Minimun	Average	Maximun
Operator	38.77	65.43	99.09
Foreman	49.20	76.58	127.54
Storekeeper	61.14	93.77	197.91
Sales-man	100.86	238.81	394.66
Chief of labo	139.18	232.43	298.89
Production manager	233.68	345.96	577.47

* Gross payment and 197 hours/month

Source: "SALARIOS" published by PRESIDENCIA DE LA REPUBLICA ORIENTAL DEL URUGUAY SECRETARIA DE PLANEAMIENTO, COORDINACION Y DIFUSION.

b) Construction labor wage.

Construction labor wage is referred to the information from the sub-contractor in Uruguay.

Those are attached hereafter.

LOCAL LABOR COST INFORMATION

(As of _____)

Date : _____

Reported by : _____

COUNTRY : _____ DISTRICT : _____

AGENT : (Indicate if applicable)

_____

DATA SOURCE : [Check (√) the appropriate item.]

☐ Actual wage data for _____ Project

☐ Information obtained by site survey for _____ Project

☐ Wage level information in _____ District

☐ _____

1. WAGES

1.1 Working Conditions

- Work period : 11,3 months (Indicate basic period.)
- Workweek : 8 to 10 hours a day/ 6 workdays a week basis

1.2 Monthly Wage

Indicate below the monthly wage which is the actual amount paid to each local worker. It includes paid leave, personal income tax, social insurance, and other applicable levies for each individual.

(Do not include bonus and completion pay, if required, in the monthly wage. Indicate in item 2.1.)

It doesn't include social insurance in both cases. It's about 70% and it's payed by our clients, except for indirect workers.

Direct Worker

Unit : US$/Man-month

(1)	Foreman	500
(2)	Pipe Welder (Qualified)	
(3)	Plate Welder (Qualified)	
(4)	Pipe Fitter	
(5)	Rigger	
(6)	Ironworker	
(7)	Mechanic	250
(8)	Electrician	250
(9)	Instrument Worker	
(10)	Insulation Worker	
(11)	Tinsmith	
(12)	Painter	
(13)	Carpenter	150
(14)	Rebar Worker	
(15)	Concrete Worker	130
(16)	Bricklayer, Mason	130
(17)	Plasterer	
(18)	Operator (Heavy Equipment)	200
(19)	Truck Driver	130
(20)	Semiskilled Worker	100
(21)	Unskilled Worker	80
(22)	Other ( )	
	( )	
	( )	

Indirect Worker

Unit : US$/Man-month

(1)	Accountant	800
(2)	Secretary	200
(3)	Clerk	
(4)	Typist	150
(5)	Telex Operator	150
(6)	Office Boy	80
(7)	Doctor	
(8)	Nurse	
(9)	Safety Supervisor	
(10)	Security Supervisor	
(11)	Security Personnel	
(12)	Storekeeper	250
(13)	Car Driver	120
(14)	Car Mechanic	200
(15)	Camp Administrator	
(16)	Cook	
(17)	Kitchen Boy	
(18)	Laundry Man	
(19)	House Boy	
(20)	Maid	
(21)	Other ( )	
	( )	
	( )	

1.3 Paid Leave

Indicate the number of days allowed for the following paid leave periods :

(1) Annual leave : 20 days a year + 1 day each 4 years

(2) Sick leave : not fixed days a year

(3) National holidays : 5 days a year

The above paid leave periods are covered by the monthly wage stated in item 1.2.

2. ADDITIONAL PAY

2.1 Bonus and Completion Pay

If bonus or completion pay or both are given in addition to the monthly wage stated in item 1.2, indicate below :

Bonus _____ days a year

Completion pay _____ days a year

2.2 Overtime Premium

Indicate the overtime premium on a percentage basis.

(1) Overtime work after regular working hours :

double ~~percent of monthly wage X 1/25 X 1/8~~

(2) Work on weekly holiday :

double percent of monthly wage X 1/25 X 1/8

(3) Work on national holiday :

triple ~~percent of monthly wage X 1/25 X 1/8~~

2.3 Items to be borne by Chiyoda [Check (√) the appropriate item(s)].

- ☐ Mobilization/Demobilization cost
- ☐ Camp facilities
- ☐ Food and consumables
- ☐ Kitchen facilities with utilities
- ☐ Actual cost and expense at jobsite
- ☐ Daily transportation to and from jobsite
- ☐ _____
- ☐ _____

Chapter II PROJECT SCHEDULE

The Study team explained to the Uruguay side that the most essential factor for this project is to assure the sufficient supply of pulpwood to the mill. The Uruguay side, of course, understood the essential factor of this project and, therefore, the construction schedule of the mill will be accelerated or modified according to the Plantation schedule which will be promoted by the Uruguay side. Moreover, the study team would dare to stay that the construction of the mill shall be started after confirmed that the plantation has been effectively progressed as per the schedule.

Under the above circunstances, the study team submitted to the Uruguay side the following two schedules, one is an expected construction schedule and the other is the study schedule which the study team is now engaging in.

(1) Expected construction schedule for 750 T/D BKP plant in the Oriental Republic of Uruguay.
(Including the progress schedule for the plantation)

(2) Work schedule for the feasibility study on the establishment of paper pulp mill in the Oriental Republic of Uruguay.

The followings are brief explanation of the expected construction schedule, as per attached, for the reference to the Uruguay side for their plaming.

(1) The project preparation for the construction of the mill is better to start at the 5th year after the plantation for the project. It means that the necessary arrangement and or preparation for the construction of the mill shall be started after confirmed that the plantation has been effectively progressed as per schedule and assured the sufficient supply of pulpwood to the mill.

(2) The project preparation is consists of the following factors

1 - Feasibility study (at the final stage)
2 - Basic design for BKP factory
3 - Financing arrangement
4 - International tender document for the purchasing of the entire plant
5 - Proposal by the bidder for the above
6 - Proposal evaluation by the Owner's Consultant
7 - Contract negotiation with the contractor and award of the contract

The above works will be completed within two and half years after the starting of the project preparation

(3) The construction of the project will consists of the following factors:

1 - Detailed engineering
2 - Site development
3 - Equipment procurement
4 - Equipment transportation
5 - Civil and structural works
6 - Installation of equipment

The above works will be completed in around four years after the contract awarded to the contractor.

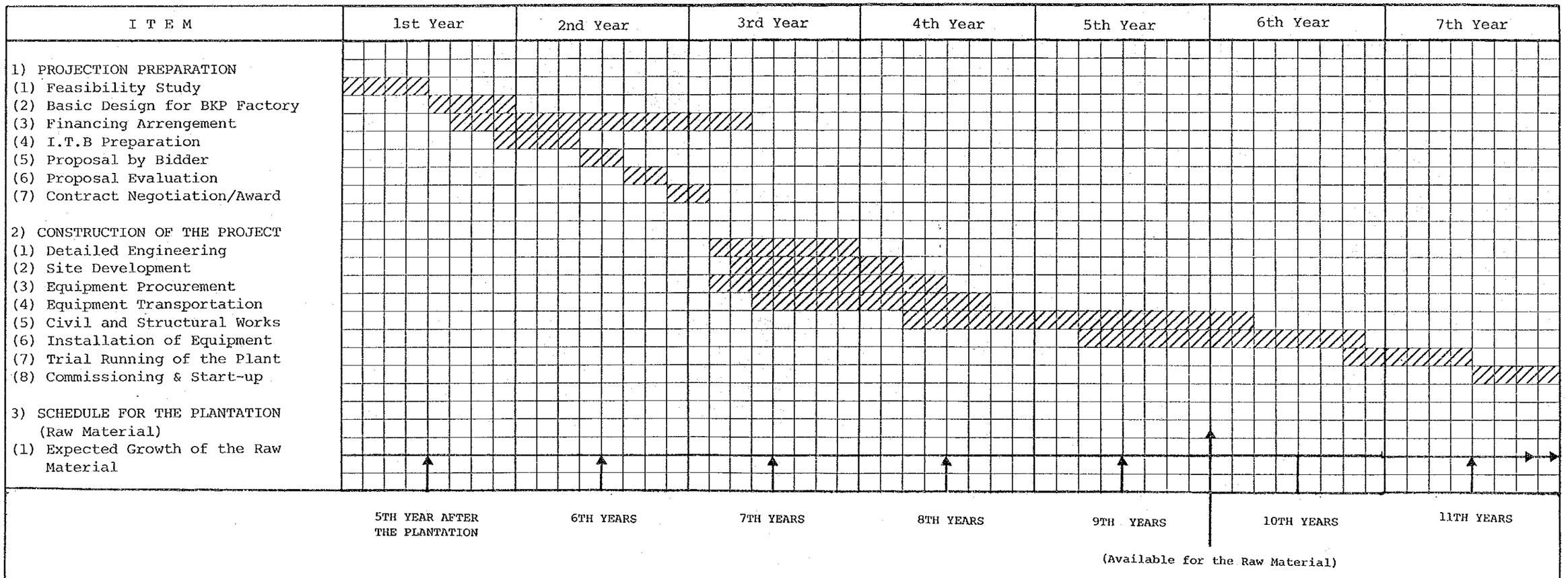
(4) Trial ruming of the plant will be started around the end of the 6th. years after the project preparation was started or around the end of the 4th. years after the contract awarded to the contractor.

(5) The commissioning and the start-up of the plant will be executed around the mid. of the seventh years after the project preparation has been started, or around the mid. of the fifth years after the commencement of the construction of the project.
As the study team mentioned as above, the above schedule will be re-studied and modified as soon as the concrete idea for the project has been finalized.

EXPECTED CONSTRUCTION SCHEDULE FOR 750 T/D BKP INDUSTRY
IN THE ORIENTAL REPUBLIC OF URUGUAY

(Inculdings the Progress Schedule for the Plantation)

DATE December 20th, 1984



Remarks: An essential factor for this projects is to assure the sufficient supply of pulpwood to the mill. The construction of the mill shall be started after confirmed that the plantation has been effectively progressed as per the schedule.

The Feasibility Study on the Establishment of Paper Pulp Mill
In The Oriental Republic of Uruguay

UNICO International Corporation
Oji Paper Co., Ltd.
Hokuetsu Engineering Co., Ltd.

WORK SCHEDULE

Description	1984		1985									
	11	12	1	2	3	4	5	6	7	8	9	10
(A) Industrial development plan and investment (Financial terms) condition in Uruguay												
(1) Background of the project												
(2) Market study of paper pulp products (BKP)												
(3) Study on forest resources and the plantation												
(4) Study on law material												
(5) Study for the plant site (6) Study for the environment conditions												
(B) Summerize of the study in Uruguay												
(7) Pulp test												
(C) Basic planning and conceptional designing												
(D) Engineering study (E) Project management												
(F) Estimate of cost breakdown and project cost												
(G) Discussion with counterpart in Japan												
(8) Financial analysis												
(9) Economic and social impact												
(10) Conclusion and recommendation												
Preparation of Report		Inception Report Draft JICA		Rroqress Report Minutes URGUAY				Draft Report JICA		final report		

Ex: ——— Pre-arrangement, ▨ Site Survey, ▭ Works in Japan, ▲——▲ Reporting.

A N N E X - 1

URUGUAYAN Counterparts and Interviewes

The Uruguayan Government designated the Technological Laboratory of Uruguay (LATU) of the Ministry of Industry and Energy to be incharge of liaison office with the Japanese Study team, and several officials were attended from the government authorities concerned to become the counterparts under LATU.

The followings are the persons we met during we stayed in URUGUAY for the meetings, discussions and interviews:

Name	Authorities
Sr. Raúl H.Villardino (General Director)	The Ministry of Industry and Energy in Uruguay
Srta. Rosario Pou Ferrari (Technical Advisor)	The Ministry of Industry and Energy in Uruguay
Sr. Roberto Ramponi (Presidente Unidad Asesora de Prom. Industrial)	The Ministry of Industry and Energy in Uruguay
Sr. Jorge Pelufo	SEPLACODI
Sra. Ing. Ana Cazzadori (Technical Advisor)	SEPLACODI
Sr. Gustavo Cola Cancela (Accountant)	SEPLACODI
Srta. Ilda Silva Porro (Direction Forestal)	The Ministry of Agriculture and Fishery
Eng. Agr. Daniel San Roman	The Ministry of Agriculture and Fishery
Sr. Ing.Agr. Pedro Senyzsyn	The Faculty of Agriculture, the University of the Oriental Republic of URUGUAY
Sr. Enrique D.Bía (President)	The Technological Laboratory of Uruguay (LATU)

Sr. Ing.Fernando Stotz	The Technological Laboratory of Uruguay (LATU)
Chem.Eng. Raúl de Castro	The Technological Laboratory of Uruguay (LATU)
Dr. Mario H. Carminatti	New Governor Fray Bentos
Julio Alvarez Borges	Jefe de la 5d. Circunscripcion p.N.N. Fray Bentos

The Association of Paper Industry in Uruguay

Ing.Agr. Raúl Menendez Rampa	FNP (Fábrica Nacional de Papel S.A.)
Ing. Norberto F. Cassella (Director Técnico)	FNP (Fábrica Nacional de Papel S.A.)
Dr. Angel Cantoni (Director Delegado)	PAMER

Departamento Forestal Fabrica Nacional de Papel S.A.

Ing.Agr. Raúl Menendez Rampa
Ing.Agr. Oscar R.Arca Regueira

PAMER

Ing.Agr. Luis Soria
Sr. Elims Fegueroa

CAJA BANCARIA

Sr. Santos Ronchete

Forestadora y maderera del norte S.A.

Sr. Lorenzo Balerio

INDUSTRIAS FORESTALES

Presidente Alberto Voulminot

Estación Experimental Bañados de Medina

Ing.Agr. Fernando Martínez (Profesor)

URUGUAYAN COUNTERPARTS AND INTERVIEWS MET BY THE SITE SURVEY TEAM

1984

December 11 - Juan Lacaze - F.N.P. (Paper Mill)
Mr. Norberto Cassella - Technical Director
Mr. Faedo - Laboratory Head.

December 12 - Mercedes - PAMER (Paper Mill)
Dr. Angel Cantoni - Manager
Mr. Luis Alvarez - Laboratory Head

December 13 - Fray Bentos - Río Negro Intendancy
Dr. Carminatti - Recently elect. Intendant
Mr. Julio Cesar Amaral - Secretary
Mr. Julio Alvarez - Fray Bentos Port Prefect

December 14 - Fray Bentos Port Prefecture (Fray Bentos)
Mr. Julio Alvarez - Fray Bentos Port Prefect
Dr. Carminatti - Recently elect Rio Negro Intendant
Mr. Luis Panzl - National Ports Administration (A.N.P.)

December 15 - Fray Bentos - Río Negro Intendancy
Dr. Carminatti - Recently elect Intendant
Mr. Carminatti - Brother of elect Intendant
Mr. Artigas Pereyra - Friend and adviser of Dr.Carminatti
Mr. Julio Alvarez - Fray Bentos Port Prefect

December 17 - Paysandú - Paysandú Intendancy
Arq. Alberto Zinno - Paysandú Intendant
Mr. Ricardo Molinelli - Secretary

December 17 - Casablanca Port and land for industrial usage
Mr. Piaggio - Land-surveyor, Paysandú Intendency

Annex - 2 - STUDY ITINERARY IN URUGUAY

November, 1984

29 (THU) Ar. Montevideo (1st Mission)
1st. general discussion whith Mr. T. MIKAMI
Japanese Embassy

30 (FRI) Courtesy call to the Ambassador at the Japanese Embassy.
Establishment of the study team office in the Technological Laboratory of Uruguay (LATU).
Courtesy call to the President, Sr. Enrique Bía, at LATU.
1st. meeting with Counterpart at LATU.
Courtesy call to Sr. Jorge Pelufo at SEPLACODI.

December, 1984

1st. (SAT) General discussion whith Mar. T. MIKAMI, JICA paper expert, stationed at LATU, Discussion with Mr. Y.ASAI, Kambara (URUGUAY)

2nd. (SUN) Discussion whith Mr. T.MIKAMI, above and Mr. Y.ASAI, Kambara (URUGUAY) for general information concerning Uruguay.

3rd. (MON) The 2nd meeting with the counterpart.
Visit to collection general information;
Mr. Rodolfo Kubota
Ministry of Industry and Energy (MIE)
Ministry of Finance and Economy

4th (TUE) Separate meetings with the counterparts.
The plantation group.
The site survey group.
The market survey group (including economic and financial analysis)
Visits to collection of general information;
The Port Authority of Montevideo
Ministry of Industry and Energy
SEPLACODI

5th (WED) Separate meeting with the counterparts.
Visits to collection of general information;
M/S KAMBARA (URUGUAY) Ltd
The Ministry of Agriculture and Fishery
The Japanese Embassy

6th (THU) Separate meeting with the counterparts.
Visits to collection of general information;
M/S KAMBARA (URUGUAY) Ltd.
M/S Rodolfo Kubota
Ministry of Industry and Energy
Thermal Power Plant, Montevideo
Shipyard, Montevideo

7th (FRI) Separate meeting with the counterparts
Visits to collection of general information;
SEPLACODI
The Ministry of Agriculture and Fishery
Mr. HISAO YAMAMOTO

8th (SAT) Ar. Montevideo (2nd. Mission)
General discussion inside the study team.

9th (SUN) General discussion inside the study team.

10th (MON) Courtesy visit of 2nd. Mission:
The Japanese Embassy.
SEPLACODI
The Ministry of Industry and Energy
The Ministry of Agriculture and Fishery
The 3rd. general discussion with the counterparts.

11th (TUE) (A group , B group, C group) Move to up-countries.
Survey on the paper manufacturing .
Mills and plantations, and for sample collection.

A - group : Site survey team
Mr. Y. MIKAMI
Mr. M. ONOZUKA
Mr. K. MATSUBARA
Mr. T. SENTOKU
Mr. T. SATO

B - group: Test sampling team
Mr. F. SAKABE

C - group: Mr. T. USHIJIMA
Mr. J. MOROKUMA

A - group: Visit FNP paper factory and JUAN LACAZE
B - group: Visit FNP plantation
C - group: Visit FNP plantation

12th (WED) A - group: Visit PAMER paper factory and hydro power plant
B - group: Visit PAMER paper factory and hydro power plant
C - group: Visit PAMER plantation

13th (THU) A - group: Visit FRAY BENTOS, Port Authority, Municipality, electric authority
B - group: Visit CAJA BANCARIA and FRAY BENTOS
C - group: Visit CAJA BANCARIA and PAYSANDU

14th (FRI) A - group: Survey on plant site at FRAY BENTOS
B - group: Join to the above survey
C - group: Proceeding to RIVERA

15th (SAT) A - group: Survey on plant site at FRAY BENTOS
B - group: Join to the above survey and returning to Montevideo
C - group: Survey on the plantation in RIVERA

16th (SUN) A-group: Visit to NUEVA PALMIRA
B-group: Returns to MONTEVIDEO
c-group: Move to MELO, survey on the plantation owned by Sr Michel Acle (project 23)

17th (MON) A-group: Moves to PAYSANDU
C-group: Survery on the Estación Experimental Bañados de Medina

18th (TUE) A-group: Return to MONTEVIDEO
C-group: Return to MONTEVIDEO

19th (WED) General discussion within the study team
Visits to the authorities concerned for the field survey for the data collection promissed during the field survey

20th (THU) General discussion with the counterparts
Visits to the several authorities for the data collection

21st (FRI) General discussion whith the counterport
Signing on the interior report.

22nd (SAT) General discussion whithin the study team

23rd (SUN) General discussion whithin the study team

24th (MON) Leaving for Japan.

ANNEX 3

(1) Minutes of Meeting, dated November 30, 1984

(2) Minutes of Meeting, dated December 3, 1984

(3) Minutes of Meeting (Sectional Meeting)

Dec. 4th - Dec 7th 1984

(4) Minutes of Meeting, (dated December 10, 1984)

MINUTES OF MEETING

1) Date: November 30 1984/14.30 - 16.50 PM
2) Place: LATU/Montevideo
3) Attendant:

URUGUAY SIDE

Sra. Ana Cazzadori: SEPLACODI (Technical advisor)
Srta. Rosario Pou Ferrari: Ministerio de Industria y Energía (Technical advisor)
Srta. Ilda Silva Porro: Ministerio de Agricultura y Pesca (Direction Forestal)
Eng. Pedro Senyszyn: Facultad de Agronomía Universidad de la República
Sr. Fernando Stotz: LATU

STUDY MISSION SIDE

JICA TEAM

Mr. Y. MIKAMI , Study Team Leader
Mr. M. ONOZUKA, Engineer
Mr. K. MATSUBARA, Engineer
Mr. K. NAGAI, Coordinator

The Japanese Embassy in URUGUAY

Mr. IMAZU

Consultante de JICA (Stationed in URUGUAY)

Ing. Takahito Mikami

4) Main Topics discussed

1) The Study Mission explained that the objectives of the Study Team is to study and examine the technical, economical and financial feasibility on establishment of a paper pulp mill (phase III), for export oriented in URUGUAY as a servies of study based on the master plan made by JICA on February 1981.

The URUGUAY side agreed above objects of the study mission and confirmed that the study mission is no concern about the projects mentioned in the above master plan , phase I (short-term plan) and phase II (medium-term project).

2) Production capacity

The Study Mission explained that the daily production capacity of 750 tons BKP is the standard size in the world for an export oriented pulp mill at present. The Study Mission also explained that since the project is aimed for export purpose, the product should be internationally competitive, and in order to the advantage of the scale economy also, the study shall be based on fundamentally a daily production capacity of 750 tons BKP.

The Study Mission also explained that, the production capacity mentioned above shall be examined and reviewed in accordance with the market situation and plant site conditions.

The Uruguay side commented that the plant capacity of 750 T/D BKP was recommended by Japanese side at the time of discussion on the presentation of the master plan on February 1981. The Uruguay side has no objection for the above recommendation, however, 750 T/D capacity shall be the maximum one and the final capacity shall be decided after the through study and examination both on the market situation and plant site conditions, since the paper pulp industry require huge amount of money.

3) Product Item

The Study Mission explained that in accordance with the recommendation made by the master plan of February, 1981 , the study shall be fundamentally concentrated into the BKP (bleached kraft pulp) as product item for the proposed paper pulp mill, under the reason that BKP seems more favorable product in international market and easy plantation in Uruguay.

The Uruguay side commented that the above product of BKP was recommended by Japanese team , visited here on August, 1980.

The Uruguay side has no objection basically for the above recommendation at this stage, since the main purpose of the project is to increase the exports and to contribute to the regional development , The Uruguay side has no objection to select the product item as BKP for the establishment of the paper pulp mill.

The Uruguay side requested to make market study for the following items in adition to the BKP mentioned above.

(A) unbleached kraft paper pulp

(B) papers

(C) chips

(D) paper board

The Study Mission agreed to make above study during they stay in Uruguay.

4) Locations of the plant site

The Uruguay side commented that regarding to the plant site the following three nominated sites shall be survived and make recommendation the most suitable location for the plant sites.

CASA BLANCA

FRAY BENTOS

and JUAN LACAZE

The both parties has reached agreement also that any other sites besides above three is not required for any survey.

5) Pulp Test Sample

Uruguay side has selected under the consultation with the team the following six kinds of trees for the suitable material for the test sample to be sent to Japan.

(A) GRANDIS (EUCALYPTUS)
(B) GLOBULUS (EUCALYPTUS)
(C) MAIDENI (EUCALYPTUS)
(D) TAEDA (PINUS)
(E) ELLIOTTI (PINUS)
(F) POPULUS

The cutting of above test sample shall be carried out under the presence of both parties after hte Japanese experts has arrived in Uruguay in December 8 1984. The necessary measures in URUGUAY to air mail the sample logs to Japan for the test shall be arranged by the SEPLACODI however the team will bear the transportation cost, customs clearance expenses and the air freight charges to Japan for the test logs.

6) The Study Team suggested to have a general meeting on December 3rd. again at LATU with the same member today and proceed to the separate meeting from december 4th. into three groups, market study group, site survey group and plantation group.
The Uruguay side have no objection for above suggestion and agreed.
Confirmed.

SEPLACODI	Y. MIKAMI (Team Leader) JICA

MINUTES OF MEETING

1) Date: December 3, 1984. 15ºº - 17 ºº PM
2) Place: LATU/Montevideo
3) Attendant:

URUGUAY SIDE

Sra. Ana Cazzadori : SEPLACODI (Technical advisor)
Sr. Gustavo Cola Cancela : SEPLACODI (Accountant)
Sra. Rosario Pou Ferrari : Ministerio de Industria y Energía (Technical advisor)
Srta. Ilda Silva Porro : Ministerio de Agricultura y Pesca (Direction Forestal)
Eng. Pedro Senyszyn : Facultad de Agronomía Universidad de la República
Sr. Fernando Stotz : LATU

STUDY MISSION SIDE

JICA TEAM

Mr. Y. MIKAMI, Study Team Leader
Mr. M. ONOZUKA, Engineer
Mr. K. MATSUBARA, Engineer
Mr. K. NAGAI, Coordinator

The Japanese Embassy in URUGUAY

Mr. IMAZU

Consultante de JICA (Stationed in URUGUAY)

Ing. TAKAHITO MIKAMI

1) The Study Mission submitted "Minutes of Meeting" to the Uruguay for the confirmation of discussion held at LATU on November 30, 1984. The URUGUAY side has no objection for the above contents.

2) The Study Mission submitted "The Study Schedule of 750 T/D BKP Project (Field Survey outside Montevideo)" to the URUGUAY side and explained the detailed field survey schedule in URUGUAY. The main points which the Study Mission explained were as follows:

(1) The Study Mission divided into four groups as follows:

- Site Survey Team
  MR. M.ONOZUKA, MR. K.MATSUBARA
  MR. T.SENTOKU, MR. T.SATO
- Test Sample Team
  MR. F.SAKABE
  MR. T.USHIJIMA
- Plantation Survey Team
  MR. Y.MIKAMI, MR. J.MOROKUMA
- Market Study Team
  MR. K.NAGAI

(2) The detailed schedule were explained as per attached, however, the following is the basic events for the trips:

11th/Dec (Tue) All Team, except Market Study Team, will leave Montevideo for Mercedes.
To Visit: FNP Factory
FNP Plantation JUAN LACAZE one of the nominated plant site.

12th/Dec (Wed) All Team will visit following sites

To Visit: PAMER Factory

PAMER plantation

13th/Dec (The) All Team will leave for Fray Bentos

14th/Dec (Fri) Site survey team. Will visit area of FRAY BENTOS such as natural condition (geographical condition, location and climates), infrastructure (port,road, railway), utilities (power, water, oil,chamical), and local conditions.

Test sample team: will visit to the plantation area (CAJA BANCARIA) for the collection of the test sample to be sent to Japan.

Plantation survey team: Will accompany together with the above sample team for the attendance and selection of the test sample to be cut at the plantation.

15th/Dec (Sat) - 18th/Dec (Tue)

Site Survey team: Same as above but not limited to visit PAYSANDU for the site survey of CASA BLANCA (one of the nominated plant site), during the above survey, and also may visit PAMER Hydro Power Station.

Test sample team: Wil arrange collection of the sample and bring back the sample to MONTEVIDEO for the shipment to Japan

Plantation survey team: whill move to the up country for the survey of plantation and checking of raw material availability. The following is the tentative schedule

15th PAYSANDU - TACUAREMBO - RIVERA
16th RIVERA - TACUAREMBO
17th TACUAREMBO - MELO
18th MELO - MONTEVIDEO

However,all above schedule will be modified according to the condition visited.

19th/Dec (Wed) General discussion among the team and summerize the result of survey at MONTEVIDEO

20th/Dec (The) General discussion with the URUGUAY side for summerizing the survey report at MONTEVIDEO

21st/Dec (Fri) Signing on Interim Report between the URUGUAY side and the Study Mission.

22nd -23rd/Dec
The final checking of all the survey rewet.

24th/Dec (Mon) The Study Mission will leave for Japan

(3) The Study Mission requested to the URUGUAY side to arrange the representative persons to be accompanied to the above each team for the smooth field study in up country.
The study mission committed to bear the actual expenses during the trip of Uruguay persons.
The URUGUAY side agreed to the proposal and promised to give the name of representative on the next meeting.

(4) A formal courtesy call to the municipality at FRAY BENTOS is included in the programm and Mr. IMAZU japanese embassy, is requested to attend the courtesy call, in order to avoide any trouble with the related authorities and industries (private or public) for the smooth execution of the survey.

3) The URUGUAY side explained that the following sites has decided the selected area to have cut sample logs to be sent bach to Japan.

Name of tree	Sample cut location
GRANDIS (EUCALYPTUS)	CAJA BANCARIA
GLOBULUS(")	FNP
MAIDENI (")	FNP
TAEDA (PINES)	CAJA BANCARIA
ELLIOTTI (PINES)	CAJA BANCARIA
POPULUS	near CAJA BANCARIA

4) The Study Mission explained that through the analysis and through the study of the market situation, especially in Europe, the BKP (Bleached kraft pulp) as product item for the proposed pulp will be more saleable than any other products in international market. The Study Mission submitted the data for the above result (attached herewith a copy of data) and the URUGUAY side agreed to select the BKP as Product item for the Proposed Paper Mill.

Regarding to the plant capacity, the Study Mission also explained that the daily production capacity of 750T/D BKP is the standard size in the world for an export oriented pulp mill in order to advantage of the scale economy.
The URUGUAY side understood the above explanation.

5) The URUGUAY side asked wheter the Study is included the marketing survey (Market Mechanism of imported countries, distribution mechanism, customer's name, special policies to be taken by the government of importation of the products etc.) or not.

The Study Mission explained that the Marketing survey, proposed by the URUGUAY side, is not included in the scope of work for the study, but the Marketing survey should be carried out at the stage when the URUGUAY side has decided the basic policy for the project and the formation of the new company (Detailed investment etc.) and, therefore, the Study, will be concentrated into the Market possibility, such as whether the BKP will be sold to EC, then how much its price together with salable quantity etc.

The Study Mission, however, promised to study and report the some cases especially in Brazil as reference.

6) Regarding to the Market survey in URUGUAY, the URUGUAY side requested that in order to avoide any confliction with the existing paper mills, distributor and/or dealers, it is suggested to study and examine by the data available in LATU and SEPLACODI, not for the field interview in URUGUAY , since the product is aimed for export in its majority. The Study Mission agreed above comment given by the URUGUAY side.

7) The both parties agreed to proceed to the separate meetings from December 4th. into three groups , market study groups (including economical and financial analysis), site survey group and plantation group as we agreed upon already through the meeting held on November 30, 1984.

SEPLACODI	Y.MIKAMI (Team Leader) JICA

THE SELECTION OF THE PLANT

The plant should have competitiveness especially for the export orientated plant in price wise and qualitywise and also have the stable market.

In the Master plan, they have selected 750 t/d BKP plant as the export oriented plant as phase 3 Long-term project.

The situation is the same as mentioned below, therefore,consultant will take the BKP plant having a capasity of 750 t/d as standard case. And if there is some constrain on the above capacity, the other capacity will be studied.

1) Kind of product

Market of pulp and papar in the world is mentioned in table 1 which shows the following result.

Mass Trade commodity

Bleached sulphate pulp, News print, other paper & paper board

Quasi Trade commodity

Bleached Sulphite, un bleached sulphate, dissolved wood pulp, printing + writing paper, wrap + pack paper.

In the chemical wood pulp, trade of bleached sulphate pulp is not only biggest but also is expanded rapidly however other pulp trade is almostly stagnated.

The main reason why BKP trade is expanded is that user of pulp (paper company) wants to use the BLP which is cheaper than BNP and the market of BLP is rather tight in comparison with BNP.

Uruguay has not enough wood resources but paper and pulp plant to be studies is the export oriented plant based on the domestic resource (even in future, after plantation)

Table 1

	Import Quantity		World Total	(1000 MT)
	1971	1976	1979	1981
Mechanical Wood pulp	1135		1436	1179
Semi-chemical pulp	140		145	156
Chemical wood pulp	11834		16980	16693
Unbleached sulphite pulp		499	517	503
Bleached sulphite pulp		2173	2325	2264
Unbleached sulphate pulp		1614	1661	1423
Bleached sulphate pulp		8972	11832	11836
Dissolv wood pulp	1481		1498	1458
Other fibre pulp	130		217	193
Paper + paper board	23867		32332	33353
News print	10729		12253	12519
Printing + writing paper	3432		6651	6638
Other paper + paper board	9701		13427	14196
Housh + sanit paper		255	323	363
Wrap + pack paper		6386	7266	8167
Paper + paper BD NES	3728		4923	4325

Source: UN statistics

Mass Trade : Bleached sulphate pulp, news print, other papers + paper board.

Quasi : Bleached sulphite, unbleached sulphate dissolve wood pulp, printing + writing, wrap + pack paper

Table 2 shows that EEC is the biggest market of pulp and Asia (biggest is Japan) is also importation area but other areas are the net exporting areas. The rank of exporting area is North America, North Europe, Latin America and Africa.

In consideration of distance in addition to the above, EEC should be considered as main market of Uruguay pulp plant and North America, North Europe and Latin America should be considered as competitor.

In the Latin America recently, Brasil has constructed the BKP plant and News paper plant, Argentine has constructed also Market BKP plant and New paper plant and Guatemala has built Market BKP plant.

Table 2 Capacity, Production and consumption in 1982

(1000 MT)

	Paper board Capacity	Pulp Capacity	Paper board production		Pulp production		Pulp Comsumption		Net import of pulp		Paper board comsuption		Net import paper	
			1981	1982	1981	1982	1931	1982	1981	1982	1981	1982	1981	1982
EEC	27385	6580	24385	23653	5502	5338	13333	12669	7831	7331	32830	32361	8445	8708
North Europe	15740	20175	13644	13127	17468	15942	12918	12007	-4550	-3935	3583	3313	-10061	-9814
Other Europe	6846	4348	5750	5861	3765	3797	3585	3579	- 180	- 218	5068	5251	- 682	- 499
West Europe Sub Total	49971	31103	43779	42641	26735	25077	30836	28255	4101	3178	41481	40925	- 2298	-1716
East Europe	15594	12466	15361	15576	13210	13500	12569	13642	- 641	142	15336	15667	- 25	91
Europe Total	65565	43569	59140	58217	39945	38577	43405	41897	3460	3320	56817	56602	- 2325	-1615
North America	63683	50966	70098	66539	66496	61774	60404	56288	-6092	-5486	65171	62276	- 4927	-4263
Asia	39034	22627	20933	30134	14581	14856	17816	17870	3235	3014	32299	32822	3266	2688
Oceania	2546	2376	2164	2198	1823	1755	1569	1572	- 254	- 183	2485	2545	381	347
Latin America	10181	7347	7583	7582	5166	5162	4671	4470	- 495	- 692	9413	9021	1830	1439
Africa	2250	1924	1843	1848	1648	1698	1284	1159	- 364	- 539	2572	2500	729	652
World Total	198.528	151.924	169.809	166.518	130.902	125.065	130497	124604	-	-	168757	165766	-	-

Source: Pulp and Paper International

The export oriented plant based on the domestic resources (wood, natural gas, crude oil and others) is selected from the view of transportation cost of product in each stages (log, chip, pulp and paper), production cost and market situation.

Export opportunity of log and chip is not included in this study and will be studied separately.

In generally speaking, for the export oriented plant based on domestic resources, pulp plant is selected because paper plant has already built in major consuming country and production cost of paper will be higher in new plant especially in the country in which plant cost and maintenance cost will be high because paper plant is one of the capital incentive one.

And also with the following reasons, the BKP is considered as the most suitable project to be studied.

From mass trade commodity, news paper and other paper, and paper board are not suitable as export oriented project because International grade of news print should be made mainly from Spruce and Fir which are whiter and more fitted for producing mechanical pulp than the other soft wood and kraft paper based on the domestic pulp wood in Uruguay who have the inferior quality.

2) Capacity at the plant

Because pulp plant is the capital intensive plant, therefore the bigger size plant has the stronger competitiveness if there is no constrain.

750 t/d BKP plant has already constructed and are under smooth operation, therefore 750 t/d should be taken as the base case and the other capacity will be studied if necessary.

Any way, the experiences of Japan in Brazil will be useful for this study because it is the mile stone of the historical current of the South America becomes to the suppling area of pulp to the world.

MINUTES OF MEETING

(Section Meeting)

1) Date : Dec. 4th - Dec. 7th. 1984
2) Place: LATU/MONTEVIDEO
3) Attendant

URUGUAY SIDE

Srta. Rosario Pou Ferrari : Ministerio de Industria y Energía
(Technical advisor)
(attended on Dec. 4th and 6th)

Srta. Ilda Silva Porro : Ministerio de Agricultura y
Pesca (Direction Forestal)

Ing. Pedro Senyzyn : Facultad de Agronomía
Universidad de la República

Study Mission Side

JICA Team

Mr. M. ONOZUKA, Engineer
Mr. K. NAGAI, Coordinator

1) The Study Mission has submitted the dailed questionnaire (a copy appached herewith) for forest plantation (planta tion and row material), background information and all other informations, required for the study of the establishment of the 750 t/D BKP mill in the Oriental Republic of URUGUAY.

2) The both parties has discussed each items of the above questionnaire for four days and as the result the Study Mission received the following data from the URUGUAY side, which were made by them as the reply for above questionnaire.

DESCRIPTION (Written in Spanish)

1) Cost of plantation at 1984
(Including the price of land for the plantation)

2) Evaluation/breakdown cost of the plantation for last ten years (1974 - 1984)

3) Estimation for breakdown of the plantation in 1983-1984

4) Costo De forestación/HAS (density)

5) Lista de Precios de Mercadería a Levantar en el Centro forestal.

6) Forestación en el URUGUAY

7) Registered plantations area from 1975 - 1983

8) Annual cutting of forests for industry purposes (results of six years)

9) Wood volume estimation per distance and age of plantations

10) Present purchase price of major machinery agricultural tractors, gradors, prouphs, seeders, pumps and gasoline, kerosene etc.

11) Direccion forestal, División Planeamiento y Desarrollo Forestal, Ministerio de Agricultura y Pesca

12) Cost of Major Operations

13) Efficiency of Major Operations for sawlogs

14) Cost of preparing pine round wood for the sawmill in the forest.

15) Reply to the questionnaire Nº 12-3
(period of Operation and annual production)

16) Transportes Carreteros
Transportes Ferroviarios

17) Weather data including monthly mean temperature, and rainfalls in the major districts of URUGUAY

18) Factory capacity and actual production for plywood, particle board and fibreboard.

19) Costo de flete de Madera en rollo

20) Densidad Básica (kg/m^3) de Maderas de especies

21) Pulp and paper industry

22) Carta forestal actualizada y suelos de interes forestal
(Map of forestation)

(23) El manejo de plantaciones forestales en Uruguay

(24) Mediciones en forestaciones de Pino en el Uruguay.
El manejo de explotaciones forestales en Uruquay.
Poder calorífico de maderas secas.
Precios de maquinaria importada

(25) Precios de maquinaria importada

(26) Poder calorífico de maderas secas determinado en laboratorio con bomba calorimétrica.

(27) Situacion actual de la forestación en el Uruguay

(28) F.Y.M.N.S.A.
Forestadora y maderera del norte S.A.
Diciembre de 1984

MINISTERIO DE AGRICULTURA Y PESCA DIRECCION FORESTAL

3) QUESTIONNAIRE FOR FOREST RELATION
(Plantation and raw material)

I. Background Information

1. Forest type map of the projected area (Distribution of species, ages m^3/ha etc.) or acreage classified by vegetation type (woods, ranch, etc.)

2. Land prices for plantation classified by vegetation type.

3. Plantation results of annual growth of the stem, and standard yield table of major species (number of tree, volume of stem/ha; D.B.H. of standard tree, etc., by age)

4. Results in the past five years and projection for succeeding year of log production, demand for logs.

5. Density (BD kg/m^3) of each species.

6. Plantation results in the past ten years and present schedule of planting species, its location and planting acreage.

7. Cost of plantation with breakdown in major operation on a yearly basis. ($/ha)

8. Weather data including monthly mean temperature, and rainfalls in the major districts of Uruguay.

9. Production of exsisting sawmills and wood processing mills around the projected pulp and paper mill and their utilization of wood waste.

10. Governmental policy and incentives on afforestation, forest management.

11. Stumpage and price of pulpwood at mill or roadside.

12. Data of operations at typical logging site.

1) Typical operations ..... Operation flow, required machinery and labor, actual working days per year and working hours per shift.

2) Efficiency (m^3/machine/day, m^3/head/day) and cost ($/$m^3$, $/$m^3$/Km) of major operations (felling & bucking, forwarding transportation etc.) and logging conditions such as density of standing timber (m^3/ha), average D.B.H., topography, road density (m/ha), average yarding and hauling distance and method of logging, etc.

3) Period of operations and annual production.

4) Direct management or by contractors, method of inviting labors, wage and fringe benefit.

5) Present purchase price and operation cost ($/Hr/machine) of major machinery and major specification.

(a) Tractor
(b) Yarder or skidder
(c) Crawler crane
(d) Log Truck
(e) Price of kerosene, gasoline and engine oil.

6) Present purchase price of chemicals

(a) Salt ($NaCl$)
(b) Suphuric acid (H_2SO_4)
(c) Salt Cake (Na_2SO_4)
(d) Lime Stone

MINUTES OF MEETING

1) Date: December 10, 1984 15.oo - 17.oo PM

2) Place: LATU/Montevideo

3) Attendant:

URUGUAY SIDE

Eng. Ana Cazzadori:	SEPLACODI (Technical advisor)
Eng. Agr. Rosario Pou Ferrari:	Ministerio de Industria y Energía (Technical advisor)
Eng. Agr. Ilda Silva Porro:	Ministerio de Agricultura y Pesca (Direction Forestal
Eng. Pedro Senyszyn:	Facultad de Agronomía Universidad de la República
Eng. Agr. Daniel San Roman:	Ministerio de Agricultura y Pesca Direction Forestal)
Eng. Fernando Stotz:	LATU
Chem. Eng. Raúl de Castro:	LATU

STUDY MISSION SIDE

JICA TEAM

Mr. Y. MIKAMI , Study Team Leader

Mr. M. ONOSUKA, Engineer

Mr.K.MATSUBARA, Engineer

Mr.J.MOROKUMA ,

Mr. F. SAKABE ,

Mr. T. SATO ,

Mr. T.SENTOKU ,

Mr.T.USHIJIMA ,

Mr. K. NAGAI , Coordinator

The Japanese Embassy in URUGUAY

Mr. T. IMAZU

Consultante de JICA (Stationed in URUGUAY)

Eng. T. MIKAMI

The discussion was started based on the "Main Topics" to be discussed on December 10th (MON) , as per attached, prepared by the study team.

1) Sample logs collection

The Uruguay side confirmed that the all sample logs shall be selected at FNP and CAJA BANCARIA instead of NEAR CAJA BANCARIA, once they proposed at the 1st. Meeting held on November 30 , 1984.

The Uruguay side confirmed that the permission for the above sample collection has been obtained from the authorities concerned.

2) The final organization of the survey team and its schedule

The Study Mission introduced to the Uruguay side all the study mission members arrived December 8th. as 2nd. mission and explained revised schedule of the field survey for the up country, starting from December 11th. (Revised schedule is attached hereto)
Members of the field survey team were fixed finally as follows:

Site Survey team : JICA

Mr. Y.MIKAMI

Mr. K.MATSUBARA , Mr. M.ONOZUKA

Mr. T.SATO , Mr. T.SENTOKU

URUGUAY

Chem. Eng. Raúl de Castro

Sampling team: JICA

Mr. F.SAKABE

URUGUAY

Eng. Agr. Daniel San Roman

Plantation team: JICA

Mr. J.MOROKUMA, Mr. T.USHIJIMA

URUGUAY

Eng. Agr. Daniel San Roman

Remarks:

(1) Mr. T. IMAZU , Japanese Embassy, will join to the site survey team on December 13th (THU) for the courtesy call at Municipality - FRAY BENTOS , at 14.oo PM on the same day.

(2) Mr. Y. MIKAMI, will return to Montevideo with Mr. T. IMAZU for the final arrangement of the Interim Report, which will be expected to be signed on December 21st. 1984.

(3) Eng. Agr. Daniel San Roman will be proceeded to the plantation team after the attendance of the sample collection at CAJA BANCARIA has been completed.

(4) The both parties confirmed that the above schedule will be modified according to the travelling conditions at the destination.

3) Organization to be visited at

The Uruguay side explained to the Study Mission that the followings are the person or organization to be visited for the field survey (plantation team)

at RIVERA : Sr. Balerio Fymmsa

at MELO : Estación Experimental Bañados de Merina
Eng. Fernando Martinez

4) Location of sampling of logs

The Uruguay side commented that concerning the locations of sellection of sample logs , though they once decided the location of sampling at FNP and CAJA BANCARIA, Rivera is also seems recommentable location for the sampling of Eucalyptus in addition to CAJA BANCARIA , since Rivera seems more favourable productivity area for Eucalyptus.
The study team explained that from the technical view point quality and characteristics of the paper and or pulp is not so affected by the material selected, any plantation sites, in case the material selected remains same kinds. It will be affected a little bit on the process of bleaching, however, it is not so important factor at this study stage that we would like to recommend to select the samples at the locations as we agreed on the 2nd. Meeting, held on December 3rd 1984.

The Uruguay side agreed tha above explanation made by the study team and finally confirmed that the collected locations of samples are same places as agreed on December 3rd. Meeting.

5) The both parties confirmed that the following are the meeting schedules to be proceeded from now on.

(1) Dec. 20th (THU) 10.oo AM at LATU

General discussion for the result of field survey
- reporting on the result of field survey by 3 teams separately.
- general discussion with both parties.

(2) Dec. 21st (FRI) at 10.oo AM at LATU
final settlement on the draft of Interim Report for the signing by both parties.

(3) Dec. 21st (FRI) at 17.oo PM at SEPLACODI
signing on the Interim Report with Mr. Pelufo, SEPLACODI and Mr. Y. MIKAMI , JICA

THE STUDY SCHEDULE OF 750 T/D BKP PROJECT (REVISED ON DEC/10. 1984)

3/DEC/84

FIELDO SURVEY OUTSIDE MONTEVIDEO

DATE	SITE SURVEY TEAM	TEST SAMPLING TEAM	PLANTATION SURVEY TEAM	
	JICA TEAM: MR Y.MIKAMI Mr. M.ONOZUKA K.MATSUBARA T. SENTOKU T. SATO SEPLACODI: DECA (LATU)	JICA: MR. F. SAKABE SEPLACODI: ING.AGR.DANIEL SAN ROMAN	JICA MR.T.USHIJIMA J. MOROKUMA SEPLACODI :	COORDINATION MR. K. NAGAI SEPLACODI :
10/DEC(MON)	20.30 PARTY			
11/DEC(TUE)	LV 8.00 MONTEVIDEO→JUAN L.LACAZE (FNP)→ MERCEDES	(HOTEL = MERCEDES)		MONTEVIDEO
	REMARKS 1) TO VISIT = FNP FACTORY 2) TO VISIT = FNP PLANTATION			
12/DEC(WED)	AM: MERCEDES PAMER PM: PAMER MERCEDES	(HOTEL=MERCEDES)		MONTEVIDEO
	REMARK 1) TO VISIT : PAMER FACTORY 2) TO VISIT : PAMER PLANTATION			
12/DEC(THU)	AM: MERCEDES FRAY BENTOS PM: FRAY BENTOS		PAYSANDU : SAMPLING AT CAJA BANCARIA	MONTEVIDEO/FRAY BENTOS With Mr. IMAZU, Japanese Embassy FRAY BENTOS ⟶
14/DEC(FRI)	AM/PM: FRAY BENTOS REMARK 1) TO VISIT FRAY BENTOS SITE FORT (HOTEL : FRAY BENTOS)	(HOTEL=PAYSANDU) AM:FRAY BENTOS SAMPLING AREA (CAJA BANCARIA) REMARK 1) TO ARRANCE SAMPLE LOGS (HOTEL PAYSANDU)	PAYSANDU→ RIVERA (HOTEL RIVERA)	MONTEVIDEO(With Mr.Y. MIKAMI)

DATE	SITE SURVEY TEAM	TEST SAMPLING TEAM	PLANTATION SURVEY TEAM	COORDINATION
15/DEC(SAT)	STAY AT FRAY BENTOS (HOTEL : FRAY BENTOS)	ARRANGEMENT FOR SAMPLING LOGS (HOTEL PAYSANDU)	 RIVERA (HOTEL RIVERA)	 MONTEVIDEO
16/DEC(SUN)	REMARK 1) VISIT TO PAMER 2) HYDRAULICS DAM	BRING BACK SAMPLE LOGS TO MONTEVIDEO	RIVERA→TACUAREMBO (HOTEL: MELO)	MONTEVIDEO
17/DEC(MON)	FRAY BENTOS→PAYSANDU (CASA BLANCA)		MELO (HOTEL MELO)	MONTEVIDEO
18/DEC(TUE)	 MONTEVIDEO	MONTEVIDEO (ARRANGEMENT FOR AIR) FREIGHTING)	MELO⟶MONTEVIDEO	MONTEVIDEO
19/DEC(WED)	GENERAL DISCUSSION AND SUMMARIZE SURVEY RESULT			MONTEVIDEO
20/DEC(THE)	GENERAL DISCUSSION WITH URUGUAY MEMBERS			
21/DEC(FRI)	17.00 PM SIGNING ON INTERIM REPORT 20.30 PM PARTY WITH ALL TEAM MEMBERS			
22nd-23rd	SUMMARIZING ALL STUDY RESULTS			
24/DEC(MON)	LV. FOR JAPAN			

Main points to be discussed on December 10th (MON). 1984

1) Sample logs collection

(A) at FNP on Dec/11 (TUE)

(B) at CAJA BANCARIA on Dec 13th (THU)

	CAJA BANCARIA	Others
To whom and where we have to meet ,		
Name of Person:		
Address:		
Tele. No.:		

2) Final Organization of Survey Team and its schedule.(Especially plantation groups)

3) A general Meeting with URUGUAY side after the field survey.

Dec. 20th (THU) 10.oo AM at LATU

Dec. 20th (TH) 15.oo PM with Sra. Ana Cazzadori

(A) Reporting the result of survey by each three teams.

(B) General discussion with both parties

(C) Final settlement on draft of Interim Report, for signing on Dec. 21st. (FRI)

4) Signing on the Interim Report

Dec. 21st. (FRI) at 10.oo AM at LATU

(signed by Mr. Y.MIKAMI by JICA Team)

(signed by Mr. PERUFFO by URUGUAY side)

5) Organization to be visited at

Rivera

Tacuarembó

Melo

6) Name and title of persons to be invited to the Party on Dec 21st 1984 and method at despatching invitation card

7) Delivery method of sample logs to Japan.

(1) A field report by Sample Collection Team

Dec. 11 th. (TUE) We have visited the forestal deparment, located about 2 Km N-W of FNP around 11,oo AM with plantation team and met Mr. Raúl Menendez Rampa and Mr. Oscar R. Arca Regviera.

Two kinds of Samle logs, according to the discussion with URUGUAY side on Dec. 10th., Eucalyptus Globulus and Eucalyptus Maideni, which they have prepared by themselves yesteraday and were collected by us. Both of the sample collected were informed that they are four years grade. We put the sample No. 1 for Eucalyptus Maideni and No.2 for Eucalyptus Globulus. All of the above samples were barked already and were cut into about 25 cm length each already, therefore, we collected 8 pcs each (about 20 kgs) and total 16 pcs for 2 kinds (about 40 kgs).

Dec. 12th. (WED) 8.oo AM left for MERCEDES with plantation survey team. 11.20 AM arrived at plantation office, CAJA BANCARIA. According to the instruction given by the plantation office above, we have proceeded to the plantation area under the guidance by the plantation office and collected 4 kinds of wood samples under the attendance of Eng. Agr. Daniel San Roman and the plantation survey team.

The samples which we have received in two days were as follows:

Sample No.	Species	Collected locations
No. 1	Eucalyptus,Maideni	FNP
No. 2	Eucalyptus, Globulus	FNP
No. 3	Pinus, taeda	CAJA BANCARIA
No. 4	Populus	CAJA BANCARIA
No. 5	Pinus, Elliotti	CAJA BANCARIA
No. 6	Eucalyptus,Grandis	CAJA BANCARIA

All of the above samples were delivered to Montevideo for the arrangement for airfreighting to Japan.

(2) Pulp test in Japan

Upon arrival all of the sample above to Japan, we are scheduled to carry out the pulp test according to the rule of Japanese Industrial Standard (JIS).

Firstly, the above sample woods will be cut into chips and will prepare the chips size about 10 mm x 10 mm for the test.

The following process for the test will be carried out for all six kinds of samples collected.

(1) Unbleached yield

We will select cooking condition for unbleached pulp for the KAPP No. 13 for Hard wood and KAPPA No. 20 for soft wood and will determine unbleached yield.

(2) Bleached yield

We will set our target brigthness 90 GE while using the same bleaching condition on each sample and will compare the brightness of each sample and will determine bleached pulp yield from the unbleached pulp.

(3) Though the economical evaluation of the samples as pulp material we decided by the appearance (colour) of bleached pulp and the yield, the Viscosity, which is required generally for the quality evaluation, will be measured and will report for your reference.

(4) After completed all the above test, we will summerize the data obtained and will put priority making each for H.W. and S.W. for suitability of making pulp for all six kinds of wood samples.

Montevideo, Dec. 14 de 1984

PACKING LIST OF SAMPLE LOGS

CASE Nº	CONTENTS		NET WEIGHT
Nº 1	Eucalyptus Maideni (Sample Nº1, FNP)	8 pcs.	28kgs. (Cartón box)
Nº 2	Eucalyptus globulus (Sample Nº2 FNP)	8 pcs.	16Kgs. (Carton box)
Nº 3	Pinus toeda (Sample Nº3 CAJA BANCARIA)	1 pcs.	15Kgs. (Wooden crate)
	Populas (Sample Nº4 CAJA BANCARIA)	1 pcs	30Kgs.
Nº 4	Pinus elliotti (Sample Nº5, CAJA BANCARIA)	1 pcs	30 Kgs. (Wooden crate)
	Eucalyptus, grandis (Sample Nº6, CAJA BANCARIA)	1 pcs	25 Kgs.

(2) Site survey report by SITE SURVEY TEAM

MINUTES OF MEETING

(Factory Survey)

I. Fábrica Nacional de Papel S.A. (FNP)

1) Date : December 11 1984 (11 AM - 14:30 PM)
2) Place : FNP
3) Attendants

FNP SIDE

ING. NORBERTO F. CASSELLA
(Director Técnico)

INGENIERO QUIMICO HORACIO FAEDO
CERIOTTI (JEFE DEPARTAMENTO DE PAPEL)

STUDY MISSION SIDE

Mr. Y. MIKAMI, Study Team Leader
Mr. M. ONOZUKA, Engineer
Mr. K. MATSUBARA, Engineer
Mr. T. SENTOKU, Engineer
Mr. T. SATO, Engineer

LATU

Sr. RAUL DE CASTRO, Chemical
Eng. Pulp and paper Section- LATU

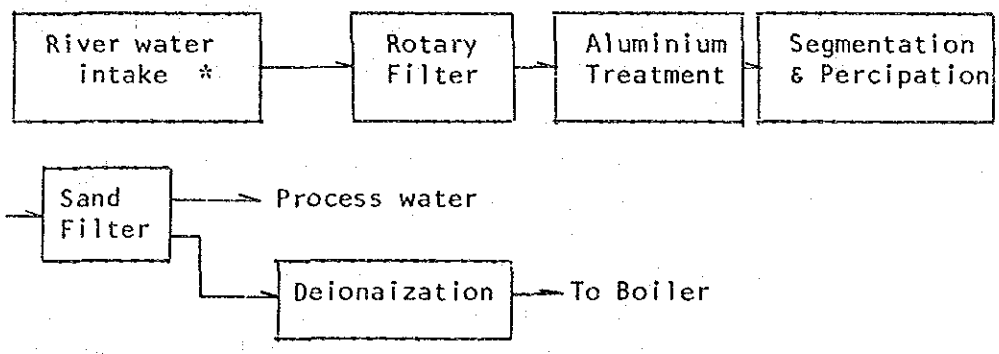
4) Outline of the factory survey
After the factory trip, they kindly accepted our questions and then we were invited to luncheon party at the their guest house.
This factory has ,75 T/D BKP Plant and paper machine mainly for printing & writing paper production.
(40% of their products are exported to Argentina)

5) Major Topics of the discussion

a) Facility of factory

Since major facilities and equipment were described in the Master plan study and preliminary mission's study, they are deleted here.

i) Water Treatment for process water



ii) Waste water

Although water control by the regulation is stipulated, it is not effective.

The factory considers future installation of these facilities.

iii) Sludge

This factory does not have kiln for caustic process and therefore waste $CaCO_3$ is discharged as land disposal.

iv) Electricity

They consume 3,000kw of electricity and 60% of them is self-generated.

* River water chemical analysis was obtained here.

b) Construction way

. Engineering & Layout ---------- Jaakko Pöyry

. Electrical

consultant ---------- Montevideo

construction ---------- Local

. Civil/Architectual

consultant ---------- Montevideo

construction ---------- Local

. Mechanical

Recovery boiler ---------- Brazil company

Some of them are done by themselves.

. Construction management is done by themsalves

. Heavy machine transportation was done using the Route Nº 101 from Montevideo port.

c) Price and cost

Wood (8 - 10 years woods and all Eucalytus)for pulp at the Mill ---------- 10 U$S/cu-m

Wood for fuel at the Mill -------- 8 U$S/cu-m

Wood prices purchased from outside plantation and prices from own plantation are almost equivalent at the mill because tree's prices as stand in outside plantation are cheaper than in own plantation.

However, transportation cost from outside is higer than from own plantation. Average transportation distance from own plantation is about 30 km from mill.

d) Inventory

i) Wood for pulp (logs)---------- 3 Months

ii) Chips for pulp ---------- 3 days

iii) Wood for fuel ---------- 6 Months (including dry)

iv) Chemicals*

Cl_2 ---------- 4 - 5 days
NaOH

e) Nº of employee

Totally 650 person and three shifts.

f) Miscellaneous

i) Several paper companies in this country have agreement that each factory mainly produces special product in order to avoid severe competition. Therefore this factory produces manily printing and writing paper.

ii) Some of products from this factory is exported to Argentina by the means of truck transportation using ferry.

iii) Fuel consumption

20% ---------- Heavy fuel oil

80% ---------- Wood and black liquor

They plan to convert to woods from fuel oil.

iv) Wharf

At a wharf annexed FNP factory, a 3.000 DWT tanker belonged to ANCAP (state petroleum company) is moored. According to a port representative, dredging of the port has been made once per three year by the reason of sand accumulation from upstream.

* Those chemicals are supplied to this factory from NaOH production factory far from 100 km.

Analysis: Water from river

F.N.P. (Rio de la Plata) 1984.9.22

pH	7.9	
Color (Pt Carbonate method)	2.50	
Electric conductivity	122	
Solid Total	163	mg/l
suspended solid	38	mg/l
disolved solid	125	mg/l
Total hardness ($CaCO_3$)	35.72	mg/l

Anions

HCO_3 (Bicarbonate)	Compound	45.63	mg/l
CO_3	Compound	0	mg/l
OH (hydroxi)	Compound	0	mg/l
SiO_2 (Salica)	Compound	2.0	mg/l
SO_4	Compound	19.5	mg/l
CL	Compound	7.9	mg/l
NO_3 (Nitrate)	Compound	0.13	mg/l

Cations

Ca Compound (Ca)		11.25	mg/l
Mg Compound (Mg)		1.83	mg/l
Na Compound (Na)		4	mg/l
K Compound (Na)		0.55	mg/l
Fe Compound (Fe_2O_3)		4.15	mg/l
Al Compound (Al_2O_3)		trace	
$KMnO_4$ Consum (O_2)		3.41	mg/l
CO_2 gas		1	mg/l
Alkalisity (phenolhthalein)		0	mg/l
Alkalisity (Heliznitin)	$CaCO_3$	37.4	mg/l

MINUTES OF MEETING

(Factory Survey)

II PAPELERA MERCEDES S.A. (PAMER)

1) Date : December 12, 1984 (9 AM - 1 PM)

2) Place : PAMER

3) Attendants:

PAMER SIDE

Dr. ANGEL CANTONI, Director Delegado

STUDY MISSION SIDE

Mr. Y. MIKAMI, Study Team Leader
Mr. M. ONOZUKA, Engineer
Mr. F. SAKABE, Engineer
Mr. K. MATSUBARA, Engineer
Mr. T. SENTOKU, Engineer
Mr. T. SATO, Engineer

LATU

Sr. RAUL DE CASTRO

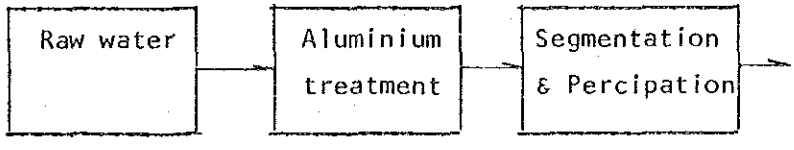
4) Outline of the factory survey

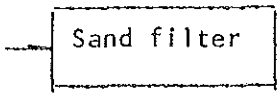
This factory produces mainly liner board.
They have GP and SCP facilities and their annual production 11.000 t.

5) Major topics of the discussion

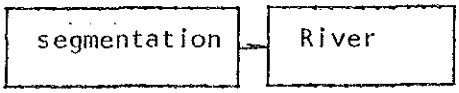
a) Facility of factory

i) Water treatment for process water





ii) Waste water



iii) Electricity

. Capacity 9.000 KW (80% of it----------self-generation)

. Bark boiler (12t/h) is installed and its generating capacity is 800 KW. Beside it 1000 KW of diesel generator is also installed and it has been used once a year in case of emergency such as black-out.

The bark boiler was supplied by the Brazil Mitsubishi

capacity of bark boiler ---------- 12 t/h
40 Kg/cm^2
400 °C
1.5 Million U$S

b) Transportation

Mainly truck transportation for woods is carried out in this factory. However, railway transportation is cheaper than truck. For example it costs 280 pesos/ton including charge/discharg for 120 km. distance.

Water transportation (raft) is prohabited here.

c) Raw wood prices and cost

(1) Wood prices from outside plantation

(1) wood price

Pine 1100 Peso/ton 2.2m length & max dia 20 cm.

Eucalyptus 550 peso/ton (for fuel)

d) Labor wage

750 - 1200 U$S for engineer plus 2 months bonus
1700 U$S for invited engineer
110 - 120 U$S for labor plus 57% allowance

e) Factory organization

. Total employee (Factory) 330 persons
other 330 persons in Montevideo
for box making

. Breakdown of employee

Reliable person	30 - 35	persons
Administration	20	persons
Maintenance	70	persons
Production line	210	persons
	330	persons

Production line

Pulping	30	persons
Paper	50 -55	persons
Utility	18	persons
Barking	32	persons

. Production line has 3 (Three) shifts and working time is 8 hrs. However on Sunday the line fully stops.

. On Sunday of every 15 days, production line is inspected and maintained

(2) obtaining area Within 40 - 130 Km & average 60 Km distance

from CAJA NORTAÑA	120 Km	50%
	100 Km	40%

Two Type Cut & loading	350 Pesos
Tree as it is	200 Pesos
	550 Pesos
+ Transportation	550
	1100 Pesos

(3) Moisture : 55 - 60%

(2) Wood prices from own plantation

(1) Pine Stand wood 120 Pesos

Cutting cost 350 Pesos

470 Pesos

Transportation 200 Pesos

670 Pesos

(2) Land cost : 300 - 350 U$S/ha.

(3) Future plan

In future wood procurement is to be achieved up to 60 - 70% from own plantation.

(4) Production record

Double colgated box for citrus

1983	2.28 Million boxes	
1984	3.0 " "	
1990	8.0 " "	(expected by citrus producers)

Citruses are now exported to Holland and Sweden.

f) Factory space

Factory 8 ha
Total 32 ha

Land cost 350 U$S/ha

g) Analysis of pulp manufacturing cost

PAMER S.A. MERCEDES

	PESO	
Salario	1069.24	
Leyes Sociales	571.22	
Gastos Varios	244.66	
Gastos Diferidos	220.09	
Energía UTE	849.15	
Gastos Fletes	288.17	
Consumo Materias Primas vs	96.23	
Consumo Combustibles	265.13	
Consumo Maderos p/vapor	199.62	
Consumo Materiales y repaseles	364.94	
Consumo Talas y filtros	17.91	
Amortizaciones	739.10	4%
Heclesa Pino 1	5129.44	27.23%
Na_2CO_3	5638.63	
Na_2SO_3	2128.52	
Agua	884.43	
Total	18836.34/t/USCP	

DOCUMENT LIST

AREA PLAN DRAWING OF FRAY BENTOS	Dec. 12
TOPOGRAPHIC DRAWING OF FRAY BENTOS	CONSTRUCTION DEPARTMENT,
AERIAL PHOTOGRAPH OF FRAY BENTOS	PREFECTURAL OFFICE

DRAWING OF PRIVATE WHARF OF ANGLO MEAT FACTORY	Dec. 14
DRAWING OF BUILDING OF ANGLO MEAT FACTORY	ANGLO MEAT FACTORY FRAY BENTOS

LIST OF ARRIVED VESSEL OF FRAY BENTOS PORT	Dec. 14
PLAN DRAWING OF FRAY BENTOS PORT	PORT AUTHORITY
DATA OF WEATHER CONDITION OF FRAY BENTOS AREA	OFFICE,
TARIFF OF FRAY BENTOS PORT	FRAY BENTOS

GENERAL DOCUMENTS OF FRAY BENTOS	Dec. 15
	DR. MARIO H.CARMINATTI

SITE SURVEY REPORT BY PLANTATION GROUP

1. Date: Dec.11, 1984 / 11:00 - 13:30
2. Place: Oficina Forestal y Depósito de Madera & Plantation
3. Attendant:

URUGUAY SIDE

ING. AGR. RAUL MENENDEZ RAMPA	Departamento Forestal
ING. AGR. OSCAR R.ARCA REQUEIRA	Fábrica Nacional de Papel S.A.
ING. AGR. DANIEL SAN ROMAN	Dirección Forestal, Ministerio de Agricultura y Pesca.
Sr. GUILLERMO REYES	(As interpreter)

Study Mission Side

MR. J. MOROKUMA
MR. F. SAKABE
MR. T. USHIJIMA
MR. H. YAMAMOTO (As interpreter)

4. Main Topics discussed

1) Pulp Test Samples

FNP had prepared Pulp Test Samples before Study Mission arrived at the above mentioned place as follows

i) E. Globulus	Length : about 25 cm
ii) E. Maideni	Dia : about 10 cm
iii) E. Grandis	Pieces : 8/each species
iv) E. ?	Age : 4 years old
	Date to have cut: Dec,10, 1984

FNP offered that FNP could arrange to cut Test Samples in the plantation side if Study Mission wants to see cutting samples and that FNP could provide four species if S.M.wants,

Study Mission accepted Test Samples of E.Glob. and E. Maideni in accordance with the discussion result regarding the collection of Test Samples.
FNP asked S.M. what sorts of test would be carried out in Japan and S.M. gave brief answer about the pulping test.

2) Information of plantation

i) Plantation Areas, about 4000 ha

ii) Species : various species of E.

iii) Cutting Age : 12 years old

iv) Interval of planting: 2 m x 2 m in the past
2 x 3 at the moment

v) Examples of mean annual increment

E.Globulus : 12 years old 17 m^3/ha./year

E.Grandis : 11 years old 164 tons./ha.=15m^3/ha./year

E.Globulus : 1100 kg/m^3 (without bark)

E.Grandis : 980 kg/m^3 (without bark)

E.Grandis : 8 years old 20 m^3/ha/year (2 x 2 m)
(DBH, 13, 17,21,cm)
(H. 16 m up to 7 cm top)

vi) Seed : E. Globulus can bear seed in FNP own plantation.
FNP is importing necessary seed from South Africa.

vii) Storm damage : No

viii) Frost damage : Yes; late frost, early frost

ix) Thinning : Without thinning in case of E.
With chinning in case of Pine, but there are no demand to thinned wood.
So most of plantation owners can not make thinning because of economic issues.

x) Delivery cost of pulpwood : 10 u$/$m^3$

fuel wood: 8 u$/$m^3$

xi) Natural regeneration of E.

1st Cut	2nd Cut	3rd Cut	4th Cut
12 years old	20 years	28 years	36 years

xii) Loading capacity of truck

truck 12 m^3 trailer 15 m^3 total 27 m^3

1. Date : Dec. 12, 1984 / 9:50 - 14:30 - 17:50

2. Place: Pamer's Plantation in Soriano, 20 km from Mill
   " " in Rio Negro, 40 km from Mill

3. Attendant :

URUGUAY SIDE

ING.AGR. LUIS SORIA PAMER
Sr. ELIMS FIGUEROA "

ING.AGR. DANIEL SAN ROMAN
Sr. GUILLERMO REYES (TRANSLATOR)

Study Mission

Mr. J. MOROKUMA
Mr. T. USHIJIMA

4. MAIN TOPICS DESCUSSED

1) Information of Plantation in Soriano

Area : 168 ha. 20 Km from Mill
Planted Species: mainly E.
Frost and grass are two main obstacles against plantation in this area.
E. Grandis suffers frost demage easily. So PAMER is now planting E.TRETICORNIS and E.ROSTRATA (= E. CAMANDULENSIS)

Cutting Age : 6 - 8 years old (DBH 12 cm, H 8 - 10 m)

M.A.I. : average 25 m^3/ha/year (will continue up to 10 - 12 years old)

Spacing: $2\frac{5}{}$ x $2.\frac{5}{}$ m new plantation
2 x 2 m old plantation

Populus:
cutting age : 6 years old
expecting yield : 250 tons/ha at the age of 6.
Spacing : 4m x 2 m

Salix :

cutting age : 6 years old

expecting yield: 300 tons/ha at the age of 6

Salix : 3rd cutting

2nd cutting was made 6 years ago, PAMER bought the area after 2nd cutting and thinning of 200 tons/ha. will be made this year, but PAMER expects 350 tons/ha of final cut 3 years after the thinning.

Usually, 4 or 5 harvesting can be expected from one root during 20 years.

2) Information of Plantation in Rio Negro

Area: 850 ha. 40 Km from Mill

Planted species : Pine, E., Populus,

Pinus taeda:

Pruning will be made at the age of 4 - 5, or at the time when DBH reaches to 6 -9 cm.

Pinus ELLIOTTII : for pulpwood

Pruning : DBH 7 - 8 cm

Thinning : 6 - 7 years, 100 tons/ha. (equivalent to 30%)

Final cut: 10 - 12 years, 350 tons/ha.

Pinus ELLIOTTII : for SAWLOG rate of thinning

1st pruning and thinning : 6 - 7 years old 30%

2nd " " :10 -12 " " 30%

Final cut :18 -20 " "

(400 - 500 trees/ha. originally 1.100 trees/ha 3 x 3 m)

Pinus taeda plantation of 18 years old

Area : 3 ha.

DBH : 26 cm H: 18 m

Rate of thinning : 30 - 40%

Expecting volume from thinning: 400 - 500 t from total area (→ 133 - 167 tons/ha ÷ 35% = 380 - 476 tons/ha. → present volume per ha.)

Final cut : 20 - 21 years old for sawlog
400 - 500 tons/ha.

3) Nursery

			ready for planting
Production in 1984 :	Pine	: 100.000 pieces	1 year old
	E.	: 200.000 "	"
	Populus	: 50.000 "	"

Size of pot : ø 9 cm x 15 cm.

BARBADOS : Seedling with root

Estaca : direct cutting

4) Mill consumption and purchasing price of pulpwood

E. 32.000 tons/year for energy and semi chemical pulp

Pine 12.000 "

Populus 4 - 5.000 tons/year

E. (red. white)	L:2^{20} ø - 25 cm	U$ 500	/ton.	at mill
E. (red. white)	L:1^{10} ø 25 - 60	" 420	"	"
E. (red,White)	without bark ø - 25	" 600	"	"
Pine & Populus	without bark ø - 25	" 770	"	"

(distance : about 100 - 120 km)

Stumpage of E. (Price of standing tree) U$220/ton

Density		Purchasing rate/consumtion
E. (red, white)	1.000 kg/m^3	80 -90%
Pine	600 - 650	100 %
Populus	450 - 500	20 %

5) PAMER'S policy of plantation

i) to control the pulpwood purchaching price.

1. Date: Dec. 13, 1984/11.00 - 14.00
2. Place: Caja Bancaria
3. Attendant:

URUGUAY SIDE

Sr. Santos Ronchette, Caja Bancaria
Ing. Agr. Daniel San Roman
Sr. Guillermo Reyes (as interpreter)

Study Mission Side

Mr. J. MOROKUMA
Mr. F. SAKABE
Mr. T. USHIJIMA

Mr. H. Yamamoto (as interpreter)

4. Main Topics

1) Pulp Test Samples

Caja Bancaria guided Study Mission to two logging sites to give samples of Pinus taeda and Populus alamo as requested by Study Mission.

Pinus taeda is about 12 years old and Populus alamo is 17 years old.

Caja Bancaria felled a standing tree of Pinus elliotti to make a sample, which is 16 years old.

And a sample of E. Grandis which is 14 years old was selected from piled logs.

All samples were debarked at the collected places.

2) Plantation data

Caja Bancaria has two blocks of lands. One is 900 ha. wide and the other is 6,000 ha. The land of 900 has not been planted yet.

Caja Bancaria started plantation about 20 years ago, having bought a livestock farm. Up to now, Caja Bancaria bought 3 linestock farms, totaling 6,900 ha .

Since Caja Bancaria's forest engineer was not in the office, Study Mission could not get detailed data of its plantation.

3) Estimation of Pinus elliottii

Age: 16 years old

DBH: 22 cm in average H: 16 m

Spacing: $2\frac{5}{-} \times 2\frac{5}{-}$ - 1600 trees/ha.

Present number of trees = 1600 x 70% = 1.120 trees (estimate)

$\left(\frac{0.22}{2}\right)^2_2 \times \pi \times 16\ m \times 0,4 = 0.24\ m^3/tree$

$\times 0.5 = 0,30$

$0.24 \times 1.120 = 270\ m^3/ha$ (with bark) $16\frac{9}{-}\ m^3/ha/year$

$270 \times 0.75 = 200\ m^3/ha$ (without bark) $12\frac{7}{-}\ m^3/year/ha$

$0.30 \times 1.120 = 340\ m^3/ha$ (with bark) $21\frac{3}{-}\ m^3/ha/year$

$340 \times 0.75 = 255\ m^3/ha$ (without bark) $15\frac{9}{-}\ m^3/ha/year$

1. Data: Dec 15, 1984/8.30 - 18.00
2. Place: 2 plantations of Forestadora y maderera del Norte S.A.
3. Attendant

Uruguay side

Srta. Ing. Agr. Rosario Pou Ferrari

Sr. Ing. Agr. Daniel San Roman

Plantation owner: Sr. Lorenzo Balerio

Member of Excursion Tour: Sr. Alberto Voulminot
(Presidente of Industrias Forestales)

Study Team side

Mr. J. MOROKUMA

Mr. T. USHIJIMA

4. Main Topics

1) Study Team joined to Excursion Tour Group of plantation owners and government officials by Srta. Rosario Pou Ferrari's suggestion and introduction.
She helped Study Team during the tour.
And FYMNSA'S forest engineer Sr. Krall could not attend because his daughter delivered baby.

2) Partial translation of the papers given by FYMNSA a attached herewith.

FYMNSA (Forestadora Y maderera del norte S.A.)

I. General Aspects

I.1. Activities description

FYMNSA is a forestry and livestock company in Rivera since 1974. Its purpose was to develop forestry in sandy zone in Rivera and Tacuarembó. This project brought an increase in the number of workers in this region.

In order to achieve the purpose, FYMNSA built

- houses for workers and their families,
- school, etc.

The plantation began in a 5,000 ha. farm (today : 6,850 ha.)

At the same time the company dedicated to livestock activity.

I.2. Location

The plantation is 9 km far from the railroad and the town of Paso Atoques, and 11 km far from the town of Tranqueras.

The plantation is over the geological formation called Tacuarembó.

Its area is about 1,600,000 ha.

1,000,000 ha. of this area can be forested.

Characteristics of the soil :

a) high depth, sandy soil, low productivity, erosionable,

b) low productivity, CONEAT index : 35% to 75%.
This is the reason why this soil is not good for livestock and agriculture. The climate of this region favours species of quick growth (P.taeda, P.elliottii, E.grandis) because of the high amount of rain.

II. Main Activity : Forestry

II.1. Basic topics

II.1.1. Introduction

The original project was approved by Forestry Direction (2,500 ha.). Today we are doing the 2nd part of the project (2,000 ha.).

II.1.2. Nursery

The seedlings are produced in their own nursery. The seed is from orchard seed (South Africa).

II.1.3. Forestry

Almost 100% of the plantation is of P. taeda and P. elliottii, 1100 trees/ha.

Fig. 1 Forestry Area

Year	Ha.	
1976	100	
1977	740	
1978	830	
1979	330	
1980	480	
1984	1,280	"effective plantation area is about 80%" suggested by Ing. Daniel.
Total	3,730	

"Ing. Daniel gave the following data.
Actual result of soil preparation in the 2nd project.
16 hours (2 shift) / day x 45 days
60cm wide x 5cm deep of caltivation was made by Rotunador plus 50hp tractor along the contour line.

Plantation area	: about 1,280 ha. x 80% = 1,024 ha.	
Species	: almost 100% P.Taeda	4 x 3m
	a few P.Patuda	4 x 3m

Foremen	: 4
Plantation workers	: 44
Ants control	: 6
Cooks	: 2
Cook-helpers	: 2
Total	: 58 x 30 days

II.1.4. Forest Management

i) Ants control

The control begins 6 months before the forest planting, and continues during the 1st, 2nd and 3rd year of planting.

ii) Prunning

All the trees are prunned up to 2.20m in height between the 3rd and 4th year. The trees to be remaind until final cut (350 trees) are prunned up to 5m in height betweent the 6th and 7th year. "Prunning is never done over 2/3 of tree height because crown becomes too small to grow."

iii) Thinning

The first thinning is between 9th and 10th year, remaining 750 trees/ha. The 2nd thinning is between the 14th and 15th year, remaining 350 trees/ha.
Final cut is from the 18th to 20th year.

II.1.5. Destination of the wood (Uses)

a) Thinning : chips, pulpwood, packing, sawlog.
b) Final cut : veneer, sawlog (high quality), etc.
c) Residues (of logging) should be to energy source.

II.2. Labour

Fig.2. Average 60 people

Year	Labour	1975=100
1975	33	100
1976	46	140
1977	56	170
1978	59	179
1979	60	182
1980	57	173
1981	62	188
1982	65	197
1983	65	197
1984	80	243

Transitory labour : during plantation, prunning and thinning
: 90 people.

In livestock activities : 1 man/400 ha.
(before 1975 : 1 man/1,000 ha)

Today, FYMNSA : 1 man/76 ha.

Fig. III

Year	Ha./man
1975	152
1978	85
1981	81
1984	76

II.3. Incencives and Finacial

II.3.1. Ways of Financial

The whole project was made with our own fund.

II.3.2. Incentives (just explained)

II.4. Forestry and livestock

Fig. IV

Year	Amount of cattle breed	Amount of sheep
1976	2,102	1,813
1977	2,831	2,660
1978	2,398	1,750
1979	1,812	1,494
1980	1,862	2,601
1981	2,163	2,311
1982	2,094	979
1983	2,089	596
1984	2,168	900

The amout of animals per ha. is similar to other farms with an equal CONIAT index (55%)

Fig. V

Year	Cattle breed only (ha.)	Cattle and forestry (ha.)
1976	3,986	-
1977	3,246	-
1978	2,416	30
1979	2,086	203
1980	1,606	673
1981	1,606	1,362
1982	1,606	1,948
1983	1,606	2,264
1984	1,456	2,480

Fig. VI

Production of livestock meat (of cattle and sheep)

Year	Weight of living meat (kg)
1977	93,146
1978	93,146
1979	107,909
1980	107,909
1981	115,519
1982	115,519
1983	123,450

II.5. Others

Eucaliptus 30 ton/ha./year = 6 ton of oil = U$ 1,380

Extensive land production (34.6 kg of meat/ha./year + 3.0 kg of wool/ha./year) = U$ 55

"Data given by Ing. Daniel (regarding FYMNSA)

1) Soil preparation cost in 1984 : U$ 35/ha., very cheap

2) Cost of 1st prunning : U$ 22 - 23/ha.
" 2nd " : " 29 "

3) Expecting increase of diameter 2.5 - 3.4 (=3cm)/year in DBH

4) Increment : 23 ton/ha./year at the age of 18 - 20

5) Rainfall : 1500 mm/year in the North of Uruguay
800 - 900 in the South "

6) Growing period : 10 months from Aug. to May in the North
8 " in the South

7) Plantation observed

Planted year : 1976, 8 years old

Ave. DBH : 20cm, H : 14m

thinned logs $^{\circ}$20cm 1 = 2.40m, 160 - 180 kg/tree

Planted year : 1984, soil preparation was made 1 month before planting.

Sheep enter the plantation 6 months after planting.

Cattle " " 12 " " " " "

1. Date: Dec. 16, 1984/10:30 - 11:00 17:00 - 19:00

2. Place: Near Tacuarembó Project 23
on the way from Rivera to Melo

3. Attendant:

Uruguay side

Ing. Agr. Daniel San Román
Sr. Guillermo Reyes (As interpreter)

Study Mission side

Mr. T. USHIJIMA
Mr. J. MOROKUMA

4. Survey Result

Ownwer of Plantation	:	Michel Acle
Planted year	:	1975, 9 years old
Areas	:	50 ha.
Species	:	E. Grandis
Average DBH	:	24 cm
Average Height	:	18 m
Interval	:	3 x 3 m = 1.100 trees/ha

Present number of trees (estimate)

1.100 x 65 - 70% =715 - 770 trees/ha.

$$\frac{(0.24)^2}{(2)^2} \times \tilde{n} \times 18 \times 0.65 = 0.59$$

$$\left.\begin{array}{l} \times 715 = 378 \\ \times 770 = 407 \end{array}\right\} \text{ Ave. } 390\ m^3/ha$$

$44 m^3$/ha/year (with bark)

5. Mr. Daniel gave Study Team the explanation about FYMNMA'S document which was given during the excursion tour and also the data he got in the Spanish language.
   And also he gave the explanation of the forest incentive in detail.

1. Date: Dec. 17, 1984/8:00 - 13:00
2. Place: Estación Experimental Bañados de Medina
3. Attendant

Uruguay side

Ing. Agr. Fernando Martínez
Ing. Agr. Daniel San Roman
Sr. Guillermo Reyes (As interpreter)

Study Team Side

Mr. J. MOROKUMA
Mr. T. USHIJIMA

4. Main Topics

1) Ing. Fernando Martínez showed Study Team experimental comparison forests of various pine species and provenance test forests of Pinus Taeda in detail and gave the comparison result data of Pinus Taeda, which is attached herewith.

2) Ing. Daniel took notes of Ing Fernando's explanation on behalf of Mr. Morokuma and gave it to Mr. Morokuma. Also,Mr. Daniel gave procedencias situación actual de la forestación en el Uruguay.

(Some data from the "Bicentenario" Test - 6 provenances of Pino Taeda)

ALGUNOS DATOS DEL ENSAYO "BICENTENARIO"- 6 PROCEDENCIAS DE PINO TAEDA

Promedios de 6 árboles , 2 repeticiones; muestreo= 25%. Edad 18 años. 9/19

(Average of 6 trees, 2 replications; to sample: 25% Age: 18 years)

P R O C E D E N C I A S (Provenances)

	Sam Houston Texas	Bowie Texas	Nutchitoches Louisiana	Kisatchie Louisiana	Crossett Arkansas	Warren Georgia
(D.B.H) D.A.P. cm.	38,6	32,9	32,2	34,2	32,6	33,0
Total height Altura total m.	17,85	15,70	15,42	16,65	17,05	16,73
Weight Aver. Tree Peso Prom. Arbol quilos (k_g)	1117,2	692,8	692,3	802,0	772,3	741,5
TT /Ha Toneladas/Há.	438	272	271	314	303	291
TT/ha/y Ton./Há./Año.	24,1	15,1	15,1	17,5	16,8	16,2

Detail of trees

Detalle de los árboles:

Sam Houston		1	2	3	Weight P. total	(Average) Promedio	TT/Ha Ton./Há.	Ton./Há./Año.
Texas	A	828	1147	1355	3300	1110,0	435,12	24,17
Idem	B	1579	834	990	3403	1134,3	444,66	24,70
Bowie								
Texas	A	576	734	920	2230	743,3	291,39	16,19
Idem	B	595	708	624	1927	642,3	251,79	13,99
Natchitoches								
Louisiana	A	1089	609	593	2291	763,7	299,36	16,63
Idem	B	598	633	632	1863	621,0	243,43	13,52
Kisatchie								
Louisiana	A	1134	694	726	2554	851,3	333,72	18,54
Idem,	B	526	991	741	2258	752,7	295,05	16,39
Crossett								
Arkansas	A	440	724	810	1974	658,0	257,94	14,33
Idem	B	802	969	889	2660	886,6	347,57	19,31
Warren								
Georgia	A	611	922	730	2263	754,3	295,70	16,43
Idem.	B	639	677	879	2195	731,7	286,60	15,87

1. Date: Dec. 17, 1984/ 17.00 - 19.30
2. Place: Nuevo Hotel in Melo
3. Attendant

Uruguay side

Ing. Agr. Daniel San Roman
Sr. Guillermo Reyes (As interpreter)

Study Team Side

Mr. J. MOROKUMA
Mr. T. USHIJIMA

4. Main Topics Discussed

1) Study Team showed Ing. Daniel Discussion Material of Dec. 14,1984, attached herewith, in order to have Study Team's intention regarding Draft Progress Report understood.

2) Both parties held a meeting on Dec. 17, 1984, in order to discuss the items which should be included in Draft Progress Report as the part of Plantation Survey Team.

3) The following are the result of discussion

i) Price of land U$S 225/ha

ii) Cost of Plantation, cutting age and havesting volume

Year	Pine	E. and Populus
0	6.193,50	8.503,30
1	619,40	850,30
2	619,40	850,30
3	619,40	850,30
4	-	-
5	-	-
6	-	-
7	-	-
8	-	500 ($25m^3$/ha/year)
: 11	- ($15 m^3$/ha/year)	:
14		500 ($30m^3$/ha/year)
:		:
20		500 ($30m^3$/ha/year)
:		:
28		500 ($25m^3$/ha/year)
:		:
36		: ($25m^3$/ha/year)

iii) Interest rate

LIBOR rate

iv) Logging cost

Pine N$ 150/ton including loading cost with bark

E. and Populus N$ 250/m^3 including loading cost without bark

v) Transportation Cost

up to 150 Km N$ 3.00/ton/km
over 150 km N$ 2.70/ton/km

vii) Study Team told Ing. Daniel that Study Team thinks that it is necessary to introduce mechanical logging system because it seems difficult to extract the whole of 1.5 million m^3 by traditional logging method only, and that Study Team wants to calculate the mechanical logging cost and wants to increase logging cost including logging road maintenance cost, if necessary.

Ing. Daniel agreed to Study Team's idea.

Discussion Material 14/Dec

Regarding the Progress Report (Interium Report)

1. Draft Progress report should be completed until Dec. 20 1984, having hold discussion between Uruguay side and Study Mission.

2. The following are Japanese Plantation Team's ideas as to what sorts of items should be decided in Final Progress Report. Study Team will make Draft Final Report according to Progress Report which are muturally agreed.

   i) According to the master plan made by JICA on February 1981, requirement of pulpwood is as follows:
   Pines 779.000 m^3/year
   Hardwood 664.000 m^3/year
   Total 1.443.000 m^3/year ≒ 1.5 million m^3/year

   ii) How to develop plantations to supply such amount of pulpwood.

   iii) Where do you plant?

   iv) When do you start?

   v) Can you buy plantation areas? and how much does it cost per ha.?

   vi) What is the plantation cost?

   vii) What species should be planted?

   viii) What is mean annual increment (m^3/ha/year)?
   P.taeda, P. elliottii
   E. Grandis, E. Globulus, E. Mandeni,
   Populus

   ix) What is logging cost?

   x) What is transportation cost?

"National Plantation Development Program"

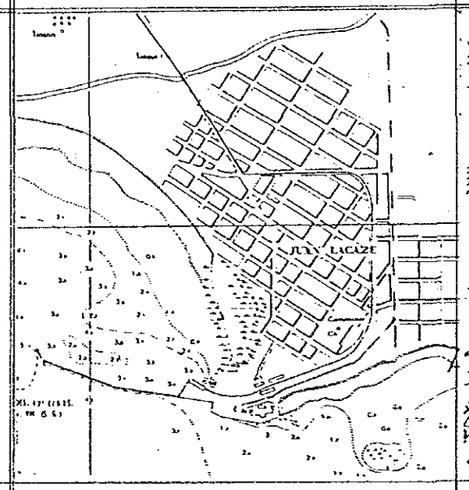
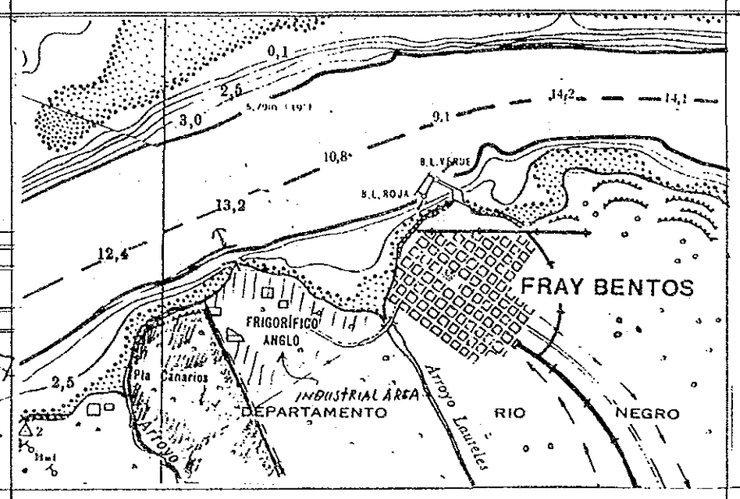
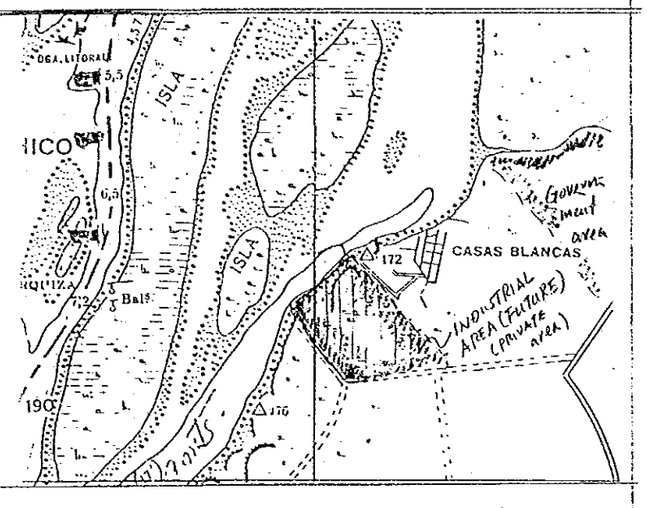
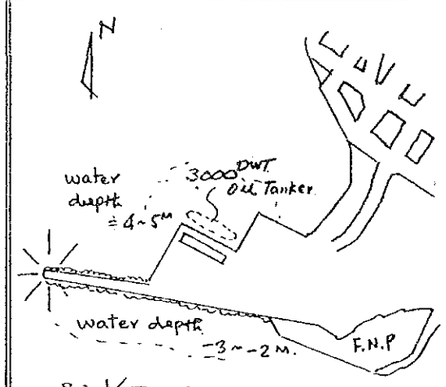
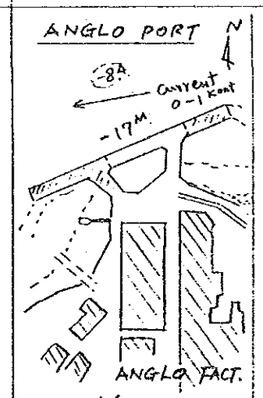
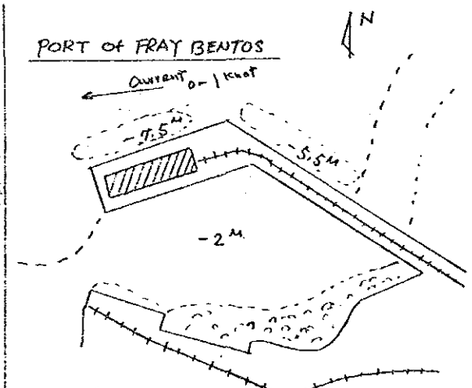
1) Forestry Department, Ministry of Agriculture and Fishery, wants to enlarge plantation areas.
   Is it right?

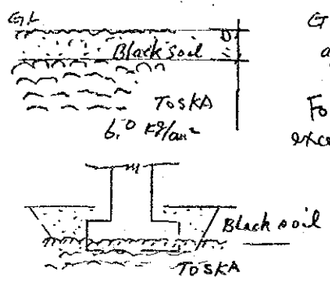
2) In case of Japan, Japanese Gevernment has announced its 5 years' economic development plan (or program) every 5 years, including plantation development plant (or program)
   Does your such economic development plan include plantation development plan.
   Please give me a copy of your plantation development plan when we come back to Montevideo, if you have.

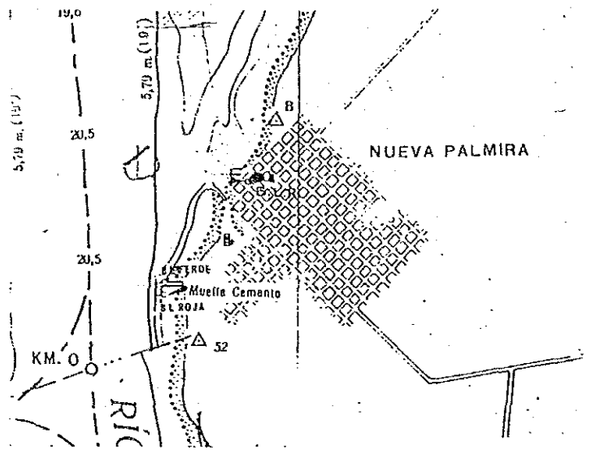
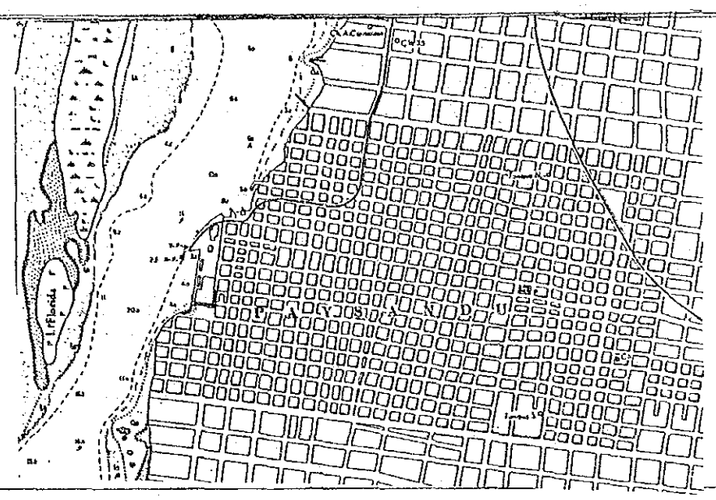
CHIYODA CHEMICAL ENGINEERING & CONSTRUCTION CO., LTD.

COMPARISON TABLE for PLANT SITE SELECTION

(As of 20. DEC. 1984) (1/4)

NO	SURVEY ITEMS	JUAN LACAZE	FRAY BENTOS		CASA BLANCA
1	Site Location				
2	Date of Survey	11, DEC. 1984 (Tuesday)	13. DEC. ~ 15, DEC. 1984		17. DEC. 1984 (Monday)
3	Detail Location of Port.	 S: 1/5,000	 S: 1/5000  S: 1/5000		There is a small jetty at meat factory named FRICASA. Detail location of port is not available.
4	Average water depth.	4M ~ 6M	17M	5M ~ 8M	10M
5	Past experience arrival of Max Cargo Vessel.	information not available	L=170M Cargo Vessel arrived	52,000 Ton (Loading 18,350 Ton) "EUTHALIA" arrived	information not available
6	Availability of Plant Site	not available	Available near River Side. Area space is about 140ha.		Available not near river side. (150ha) Area is occupied by STATE of Government.
7	Availability of Electricity	Available	Electricity power is supplied to ANGLO FACTORY, but not enough capacity. In future will be available to supply PLANT SITE.		Not available now, but according to Goverment information, it will be available future.
8	Availability of water intake	Available from River	Available from River		Available, but not easy to take water from River.
9	River Condition	Around port is very shallow and river bed condition is muddy. Current of river is not so much. F.N.P does not use port for transportation. Max differencial water level is within 1.0M.	Port condition is good and river bed is almost sand, therefore, anchoring for ship is no problem. Current is not so much, about 0 ~ 1 knot. Experience of FLOOD is almost None.		Water depth of river is enough, but there are some shallow place around FRICASA port. FRICASA port is not used for transportation now. Too much experience of FLOOD. Differencial water level is max. 8M.

No.	SURVEY ITEMS	JUAN LACAZE	FRAY BENTOS	CASA BLANCA
10	General Geological Condition	No information, but it may be same condition to FRAY BENTOS	Generaly, surface material of ground is black soil which is not suitable material for foundation. Thickness of black soil layer is about 1.0M. Below black soil, there are so much hard layer such as Rock. This material is hard CLAY named TOSKA. Soil bearing capacity of TOSKA is about 6.0 kg/cm²  Ground water Level is approximate 5.0M below G.L. Foundation is usually no pile except to special condition.	NO information, but it may be same condition to. FRAY BENTOS
11	General Topographical Condition of plant Site	No information, but Land elevation from water level of river is approximate 4.0M.	According to site survey by visual check and topographical map, land elevation of plant site which is taken for FEASIBILITY STUDY is approximate 10M to 15M above water level of river. Land slope is not so steep and covered with so much grass.	No information, but according to site survey by visual check, same condition to. FRAY BENTOS. However, expected plant site is not occupied by Government and along the river side of area is cliff. Land slope is not so steep and covered with so much grass.
12	Railway condition around port.	There is no railway around port side.	Railway transportation is available from port.	Not available.
13	Rail way condition around plant site	NO information	According to Government information, it is available to connect new rail way between and existing main rail way.	No information
14	Road and Traffic Condition around Port and plant site	Around F.N.P and port are no problem, but no information for another area.	Road condition around port is almost good, but if plant site will be located designated area, it will be necessary to provide the NEW ROAD from site to port. Because, when plant operation will be commenced, many big truck will pass to the town. New warehouse is necessary near the port.	No information, but if plant site will be located governmental area which is located far from river, it is necessary to carry the material and product from site to PAYSANDU PORT. As that case, it will be some traffic problem.
	SITE SELECTION based on SITE SURVEY	not Suitable	Suitable	not Suitable

NO.	SURVEY ITEMS	NUEVA PALMIRA	PAYSANDU (except CASA BLANCA)
1	Site Location		
2	Date of Survey	16, DEC. 1984 (Sunday)	17, DEC. 1984 (monday)
3	Detail Location of port