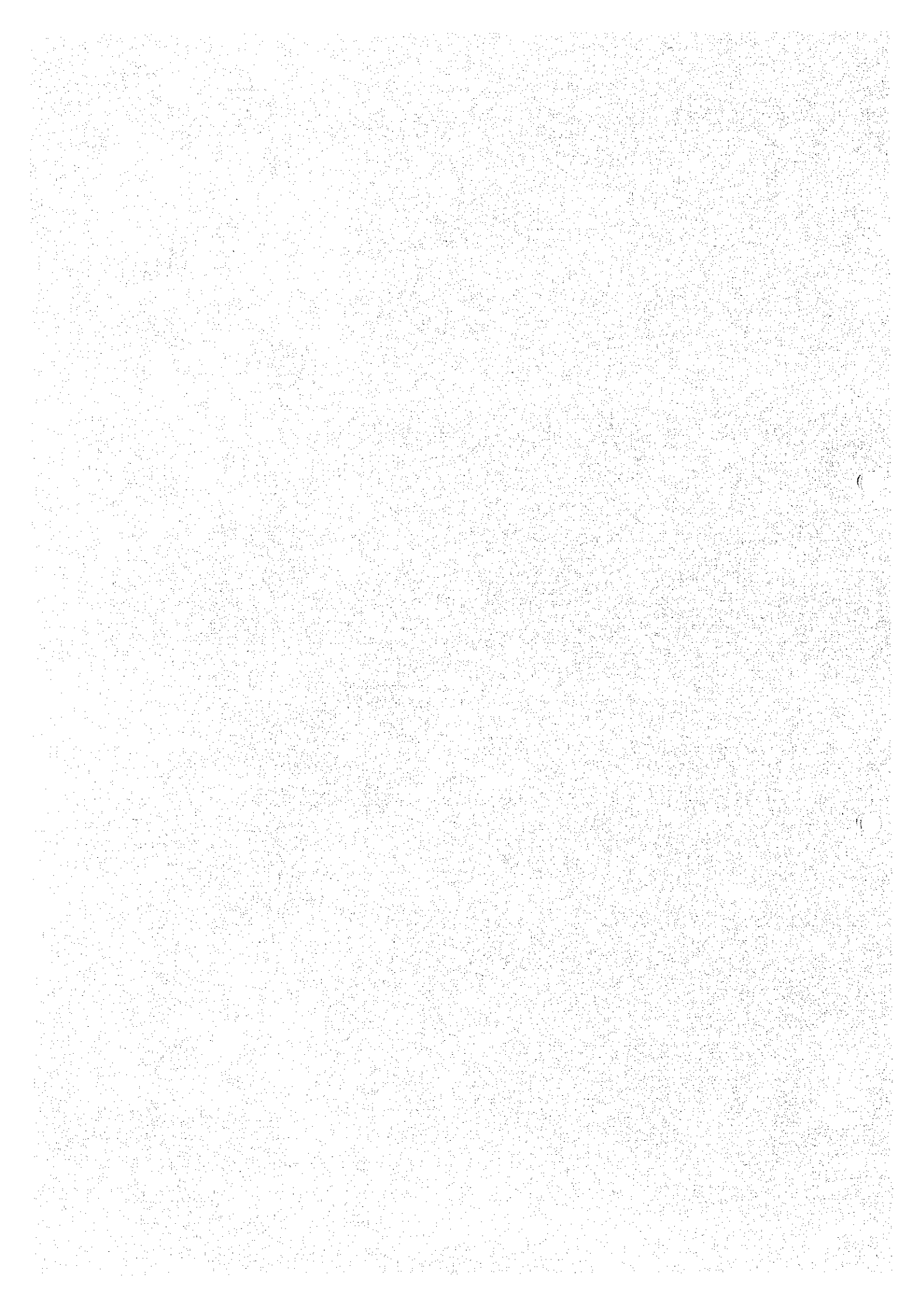


PART-3 ECONOMIC EVALUATION



3-1 Standard Evaluation

3-1-1 Assumptions

a) Ore Reserve and Production Rate

A total ore reserve is assumed of 2,872,500 tons at a grade of 1.94% Cu, as shown in Table 7 of the Part 1.

It is also assumed that the production be resumed at a rate of 50,000 tons per month. Accordingly, the ore reserve is sufficient to continue the production at this rate for approximately 4.8 years.

b) Capital Expenditure

In addition to the capital expenditures which are explained in 1-9-1 and 2-9-1, a total sum of US.\$3,099,000 is allocated for the working capital to keep the production at a steady rate.

Table- 24 Capital Expenditure

	Yen(1000)	U.Sh(1000)	US.\$(1000)
Mine			
Mining	863,850	30,591	4,857
Milling	191,460	6,779	854
Engineering	215,330	7,624	959
Subtotal	1,270,640	44,994	5,670
Contingency	88,860	3,147	398
General	80,500	2,850	360
Transportation	60,000	2,125	268
Total	1,500,000	53,116	6,696
Working Capital	453,352	14,734	1,858
Smelter			
Smelting	723,800	25,630	3,231
Installation	55,000	1,948	246
Transportation	29,000	1,027	129
General	81,000	2,868	362
Escalation & Others	81,000	2,868	362
Total	969,800	34,341	4,330
Working Capital	302,804	9,841	1,241
Grand Total	3,225,956	112,032	14,125

The working capital consists essentially of the inventories for 6 months at the Mine and for 12 months at the Smelter,

The total capital expenditure is summerized in Table 24.

c) Operating Cost

The monthly operating costs for the Mine and the Smelter are separately explained in 1-9-2 and 2-9-2, and are quoted again in Table-25 as follows.

Table- 25 Summary of Monthly Operating Cost

	U.Sh(1000)	US.\$	US\$/crude ore ton
Mining	2,764.4	348,608	6.97
Engineering	1,493.5	188,340	3.77
Milling	718.0	90,545	1.81
Smelting	1,301.7	164,145	3.28
Administeration	771.6	97,299	1.95
Subtotal	7,049.2	888,937	
Conc. Transportation	307.9	38,830	0.78
Bank Interest (8% Annually)	49.3	6,219	0.06
Provision for	95.3	12,017	0.24
Total	7,501.7	946,003	18.86

d) Production Schedule

The annual production schedule is tabulated in Table26 .

In general, it is economically more effective to mine higher grade ore in earlier stages. However, such a variation in mining grade is not taken into account in this evaluation.

The following assumptions are made for the mill recovery, the concentrate grade, the moisture content in the Cu-concentrate, the smelting recovery and the blister grade (Table-21 and 2-9-4).

Mill Recovery	92.80%
Concentrate Grade	28.50%
Moisture Content	8.50%
Smelting Recovery	95.00%
Blister Grade	99.00%

Table 26 PRODUCTION SCHEDULE (1)

Year	1 ST		2 ND		3 RD		4 TH		5 TH		Total	
	Tonnage	Cu %	Tonnage	Cu %	Tonnage	Cu %	Tonnage	Cu %	Tonnage	Cu %	Tonnage	Cu %
Eastern	167,000	2.14	167,000	2.14	167,000	2.14	167,000	2.14	65,100	2.14	733,100	2.14
Stream	36,000	2.06	36,000	2.06	36,000	2.06	36,000	2.06	27,400	2.06	171,400	2.06
Buhunga/ Namhuga	120,000	1.92	120,000	1.92	120,000	1.92	120,000	1.92	215,100	1.92	695,100	1.92
Upper Bukangama	96,000	1.81	96,000	1.81	159,000	1.81	158,600	1.81			521,600	1.81
Middle Bukangama	60,000	1.77	21,180	1.77							81,180	1.77
Lower Bukangama	121,000	1.84	147,820	1.84	118,000	1.84	118,400	1.84	164,900	1.84	670,120	1.84
Total	600,000	1.94	600,000	1.94	600,000	1.94	600,000	1.94	472,500	1.93	2,872,500	1.94
Concentrate	37,901	28.5	37,901	28.5	37,901	28.5	37,901	28.5	29,694	28.5	181,298	28.5
Blister	10,365	99	10,365	99	10,365	99	10,365	99	8,121	99	49,581	99

Crude Ore

e) Revenue and Marketing Cost

The copper price of UK.£694,5 per ton as of May 10th, 1978 is applied to the gross revenue estimation.

The actual gross revenue is assumed to be 99% of the copper price above mentioned, according to the recent sales contract.

The exchange rate of US.\$ 1.795 for UK£ 1 as of May 10th, 1978 is used for conversion from one to the other.

The following assumptions are made for the marketing costs on the basis of the actual contracts in 1977.

Inland Freight (Jinja-Mombasa) & Port Handling Charge	32.413	US.\$/ton
Ocean Freight	87.632	US.\$/ton
Refining Charge(incl. sales commission, sampling & others.)	200.882	US.\$/ton

f) Accumulated Loss

The accumulated loss of Kilembe Mines Ltd. is estimated at US.\$ 12,515,375 by the end of November, 1977. A sum of US.\$ 7,050,976 has been loaned from the Berclay Bank of Uganda by the end of October, 1977.

No information is available in regard to the financial status of Kilembe Mines Ltd. after the above period.

The accumulated loss and loan by the time of resuming production (March 1 st, 1980) are estimated by assuming as follows;

Monthly Expenses	US.\$
Salaries and Wages	385,408
Incidentals	43,641

The incidental expense is assumed at US.\$ 87,282 for the month of December 1977, and there-after at US.\$43,641 monthly.

It is also assumed that the capital expenditure, the accrued expenses and interest on the bank loan be loaned from the Bank. The interest rate on the bank loan is assumed at 8% per annum.

The accumulated loss, loan and interest as of February 29, 1980 are estimated as follows;

Accumlated loss	US.\$ 26,620,768
Accumlated Loan and Interest	US.\$ 23,171,010
Loan and Interest for the Capital Expenditure	US.\$ 14,730,089
Total Loan as of Feb.29,1980	US.\$ 37,901,099

g) Operating Profit (Loss)

In case that the monthly operating profit is negative(loss), the monthly loss is assumed to be restored by bank loan (overdraft) every month at an interest rate of 8% per annum. The interest on the monthly loan is included in the monthly operating cost. The accrued loan and interest at the year end are accumulated at an interest rate of 8% per annum by the end of the production.

In case that the monthly operating profit is positive, it is treated in the same manner as above, only in reversed sign. It is based on the assumption that the monthly operating profit be retained at an interest rate of 8% per annum.

3-1-2 Result of Cash Flow Analysis

The cash flow analysis is made by using a computer IBM 360-168, and its result is given in Table 27.

The result indicates that an annual loss ranging between US.\$ 1,693,000 and 2,063,000 is anticipated every year during the period of the production on the basis of the assumptions given in the proceeding section. The total loss will amount to US.\$ 8,994,000 by the time of exhausting the given ore reserve, in addition to the accumulated loss of US.\$ 26,620,768 before starting the production.

The bank loan and interest will be accrued to US.\$ 62,403,000 at the end of the production.

The project is apparently unprofitable on the basis of the assumed copper price, UK£ 694.5.

TABLE 27-A OPERATING PROFIT (LOSS) STATEMENT NO. 1-1 (NO MARK 1,000U\$)

ITEM	1ST YEAR	2ND YEAR	3RD YEAR	4TH YEAR	5TH YEAR	TOTAL
I 1 ORE MILLED	600000	600000	600000	600000	472500	2872500
I 2 GRADE	194	194	194	194	1881	
I 3 BLISTER PRODUCTION	10365	10365	10365	10365	7910	49372
I 4 GROSS REVENUE	12922	12922	12922	12922	9861	61549
I 5 " (1,000U\$)	102555	102555	102555	102555	78264	488483
I 6 FREIGHT ON RAIL J/M	336	336	336	336	256	1600
I 7 OCEAN FREIGHT	908	908	908	908	693	4327
I 8 RIFINING CHARGE ETC	2082	2082	2082	2082	1589	9918
I 9 TOTAL SHIPPING & MARKETING	3327	3327	3327	3327	2539	15845
I 10 " (1,000U\$)	26401	26401	26401	26401	20148	125753
I 11 PROSPECTING	50	50	50	50	57	151
I 12 DEVELOPMENT + DRILLING	668	668	668	668	557	3230
I 13 STOPPING	1805	1805	1805	1805	1504	8723
I 14 HOIST + TRAMMING	660	660	660	660	550	3122
I 15 MINE ADMINISTRATION	412	412	412	412	343	1990
I 16 TECHNICAL SERVICE	588	588	588	588	490	2840
I 17 ENGINEERING	1799	1799	1799	1799	1499	8694
I 18 ADMINISTRATION + GEN. EXP.	1168	1168	1168	1168	973	5643
I 19 CONCENTRATOR	1087	1087	1087	1087	905	5252
I 20 SMELTING	1970	1970	1970	1970	1641	9520
I 21 OTHERS	462	462	462	462	385	2232
I 22 FREIGHT ON RAIL K/J	466	466	466	466	356	2220
I 23 BANK INTEREST	63	63	63	63	62	313
I 24 PROV. FOR APPROPRIATION	144	144	144	144	120	697
I 25 TOTAL PRODUCTION EXPENSES	11341	11341	11341	11289	9386	54698
I 26 " (1,000U\$)	90009	90009	90009	89594	74489	434111
I 27 OPERATING PROFIT	-1746	-1746	-1746	-1693	-2063	-8994
I 28 " (1,000U\$)	-13856	-13856	-13856	-13440	-16373	-71381
I 29 OVERDRAFT FOR OPERATION	1746	3631	5668	7815	10503	10503
I 30 " FOR CAPITAL COST	15908	17181	18556	20040	21376	18277
I 31 " ACCUMULATED	25023	27025	29187	31522	33623	33623
I 32 OVERDRAFT TOTAL	42677	47837	53410	59377	65502	62403
I 33 " (1,000U\$)	338709	379662	423890	471242	519859	495262
I 34 ACCUMULATED PROFIT	-28367	-30113	-31858	-33552	-35615	
I 35 " (1,000U\$)	-225134	-238989	-252845	-266285	-282659	

1	METAL PRICE	(L/T)	694.5
2	EXCHANGE RATE	(\$/L)	1.795
3	FREIGHT ON RAIL J/M	(\$/L)	32.413
4	OCEAN FREIGHT	(\$/L)	87.632
5	REFINING CHARGE	(\$/L)	200.882
6	MILL RECOVERY	%	92.8
7	RIF. RECOVERY	%	95.
8	BLISTER	%	99.
9	CONC. GRADE	%	28.5
10	MOISTURE	%	8.5
11	PROSPECTING	(\$/M)	4203.
12	DEVELOPMENT + DRILLING	(\$/M)	55696.
13	STOPPING	(\$/M)	150396.
14	HOIST + TRAMMING	(\$/M)	55028.
15	MINE ADMINISTRATION	(\$/M)	34312.
16	TECHNICAL SERVICE	(\$/M)	48973.
17	ENGINEERING	(\$/M)	149901.
18	ADMINISTRATOR	(\$/M)	97299.
19	CONCENTRATOR	(\$/M)	90545.
20	SMELTER	(\$/M)	164145.
21	OTHERS	(\$/M)	38489.
22	FREIGHT ON RAIL K/J	(\$/M)	11.
23	BANK INTREST	%	8.
24	PROV. FOR APPROPRIATION	(\$/M)	12017.
25	ACCUMULATED PROFIT	(\$/M)	-26621.

3-2 Variations

3-2-1 Ore Reserve

Assuming the ore reserve of 4,120,110 tons at a grade of 1.69% Cu, the cash flow analysis is made in the same manner as in the standard case.

Of other standard assumptions, the expected mill recovery is altered to 92.20% in accordance with the mill head grade of 1.69% Cu. The production schedule is accordingly modified as shown in Table 28. The mine life is prolonged to 6.9 years from 4.8 years of the standard case.

The computer out-put of the cash flow analysis is given in Table 29.

The operating loss, ranging from US.\$ 2,967,000 to 3,117,000, will be accumulated up to US.\$ 21,078,000 by the end of the production, on top of the accumulated loss before starting the production.

The accrued loan and interest will amount to US.\$ 88,713,000.

This case is more unprofitable than the standard case.

3-2-2 Copper Price

Assuming that there happens to be a sudden improvement in the copper market in the immediate future, the standard evaluation is re-examined for various copper prices.

The total operating loss and profit will be balanced at the copper price of UK£ 792 .

The cash flows for the copper prices 20% and 40% higher than that of the standard assumptions are estimated and given in Table 30 and 31.

In the former case, at the copper price of UK£ 833.4 per ton, the annual operating profit is expected to range from US.\$ 935,000 to 988,000 except for the last year of the production, when the annual operating loss of US.\$ 30,000 is incurred. However, the operating profit including interest (Negative overdraft) is far in sufficient to pay off the accrued loan and interest for the capital expenditure.

In the latter case, at the copper price of UK£ 972.3, the annual operating profit will exceed US.\$ 3,500,000 except for the last year. The retained operating profit with interest is expected to surplus the accrued loan and interest for the capital expenditure by US.\$ 1,385,000 at the end of the production. The accrued loan and interest for the capital expenditure will be paid off at a copper price of UK£ 960.

TABLE 28 PRODUCTION SCHEDULE (II)

Year	1 ST		2 ND		3 RD		4 TH		5 TH		6 TH		7 TH		Total	
	Tonnage	Cu %	Tonnage	Cu %	Tonnage	Cu %	Tonnage	Cu %	Tonnage	Cu %	Tonnage	Cu %	Tonnage	Cu %	Tonnage	Cu %
Eastern	130,000	1.96	130,000	1.96	130,000	1.96	130,000	1.96	130,000	1.96	130,000	1.96	112,300	1.96	892,300	1.96
Stream	25,000	2.06	25,000	2.06	25,000	2.06	25,000	2.06	25,000	2.06	25,000	2.06	21,400	2.06	171,400	2.06
Buhunga/ Nanhuga	112,000	1.85	112,000	1.85	112,000	1.85	112,000	1.85	112,000	1.85	112,000	1.85	95,700	1.85	767,700	1.85
Upper Bukangama	168,000	1.41	168,000	1.41	168,000	1.41	168,000	1.41	168,000	1.41	168,000	1.41	143,010	1.41	1,151,010	1.41
Middle Bukangama	53,000	1.29	53,000	1.29	53,000	1.29	53,000	1.29	53,000	1.29	53,000	1.29	49,740	1.29	367,740	1.29
Lower Bukangama	112,000	1.74	112,000	1.74	112,000	1.74	112,000	1.74	112,000	1.74	112,000	1.74	97,960	1.74	769,960	1.74
Total	600,000	1.69	600,000	1.69	600,000	1.69	600,000	1.69	600,000	1.69	600,000	1.69	520,110	1.69	4,120,110	1.69
Concentrate	32,804	28.5	32,804	28.5	32,804	28.5	32,804	28.5	32,804	28.5	32,804	28.5	28,436	28.5	225,260	28.5
Blister	8,971	99	8,971	99	8,971	99	8,971	99	8,971	99	8,971	99	7,777	99	61,603	99

Grude Ore

TABLE 29-A OPERATING PROFIT (LOSS) STATEMENT NO. 2-1 (NO MARK : '000US\$)

ITEM	1ST YEAR	2ND YEAR	3RD YEAR	4TH YEAR	5TH YEAR	6TH YEAR	7TH YEAR	TOTAL
I 1 ORE MILLED TONS	600000	600000	600000	600000	600000	600000	520110	4120110
I 2 GRADE %	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
I 3 BLISTER PRODUCTION TONS	8971	8971	8971	8971	8971	8971	7777	61605
I 4 GROSS REVENUE ('000US\$)	11184	11184	11184	11184	11184	11184	9695	76798
I 5 " " " " " " " "	88761	88761	88761	88761	88761	88761	76943	609510
I 6 FREIGHT ON RAIL J/M	291	291	291	291	291	291	252	1997
I 7 OCEAN FREIGHT	786	786	786	786	786	786	681	5399
I 8 RIFINING CHARGE ETC	1802	1802	1802	1802	1802	1802	1562	12375
I 9 TOTAL SHIPPING + MARKETING ('000US\$)	2879	2879	2879	2879	2879	2879	2496	19771
I 10 " " " " " " " "	22850	22850	22850	22850	22850	22850	19808	156910
I 11 PROSPECTING	50	50	50	50	50	50	50	151
I 12 DEVELOPMENT + DRILLING	668	668	668	668	668	668	613	4623
I 13 STOPING	1805	1805	1805	1805	1805	1805	1654	12483
I 14 HOIST + TRAMMING	660	660	660	660	660	660	605	4567
I 15 MINE ADMINISTRATION	412	412	412	412	412	412	377	2848
I 16 TECHNICAL SERVICE	588	588	588	588	588	588	539	4065
I 17 ENGINEERING	1799	1799	1799	1799	1799	1799	1649	12442
I 18 ADMINISTRATION + GEN. EXP.	1168	1168	1168	1168	1168	1168	1070	8076
I 19 CONCENTRATOR	1087	1087	1087	1087	1087	1087	996	7515
I 20 SMELTING	1970	1970	1970	1970	1970	1970	1806	13624
I 21 OTHERS	462	462	462	462	462	462	423	3195
I 22 FREIGHT ON RAIL K/J	403	403	403	403	403	403	350	2770
I 23 BANK INTEREST	109	109	109	109	109	109	101	751
I 24 PROV. FOR APPROPRIATION	144	144	144	144	144	144	132	997
I 25 TOTAL PRODUCTION EXPENSES ('000US\$)	11325	11325	11325	11325	11325	11325	10316	78106
I 26 " " " " " " " "	89877	89877	89877	89877	89877	89877	81872	619889
I 27 OPERATING PROFIT ('000US\$)	-3020	-3020	-3020	-3020	-3020	-3020	-3117	-21078
I 28 " " " " " " " "	-23966	-23966	-23966	-23966	-23966	-23966	-24737	-167289
I 29 OVERDRAFT FOR OPERATION	3020	6281	9803	13555	17607	21983	26858	26858
I 30 " " " " " " " "	15909	17181	18556	20040	21643	23375	25245	22146
I 31 " " " " " " " "	25023	27025	29187	31522	34044	36767	39709	39709
I 32 OVERDRAFT TOTAL ('000US\$)	43952	50487	57546	65117	73294	82125	91812	88713
I 33 " " " " " " " "	348823	400691	456717	516802	581697	651784	728669	704074
I 34 ACCUMULATED PROFIT ('000US\$)	-29641	-32660	-35680	-38648	-41615	-44583	-47699	-47699
I 35 " " " " " " " "	-235244	-259210	-283177	-306727	-330278	-353829	-378566	-378566

TABLE 29-8 ***** PARAMETER LIST ***** NO. 2-1

1	METAL PRICE		(L/T)	694.9
2	EXCHANGE RATE		(\$/L)	1.795
3	FREIGHT ON RAIL	J/M	(\$/L)	32.413
4	OCEAN FREIGHT		(\$/L)	87.632
5	REFINING CHARGE		(\$/L)	200.882
6	MILL RECOVERY		%	92.2
7	RIF. RECOVERY		%	95.
8	BLISTER		%	99.
9	CONC. GRADE		%	28.5
10	MOISTURE		%	8.5
11	PROSPECTING		(\$/M)	4203.
12	DEVELOPMENT + DRILLING		(\$/M)	55696.
13	STOPING		(\$/M)	150396.
14	HOIST + TRAMMING		(\$/M)	55028.
15	MINE ADMINISTRATION		(\$/M)	34312.
16	TECHNICAL SERVICE		(\$/M)	48973.
17	ENGINEERING		(\$/M)	149901.
18	ADMINISTRATION		(\$/M)	97299.
19	CONCENTRATOR		(\$/M)	90545.
20	SMELTER		(\$/M)	164145.
21	OTHERS		(\$/M)	38489.
22	FREIGHT ON RAIL	K/J	(\$/M)	11.
23	BANK INTREST		%	8.
24	PROV. FOR APPROPRIATION		(\$/M)	12017.
25	ACCUMULATED PROFIT			26621.

FIG. 32 ***** EQUATION FOR METAL PRICE VS. OPERATING PROFIT TOTAL *****

(OPERATING PERIOD : FIVE YEARS)

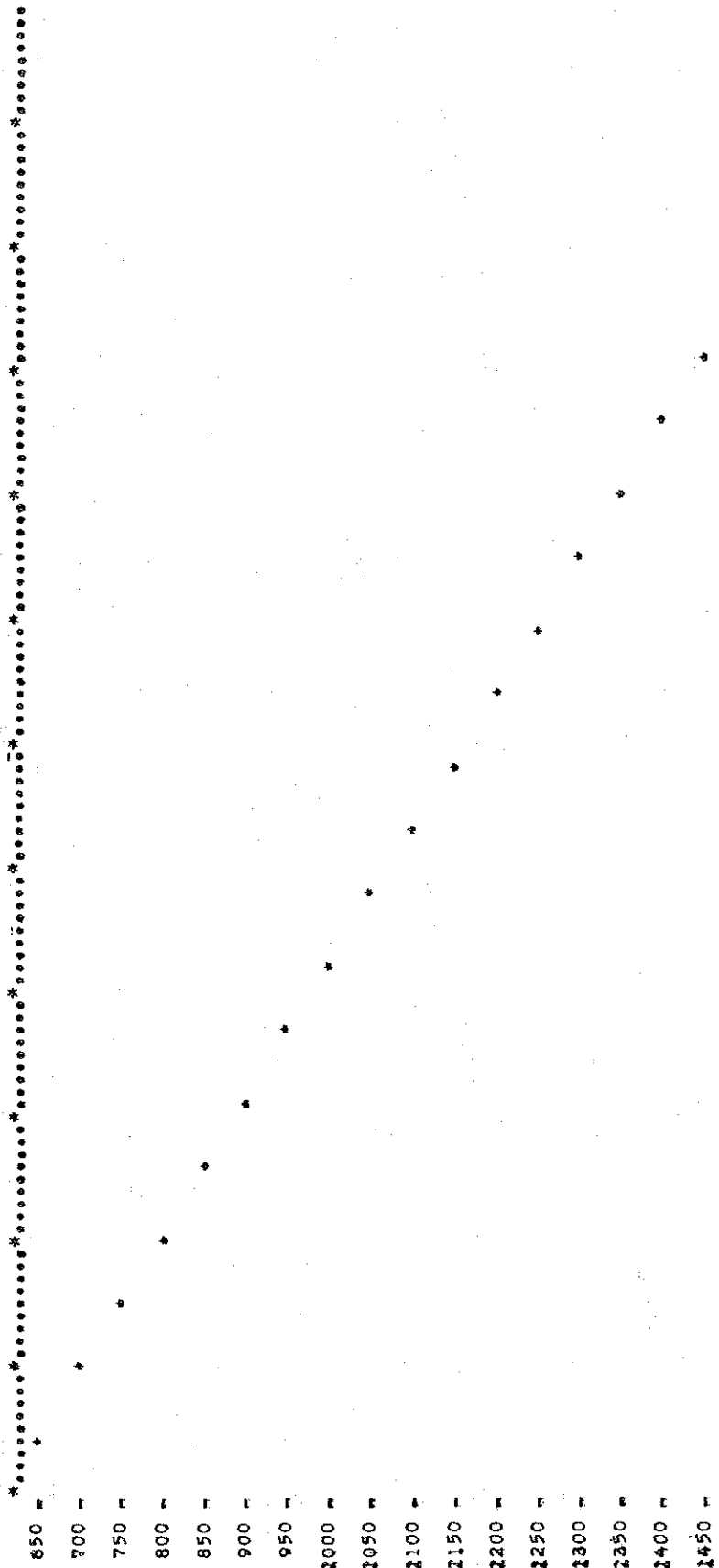
OPERATING PROFIT = 108.58* METAL PRICE - 85913

MARGINAL POINT1 (OPERATING PROFIT TOTAL = 0) : 792 (L/T)

MARGINAL POINT2 (OPERATING PROFIT TOTAL = CAPITAL COST) : 960 (L/T)

MARGINAL POINT3 (OPERATING PROFIT TOTAL = OVERDRAFT TOTAL) : 1270 (L/T)

-20000 -10000 0 10000 20000 30000 40000 50000 60000 70000 OP. PROFIT TOTAL (,000US\$)



METAL PRICE (L/T)

TABLE 30-A OPERATING PROFIT (LOSS) STATEMENT NO. 1-2 (NO MARK I, 000US\$)

ITEM	1ST YEAR	2ND YEAR	3RD YEAR	4TH YEAR	5TH YEAR	TOTAL
1 ORE MILLED TONS	60000	60000	60000	60000	47250	287250
2 GRADE %	1.94	1.94	1.94	1.94	1.88	
3 BLISTER PRODUCTION TONS	10365	10365	10365	10365	7910	49372
4 GROSS REVENUE (,000US\$)	15506	15506	15506	15506	11834	73859
5 "	123066	123066	123066	123066	93917	586179
6 FREIGHT ON RAIL J/M	336	336	336	336	256	1600
7 OCEAN FREIGHT	908	908	908	908	693	4327
8 RIFINING CHARGE ETC	2082	2082	2082	2082	1589	9918
9 TOTAL SHIPPING & MARKETING (,000US\$)	3327	3327	3327	3327	2539	15845
10 "	26401	26401	26401	26401	20148	125753
11 PROSPECTING	50	50	50	50	151	151
12 DEVELOPMENT & DRILLING	668	668	668	668	557	3230
13 STOPING	1805	1805	1805	1805	1504	8723
14 HOIST & TRAMMING	660	660	660	660	550	3192
15 MINE ADMINISTRATION	412	412	412	412	343	1990
16 TECHNICAL SERVICE	588	588	588	588	490	2840
17 ENGINEERING	1799	1799	1799	1799	1499	8694
18 ADMINISTRATION & GEN. EXP.	1168	1168	1168	1168	973	5643
19 CONCENTRATOR	1087	1087	1087	1087	905	5252
20 SMELTING	1970	1970	1970	1970	1641	9520
21 OTHERS	462	462	462	462	385	2232
22 FREIGHT ON RAIL K/J	466	466	466	466	356	2220
23 BANK INTEREST	34	34	34	34	1	136
24 PROV. FOR APPROPRIATION	144	144	144	144	120	697
25 TOTAL PRODUCTION EXPENSES (,000US\$)	11244	11244	11244	11244	9325	54249
26 "	89240	89240	89240	89240	74004	430549
27 OPERATING PROFIT (,000US\$)	935	935	935	935	30	3765
28 "	7424	7424	7424	7424	235	29877
29 OVERDRAFT FOR OPERATION	935	1946	3037	4268	4579	4579
30 " FOR CAPITAL COST	15908	17191	18556	20040	21376	18277
31 " ACCUMULATED	25023	27023	29187	31522	33623	33623
32 OVERDRAFT TOTAL (,000US\$)	39996	42260	44706	47294	50420	47321
33 "	317429	335399	354807	375552	400159	375563
34 ACCUMULATED PROFIT (,000US\$)	25686	24750	23815	22827	22856	
35 "	203853	196429	189005	181165	181400	

TABLE 30-B ***** PARAMETER LIST *****

1	METAL PRICE	(L/T)	833.4
2	EXCHANGE RATE	(\$/L)	1.795
3	FREIGHT ON RAIL J/M	(\$/L)	32.413
4	OCEAN FREIGHT	(\$/L)	87.632
5	REFINING CHARGE	(\$/L)	200.882
6	MILL RECOVERY	%	92.8
7	RIF. RECOVERY	%	95.
8	BLISTER	%	99.
9	CONC. GRADE	%	28.5
10	MOISTURE	%	8.5
11	PROSPECTING	(\$/M)	4203.
12	DEVELOPMENT + DRILLING	(\$/M)	55696.
13	STOPPING	(\$/M)	150396.
14	HOIST + TRAMMING	(\$/M)	55028.
15	MINE ADMINISTRATION	(\$/M)	34312.
16	TECHNICAL SERVICE	(\$/M)	48973.
17	ENGINEERING	(\$/M)	149901.
18	ADMINISTRATOR	(\$/M)	97299.
19	CONCENTRATOR	(\$/M)	90545.
20	SMELTER	(\$/M)	164145.
21	OTHERS	(\$/M)	38489.
22	FREIGHT ON RAIL K/J	(\$/M)	11.
23	BANK INTREST	%	8.
24	PROV. FOR APPROPRIATION	(\$/M)	12017.
25	ACCUMULATED PROFIT		=26621.

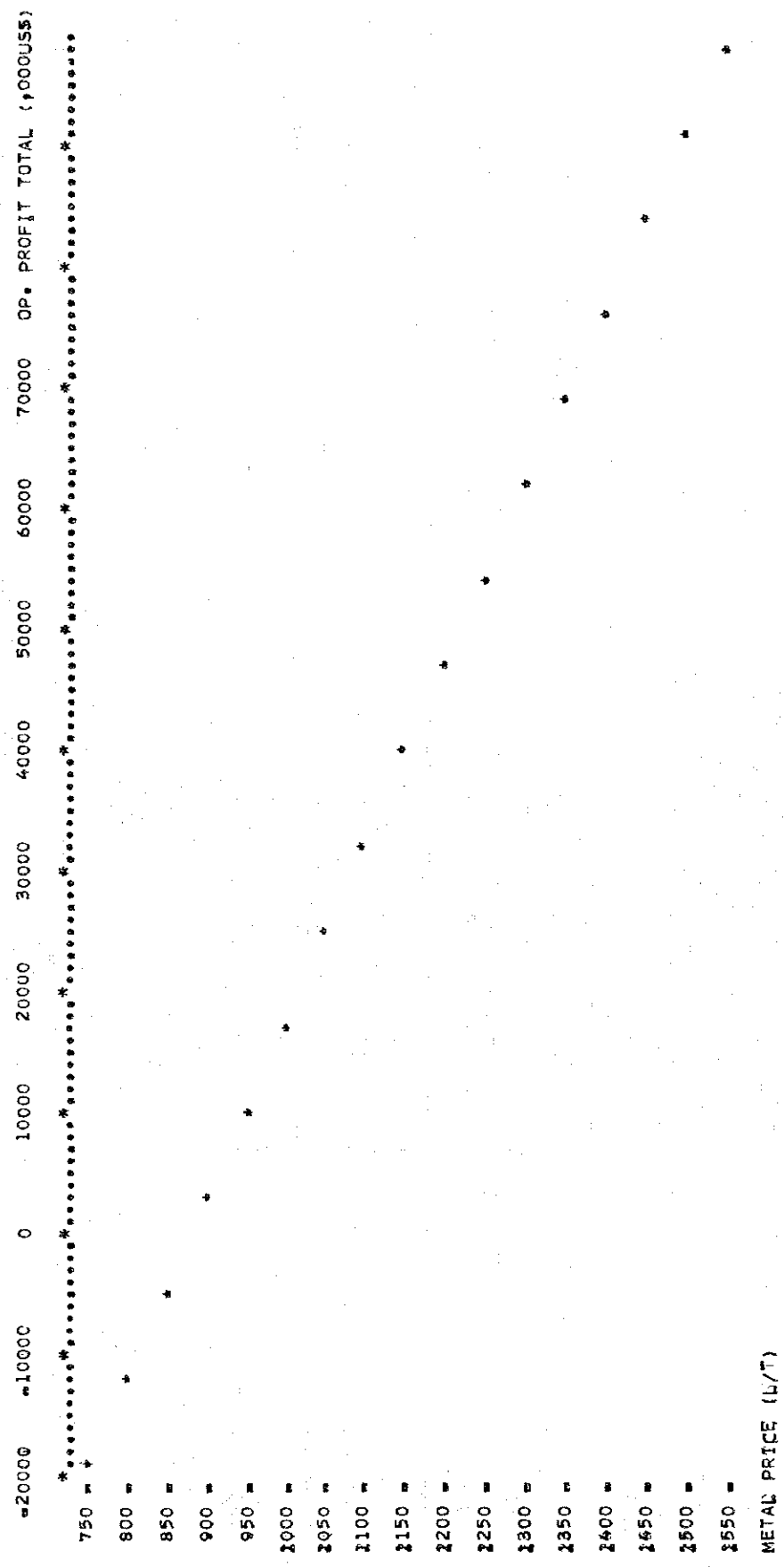
TABLE 31-A OPERATING PROFIT (LOSS) STATEMENT NO. 1-3 (NO MARK : 000055)

ITEM	1ST YEAR	2ND YEAR	3RD YEAR	4TH YEAR	5TH YEAR	TOTAL
I 1 ORE MILLED TONS	600000	600000	600000	600000	472500	2872500
I 2 GRADE %	1.94	1.94	1.94	1.94	1.88	
I 3 BLISTER PRODUCTION TONS	10365	10365	10365	10365	7910	49372
I 4 GROSS REVENUE (,000US\$)	18091	18091	18091	18091	13806	86168
I 5 " "	143577	143577	143577	143577	109570	683876
I 6 FREIGHT ON RAIL J/M	336	336	336	336	256	1600
I 7 OCEAN FREIGHT	908	908	908	908	693	4327
I 8 RIFINING CHARGE ETC	2082	2082	2082	2082	1589	9918
I 9 TOTAL SHIPPING & MARKETING	3327	3327	3327	3327	2539	15845
I 10 " " (,000US\$)	26401	26401	26401	26401	20148	125753
I 11 PROSPECTING	50	50	50	50		151
I 12 DEVELOPMENT & DRILLING	668	668	668	668	557	3230
I 13 STOPING	1805	1805	1805	1805	1504	8723
I 14 HOIST & FRAMING	660	660	660	660	550	3192
I 15 MINE ADMINISTRATION	412	412	412	412	343	1990
I 16 TECHNICAL SERVICE	588	588	588	588	490	2840
I 17 ENGINEERING	1799	1799	1799	1799	1499	8694
I 18 ADMINISTRATION & GEN. EXP.	1168	1168	1168	1168	973	5643
I 19 CONCENTRATOR	1087	1087	1087	1087	905	5252
I 20 SMELTING	1970	1970	1970	1970	1641	9520
I 21 OTHERS	462	462	462	462	385	2232
I 22 FREIGHT ON RAIL K/J	466	466	466	466	356	2220
I 23 BANK INTEREST	131	131	131	131	60	585
I 24 PROV. FOR APPROPRIATION 8%	144	144	144	144	120	697
I 25 TOTAL PRODUCTION EXPENSES (,000US\$)	11147	11147	11147	11147	9263	53800
I 26 " "	88471	88471	88471	88471	73519	426987
I 27 OPERATING PROFIT	3617	3617	3617	3617	2004	16523
I 28 " " (,000US\$)	28704	28704	28704	28704	15903	131136
I 29 OVERDRAFT FOR OPERATION	3617	7523	11741	16350	19662	19662
I 30 " FOR CAPITAL COST	15908	17181	18556	20040	21376	18277
I 31 " ACCUMULATED	25023	27025	29187	31522	33623	35623
I 32 OVERDRAFT TOTAL (,000US\$)	37315	36683	36001	35212	35338	32239
I 33 " "	296149	291137	285723	279461	280459	255863
I 34 ACCUMULATED PROFIT (,000US\$)	23004	19387	15771	12102	10098	
I 35 " "	182573	153869	125164	96045	80142	

1	METAL PRICE	(L/T)	972.3
2	EXCHANGE RATE	(\$/L)	1.795
3	FREIGHT ON RAIL J/M	(\$/L)	32.413
4	OCEAN FREIGHT	(\$/L)	87.632
5	REFINING CHARGE	(\$/L)	200.882
6	MILL RECOVERY	%	92.8
7	RIF. RECOVERY	%	95.
8	ELISTER	%	99.
9	CONC. GRADE	%	28.5
10	MOISTURE	%	8.5
11	PROSPECTING	(\$/M)	4203.
12	DEVELOPMENT + DRILLING	(\$/M)	55696.
13	STOPPING	(\$/M)	150396.
14	HOIST + TRAMMING	(\$/M)	55028.
15	MINE ADMINISTRATION	(\$/M)	34312.
16	TECHNICAL SERVICE	(\$/M)	48973.
17	ENGINEERING	(\$/M)	149901.
18	ADMINISTRATION	(\$/M)	97299.
19	CONCENTRATOR	(\$/M)	90545.
20	SMELTER	(\$/M)	164145.
21	OTHERS	(\$/M)	38489.
22	FREIGHT ON RAIL K/J	(\$/M)	11.
23	BANK INTEREST	%	8.
24	PROV. FOR APPROPRIATION	(\$/M)	12017.
25	ACCUMULATED PROFIT		26621.

FIG. 33 ***** EQUATION FOR METAL PRICE VS. OPERATING PROFIT TOTAL *****

(OPERATING PERIOD : SEVEN YEARS)
 OPERATING PROFIT = 146.80 * METAL PRICE - 128809
 MARGINAL POINT1 (OPERATING PROFIT TOTAL = 0) : 878 (L/T)
 MARGINAL POINT2 (OPERATING PROFIT TOTAL = CAPITAL COST) : 1029 (L/T)
 MARGINAL POINT3 (OPERATING PROFIT TOTAL = OVERDRAFT TOTAL) : 1299 (L/T)



METAL PRICE (L/T)

TABLE 32-A OPERATING PROFIT (LOSS) STATEMENT NO. 2-2 (NO MARK : 000US\$)

ITEM	1ST YEAR	2ND YEAR	3RD YEAR	4TH YEAR	5TH YEAR	6TH YEAR	7TH YEAR	TOTAL
1 ORE MILLED	600000.0	600000.0	600000.0	600000.0	600000.0	600000.0	520110.0	4120110.0
2 GRADE	1.691	1.691	1.691	1.691	1.691	1.691	1.691	1.691
3 BLISTER PRODUCTION	8971.0	8971.0	8971.0	8971.0	8971.0	8971.0	7777.0	61605.0
4 GROSS REVENUE	13421.0	13421.0	13421.0	13421.0	13421.0	13421.0	11634.0	92158.0
5 "	106514.0	106514.0	106514.0	106514.0	106514.0	106514.0	92331.0	731412.0
6 FREIGHT ON RAIL J/M	291.0	291.0	291.0	291.0	291.0	291.0	252.0	1997.0
7 OCEAN FREIGHT	786.0	786.0	786.0	786.0	786.0	786.0	681.0	5399.0
8 RIFINING CHARGE ETC	1802.0	1802.0	1802.0	1802.0	1802.0	1802.0	1562.0	12375.0
9 TOTAL SHIPPING + MARKETING	2879.0	2879.0	2879.0	2879.0	2879.0	2879.0	2496.0	19771.0
10 "	22850.0	22850.0	22850.0	22850.0	22850.0	22850.0	19808.0	156910.0
11 PROSPECTING	50.0	50.0	50.0	50.0	50.0	50.0	613.0	151.0
12 DEVELOPMENT + DRILLING	668.0	668.0	668.0	668.0	668.0	668.0	1654.0	4623.0
13 STOPING	1805.0	1805.0	1805.0	1805.0	1805.0	1805.0	605.0	12483.0
14 HOIST + TRAMMING	660.0	660.0	660.0	660.0	660.0	660.0	377.0	4567.0
15 MINE ADMINISTRATION	412.0	412.0	412.0	412.0	412.0	412.0	539.0	2848.0
16 TECHNICAL SERVICE	588.0	588.0	588.0	588.0	588.0	588.0	1649.0	4065.0
17 ENGINEERING	1799.0	1799.0	1799.0	1799.0	1799.0	1799.0	1070.0	12442.0
18 ADMINISTRATION + GEN. EXP.	1168.0	1168.0	1168.0	1168.0	1168.0	1168.0	996.0	8076.0
19 CONCENTRATOR	1087.0	1087.0	1087.0	1087.0	1087.0	1087.0	1806.0	7515.0
20 SMELTING	1970.0	1970.0	1970.0	1970.0	1970.0	1970.0	423.0	13624.0
21 OTHERS	462.0	462.0	462.0	462.0	462.0	462.0	350.0	3195.0
22 FREIGHT ON RAIL K/J	403.0	403.0	403.0	403.0	403.0	403.0	36.0	2770.0
23 BANK INTEREST	25.0	25.0	25.0	25.0	25.0	25.0	132.0	182.0
24 PROV. FOR APPROPRIATION	144.0	144.0	144.0	144.0	144.0	144.0	10251.0	997.0
25 TOTAL PRODUCTION EXPENSES	11241.0	11241.0	11241.0	11241.0	11241.0	11241.0	81354.0	77538.0
26 "	89211.0	89211.0	89211.0	89211.0	89211.0	89211.0	81354.0	615377.0
27 OPERATING PROFIT	699.0	699.0	699.0	699.0	699.0	699.0	1113.0	5150.0
28 "	5548.0	5548.0	5548.0	5548.0	5548.0	5548.0	8831.0	40875.0
29 OVERDRAFT FOR OPERATION	699.0	699.0	699.0	699.0	699.0	699.0	6468.0	6468.0
30 " FOR CAPITAL COST	15909.0	17181.0	18556.0	20040.0	21643.0	23751.0	25245.0	22146.0
31 " ACCUMULATED	25023.0	27025.0	29187.0	31522.0	34044.0	36767.0	39709.0	39709.0
32 OVERDRAFT TOTAL	41631.0	45660.0	50013.0	54660.0	59679.0	65101.0	71422.0	68323.0
33 "	330405.0	362382.0	396325.0	433808.0	473646.0	516671.0	566841.0	542246.0
34 ACCUMULATED PROFIT	27320.0	28019.0	28718.0	29365.0	30012.0	30659.0	31771.0	31771.0
35 "	216826.0	222374.0	227923.0	233056.0	238189.0	243322.0	252153.0	252153.0

TABLE 32-B ***** PARAMETER LIST *****

1	METAL PRICE	(L/T)	833.4
2	EXCHANGE RATE	(\$/L)	1.795
3	FREIGHT ON RAIL J/M	(\$/L)	32.413
4	OCEAN FREIGHT	(\$/L)	87.632
5	REFINING CHARGE	(\$/L)	200.882
6	MILL RECOVERY	%	92.2
7	RIF. RECOVERY	%	95.
8	BLISTER	%	99.
9	CONC. GRADE	%	28.5
10	MOISTURE	%	8.5
11	PROSPECTING	(\$/M)	4203.
12	DEVELOPMENT + DRILLING	(\$/M)	55696.
13	STOPING	(\$/M)	150396.
14	HOIST + TRAMMING	(\$/M)	55028.
15	MINE ADMINISTRATION	(\$/M)	34312.
16	TECHNICAL SERVICE	(\$/M)	48973.
17	ENGINEERING	(\$/M)	149901.
18	ADMINISTRATOR	(\$/M)	97299.
19	CONCENTRATOR	(\$/M)	90545.
20	SMELTER	(\$/M)	164145.
21	OTHERS	(\$/M)	38489.
22	FREIGHT ON RAIL K/J	(\$/M)	11.
23	BANK INTREST	%	8.
24	PROV. FOR APPROPRIATION	(\$/M)	12017.
25	ACCUMULATED PROFIT		=26621.

TABLE 33-A OPERATING PROFIT (LOSS) STATEMENT NO. 2-3 (NO MARK : \$000US\$)

ITEM	1ST YEAR	2ND YEAR	3RD YEAR	4TH YEAR	5TH YEAR	6TH YEAR	7TH YEAR	TOTAL
1 ORE MILLED	600000	600000	600000	600000	600000	600000	520110	4120110
2 GRADE	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
3 BLISTER PRODUCTION	8971	8971	8971	8971	8971	8971	7777	61605
4 GROSS REVENUE	15657	15657	15657	15657	15657	15657	13573	107518
5 "	124266	124266	124266	124266	124266	124266	107720	853314
6 FREIGHT ON RAIL J/M	291	291	291	291	291	291	252	1997
7 OCEAN FREIGHT	786	786	786	786	786	786	681	5398
8 RIFINING CHARGE ETC	1802	1802	1802	1802	1802	1802	1562	12375
9 TOTAL SHIPPING & MARKETING	2879	2879	2879	2879	2879	2879	2496	19771
10 "	22850	22850	22850	22850	22850	22850	19808	156910
11 PROSPECTING	50	50	50	50	50	50	50	151
12 DEVELOPMENT & DRILLING	668	668	668	668	668	668	613	4623
13 STOPING & TRAMMING	1805	1805	1805	1805	1805	1805	1654	12483
14 HOIST & TRAMMING	660	660	660	660	660	660	605	4567
15 MINE ADMINISTRATION	412	412	412	412	412	412	377	2848
16 TECHNICAL SERVICE	588	588	588	588	588	588	539	4065
17 ENGINEERING	1799	1799	1799	1799	1799	1799	1649	12442
18 ADMINISTRATION & GEN. EXP.	1168	1168	1168	1168	1168	1168	1070	8076
19 CONCENTRATOR	1087	1087	1087	1087	1087	1087	996	7515
20 SMELTING	1970	1970	1970	1970	1970	1970	1806	13624
21 OTHERS	462	462	462	462	462	462	423	3195
22 FREIGHT ON RAIL K/J	403	403	403	403	403	403	350	2770
23 BANK INTEREST	59	59	59	59	59	59	59	385
24 PROV. FOR APPROPRIATION	144	144	144	144	144	144	132	997
25 TOTAL PRODUCTION EXPENSES	11157	11157	11157	11104	11104	11104	10185	76969
26 "	88546	88546	88546	88130	88130	88130	80837	610865
27 OPERATING PROFIT	1622	1622	1622	1674	1674	1674	891	10778
28 "	12870	12870	12870	13285	13285	13285	7075	85539
29 OVERDRAFT FOR OPERATION	1622	3373	5264	7359	9623	12066	13922	13922
30 " FOR CAPITAL COST	15909	17191	18556	20040	21643	23375	25245	22146
31 " ACCUMULATED	25023	27025	29187	31522	34044	36767	39709	39709
32 OVERDRAFT TOTAL	39310	40833	42479	44203	46065	48076	51032	47933
33 "	311987	324072	337133	350815	365595	381558	405013	380417
34 ACCUMULATED PROFIT	24999	23378	21756	20082	18408	16735	15843	15843
35 "	198408	185538	172669	159384	146099	132814	125739	125739

TABLE 33-B ***** PARAMETER LIST ***** NO. 2-3

1	METAL PRICE		(L/T)	972.3
2	EXCHANGE RATE		(\$/L)	1.795
3	FREIGHT ON RAIL	J/M	(\$/L)	32.413
4	OCEAN FREIGHT		(\$/L)	87.632
5	REFINING CHARGE		(\$/L)	200.882
6	MILL RECOVERY		%	92.2
7	RIF. RECOVERY		%	95.
8	BLISTER		%	99.
9	CONC. GRADE		%	28.5
10	MOISTURE		%	8.5
11	PROSPECTING		(\$/M)	4203.
12	DEVELOPMENT + DRILLING		(\$/M)	55696.
13	STOPPING		(\$/M)	150396.
14	HOIST + TRAMMING		(\$/M)	55028.
15	MINE ADMINISTRATION		(\$/M)	34312.
16	TECHNICAL SERVICE		(\$/M)	48973.
17	ENGINEERING		(\$/M)	149901.
18	ADMINISTRATOR		(\$/M)	97299.
19	CONCENTRATOR		(\$/M)	90545.
20	SMELTER		(\$/M)	164145.
21	OTHERS		(\$/M)	38489.
22	FREIGHT ON RAIL	K/J	(\$/M)	11.
23	BANK INTREST		%	8.
24	PROV. FOR APPROPRIATION		(\$/M)	12017.
25	ACCUMULATED PROFIT			=26621.

Provided that the copper price of UK.£1270 per ton be attained, all the debt, including the accumulated loan and interest before starting the production, could be written off. However, such a high copper price is highly improbable at the present market situation.

The relation between the copper price and the retained operating profit (loss) is shown in Fig 32.

In the case of the ore reserve of 4,120,110 ton at a grade of 1.69% Cu, the operating profit will be expected for higher copper prices than UK.£ 878 per ton (Table 32). The copper price of UK.£1029 will be required to pay off the accrued loan and interest for the capital expenditure.

An extraordinarily high copper price such as UK.£ 1299 per ton will be needed for the write-off of all the debt (Table 33).

The relation between the copper price and the retained operating profit is shown in Fig 33.

At any event, a much higher copper price than that prevailing at the present time will be essential to make the project profitable.

3-2-3 Others

The following factors will be influential to the profitability of the project. However, they are not taken into account for the cash flow analysis, because it is hardly possible at the present time to estimate their values and/or costs due to many unknown elements.

a) Number of Staffs and Labours

If it is possible to decrease the number of the staffs and labours, without affecting the production, the operating cost will be substantially improved, because the salaries and wages account for more than 45% of the operating cost. At the present time, it is difficult to estimate the optimum number of the staffs and labours as afore-mentioned (1-9-2).

However, it is recommended to decrease the number by increasing the productivity per person as the operation proceeds.

b) Location of Smelter

The Kilembe Mine and the Jinja Smelter are located some 500 km apart from each other.

It is considered to move the Smelter to the site in proximity with the Kilembe Mine. However, the preliminary estimation indicates that the construction of a new smelter will require approximately US.\$ 14,200,000(2-9-3) which is more than three times of the investment for the improvement of the existing Jinja Smelter.

In general, the production rate of 50,000 tons per month appears to be too small to justify the construction of a new smelter.

c) Sales of Concentrate

It seems to be easier to find a market for the Cu-concentrates than for the blister. If it is possible to sell the Cu-concentrate instead of the blister, no capital expenditure is necessary for the reconstruction of the Jinja Smelter. On the other hand, the transportation cost per copper metal ton will become higher.

There is another problem to market the Cu-concentrate, that is, the availability of the stock yard for the concentrate at Mombasa.

d) Recovery of Cobalt

The ore of the Kilembe Mine contains an appreciable amount of cobalt as afore-mentioned. The cobalt occurs mostly in close affiliation with pyrite without forming any specific cobalt minerals, although a minor amount of siegenite has been identified (Appendix-5, 1-2-3 b)). The distribution of cobalt in the products of the Kilembe Mine for the years, 1968, 1971, 1974 and 1976 is tabulated in Table 34. The pyrite concentrates, which are stock piled in an open dam near the filter plant, appear to contain more than 1.3% of cobalt according to the production record in Table 34.

Most of cobalt supplied to the world market at the present time is recovered from copper and/or nickel ores containing 0.1 to 0.5% of cobalt (Table 35) as by-product.

The cobalt grade of the ore in the Kilembe Mine seems to be moderate in comparison with those in the presently producing mines. However, the cobalt content in the concentrates is rather low and hardly possible to be increased by way of flotation due to its nature closely associated with pyrite.

At the Keretti Mine of Outokumpu Oy, Finland, cobalt is being commercially recovered from pyrite concentrates containing only 0.69% cobalt.

The Falconbridge Nickel Mines Ltd., the former management, has studied the recovery of cobalt from the pyrite concentrates. However, the commercial production of cobalt has never been realized.

Table 34 Copper and Cobalt Distribution

Year	Product	Amount		Grade %		Distribution %	
		Tonnage	Distribution %	Cu	Co	Cu	Co
1968	Mill Feed	926,760	100.00	1.85	0.16	100.00	100.00
	Copper Conc.	56,639	6.11	27.69	0.16	91.46	6.04
	Pyrite Conc.	70,982	7.66	0.52	1.31	2.13	61.99
	Tailing	799,139	86.23	0.14	0.06	6.41	31.97
1971	Mill Feed	947,627	100.00	1.80	0.15	100.00	100.00
	Copper Conc.	56,010	5.91	28.38	0.21	93.09	8.41
	Pyrite Conc.	64,766	6.83	0.27	1.34	1.02	62.04
	Tailing	826,851	87.26	0.12	0.05	5.89	29.55
1974	Mill Feed	708,230	100.00	1.75	0.16	100.00	100.00
	Copper Conc.	39,686	5.60	28.88	0.16	92.40	5.75
	Pyrite Conc.	45,056	6.36	0.30	1.34	1.09	54.70
	Tailing	623,488	88.04	0.13	0.07	6.51	39.55
1976	Mill Feed	396,485	100.00	1.79	0.17	100.00	100.00
	Copper Conc.	23,670	5.97	27.73	0.21	92.29	7.37
	Pyrite Conc.	22,429	5.66	0.35	1.38	1.10	45.88
	Tailing	350,386	88.37	0.13	0.09	6.61	46.75

Table 35 Co and Other Metal Contents in Ore and Concentrates of Some Mines in the World

Country	Mine/Location	Mill Feed			Concentrate (A)			Concentrate (B)			Remarks
		Cu(%)	Ni(%)	Co(%)	Cu(%)	Ni(%)	Co(%)	Cu(%)	Ni(%)	Co(%)	
Zambia	Chibuluma	4.67	-	0.25	33.84	-	0.27	3.30	-	3.57	July, 1958-June, 1959
Zambia	Rhokana	2.05	-	0.12	34.11	-	0.74	5.84	-	3.82	1967 - 1968
Zaire	Kolwezi	2	-	0.35	46.	-	2.5	-	-	-	
Canada	Georgian Bay	0.86	1.54	0.07	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	Falconbridge Nickel Mines Ltd.
Canada	Lynn Lake	0.9	0.48	0.01	N.A.	N.A.	N.A.	1.8	13.0	0.4	
Morocco	Bou Azzer	-	1.2	14.0	-	-	-	-	-	-	
Cuba	Levisa Bay	-	1.25	0.10	-	-	-	-	-	-	Laterite
U.S.A.	Black Bird	1.50	-	0.70	-	-	-	N.A.	-	17.74	Cobaltite Not Producing
Philippines	Nonoc Is.	-	1.2	0.1	-	-	-	-	-	-	Laterite
New Caledonia	Moneo	-	2.5+	0.18-0.25	-	-	-	-	2.0	2.0	Garnierite
Finland	Outo Kumpu	3.02	-	0.29	21.35	-	0.23	0.15	-	0.69	Pyrite Conc.
Turkey	Ergeni	2.21	-	0.23	N.A.	-	N.A.	N.A.	-	N.A.	

The last feasibility study for the recovery of cobalt was undertaken by a consulting company, Atkins, Hatch and Associates Ltd, Toronto, Ontario, Canada in 1967. The further metallurgical research was carried on in Canada by the Falconbridge Nickel Mines Ltd and the Lakefield Research of Canada Ltd, until 1970. According to the reports of the above studies, the recovery of cobalt seems to be practical. However, the figures used in these reports are out of date for the present use.

The present cobalt market is abnormally tight mainly due to the conflict going on in Zaire, who supplies more than 50% of the world demands for cobalt. When the problems in Zaire are settled, the cobalt price will be stabilized.

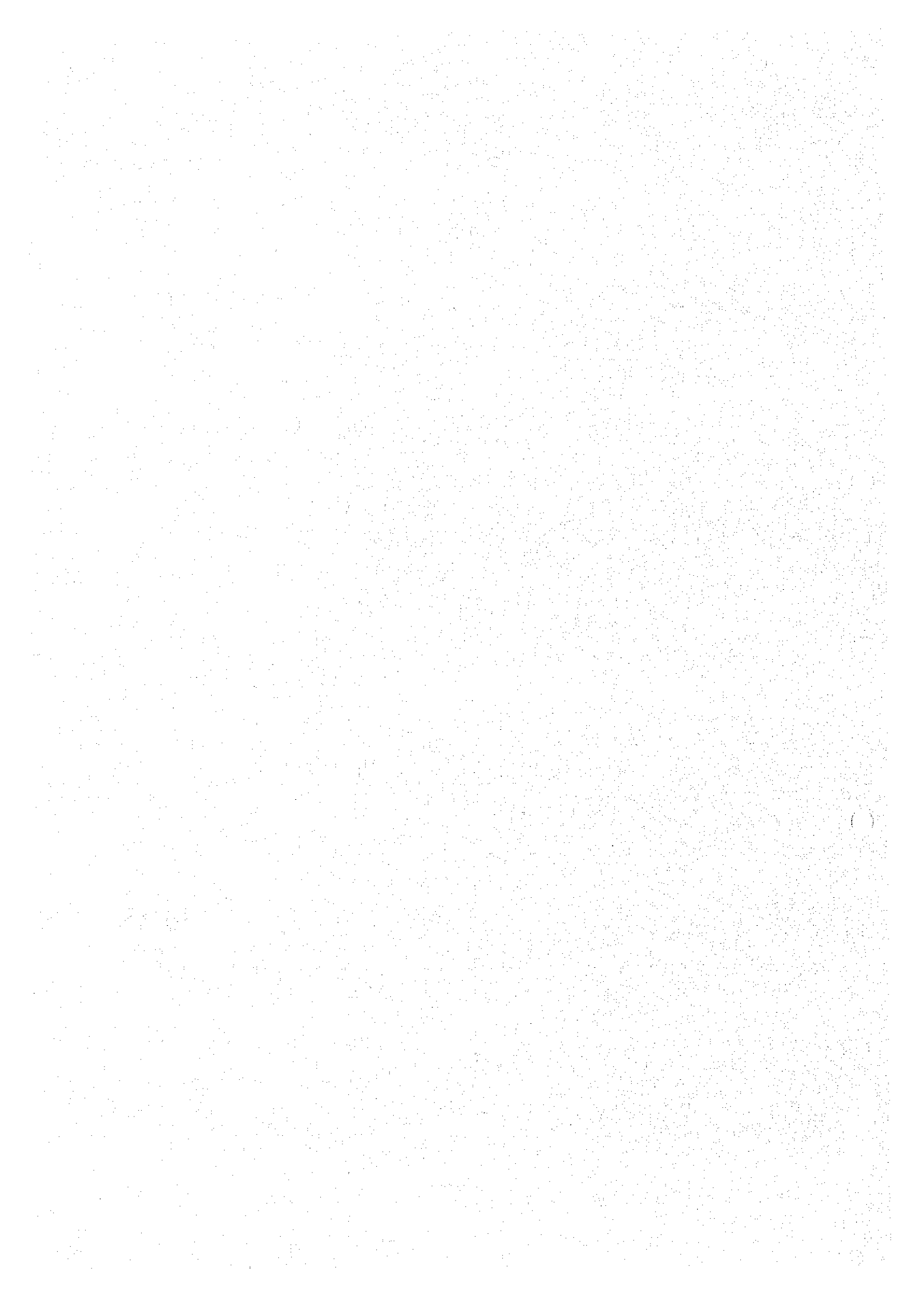
The recent progress in the development of the deep ocean floor implies the possibility to recover cobalt from manganese nodules in near future. If a project of the deep ocean development is commercialized, cobalt will be oversupplied in the world market.

Never-the-less, the recovery of cobalt would contribute substantially to the profitability of the mine, if it is commercially realized.

It will be indispensable to carry out an extensive research including metallurgy, marketing of cobalt and sulphuric acid, capital and operating cost and others, before starting the program for the recovery of cobalt.

Unfortunately, this report cannot go in detail on this subject any further due to insufficient time and information.

APPENDICES



APPENDIX-1 LIST OF ORE RESERVE

Ore Block	Ledger	Proved		Probable		Remarks
		Tonnage(M.T.)	Cu %	Tonnage(M.T.)	Cu %	
45-650. Ser. R. Pillar	E-2	32,000	1.34			Temporary Pillar
45-2100. 48-18 Rem.	E-3	1,000	1.75			Temporary Pillar
48-17 Rem.	E-3	3,000	2.33			Temporary Pillar
Dome Central. Rem-17	E-4	1,000	4.00			
Rem-18	E-4	1,400	2.00			
Rem-3	E-4	500	1.69			
Rem-1	E-4	2,000	2.32			
Rem-23	E-4	500	4.00			
Rem-2	E-4	6,000	2.65			
Dome West. Rem-11	E-5	7,000	1.65			H.W. Ore
12-Hlge.	E-5	7,000	1.65			Temporary Pillar
43-680. 160. Ser.R.	E-8	2,000	2.05			Temporary Pillar
7 Hlge.	E-8	16,500	1.75			Temporary Pillar
43-900N. 11 Hlge.	E-9	11,500	1.90			Temporary Pillar
43-900W. 5 Hlge.	E-10	9,700	1.29			Temporary Pillar
43-900S. 43-720 Rem.	E-10	1,000	1.30	1,200	1.30	
W. of Dike	E-10	13,000	1.29			
1200 Shaft	E-11	110,000	1.71			Temporary Pillar
43-1300/1600. Pillar	E-12	18,000	2.24			Temporary Pillar
43-1610/i617. 43-1610	E-13	5,000	2.02			
1810 S.R.	E-13	2,200	1.90			Temporary Pillar
43-2600W. 2550	E-15	1,000	2.23			Temporary Pillar
3 Hlge.	E-15	3,000	1.78			Temporary Pillar
2580 Rib.	E-15	13,200	1.83			Temporary Pillar
4303 Sill	E-15	9,000	1.78			Temporary Pillar
2460 Rib.	E-15	6,100	1.70			Temporary Pillar

Ore Block	Ledger	Proved		Probable		Remarks
		Tonnage(M.T.)	Cu %	Tonnage(M.T.)	Cu %	
43-2700 W/S. 4303 Sill	E-16	2,000	2.54			Temporary Pillar
43-27 Low.	E-16	4,500	1.83			Temporary Pillar
10 Hlge.	E-16	8,000	1.61			Temporary Pillar
44-2700 2680 Rib	E-16	7,500	1.92			Temporary Pillar
2550 S.R.	E-16	14,000	1.34			Temporary Pillar
2850 Rib	E-16	3,000	1.81			Temporary Pillar
44-2000W. 1770	E-17	1,000	2.06			Temporary Pillar
1780	E-17	3,000	1.96			Temporary Pillar
3 Hlge.	E-17	2,000	1.86			Temporary Pillar
12 Hlge.	E-17	6,500	1.83			Temporary Pillar
2050 XC 4513	E-18	19,800	1.65			Temporary Pillar
43-15 East	E-19	2,800	1.45			
42-07 H.W.	E-20	21,000	1.62			
42-05 H.W./4203	E-20	71,400	1.08			
740 Sect.	E-20	12,000	1.13			
42-1800 1390 F.W.	E-20	5,100	1.17			
1390 H.W.	E-20	45,800	1.06			
4304 Hlge	E-20	6,400	1.82			Temporary Pillar
42-1600 1390/1450	E-20	16,400	1.38			
42-33 East	E-21	10,300	2.19			
42-11	E-21	2,200	1.27			
41-27 East	E-22	4,600	1.78			
2000 Shaft Access	E-23	38,100	2.25			Temporary Pillar
2000 Shaft	E-23	14,000	1.54			Temporary Pillar
S. of 2000 Shaft	E-23	6,200	2.73			

Section	Ore Block		Av. Thick (Ft.)	Av. Grade (Cu %)	Tonnage (M.T.)	Extractable Ore		Dilution		Minable Ore		Remarks
	Level					Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	
1350 W	6535 - 6466		25	1.31	12,500	10,600	1.31	1,590	.20	12,190	1.17	
1400 W	6531 - 6526		27	1.19	10,000	8,500	1.19	1,230	.20	9,730	1.06	
1450 W	6455 - 6411		46	.71	10,600	9,010	.71	1,350	.20	10,360	.64	
1500 W	6501 - 6416		37	1.23	15,400	13,100	1.23	1,970	.20	15,070	1.10	
	6338 - 6290		50	.92	64,200	54,600	.92	8,190	.20	62,790	.83	
1550 W	6534 - 6517		24	1.37	2,710	2,300	1.37	350	.20	2,650	1.22	
	6386 - 6258		33	1.29	36,300	30,900	1.29	4,640	.20	35,540	1.15	H.W. Ore
	6393 - 6318		22	1.21	14,800	12,600	1.21	1,890	.20	14,490	1.08	F.W. Ore
1600 W	6583 - 6518		20	1.58	16,300	13,900	1.58	2,090	.20	15,990	1.40	
	6383 - 6318		30	.74	13,800	11,700	.74	1,760	.20	13,460	.67	F.W. Ore
1650 W	6551 - 6506		23	1.27	25,400	21,600	1.27	3,240	.20	24,840	1.13	
	6381 - 6316		21	1.25	8,540	7,360	1.25	1,090	.20	8,350	1.11	F.W. Ore
1700 W	6557 - 6547		29	.99	6,460	5,490	.99	820	.20	6,310	.89	
	6018 - 5940		22	1.55	27,300	23,200	1.55	3,480	.20	26,680	1.37	1720 Winz Pillar

Section	Ore Block		Av. Thick (Ft.)	Av. Grade (Cu %)	Tonnage (M.T.)	Extractable Ore		Dilution		Minable Ore		Remarks
	Level					Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	
1750 W	6610 - 6606		28	1.08	30,800	26,200	1.08	3,930	.20	30,130	.97	H.W. Ore
	6381 - 6167		52	1.30	67,100	57,000	1.30	8,550	.20	65,550	1.16	1760 Winz Pillar
	6561 - 6545		25	2.45	11,000	9,350	2.45	1,400	.20	10,750	2.16	F.W. Ore
1800 W	6509 - 6446		83	1.52	37,500	31,900	1.52	4,790	.20	36,690	1.35	
	6463 - 6202		22	1.82	31,500	26,800	1.82	4,020	.20	30,820	1.61	H.W. Ore
	6202 - 5934		18	1.66	30,400	25,800	1.66	3,870	.20	29,670	1.47	H.W. Ore
	6427 - 6201		24	1.11	30,200	25,700	1.11	3,860	.20	29,560	.99	F.W. Ore
	6009 - 5938		17	1.10	7,290	6,200	1.10	930	.20	7,130	.98	F.W. Ore
1850 W	6605 - 6603		61	2.01	12,500	10,600	2.01	1,590	.20	12,190	1.77	
1840 W	6107 - 6025		65	1.39	16,000	13,600	1.39	2,040	.20	15,640	1.23	
1860 W	6107 - 6029		55	1.40	13,800	11,730	1.40	1,760	.20	13,490	1.24	
1900 W	6673 - 6646		28	.92	8,750	7,440	.92	1,120	.20	8,560	.83	
	6637 - 6620		14	3.23	4,580	3,890	3.23	580	.20	4,470	2.84	H.W. Ore
	6597 - 6583		27	1.41	8,540	7,260	1.41	1,090	.20	8,350	1.25	F.W. Ore
1950 W	6704 - 6655		16	1.28	7,920	6,730	1.28	1,010		7,740	1.14	
2000 W	5985 - 5870		38	3.85	46,300	39,400	3.85	5,910	.20	45,310	3.37	
2050 W	6687 - 6637		36	1.70	30,400	25,800	1.70	3,870	.20	29,670	1.50	

Section	Ore Block Level	Av. Thick (Ft.)	Av. Grade (Cu %)	Tonnage(M.T.)	Extractable Ore		Dilution		Minable Ore		Remarks
					Tonnage(M.T.)	Cu %	Tonnage(M.T.)	Cu %	Tonnage(M.T.)	Cu %	
2100 W	6674 - 6624	26	1.64	31,700	26,900	1.64	4,040	.20	30,940	1.45	
2150 W	6657 - 6612	34	1.73	19,000	16,200	1.73	2,430	.20	18,630	1.53	
2250 W	6587 - 6573	20	1.25	7,920	6,730	1.25	1,010	.20	7,740	1.11	
	6381 - 6279	68	2.16	46,300	39,400	2.16	5,910	.20	45,310	1.90	
	6185 - 6062	19	1.14	11,500	9,780	1.14	1,470	.20	11,250	1.02	
2300 W	6536 - 6520	15	.98	9,380	7,970	.98	1,200	.20	9,170	.88	
	6383 - 6284	67	1.52	49,000	41,700	1.52	6,260	.20	47,960	1.35	
2350 W	6384 - 6270	44	1.37	37,300	31,700	1.37	4,760	.20	36,460	1.22	
2400 W	6480 - 6265	18	1.14	30,800	26,200	1.14	3,930	.20	30,130	1.02	
2450 W	6698 - 6531	21	.96	30,200	25,700	.96	3,860	.20	29,560	.86	
	6568 - 6565	15	1.45	6,250	5,310	1.45	800	.20	6,110	1.29	
	6554 - 6510	14	1.78	8,330	7,080	1.78	1,060	.20	8,140	1.57	
	6480 - 6305	18	1.20	22,700	19,300	1.20	2,900	.20	22,200	1.07	
2500 W	6730 - 6591	23	1.10	27,900	23,700	1.10	3,560	.20	27,260	.98	
	6538 - 6527	24	1.35	18,100	15,400	1.35	2,310	.20	17,710	1.20	
	6540 - 6265	14	1.15	31,000	26,400	1.15	3,960	.20	30,360	1.03	

Section	Ore Block Level	Av. Thick (Ft.)	Av. Grade (Cu %)	Tonnage(M.T.)	Extractable Ore		Dilution		Minable Ore		Remarks
					Tonnage(M.T.)	Cu %	Tonnage(M.T.)	Cu %	Tonnage(M.T.)	Cu %	
2550 W	6704 - 6593	18	.87	18,100	15,400	.87	2,310	.20	17,710	.78	
	6581 - 6539	20	1.18	10,600	9,010	1.18	1,350	.20	10,360	1.05	
	6510 - 6336	16	.99	24,800	21,100	.99	3,170	.20	24,270	.87	
2600 W	6756 - 6724	25	.93	6,250	5,310	.93	800	.20	6,110	.83	
	6686 - 6603	21	1.11	16,300	13,900	1.11	2,090	.20	15,990	.99	
	6521 - 6454	19	1.23	11,300	9,610	1.23	1,440	.20	11,050	1.10	
2650 W	6792 - 6764	20	.95	4,580	3,890	.95	580	.20	4,470	.85	
	6691 - 6604	33	.95	20,000	17,000	.95	2,550	.20	19,550	.85	
	6580 - 6529	19	1.04	10,200	8,670	1.04	1,300	.20	9,960	.93	
	6502 - 6489	16	1.82	6,040	5,130	1.82	770	.20	5,900	1.61	
2700 W	6853 - 6727	19	1.26	15,000	12,800	1.26	1,920	.20	14,720	1.12	
	6686 - 6640	31	1.10	11,300	9,610	1.10	1,440	.20	11,050	.98	
	6581 - 6515	16	2.06	10,800	9,180	2.06	1,380	.20	10,560	1.82	
2750 W	6845 - 6652	27	.96	36,000	30,600	.96	4,590	.20	35,190	.86	
	6580 - 6502	17	1.35	9,790	8,320	1.35	1,250	.20	9,570	1.20	
2800 W	6879 - 6725	26	.92	27,100	23,000	.92	3,450	.20	26,450	.83	
	6686 - 6649	36	1.71	15,600	13,300	1.71	2,000	.20	15,300	1.51	
	6579 - 6502	19	.92	8,750	7,440	.92	1,120	.20	8,560	.83	

Section	Ore Block		Av. Thick (Ft.)	Av. Grade (Cu %)	Tonnage (M.T.)	Extractable Ore		Dilution		Minable Ore		Remarks
	Level					Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	
2850 W	6908 - 6889		19	.85	4,790	4,070	.85	610	.20	4,680	.77	
	6869 - 6741		24	.93	17,900	15,200	.93	2,280	.20	17,480	.83	
	6685 - 6657		37	2.23	12,300	10,500	2.23	1,580	.20	12,080	1.96	
	6580 - 6533		12	1.51	5,000	4,250	1.51	640	.20	4,890	1.34	
2900 W	6964 - 6899		18	1.77	6,460	5,490	1.77	820	.20	6,310	1.57	
	6868 - 6729		19	1.35	18,500	15,700	1.35	2,340	.20	18,040	1.20	
	6686 - 6657		25	.95	7,290	6,200	.95	930	.20	7,130	.85	
2950 W	6927 - 6891		13	1.57	3,960	3,370	1.57	510	.20	3,880	1.39	
	6791 - 6742		9	1.93	3,330	2,830	1.93	420	.20	3,250	1.71	
	6687 - 6640		27	1.16	14,000	11,900	1.16	1,790	.20	13,690	1.03	
3000 W	6701 - 6645		24	1.00	10,600	9,010	1.00	1,350	.20	10,360	.90	
3050 W	6807 - 6738		19	2.10	11,700	9,950	2.10	1,490	.20	11,440	1.85	
3100 W	6807 - 6738		19	2.10	11,700	9,950	2.10	1,490	.20	11,440	1.85	
3150 W	6888 - 6821		16	2.10	8,330	7,080	2.10	1,060	.20	8,140	1.85	
3220 W	6891 - 6830		20	1.70	22,500	19,100	1.70	2,870	.20	21,970	1.50	
	6818 - 6761		16	1.29	14,400	12,200	1.29	1,830	.20	14,030	1.15	

Section	Ore Block		Av. Thick (Ft.)	Av. Grade (Cu %)	Tonnage (M.T.)	Extractable Ore		Dilution		Minable Ore		Remarks
	Level					Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	
12 XC	5722 - 5622		24	1.07	25,400	21,600	1.07	3,240	.20	24,840	.97	
13 XC	5719 - 5703		14	1.66	2,000	1,700	1.66	260	.20	1,960	1.47	
	5671 - 5595		26	1.14	24,000	20,400	1.14	3,060	.20	23,460	1.02	
1535 W	5856 - 5820		18	1.23	8,750	7,440	1.23	1,120	.20	8,560	1.10	
	5600 - 5578		28	.52	7,290	6,200	.52	930	.20	7,130	.48	
1600 W	5616 - 5607		12	1.28	2,380	2,020	1.28	300	.20	2,220	1.14	
1680 W	5940 - 5578		20	1.44	36,500	31,000	1.44	4,645	.20	35,650	1.28	
1720 W	5940 - 5578		20	1.44	52,100	44,300	1.44	6,650	.20	50,950	1.28	1720 Winz Filler
18 XC	5938 - 5605		14	1.37	47,300	40,200	1.37	6,030	.20	46,230	1.22	
1800 W	5570 - 5536		15	1.87	9,630	8,190	1.87	1,230	.20	9,420	1.65	
19 XC	5743 - 5657		10	3.00	8,000	6,800	3.00	1,020	.20	7,820	2.63	
1900 W	5580 - 5523		21	2.08	15,000	12,800	2.08	1,920	.20	14,720	1.83	

Section	Ore Block		Av. Thick (Ft.)	Av. Grade (Cu %)	Tonnage (M.T.)	Extractable Ore		Dilution		Minable Ore		Remarks
	Level					Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	
20 XC	5735 - 5702		24	1.46	7,000	5,950	1.46	890	.20	6,840	1.30	
21 XC	5767 - 5698		19	1.38	9,670	8,220	1.38	1,230	.20	9,450	1.23	
	5587 - 5531		29	1.39	13,700	11,600	1.39	1,740	.20	13,340	1.23	
22 XC	5804 - 5697		18	1.45	17,000	14,500	1.45	2,180	.20	16,680	1.29	
	5592 - 5568		22	2.92	6,670	5,670	2.92	850	.20	6,520	2.57	
	5546 - 5516		19	2.03	6,330	5,380	2.03	810	.20	6,190	1.79	
	5498 - 5465		19	1.44	2,670	2,270	1.44	340	.20	2,610	1.28	
23 XC	5769 - 5675		17	1.08	14,700	12,500	1.08	1,880	.20	14,380	.96	
	5630 - 5606		17	1.83	7,000	5,950	1.83	890	.20	6,840	1.62	
24 XC	5772 - 5688		17	1.61	14,300	12,200	1.61	1,830	.20	14,030	1.43	
25 XC	5799 - 5630		27	1.42	32,300	27,500	1.42	4,130	.20	31,630	1.26	
	5636 - 5533		23	.62	35,000	29,800	.62	4,470	.20	34,270	.57	
	5563 - 5476		23	1.26	20,300	17,300	1.26	2,600	.20	19,900	1.12	
26 XC	5787 - 5727		24	1.10	32,700	27,800	1.10	4,170	.20	31,970	.98	
	5690 - 5653		10	1.31	5,670	4,820	1.31	720	.20	5,540	1.17	
	5563 - 5533		25	.74	6,870	5,670	.74	850	.20	6,520	.67	

Section	Ore Block		Av. Thick (Ft.)	Av. Grade (Cu %)	Tonnage (M.T.)	Extractable Ore		Dilution		Minable Ore		Remarks
	Level					Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	
6 XC	4800 - 4714		15	1.09	20,300	17,300	1.09	2,600	.20	19,900	.97	
	4605 - 4577		19	2.22	16,000	13,600	2.22	2,040	.20	15,620	1.96	
7 XC	4829 - 4770		15	1.54	4,000	3,400	1.54	510	.20	3,910	1.37	
	4786 - 4770		15	1.54	1,200	1,000	1.54	150	.20	1,150	1.37	
8 XC	4670 - 4622		26	2.11	31,300	26,600	2.11	3,990	.20	30,590	1.86	
	4782 - 4757		25	1.74	5,300	4,500	1.74	680	.20	5,180	1.54	
9 XC	4664 - 4649		42	1.12	10,000	8,500	1.12	1,280	.20	9,780	1.00	
	4860 - 4826		28	1.66	4,700	4,000	1.66	600	.20	4,600	1.47	
10 XC	4782 - 4755		32	1.62	8,000	6,800	1.62	1,020	.20	7,820	1.43	
	4664 - 4640		38	1.86	11,300	9,600	1.86	1,440	.20	11,040	1.64	
11 XC	4836 - 4832		49	1.79	8,700	7,400	1.79	1,110	.20	8,510	1.58	
	4783 - 4707		42	2.13	33,700	28,600	2.13	4,290	.20	32,890	1.88	
11 XC	4707 - 4640		11	1.93	7,300	6,200	1.93	930	.20	7,130	1.70	
	4584 - 4545		15	1.24	6,300	5,400	1.24	810	.20	6,210	1.10	
11 XC	4937 - 4883		32	2.65	19,300	16,400	2.65	2,460	.20	18,860	2.33	
	4843 - 4813		40	3.11	16,000	13,600	3.11	2,040	.20	15,640	2.73	
11 XC	4795 - 4630		19	1.88	31,700	26,900	1.88	4,040	.20	30,940	1.66	

Section	Ore Block		Av. Thick (Ft.)	Av. Grade (Cu %)	Tonnage (M.T.)	Extractable Ore		Dilution		Minable Ore		Remarks
	Level					Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	Tonnage (M.T.)	Cu %	
12 XC	5010 - 4822		21	3.07	37,300	31,700	3.07	4,760	.20	36,460	2.70	
	4786 - 4682		17	1.24	20,000	17,000	1.24	2,550	.20	19,550	1.10	
13 XC	5010 - 4838		18	2.52	31,700	26,900	2.52	4,040	.20	30,940	2.22	
	4589 - 4547		24	1.46	13,300	11,300	1.46	1,700	.20	13,000	1.30	
14 XC	5049 - 4826		14	1.95	34,700	29,500	1.95	4,430	.20	33,930	1.72	
	4588 - 4543		34	1.34	14,700	12,500	1.34	1,880	.20	14,380	1.19	
15 XC	4793 - 4720		20	1.66	17,000	14,500	1.66	2,180	.20	16,680	1.47	
	4588 - 4541		10	1.56	9,000	7,700	1.56	1,160	.20	8,860	1.38	
16 XC	4923 - 4834		13	1.70	19,700	11,600	1.70	1,740	.20	13,340	1.50	
	4793 - 4726		15	2.21	10,000	8,500	2.21	1,280	.20	9,780	1.95	
	4705 - 4637		21	.85	15,000	12,800	.85	1,920	.20	14,720	.77	
17 XC	4920 - 4818		13	3.05	16,700	14,200	3.05	2,130	.20	16,330	2.68	
	4793 - 4767		14	3.02	4,300	3,700	3.02	560	.20	4,260	2.65	
18 XC	5009 - 4972		27	2.34	10,700	9,100	2.34	1,370	.20	10,470	2.06	
	4949 - 4809		27	2.62	50,000	42,500	2.62	6,380	.20	48,880	2.30	

APPENDIX-2 PRESENT CONDITIONS OF MACHINES AND EQUIPMENT

KILEMBE MINE

APPENDIX-2

PRESENT CONDITIONS OF MACHINES AND EQUIPMENT

(KILEMBE MINE)

1. Underground Facilities

(1) Hoist Motors

Capacity(HP)	Voltage	RPM	Nos. Operative	Nos. Inoperative
250	3300	750	3	0
250	3300	585	1	0
160	415	960	3	1
100	415	740	1	1
90	415	735	1	1
150	415	735	1	1

(2) Rock Drills and Air-legs

Type	Weight (kg)	Length (mm)	Dia. (In.) of Cylinder	Stroke (mm)	Numbers Operative	Inoperative
3-Jack Hammer	23	590	3	33	200	32
3-Stoper	41	1,450	1	33	31	70
3-Air-legs		1,125	$2\frac{1}{16}$	900	163	33
Unified Air legs	5	1,450	$2\frac{15}{16}$	1,300		

(3) Shovel Loaders

Type	Bucket (m ³)	Loading Ability (m ³ /Min)	Weight (t)	Numbers Operative	Inoperative
Eimco 803 Hopper Loader	0.295	1.27	4.45	2	2
Cavo 310 Jopper Loader	0.124	0.99	3.27	4	3
Eimco 21B Rocker Shovel	0.28	1.4	3.27	28	13

(4) Scraper

Type	Capacity (HP)	Numbers	
		Operative	Inoperative
J.S. 2 Drums	20	8	4
J.S. 2 Drums	30	16	1
J.S. 2 Drums	50	4	2
Pikrose S2A 2 Drums	25	35	2
Picrose S2A 3 Drums	25/45	14	2
Picrose 2 Drums	35	11	2
Picrose S1 1 Drum	7.5	2	2
Picrose S Air, 1 Drum	-	0	5

(5) Mine Cars

Type	Dumping Mechanism	Capacity (m ³)	Weight (kg)	Numbers Operative	Inoperative
Hudson	Mannal	0.54	510	10	12
Hudson	Mannal	0.67	510	8	12
Hudson	Mannal	0.75		11	17
Hudson	Cylinder	1.3		103	119
Allen	Cylinder	1.4	1,400	46	45
Gregg	Ramp Cylinder	2.2		7	12
Hudson	Ramp Cylinder	2.4	2,930	73	82
Gregg	Ramp Cylinder	3.5	5,130	21	28
Gregg	Ramp Cylinder	3.4	3,590	4	8
Hudson	Ramp Cylinder	4.8	5,130	10	8

(6) Locomotives

Type	Motor(HP)	Weight (kg)	Speed (km/H)	Numbers Operative	Inoperative
Electric Clay- ton $3\frac{1}{2}$ ton	11	3,290	5.8	8	2
Electric Clay- ton $7\frac{1}{2}$ ton	2-30	8,630	3.84	4	0
BEV 128	2-18	7,000	6.4-12.8	8	14
BEV 227	2-4	5,000	6.4-12.8	7	8
BEV 417	4	2,000	5.6-9.6	10	14
Westing House	25	8,000		0	3
IME-2C3-A2			8.8	1	0

(7) Motors For Locomotives

Type	Capacity(HP)	Voltage(V)	Numbers Operative	Inoperative
Electric $3\frac{1}{2}$ ton	11	72	9	4
Electric $7\frac{1}{2}$ ton	30	240	3	3
128	18	240	2	0
227	4	60	10	12
417	4	48	8	9
128 BT	19	240	1	10
128	15/12	96	1	25

(8) Batteries For Locomotives

Type	Capacity(Ah)	Voltage(V)	Numbers	
			Operative	Inoperative
$3\frac{1}{2}$ Clayton	263	72	9	8
$7\frac{1}{2}$ Clayton	263	192	6	6
BEV 128BT	389	168	1	10
BEV 128	445	96	10	25
BEV 227	445	60	10	24
BEV 417	389	48	8	18

(9) Pumps

Type	Capacity(l/min)	Numbers Operative	Inoperative
A.Sh Pump	730-2,200	36	29
3GT Pump	2,730	3	3
Mono-Pump	360	10	18
Harland Pump	2,390	3	0
DRL SBx5B		2	3
DRL 6Bx8B		2	1
DRL 8Bx10B		1	0
Holman Pump		3	3
C.P. Pump		3	2
Warman Pump		1	2

(10) Motors For Pumps

Type	Capacity(HP)	Voltage(V)	RPM	Numbers Operative	Inoperative
D106/D108L	15	415	960	2	12
Flygt B2125	11	415	2,800	1	15
D6M6K	25	415	1,100	6	3
B831V-2	30	415	1,450	11	7
B831V-2	90	415	2,930	2	10
2613/57	100	415	2,960	0	2
UZ 572	180	415	1,485	2	1
B831V-2	50	415	1,460	1	2

(11) Ventilation Fans

Type	Motor(HP)	Dia.(In.)	Capacity (m3/min)	Numbers	
				Operative	Inoperative
Buffalo	50	54	1,500	2	0
Aeroto	50	60	1,500	1	0
Woods	50	60	1,850	2	4
Woods	2-25	30	1,300	2	0
Woods	10	24	440	2	0
Woods	8,6	19	220	2	1
Woods	4	19	150	0	1
Woods	4	15	110	0	1
Safanco	45	30	1,100	4	2
Meco	10	24	500	2	1
Meco	5	20	300	4	6
Meco Air CF4		16	150	3	0

2. Mill Plant Facilities

(1) Primary Crushing Section

Items	Nos.	Specification	Present Condition
Trench Scraper	1	56"J212	Operative
Grizzly	1	4'x5'	Operative
Telsmith Feder	1	48"x10 1/2"	To be replaced
Brake Crusher	1	48"x36",	Liner worn out
P1 Conveyor	1	750mmx53.4m	Operative
Double Deck Screen	1	5'x10'	Operative
P2 Conveyor	1	900mmx50m	Belt damaged
Magnet for P2 Conveyor	1		Operative
P3 Conveyor	1	900mmx54.6m	Belt damaged
P4 Conveyor	1	750mmx54m	Belt damaged
P5 Shuttle Conveyor	1	750mmx72m	Belt removed Gear damaged
Classifier	1	66"	Screw damaged
Wood chip Screen	1		Operative
P6 Conveyor	1	450mmx108.6m	Gear damaged
Surge Bin	1	18'x20', 200tons	Good
Manual Hoist	1	10 tons	Operative
Electric Hoist	1	1 tons	Operative
Pumps	12		Operative

(2) Secondary Crushing Section

Items	Nos.	Specifications	Present Condition
Stockpile chute	15	3/8" thick	4 damaged
Vibrating Feeder	2	12'x4'	damaged
S1 Conveyor	1	900mmx156m	Belt damaged
S1 Conveyor Magnet	1	36"x27"	Operative
S2 Conveyor	1	750mmx105m	Belt damaged
Conc Crusher	1	5 $\frac{1}{2}$ ' Standard	Operative
S3 Conveyor	1	750mmx45m	Belt damaged
S3 Conveyor Magnet	1	36"x27"	Operative
Screen	2	6'x16', 3/4"	Screen damaged
Electric Crane	1	15 tons	Operative
Conc Crusher	2	5 1/2' Short Head	Operative

Cont....

Items	Nos.	Specifications	Present Condition
S4 Conveyor	1	600mmx54m	Belt damaged
S5 Conveyor	1	750mmx56.4m	Belt damaged
S6 Conveyor	1	750mmx62.7m	Belt damaged
S7 Conveyor	1	750mmx64.5m	Belt damaged
S8 Conveyor	1	600mmx135m	Belt damaged
S9 Conveyor	1	600mmx218.4m	Operative
S9 Conveyor Tripper	1		Chute damaged
Electric Crane	1	10 tons	Operative
No.1--No.5 Silos	5	26'x32', 850tons	Steel plates of side walls damaged
No.6 Silo	1	36'x32', 1600tons	Steel plates of side walls damaged
Vibrating Feeders	8		Operative

(3) Grinding Section

Items	Nos.	Specifications	Present Condition
No.1/2 Weightmeter	2		Operative
No.4 Rod Mill	1	8'x12', 18rpm	Operative
Distributor	1	5'2"x6'	Operative
No.3 Cyclone	2	24"	Operative
No.3 Ball Mill	1	8'6"x8', 21.5rpm	Outlet frange damaged
No.5 Cyclone	2	24"	Operative
No.5 Ball Mill	1	8'4"x8', 18rpm	Operative
No.7 Rod Mill	1	2.2mx3m	Operative
No.6 Cyclone	2	18"	Operative
No.6 Ball Mill	1	7'x8', 22rpm	Gear box damaged
Overhead Travelling Crane	2	10 tons	One inoperative due to lack of electrical parts
No.1 Thickener	1	30'x10', 68rpm	Operative
No.2 Thickener	1	30'x10', 25rpm	Operative
No.3 Thickener	1	50'x10'	Operative
Silo Conveyors	4	600mmx90m, 600mmx36m	Operative
Weightmeters	2	600mmx18m, 450mmx33m	Operative
Classifier	1	42"	Operative
Dorroco Pumps	2	4", Rubber Diaphragm	No spare diaphragms
Spargo Pump	1	8", Rubber Liner	Operative
Spargo Pump	1	4", Rubber Liner	Bed frame damaged
Vacseal Pump	2	4", Rubber Liner	Operative

(4) Flotation

Items	Nos.	Specifications	Present Condition
Flotators	74	#48 Agitairs	Cells highly corroded
Flotators	28	#24 Denver	Cells highly corroded
No.1 Cyclones	2	12", Rubber Lining	Operative
No.1 Ball Mill	1	5'x12', 30rpm	Gear box damaged
No.2 Cyclones	4	12" Rubber Lining	Operative
No.2 Ball Mill	1	5'x8', 28rpm	Operative
Crane	1	3 tons	Operative
A.Sh Pump	2	4", 5" Rubber Lining	Operative
Wilfley Pump	4	2", 3", 4", FC.	Operative
Blowers	2	12"x30", SS.	Operative
Cu. Conc. Tank	1	2.4 ^φ	in good condition
Py. Conc. Tank	1	2.4 ^φ	in good condition

(5) Lime Grinding

Items	No.s	Specifications	Present Condition
Feed Conveyor	1	600mmx30m	Operative
Screen	1	0.9mx2.4m, 1/2"th.	Operative
Classifier	1	30"	Operative
Ball Mill	1	0.9mx1.2m, 60rpm	Operative
Agitation Tank	1		Operative
Pumps	2		Operative
Distributor	1		Operative

(6) Filtering

Items	Nos.	Specifications	Present Condition
Thickeners	2	7.2mx3m, 12mx3m	Rake rubber damaged
Dorrco Pumps	4	4"	Diaphragms damaged
Disc Filter	2	1.8mx1.8m	Leaf frame damaged
Storage Tanks	2	4.2mx4.2m	in good condition
R1 Conveyor	1	750mmx45m	Belt damaged
R2 Conveyor	1	450mmx189m	Operative
R3 Conveyor	1	900mmx72m	Operative
Roots Blowers	2	1 1/2", FC	to be renewed
Vacuum Pumps	2	18"x7", FC	Casing broken

Cont....

Item	Nos.	Specifications	Present Condition
Pulsometer pump	1	4", FC	Bearings broken
Spargo Pump	1	2", Rubber Liner	Bearings broken
Wilfley Pump	1	3", FC	Bearings broken
Vaccum Pump	1	FC	inoperative due to lack of spare parts
Allweiler Pumps	4		Bearings broken
Compressor	1		Operative
Vacseal	1	Rubber Liner	Operative
Water Pump	1	FC	Operative

3. Surface Transportation Facilities

Item	Oper- ative	Inope- rative	Specifications	Remarks
Land Rovers	19	5	2286CC	Engine Spare parts needed
Pick-up Trucks	15	13	1000-2197CC	Engine Spare parts needed
Bulldozers	9	7	67-245HP, Diesel	Spare parts needed one to be replaced
Graders	1	0	100HP	
Trailer Truck	0	1		Spare parts needed
Trucks w/ Hoist	1	2	7-6tons, Diesel	Spare parts needed
Trucks w/ Compressor	0	4	98-125HP	Spare parts needed one to be replaced
Tractors	5	2		Spare parts needed
MF Trailers	2	1	2 tons	Spare parts needed
Bucket loader	0	1	500kg	Spare parts needed
Roller	1	0	1200 m ϕ	in good condition
Crane Truck	0	1	3 tons	Spare parts needed
Cleaner	0	1		Spare parts needed
Truck w/ welding machine	1	0		in good condition
Lorries	4	19	4--6 tons	Spart parts needed 3 to be replaced

APPENDIX-3 PRICE ESTIMATIONS OF MACHINES, EQUIPMENT AND THEIR
SPARE PARTS.

KILEMBE MINE

Underground (2)

Facilities, Machines	Items	Specifications	Quantity	Weight (kg)	Estimated Price		
					1000 Yen	1000 U.S\$	US.\$
Scrapers, Slashers	Ropes	1/2"	4000 m	2,000	800	28	3,571
	Main Bodies	2DS-50M	2	6,600	9,000	319	40,179
	Main Bodies	2DS-30M	7	17,500	19,600	694	87,500
	Main Bodies	3DS-20M	4	12,800	14,400	510	64,286
	Spare Parts		1 set	2,000	8,600	304	38,393
	Buckets	AM650	3	3,000	1,260	45	5,625
		AM750	1	650	550	19	2,455
Dump Loader	Main Bodies	T5H.42m ³ x7.t x 60m ³ /Hr	4	28,000	47,000	1,664	209,821
	Main Bodies	T3H.2m ³ x 3.8tx38m ³ /Hr	4	15,200	25,520	903	113,929
	Air Hose	2" x 20m	5	100	500	18	2,232
	Air Hose	1.1/2" x 20m	5	100	500	18	2,232
	Spare Parts		1 set	3,000	14,500	513	64,732
Mine Cars	Main Body	5m Granby	10	60,000	149,500	5,293	667,411
	Main Body	1.5m ³ Granby	10	15,000	58,500	2,071	261,161
	Main Body	1m ³ Flat	10	10,000	55,900	1,979	249,554
	Bearings		200	2,000	2,000	71	8,929
	Wheels		100	2,000	2,000	71	8,929
	Plates	6T, SS41	1 set	5,000	1,000	35	4,464
	Rails	30 lb/yd	400 m	6,000	660	23	2,946
	Rails	45 lb/yd	400 m	9,000	970	34	4,330

Surface (1)

Facilities, Machines	Items	Specifications	Quantity	Weight(kg)	Estimated Price		
					1000 Yen	1000 U.Sh	US.\$
Transportation	Land Rover		1	1,500	1,640	58	7,321
	The above Spare parts		1 set	300	820	29	3,660
	Vans, & Pick-Ups		2	4,000	3,000	106	13,393
	Bulldozer	Cat. D8K	1	37,000	36,240	1,283	161,786
	Bulldozer	Cat. D7C	1	20,000	25,240	894	112,679
	Trucks with Cranes	with 6t & 3t Cranes	2	10,000	8,620	305	38,482
	Truck with Cranes	with 4.5 & 3t Cranes	1	4,000	3,850	136	17,188
	Folk Lift	2 tons	1	3,300	2,100	74	9,375
	Crane Car	15 tons TL-150	1	20,000	19,800	701	88,393
	Lorry	6 tons	1	3,500	2,720	96	12,143
	Spare parts	for new vehicles	1 set	10,000	31,200	1,105	139,286
	Spare parts	for old vehicles	1 set	3,000	8,000	283	35,714
	Machine Shop	Horizontal Borining		1	5,000	12,500	443
Milling Machine			1	3,000	15,500	549	69,196
Turning Lathe			1	5,000	11,500	407	51,339
Welding Machine		Gas Engine EGW-270YS	2	1,300	2,400	85	10,714
Starters		300A, 200A		300	5,000	177	22,321
Telephone			8	300	5,200	184	23,214
Spare parts			1 set	10,000	5,000	177	22,321
Elemental Materials			1 set	50,000	15,000	531	66,964

APPENDIX-4. BASIC DATA FOR OPERATING COST ESTIMATION

KILEMBE MINE

Mining-Development

	Major	Subordinate	Winze, Ventilation. etc.	Total	
				U.Sh.	US.\$
Scheduled Advance	300 m	200 m			
Nos. of Faces	11	8			
Advance/Round	1.3 m	1.3 m			
Labour Strength	99	64	(13)		
Machine	22	16			
Loader	11	-			
Timber	11	16			
Pipe & Rail	11	8			
General	44	24	13		
Nos. of Drills	28				
Nos. of Stoppers		20			
Nos. of Loaders	24				
Cost				374,725	47,254
Labour	99 x 21d x 43.13sh = 89,667 sh	66 x 21d x 43.13sh = 59,778 sh	13 x 21d x 43.13sh = 11,774sh	161,219	
Explosives	219sh x 300m = 65,700 sh	299.23sh x 200m = 59,846 sh	3,280sh	128,826	
ANFO	12.4kg/m	19.10kg/m			
Gelignite	3.1kg/m	4.78kg/m			
D.S.Det.	22.3 unit/m	22.3 unit/m			
Timber	1977 Budget 1,780 sh	Av. '75 - '77 37,000 sh	460sh	39,240	
Bits, Rods, etc.	15,660 sh	10,440 sh	1,340sh	27,440	
Reserves	Av. '75 & '76 6,000 sh	12,000 sh		18,000	

Mining-Subsidiary

	Diamond Drilling	Hoist & Trammimg	Administration	Total	
				U.Sh.	US.\$
Scheduled Advance	1000 m				
Nos. of Machines	3 units				
Advance/Shift	6 m				
Labour Strength	24	400	81		
Supervisor			26		
Artisan	2		37		
Ganger			4		
D.D.Operator	22				
Trammimg		268			
Hoisting		61			
Surf. Transport		71			
Office			8		
Others			6		
Cost				777,719	98,073
Man Power	23,327 sh	362,292 sh	207,790 sh	593,409	
Supervisor			26x4800sh = 124,800 sh		
Artisan	2 x 1700 sh		37x1700sh = 62,900 sh		
Labour	22x21dx43.13sh	400x21dx43.13sh = 362,292 sh	18x21dx53.15 = 20,091 sh		
Explosives		Av.75'/76' 0.267sh/ton 13,350 sh		13,350	
Timber		Av.75'/76' 0.27sh/ton 13,500 sh		13,500	
Supplies	45.60sh/m	Budget '77 0.43sh/ton 21,500 sh	Budget '77 16,320 sh	83,420	
Sundries		Budget '77 0.24sh/ton 12,000 sh	Budget '77 16,320 sh	28,320	
Reserves		Budget '77 0.28sh/ton 14,000 sh	Budget '77 600 sh	14,600	
Surf. Transport.			Budget '77 31,120 sh	31,120	

Milling Cost (Supplies)

Items	CONSUMPTION		UNIT PRICE		COST/Month	
	/Mill Feed Ton	/Month	Yen	U.Sh.	1000 Yen	U.Sh.
Operating Consumables						US.\$
Crusher Liners	28g	1.4T	400,000/T		560	19,825
Mill Liners	128g	6.4T	250,000/T		1,600	56,644
Grinding Rods	400g	20.0T	114,000/T		2,280	80,719
Grinding Balls	700g	35.0T	142,000/T		4,970	175,951
Flotation Reagents						
Z-200	13g	650 Kg	1,200/Kg		780	27,612
AX-325	7g	350Kg	400/Kg		140	4,956
AX-343	14g	700Kg	420/Kg		294	10,412
AF-238	2g	100Kg	450/Kg		45	1,594
DF-250	13g	650Kg	350/Kg		228	8,073
Lime	3.8Kg	190T		40 Sh/T		7,600
Filter Canvas		60 m ²	1,560/m ²		94	3,331
Repair Parts & Materials						
Spare parts for Pumps			160,000/Set		1,175	41,601
Spare parts for Flotators			130,000/Unit		519	18,374
Conveyor Belt		62.5m	130,000/m		813	28,778
Steel Bars, Plates		2T	70,000.T		140	4,956
Screen (Steel)		25m ²	8,600/m ²		215	7,613
Steel Pipes		570m			804	28,461
Lubricants		500Kg			186	6,582
Miscellaneous					980	34,694
Electricity	36.6 KWH	1,830 MWH		77/MWH		140,910
Crushing	3.6 KWH					
Grinding & Flotation	23.4 KWH					
Filter Plant	9.6 KWH					
Total (Material) Cost						648,439
						81,770

