CASE B-3

(ITC 60%)

PROJECT NAME GUAMSANG1080 INCOME STATEMENT DATE 112581

YEAR	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION AND SALES										
PRODUCTS VOLUME	0.	0.	0.	756000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.
SALES VOLUME	0.	0.	0.	724500.	1066500.	1080000.	1080000.	1080000.	1080000.	1080000.
INVENTORY VOLUME	0.	0.	0.	31500.	45000.	45000.	45000.	45000.	45000.	45000.
NET REVENUES	0.	0.	0.	138486.	194266.	205262.	206025.	206340.	206650.	206970.
OPERATING COSTS										
FACTORY VARIABLE COST										
RAW MATERIALS	0.	0.	0.	8100.	11571.	11571.	11571.	11571.	11571.	11571.
FUEL (COAL)	0.	0.	0.	17655.	25221.	25221.	25221.	25221.	25221.	25221.
ELECTRIC POWER	0.	0.	0.	17539.	25056.	25056.	25056.	25056.	25056.	25056.
PAPER BAG	0.	0.	0.	6577.	9396.	9396.	9396.	9396.	9396.	9396.
TOTAL	0.	0.	0.	49871.	71244.	71244.	71244.	71244.	71244.	71244.
FACTORY FIXED COST										
CONSUMABLES	0.	0.	0.	4059.	4059.	4059.	4059.	4059.	4059.	4059.
MAINTENANCE COST	0.	0.	0.	4871.	4871.	4871.	4871.	4871.	4871.	4871.
LABOR	0.	0.	0.	4116.	4116.	4116.	4116.	4116.	4116.	4116.
OVERHEAD	0.	0.	0.	1441.	1441.	1441.	1441.	1441.	1441.	1441.
LAND COST	0.	0.	0.	40.	40.	40.	40.	40.	40.	40.
DEPRECIATION (PLANT)	0.	0.	0.	13957.	13957.	13957.	13957.	13957.	13957.	13957.
DEPRECIATION (RAILWAY)	0.	0.	0.	426.	426.	426.	426.	426.	426.	426.
DEPRECIATION (OTHERS)	0.	0.	0.	871.	871.	871.	871.	871.	871.	871.
TOTAL	0.	0.	0.	29782.	29782.	29782.	29782.	29782.	29782.	29782.
FACTORY COST TOTAL	0.	0.	0.	79652.	101026.	101026.	101026.	101026.	101026.	101026.
INCREASE IN PROC INVNT	0.	0.	0.	3336.	906.	-14.	-1.	-0.	-0.	0.
NET OPERATING INCOME	0.	0.	0.	62153.	94146.	102222.	104999.	105314.	105624.	105944.
SALES & ADMINISTRATION										
TRANSPORTATION COST	0.	0.	0.	17624.	24909.	27679.	27849.	26659.	25486.	24840.
AGENT FEE	0.	0.	0.	7245.	10067.	10630.	10800.	10800.	10800.	10800.
AMORTIZATION	0.	0.	0.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
TOTAL	0.	0.	0.	26609.	36717.	40049.	40389.	39199.	38026.	37380.
NET INCOME	0.	0.	0.	35544.	57430.	62173.	64610.	66115.	67598.	68564.
FINANCIAL EXPENSES										
INTEREST ON SHORT LOAN	0.	0.	0.	2247.	1123.	0.	0.	0.	0.	0.
INTEREST ON LONG LOANS	0.	0.	0.	16166.	14080.	11994.	9908.	7822.	5736.	3650.
TOTAL	0.	0.	0.	18413.	15204.	11994.	9908.	7822.	5736.	3650.
INCOME BEFORE INCOME TAX	0.	0.	0.	17131.	42226.	50178.	54701.	58293.	61862.	64914.
PROVISION FOR INCOME TAX	0.	0.	0.	0.	0.	0.	6353.	25017.	26801.	28327.
PROFIT AFTER INCOME TAX	0.	0.	0.	17131.	42226.	50178.	48348.	33276.	35061.	36587.

PROJECT NAME GUAMSANGI080 INCOME STATEMENT DATE 112581

YEAR	1996	1997	1998	1999	2000	2001	2002	2003
PRODUCTION AND SALES								
PRODUCTS VOLUME	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.
SALES VOLUME	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.
INVENTORY VOLUME	45000.	45000.	45000.	45000.	45000.	45000.	45000.	45000.
NET REVENUES	207360.	207360.	207360.	207360.	207360.	207360.	207360.	207360.
OPERATING COSTS								
FACTORY VARIABLE COST								
RAW MATERIALS	11571.	11571.	11571.	11571.	11571.	11571.	11571.	11571.
FUEL (COAL)	25221.	25221.	25221.	25221.	25221.	25221.	25221.	25221.
ELECTRIC POWER	25056.	25056.	25056.	25056.	25056.	25056.	25056.	25056.
PAPER BAG	9396.	9396.	9396.	9396.	9396.	9396.	9396.	9396.
TOTAL	71244.	71244.	71244.	71244.	71244.	71244.	71244.	71244.
FACTORY FIXED COST								
CONSUMABLES	4059.	4059.	4059.	4059.	4059.	4059.	4059.	4059.
MAINTENANCE COST	4871.	4871.	4871.	4871.	4871.	4871.	4871.	4871.
LABOR	4116.	4116.	4116.	4116.	4116.	4116.	4116.	4116.
OVERHEAD	1441.	1441.	1441.	1441.	1441.	1441.	1441.	1441.
LAND COST	40.	40.	40.	40.	40.	40.	40.	40.
DEPRECIATION (PLANT)	13957.	13957.	13957.	13957.	13957.	13957.	13957.	13957.
DEPRECIATION (RAILWAY)	426.	426.	426.	426.	426.	426.	426.	426.
DEPRECIATION (OTHERS)	871.	871.	871.	871.	871.	871.	871.	871.
TOTAL	29782.	29782.	29782.	29782.	29782.	29782.	29782.	29782.
FACTORY COST TOTAL	101026.	101026.	101026.	101026.	101026.	101026.	101026.	101026.
NET OPERATING INCOME	106334.	106334.	106334.	106334.	106334.	106334.	106334.	106334.
SALES & ADMINISTRATION								
TRANSPORTATION COST	24840.	24840.	24840.	24840.	24840.	24840.	24840.	24840.
AGENT FEE	10800.	10800.	10800.	10800.	10800.	10800.	10800.	10800.
AMORTIZATION	1740.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
TOTAL	37380.	37380.	37380.	37380.	37380.	37380.	37380.	37380.
NET INCOME	68954.	68954.	68954.	68954.	68954.	68954.	68954.	68954.
FINANCIAL EXPENSES								
INTEREST ON LONG LOANS	1564.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1564.	0.	0.	0.	0.	0.	0.	0.
INCOME BEFORE INCOME TAX	67310.	68954.	68954.	68954.	68954.	68954.	68954.	68954.
PROVISION FOR INCOME TAX	29525.	42501.	42501.	42501.	42501.	42501.	42501.	42501.
PROFIT AFTER INCOME TAX	37785.	26454.	26454.	26454.	26454.	26454.	26454.	26454.

PROJECT NAME GUANSANG1060 BALANCE SHEET DATE 112581

YEAR	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
ASSETS										
CURRENT ASSETS										
ENDING CASH BALANCE	0.	0.	0.	3719.	6317.	44292.	88801.	131608.	159322.	188301.
ACCOUNTS RECIEVABLE	0.	0.	0.	23081.	30087.	33225.	34337.	34390.	34442.	34495.
INVENTORIES:										
PRODUCTS	0.	0.	0.	3319.	4224.	4210.	4209.	4209.	4209.	4209.
RAW MATERIALS	0.	0.	0.	1073.	1533.	1533.	1533.	1533.	1533.	1533.
TOTAL CURRENT ASSETS	0.	0.	0.	31192.	42161.	83260.	128881.	171741.	199506.	228539.
FIXED INVESTMENTS										
PLANT COST	43450.	220020.	244900.	244900.	244900.	244900.	244900.	244900.	244900.	244900.
RAILWAY	0.	0.	6396.	6396.	6396.	6396.	6396.	6396.	6396.	6396.
LAND PREMIUM	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.
PREOPERATING EXPENSE	2588.	5176.	13071.	13071.	13071.	13071.	13071.	13071.	13071.	13071.
STORE AND SPARES	0.	0.	8118.	8118.	8118.	8118.	8118.	8118.	8118.	8118.
TOTAL	58530.	237688.	284977.	284977.	284977.	284977.	284977.	284977.	284977.	284977.
AMORTIZATION	2416.	10690.	26100.	26100.	26100.	26100.	26100.	26100.	26100.	26100.
LESS: DEPRECIATION	0.	0.	0.	16995.	33990.	50985.	67980.	84975.	101970.	118965.
TOTAL FIXED INVESTMENT	60946.	248378.	311077.	294082.	277087.	260092.	243097.	226102.	209107.	192112.
TOTAL ASSETS	60946.	248378.	311077.	325274.	319248.	343352.	371978.	397843.	408613.	420651.
LIABILITIES AND STOCKHOLDERS EQUITY										
CURRENT LIABILITIES										
SHORT TERM LOANS	0.	0.	0.	22467.	0.	0.	0.	0.	0.	0.
ACCOUNTS PAYABLE	0.	0.	0.	675.	964.	964.	964.	964.	964.	964.
PROVISION FOR INCOME TAX	0.	0.	0.	0.	0.	0.	6353.	25017.	26801.	28337.
TOTAL CURRENT LIABLS.	0.	0.	0.	23142.	964.	964.	7317.	25981.	27765.	29291.
LONG TERM LOANS	30203.	176644.	208599.	182524.	156449.	130374.	104300.	78225.	52150.	26075.
STOCKHOLDERS EQUITY										
SHARE CAPITAL	30743.	71734.	102478.	102478.	102478.	102478.	102478.	102478.	102478.	102478.
RETAINED EARNINGS	0.	0.	0.	17131.	59357.	109535.	157883.	191159.	226220.	262807.
TOTAL STOCKHLD EQUITY	30743.	71734.	102478.	119609.	161835.	212013.	260361.	293637.	328698.	365285.
TOTAL LBLT & STKS EQUITY	60946.	248378.	311077.	325274.	319248.	343352.	371978.	397843.	408613.	420651.

PROJECT NAME GUAMSANG1080 BALANCE SHEET DATE 11258 1

YEAR	1996	1997	1998	1999	2000	2001	2002	2003
ASSETS								
CURRENT ASSETS								
ENDING CASH BALANCE	218153.	274563.	318012.	361461.	404909.	448358.	491807.	535255.
ACCOUNTS RECIEVABLE	34547.	34560.	34560.	34560.	34560.	34560.	34560.	34560.
INVENTORIES:								
PRODUCTS	4209.	4209.	4209.	4209.	4209.	4209.	4209.	4209.
RAW MATERIALS	1533.	1533.	1533.	1533.	1533.	1533.	1533.	1533.
TOTAL CURRENT ASSETS	258442.	314866.	358314.	401763.	445212.	488660.	532109.	575557.
FIXED INVESTMENTS								
PLANT COST	244900.	244900.	244900.	244900.	244900.	244900.	244900.	244900.
RAILWAY	6396.	6396.	6396.	6396.	6396.	6396.	6396.	6396.
LAND PREMIUM	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.
PREOPERATING EXPENSE	13071.	13071.	13071.	13071.	13071.	13071.	13071.	13071.
STORE AND SPARES	8118.	8118.	8118.	8118.	8118.	8118.	8118.	8118.
TOTAL	284977.	284977.	284977.	284977.	284977.	284977.	284977.	284977.
AMORTIZATION	26100.	26100.	26100.	26100.	26100.	26100.	26100.	26100.
LESS: DEPRECIATION	133960.	152954.	169949.	186944.	203939.	220934.	237929.	254924.
TOTAL FIXED INVESTMENT	175117.	158122.	141128.	124133.	107138.	90143.	73148.	56153.
TOTAL ASSETS	433559.	472988.	499442.	525896.	552349.	578803.	605257.	631710.
LIABILITIES AND STOCKHOLDERS EQUITY								
CURRENT LIABILITIES								
ACCOUNTS PAYABLE	964.	964.	964.	964.	964.	964.	964.	964.
PROVISION FOR INCOME TAX	29525.	42501.	42501.	42501.	42501.	42501.	42501.	42501.
TOTAL CURRENT LIABLS.	30489.	43465.	43465.	43465.	43465.	43465.	43465.	43465.
STOCKHOLDERS EQUITY								
SHARE CAPITAL	102478.	102478.	102478.	102478.	102478.	102478.	102478.	102478.
RETAINED EARNINGS	300592.	327045.	353499.	379953.	406406.	432860.	459314.	485768.
TOTAL STOCKHLD EQUITY	403070.	429523.	455977.	482431.	508884.	535338.	561792.	588245.
TOTAL LBLT & STKS EQUITY	433559.	472988.	499442.	525896.	552349.	578803.	605257.	631710.

PROJECT NAME GUAMSANG1080 CASH FLOW STATEMENTS DATE 112581

YEAR	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
BEGINNING CASH BALANCE	0.	0.	0.	0.	3719.	6317.	44292.	88801.	131608.	159322.
CASH PROVIDED BY										
OPERATIONS:										
NET INCOME	0.	0.	0.	35544.	57430.	62173.	64610.	66115.	67598.	68564.
DEPRECIATION	0.	0.	0.	15255.	15255.	15255.	15255.	15255.	15255.	15255.
AMORTIZATION	0.	0.	0.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
INCREASE IN ACNT PAY	0.	0.	0.	675.	289.	0.	0.	0.	0.	0.
LESS:										
INCREASE IN ACNT RCV	0.	0.	0.	23081.	7006.	3138.	1112.	52.	52.	53.
INCREASE IN PROC INVNT	0.	0.	0.	3319.	906.	-14.	-1.	-0.	-0.	0.
INCREASE IN MATL INVNT	0.	0.	0.	1073.	460.	0.	0.	0.	0.	0.
TOTAL FROM OPERATION	0.	0.	0.	25741.	66343.	76044.	80493.	83058.	84542.	85506.
CAPITAL PROVIDED	30743.	40991.	30744.	0.	0.	0.	0.	0.	0.	0.
LONG TERM LOANS	30203.	146441.	31955.	0.	0.	0.	0.	0.	0.	0.
TOTAL CASH PROVIDED	60946.	187432.	62699.	25741.	66343.	76044.	80493.	83058.	84542.	85506.
CASH APPLIED TO										
INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.	6353.	25017.	26801.
PRINCIPAL PAYMENTS:										
SHORT TERM LOANS	-0.	0.	0.	-22467.	22467.	0.	0.	0.	0.	0.
LONG TERM LOANS	0.	0.	0.	26075.	26075.	26075.	26075.	26075.	26075.	26075.
INTEREST PAYMENTS:										
INTEREST ON SHORT LOAN	0.	0.	0.	2247.	1123.	0.	0.	0.	0.	0.
INTEREST ON LONG LOANS	2416.	8274.	15410.	16166.	14080.	11994.	9908.	7822.	5736.	3650.
TOTAL	2416.	8274.	15410.	18413.	15204.	11994.	9908.	7822.	5736.	3650.
FIXED INVESTMENTS	58530.	179158.	47289.	0.	0.	0.	0.	0.	0.	0.
TOTAL CASH APPLIED	60946.	187432.	62699.	22021.	63745.	38069.	35983.	40251.	56828.	56526.
NET CASH INCREASE	0.	0.	0.	3719.	2597.	37975.	44510.	42807.	27714.	28979.
ENDING CASH BALANCE	0.	0.	0.	3719.	6317.	44292.	88801.	131608.	159322.	188301.
MINIMUM CASH REQUIREMENT	0.	0.	0.	3719.	5031.	5170.	5184.	5135.	5086.	5059.

PROJECT NAME GUAMSANG1060 CASH FLOW STATEMENTS DATE 112581

YEAR	1996	1997	1998	1999	2000	2001	2002	2003
BEGINNING CASH BALANCE	188301.	218153.	274563.	318012.	361461.	404909.	448358.	491807.
CASH PROVIDED BY								
OPERATIONS:								
NET INCOME	68874.	68954.	68954.	68954.	68954.	68954.	68954.	68954.
DEPRECIATION	15255.	15255.	15255.	15255.	15255.	15255.	15255.	15255.
AMORTIZATION	1740.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
LESS:								
INCREASE IN ACNT RCV	52.	13.	0.	0.	0.	0.	0.	0.
TOTAL FROM OPERATION	85818.	85936.	85949.	85949.	85949.	85949.	85949.	85949.
TOTAL CASH PROVIDED	85818.	85936.	85949.	85949.	85949.	85949.	85949.	85949.
CASH APPLIED TO								
INCOME TAX PAYMENT	28327.	29525.	42501.	42501.	42501.	42501.	42501.	42501.
PRINCIPAL PAYMENTS:								
LONG TERM LOANS	26075.	0.	0.	0.	0.	0.	0.	0.
INTEREST PAYMENTS:								
INTEREST ON LONG LOANS	1564.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1564.	0.	0.	0.	0.	0.	0.	0.
TOTAL CASH APPLIED	55966.	29525.	42501.	42501.	42501.	42501.	42501.	42501.
NET CASH INCREASE	29851.	56411.	43449.	43449.	43449.	43449.	43449.	43449.
ENDING CASH BALANCE	218153.	274563.	318012.	361461.	404909.	448358.	491807.	535255.
MINIMUM CASH REQUIREMENT	5059.	5059.	5059.	5059.	5059.	5059.	5059.	5059.

PROJECT NAME GUAMSANG1080 IRR CALCULATION DATE 1:12581

ON TOTAL INVESTMENT (BEFORE TAX)

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATN	INTEREST	INCREASE IN WORKING CAPITAL	RETURN BEFORE TAX	DISCOUNT FACTOR	PRESENT VALUE
1986	58530.	0.	0.	0.	0.	-58530.	1.000000	-58530.
1987	179158.	0.	0.	0.	0.	-179158.	.837673	-150076.
1988	47289.	0.	0.	0.	0.	-47289.	.701697	-33183.
1989	0.	17131.	16995.	18413.	26798.	25741.	.587792	15130.
1990	0.	42226.	16995.	15204.	8082.	66343.	.492378	32666.
1991	0.	50178.	16995.	11994.	3124.	76044.	.412452	31365.
1992	0.	54701.	16995.	9908.	1112.	80493.	.345500	27810.
1993	0.	58293.	16995.	7822.	52.	83058.	.289416	24038.
1994	0.	61862.	16995.	5736.	52.	84542.	.242436	20496.
1995	0.	64914.	16995.	3650.	53.	85506.	.203082	17365.
1996	0.	67310.	16995.	1564.	52.	85818.	.170117	14599.
1997	0.	68954.	16995.	0.	13.	85936.	.142502	12246.
1998	0.	68954.	16995.	0.	0.	85949.	.119370	10260.
1999	0.	68954.	16995.	0.	0.	85949.	.099993	8594.
2000	0.	68954.	16995.	0.	0.	85949.	.083762	7199.
2001	0.	68954.	16995.	0.	0.	85949.	.070165	6031.
2002	0.	68954.	16995.	0.	0.	85949.	.058775	5052.
2003	0.	68954.	16995.	0.	0.	85949.	.049235	4232.
TERMINAL VALUE						95491.	.049235	4701.

INTERNAL RATE OF RETURN 19.38 % (BEFORE TAX)

PROJECT NAME GUAMSANG1080 IRR CALCULATION ON TOTAL INVESTMENT (AFTER TAX) DATE 112581

YEAR	TOTAL INVESTMENT	PROFIT AFTER TAX	DEPRECIATN	INTEREST	INCREASE IN WORKING CAPITAL	RETURN AFTER TAX	DISCOUNT FACTOR	PRESENT VALUE
1986	58530.	0.	0.	0.	0.	-58530.	1.000000	-58530.
1987	179158.	0.	0.	0.	0.	-179158.	.870046	-155876.
1988	47289.	0.	0.	0.	0.	-47289.	.756980	-35797.
1989	0.	17131.	16995.	18413.	26798.	25741.	.658608	16953.
1990	0.	42226.	16995.	15204.	8082.	66343.	.573019	38016.
1991	0.	50178.	16995.	11994.	3124.	76044.	.498553	37912.
1992	0.	48348.	16995.	9908.	1112.	74140.	.433764	32159.
1993	0.	33276.	16995.	7822.	52.	58041.	.377395	21904.
1994	0.	35061.	16995.	5736.	52.	57741.	.328351	18959.
1995	0.	36587.	16995.	3650.	53.	57179.	.285680	16335.
1996	0.	37785.	16995.	1564.	52.	56293.	.248555	13992.
1997	0.	26454.	16995.	0.	13.	43435.	.216254	9393.
1998	0.	26454.	16995.	0.	0.	43449.	.188151	8175.
1999	0.	26454.	16995.	0.	0.	43449.	.163700	7113.
2000	0.	26454.	16995.	0.	0.	43449.	.142427	6188.
2001	0.	26454.	16995.	0.	0.	43449.	.123918	5384.
2002	0.	26454.	16995.	0.	0.	43449.	.107814	4684.
2003	0.	26454.	16995.	0.	0.	43449.	.093803	4076.
TERMINAL VALUE						95491.	.093803	8957.

INTERNAL RATE OF RETURN 14.94 % (AFTER TAX)

PROJECT NAME GUAMSANG1080 IRR CALCULATION ON EQUITY (AFER TAX) DATE 112581

YEAR	SHARE CAPITAL	PROFIT AFTER TAX	DEPRECIATN	LOAN REPAYMENT	INCREASE IN WORKING CAPITAL	TOTAL RETURN	DISCOUNT FACTOR	PRESENT VALUE
1986	30743.	0.	0.	-0.	0.	-30743.	1.000000	-30743.
1987	40991.	0.	0.	0.	0.	-40991.	.836305	-34281.
1988	30744.	0.	0.	0.	0.	-30744.	.699406	-21503.
1989	0.	17131.	16995.	3608.	26798.	3719.	.584917	2175.
1990	0.	42226.	16995.	48541.	8082.	2597.	.489169	1271.
1991	0.	50178.	16995.	26075.	3124.	37975.	.409094	15535.
1992	0.	40348.	16995.	26075.	1112.	38156.	.342128	13054.
1993	0.	33276.	16995.	26075.	52.	24144.	.286123	6908.
1994	0.	35061.	16995.	26075.	52.	25929.	.239286	6204.
1995	0.	36587.	16995.	26075.	53.	27453.	.200116	5494.
1996	0.	37785.	16995.	26075.	52.	28653.	.167358	4795.
1997	0.	26454.	16995.	0.	13.	43435.	.139963	6079.
1998	0.	26454.	16995.	0.	0.	43449.	.117051	5086.
1999	0.	26454.	16995.	0.	0.	43449.	.097891	4253.
2000	0.	26454.	16995.	0.	0.	43449.	.081866	3557.
2001	0.	26454.	16995.	0.	0.	43449.	.068465	2975.
2002	0.	26454.	16995.	0.	0.	43449.	.057258	2488.
2003	0.	26454.	16995.	0.	0.	43449.	.047885	2081.
TERMINAL VALUE						95491.	.047885	4573.

INTERNAL RATE OF RETURN 19.57 % (AFTER TAX)

CASE B-4

(TAX HOLIDAY 7 YEARS)

PROJECT NAME GUAMSANG1080 INCOME STATEMENT DATE 112581

YEAR	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION AND SALES										
PRODUCTS VOLUME	0.	0.	0.	756000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.
SALES VOLUME	0.	0.	0.	724500.	1066500.	1080000.	1080000.	1080000.	1080000.	1080000.
INVENTORY VOLUME	0.	0.	0.	31500.	45000.	45000.	45000.	45000.	45000.	45000.
NET REVENUES	0.	0.	0.	138486.	194266.	203262.	206025.	206340.	206650.	206970.
OPERATING COSTS										
FACTORY VARIABLE COST										
RAW MATERIALS	0.	0.	0.	8100.	11571.	11571.	11571.	11571.	11571.	11571.
FUEL (COAL)	0.	0.	0.	17655.	25221.	25221.	25221.	25221.	25221.	25221.
ELECTRIC POWER	0.	0.	0.	17539.	25056.	25056.	25056.	25056.	25056.	25056.
PAPER BAG	0.	0.	0.	6577.	9396.	9396.	9396.	9396.	9396.	9396.
TOTAL	0.	0.	0.	49871.	71244.	71244.	71244.	71244.	71244.	71244.
FACTORY FIXED COST										
CONSUMABLES	0.	0.	0.	4059.	4059.	4059.	4059.	4059.	4059.	4059.
MAINTENANCE COST	0.	0.	0.	4871.	4871.	4871.	4871.	4871.	4871.	4871.
LABOR	0.	0.	0.	4116.	4116.	4116.	4116.	4116.	4116.	4116.
OVERHEAD	0.	0.	0.	1441.	1441.	1441.	1441.	1441.	1441.	1441.
LAND COST	0.	0.	0.	40.	40.	40.	40.	40.	40.	40.
DEPRECIATION (PLANT)	0.	0.	0.	13957.	13957.	13957.	13957.	13957.	13957.	13957.
DEPRECIATION (RAILWAY)	0.	0.	0.	426.	426.	426.	426.	426.	426.	426.
DEPRECIATION (OTHERS)	0.	0.	0.	871.	871.	871.	871.	871.	871.	871.
TOTAL	0.	0.	0.	29782.	29782.	29782.	29782.	29782.	29782.	29782.
FACTORY COST TOTAL	0.	0.	0.	79652.	101026.	101026.	101026.	101026.	101026.	101026.
INCREASE IN PROC INVNT	0.	0.	0.	3319.	906.	-14.	-1.	-0.	-0.	0.
NET OPERATING INCOME	0.	0.	0.	62153.	94146.	102222.	104999.	105314.	105624.	105944.
SALES & ADMINISTRATION										
TRANSPORTATION COST	0.	0.	0.	17624.	24909.	27679.	27849.	26659.	25486.	24840.
AGENT FEE	0.	0.	0.	7245.	10067.	10630.	10800.	10800.	10800.	10800.
AMORTIZATION	0.	0.	0.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
TOTAL	0.	0.	0.	26609.	36717.	40049.	40389.	39199.	38026.	37380.
NET INCOME	0.	0.	0.	35544.	57430.	62173.	64610.	66115.	67598.	68564.
FINANCIAL EXPENSES										
INTEREST ON SHORT LOAN	0.	0.	0.	2247.	1123.	0.	0.	0.	0.	0.
INTEREST ON LONG LOANS	0.	0.	0.	16166.	14080.	11994.	9908.	7822.	5736.	3650.
TOTAL	0.	0.	0.	18413.	15204.	11994.	9908.	7822.	5736.	3650.
INCOME BEFORE INCOME TAX	0.	0.	0.	17131.	42226.	50178.	54701.	58293.	61862.	64914.
PROFIT AFTER INCOME TAX	0.	0.	0.	17131.	42226.	50178.	54701.	58293.	61862.	64914.

PROJECT NAME GUAMSANGI080 INCOME STATEMENT DATE 112581

YEAR	1996	1997	1998	1999	2000	2001	2002	2003
PRODUCTION AND SALES								
PRODUCTS VOLUME	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.
SALES VOLUME	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.
INVENTORY VOLUME	45000.	45000.	45000.	45000.	45000.	45000.	45000.	45000.
NET REVENUES	207360.	207360.	207360.	207360.	207360.	207360.	207360.	207360.
OPERATING COSTS								
FACTORY VARIABLE COST								
RAW MATERIALS	11571.	11571.	11571.	11571.	11571.	11571.	11571.	11571.
FUEL (COAL)	25221.	25221.	25221.	25221.	25221.	25221.	25221.	25221.
ELECTRIC POWER	25056.	25056.	25056.	25056.	25056.	25056.	25056.	25056.
PAPER BAG	9396.	9396.	9396.	9396.	9396.	9396.	9396.	9396.
TOTAL	71244.	71244.	71244.	71244.	71244.	71244.	71244.	71244.
FACTORY FIXED COST								
CONSUMABLES	4059.	4059.	4059.	4059.	4059.	4059.	4059.	4059.
MAINTENANCE COST	4871.	4871.	4871.	4871.	4871.	4871.	4871.	4871.
LABOR	4116.	4116.	4116.	4116.	4116.	4116.	4116.	4116.
OVERHEAD	1441.	1441.	1441.	1441.	1441.	1441.	1441.	1441.
LAND COST	40.	40.	40.	40.	40.	40.	40.	40.
DEPRECIATION (PLANT)	13957.	13957.	13957.	13957.	13957.	13957.	13957.	13957.
DEPRECIATION (RAILWAY)	426.	426.	426.	426.	426.	426.	426.	426.
DEPRECIATION (OTHERS)	871.	871.	871.	871.	871.	871.	871.	871.
TOTAL	29782.	29782.	29782.	29782.	29782.	29782.	29782.	29782.
FACTORY COST TOTAL	101026.	101026.	101026.	101026.	101026.	101026.	101026.	101026.
NET OPERATING INCOME	106254.	106334.	106334.	106334.	106334.	106334.	106334.	106334.
SALES & ADMINISTRATION								
TRANSPORTATION COST	24840.	24840.	24840.	24840.	24840.	24840.	24840.	24840.
AGENT FEE	10800.	10800.	10800.	10800.	10800.	10800.	10800.	10800.
AMORTIZATION	1740.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
TOTAL	37380.	37380.	37380.	37380.	37380.	37380.	37380.	37380.
NET INCOME	68874.	68954.	68954.	68954.	68954.	68954.	68954.	68954.
FINANCIAL EXPENSES								
INTEREST ON LONG LOANS	1564.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1564.	0.	0.	0.	0.	0.	0.	0.
INCOME BEFORE INCOME TAX	67310.	68954.	68954.	68954.	68954.	68954.	68954.	68954.
PROVISION FOR INCOME TAX	2848.	30347.	30347.	30347.	30347.	30347.	30347.	30347.
PROFIT AFTER INCOME TAX	64461.	38607.	38607.	38607.	38607.	38607.	38607.	38607.

PROJECT NAME GUAMSANG1080 BALANCE SHEET DATE 112581

YEAR	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
ASSETS										
CURRENT ASSETS										
ENDING CASH BALANCE	0.	0.	0.	3719.	6317.	44292.	88801.	137962.	190692.	246472.
ACCOUNTS RECIEVABLE	0.	0.	0.	23081.	30087.	33225.	34337.	34390.	34442.	34495.
INVENTORIES:										
PRODUCTS	0.	0.	0.	3319.	4224.	4210.	4209.	4209.	4209.	4209.
RAW MATERIALS	0.	0.	0.	1073.	1533.	1533.	1533.	1533.	1533.	1533.
TOTAL CURRENT ASSETS	0.	0.	0.	31192.	42161.	83260.	128881.	178094.	230876.	286710.
FIXED INVESTMENTS										
PLANT COST	43450.	220020.	244900.	244900.	244900.	244900.	244900.	244900.	244900.	244900.
RAILWAY	0.	0.	6396.	6396.	6396.	6396.	6396.	6396.	6396.	6396.
LAND PREMIUM	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.
PREOPERATING EXPENSE	2588.	5176.	13071.	13071.	13071.	13071.	13071.	13071.	13071.	13071.
STORE AND SPARES	0.	0.	8118.	8118.	8118.	8118.	8118.	8118.	8118.	8118.
TOTAL	58530.	237688.	284977.	284977.	284977.	284977.	284977.	284977.	284977.	284977.
AMORTIZATION	2416.	10690.	26100.	26100.	26100.	26100.	26100.	26100.	26100.	26100.
LESS: DEPRECIATION	0.	0.	0.	16995.	33990.	50985.	67980.	84975.	101970.	118965.
TOTAL FIXED INVESTMENT	60946.	248378.	311077.	294082.	277087.	260092.	243097.	226102.	209107.	192112.
TOTAL ASSETS	60946.	248378.	311077.	325274.	319248.	343352.	371978.	404196.	439983.	478822.
LIABICITIES AND STOCKHOLDERS EQUITY										
CURRENT LIABICITIES										
SHORT TERM LOANS	0.	0.	0.	22467.	0.	0.	0.	0.	0.	0.
ACCOUNTS PAYABLE	0.	0.	0.	675.	964.	964.	964.	964.	964.	964.
TOTAL CURRENT LIABLS.	0.	0.	0.	23142.	964.	964.	964.	964.	964.	964.
LONG TERM LOANS	30203.	176644.	208599.	182524.	156449.	130374.	104300.	78225.	52150.	26075.
STOCKHOLDERS EQUITY										
SHARE CAPITAL	30743.	71734.	102478.	102478.	102478.	102478.	102478.	102478.	102478.	102478.
RETAINED EARNINGS	0.	0.	0.	17131.	59357.	109535.	164236.	222529.	284391.	349305.
TOTAL STOCKHLD EQUITY	30743.	71734.	102478.	119609.	161835.	212013.	266714.	325007.	386869.	451783.
TOTAL LBLT & STKS EQUITY	60946.	248378.	311077.	325274.	319248.	343352.	371978.	404196.	439983.	478822.

PROJECT NAME GUAMSANG1080 BALANCE SHEET DATE 112581

YEAR	1996	1997	1998	1999	2000	2001	2002	2003
ASSETS								
CURRENT ASSETS								
ENDING CASH BALANCE	304650.	387738.	443340.	498942.	554544.	610146.	665748.	721350.
ACCOUNTS RECIEVABLE	34547.	34560.	34560.	34560.	34560.	34560.	34560.	34560.
INVENTORIES:								
PRODUCTS	4209.	4209.	4209.	4209.	4209.	4209.	4209.	4209.
RAW MATERIALS	1533.	1533.	1533.	1533.	1533.	1533.	1533.	1533.
TOTAL CURRENT ASSETS	344939.	428040.	483642.	539244.	594846.	650448.	706050.	761652.
FIXED INVESTMENTS								
PLANT COST	244900.	244900.	244900.	244900.	244900.	244900.	244900.	244900.
RAILWAY	6396.	6396.	6396.	6396.	6396.	6396.	6396.	6396.
LAND PREMIUM	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.
PREOPERATING EXPENSE	13071.	13071.	13071.	13071.	13071.	13071.	13071.	13071.
STORE AND SPARES	8118.	8118.	8118.	8118.	8118.	8118.	8118.	8118.
TOTAL	284977.	284977.	284977.	284977.	284977.	284977.	284977.	284977.
AMORTIZATION	26100.	26100.	26100.	26100.	26100.	26100.	26100.	26100.
LESS: DEPRECIATION	135959.	152954.	169949.	186944.	203939.	220934.	237929.	254924.
TOTAL FIXED INVESTMENT	175117.	158122.	141128.	124133.	107138.	90143.	73148.	56153.
TOTAL ASSETS	520057.	586163.	624770.	663377.	701984.	740591.	779198.	817805.
LIABILITIES AND STOCKHOLDERS EQUITY								
CURRENT LIABILITIES								
ACCOUNTS PAYABLE	964.	964.	964.	964.	964.	964.	964.	964.
PROVISION FOR INCOME TAX	2848.	30347.	30347.	30347.	30347.	30347.	30347.	30347.
TOTAL CURRENT LIABLS.	3813.	31311.	31311.	31311.	31311.	31311.	31311.	31311.
STOCKHOLDERS EQUITY								
SHARE CAPITAL	102478.	102478.	102478.	102478.	102478.	102478.	102478.	102478.
RETAINED EARNINGS	413766.	452373.	490980.	529587.	568194.	606801.	645408.	684015.
TOTAL STOCKHLD EQUITY	516244.	554851.	593458.	632065.	670672.	709279.	747886.	786493.
TOTAL LBLT & STKS EQUITY	520057.	586163.	624770.	663377.	701984.	740591.	779198.	817805.

PROJECT NAME GUAMSANG1080 CASH FLOW STATEMENTS DATE 112581

YEAR	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
BEGINNING CASH BALANCE	0.	0.	0.	0.	3719.	6317.	44292.	88801.	137962.	190692.
CASH PROVIDED BY										
OPERATIONS:										
NET INCOME	0.	0.	0.	35544.	57430.	62173.	64610.	66115.	67598.	68564.
DEPRECIATION	0.	0.	0.	15255.	15255.	15255.	15255.	15255.	15255.	15255.
AMORTIZATION	0.	0.	0.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
INCREASE IN ACNT PAY	0.	0.	0.	675.	289.	0.	0.	0.	0.	0.
LESS:										
INCREASE IN ACNT RCV	0.	0.	0.	23081.	7006.	3138.	1112.	52.	52.	53.
INCREASE IN PROD INVNT	0.	0.	0.	3319.	906.	-14.	-1.	-0.	-0.	0.
INCREASE IN MATL INVNT	0.	0.	0.	1073.	460.	0.	0.	0.	0.	0.
TOTAL FROM OPERATION	0.	0.	0.	25741.	66343.	76044.	80493.	83058.	84542.	85506.
CAPITAL PROVIDED	30743.	40991.	30744.	0.	0.	0.	0.	0.	0.	0.
LONG TERM LOANS	30203.	146441.	31955.	0.	0.	0.	0.	0.	0.	0.
TOTAL CASH PROVIDED	60946.	187432.	62699.	25741.	66343.	76044.	80493.	83058.	84542.	85506.
CASH APPLIED TO										
PRINCIPAL PAYMENTS:										
SHORT TERM LOANS	-0.	0.	0.	-22467.	22467.	0.	0.	0.	0.	0.
LONG TERM LOANS	0.	0.	0.	26075.	26075.	26075.	26075.	26075.	26075.	26075.
INTEREST PAYMENTS:										
INTEREST ON SHORT LOAN	0.	0.	0.	2247.	1123.	0.	0.	0.	0.	0.
INTEREST ON LONG LOANS	2416.	8274.	15410.	16166.	14080.	11994.	9908.	7822.	5736.	3650.
TOTAL	2416.	8274.	15410.	18413.	15204.	11994.	9908.	7822.	5736.	3650.
FIXED INVESTMENTS	58530.	179158.	47289.	0.	0.	0.	0.	0.	0.	0.
TOTAL CASH APPLIED	60946.	187432.	62699.	22021.	63745.	38069.	35983.	33897.	31811.	29725.
NET CASH INCREASE	0.	0.	0.	3719.	2597.	37975.	44510.	49160.	52730.	55781.
ENDING CASH BALANCE	0.	0.	0.	3719.	6317.	44292.	88801.	137962.	190692.	246472.
MINIMUM CASH REQUIREMENT	0.	0.	0.	3719.	5031.	5170.	5184.	5135.	5086.	5059.

PROJECT NAME GUAMSANGIO80 CASH FLOW STATEMENTS DATE 112581

YEAR	1996	1997	1998	1999	2000	2001	2002	2003
BEGINNING CASH BALANCE	246472.	304650.	387738.	443340.	498942.	554544.	610146.	665748.
CASH PROVIDED BY								
OPERATIONS:								
NET INCOME	68874.	68954.	68954.	68954.	68954.	68954.	68954.	68954.
DEPRECIATION	15255.	15255.	15255.	15255.	15255.	15255.	15255.	15255.
AMORTIZATION	1740.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
LESS:								
INCREASE IN ACNT RCV	52.	13.	0.	0.	0.	0.	0.	0.
TOTAL FROM OPERATION	85818.	85936.	85949.	85949.	85949.	85949.	85949.	85949.
TOTAL CASH PROVIDED	85818.	85936.	85949.	85949.	85949.	85949.	85949.	85949.
CASH APPLIED TO								
INCOME TAX PAYMENT	0.	2848.	30347.	30347.	30347.	30347.	30347.	30347.
PRINCIPAL PAYMENTS:								
LONG TERM LOANS	26075.	0.	0.	0.	0.	0.	0.	0.
INTEREST PAYMENTS:								
INTEREST ON LONG LOANS	1564.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1564.	0.	0.	0.	0.	0.	0.	0.
TOTAL CASH APPLIED	27639.	2848.	30347.	30347.	30347.	30347.	30347.	30347.
NET CASH INCREASE	58178.	83088.	55602.	55602.	55602.	55602.	55602.	55602.
ENDING CASH BALANCE	304650.	387738.	443340.	498942.	554544.	610146.	665748.	721350.
MINIMUM CASH REQUIREMENT	5059.	5059.	5059.	5059.	5059.	5059.	5059.	5059.

PROJECT NAME GUAMSANG1080 IRR CALCULATION ON TOTAL INVESTMENT (BEFORE TAX) DATE 112581

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATN	INTEREST	INCREASE IN WORKING CAPITAL	RETURN BEFORE TAX	DISCOUNT FACTOR	PRESENT VALUE
1986	58530.	0.	0.	0.	0.	-58530.	1.000000	-58530.
1987	179158.	0.	0.	0.	0.	-179158.	.837673	-150076.
1988	47289.	0.	0.	0.	0.	-47289.	.701697	-33183.
1989	0.	17131.	16995.	18413.	20798.	25741.	.587792	15130.
1990	0.	42226.	16995.	15204.	8082.	66343.	.492378	32666.
1991	0.	50178.	16995.	11994.	3124.	76044.	.412452	31365.
1992	0.	54701.	16995.	9908.	1112.	80493.	.345500	27810.
1993	0.	58293.	16995.	7822.	52.	83058.	.289416	24038.
1994	0.	61862.	16995.	5736.	52.	84542.	.242436	20496.
1995	0.	64914.	16995.	3650.	53.	85506.	.203082	17365.
1996	0.	67310.	16995.	1564.	52.	85818.	.170117	14599.
1997	0.	68954.	16995.	0.	13.	85936.	.142502	12246.
1998	0.	68954.	16995.	0.	0.	85949.	.119370	10260.
1999	0.	68954.	16995.	0.	0.	85949.	.099993	8594.
2000	0.	68954.	16995.	0.	0.	85949.	.083762	7199.
2001	0.	68954.	16995.	0.	0.	85949.	.070165	6031.
2002	0.	68954.	16995.	0.	0.	85949.	.058775	5052.
2003	0.	68954.	16995.	0.	0.	85949.	.049235	4232.
TERMINAL VALUE						95491.	.049235	4701.

INTERNAL RATE OF RETURN 19.38 % (BEFORE TAX)

PROJECT NAME GUAMSANG1080 IRR CALCULATION DATE 1\12\81

ON TOTAL INVESTMENT (AFTER TAX)

YEAR	TOTAL INVESTMENT	PROFIT AFTER TAX	DEPRECIATN	INTEREST	INCREASE IN WORKING CAPITAL	RETURN AFTER TAX	DISCOUNT FACTOR	PRESENT VALUE
1986	58530.	0.	0.	0.	0.	-58530.	1.000000	-58530.
1987	179158.	0.	0.	0.	0.	-179158.	.848211	-151964.
1988	47289.	0.	0.	0.	0.	-47289.	.719463	-34023.
1989	0.	17131.	16995.	18413.	26798.	25741.	.610257	15708.
1990	0.	42226.	16995.	15204.	8082.	66343.	.517627	34341.
1991	0.	50178.	16995.	11994.	3124.	76044.	.439057	33388.
1992	0.	54701.	16995.	9908.	1112.	80493.	.372413	29977.
1993	0.	58293.	16995.	7822.	52.	83058.	.315885	26237.
1994	0.	61862.	16995.	5736.	52.	84542.	.267937	22652.
1995	0.	64914.	16995.	3650.	53.	85506.	.227267	19433.
1996	0.	64461.	16995.	1564.	52.	82969.	.192771	15994.
1997	0.	38607.	16995.	0.	13.	55589.	.163510	9089.
1998	0.	38607.	16995.	0.	0.	55602.	.138691	7712.
1999	0.	38607.	16995.	0.	0.	55602.	.117640	6541.
2000	0.	38607.	16995.	0.	0.	55602.	.099783	5548.
2001	0.	38607.	16995.	0.	0.	55602.	.084637	4706.
2002	0.	38607.	16995.	0.	0.	55602.	.071790	3992.
2003	0.	38607.	16995.	0.	0.	55602.	.060893	3386.
TERMINAL VALUE						95491.	.060893	5815.

INTERNAL RATE OF RETURN 17.90 % (AFTER TAX)

PROJECT NAME GUAMSANGI080 IRR CALCULATION ON EQUITY (AFER TAX) DATE 112581

YEAR	SHARE CAPITAL	PROFIT AFTER TAX	DEPRECIATN	LOAN REPAYMENT	INCREASE IN WORKING CAPITAL	TOTAL RETURN	DISCOUNT FACTOR	PRESENT VALUE
1986	30743.	0.	0.	-0.	0.	-30743.	1.000000	-30743.
1987	40991.	0.	0.	0.	0.	-40991.	.803174	-32923.
1988	30744.	0.	0.	0.	0.	-30744.	.645089	-19833.
1989	0.	17131.	16995.	3608.	26798.	3719.	.518119	1927.
1990	0.	42226.	16995.	48541.	8082.	2597.	.416139	1081.
1991	0.	50178.	16995.	26075.	3124.	37975.	.334232	12692.
1992	0.	54701.	16995.	26075.	1112.	44510.	.268447	11948.
1993	0.	58293.	16995.	26075.	52.	49160.	.215610	10599.
1994	0.	61862.	16995.	26075.	52.	52730.	.173172	9131.
1995	0.	64914.	16995.	26075.	53.	55781.	.139087	7758.
1996	0.	64461.	16995.	26075.	52.	55330.	.111711	6181.
1997	0.	38607.	16995.	0.	13.	55589.	.089724	4988.
1998	0.	38607.	16995.	0.	0.	55602.	.072064	4007.
1999	0.	38607.	16995.	0.	0.	55602.	.057880	3218.
2000	0.	38607.	16995.	0.	0.	55602.	.046488	2585.
2001	0.	38607.	16995.	0.	0.	55602.	.037338	2076.
2002	0.	38607.	16995.	0.	0.	55602.	.029989	1667.
2003	0.	38607.	16995.	0.	0.	55602.	.024086	1339.
TERMINAL VALUE						95491.	.024086	2300.

INTERNAL RATE OF RETURN 24.51 % (AFTER TAX)

CASE B-5

(ALL PRODUCTS CAN BE SOLD AT M$192/ton IN KELANTAN AND TRENGGANU)

PROJECT NAME GUAMSANG1080 INCOME STATEMENT DATE 121781

YEAR	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION AND SALES										
PRODUCTS VOLUME	0.	0.	0.	756000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.
SALES VOLUME	0.	0.	0.	724500.	1066500.	1080000.	1080000.	1080000.	1080000.	1080000.
INVENTORY VOLUME	0.	0.	0.	31500.	45000.	45000.	45000.	45000.	45000.	45000.
NET REVENUES	0.	0.	0.	130104.	204768.	207360.	207360.	207360.	207360.	207360.
OPERATING COST										
FACTORY VARIABLE COST										
RAW MATERIALS	0.	0.	0.	8100.	11571.	11571.	11571.	11571.	11571.	11571.
FUEL (COAL)	0.	0.	0.	17655.	25221.	25221.	25221.	25221.	25221.	25221.
ELECTRIC POWER	0.	0.	0.	17559.	25056.	25056.	25056.	25056.	25056.	25056.
PAPER BAG	0.	0.	0.	6577.	9396.	9396.	9396.	9396.	9396.	9396.
TOTAL	0.	0.	0.	49871.	71244.	71244.	71244.	71244.	71244.	71244.
FACTORY FIXED COST										
CONSUMABLES	0.	0.	0.	4059.	4059.	4059.	4059.	4059.	4059.	4059.
MAINTENANCE COST	0.	0.	0.	4871.	4871.	4871.	4871.	4871.	4871.	4871.
LABOUR	0.	0.	0.	4116.	4116.	4116.	4116.	4116.	4116.	4116.
OVERHEAD	0.	0.	0.	1441.	1441.	1441.	1441.	1441.	1441.	1441.
LAND COST	0.	0.	0.	40.	40.	40.	40.	40.	40.	40.
DEPRECIATION (PLANT)	0.	0.	0.	13957.	13957.	13957.	13957.	13957.	13957.	13957.
DEPRECIATION (RAILWAY)	0.	0.	0.	426.	426.	426.	426.	426.	426.	426.
DEPRECIATION (OTHERS)	0.	0.	0.	871.	871.	871.	871.	871.	871.	871.
TOTAL	0.	0.	0.	29782.	29782.	29782.	29782.	29782.	29782.	29782.
FACTORY COST TOTAL	0.	0.	0.	79652.	101026.	101026.	101026.	101026.	101026.	101026.
INCREASE IN PROC INVNT	0.	0.	0.	3319.	906.	-14.	-1.	-0.	-0.	0.
NET OPERATING INCOME	0.	0.	0.	62770.	104648.	106320.	106334.	106334.	106334.	106334.
SALES & ADMINISTRATION										
TRANSPORTATION COST	0.	0.	0.	16663.	24529.	24840.	24840.	24840.	24840.	24840.
AGENT FEE	0.	0.	0.	7245.	10665.	10800.	10800.	10800.	10800.	10800.
AMORTIZATION	0.	0.	0.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
TOTAL	0.	0.	0.	25649.	36935.	37380.	37380.	37380.	37380.	37380.
NET INCOME	0.	0.	0.	37122.	67713.	68940.	68954.	68954.	68954.	68954.
FINANCIAL EXPENSES										
INTEREST ON SHORT LOAN	0.	0.	0.	2078.	1039.	0.	0.	0.	0.	0.
INTEREST ON LONG LOANS	0.	0.	0.	16166.	14080.	11994.	9908.	7822.	5736.	3650.
TOTAL	0.	0.	0.	18245.	15120.	11994.	9908.	7822.	5736.	3650.
INCOME BEFORE INCOME TAX	0.	0.	0.	18877.	52594.	56945.	59045.	61132.	63218.	65304.
PROVISION FOR INCOME TAX	0.	0.	0.	0.	0.	0.	17093.	26436.	27479.	28522.
PROFIT AFTER INCOME TAX	0.	0.	0.	18877.	52594.	56945.	41953.	34696.	35739.	36782.

PROJECT NAME GUAMSANGLORO INCOME STATEMENT DATE 121781

YEAR	1996	1997	1998	1999	2000	2001	2002	2003
PRODUCTION AND SALES								
PRODUCTS VOLUME	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.
SALES VOLUME	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.	1080000.
INVENTORY VOLUM	45000.	45000.	45000.	45000.	45000.	45000.	45000.	45000.
NET REVENUES	207360.	207360.	207360.	207360.	207360.	207360.	207360.	207360.
OPERATING COSTS								
FACTORY VARIABLE COST								
RAW MATERIALS	11571.	11571.	11571.	11571.	11571.	11571.	11571.	11571.
FUEL (COAL)	25221.	25221.	25221.	25221.	25221.	25221.	25221.	25221.
ELECTRIC POWER	25056.	25056.	25056.	25056.	25056.	25056.	25056.	25056.
PAPER BAG	9396.	9396.	9396.	9396.	9396.	9396.	9396.	9396.
TOTAL	71244.	71244.	71244.	71244.	71244.	71244.	71244.	71244.
FACTORY FIXED COST								
CONSUMABLES	4059.	4059.	4059.	4059.	4059.	4059.	4059.	4059.
MAINTENANCE COST	4871.	4871.	4871.	4871.	4871.	4871.	4871.	4871.
LABOR	4116.	4116.	4116.	4116.	4116.	4116.	4116.	4116.
OVERHEAD	1441.	1441.	1441.	1441.	1441.	1441.	1441.	1441.
LAND COST	40.	40.	40.	40.	40.	40.	40.	40.
DEPRECIATION (PLANT)	13957.	13957.	13957.	13957.	13957.	13957.	13957.	13957.
DEPRECIATION (RAILWAY)	426.	426.	426.	426.	426.	426.	426.	426.
DEPRECIATION (OTHERS)	871.	871.	871.	871.	871.	871.	871.	871.
TOTAL	29782.	29782.	29782.	29782.	29782.	29782.	29782.	29782.
FACTORY COST TOTAL	101026.	101026.	101026.	101026.	101026.	101026.	101026.	101026.
NET OPERATING INCOME	106334.	106334.	106334.	106334.	106334.	106334.	106334.	106334.
SALES & ADMINISTRATION								
TRANSPORTATION COST	24840.	24840.	24840.	24840.	24840.	24840.	24840.	24840.
AGENT FEE	10800.	10800.	10800.	10800.	10800.	10800.	10800.	10800.
AMORTIZATION	1740.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
TOTAL	37380.	37380.	37380.	37380.	37380.	37380.	37380.	37380.
N T INCOME	68954.	68954.	68954.	68954.	68954.	68954.	68954.	68954.
FINANCIAL EXPENSES								
INTEREST ON LONG LOANS	1564.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1564.	0.	0.	0.	0.	0.	0.	0.
INCOME BEFORE INCOME TAX	67390.	68954.	68954.	68954.	68954.	68954.	68954.	68954.
PROVISION FOR INCOME TAX	29565.	42501.	42501.	42501.	42501.	42501.	42501.	42501.
PROFIT AFTER INCOME TAX	37825.	26454.	26454.	26454.	26454.	26454.	26454.	26454.

PROJECT NAME GUAMSANG1080 BALANCE SHEET DATE 121781

YEAR	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
ASSETS										
CURRENT ASSETS										
ENDING CASH BALANCE	0.	0.	0.	3679.	14390.	61838.	111804.	146763.	174465.	203210.
ACCOUNTS RECIEVABLE	0.	0.	0.	23184.	34128.	34560.	34560.	34560.	34560.	34560.
INVENTORIES:										
PRODUCTS	0.	0.	0.	3316.	4224.	4210.	4209.	4209.	4209.	4209.
RAW MATERIALS	0.	0.	0.	1078.	1533.	1533.	1533.	1533.	1533.	1533.
TOTAL CURRENT ASSETS	0.	0.	0.	31255.	54275.	102141.	152106.	187065.	214767.	243512.
FIXED INVESTMENTS										
PLANT COST	43450.	220070.	244900.	244900.	244900.	244900.	244900.	244900.	244900.	244900.
RAILWAY	0.	0.	6396.	6396.	6396.	6396.	6396.	6396.	6396.	6396.
LAND PREMIU	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.
PREOPERATING EXPENSE	2580.	5176.	13071.	13071.	13071.	13071.	13071.	13071.	13071.	13071.
STORE AND SPARES	0.	0.	8118.	8118.	8118.	8118.	8118.	8118.	8118.	8118.
TOTAL	58530.	237688.	284977.	284977.	284977.	284977.	284977.	284977.	284977.	284977.
AMORTIZATION	2416.	10690.	26100.	26100.	26100.	26100.	26100.	26100.	26100.	26100.
LESS: DEPRECIATION	0.	0.	0.	16995.	33990.	50985.	67980.	84975.	101970.	118965.
TOTAL FIXED INVESTMENT	60946.	248378.	311077.	294082.	277087.	260092.	243097.	226102.	209107.	192112.
TOTAL ASSETS	60946.	248378.	311077.	325337.	331362.	362233.	395203.	413168.	423874.	435624.
LIABILITIES AND STOCKHOLDERS EQUITY										
CURRENT LIABILITIES										
SHORT TERM LOANS	0.	0.	0.	20783.	0.	0.	0.	0.	0.	0.
ACCOUNTS PAYABLE	0.	0.	0.	675.	964.	964.	964.	964.	964.	964.
PROVISION FOR INCOME TAX	0.	0.	0.	0.	0.	0.	17093.	26436.	27479.	28522.
TOTAL CURRENT LIABLS.	0.	0.	0.	21458.	964.	964.	18057.	27400.	28443.	29486.
LONG TERM LOANS	30203.	176644.	208599.	182524.	156449.	130374.	104300.	78225.	52150.	26075.
STOCKHOLDERS EQUITY										
SHARE CAPITAL	30743.	71734.	102478.	102478.	102478.	102478.	102478.	102478.	102478.	102478.
RETAINED EARNINGS	0.	0.	0.	18877.	71471.	128416.	170369.	205065.	240803.	277585.
TOTAL ST'CHLD EQUITY	30743.	71734.	102478.	121355.	173949.	230894.	272847.	307543.	343281.	380063.
TOTAL LBLTY & STKS EQUITY	60946.	248378.	311077.	325337.	331362.	362233.	395203.	413168.	423874.	435624.

PROJECT NAME GUAMSANGIORO BALANCE SHEET DATE 121781

YEAR	1996	1997	1998	1999	2000	2001	2002	2003
ASSETS:								
CURRENT ASSETS								
ENDING CASH BALANCE	23299.	286382.	332830.	376276.	419727.	463176.	506625.	550073.
ACCOUNTS RECIEVABLE	54560.	54560.	54560.	54560.	54560.	54560.	54560.	54560.
INVENTORIES:								
PRODUCTS	4209.	4209.	4209.	4209.	4209.	4209.	4209.	4209.
RAW MATERIALS	1533.	1533.	1533.	1533.	1533.	1533.	1533.	1533.
TOTAL CURRENT ASSETS	273500.	329684.	373133.	416581.	460030.	503478.	546927.	590376.
FIXED INVESTMENTS								
PLANT COST	244900.	244900.	244900.	244900.	244900.	244900.	244900.	244900.
RAILWAY	6396.	6396.	6396.	6396.	6396.	6396.	6396.	6396.
LAND PREMIUM	12492.	12492.	12492.	12492.	12492.	12492.	12492.	12492.
PREOPERATING EXPENSE	13071.	13071.	13071.	13071.	13071.	13071.	13071.	13071.
STORE AND SPARES	8118.	8118.	8118.	8118.	8118.	8118.	8118.	8118.
TOTAL	284977.	284977.	284977.	284977.	284977.	284977.	284977.	284977.
AMORTIZATION	26100.	26100.	26100.	26100.	26100.	26100.	26100.	26100.
LESS: DEPRECIATION	135959.	152954.	169949.	186944.	203939.	220934.	237929.	254924.
TOTAL FIXED INVESTMENT	175117.	158122.	141128.	124133.	107138.	90143.	73148.	56153.
TOTAL ASSETS	448617.	487806.	514260.	540714.	567168.	593621.	620075.	646529.
LIABILITIES AND STOCKHOLDERS EQUITY								
CURRENT LIABILITIES								
ACCOUNTS PAYABLE	964.	964.	964.	964.	964.	964.	964.	964.
PROVISION FOR INCOME TAX	29545.	42501.	42501.	42501.	42501.	42501.	42501.	42501.
TOTAL CURRENT LIABLS.	30509.	43465.	43465.	43465.	43465.	43465.	43465.	43465.
STOCKHOLDERS EQUITY								
SHARE CAPITAL	102470.	102478.	102478.	102478.	102478.	102478.	102478.	102478.
RETAINED EARNINGS	315410.	341964.	368317.	394771.	421225.	447678.	474132.	500586.
TOTAL STOCKHLD EQUITY	417888.	444342.	470795.	497249.	523703.	550156.	576610.	603064.
TOTAL L'LT & STKS EQUITY	448617.	487806.	514260.	540714.	567168.	593621.	620075.	646529.

PROJECT NAME GUAMSANG1000 CASH FLOW STATEMENTS DATE 121781

YEAR	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
BEGINNING CASH BALANCE	0.	0.	0.	0.	3679.	14390.	61838.	111804.	146763.	174465.
CASH PROVIDED BY										
OPERATIONS:										
NET INCOME	0.	0.	0.	37122.	67713.	68940.	68954.	68954.	68954.	68954.
DEPRECIATION	0.	0.	0.	15255.	15255.	15255.	15255.	15255.	15255.	15255.
AMORTIZATION	0.	0.	0.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
INCREASE IN ACNT PAY	0.	0.	0.	675.	289.	0.	0.	0.	0.	0.
LESS:										
INCREASE IN ACNT RCV	0.	0.	0.	23184.	10944.	432.	0.	0.	0.	0.
INCREASE IN PROD INVNT	0.	0.	0.	3319.	906.	-14.	-1.	-0.	-0.	0.
INCREASE IN MATL INVNT	0.	0.	0.	1073.	460.	0.	0.	0.	0.	0.
TOTAL FROM OPERATION	0.	0.	0.	27216.	72688.	85517.	85949.	85949.	85949.	85949.
CAPITAL PROVIDED	30743.	40991.	30744.	0.	0.	0.	0.	0.	0.	0.
LONG TERM LOANS	30203.	146441.	31955.	0.	0.	0.	0.	0.	0.	0.
TOTAL CASH PROVIDED	60946.	187432.	62699.	27216.	72688.	85517.	85949.	85949.	85949.	85949.
CASH APPLIED TO										
INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.	17093.	26436.	27479.
PRINCIPAL PAYMENTS:										
SHORT TERM LOANS	-0.	0.	0.	-20783.	20783.	0.	0.	0.	0.	0.
LONG TERM LOANS	0.	0.	0.	26075.	26075.	26075.	26075.	26075.	26075.	26075.
INTEREST PAYMENTS:										
INTEREST ON SHORT LOAN	0.	0.	0.	2078.	1039.	0.	0.	0.	0.	0.
INTEREST ON LONG LOANS	2416.	8274.	15410.	16166.	14080.	11994.	9908.	7822.	5736.	3650.
TOTAL	2416.	8274.	15410.	18245.	15120.	11994.	9908.	7822.	5736.	3650.
FIXED INVESTMENTS	58530.	179158.	47289.	0.	0.	0.	0.	0.	0.	0.
TOTAL CASH APPLIED	60946.	187432.	62699.	23536.	61978.	38069.	35983.	50990.	58247.	57204.
NET CASH INCREASE	0.	0.	0.	3679.	10710.	47448.	49966.	34959.	27702.	28745.
ENDING CASH BALANCE	0.	0.	0.	3679.	14390.	61838.	111804.	146763.	174465.	203210.
MINIMUM CASH REQUIREMENT	0.	0.	0.	3679.	5040.	5059.	5059.	5059.	5059.	5059.

PROJECT NAME GUAMSANG1080 CASH FLOW STATEMENTS DATE 121781

YEAR	1996	1997	1998	1999	2000	2001	2002	2003
BEGINNING CASH BALANCE	203210.	232997.	289382.	332830.	376279.	419727.	463176.	506625.
CASH PROVIDED BY								
OPERATIONS:								
NET INCOME	68954.	68954.	68954.	68954.	68954.	68954.	68954.	68954.
DEPRECIATION	15255.	15255.	15255.	15255.	15255.	15255.	15255.	15255.
AMORTIZATION	1740.	1740.	1740.	1740.	1740.	1740.	1740.	1740.
LESS:								
TOTAL FROM OPERATION	85949.	85949.	85949.	85949.	85949.	85949.	85949.	85949.
TOTAL CASH PROVIDED	85949.	85949.	85949.	85949.	85949.	85949.	85949.	85949.
CASH APPLIED TO								
INCOME TAX PAYMENT	28522.	29565.	42501.	42501.	42501.	42501.	42501.	42501.
PRINCIPAL PAYMENTS:								
LONG TERM LOANS	26075.	0.	0.	0.	0.	0.	0.	0.
INTEREST PAYMENTS:								
INTEREST ON LONG LOANS	1564.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1564.	0.	0.	0.	0.	0.	0.	0.
TOTAL CASH APPLIED	56161.	29565.	42501.	42501.	42501.	42501.	42501.	42501.
NET CASH INCREASE	29788.	56384.	43449.	43449.	43449.	43449.	43449.	43449.
ENDING CASH BALANCE	232997.	289382.	332830.	376279.	419727.	463176.	506625.	550073.
MINIMUM CASH REQUIREMENT	5059.	5059.	5059.	5059.	5059.	5059.	5059.	5059.

PROJECT NAME GUAMSANG1080 IRR CALCULATION ON TOTAL INVESTMENT (BEFORE TAX) DATE 121781

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATN	INTEREST	INCREASE IN WORKING CAPITAL	RETURN BEFORE TAX	DISCOUNT FACTOR	PRESENT VALUE
1986	58530.	0.	0.	0.	0.	-58530.	1.000000	-58530.
1987	179158.	0.	0.	0.	0.	-179158.	.832259	-149106.
1988	47289.	0.	0.	0.	0.	-47289.	.692654	-32755.
1989	0.	18877.	16995.	18245.	26901.	27216.	.576468	15689.
1990	0.	52594.	16995.	15120.	12020.	72688.	.479770	34874.
1991	0.	56045.	16995.	11994.	418.	85517.	.399293	34146.
1992	0.	59045.	16995.	9908.	-1.	85949.	.332315	28562.
1993	0.	61132.	16995.	7822.	-0.	85949.	.276572	23771.
1994	0.	63218.	16995.	5736.	-0.	85949.	.230179	19784.
1995	0.	65304.	16995.	3650.	0.	85949.	.191569	16465.
1996	0.	67390.	16995.	1564.	0.	85949.	.159435	13703.
1997	0.	68954.	16995.	0.	0.	85949.	.132691	11405.
1998	0.	68954.	16995.	0.	0.	85949.	.110433	9492.
1999	0.	68954.	16995.	0.	0.	85949.	.091909	7900.
2000	0.	68954.	16995.	0.	0.	85949.	.076492	6574.
2001	0.	68954.	16995.	0.	0.	85949.	.063661	5472.
2002	0.	68954.	16995.	0.	0.	85949.	.052983	4554.
2003	0.	68954.	16995.	0.	0.	85949.	.044095	3790.
TERMINAL VALUE						95491.	.044095	4211.

INTERNAL RATE OF RETURN 20.15 % (BEFORE TAX)

PROJECT NAME GUAMSANG1080 IRR CALCULATION ON TOTAL INVESTMENT (AFTER TAX) DATE 121781

YEAR	TOTAL INVESTMENT	PROFIT AFTER TAX	DEPRECIATN	INTEREST	INCREASE IN WORKING CAPITAL	RETURN AFTER TAX	DISCOUNT FACTOR	PRESENT VALUE
1986	585 0.	0.	0.	0.	0.	-58530.	1.000000	-58530.
1987	179158.	0.	0.	0.	0.	-179158.	.865993	-155150.
1988	47289.	0.	0.	0.	0.	-47289.	.749945	-35464.
1989	0.	18877.	16995.	18245.	26901.	27216.	.649447	17675.
1990	0.	52594.	16995.	15120.	12020.	72688.	.562417	40891.
1991	0.	56945.	16995.	11994.	418.	85517.	.487049	41651.
1992	0.	41953.	16995.	9908.	-1.	68857.	.421782	29042.
1993	0.	34696.	16995.	7822.	-0.	59513.	.365260	21738.
1994	0.	35739.	16995.	5736.	-0.	58470.	.316313	18495.
1995	0.	36782.	16995.	3650.	0.	57427.	.273925	15731.
1996	0.	37825.	16995.	1564.	0.	56384.	.237217	13375.
1997	0.	26454.	16995.	0.	0.	43449.	.205428	8926.
1998	0.	26454.	16995.	0.	0.	43449.	.177900	7729.
1999	0.	26454.	16995.	0.	0.	43449.	.154060	6694.
2000	0.	26454.	16995.	0.	0.	43449.	.133415	5797.
2001	0.	26454.	16995.	0.	0.	43449.	.115536	5020.
2002	0.	26454.	16995.	0.	0.	43449.	.100054	4347.
2003	0.	26454.	16995.	0.	0.	43449.	.086646	3765.
TERMINAL VALU						95491.	.086646	8274.

INTERNAL RATE OF RETURN 15.47 % (AFTER TAX)

PROJECT NAME GUAMSANGLORO IRR CALCULATION ON EQUITY (AFER TAX) DATE 121781

YEAR	SHARE CAPITAL	PROFIT AFTER TAX	DEPRECIATN	LOAN REPAYMENT	INCREASE IN WORKING CAPITAL	TOTAL RETURN	DISCOUNT FACTOR	PRESENT VALUE
1986	30743.	0.	0.	-0.	0.	-30743.	1.000000	-30743.
1987	40991.	0.	0.	0.	0.	-40991.	.828434	-33958.
1988	30744.	0.	0.	0.	0.	-30744.	.686304	-21100.
1989	0.	14477.	16995.	5292.	26901.	3679.	.568558	2092.
1990	0.	52594.	16995.	46858.	12020.	10710.	.471013	5045.
1991	0.	56945.	16995.	26075.	418.	47448.	.390263	18514.
1992	0.	41953.	16995.	26075.	-1.	32873.	.323258	10627.
1993	0.	34696.	16995.	26075.	-0.	25616.	.267798	6860.
1994	0.	35739.	16995.	26075.	-0.	26659.	.221853	5914.
1995	0.	36782.	16995.	26075.	0.	27702.	.183791	5091.
1996	0.	37825.	16995.	26075.	0.	28745.	.152258	4377.
1997	0.	26454.	16995.	0.	0.	43449.	.126136	5480.
1998	0.	26454.	16995.	0.	0.	43449.	.104496	4540.
1999	0.	26454.	16995.	0.	0.	43449.	.086568	3761.
2000	0.	26454.	16995.	0.	0.	43449.	.071716	3116.
2001	0.	26454.	16995.	0.	0.	43449.	.059412	2581.
2002	0.	26454.	16995.	0.	0.	43449.	.049219	2138.
2003	0.	26454.	16995.	0.	0.	43449.	.040774	1772.
TERMINAL VALUE						95491.	.040774	3894.

INTERNAL RATE OF RETURN 20.71 % (AFTER TAX)

ATTACHMENT II

CONSTRUCTION COST LIST

Construction Cost List

1. Materials

No.	Item	Description	Unit	Unit Rate (Malaysian $)	Remarks
1.	Cement	Type-I	Bag (Ton)	9.60 (192.0)	Bagged Cement
2.	Reinforce steel bar	Mild steel SR24 ϕ16	Ton	1,000	
3.	Reinforce steel bar	High yield steel SD40 ϕ16	Ton	1,000	
4.	Crushed stone	25mm under	Cu.yd	25	
5.	Crushed stone	40mm under	Cu.yd	25	
6.	Fine aggregate	Screened sand	Cu.yd	8.50	
7.	Aggregate	25mm under	Cu.yd	25	
8.	Aggregate	40mm under	Cu.yd	25	
9.	Ply wood	12mm thickness 4' x 8'	PC	31	
10.	Timber	Typical section 4" x 4" x 10'			
		Soft wood	Ton	350	
		Hard wood	Ton	600	
11.	Galvanized iron sheet	1/16" x 3' x 8'	PC	10	
12.	Absestos cement sheet	1/4" x 4' x 8'	PC	10	
13.	Structural steel plate	Typical thickness 9mm SS41	ℓb	60	
14.	Structural steel angle	Typical section L-65 x 65 x 6	ℓb	70	
15.	Fuel	for Car	Liter	1.12	
16.	Roof tiles	1' - 3" x 9"			
		Butterfly tiles	PC	1.50	
		Redland tiles	PC	1.50	
17.	Vinyle pipe	Typical section 100ϕ x 3000	PC	30	

No.	Item	Description	Unit	Unit Rate (Malaysian $)	Remarks
18.	Reinforce concrete hume pipe	No pressure Class 'Y'			
		ϕ18"	5 ft length	73.80	
		ϕ24"		105.60	
		ϕ30"		138.00	
		ϕ36"		202.20	
		ϕ42"		255.00	
		ϕ48"		312.20	
		ϕ60"		——	
19.	Brick	4½" x 9" x 3½"	PC	.15	
		9" x 9" x 3½"	sq.yd	28	
		13½" x 9" x 3½"	sq.yd	50	

2. Works

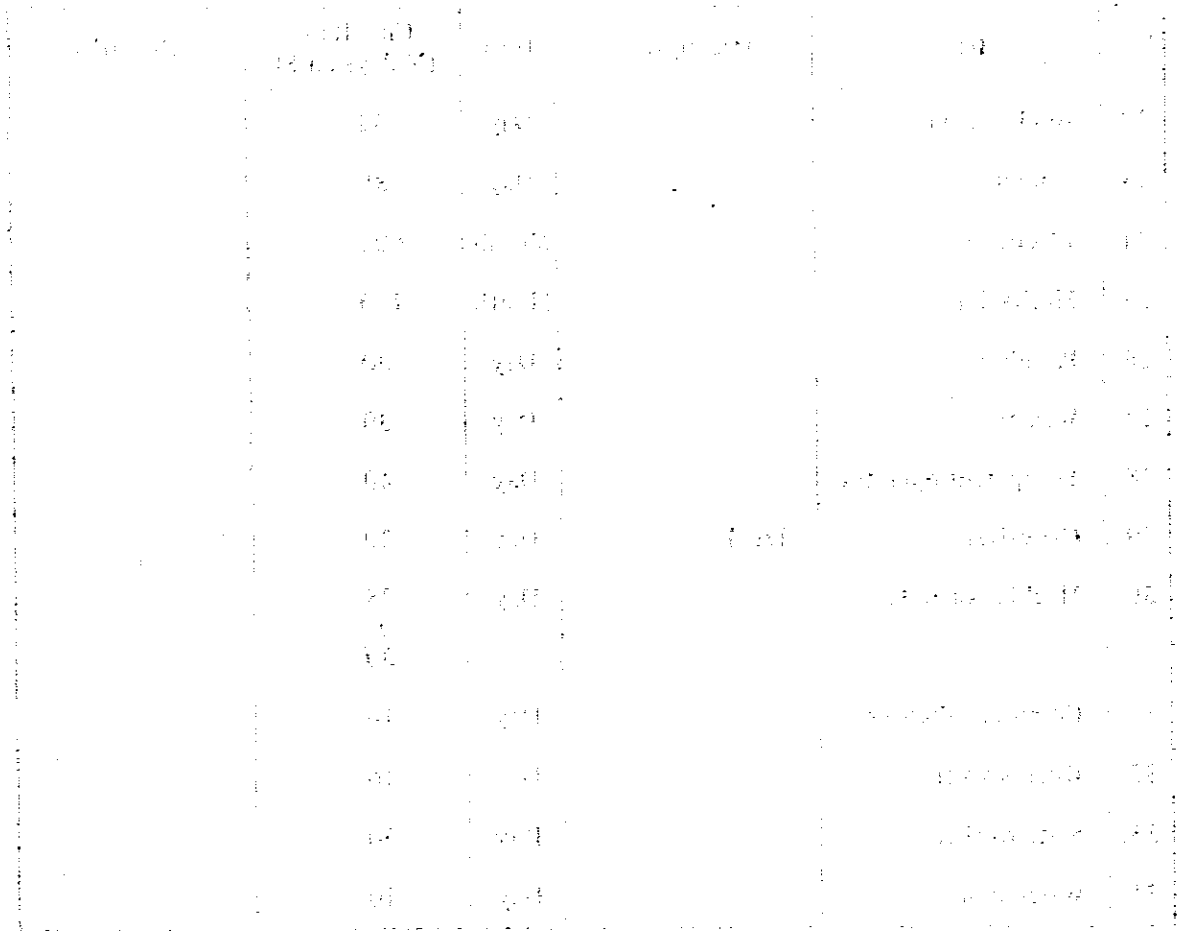
No.	Item	Description	Unit	Unit Rate (Malaysian $)	Remarks
1.	Excavation	Up to 2m	Cu.yd	1.20	
	Excavation	Up to 3m	Cu.yd	1.80	
	Excavation	Up to 5m	Cu.yd	2.50	
2.	Land levelling	Cutting, Moving, Filling	Cu.yd	1.00	
3.	Concrete (inc. form works)	1 : 3 : 6 mix.	Cu.ft	7	
		1 : 2 : 4 mix.	Cu.ft	9	
4.	Concrete (inc. form works)	1 : 1½ : 3 mix.	Cu.ft	10	
5.	Reinforcing steel	Supply & erection			
		5/8"ϕ above	ℓb	80	
		1/2"ϕ below	ℓb	85	
6.	Asbestos cement sheeting	Supply & erection	Sq.yd	2.52	
7.	Galvanized iron sheet	Supply & erection	Sq.yd	2.52	
8.	Brick wall	Supply & erection			
		9"	Thick	28	
		13½"	Thick	50	

3. Labour Fee

No.	Item	Description	Unit	Unit Rate (Malaysian $)	Remarks
1.	Technical manager		Month	4.000 ~ 5.000	
2.	Technical assist. manager		Month	2.000 ~ 3.000	
3.	Surveyor		Month	800	
4.	Surveyor helper		Day	5	
5.	Clark		Month	450	
6.	Typist		Month	400	
7.	Cook		Month	300	
8.	Nurse		Month	550	
9.	Office boy		Month	180	
10.	Driver	Car, land-rover	Month	220	
11.	Staff	10 years or more	Month	3,500	
12.	Foreman		Month	1,500	
13.	Earth worker		Day	12	
14.	Concrete worker		Day	20	
15.	Carpenter				
		Local	Day	25	
		Outside	Day	30	
16.	Steel fixer		Day	20	
17.	Structural worker		Day	40	
18.	Roofing worker		Day	40	
19.	Plaster		Day	25	
20.	Water proofing worker		Day	25	
21.	Tile worker		Day	25	

No.	Item	Description	Unit	Unit Rate (Malaysian $)	Remarks
22.	Brick mason		Day	30	
23.	Painter		Day	35	
24.	Electrician		Month	600	
25.	Mechanician		Month	700	
26.	Plumber		Day	30	
27.	Welder		Day	30	
28.	Equipment operator		Day	40	
29.	Car driver	Truck	Day	20	
30.	Machine operator		Day	25 ~ 30	
31.	Common labourer		Day	16	
32.	Duct worker		Day	16	
33.	Slate worker		Day	20	
34.	Watchman		Day	10	

Notes: 1. Unit costs mentioned above have been collected in Kota Bharu.
2. Prices for the cost estimation of this project has been set, as 10% greater than above unit costs.
3. Regarding labour fee, it has been set 20% greater in GuaMusang and Jeli to compare with Tanah Merah.



ATTACHMENT III

SCOPE OF WORK

SIGNED ON MAY 13, 1981

SCOPE OF WORK

FOR

THE FEASIBILITY STUDY

ON

THE ESTABLISHMENT OF INTEGRATED CEMENT

INDUSTRY IN KELANTAN, MALAYSIA

AGREED BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY

AND

ECONOMIC PLANNING UNIT

DATED : ON 16th MAY, 1981

(MR. HIROSHI SUGIURA)
LEADER OF THE JAPANESE STUDY,
JAPAN INTERNATIONAL
COOPERATION AGENCY.

(TAN SRI ISHAK BIN PATEH AKHIR)
DIRECTOR GENERAL,
ECONOMIC PLANNING UNIT,
PRIME MINISTER'S DEPARTMENT

The Japanese Study Team organized by the Japan International Cooperation Agency and headed by Mr. Hiroshi Sugiura exchanged views and has a series of discussions in Kuala Lumpur from May 12 to May 13, 1981 with representatives of the Economic Planning Unit and other Authorities concerned on the Scope of Works for the execution of the Study.

As a result of the discussions, the Japanese Study Team and the officials of the Government of Malaysia hereto agreed upon the Scope of Works.

CONTENTS

I. BACKGROUND

1. The Federal Government of Malaysia, in pursuit of its intention to accelerate economic development is actively encouraging the establishment of resource-based industry and a scheme of incentives to locate industry in less developed states is in operation.

2. In Kelantan, cement required mostly for various types of works have to be supplied by the cement producers located at the western part of Peninsular Malaysia, resulting in higher cost of transportation.

3. On the other hand, demand is expected to outstrip production by the late eighties. This provides opportunity for the set-up of cement plant in Kelantan which would contribute to accelerating the economic development of the state as well as utilising its abundant limestone resources.

4. Under this circumstance, the Government of Malaysia decided to study the possibility of establishing a cement factory and requested the Government of Japan to make a feasibility study of the cement factory in February, 1981.

5. In response to this request, the Government of Japan decided to undertake the study and has entrusted the Japan International Cooperation Agency (here inafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation of the Government of Japan, with the task of carrying it out.

6. Such being the case, JICA has decided to despatch to Malaysia a study team (here inafter referred to as "The Japanese Study Team") consisting of ten experts.

II. OBJECTIVES

7. This feasibility study, which will be based on the agreed scope of work is to study the possibility of establishing a viable cement industry in Kelantan from technical, economical and financial viewpoints including surveys on limestone deposits and the proposed factory sites, and surveys on market and distribution.

III. SCOPE OF STUDY

8. To achieve the above-mentioned objectives, the work of The Japanese Study Team will include undertaking of field surveys and discussion with Authorities/organisations and industries concerned in Malaysia.

9. The range of the study will be based on the following conditions:

(i) Market survey and estimates of demand will be studied within Malaysia, however, Singapore and any other countries will be considered if they have export potential.

(ii) The limestone resources of Kelantan will be reviewed and the most promising deposits (including Gua Musang) will be examined for the suitability of limestone, the amount of usable reserves and the ease of quarrying.

(iii) Plant sites appropriate for these deposits will be determined. The team will survey Jeli, Tanah Merah, and Gua Musang industrial estates as possible locations but not necessarily be confined to them.

(iv) Detailed financial and economic analysis of the main alternatives in respect to plant size, location and degree of integration will be performed.

10. Field survey will be conducted in three sectors which will be carried out as follows:-

(i) Market survey.

The following items will be studied:

(a) Collection and analysis of cement consumption data in the whole of Malaysia, West Malaysia and east coast states of Kelantan, Trengganu and Pahang with details such as the grade, quality, package, transportation, price, payment and so forth.

(b) Analysis of the production and sales activity of existing and intending manufacturers based on present capacity, quality, sales,process, likely age of production plant, raw material and utilities.

(c) Review of qualitative factors, covering customer attitudes and preferences, import restrictions, governmental influences and methods of marketing.

(d) Preparation of market demand and supply forecasts showing in total and by product grade, customer category, location for the period up to 1990 with sales performances up to 2000.

(ii) Raw Material Survey

The following items will be studied:

(i) Review of past works in this field within Kelantan

(ii) On-site surveys for clay, siliceous materials and iron ore in accessible areas close to the proposed cement plant sites including sampling for analysis.

(c) A review of the limestone resources of Kelantan and on-site surveys of the most promising deposits including but not necessarily confined to Jeli, Gua Musang and Dabong.

(d) Analysis of samples of materials to prove the suitability of identified deposits for the intended purpose.

(e) Study for limestone quarry including transportation and crushing units.

(iii) Cement Plant and Infrastructure Survey.

The following items will be studied:

(a) Collection of published and/or unpublished documents concerned with natural conditions and, in particular, soil conditions at the proposed cement factory sites.

(b) Collection of papers and discussion on infrastructures in Kelantan connected with economic and industrial development program in the State.

(c) Collection and analysis of technical and cost data on gypsum, fuels, packing materials and maintenance materials including utilities, labour cost, pollution regulation and the past experience on construction. Particular attention should be paid to fuel alternatives especially coal and natural gas and the implications of conveying these fuels to the plant site.

(d) Field survey on the proposed factory sites and infrastructures such as ports, roads bridges and railways for the study of transportation and freight of plant equipment, fuels, products and necessary materials.

(e) Estimation of site construction and plant costs, financial and other costs required for the financial and economic analysis.

(f) Assessment of the environmental impact of the cement plant.

(g) Matrix preliminary analysis including the degree of integration and effects from infrastructures on the combination of limestone quarries and cement plant sites versus its capacity in accordance with demand estimates to find two or three feasible cases.

(h) Detailed study on the said cases such as layout, equipment list, raw materials consumption list, utilities, manpower, consumables and the entire project implementation schedule.

(iv) Financial and Economic Analysis

After the completion of the three studies (above-mentioned (1), (2) and (3)) detailed financial and economic analysis will be conducted for the agreed alternatives :-

(a) Estimates of the pre-operating cost, including investment cost required for plant and equipment, land, building ocean and inland freight, site construction and other necessary items.

(b) Projection of all costs and expenses for 5 years from commencement of production and, if break-even being not attainable within that period, up to the time of break-even.

(c) Projected yearly profit and loss accounts, working capital requirements, cash flow and financial and economic rates of return including sensitivity analysis.

IV. SCHEDULE OF REPORT PRESENTATION

(i) An inception report (25 copies) containing a detailed statement of proposed procedures and work schedule will be submitted for discussion to the Government of Malaysia before The Japanese Study Team leaves Malaysia.

(ii) An interim report (25 copies) shall also be submitted for discussion within 2½ months after The Japanese Study Team leaves Malaysia. The report should include an outline of the work performed during the period and indicating the progress under each major category of the Scope of Work as agreed. It should also include preliminary results of the technical, financial and economic analysis of the main alternatives.

(iii) The draft final report written in English will be prepared and submitted (50 copies) for discussion in Malaysia, 2½ months after the discussion on the interim report. The report should contain a summary of all work performed during the study, the finding and recommendations of the consultants based on the discussion of the interim report. Maps, plans, tables and diagrams will also be included.

(iv) The final report written in English will be prepared and submitted (50 copies) 2 months after the discussion of the draft final report, incorporating all changes required and agreed upon during the said discussion.

(v) All reports when finalized and submitted to the Government of Malaysia shall remain the property of the Government of Malaysia.

V. CONTRIBUTION OF THE GOVERNMENT OF MALAYSIA

11. Cooperation and services on the following items would be highly appreciated:

(i) Furnishing of necessary information and data

(ii) Attendance of proper personnel from the Malaysian Government and Authorities/Organization as required for the field survey.

(iii) Arrangement and provisions of the following necessary facilities and conveniences for the field survey:

(a) Helpers for raw materials sampling.

(b) Land rovers around raw materials deposit

(c) Conference room facilities when necessary

(d) Clerk and secretary services

(iv) To exempt The Japanese Study Team from taxes and duties normally accorded under the provision of General Circular No. 1 of 1979 for materials, equipment and personal effects brought into Malaysia for the purpose of the Study.

(v) To indemnify any member of the team in respect of damages arising from any legal action against him in relation to any act performed or omission made in undertaking the survey except when the two Governments agree that such a member is guilty of gross negligence or wilful misconduct.

(vi) To inform the members of the 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.

VI. CONTRIBUTION OF THE GOVERNMENT OF JAPAN

(i) To bear necessary expenses for the execution of the study excluding for the items mentioned in 5. (Undertaking of the Government of Malaysia).

(ii) To provide Study Team to undertake the feasibility study of the above project.

(iii) To transfer the knowledge to the Malaysian counterpart personnel during the study period.

ATTACHMENT IV

MINUTES OF MEETING

ON DEC. 24, 1981

Telefon: 200133
Kawat: ECONOMICS
Telex: EPUPM MA 30098
Bilangan Surat Kita: (6) dlm.UPE 32/1/56
Bilangan Surat Tuan:

UNIT PERANCANG EKONOMI
JABATAN PERDANA MENTERI
KUALA LUMPUR 11-01
MALAYSIA

BY HAND

January 11, 1982.

Mr. N. Abe,
Resident Representative,
Japan International Cooperation Agency,
23, Jalan Ampang Hilir,
Kuala Lumpur.

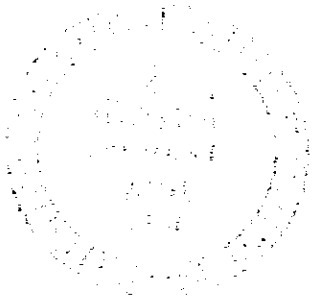
Dear Sir,

Re : Minutes of Steering Committee Meeting for The Feasibility Study on the Establishment of an Integrated Cement Industry in Kelantan

With reference to the above matter, enclosed herewith a copy of minutes of the meeting held on 24th December 1981 for your information and retention.

Yours Sincerely,

.....
(Salan bin Shawal)
on behalf of
Director General
Economic Planning Unit.



Minutes of Steering Committee Meeting for the Feasibility Study on the Establishment of an Integrated Cement Industry in Kelantan

Date : 24th December 1981

Time : 9.30 a.m.

Venue : Main Conference Room
Economic Planning Unit
Prime Minister's Department

Present :

Mr. Rahim Din	- EPU, Deputy Director General (Chairman)
Ms. Raja Zaharaton Raja Zainal Abidin	- Ministry of Trade and Industry
Mr. Johar Murad	- Ministry of Public Enterprise
Mr. Wan Yahya Wan Salleh	- SEPU Kelantan
Mr. Ismail Bukhary	- SEPU Kelantan
Mr. Mike Stevens	- SEPU Kelantan
Mr. Chew Bang Chyuan	- MIDA
Ms. Hindun Tahir	- EPU
Mr. Ryutaro NODA	- JICA
Mr. Tetsuya HIRONAKA	- JICA
Mr. Keiichi ARAKANE	- JICA
Mr. Kunihiko TADAKA	- Embassy of Japan
Mr. Salam Shawal	- EPU (Secretary)

Absent

Mr. Azmi Ali	- Treasury
Mr. Abbas Salleh	- SEDC of Kelantan

I. Introduction

1. The Chairman welcomed all members present. The meeting was informed that the objective of the meeting was to discuss the Draft

Final Report (DFR) which was earlier presented by JICA.

II. Discussion

2.1. Energy Resources

2.1. During the discussion on the Interim Report, the Japanese Study Team (JST) was required to analyse world demand and supply of coal. JST was also asked to indicate the difference in cost per ton cement due to transporting coal from the port of entry to Kelantan compared to that of the West Coast Cement Plants. After much deliberations, the Committee was satisfied with the analysis undertaken in the DFR.

2.2. However the Committee requested JST to show operational procedures and methods of securing a steady supply of coal from international suppliers in the Final Report.

3. Comparison of Capital Cost

3.1. JST had been requested to carry out a comparative study on total capital cost for a cement plant vis-a-vis other producers local as well as abroad. Comparative studies on capital cost vis-a-vis local producers using average figures for all producers have been undertaken by JST in the DFR (Page 276). However, the Committee was informed that to undertake a comparative study vis-a-vis international producers was a difficult task and beyond the scope of work of JST.

3.2. Nevertheless, JST agreed to add in a few sentences in the Final Report so as to maintain the fact that all costs quoted in the study were reasonable and competitive internationally.

4. Market Strategy

4.1. JST was requested to further explain on the marketing strategies adopted in the DFR. JST assumed that 100% of cement demand for Trengganu

and Kelantan could be supplied by the Kelantan Cement Plant. This assumption was questionable while Kelantan cement had to face competition from present producers in the market including that of Pahang Cement.

4.2. However, after lengthy discussion and explanation from JST, the Committee was satisfied and agreed to the recommendations as put forward in the DFR.

5. Market Projections

5.1. With reference to table V-2-7 page 194 in the DFR and table V-2-7 page 176 in the Interim Report, the calculation on demand for cement in Kelantan and Trengganu was based on higher demand growth rates as compared to that in the Interim Report, but the rationale for such assumption was not available. JST was requested to clarify on this point. The meeting was informed that an additional 250,000 tons of cement was added to the demand figures of 1979/1980. This represented the import volume by wholesalers/retailers of these two states which was not included in the MTI trade statistics which was the basis of calculations in the Interim Report.

6. Financial Analysis

6.1. The calculation of IRR in the DFR should use the price and cost in respect of a uniform base year i.e. 1981 constant prices. Although JST made minor changes in the estimated production cost using constant prices of 1981, closer examination showed that changes were mainly due to actual increase in cost of obtaining/transporting limestone from Gua Musang to Tanah Merah. JST explained that the figures used in the Interim Report were actually based on 1984 costs and prices. It was however wrongly printed as 1980 costs.

7. Modifications to be Included in the Final Report

7.1. Minor additions and modifications that have to be included in the Final Report and have been agreed upon are as follows:-

i) The write-up by JICA - Preface

ii) JST leader write-up - Foreword

iii) Table on page 191 of DFR will include also cement consumption by brand for the states of Trengganu and Pahang

iv) Production figures for CIBA to be corrected as on page 95 of DFR.

v) Map on location of Existing and Planned Cement Plant in Peninsular Malaysia as on page 95 of DFR to include Perak Halla.

vi) Operative procedures and methods of securing a steady supply of coal from international suppliers.

7.2. The Committee agreed to accept the report on the condition that JST includes the modifications and addition as stated above.

7.3. The meeting ended at 11.30 a.m. on a note of thanks and appreciation from the Committee on the codial relation and the good work done by JICA and the JST in particular.

APPENDIX I

PRELIMINARY CASE STUDY

PRELIMINARY CASE STUDY

TABLE OF CONTENTS

1. Marketing

When this feasibility study was started the cement supply situation in Malaysia was as follows:

a) Besides the five existing cement manufacturers including CMS's grinding mill in East Malaysia, there were three projects which were approved but yet to be implemented. (Simen Perak, Pahang Cement and Perak Halla).

b) In addition there were one new project (Kedah Cement), and two expansion projects (Tasek and CIMA) and the new project in Kelantan was to be studied for its feasibility. Upon request by Malaysian Government.

c) Then MIDA made the three case studies as shown in Table III-2-5 to -11. In which the demand and supply of cement situation was studied in Case I and II based on the assumption that all three approved projects are to be implemented for Case I, and that two (Pahang Cement and Perak Halla) are to be implemented and the remaining one (Simen Perak) is to be replaced by the new project (Kedah Cement).
In Case III the assumption was that beside the projects in Case II, two expansions by Tasek and CIMA, and new Kelantan Cement were added for the prospective suppliers.

d) Therefore in the Interim Report it was recommended that there will be room for a new comer besides those mentioned either in Case I or Case II in 1987 at the earliest, and that the new comer should be chosen out of the Kelantan Cement and the other existing manufacturers, for expansion depending on the project's necessity or importance and economic viability.

e) Based on the above recommendation nine case studies of Kelantan Cement were made, so as to find out the best plant size and location from several view points.

2. Determination of Study Case

To execute the feasibility study on the establishment of cement factory, it is necessary to fix the plant capacity and its proposed site at first. The study cases set forth in this report involve three levels of the plant capacity connected with the marketing discussed at the beginning of this section, and three proposed plant sites based on raw materials supply, the developing program of industrial estates with infrastructures and utilities, and market for the product, thus coming up to nine cases in total to study.

2-1 Production capacity

Since the proposed plant will cover the local market such as Kelantan and Trengganu, in particular, the market size is one of the critical parameter to set the plant capacity. Around 500 thousand tons of annual production size is understood as an appropriate cement plant capacity in a smaller case. Suppose the other conditions are the same, and the all products can be sold, the larger plant will prove the more economical. Therefore, it is decided to set 500 thousand tons per annum as the smallest capacity, and 666 thousand tons per annum as the medium. The largest capacity is set at 833 thousand tons per annum, however, it has to be operated for a few years after start up at the lower capacity than the rated capacity because of its excess capacity versus local market.

Annual Production (ton/year)

Plant Capacity (t.cl/d)	1,500	2,000	2,500
Clinker	476,200	634,300	793,300
Cement (Net)	500,000	666,000	833,000

2-2 Proposed plant sites

As aforementioned, three proposed plant sites are selected prior to the field survey. Advantages and disadvantages of each site are as follows.

(1) Tanah Merah (Fig. 2-1)
- a) Limestone has to be transported from Dabong by railway.
- b) Silica rich clay is available nearby.
- c) The site is situated nearest to the market.
- d) Railway and road facilities are available.
- e) The town has a main station of the national electric grid system.
- f) The site is nearest to Kota Bharu.
- g) The site is located on the flat but elevated ground.

(2) Gua Musang (Fig. 2-2)
- a) Limestone is available at Gua Panjang.
- b) Clay is available locally but silica sand and iron ore have to be transported from outside sources.
- c) It is far from the market.
- d) Railway is available and road is under construction.
- e) Electric power supply is planned from Tanah Merah.

Fig. 2-1 Location of the Plant Site in Tanah Merah

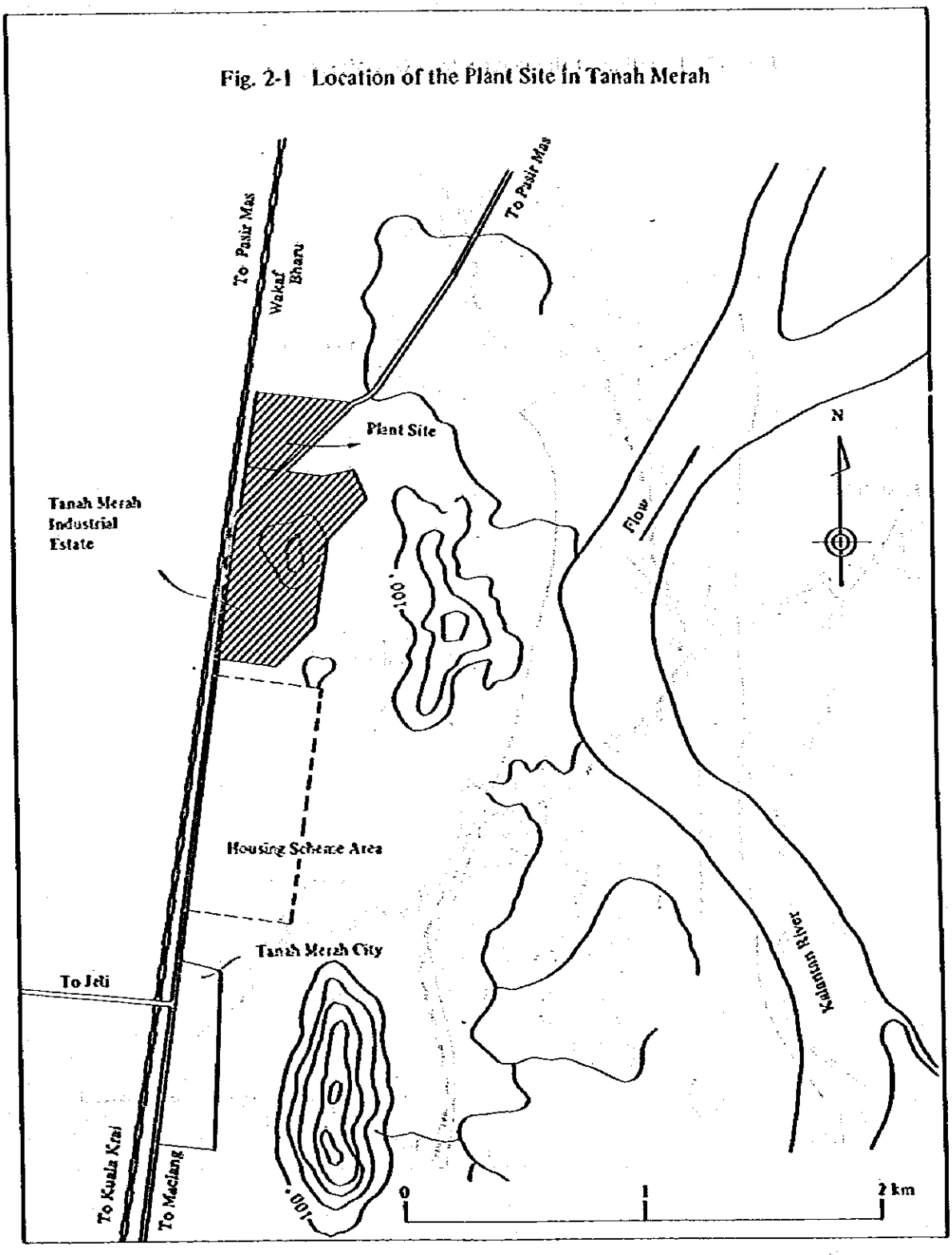


Fig. 2-2 Location of the Plant Site in Gua Musang

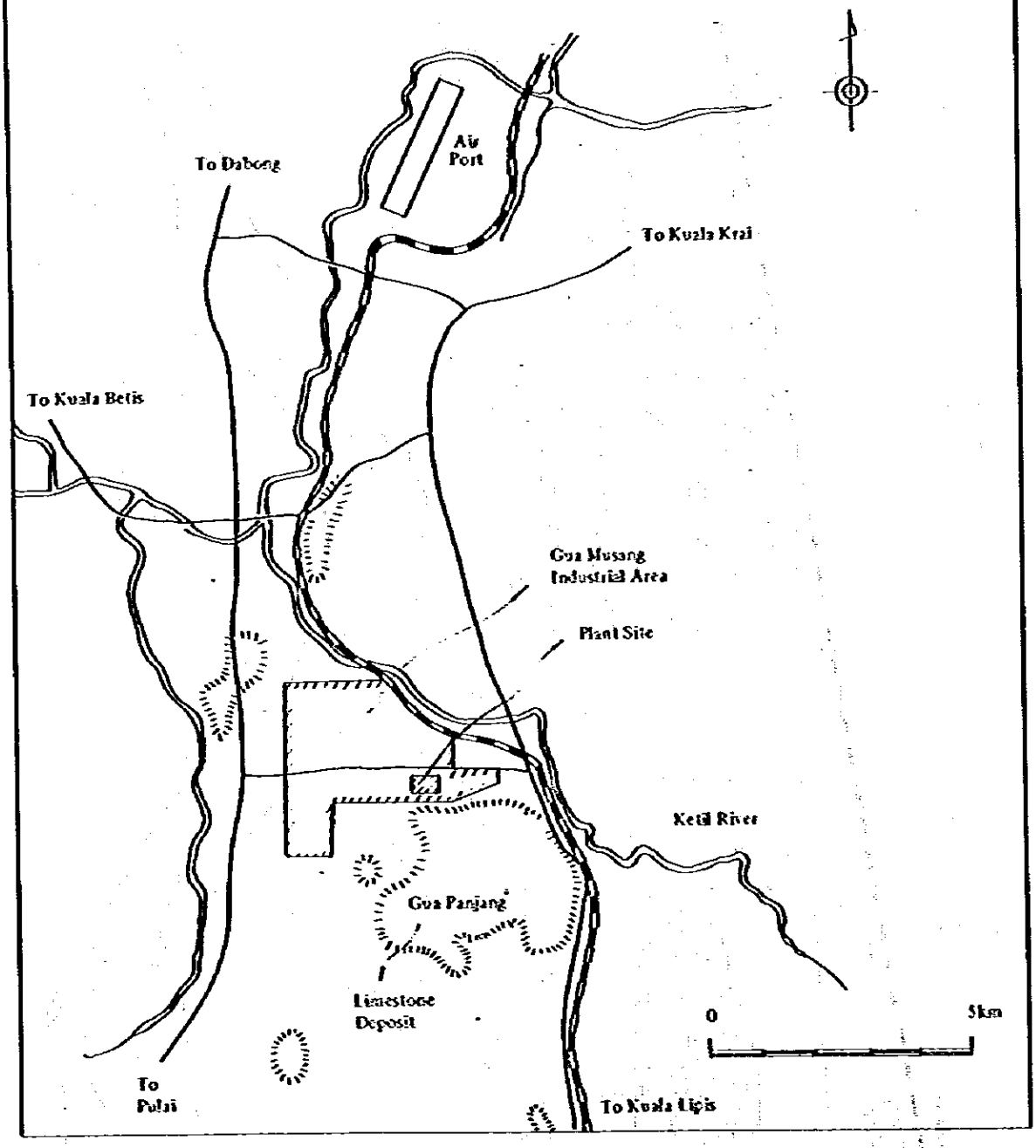
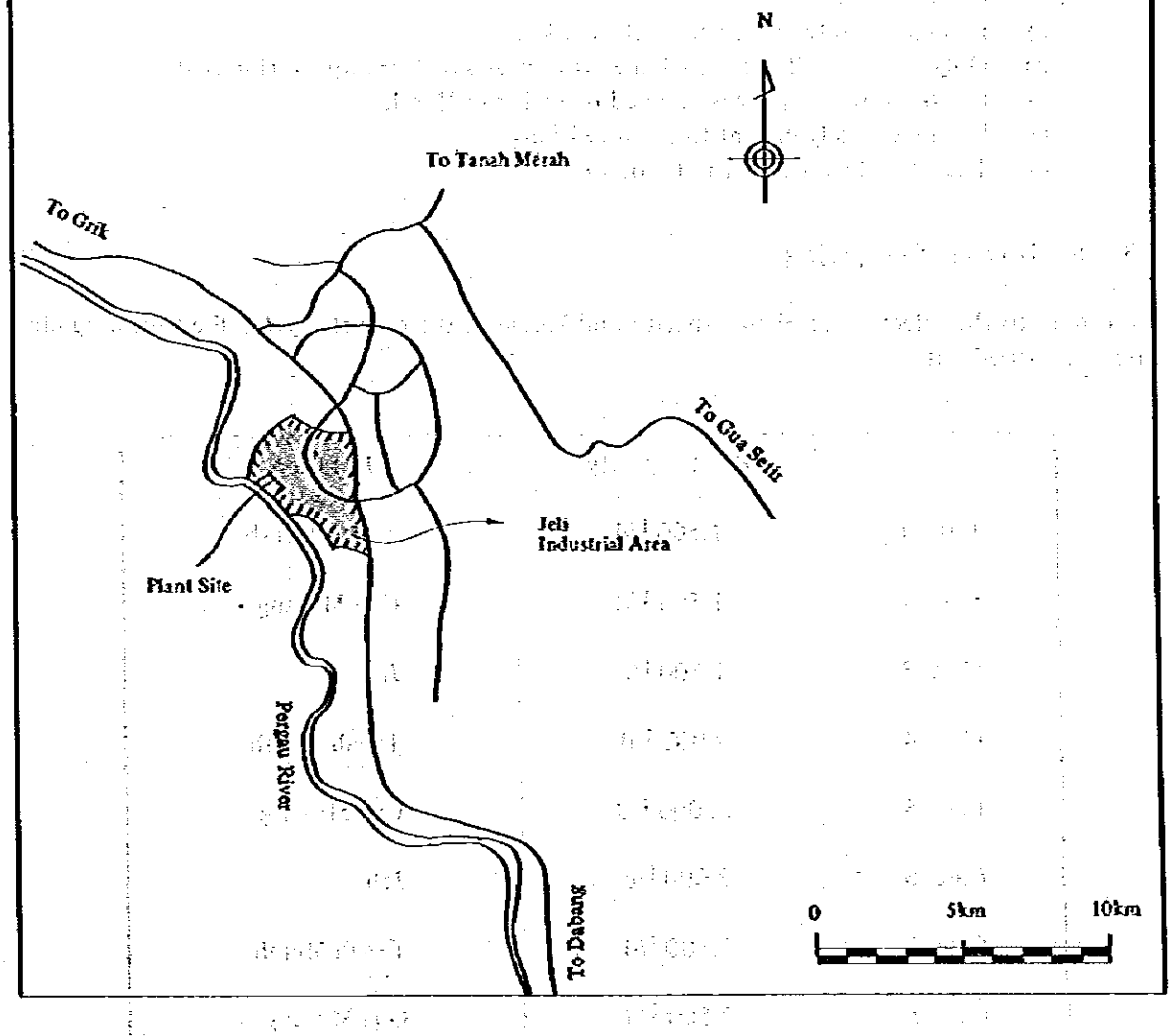


Fig. 2-3 Location of the Plant Site in Jeli



f) It is far from Kota Bharu.
g) The site is located on a flat ground with oil palm plantation.

(3) Jeli (Fig. 2-3)
a) Limestone is available at Gua Setir.
b) Clay is available locally but silica sand and iron ore have to be transported from outside sources.
c) It is moderately distant from the market.
d) Only road is available, which means to bear a high transportation cost.
e) Electric power supply is planned from Tanah Merah.
f) It is moderately distant from Kota Bharu.
g) The site is located on a flat ground.

2-3 Study cases of the project

According to the selection of plant capacity and location, the case study for the following nine cases are carried out.

	Plant capacity	Location
Case 1	1,500 t/d	Tanah Merah
Case 2	1,500 t/d	Gua Musang
Case 3	1,500 t/d	Jeli
Case 4	2,000 t/d	Tanah Merah
Case 5	2,000 t/d	Gua Musang
Case 6	2,000 t/d	Jeli
Case 7	2,500 t/d	Tanah Merah
Case 8	2,500 t/d	Gua Musang
Case 9	2,500 t/d	Jeli

2-4 Raw materials supply

The combination of raw material deposits and plant sites are as follows.

(1) Limestone
Tanah Merah has a possibility to receive limestone from three deposits, however it is the most economical to get it from Dabong by railway.
Transporting facility and distance from each quarry to plant site are as follows:

Site	Case	Limestone quarry	Transporting facility	Distance (km)
Tanah Merah	1, 4, 7	Dabong	Railway	88
Gua Musang	2, 5, 8	Gua Panjang	Belt conveyor	1
Jeli	3, 6, 9	Gua Setir	Lorry	18

(2) Clay

At each site, clay is available at the nearest deposit to the plant site. Distance and transporting facility from quarry to the site are as follows:

Site	Case	Quarry	Transporting facility	Distance (km)
Tanah Merah	1, 4, 7	Tanah Merah (West)	Lorry	9
Gua Musang	2, 5, 8	Gua Musang (South)	Lorry	3
Jeli	3, 6, 9	Jeli	Lorry	12

(3) Siliceous material

Tanah Merah has high silica clay near the site, therefore siliceous material is not required. Gua Musang and Jeli have to use silica sand from the Kelantan river near Kota Bharu. It may be possible to find siliceous materials near the site by the further investigation. Distance and transporting facility from quarry to the site are as follows:

Site	Case	Quarry	Transporting facility	Distance (km)
Tanah Merah	1, 4, 7	Tanah Merah (North) (clay)	Lorry	1
Gua Musang	2, 5, 8	Kelantan river	Lorry and railway	202
Jeli	3, 6, 9	Kelantan river	Lorry	96

(4) Iron ore

Iron ore from Bukit Lata is used in all cases, because reliable iron deposit couldn't be confirmed in Temangan and Bukit Kuang.

Distance and transportation facility from quarry to the site are as follows:

Site	Case	Quarry	Transporting facility	Distance (km)
Tanah Merah	1, 4, 7	Bukit Lata	Lorry	46
Gua Musang	2, 5, 8	Bukit Lata	Lorry and railway	208
Jeli	3, 6, 9	Bukit Lata	Lorry	69

(5) Gypsum

Gypsum imported from Thailand by rail are used in all cases.

Distance and transportation facility from Sungai Golok station, where the entrance point is located, to the site are as follows:

Site	Case	Supply source	Transporting facility	Distance (km)
Tanah Merah	1, 4, 7	Thailand	Railway	47
Gua Musang	2, 5, 8	Thailand	Railway	202
Jeli	3, 6, 9	Thailand	Lorry	59

2-5 Utility and labour condition

2-5-1 Electric power

(1) Power demand

Electric power requirement for cement pant is assumed as follows.

No.	Item	Unit	Case 1~3	Case 4~6	Case 7~9
1	Production capacity	t-cement/hour	65.6	87.5	109.4
2	Unit consumption	KWH/t-cement	120	118	116
3	Average power	KW (1x2)	7,900	10,300	12,700
4	Load factor $\left(\frac{\text{Average power}}{\text{Max. demand power}}\right)$	%	75	75	75
5	Max. demand power	KW (3÷4)	10,600	13,800	17,000

(2) Unit price

Based on the above conditions and the tariff of LLN, the unit price of power is calculated as follows.

No.	Item	Unit	Case 1~3	Case 4~6	Case 7~9
1	Max, power demand	KW	10,600	13,800	17,000
2	Unit power consumption	KW/t-cement	120	118	116
3	Annual cement production	10^3 t/y	500	666	833
4	Annual power consumption	10^6 KWH/y	60	79	97
5	Demand charge	10^3 M$/y	1,500	2,000	2,400
6	Energy charge	10^3 M$/y	10,200	13,400	16,500
7	Total charge	10^3 M$/y	11,726	15,400	18,900
8	Unit price	M$/KWH	0.20	0.20	0.20
9	Unit power cost	M$/t-cement	24.0	23.6	23.2

2-5-2 Water

As each plant site is situated near the source of river water, i.e. Tanah Merah to Kelantan river, Jeli to Pergau river and Gua Musang to Ketil river, industrial water is available from river or ground water.

Drinking water is supplied by JKR to all sites.

The following are estimated requirements of water in the case of one-way use – not recirculating –.

Case	1~3	4~6	7~9
Industrial water t / h	200	260	330
Drinking water t / d	31	31	31

2-5-3 Labour

The population of the cities relating to the plant site at present are as follows:

Tanah Merah	about	70,000
Gua Musang	about	5,000
Jeli	about	3,000

If the project is established in Jeli or Gua Musang, it may encounter difficulties in securing locally adequate labor force. The project may require to recruit them from the other places including skilled workers and engineers.

3. Mixing Proportion of Raw Materials

3-1 Chemical composition of raw material

Average values of chemical composition of raw materials used in this calculation are shown in Table 3-1.

Table 3-1 Chemical Composition of Raw Materials

Materials		Sample		Moisture (%)	Chemical Composition (wt. %)									P_2O_5* (ppm)	Cl* (ppm)
					L.O.I	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	SO_3	Na_2O	K_2O	Total		
Limestone	(1)	Gua Punyang	(C)	2.5	40.24	0.71	1.11	0.26	50.43	0.56	0.04	0.07	0.17	99.63	240	50
	(2)		(D)	2.5	43.24	1.02	0.25	0.06	54.65	0.49	0.07	0.01	0.03	99.82	200	40
	(3)	Gua Setir		2.5	43.93	0.24	0.17	0.05	53.51	1.92	0.02	0.01	0.02	99.87	110	30
	(4)	Dabong		2.5	42.80	1.96	0.66	0.21	52.86	1.15	0.04	0.05	0.09	99.82	330	50
Clay	(1)	Tanah Merah	West	14.6	5.93	70.50	14.91	7.04	0.28	0.05	0.04	0.09	1.14	99.98	320	35
	(2)		North	26.4	13.76	40.86	27.68	16.50	0.28	0.25	0.03	0.13	0.50	99.99	600	58
	(3)	Joli		18.1	6.88	60.51	21.93	6.78	0.21	0.20	0.02	0.28	3.18	99.99	360	30
	(4)	Gua Musang	South	17.5	7.06	62.04	20.57	6.22	0.35	0.40	0.02	0.22	3.10	99.98	340	19
Silica Sand		S. Kelantan		2.9	0.51	90.41	4.70	0.62	0.38	0.00	0.00	0.60	2.76	99.98	200	50
Iron Ore		Bt. Lutu		-	11.43	11.40	12.99	61.20	0.63	0.76	0.12	0.12	1.21	99.86	6350	23
Coal Ash		Australia	Hunter Valley Coal	-	-	68.6	24.0	2.7	0.7	0.6	0.3	0.5	1.1	98.5	-	-

* dry basis

3-2 Combination of raw materials

Combination of raw materials and moduli of clinker selected in this calculation are shown in Table 3-2.

Table 3-2 Combination of Raw Materials

Plant Site				Jeli			Tanah Merah					Gua Musang		
Combination of Raw Materials				No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
Burning Conditions	Fuel	Coal		O	O		O	O		O	O	O	O	
		Oil				O			O					O
	Heat Consumption	800 Kcal/kg		O			O			O		O		
		760 Kcal/kg			O			O			O		O	
Lime-stone	(1)	Gua	(C)									O	O	O
	(2)	Panjang	(D)									O	O	O
	(3)	Gua Setir		O	O	O								
	(4)	Dabong					O	O	O	O				
Clay	(1)	Tanah	West				O	O	O	O				
	(2)	Merah	North				O	O	O	O				
	(3)	Jeli		O	O	O								
	(4)	Gua Musang										O	O	O
Silica Sand	S. Kelantan			O	O	O				O		O	O	O
Iron Ore	Bt. Lata			O	O	O	O	O	O	O	O	O	O	O
Moduli of Clinker (planned)			HM	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.06	2.10	2.10	2.10
			SM	2.60	2.60	2.60	2.60	2.60	2.60	2.40	2.60	2.60	2.60	2.60
			IM	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80

3-3 Mixing proportion of raw materials

The mixing proportion of raw materials based on dry basis, the chemical composition of raw meal, chemical composition of clinker and mineral composition of clinker are shown in Table 3-3 ~ 3-6, respectively.

Table 3-3 Mixing Proportion of Raw Materials

Plant Site				Jeli			Tanah Merah					Gua Musang		
Combination of Raw Materials				No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
Lime-stone	(1)	Gua	(C)									41.269	41.228	40.793
	(2)	Pan-jang	(D)									41.269	41.228	40.793
	(3)	Gua Setir		79.318	79.276	78.457								
	(4)	Dabong					81.335	81.282	80.449	81.192	80.938			
Clay	(1)	Tanah	West				17.099	17.127	17.578	13.358	17.422			
	(2)	Merah	North				0.760	0.786	1.363	3.341	0.827			
	(3)	Jeli		12.213	12.265	13.244								
	(4)	Gua Musang										11.949	12.008	13.083
Silica Sand	S. Kelantan			6.731	6.728	6.664				1.382		3.724	3.715	3.605
Iron Ore	Bt. Lata			1.738	1.731	1.635	0.806	0.805	0.610	0.726	0.813	1.789	1.821	1.726
Total				100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

(wt % in dry basis)

Table 3-4 Chemical Composition of Raw Meal

Plant Site		Jeli			Tanah Merah					Gua Musang		
Combination		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
Chemical Composition (wt % in dry basis)	L.O.I	35.91	35.90	35.60	36.02	36.00	35.73	36.09	35.88	35.52	35.51	35.21
	SiO_2	13.87	13.89	14.41	14.05	14.08	14.60	13.71	14.30	14.18	14.20	14.73
	Al_2O_3	3.36	3.37	3.56	3.40	3.41	3.61	3.61	3.47	3.43	3.44	3.64
	Fe_2O_3	1.97	1.97	1.98	1.99	2.00	2.00	2.11	2.03	2.02	2.02	2.02
	CaO	42.50	42.48	42.05	43.05	43.02	42.58	42.97	42.84	43.41	43.39	42.94
	MgO	1.56	1.56	1.55	0.95	0.95	0.94	0.95	0.95	0.49	0.49	0.49
	SO_3	0.02	0.02	0.02	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05
	Na_2O	0.08	0.08	0.09	0.06	0.06	0.06	0.07	0.06	0.08	0.08	0.08
	K_2O	0.61	0.61	0.64	0.28	0.28	0.29	0.29	0.28	0.58	0.58	0.61
	Total	99.88	99.88	99.90	99.84	99.84	99.85	99.84	99.85	99.76	99.76	99.77
	P_2O_5 (ppm)	254	254	250	297	297	288	298	298	361	361	356
	CL (ppm)	31	31	31	47	47	47	48	47	42	42	41
Moduli of raw meal (Calculated)	H.M	2.21	2.21	2.10	2.21	2.21	2.10	2.21	2.16	2.21	2.21	2.10
	S.M	2.60	2.60	2.59	2.60	2.60	2.60	2.40	2.60	2.60	2.60	2.60
	I.M	1.71	1.71	1.80	1.71	1.71	1.80	1.71	1.71	1.71	1.71	1.80

Table 3-5 Chemical Composition of Clinker

Plant Site		Jeli			Tanah Merah					Gua Musang		
Combination		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
Chemical Composition (wt % in dry basis)	SiO_3	22.39	22.39	22.39	22.71	22.71	22.71	22.20	23.01	22.78	22.78	22.78
	Al_2O_3	5.54	5.54	5.54	5.62	5.62	5.62	5.95	5.69	5.63	5.63	5.63
	Fe_2O_3	3.08	3.08	3.08	3.12	3.12	3.12	3.30	3.16	3.13	3.13	3.13
	CaO	65.30	65.30	65.30	66.25	66.25	66.25	66.25	65.84	66.45	66.45	66.45
	MgO	2.41	2.41	2.40	1.47	1.47	1.47	1.48	1.46	0.77	0.77	0.76
	Total	98.72	98.72	98.71	99.17	99.17	99.17	99.18	99.16	98.76	98.76	98.75
Moduli of Clinker (Calculated)	H.M	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.06	2.10	2.10	2.10
	S.M	2.60	2.60	2.60	2.60	2.60	2.60	2.40	2.60	2.60	2.60	2.60
	I.M	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80

Note: SO_3 content in clinker estimate 0.3%

Table 3-6 Mineral Composition of Clinker

Plant Site		Jeli			Tanah Merah					Gua Musang		
Combination		No. 1	No. 2	No 3.	No 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
Mineral Composeal*-1 (wt % in dry basis)	C_3S	53.2	53.2	53.2	53.2	53.2	53.2	55.4	49.6	53.2	53.2	53.2
	C_2S	24.1	24.1	24.1	24.1	24.1	24.1	21.8	28.6	24.1	24.1	24.1
	C_3A	9.5	9.5	9.5	9.5	9.5	9.5	10.2	9.7	9.5	9.5	9.5
	C_4AF	9.4	9.4	9.4	9.4	9.4	9.4	10.0	9.6	9.4	9.4	9.4
L.S.F*-2		0.912	0.912	0.912	0.912	0.912	0.912	0.924	0.895	0.912	0.912	0.912

Note: *-1 ; Mineral component of clinker are calculated according to ASTM C150.
The symbols of each mineral stands for as follows.

C_3S ($3CaO.SiO_2$) : Tricalcium Silicate
C_2S ($2CaO.SiO_2$) ; Dicalcium Silicate
C_3A ($3CaO.Al_2O_3$) : Tricalcium Aluminate
C_4AF ($4CaO \cdot Al_2O_3 \cdot Fe_2O_3$) : Tetracalcium Aluminoferrite

*-2 ; L.S.F. (Lime Saturation Factor)
L.S.F. are calculated according to the equation stipulated in BS12.

3-4 Theoretical unit consumption of raw materials

Theoretical unit consumption of raw materials is calculated using the mixing proportion of raw materials and is shown in Table 3-7.

Table 3-7 Unit Consumption of Raw Materials (Theoretical Value)

Plant Site				Jeli			Tanah Merah					Gua Musang		
Combination				No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
Lime-stone	(1)	Gua	C									0.6314	0.6314	0.6314
	(2)	Panjang	D									0.6314	0.6314	0.6314
	(3)	Gua Setir		1.2184	1.2184	1.2186								
	(4)	Daboog					1.2515	1.2515	1.2517	1.2515	1.2437			
Clay	(1)	Tanah	West				0.2631	0.2637	0.2735	0.2059	0.2677			
	(2)	Merah	North				0.0117	0.0121	0.0212	0.0515	0.0127			
	(3)	Jeli		0.1876	0.1885	0.2057								
	(4)	Gu Musang										0.1829	0.1839	0.2025
Silica Sand		S. Kelantan		0.1034	0.1034	0.1035				0.0213		0.0570	0.0569	0.0558
Iron Ore		Bt. Lata		0.0267	0.0266	0.0254	0.0124	0.0124	0.0095	0.0112	0.0125	0.0280	0.0279	0.0267
Total*				1.5361	1.5369	1.5532	1.5387	1.5397	1.5559	1.5414	1.5366	1.5307	1.5315	1.5478

* t-raw materials in dry basis/t-clinker including coal ash.

3-5 Actual unit consumption of raw materials

In the above theoretical calculation, the loss in process was neglected. Actual unit consumption of raw materials is calculated by taking account of the possible loss in process and is shown in Table 3-8.

Table 3-8 Unit Consumption of Raw Materials (Actual Value)

Plant Site				Jeli			Tanah Merah					Gua Musang		
Combination				No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
Lime-stone	(1)	Gua	C									0.6440	0.6440	0.6440
	(2)	Panjang	D									0.6440	0.6440	0.6440
	(3)	Gua Setir		1.2428	1.2428	1.2430								
	(4)	Daboog					1.2765	1.2765	1.2767	1.2765	1.2686			
Clay	(1)	Tanah	West				0.2684	0.2690	0.2790	0.2100	0.2731			
	(2)	Merah	North				0.0119	0.0123	0.0216	0.0525	0.0130			
	(3)	Jeli		0.1914	0.1923	0.2098								
	(4)	Gua Musang										0.1866	0.1876	0.2066
Silica Sand		S. Kelantan		0.1055	0.1055	0.1056				0.0217		0.0581	0.0580	0.0569
Iron Ore		Bt. Lata		0.0272	0.0271	0.0259	0.0126	0.0126	0.097	0.0114	0.0128	0.0286	0.0285	0.0272
Total*				1.5669	1.5677	1.5843	1.5694	1.5694	1.5870	1.5721	1.5675	1.5613	1.5621	1.5787

* t- raw materials in dry basis/t- clinker including coal ash.

4. Outline of Plant

4-1 Main machinery and equipment

Main machinery and equipment which are adopted in the plant should be selected by taking into account the local condition.
The qualities and procurement condition of raw materials and fuel, the social and natural conditions at the plant sites are surveyed and studied.
As a result, the following main machinery and equipment are selected for the project.

1. Preblending bed system
   As the raw materials to be used for cement manufacturing are natural, their chemical and mineral compositions fluctuate widely.
   It is also a well-known fact that their fluctuations lead to the influence on plant operation, fuel consumption and quality of cement.
   In order to avoid the above, the preblending bed system is used to homogenize and store raw materials before raw materials are blended into raw meal.
   This preblending bed system has the following advantages:
   (1) Intermediate storage stockpile (buffer stock)
      (a) The storage facilities at the quarry site and at the clinker manufacturing plant are not required to be geared each other.
      (b) Rationalization can be made, because multiple shift work at the quarry site can be reduced and large-sized equipment is not required.
      (c) Raw materials can be constantly and directly supplied to the kiln.
      (d) Sticky materials are handled in preblending bed easier than in the silo.
      (e) Automation of preparatory handling of raw materials is made easily.
   (2) Homogenization
      (a) High blending efficiency can be obtained.
      (b) Inhomogeneous raw materials, which could not be used as raw materials without a blending bed system, can be utilized.
      (c) Pre-mixture of various kinds of raw materials can be achieved.
      (d) Cement of high quality can be manufactured.

2. Raw material and coal grinding mill
   Tube mill and vertical roller mill are adopted widely for grinding raw materials and coal.
   Since the raw materials and coal have a high moisture content as revealed by our survey and tests, they must be sufficiently dried to maintain a stable operation of the dry process. From this standpoint, the vertical roller mill is most preferred in that and it can be used not only for drying but grinding as well.
   In the cement industry, among others, the vertical roller mill is used widely with the SP process ever since the suspension preheater is introduced to improve the heat transfer in the dry process. This is attributable mainly to the fact that the vertical roller mill can use exhaust gas from the SP kiln process at 350°C, which is discharged, after reuse, at

90 ~ 120°C.
Thus, the vertical roller mill is adopted. Its advantages are described below.

1) 15 – 20% lower power consumption, compared with the overall grinding system comprising a tube mill operating in a closed circuit with a bucket elevator.
2) Excellent drying capacity, even if only kiln exit gases of relatively low temperature (below 300°C) are used.
3) Quick response to altered operating conditions; in particular, scope for rapid intervention in the raw mix composition, thanks to short average retention time of the materials in mill (approx. 2 minutes).
4) Less noise emission in the significant frequency range as compared with steel-lined tube mills.
5) The feed materials do not have to be available under a finely crushed condition: this is especially advantageous when dealing with very moist abrasive materials.
6) Lower running costs due to lower power consumption and maintenance costs.

3. Clinker Cooler

Clinker cooling is needed to manufacture cement for the following reasons.
(1) Proper cooling improves quality of cement.
(2) The recovered heat value of hot clinker is about 200 Kcal/kg clinker, which is one of the important factors to reduce the manufacturing costs.
(3) It is difficult to convey hot clinker.
(4) Hot clinker has a negative effect on the grinding process.
The cooling of the clinker influences its structure, the mineralogical composition, grindability and consequently, final quality of cement as a final product.
Therefore, we must adopt the most suitable cooling method in order to manufacture cement of high quality from the technical and economical points.

There are four types of clinker cooler:
(1) The cooling drum located underneath the rotary kiln. (rotary cooler)
(2) Cooling drums attached to the circumference of the discharge end of rotary kiln. (planetary cooler)
(3) The grate cooler
(4) The shaft cooler
The rotary cooler is of old type and its reclaimed secondary air temperature is so low that the fuel consumption and burning efficiency are bad.
As far as the planetary cooler is concerned, it is difficult to operate and maintain its cooler from the view of structual and mechanical points.
Grate type cooler is adopted as a clinker cooler on the following reasons.
(1) Excellent air quenching effect.
In case of the rotary and planetary cooler, cooling is predominantly performed by transverse air current. In case of grate type cooler, however, cooling is performed by a combination of cross-current and counter-current air.
(2) Improvement of the quality of cement
This type cooler enables rapid initial cooling of the clinker, a feature is of great importance for the formation of tricalcium silicate.
The application of excess cooling air results in cooling the clinker down to 60 –

100°C, and this temperature allows the clinker to be ground immediately into cement.

(3) Good heat exchange between hot clinker and cooling air
In this cooler, the clinker temperature can be about 1,350 – 1,450°C, resulting in increase of the thermal efficiency up to 60 – 70%.

(4) Complete control of secondary air and the clinker temperature.

(5) Low heat loss by radiation and convection.

4-2 Specification of main machinery, equipment and facilities

The following are the specifications of main machinery and equipment, electrical and instrumentation, and building and civil works of the plant for three production levels.

(1) Main Machinery and Equipment

Specification of Main Machinery and Equipment	Case of Plant		
	1,500 t.cl./d	2,000 t.cl./d	2,500 t.cl./d
1. Limestone preblending storage			
Type of storage: Longitudinal stock pile with tripper conveyor sheltered type			
Capacity: Wet basis	2x10,000T	2x13,000T	2x16,000T
Size of stock pile: (m^W x m^L x m^H)	19x104x7.4	20x125x7.8	22x124x8.6
Q'ty:	2 sets	2 sets	2 sets
2. Tripper conveyor			
Service: For piling in the shed			
Type: Belt conveyor with tripper			
Capacity: Wet basis	350 t/h	460 t/h	580 t/h
Length: Center to center distance	240 m	280 m	280 m
Q'ty:	1 set	1 set	1 set
3. Reclaimer			
Service: For reclaiming and transporting			
Type: Bridge scraper			
Capacity: Wet basis	140 t/h	190 t/h	230 t/h
Length of scraper:	23 m	24 m	23 m
Travelling length:	220 m	260 m	260 m
Rail span:	22 m	23 m	25 m
Q'ty:	1 set	1 set	1 set

Specification of Main Machinery and Equipment	Case of Plant		
	1,500 t.cl./d	2,000 t.cl./d	2,500 t.cl./d
4. Clay/silica source storage			
Type of storage: Longitudinal/conical stock pile with tripper conveyor Sheltered type			
Capacity: Wet basis			
Clay	5,000T	6,500T	8,500T
Silica source	300T	350T	400T
Size of stock pile: (m^W x m^L x m^H)			
Clay (longitudinal)	15x83x5.9	18x88x7.0	19x102x7.4
Silica source (conical)	1x13mϕ x2.8m^H	1x13.5mϕ x5.3m^H	1x14mϕ x5.5m^H
Q'ty:	1 set	1 set	1 set
5. Tripper conveyor			
Service: For piling clay/silica source to the shed			
Type: Belt conveyor with tripper			
Capacity: Wet basis	90 t/h	120 t/h	150 t/h
Length: Center to center distance	110 m	120 m	130 m
Q'ty:	1 set	1 set	1 set
6. Wheel loader			
Service: For feeding clay/silica source to the hoppers (also iron source, coal and gypsum to be used.)			
Type: Tractor shovel type			
Bucket capacity: 1.5 m^3			
Drive system: Four-wheel drive	1 set	1 set	2 sets
7. Iron source storage			
Type of storage: Sheltered type			
Capacity: Wet basis	400T	500T	700T
Size of stock pile: (m^W x m^L x m^H)	9x18x2.8	10x18x2.8	12x18x2.8
Q'ty:	1 set	1 set	1 set
8. Raw mill			
Service: For grinding raw materials			
Type: Vertical roller mill			
Capacity: Dry basis	120 t/h	160 t/h	200 t/h
Fineness: Less than 14% residue on 200 mesh			
Roller diameter:	1,400 mm	1,500 mm	1,700 mm
Table diameter:	2,800 mm	3,000 mm	3,400 mm
Motor (main)	1,200 kW	1,400 kW	1,900 kW
Q'ty:	1 set	1 set	1 set

Specification of Main Machinery and Equipment	Case of Plant		
	1,500 t.cl./d	2,000 t.cl./d	2,500 t.cl./d
9. Conditioning tower			
Service: In case of emergency for conditioning of exhaust gas from suspension preheater			
Type: Vertical cylindrical type			
Size: (m^{ϕ} x m^{H})	5.4x17.5	5.9x19.5	6.4x20.7
Gas volume:	2,100 Nm^3/min.	2,700 Nm^3/min.	3,400 Nm^3/min.
Gas temperature: Inlet	350°C	350°C	350°C
Outlet (design basis)	150°C	150°C	150°C
Spray water:	18 t/h	25 t/h	30 t/h
Q'ty:	1 set	1 set	1 set
10. Raw meal blending silo			
Service: For blending of raw meal			
Type: Reinforced concrete construction Double deck type			
Effective capacity:	1,100T	1,600T	1,900T
Size: Inside diameter ($m\phi$)	12.0	13.5	14.0
Effective height (m^{H})	12.0	13.5	14.0
11. Raw meal storage silo			
Service: For storage of raw meal			
Type: Reinforced concrete construction One is built under the raw meal blending silo, the other is a separate silo.			
Capacity: Total	6,600T	9,500T	11,000T
Size: Inside diameter (m^{ϕ}) x effective height (m^{H})			
Double deck	12x16	13.5x18.5	14.0x21.0
Separate silo	12x34	13.5x38	14.0x41.0
Q'ty:	2	2	2
12. Suspension preheater			
Service: For preheating raw meal			
Type: Four stages cyclone preheater			
Capacity:	1,500 t/d	2,000 t/d	2,500 t/d
13. Suspension preheater fan			
Service: For inducing exhaust gas from suspension preheater			
Type: Double suction type			
Capacity:	4,000 m^3/min.	5,400 m^3/min.	6,700 m^3/min.

Specification of Main Machinery and Equipment	Case of Plant		
	1,500 t.cl./d	2,000 t.cl./d	2,500 t.cl./d
Pressure:	450 mmAq	480 mmAq	510 mmAq
Motor: WIM, Direct drive for fan	500 kW	700 kW	950 kW
14. Rotary kiln			
Service: For clinker burning			
Type: Dry short kiln with suspension preheater			
Capacity:	1,500 t/d	2,000 t/d	2,500 t/d
Shell size: Inner diameter (m^{ϕ})	4.3	4.7	5.1
Overall length (m^{L})	68	76	81
Number of supports:	3	3	3
Motor:	250 kW	300 kW	380 kW
15. Clinker cooler			
Service: For cooling of clinker			
Type: Horizontal greate cooler			
Capacity:	1,500 t/d	2,000 t/d	2,500 t/d
Clinker temperature: 70°C plus ambient temperature			
Grate area:	48 m^2	64 m^2	80 m^2
No. of compartment:	5	6	7
16. Electrostatic precipitator			
Service: For dedusting of exhaust gas of raw mill and SP exhaust gas			
Type: Horizontal gas flow			
Gas volume: Max.	4,300 m^3/min.	5,500 m^3/min.	7,000 m^3/min.
Temperature: Nor. 100 ~ 150°C			
Dust content: Inlet 70 g/Nm^3			
Outlet 0.1 g/Nm^3			
17. Electrostatic precipitator			
Service: For dedusting of exhaust gas from clinker cooler			
Type: Horizontal gas flow			
Gas volume: Max.	1,700 m^3/min.	2,200 m^3/min.	2,700 m^3/min.
Temperature:	250°C	250°C	250°C
Dust content: Inlet 20 g/Nm^3			
Outlet 0.1 g/Nm^3			
18. Clinker silo			
Type: Concrete structure			
Capacity:	15,000T	20,000T	2x12,500T

Specification of Main Machinery and Equipment	Case of Plant		
	1,500 t.cl./d	2,000 t.cl./d	2,500 t.cl./d
Size: (m^{ϕ} x m^{H})	22x40	25x39	20x38
Q'ty:	1 set	1 set	2 sets
19. Coal storage			
Type: Sheltered type			
Capacity:	3,000T	3,000T	3,000T
Size of stock pile: (m^{W} x m^{L} x m^{H})	30x55x3.0	30x55x3.0	30x55x3.0
Q'ty:	1 set	1 set	1 set
20. Gypsum storage			
Type: Sheltered type			
Capacity:	3,000T	3,000T	3,000T
Size of stock pile: (m^{W} x m^{L} x m^{H})	20x45x3.0	20x45x3.0	20x45x3.0
Q'ty:	1 set	1 set	1 set
21. Coal mill			
Service: For grinding coal			
Type: Vertical roller mill			
Capacity: Dry basis	10 t/h	13 t/h	17 t/h
Fineness: Less than 15% residue on 75 micron sieve			
Roller diameter:	850 mm	950 mm	1,060 mm
Table diameter:	1,200 mm	1,300 mm	1,400 mm
Motor (main):	90 kW	120 kW	160 kW
Q'ty:	1 set	1 set	1 set
22. Cement mill			
Service: For grinding clinker and gypsum			
Type: Closed circuit, 2-compartment compound mill with cyclone air separator			
Capacity: Dry basis	90 t/h	120 t/h	2x75 t/h
Feed size: Under 30 mm			
Size: Inside diameter (m^{ϕ})	4.1	4.5	3.9
Overall length (m^{L})	12.2	13.0	11.5
Fineness: Mean 2,800 Blaine			
Q'ty:	1 set	1 set	2 sets
Motor: Rated power (kw)	2,700	3,600	2x2,250
23. Cement Silo			
Service: For storage of cement			
Type: Concrete structure			
Capacity:	7,500T	11,000T	13,000T
Size: (m^{ϕ} x m^{H})	17x39	19x39	20x41
Q'ty:	1 set	1 set	1 set

Specification of Main Machinery and Equipment	Case of Plant		
	1,500 t.cl./d	2,000 t.cl./d	2,500 t.cl./d
24. Packer Service: For filling of cement to cement sack Type: Rotary packer Capacity: Max. 100 t/h each set (at 50 kg sack) Accuracy: ±1/200 No. of spout : 8 Spouts Q'ty:	2 sets	3 sets	4 sets

2. Electrical and Instrumentation

(1) Receiving switchgear	Outdoor, metal-enclosed self-standing type Voltage: 33KV, 50Hz, 3 phase Main equipment: (1) Circuit breaker (2) Lightning arrestor (3) Current transformer (4) Potential transformer (5) Protective relays and meters (6) Supply meter
(2) Receiving transformer	Outdoor, oil-immersed and self-cooled type Rated voltage: 33,000/6,000V Tap voltage: No-load tap changer 34,500, 31,500, 30,000V
(3) 6KV switchgear	Indoor, metal-enclosed and self-standing type, multiunit per cabinet Main equipment: (1) Circuit breaker and/or high tension air-break electromagnetic (2) Current transformer (3) Protective relays and meters
(4) Transformer	Indoor, oil-immersed and self-cooled type Rated voltage: 6,000/380V Tap voltage: No-load tap changer, 5 nos of 2.5% tap voltage
(5) Power capacitor	Indoor, oil-immersed and self-cooled type Voltage: 6,000V Accessories: Discharge coil, series reactor
(6) Bus duct	Metal-clad type
(7) Battery and charger	Indoor, alkaline battery Input: 380V Charger: Metal-enclosed, self-cooled and self-standing type 3 phase bridge rectifier

(8) Supervisory panel	Indoor, metal-enclosed and self-standing type The panel has mimic of power distribution, control switches, meters and annunciators
(9) Motor control center	Indoor, metal-clad, self-standing type Multi unit per cabinet Rated: 380V, 3 phase, 4 wires, 50Hz
(10) Local control box	Outdoor, self-standing and/or wall-hanging type
(11) Maintenance box	Indoor, wall-hanging type
(12) Lighting switch box	Indoor, wall-hanging type
(13) Motor	
(1) Direct current motor	Totally enclosed fan-cooled type DC motor with SCR controller. For kiln, clinker cooler
(2) Variable speed motor	Totally enclosed fan-cooled type cage rotor induction motor with eddy-current coupling controlled by SCR controller. For constant feed weigher and other feeders. 380V, 3 phase, 50Hz
(3) Induction motor	Totally-enclosed fan-cooled type and/or drip-proof type induction motor (1) Wound rotor type with liquid speed controller 380V, 3 phase, 50Hz For separator, preheater fan (2) Wound rotor type with starting resistor 6,000V, 380V, 3 phase, 50Hz For raw mill, coal mill (3) Cage rotor type 6,000V, 380V, 3 phase, 50Hz For fan, pump, blower, etc.
(4) Geared motor	Totally-enclosed fan-cooled, cage rotor type induction motor with gear 380V, 3 phase, 50Hz For conveyor, bucket elevator, flow conveyor, etc.
(14) Lighting fixture	Outdoor and/or indoor Mercury vapor lamp Fluorescent lamp Voltage: 220V, 50Hz
(15) Control panel and control desk	For process control, including control switches, lamps, meters instruments, annunciators, etc.
(16) Instrument	The following instruments are mounted and have the functions such as alarming, controlling, indicating, integrating and/or recording Measurement item 1) Weight 2) Differential pressure 3) Watt 4) Ampere 5) Flow

6) Level
7) Temperature
8) Pressure
9) Revolution
10) Component

(17) Cable
6,600V, 600V cross-linked polyethylene insulated, PVC seathed cable.
600V PVC insulated, PVC seathed control cable.

3. Building and Civil Works

The building and civil works to be required for construction of this project are as follow:

(1) Limestone Preblending Shed
Structure: 1-storied steel framed on reinforced concrete foundation
Appurtenant works: Overhead conveyor girder
Reclaimer foundation

(2) Raw Materials Storage Shed
Application: Storaging for clay, silica source and iron source
Structure: 1-storied steel framed on reinforced concrete foundation
Appurtenant works: Steel stairway and handrail
Overhead conveyor girder
Extraction equipment foundation

(3) Raw mill house
Structure: 3-storied steel framed on reinforced concrete foundation
Appurtenant works: Mill foundation
Motor foundation
Overhead crane girder
Fan foundation
Cyclone foundation
Steel stairway and handrail

(4) Raw Meal Blending and Storage Silo
Structure: Substructure
Reinforced concrete structure
Superstructure
Reinforced concrete and all welded steel plate structure
Appurtenant works: Machine foundation
Stairway, handrail and walkway

(5) Coal Storage Shed
Structure: 1-storied steel framed on reinforced concrete foundation
Appurtenant works: Receiving hopper
Extraction equipment foundation

(6) Coal Mill Building
Structure: 2-storied steel framed on reinforced concrete foundation
Appurtenant: Mill foundation
Steel stairway and handrail

(7) Burner Platform (including clinker cooler room)
Structure: 2-storied steel framed on reinforced concrete
Appurtenant: Cooler pit of reinforced concrete at the basement
Stairway and handrail

(8) Clinker Silo

Structure:	Substructure
	Reinforced concrete structure
	Superstructure
	All welded steel plate structure
Appurtenant works:	Stairway, handrail and walkway.

(9) Gypsum Storage

Structure:	1-storied steel framed on reinforced concrete foundation
Appurtenant works:	Receiving hopper
	Extraction equipment foundation

(10) Cement Mill Building

Structure:	3-storied steel framed on reinforced concrete foundation
Appurtenant works:	Mill foundation
	Motor foundation
	Fan foundation
	Cyclone foundation
	Steel stairway and handrail

(11) Cement Packing House

Structure:	2-storied and partially 3-storied steel framed on reinforced concrete foundation
Appurtenant works:	Packer foundation
	other machinery foundation
	Steel stairway and handrail

(12) Other Building
- (a) Office
- (b) Workshop
- (c) Laboratory
- (d) Warehouse
- (e) Substation
- (f) Truck weigh bridge house
- (g) Gate house
- (h) Toilet blocks

(13) Pavement

(14) Drainage system

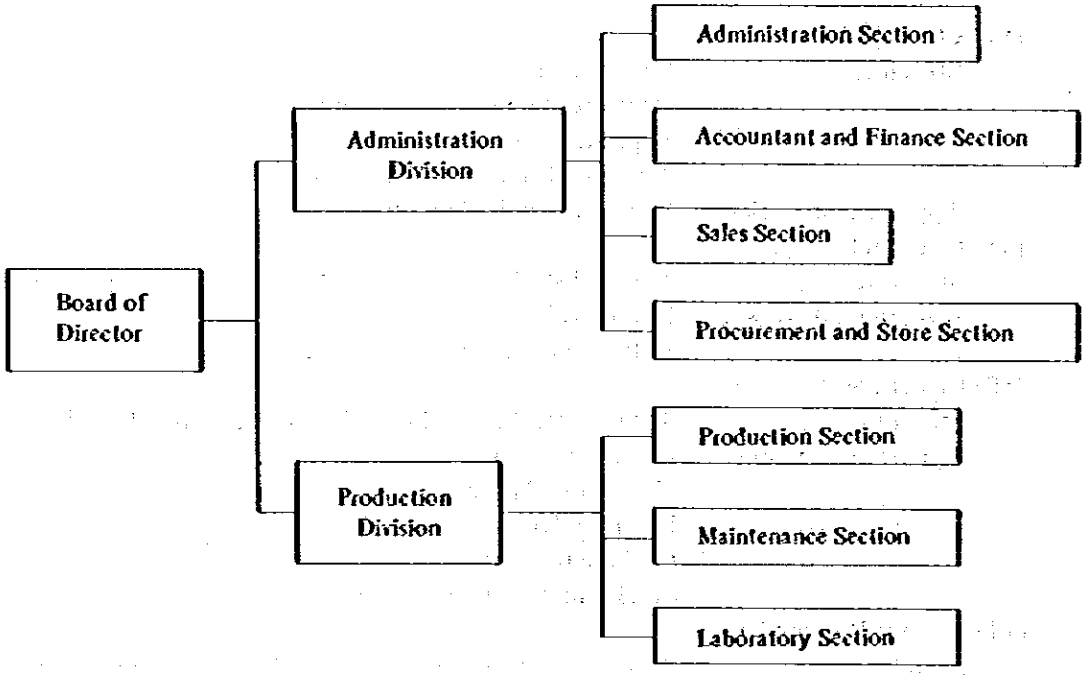
(15) Cable duct

(16) Gate and Fence

4-3 Organization and personnel requirements

(1) Organization

The outline of organization is shown as follows:



(2) Personnel Requirements

The personnel requirements for the plant is estimated 308 for all cases.
Break down of labour requirement and cost is shown in Table V-7-1.
The labour cost for Gua Musang and Jeli is set at 1.2 times that of Tanah Merah because of the social conditions at the plant site.

Table 4-1 Labour Cost Breakdown for Tanah Merah

Production

Item	No. of Person	Unit cost M$/Man, Month	Annual cost M$/Year
Technical Manager	1	7,500	90,000
Assistant T.M.	2	6,000	144,000
Electrical Engineer	3	3,500	126,000
Mechanical Engineer	3	3,500	126,000
Chemical Engineer	1	3,500	42,000
Assistant Chemist	2	2,500	60,000
Master Burner	1	5,000	60,000
Supervisors	18	1,200	259,200
Skilled workers	60	800	576,000
Semi-skilled workers	75	600	540,000
Unskilled workers	90	400	432,000
Quarry Engineer	1	3,500	42,000
Assistant Q.E	2	2,500	60,000
Clerks	9	500	54,000
Sub-total	268		2,611,200

Administration

General Manager	1	6,000	72,000
Company Secretary	1	3,500	42,000
Sales Manager	1	5,000	60,000
Chief Accountant	1	3,500	42,000
Office management/Personnel	2	2,500	60,000
Administration	8	800	76,800
Accountants	9	600	64,800
Sales & Purchase	5	800	48,000
Clerks	12	500	72,000
Sub-total	40		537,600
Total	308		3,148,800

4-4 Flow diagram, layout and implementation schedule

1. General flow diagram
   Refer to Fig. 4-1 General flow diagram which covers in all cases for main machinery and equipment.

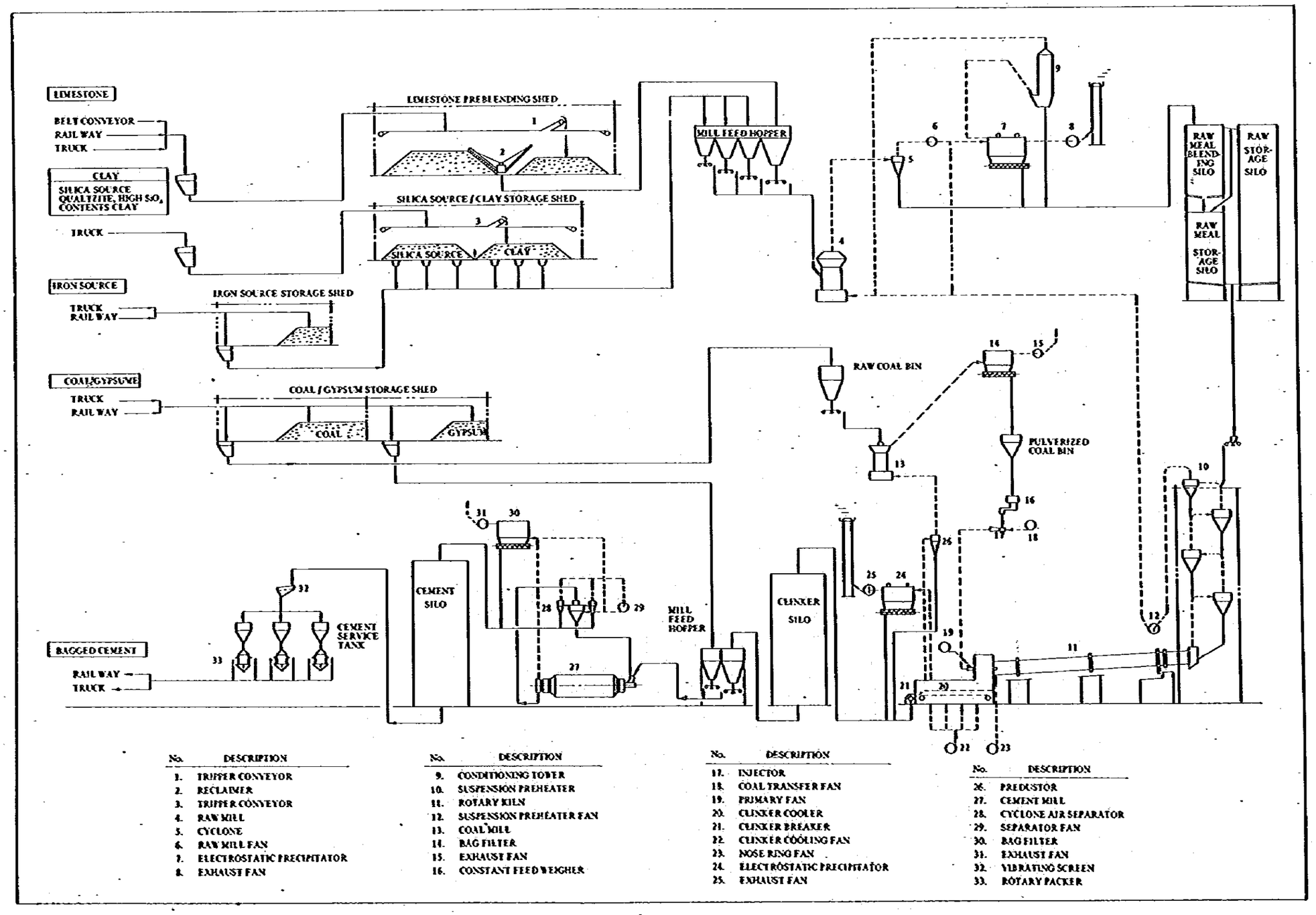
2. Layout
   Refer to Fig. 4-2, typical layout of coment plant is shown at 2,000 t-cl/d.
   The layout for the case of 2,000 t-cl/d can be applied to the case of 1,500 t-cl/d and 2,500 t-cl/d except the dimensions of the plant site.
   Necessary size and area of the plant site are approximately estimated as follows:

Capacity	Size	Area
1,500 t-cl/d	320 m x 500 m	160,000 m²
2,000 t-cl/d	360 m x 550 m	198,000 m²
2,500 t-cl/d	400 m x 550 m	220,000 m²

   The plant layout varies from site to site depending on the method of raw material receiving, and cement shipping, and the local conditions.
   Plant layout will be studied in detail for the selected case in the final report.

3. Implementation schedule
   Refer to Fig. 4-3, schedule sheet for plant construction covers all cases.
   The schedule is based on the assumption that the project will be implemented smoothly.

Fig. 4-1 General Flow Diagram



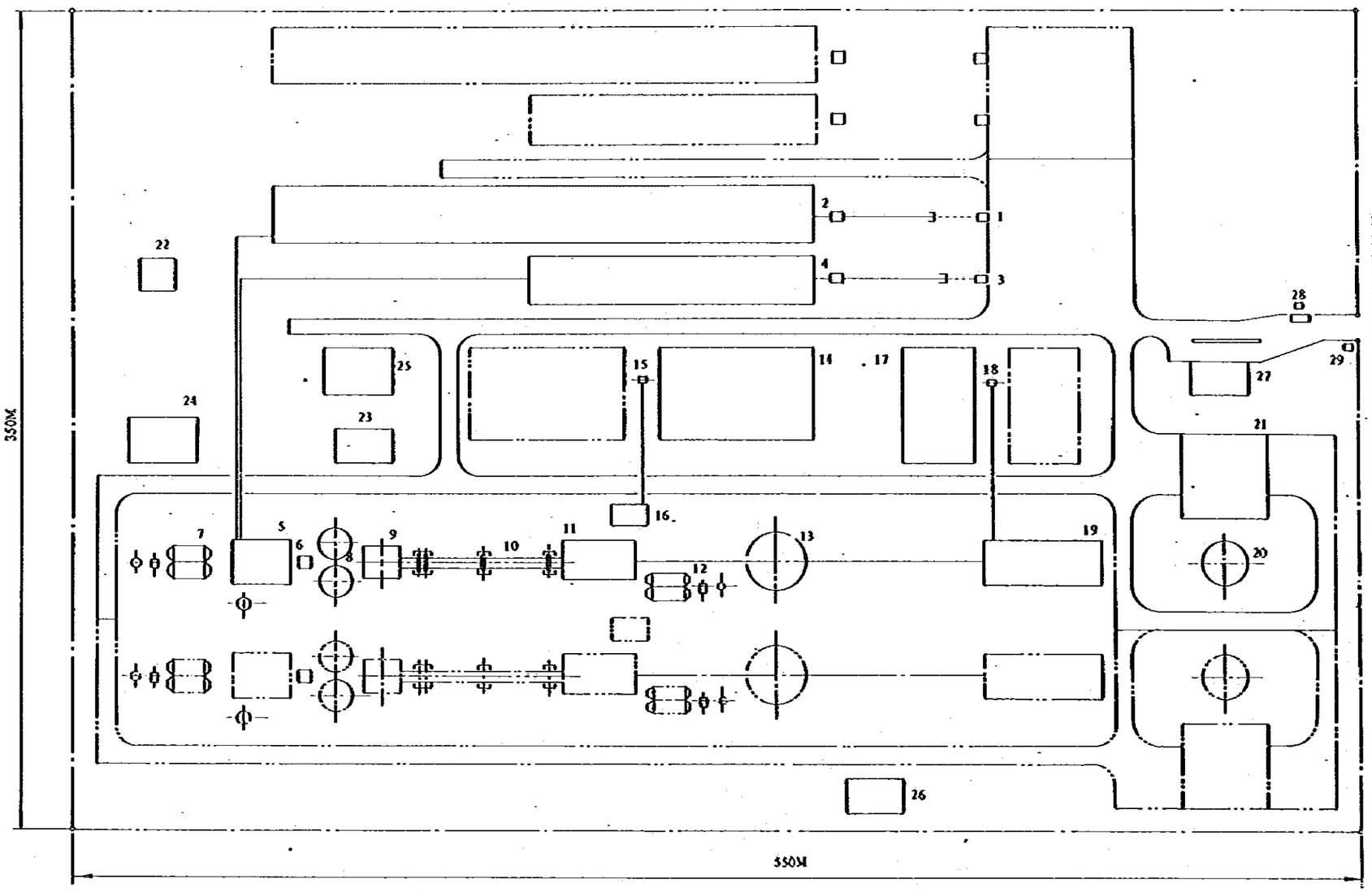
No.	DESCRIPTION
1.	TRIPPER CONVEYOR
2.	RECLAIMER
3.	TRIPPER CONVEYOR
4.	RAW MILL
5.	CYCLONE
6.	RAW MILL FAN
7.	ELECTROSTATIC PRECIPITATOR
8.	EXHAUST FAN

No.	DESCRIPTION
9.	CONDITIONING TOWER
10.	SUSPENSION PREHEATER
11.	ROTARY KILN
12.	SUSPENSION PREHEATER FAN
13.	COAL MILL
14.	BAG FILTER
15.	EXHAUST FAN
16.	CONSTANT FEED WEIGHER

No.	DESCRIPTION
17.	INJECTOR
18.	COAL TRANSFER FAN
19.	PRIMARY FAN
20.	CLINKER COOLER
21.	CLINKER BREAKER
22.	CLINKER COOLING FAN
23.	NOSE RING FAN
24.	ELECTROSTATIC PRECIPITATOR
25.	EXHAUST FAN

No.	DESCRIPTION
26.	PREHEATOR
27.	CEMENT MILL
28.	CYCLONE AIR SEPARATOR
29.	SEPARATOR FAN
30.	BAG FILTER
31.	EXHAUST FAN
32.	VIBRATING SCREEN
33.	ROTARY PACKER

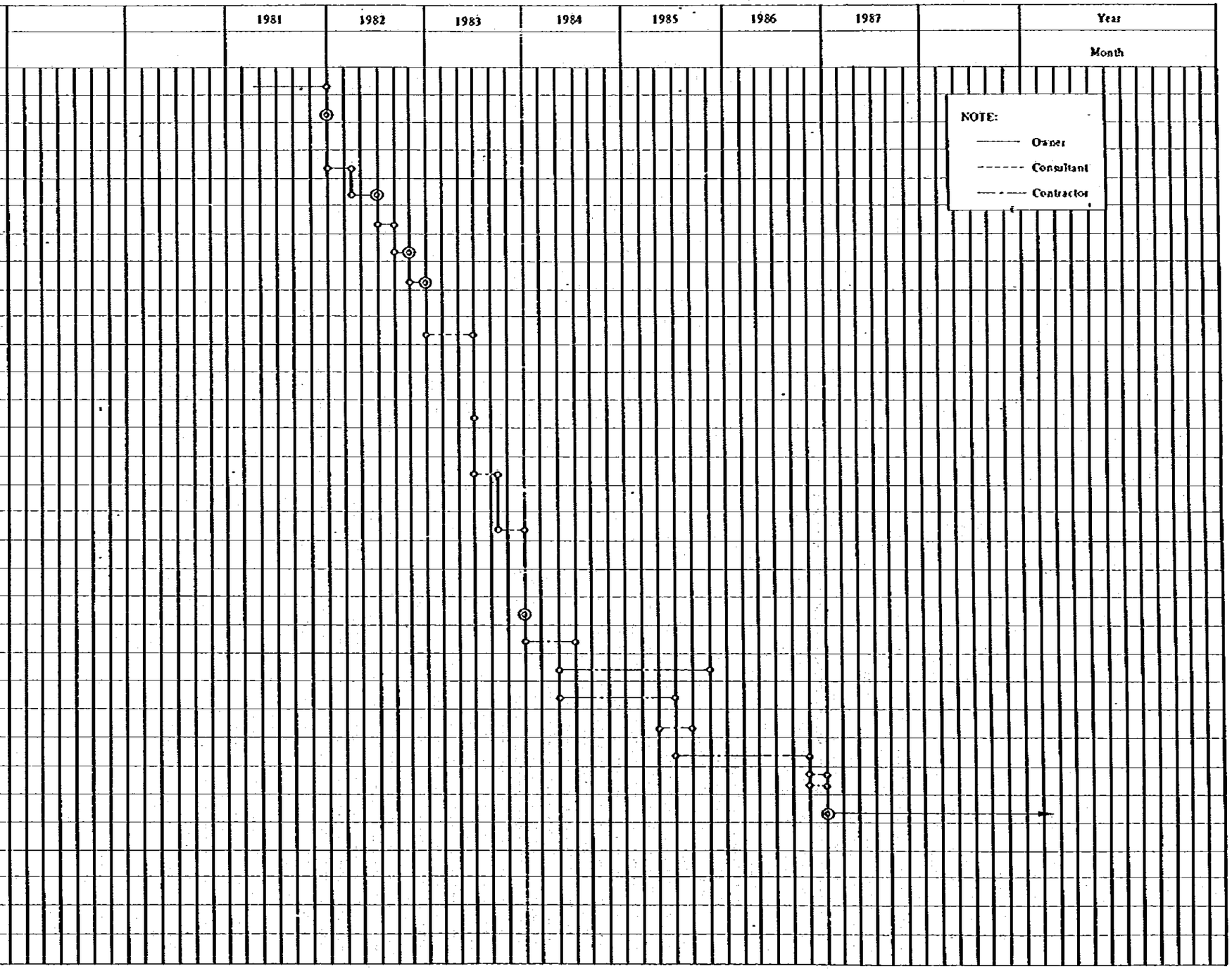
Fig. 4-2 Typical Layout of Cement Plant



1. LIMESTONE RECEPTION HOPPER
2. LIMESTONE PREBLENDING SHED
3. CLAY, SILICA SOURCE AND IRON SOURCE RECEPTION HOPPER
4. CLAY, SILICA SOURCE AND IRON SOURCE STORAGE SHED
5. RAW MILL
6. CYCLONE
7. ELECTROSTATIC PRECIPITATOR-ROTARY KILN/RAW MILL
8. BLENDING AND STORAGE SILO
9. SUSPENSION PREHEATER
10. ROTARY KILN
11. BURNER PLATFORM/CLINKER COOLER
12. ELECTROSTATIC PRECIPITATOR-CLINKER COOLER
13. CLINKER SILO
14. COAL STORAGE SHED
15. COAL HOPPER
16. COAL MILL
17. GYPSUM STORAGE SHED
18. GYPSUM HOPPER
19. CEMENT MILL
20. CEMENT SILO
21. PACKER AND BAGGED CEMENT LOADING
22. SUBSTATION
23. CENTER CONTROL ROOM
24. REPAIR SHOP
25. WAREHOUSE
26. WATER RESERVOIR
27. OFFICE
28. TRUCK WEIGHBRIDGE
29. GATEHOUSE

Fig. 4-3 Schedule Sheet for Plant Construction

No.	ITEM
1	Preparation of F/S
2	Submission of F/S
3	Review and Approval of F/S
4	Decision of the Project
5	Arranging of Equity Capital
6	Arranging of Finance, Forming of Company
7	Selection of Consultant
8	Preparation of Tender Specification
	(incl. evaluation/recommendation of
	design base, plant and process)
9	Tender Document Issuance
10	Preparation of Proposal
11	Evaluation and Selection of Successful
	Bidder (incl. negotiation)
12	Contract of Plant Construction
13	Basic/Detailed Engineering
14	Civil Works
15	Manufacturing
16	Shipping
17	Erection
18	Commissioning
19	Commercial Operation



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5. Capital Requirements and Financing Plan

5-1 Capital requirements

(1) General

Based on the plant layout and the process flowsheets as described in 4, the total capital requirements for the Project have been estimated. The following conditions have been assumed as the bases for the estimation:

a) Basis of prices:
   1981 constant prices

b) Exchange rate:
   Japanese yen – ¥1 = M$0.01
   U. S. dollars – US$1 = M$2.20

c) Import duty:
   Assumed to be exempted

(2) Project Capital Requirements

As stated in 2-3 the Project has been studied in nine cases of different plant capacity and locations. The total capital requirements for each case, of which breakdown is shown in Table 5-1, are as follows:

Total Capital Requirements (M$'000)

Plant Capacity	Tanah Merah	Gua Musang	Jeli
500,000 ton/year	(Case 1) 202,662	(Case 2) 209,958	(Case 3) 209,440
666,000 ton/year	(Case 4) 242,955	(Case 5) 253,307	(Case 6) 249,265
833,000 ton/year	(Case 7) 275,380	(Case 8) 286,855	(Case 9) 280,647

(Interest rate: 8% p.a.)

In Gua Musang and Jeli, the capital expenditure will necessarily be greater than in Tanah Merah because of higher costs of civil engineering and construction due in part to limited availability of labor force which necessitates importation of workers from other states and in part to the less-developed infrastructure which means added costs for the development of infrastructure, and because of lack of supporting industries.

(3) Assumption for Capital Cost Estimation

Basic assumptions reflected in the estimation are as follows.

a) Machinery and Equipment
   The cost of machinery and equipment covers main machinery, electric and instrumentation equipment and auxiliary equipment except mining equipment.

b) Erection, Building and Structures
   The cost of civil and erection works has been estimated by taking account of the

Table 5-1 Estimated Capital Requirements (1981 Prices)

(M$'000)

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
Plant Capacity	500,000 ton/year			666,000 ton/year			833,000 ton/year		
Location	Tanah Merah	Gua Musang	Jeli	Tanah Merah	Gua Musang	Jeli	Tanah Merah	Gua Musang	Jeli
Plant Cost									
Machinery and Equipment	81,400	81,400	81,400	96,800	96,800	96,800	111,100	111,100	111,100
Erection Cost	26,400	30,600	29,000	31,900	38,300	35,100	36,300	43,600	39,900
Building and Structure	35,200	42,200	38,700	41,800	50,200	46,000	47,300	56,800	52,000
Sub-total	143,000	154,200	149,100	170,500	185,300	177,900	194,700	211,500	203,000
Others									
Railway Siding	8,364	3,936	–	9,840	4,625	–	11,316	5,215	–
Road	–	–	7,000	–	–	7,000	–	–	7,000
Land Premium	7,586	6,327	8,205	9,168	7,754	9,415	10,265	8,677	10,080
Store and Spares	4,884	4,884	4,884	5,808	5,808	5,808	6,666	6,666	6,666
Sub-total	20,834	15,147	20,089	24,816	18,187	22,223	28,247	20,558	23,746
Total Construction Cost	163,834	169,347	169,189	195,316	203,487	200,123	222,947	232,058	226,746
Pre-Operating Expenses	8,130	8,684	8,562	9,331	9,949	9,771	10,438	11,053	10,851
Initial Working Capital	14,535	14,683	14,678	19,101	19,263	19,253	20,053	20,209	20,187
Total Project Cost	186,499	192,714	192,429	223,748	232,699	229,147	253,438	263,320	257,784
Interest During Construction (Interest Rate: 8% p.a.)	16,163	17,244	17,011	19,207	20,608	20,118	21,942	23,535	22,863
Total Capital Requirements	202,662	209,958	209,440	242,955	253,307	249,265	275,380	286,855	280,647

infrastructure and labor conditions in each of plant area.

c) Railway Siding, Road
The costs of railway siding and road have been estimated based on the information from Malayan Railway and J.K.R., respectively.

d) Land Premium
The cost of land premium has been set at M$3.00/s.q. feet in Tanah Merah and Gua Musang and M$2.50/s.q. feet in Jeli on the assumption that the land levelling including drainage system would be completed ready for plant construction and electricity, water and telephone line shall be delivered to the boundary of the plant site.

e) Store and Spares
It is assumed that an initial store and spares needed for operation for two years will be procured at the same time as the plant equipment. On the basis of this assumption, the cost to be procured initially is estimated at 6% of the cost of machinery and equipment.

f) Pre-Operating Expenses, Initial Working Capital
The break-down of pre-operating expenses and initial working capital are shown in Table V-8-2.

5-2 Financing plan

30% of the capital requirements for the Project will be financed by the equity capital and the remaining 70% by loans.
The paid-up schedule of the equity capital has been assumed to be as follows:

1984	30%
1985	40%
1986	30%
Total	100%

Regarding the loans, working capital will be financed by short term loan and the remaining from long term loans.
Since the source of financing for the Project has not yet been determined, the terms of financing are not known. In this report the terms and conditions used as the basis of financial planing are the interest rate on loans of 8% p.a., and repayment in 11 years (including a three-years grace period). Further studies using different interest rates of 5% p.a. and 10% p.a. are shown in sensitibity analysis.
The interest rate of short term loan is assumed to be 10% p.a..
The results of financing planing are shown in Table 5-3.

Table 5-2 Pre-Operating Expenses & Initial Working Capital (1981 Prices)

(MS'000)

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
Plant Capacity	500,000 ton/year			666,000 ton/year			833,000 ton/year		
Location	Tanah Merah	Gua Musang	Jeli	Tanah Merah	Gua Musang	Jeli	Tanah Merah	Gua Musang	Jeli
Pre-Operating Expenses									
Consultant fee (3% of Plant Cost)	4,290	4,626	4,473	5,115	5,559	5,337	5,841	6,345	6,090
Land rent fee (3 years)	66	59	79	79	71	92	89	80	100
Labor cost (6 months)	1,575	1,890	1,890	1,575	1,890	1,890	1,575	1,890	1,890
Loses during test operation (1/3 month of variable cost and consumables)	1,199	1,104	1,120	1,562	1,429	1,452	1,933	1,738	1,771
Miscellaneous	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total	8,130	8,684	8,562	9,331	9,949	9,771	10,438	11,053	10,851
Initial Working Capital									
Accounts receivable (2 months)	10,733	10,733	10,733	14,291	14,291	14,291	14,976	14,976	14,976
Inventory									
Products (half month)	1,862	1,840	1,844	2,311	2,257	2,263	2,473	2,393	2,398
Raw Materials, Coal (half month)	623	536	546	812	683	703	851	692	715
Accounts payable (Less) (one month of raw materials)	539	380	341	706	467	430	764	465	434
Minimum cash requirements (half month of production cost except depreciation, interest)	1,856	1,954	1,895	2,393	2,499	2,427	2,518	2,613	2,532
Total	14,535	14,683	14,678	19,101	19,263	19,253	20,053	20,209	20,187

Table 5-3 Tentative Financing Plan (1981 Prices)

(M$'000)

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
Plant Capacity	500,000 ton/year			666,000 ton/year			833,000 ton/year		
Location	Tanah Merah	Gua Musang	Jeli	Tanah Merah	Gua Musang	Jeli	Tanah Merah	Gua Musang	Jeli
Total Financing Required									
Equity (30%)	60,799	62,987	62,832	72,887	75,992	74,780	82,614	86,057	84,194
Debt (70%)	141,863	146,971	146,608	170,068	177,315	174,485	192,766	200,798	196,453
(Long term loan	(127,328	(132,288	(131,930	(150,967	(158,052	(155,232	(172,713	(180,589	(176,266
\Short term loan	\ 14,535	\ 14,683	\ 14,678	\ 19,101	\ 19,263	\ 19,253	\ 20,053	\ 20,209	\ 20,187
	202,662	209,958	209,440	242,955	253,307	249,265	275,380	286,855	280,647
Paid-in-Capital									
1984	18,240	18,896	18,850	21,866	22,798	22,434	24,784	25,817	25,258
1985	24,319	25,195	25,132	29,154	30,396	29,912	33,046	34,423	33,678
1986	18,240	18,896	18,850	21,867	22,798	22,434	24,784	25,817	25,258
Equity	60,799	62,987	62,832	72,887	75,992	74,780	82,614	86,057	84,194
Loan Disbursement									
Long term loan									
1984 (at Beginning)	20,830	23,145	23,111	24,786	27,655	27,153	28,096	31,383	30,415
1985 (at Middle)	86,298	91,540	88,900	102,635	109,441	105,980	117,675	125,437	121,620
1986 (at Middle)	20,200	17,603	19,919	23,546	20,956	22,099	26,942	23,769	24,231
Short term loan									
1987 (at Beginning)	14,535	14,683	14,678	19,101	19,263	19,253	20,053	20,209	20,187
Debt	141,863	146,971	146,608	170,068	177,315	174,485	192,766	200,798	196,453

6. Financial Analysis

6-1 Main assumptions for cost estimation and financial projections

(1) General

The production cost estimates and the financial projections in this report are based on the assumption that commercial operation of the Plant will be started in 1987, and that the Plant has an economic life-span of 15 years after the start up.

These estimates and projections are given at 1981 constant prices.

(2) Production and Sales

Regarding operation of the cement plant, it is reasonable to assume from technical point of view that the rate of net capacity utilization will be 70% for the first year, 90% for the second year and 100% for the subsequent years.

It is assumed that the sales volume of cement will be equivalent to the total demand of Kelantan and Trengganu.

According to the above assumptions, the projections of production and sales of products are given in Table 6-1.

It is assumed that the sales price of cement will be M$192/ton.

(3) Taxation

The Project will be given maximum incentives which may be allowed under the tax law and regulations in Malaysia. The following taxation is assumed for the financial projections:

a) Coorporate tax

Coorporate tax will be imposed at a rate of 50% of taxable income, consisting of:

Company tax	40%
Development tax	5%
Excess profit tax	5%
Total	50%

However the Project will be given tax holidays for a period of 7 years after the commencement of commercial operation.

The 7 year tax holiday period is computed as follows:

Pioneer company	5 years
Development area	1 year
Malaysian material content	1 year
Total	7 years

Internal rate of return (IRR) on investment computed without tax holiday is also described in this report.

b) Sales tax, Surtax

Salestax and Surtax are included in the cost of equipment to be imported.

c) Excise duty

Excise duty is computed at M$1.97 per ton of cement.

Table 6-1 Projected Production and Sales

(ton)

	1987	1988	1989	1990	1991	1992	1993	1994 onwards
Demand of Kelantan & Trenggunn	468,000	528,000	597,000	674,000	739,000	804,000	869,000	934,000
Case 1, 2, 3 (Plant Capacity: 500,000 ton/year)								
Production (capacity utilization)	350,000 (70%)	450,000 (90%)	500,000 (100%)	500,000	500,000	500,000	500,000	500,000
Sales	335,417	445,833	497,917	500,000	500,000	500,000	500,000	500,000
Inventory (half month of production)	14,583	18,750	20,833	20,833	20,833	20,833	20,833	20,833
Case 4, 5, 6 (Plant Capacity: 666,000 ton/year)								
Production (capacity utilizaiton)	466,000 (70%)	530,695 (79.7%)	599,883 (90.1%)	666,000 (100%)	666,000	666,000	666,000	666,000
Sales	446,583	528,000	597,000	663,245	666,000	666,000	666,000	666,000
Inventory	19,417	22,112	24,995	27,750	27,750	27,750	27,750	27,750
Case 7, 8, 9 (Plant Capacity: 833,000 ton/year)								
Production (capacity utilization)	488,348 (58.6%)	529,724 (63.6%)	599,925 (72.0%)	677,221 (81.3%)	741,686 (89.0%)	806,709 (96.8%)	833,000 (100%)	833,000
Sales	468,000	528,000	597,000	674,000	739,000	804,000	831,905	833,000
Inventory	20,348	22,072	24,997	28,218	30,904	33,613	34,708	34,708

Table 6-2 Projected Production Cost (1981 Prices)

(Capacity utilization: 100%)

(M$/ton)

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
Plant Capacity	500,000 ton/year			666,000 ton/year			833,000 ton/year		
Location	Tanah Merah	Gua Musang	Jeli	Tanah Merah	Gua Musang	Jeli	Tanah Merah	Gua Musang	Jeli
Variable Cost									
Limestone	14.81	7.64	5.70	14.54	6.74	5.12	15.20	6.14	4.83
Clay	0.98	0.65	0.96	0.99	0.60	0.95	0.96	0.63	0.87
Silica sand	0.05	1.44	1.98	0.05	1.44	1.98	0.05	1.44	1.98
Iron ore	0.29	0.84	0.50	0.24	0.79	0.45	0.21	0.76	0.42
Gypsum	2.36	2.46	2.57	2.36	2.46	2.57	2.36	2.46	2.57
Fuel (coal)	24.24	23.75	25.76	23.64	23.16	25.12	23.04	22.57	24.49
Electric power	24.00	24.00	24.00	23.60	23.60	23.60	23.20	23.20	23.20
Paper bag	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30
Sub-total	75.03	69.08	69.77	73.72	67.09	68.09	73.32	65.50	66.66
Fixed Cost									
Consumables	4.88	4.88	4.88	4.36	4.36	4.36	4.00	4.00	4.00
Maintenance cost	4.88	5.86	5.62	4.36	5.23	5.02	4.00	4.80	4.60
Labor	6.30	7.56	7.56	4.73	5.67	5.67	3.78	4.54	4.54
Overhead	2.20	2.65	2.65	1.65	1.99	1.99	1.32	1.59	1.59
Land cost	0.04	0.04	0.05	0.04	0.04	0.05	0.03	0.03	0.04
Depreciation	18.55	18.98	18.95	16.56	17.10	16.80	15.14	15.60	15.25
Sub-total	36.85	39.97	39.71	31.70	34.39	33.89	28.27	30.56	30.02
Sales Expenses, Others									
Transportation cost	15.30	24.50	20.00	17.20	26.60	22.00	17.30	27.10	22.10
Agent fee	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Excise duty	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97
Amortization (interest during construction)	2.16	2.30	2.27	1.92	2.06	2.01	1.76	1.88	1.83
Sub-total	29.43	38.77	34.24	31.09	40.63	35.98	31.03	40.95	35.90
Interest									
Long term loan (8% p.a.)	19.74	20.50	20.45	17.57	18.39	18.06	16.07	16.80	16.40
Short term loan (10% p.a.)	2.91	2.94	2.94	2.87	2.89	2.89	2.41	2.43	2.42
Sub-total	22.65	23.44	23.39	20.44	21.28	20.95	18.48	19.23	18.82
Total Production Cost	163.96	171.26	167.11	156.95	163.39	158.91	151.10	156.24	151.40

d) Import duties
Assumed to be exempted.

c) Capital allowance
For the computation of taxable income, neither depreciation nor amortization is deductable, but deduction is allowed for initial and annual capital allowance. After the expiration of tax holiday period, the following allowance will be applied.

- Structures and buildings
2% by straight line method. However, 12% of capital allowance can be made since 10% of special capital allowance can be additionally allowed for the initial year only.

- Machinery and equipment, erection cost, railway siding, pre-operating expenses
10% by straight line method. However, 30% of capital allowance can be made since 20% of special capital allowance can be additionally allowed for the initial year only.

6-2 Production cost

(1) General

The break-down of the production cost, based on the method of calculation given below, is shown in Table V-9-2.
The results of computation of production costs are as follows:

Total Production Cost (M$/ton cement)

Plant Capacity	Tanah Merah	Gua Musang	Jeli
500,000 ton/year	(Case 1) 163.96	(Case 2) 171.26	(Case 3) 167.11
666,000 ton/year	(Case 4) 156.95	(Case 5) 163.39	(Case 6) 158.91
833,000 ton/year	(Case 7) 151.10	(Case 8) 156.24	(Case 9) 151.40

(capacity utilization: 100%)

Assuming that the sales price would be at M$192/ton cement, the profit per ton will be M$20.74 to MS40.9. As seen from the above figures, the project will be profitable in case of capacity with 666,000 ton/year and 833,000 ton/year, since the ratio of profit on sales will be higher than 15%. Further study of profitability will be given in V-9-3.

(2) Variable Cost

Regarding the cost of raw materials and fuel, the consumption and the price are calculated in wet base and the loss in process is estimated at 2% for the purpose of cost calculation. Those costs are different according to plant site and capacity as follows:

a) Limestone

		Tanah Merah	Gua Musang	Jeli
Consumption (ton/ton cement)	:	1.247	1.258	1.214

Unit Price (M$/ton) ..... including quarry royalty of M$0.49/ton (M$1.00/cu. yd.)

500,000 ton/year	:	11.88	6.07	4.67
666,000 ton/year	:	11.66	5.36	4.22
833,000 ton/year	:	12.19	4.88	3.98

b) Clay

		Tanah Merah	Gua Musang	Jeli
Consumption (ton/ton cement)	:	0.301	0.215	0.223

Unit Price (M$/ton) ..... including quarry royalty of M$0.62/ton (M$1.00/cu. yd.)

500,000 ton/year	:	3.25	3.02	4.32
666,000 ton/year	:	3.28	2.80	4.24
833,000 ton/year	:	3.18	2.92	3.90

c) Silica Sand (in case of Tana Merah, high silica clay is used)

		Tanah Merah	Gua Musang	Jeli
Consumption (ton/ton cement)	:	0.016	0.057	0.103
Unit Price (M$/ton)	:	3.25	25.24	19.20

Above prices include the quarry royalty of M$/1.31/ton (M$1.50/cu. yd.)

d) Iron Ore

		Tanah Merah	Gua Musang	Jeli
Consumption (ton/ton cement)	:	0.013	0.029	0.028

Unit Price (M$/ton) ..... including quarry royalty of M$0.56/ton (M$1.50/cu. yd.)

500,000 ton/year	:	22.21	28.81	17.93
666,000 ton/year	:	18.65	27.20	16.26
833,000 ton/year	:	16.47	26.07	15.04

e) Gypsum

	Tanah Merah	Gua Musang	Jeli
Consumption (ton/ton cement) :	0.05	0.05	0.05
Unit Price (M$/ton) :	47.20	49.20	51.34

f) Fuel (imported coal from Australia)

	Coal consumption (Heat consumption)
500,000 ton/year :	0.121 ton/ton cement (800 Kcal/kg. clinker)
666,000 ton/year :	0.118 ton/ton cement (780 Kcal/kg. clinker)
833,000 ton/year :	0.115 ton/ton cement (760 Kcal/kg. clinker)

Unit Price	Tanah Merah	Gua Musang	Jeli
C.I.F. price at Port Kelang	M$165.00/ton		
Port charges	10.00		
Sub-total	M$175.00/ton	M$175.00/ton	M$175.00/ton
Inland transportation	25.32	21.24	37.92
Price at plant site	M$200.32/ton	M$196.24/ton	M$212.92/ton

g) Electric Power

	500,000 ton/year	666,000 ton/year	833,000 ton/year
Consumption (KWH/ton cement)	120	118	116

The price including demand charge is estimated at M$0.20/KWH, based on the running charge of M$0.17/KWH and the maximum demand charge of M$12.00/KW month indicated by National Electricity Board.

h) Paper Bag

The cost of paper bag is estimated at M$8.30/ton cement based on the condition that 3 ply bags and 4 ply bags are mixedly used on the following manner:

	3 ply bag	4 ply bag
Price of bag (50 kg) :	M$0.40 (70%)	M$0.45 (30%)

(3) Fixed Cost

a) Consumables

Annual cost of consumables such as fire brick, castables and steel balls are sssumed at 3% of capital cost for machinery and equipment.

b) Maintenance Cost

Annual maintenance costs for the plant are estimated as follows:

Tanah Merah	:	3% of capital cost for machinery and equipment
Gua Musang	:	3.45% of capital cost for machinery and equipment
Jeli	:	3.6% of capital cost for machinery and equipment

c) Labor

In all cases, it is assumed that the number of employees will be 308. Annual labor cost for the plant at Tanah Merah is estimated at M$3,148,800 and those at Gua Musang and Jeli will be 20% higher than that at Tanah Merah. The details of labor cost at Tanah Merah are shown in Table 4-1.

d) Overheads

The overhead costs are estimated at 35% of labor cost.

e) Land Cost

The cost of land rent is estimated as follows:

Plant Site, Railway, Road	:	M$250/acre.
Quarry	:	M$100/acre.

f) Depreciation and Amortization

The following periods of depreciation and amortization will be applied:

Building and structures	:	35 years
Machinery and equipment including erection cost	:	15 years
Railway siding, road	:	15 years
Pre-operating expenses	:	15 years
Interest during construction	:	15 years

(4) Sales Expenses

a) Transportation Cost

The transportation cost should vary with the distance from the plant site to each market. The growth of demand in area near to the plant site will make the cost lower.

The results of computation are shown in Table 6-3.

b) Agent Fee

The sales commission paid to agent is estimated at M$10. per ton of cement.

c) Excise Duty

Excise duty is estimated at M$1.97 per ton of cement.

6-3 Profitability

(1) Financial Rate of Return

Summary of income statement for the period of 15 years after the start of commercial operation is shown in Table 6-4.

The financial rate of return on investment for the Project was assessed in terms of the internal rate of return (IRR).

The IRR computed for each of the nine cases is as shown below:

	IRR before tax	IRR after tax: With 7-year tax holiday	IRR after tax: Without tax holiday
Capacity: 500,000 ton/year			
Case 1 (Tanah Merah)	13.9%	12.6%	9.4%
Case 2 (Gua Musang)	12.2%	11.0%	8.4%
Case 3 (Jeli)	12.9%	11.7%	8.7%
Capacity: 666,000 ton/year			
Case 4 (Tanah Merah)	15.8%	14.3%	10.7%
Case 5 (Gua Musang)	14.1%	12.7%	9.6%
Case 6 (Jeli)	15.1%	13.7%	10.2%
Capacity: 833,000 ton/year			
Case 7 (Tanah Merah)	15.7%	14.1%	10.8%
Case 8 (Gua Musang)	14.4%	12.7%	9.9%
Case 9 (Jeli)	15.4%	13.8%	10.6%

As seen from the above, IRR with tax holiday is higher than IRR without tax holiday by approx. 3%.
A cement plant in Tanah Merah would be the most profitable of three locations even if the plant capacity is changed.

(2) Pay-out Period and Break-even Point
The pay-out period and break-even point computed for each of the nine cases with the 7-year tax holiday are shown below:

	Pay-out Period	Break-even Point: First year	Break-even Point: Average for 15 years
Capacity: 500,000 ton/year			
Case 1 (Tanah Merah)	6.7 years	10.1%	50.4%
Case 2 (Gua Musang)	7.6 years	78.3%	56.7%
Case 3 (Jeli)	7.2 years	74.2%	54.3%
Capacity: 666,000 ton/year			
Case 4 (Tanah Merah)	6.0 years	61.0%	43.3%
Case 5 (Gua Musang)	6.7 years	68.0%	48.4%
Case 6 (Jeli)	6.2 years	63.9%	45.9%
Capacity: 833,000 ton/year			
Case 7 (Tanah Merah)	6.4 years	55.0%	39.3%
Case 8 (Gua Musang)	7.0 years	60.5%	43.4%
Case 9 (Jeli)	6.5 years	56.4%	40.7%

The above result indicates that the break-even point becomes more favourable as capacity becomes larger, and pay-out period becomes shortest in case of plant capacity of 666,000 ton/year.

(3) Sensitivity Analysis

Analysis of sensitivity to changes of interest rate and sales price etc. was made for case 4 (Plant Capacity: 666,000 ton/year, at Tanah Merah) which involves the highest IRR of the nine cases.

a) Interest rate on long term loan

As stated in V-8-2, interest rate is set at 8% p.a. as Base Case. And further, in this section, analysis of sensitivity to changes of interest rate is made as follows:

Interest Rate	5% p.a.	8% p.a.(Base Case)	10% p.a.
Capital Requirements & Financing (M$'000)			
Total Capital Requirements	235,541	242,955	248.041
Equity (30%)	70,662	72,887	74,413
Debt (70%)	164,879	170,068	173,628
Long Term Loan	145.778	150.967	154,527
Short Term Loan	19,101	19,101	19,101
Production Cost	M$149.24/ton	M$156.95/ton	M$162.37/ton
Pay-back Period	5.5 years	6.0 years	6.3 years
Break-even Point			
First year	51.4%	61.0%	67.8%
Average for 15 years	39.9%	43.3%	45.8%

b) Sales price, coal price and investment cost

The sensitivity of the IRR after tax to changes of sales price, coal price and investment cost is shown below:

	IRR after tax
Base Case	
Sale price : M$192/ton Coal price : M$200.32/ton	14.3%
Sales Price	
10% up : M$211.2/ton	18.0%
10% down : M$172.8/ton	10.3%
Coal Price	
10% up : M$220.35/ton	13.7%
10% down : M$180.29/ton	14.7%
Investment Cost	
10% up : 267 Million M$	13.0%
10% down : 219 Million M$	15.9%

Table 6-3 Computed Transportation Cost (1981 Prices)

(MS/ton)

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
Plant Capacity	500,000 ton/year			666,000 ton/year			833,000 ton/year		
Location	Tanah Merah	Gua Musang	Jeli	Tanah Merah	Gua Musang	Jeli	Tanah Merah	Gua Musang	Jeli
1987	15.3	24.5	20.0	17.2	26.6	22.0	17.3	27.1	22.1
1988	15.9	24.8	20.6	17.4	27.1	22.2	17.4	27.1	22.2
1989	15.8	24.7	20.4	17.4	27.2	22.2	17.4	27.2	22.2
1990	15.5	24.9	20.1	17.4	27.1	22.2	17.5	27.3	22.3
1991	15.1	24.1	19.9	16.9	25.9	21.6	17.4	27.2	22.2
1992	14.6	23.0	19.7	15.5	24.3	20.1	17.3	27.0	22.1
1993	14.0	22.0	19.5	15.4	24.5	20.0	17.1	26.5	21.9
1994	13.7	21.7	19.3	15.1	24.1	19.9	16.6	25.3	21.3
1995	13.7	21.9	19.4	14.7	23.3	19.8	15.3	24.1	20.0
1996	13.6	21.9	19.4	14.3	22.6	19.6	15.3	24.3	20.0
1997	13.5	21.7	19.4	13.9	21.8	19.4	15.1	24.2	19.9
1998	13.4	21.5	19.3	13.7	21.7	19.3	14.8	23.5	19.8
1999	13.3	21.4	19.3	13.8	21.8	19.5	14.5	22.9	19.7
2000	13.3	21.4	19.3	13.7	21.9	19.4	14.2	22.3	19.5
2001	13.3	21.4	19.3	13.7	21.9	19.4	14.2	22.3	19.5

Table 6-4 Summary of Income Statement (1981 Prices)

(Million M$)

		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Plant Capacity (500,000 ton/year)																
Sales Revenue		64.4	85.6	95.6	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
Profit																
Case 1 (Tanah Merah)	before tax	-0.6	9.6	15.9	18.5	20.7	22.2	23.8	25.2	26.1	26.2	26.2	26.3	26.3	26.3	26.3
	after tax	-0.6	9.6	15.9	18.5	20.7	22.2	23.8	25.2	15.3	15.3	15.3	15.3	15.3	15.3	15.3
Case 2 (Gua Musang)	before tax	-4.0	5.7	11.5	13.4	16.0	18.8	21.0	22.5	23.4	23.4	23.5	23.6	23.6	23.6	23.6
	after tax	-4.0	5.7	11.5	13.4	16.0	18.8	21.0	22.5	13.9	13.9	13.9	14.0	14.0	14.0	14.0
Case 3 (Jeli)	before tax	-2.4	7.7	13.9	16.4	18.8	20.7	22.1	23.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
	after tax	-2.4	7.7	13.9	16.4	18.8	20.7	22.1	23.5	14.4	14.4	14.4	14.5	14.5	14.5	14.5
Plant Capacity (666,000 ton/year)																
Sales Revenue		85.7	101.4	114.6	127.3	127.9	127.9	127.9	127.9	127.9	127.9	127.9	127.9	127.9	127.9	127.9
Profit																
Case 4 (Tanah Merah)	before tax	4.5	12.4	21.0	29.0	31.6	33.9	35.5	37.2	38.6	38.9	39.2	39.3	39.2	39.3	39.3
	after tax	4.5	12.4	21.0	29.0	31.6	33.9	35.5	37.2	21.9	22.0	22.2	22.2	22.2	22.2	22.2
Case 5 (Gua Musang)	before tax	0.4	7.7	15.3	23.5	27.3	30.4	31.9	33.7	35.4	35.9	36.4	36.5	36.4	36.4	36.4
	after tax	0.4	7.7	15.3	23.5	27.3	30.4	31.9	33.7	20.3	20.6	20.8	20.9	20.8	20.8	20.8
Case 6 (Jeli)	before tax	2.8	10.7	18.9	27.6	30.4	33.0	34.6	36.2	37.5	37.6	37.7	37.8	37.7	37.7	37.7
	after tax	2.8	10.7	18.9	27.6	30.4	33.0	34.6	36.2	21.3	21.4	21.5	21.5	21.4	21.5	21.5
Plant Capacity (833,000 ton/year)																
Sales Revenue		89.9	101.4	114.6	129.4	141.9	154.4	159.7	159.9	159.9	159.9	159.9	159.9	159.9	159.9	159.9
Profit																
Case 7 (Tanah Merah)	before tax	1.9	7.8	15.9	25.4	34.1	42.1	46.5	48.8	51.1	51.1	51.3	51.6	51.8	52.1	52.1
	after tax	1.9	7.8	15.9	25.4	34.1	42.1	46.5	48.8	28.6	28.6	28.6	28.8	28.9	29.0	29.0
Case 8 (Gua Musang)	before tax	-2.1	3.6	11.1	20.0	28.8	37.9	43.1	46.0	48.3	48.1	48.2	48.8	49.3	49.8	49.8
	after tax	-2.1	3.6	11.1	20.0	28.8	37.9	43.1	46.0	27.2	27.1	27.1	27.4	27.7	27.9	27.9
Case 9 (Jeli)	before tax	0.9	6.8	14.9	24.5	33.6	42.0	46.5	48.8	51.2	51.2	51.3	51.4	51.5	51.7	51.7
	after tax	0.9	6.8	14.9	24.5	33.6	42.0	46.5	48.8	28.6	28.6	28.6	28.7	28.7	28.8	28.8