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James Doyle Sell Mining Collection

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J. H. C.
JUN 10 1972

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

June 9, 1972

Mr. J. J. Collins
Director of Exploration
New York Office

Block-Cave Outcome

Dear Sir:

Enclosed are Mr. Crist's calculations showing the rate of return on a hypothetical deep, underground copper ore body amenable to block caving.

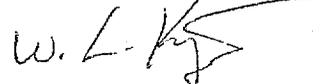
The total operating costs (\$3.45 per ton) used were arrived at after consultation with Messrs. MacDonald and Williams. The \$1.24 mining cost is the same as the Sacaton cost and, therefore, includes the latest round of wage increases. A comparison of Sacaton cost and those used in Mr. Crist's calculations are:

	Sacaton (10,500 tpd)	Crist's (40,000 tpd)
Mining	\$1.24	\$1.24
Milling	.74	.74
Indirect	.84	.99
Development	<u>.70</u>	<u>.48</u>
	\$3.52	\$3.45

The Freight-Smelter-Refinery charge of 14¢/lb. is approximately two cents higher than current charges.

I believe the calculations justify our continued exploration for both deep secondarily enriched ore bodies and deep primary ore bodies.

Very truly yours,


W. L. Kurtz

WLK:lad
Encs.

cc: JHCourtright - w/enc. 
RBCrist - w/o enc.

(000's OMITTED)

HYPOTHETICAL ESTIMATION
OF DEEP BLOCK CAVING INCOME

40,000 TPD - 20 Year Life - Minimum Reserve 320,000,000 Tons - \$200 Million Capital Expenditure

Recoverable Copper (1)		NSR (2) Value/Lb.	Market Value	Gross Inc./Year	Operating Cost/Year (3)	Fed. Inc. Tax	AFTER TAX				BEFORE TAX			CASE
Grade % Cu	Lbs./Ton						Cash Earnings	Payback Years	DCF- ROR	Earnings Per Lb. Cu	Cash Earnings	DCF- ROR	Earnings Per Lb. Cu	
0.6	12	.36	.50	63,072	50,370	648	12,054	16.9	1.6%	\$0.069	12,702	2.1	\$0.072	7A
0.8	16	.36	.50	84,096	50,370	5,694	28,032	7.1	11.0%	0.120	33,726	13.6	0.144	7B
1.0	20	.36	.50	105,120	50,370	13,911	40,839	4.9	16.6%	0.140	54,750	21.7	0.234	7C
0.6	12	.46	.60	80,592	50,370	4,853	25,369	7.9	9.7%	\$0.145	30,322	12.1	\$0.173	8A
0.8	16	.46	.60	107,456	50,370	14,865	42,221	4.7	17.1%	0.181	57,086	22.5	0.244	8B
1.0	20	.46	.60	134,320	50,370	25,825	58,125	3.4	22.9%	0.199	83,950	31.0	0.287	8C
0.6	12	.56	.70	98,112	50,370	11,052	36,690	5.5	14.9%	\$0.209	47,742	19.2	\$0.272	9A
0.8	16	.56	.70	130,816	50,370	14,796	65,650	3.0	25.4%	0.281	80,446	29.9	0.344	9B
1.0	20	.56	.70	163,520	50,370	37,739	75,411	2.7	28.4%	0.258	113,150	38.8	0.387	9C

(1) Recoverable Copper or Equivalent Values

(2) Freight-Smelter-Refinery 0.14/lb.

(3) Block Cave Mining, Milling, Indirects and Development Costs

Mining	\$1.24
Milling	.74
Indirects	.99 *
Development	.48 **
	\$3.45

* 50% of Total Direct Cost. The Indirect Costs include all State and Local Taxes plus general administrative and overhead.

** Yearly Capital Development Costs based on .04/lb. of lowest est. grade.

(000's OMITTED)

HYPOTHETICAL DEEP BLOCK CAVE
CASH FLOW AFTER TAX

40,000 TPD

	0.6%	0.8%	1.0%	0.6%	0.8%	1.0%	0.6%	0.8%	1.0%
COPPER GRADE	.50	.50	.50	.60	.60	.60	.70	.70	.70
COPPER PRICE									
CASE	7A	7B	7C	8A	8B	8C	9A	9B	9C
Capital Investment	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000
Gross Revenue	63,072	84,096	105,120	80,592	107,456	134,320	98,112	130,816	163,520
Less Operating Costs	50,370	50,370	50,370	50,370	50,370	50,370	50,370	50,370	50,370
Less Depreciation *	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Less Depletion	1,351	11,863	15,768	10,111	16,118	20,148	14,717	19,622	24,528
Taxable Income	1,351	11,863	28,982	10,111	30,968	53,802	23,025	30,824	78,622
Less Income Tax (48%)	648	5,694	13,911	4,853	14,865	25,825	11,052	14,796	37,739
<u>CASH EARNING AFTER TAX</u>	12,054	28,032	40,839	25,369	42,221	58,125	36,690	65,650	75,411
15% of Gross Income	9,461	12,614	15,768	12,089	16,118	20,148	14,717	19,622	24,528
Taxable Income Before Depletion	2,702	23,726	44,750	20,222	47,086	73,950	37,742	70,446	103,150
50%	1,351	11,863	22,375	10,111	23,543	36,975	18,871	35,223	51,575

*Straight Line Depreciation

BEFORE TAXES

CASE 7-A HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .6 PCT. GRADE \$.50 CU

CALCULATION OF RETURN ON INVESTMENT
TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 2.1 PCT	VALUE AT COMPLETION DATE
1ST	4,000,000	1.09809	4,392,374
2ND	18,000,000	1.07550	19,359,139
3RD	22,000,000	1.05338	23,174,506
4TH	76,000,000	1.03172	78,410,758
5TH	80,000,000	1.01050	80,840,000
TOTAL	\$200,000,000		\$206,176,777

PRODUCTION
CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS BEFORE TAXES	PRESENT VALUE	
		DISCOUNTED AT 2.1 PCT FACTOR	DISCOUNTED VALUE
1	12,702,000	0.989715	12,571,372
2	12,702,000	0.969359	12,312,803
3	12,702,000	0.949421	12,059,553
4	12,702,000	0.929893	11,811,511
5	12,702,000	0.910767	11,568,571
6	12,702,000	0.892034	11,330,628
7	12,702,000	0.873687	11,097,579
8	12,702,000	0.855717	10,869,323
9	12,702,000	0.838116	10,645,762
10	12,702,000	0.820878	10,426,799
11	12,702,000	0.803994	10,212,340
12	12,702,000	0.787458	10,002,292
13	12,702,000	0.771261	9,796,564
14	12,702,000	0.755398	9,595,068
15	12,702,000	0.739861	9,397,716
16	12,702,000	0.724643	9,204,423
17	12,702,000	0.709739	9,015,105
18	12,702,000	0.695141	8,829,682
19	12,702,000	0.680843	8,648,073
20	12,702,000	0.666839	8,470,198
TOTAL	\$254,040,000		\$207,865,360

DIFFERENCE = 1,688,584

AFTER TAXES

CASE 7-A HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .6 PCT. GRADE \$.50 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 1.6 PCT	VALUE AT COMPLETION DATE
1ST	4,000,000	1.07407	4,296,307
2ND	18,000,000	1.05716	19,028,921
3RD	22,000,000	1.04051	22,891,309
4TH	76,000,000	1.02412	77,833,728
5TH	80,000,000	1.00800	80,640,000
TOTAL	\$200,000,000		\$204,690,265

PRODUCTION CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS AFTER TAXES	PRESENT VALUE	
		DISCOUNTED AT 1.6 PCT FACTOR	DISCOUNTED VALUE
1	12,044,000	0.992125	11,949,165
2	12,044,000	0.976501	11,760,990
3	12,044,000	0.961123	11,575,777
4	12,044,000	0.945988	11,393,481
5	12,044,000	0.931090	11,214,057
6	12,044,000	0.916427	11,037,457
7	12,044,000	0.901995	10,863,639
8	12,044,000	0.887791	10,692,558
9	12,044,000	0.873810	10,524,171
10	12,044,000	0.860049	10,358,436
11	12,044,000	0.846505	10,195,311
12	12,044,000	0.833174	10,034,755
13	12,044,000	0.820053	9,876,728
14	12,044,000	0.807139	9,721,189
15	12,044,000	0.794428	9,568,099
16	12,044,000	0.781917	9,417,420
17	12,044,000	0.769604	9,269,114
18	12,044,000	0.757484	9,123,144
19	12,044,000	0.745555	8,979,473
20	12,044,000	0.733814	8,838,064
TOTAL	\$240,880,000		\$206,393,028

DIFFERENCE = 1,702,762

BEFORE TAXES

CASE 7-B HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .8 PCT. GRADE \$.50 CU

CALCULATION OF RETURN ON INVESTMENT
TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 13.6 PCT	VALUE AT COMPLETION DATE
1ST	4,000,000	1.77862	7,114,503
2ND	18,000,000	1.56569	28,182,450
3RD	22,000,000	1.37824	30,321,494
4TH	76,000,000	1.21324	92,206,848
5TH	80,000,000	1.06800	85,440,000
TOTAL	\$200,000,000		\$243,265,295

PRODUCTION
CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS BEFORE TAXES	PRESENT VALUE	
		FACTOR	DISCOUNTED AT 13.6 PCT DISCOUNTED VALUE
1	33,726,000	0.940140	31,707,190
2	33,726,000	0.827588	27,911,259
3	33,726,000	0.728511	24,569,770
4	33,726,000	0.641295	21,628,319
5	33,726,000	0.564520	19,039,013
6	33,726,000	0.496936	16,759,695
7	33,726,000	0.437444	14,753,252
8	33,726,000	0.385074	12,987,018
9	33,726,000	0.338973	11,432,234
10	33,726,000	0.298392	10,063,586
11	33,726,000	0.262669	8,858,791
12	33,726,000	0.231223	7,798,231
13	33,726,000	0.203541	6,864,640
14	33,726,000	0.179173	6,042,817
15	33,726,000	0.157723	5,319,381
16	33,726,000	0.138841	4,682,554
17	33,726,000	0.122219	4,121,966
18	33,726,000	0.107587	3,628,492
19	33,726,000	0.094707	3,194,095
20	33,726,000	0.083369	2,811,703
TOTAL	\$674,520,000		\$244,174,006

DIFFERENCE = 908,711

AFTER TAXES

CASE 7-B HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .8 PCT. GRADE \$.50 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 11.0 PCT	VALUE AT COMPLETION DATE
1ST	4,000,000	1.60156	6,406,257
2ND	18,000,000	1.44285	25,971,313
3RD	22,000,000	1.29986	28,597,041
4TH	76,000,000	1.17105	88,999,800
5TH	80,000,000	1.05500	84,400,000
TOTAL	\$200,000,000		\$234,374,411

PRODUCTION
CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS AFTER TAXES	PRESENT VALUE	
		DISCOUNTED AT 11.0 PCT FACTOR	DISCOUNTED VALUE
1	28,032,000	0.950450	26,643,027
2	28,032,000	0.856261	24,002,727
3	28,032,000	0.771406	21,624,078
4	28,032,000	0.694961	19,481,152
5	28,032,000	0.626091	17,550,587
6	28,032,000	0.564046	15,811,340
7	28,032,000	0.508149	14,244,450
8	28,032,000	0.457792	12,832,838
9	28,032,000	0.412425	11,561,115
10	28,032,000	0.371554	10,415,419
11	28,032,000	0.334733	9,383,261
12	28,032,000	0.301562	8,453,388
13	28,032,000	0.271677	7,615,665
14	28,032,000	0.244754	6,860,959
15	28,032,000	0.220499	6,181,044
16	28,032,000	0.198648	5,568,508
17	28,032,000	0.178962	5,016,674
18	28,032,000	0.161227	4,519,526
19	28,032,000	0.145249	4,071,645
20	28,032,000	0.130855	3,668,149
TOTAL	\$560,640,000		\$235,505,554

DIFFERENCE = 1,131,144

BEFORE TAXES

CASE 7-C HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD 1.0 PCT. GRADE \$.50 CU

CALCULATION OF RETURN ON INVESTMENT
TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 21.7 PCT	VALUE AT COMPLETION DATE
1ST	4,000,000	2.43163	9,726,532
2ND	18,000,000	1.99805	35,964,989
3RD	22,000,000	1.64178	36,119,317
4TH	76,000,000	1.34904	102,527,382
5TH	80,000,000	1.10850	88,680,000
TOTAL	\$200,000,000		\$273,018,220

PRODUCTION
CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS BEFORE TAXES	PRESENT VALUE	
		FACTOR	DISCOUNTED AT 21.7 PCT DISCOUNTED VALUE
1	54,750,000	0.910846	49,868,837
2	54,750,000	0.748435	40,976,859
3	54,750,000	0.614984	33,670,385
4	54,750,000	0.505328	27,666,709
5	54,750,000	0.415224	22,733,533
6	54,750,000	0.341186	18,679,978
7	54,750,000	0.280350	15,349,201
8	54,750,000	0.230362	12,612,326
9	54,750,000	0.189286	10,363,456
10	54,750,000	0.155535	8,515,576
11	54,750,000	0.127802	6,997,187
12	54,750,000	0.105014	5,749,537
13	54,750,000	0.086289	4,724,353
14	54,750,000	0.070903	3,881,966
15	54,750,000	0.058260	3,189,783
16	54,750,000	0.047872	2,621,021
17	54,750,000	0.039336	2,153,674
18	54,750,000	0.032322	1,769,658
19	54,750,000	0.026559	1,454,115
20	54,750,000	0.021823	1,194,836
TOTAL	\$1,095,000,000		\$274,172,991

- DIFFERENCE = 1,154,771

AFTER TAXES

CASE 7-C HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD 1.0 PCT. GRADE \$.50 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 16.6 PCT *****	VALUE AT COMPLETION DATE
1ST	4,000,000	2.00180	8,007,236
2ND	18,000,000	1.71681	30,902,713
3RD	22,000,000	1.47239	32,392,781
4TH	76,000,000	1.26277	95,971,128
5TH	80,000,000	1.08300	86,640,000
TOTAL	\$200,000,000		\$253,913,859

PRODUCTION CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS AFTER TAXES	PRESENT VALUE DISCOUNTED AT 16.6 PCT FACTOR	DISCOUNTED VALUE
1	40,839,000	0.928816	37,931,936
2	40,839,000	0.796583	32,531,677
3	40,839,000	0.683176	27,900,238
4	40,839,000	0.585914	23,928,163
5	40,839,000	0.502499	20,521,580
6	40,839,000	0.430960	17,599,983
7	40,839,000	0.369605	15,094,325
8	40,839,000	0.316985	12,945,390
9	40,839,000	0.271857	11,102,393
10	40,839,000	0.233154	9,521,778
11	40,839,000	0.199960	8,166,190
12	40,839,000	0.171492	7,003,594
13	40,839,000	0.147077	6,006,513
14	40,839,000	0.126138	5,151,383
15	40,839,000	0.108180	4,417,996
16	40,839,000	0.092779	3,789,019
17	40,839,000	0.079570	3,249,587
18	40,839,000	0.068242	2,786,953
19	40,839,000	0.058526	2,390,183
20	40,839,000	0.050194	2,049,899
TOTAL	\$816,780,000		\$254,088,780

BEFORE TAXES

CASE 8-A HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .6 PCT. GRADE \$.60 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 12.1 PCT *****	VALUE AT COMPLETION DATE
1ST	4,000,000	1.67468	6,698,740
2ND	18,000,000	1.49392	26,890,570
3RD	22,000,000	1.33266	29,318,691
4TH	76,000,000	1.18882	90,350,358
5TH	80,000,000	1.06050	84,840,000
TOTAL	\$200,000,000		\$238,098,359

PRODUCTION CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS BEFORE TAXES	PRESENT VALUE DISCOUNTED AT 12.1 PCT	
		FACTOR	DISCOUNTED VALUE
1	30,322,000	0.946030	28,685,532
2	30,322,000	0.843916	25,589,234
3	30,322,000	0.752824	22,827,149
4	30,322,000	0.671565	20,363,202
5	30,322,000	0.599076	18,165,211
6	30,322,000	0.534412	16,204,470
7	30,322,000	0.476728	14,455,371
8	30,322,000	0.425271	12,895,067
9	30,322,000	0.379367	11,503,182
10	30,322,000	0.338418	10,261,536
11	30,322,000	0.301890	9,153,913
12	30,322,000	0.269304	8,165,846
13	30,322,000	0.240235	7,284,430
14	30,322,000	0.214304	6,498,153
15	30,322,000	0.191172	5,796,747
16	30,322,000	0.170537	5,171,050
17	30,322,000	0.152130	4,612,890
18	30,322,000	0.135709	4,114,978
19	30,322,000	0.121060	3,670,810
20	30,322,000	0.107993	3,274,585
TOTAL	\$606,440,000		\$238,693,356

AFTER TAXES

CASE 8-A HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .6 PCT. GRADE \$.60 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 9.7 PCT	VALUE AT COMPLETION DATE
1ST	4,000,000	1.51843	6,073,722
2ND	18,000,000	1.38416	24,914,996
3RD	22,000,000	1.26177	27,759,035
4TH	76,000,000	1.15020	87,415,542
5TH	80,000,000	1.04850	83,880,000
TOTAL	\$200,000,000		\$230,043,296

PRODUCTION CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS AFTER TAXES	PRESENT VALUE	
		FACTOR	DISCOUNTED AT 9.7 PCT DISCOUNTED VALUE
1	25,369,000	0.955788	24,247,399
2	25,369,000	0.871274	22,103,372
3	25,369,000	0.794234	20,148,926
4	25,369,000	0.724005	18,367,298
5	25,369,000	0.659986	16,743,207
6	25,369,000	0.601628	15,262,723
7	25,369,000	0.548431	13,913,148
8	25,369,000	0.499937	12,682,906
9	25,369,000	0.455731	11,561,446
10	25,369,000	0.415434	10,539,148
11	25,369,000	0.378700	9,607,245
12	25,369,000	0.345214	8,757,744
13	25,369,000	0.314689	7,983,358
14	25,369,000	0.286863	7,277,446
15	25,369,000	0.261498	6,633,953
16	25,369,000	0.238375	6,047,359
17	25,369,000	0.217298	5,512,634
18	25,369,000	0.198083	5,025,190
19	25,369,000	0.180568	4,580,848
20	25,369,000	0.164602	4,175,796
TOTAL	\$507,380,000		\$231,171,144

DIFFERENCE = 1,127,849

BEFORE TAXES

CASE 8-B HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .8 PCT. GRADE \$.60 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 22.5 PCT	VALUE AT COMPLETION DATE
1ST	4,000,000	2.50521	10,020,845
2ND	18,000,000	2.04507	36,811,269
3RD	22,000,000	1.66944	36,727,797
4TH	76,000,000	1.36281	103,573,750
5TH	80,000,000	1.11250	89,000,000
TOTAL	\$200,000,000		\$276,133,661

PRODUCTION CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS BEFORE TAXES	PRESENT VALUE	
		DISCOUNTED AT 22.5 PCT FACTOR	DISCOUNTED VALUE
1	57,086,000	0.908163	51,843,408
2	57,086,000	0.741357	42,321,150
3	57,086,000	0.605190	34,547,877
4	57,086,000	0.494032	28,202,349
5	57,086,000	0.403291	23,022,326
6	57,086,000	0.329217	18,793,735
7	57,086,000	0.268749	15,341,825
8	57,086,000	0.219387	12,523,938
9	57,086,000	0.179091	10,223,623
10	57,086,000	0.146197	8,345,815
11	57,086,000	0.119344	6,812,910
12	57,086,000	0.097424	5,561,559
13	57,086,000	0.079529	4,540,048
14	57,086,000	0.064922	3,706,162
15	57,086,000	0.052997	3,025,438
16	57,086,000	0.043263	2,469,746
17	57,086,000	0.035317	2,016,119
18	57,086,000	0.028830	1,645,811
19	57,086,000	0.023535	1,343,519
20	57,086,000	0.019212	1,096,751
TOTAL	\$1,141,720,000		\$277,384,108

DIFFERENCE = 1,250,447

AFTER TAXES

CASE 8-B HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .8 PCT. GRADE \$.60 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 17.1 PCT *****	VALUE AT COMPLETION DATE
1ST	4,000,000	2.04106	8,164,271
2ND	18,000,000	1.74301	31,374,226
3RD	22,000,000	1.48848	32,746,606
4TH	76,000,000	1.27112	96,605,158
5TH	80,000,000	1.08550	86,840,000
TOTAL	\$200,000,000		\$255,730,261
PRODUCTION CAPITAL			
0 PRESENT VALUE =			0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS AFTER TAXES	PRESENT VALUE DISCOUNTED AT 17.1 PCT FACTOR	DISCOUNTED VALUE
1	42,135,000	0.926985	39,058,533
2	42,135,000	0.791618	33,354,853
3	42,135,000	0.676019	28,484,076
4	42,135,000	0.577300	24,324,574
5	42,135,000	0.492998	20,772,480
6	42,135,000	0.421006	17,739,095
7	42,135,000	0.359527	15,148,672
8	42,135,000	0.307025	12,936,526
9	42,135,000	0.262190	11,047,418
10	42,135,000	0.223903	9,434,174
11	42,135,000	0.191207	8,056,511
12	42,135,000	0.163285	6,880,026
13	42,135,000	0.139440	5,875,343
14	42,135,000	0.119078	5,017,372
15	42,135,000	0.101689	4,284,690
16	42,135,000	0.086839	3,659,001
17	42,135,000	0.074158	3,124,680
18	42,135,000	0.063329	2,668,386
19	42,135,000	0.054081	2,278,725
20	42,135,000	0.046184	1,945,965
TOTAL	\$842,700,000		\$256,091,099

BEFORE TAXES

CASE 8-C HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD 1.0 PCT. GRADE \$.60 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 31.0 PCT *****	VALUE AT COMPLETION DATE
1ST	4,000,000	3.40147	13,605,896
2ND	18,000,000	2.59654	46,737,812
3RD	22,000,000	1.98209	43,606,101
4TH	76,000,000	1.51305	114,991,800
5TH	80,000,000	1.15500	92,400,000
TOTAL	\$200,000,000		\$311,341,609

PRODUCTION CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS BEFORE TAXES	PRESENT VALUE DISCOUNTED AT 31.0 PCT FACTOR	DISCOUNTED VALUE
1	83,950,000	0.881679	74,016,985
2	83,950,000	0.673037	56,501,515
3	83,950,000	0.513769	43,130,928
4	83,950,000	0.392190	32,924,372
5	83,950,000	0.299381	25,133,109
6	83,950,000	0.228535	19,185,579
7	83,950,000	0.174454	14,645,480
8	83,950,000	0.133171	11,179,756
9	83,950,000	0.101657	8,534,165
10	83,950,000	0.077601	6,514,630
11	83,950,000	0.059237	4,973,000
12	83,950,000	0.045219	3,796,183
13	83,950,000	0.034518	2,897,850
14	83,950,000	0.026350	2,212,099
15	83,950,000	0.020114	1,688,625
16	83,950,000	0.015354	1,289,027
17	83,950,000	0.011721	983,990
18	83,950,000	0.008947	751,137
19	83,950,000	0.006830	573,387
20	83,950,000	0.005213	437,700
TOTAL	\$1,679,000,000		\$311,369,514

AFTER TAXES

CASE 8-C HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD 1.0 PCT. GRADE \$.60 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 22.9 PCT *****	VALUE AT COMPLETION DATE
1ST	4,000,000	2.54265	10,170,624
2ND	18,000,000	2.06888	37,239,876
3RD	22,000,000	1.68338	37,034,503
4TH	76,000,000	1.36972	104,098,758
5TH	80,000,000	1.11450	89,160,000
TOTAL	\$200,000,000		\$277,703,761
PRODUCTION CAPITAL			
0 PRESENT VALUE = 0			

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS AFTER TAXES	PRESENT VALUE DISCOUNTED AT 22.9 PCT FACTOR	DISCOUNTED VALUE
1	58,125,000	0.906834	52,709,774
2	58,125,000	0.737863	42,888,344
3	58,125,000	0.600377	34,896,944
4	58,125,000	0.488508	28,394,584
5	58,125,000	0.397484	23,103,811
6	58,125,000	0.323421	18,798,870
7	58,125,000	0.263158	15,296,070
8	58,125,000	0.214123	12,445,948
9	58,125,000	0.174226	10,126,890
10	58,125,000	0.141762	8,239,943
11	58,125,000	0.115347	6,704,592
12	58,125,000	0.093855	5,455,323
13	58,125,000	0.076366	4,438,831
14	58,125,000	0.062137	3,611,742
15	58,125,000	0.050559	2,938,765
16	58,125,000	0.041138	2,391,184
17	58,125,000	0.033473	1,945,633
18	58,125,000	0.027236	1,583,103
19	58,125,000	0.022161	1,288,123
20	58,125,000	0.018031	1,048,106
TOTAL	\$1,162,500,000		\$278,306,576

BEFORE TAXES

CASE 9-A HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .6 PCT. GRADE \$.70 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 19.2 PCT	VALUE AT COMPLETION DATE
1ST	4,000,000	2.21266	8,850,658
2ND	18,000,000	1.85626	33,412,720
3RD	22,000,000	1.55726	34,259,873
4TH	76,000,000	1.30643	99,288,832
5TH	80,000,000	1.09600	87,680,000
TOTAL	\$200,000,000		\$263,492,082

PRODUCTION CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS BEFORE TAXES	PRESENT VALUE	
		DISCOUNTED AT 19.2 PCT FACTOR	DISCOUNTED VALUE
1	47,742,000	0.919463	43,897,007
2	47,742,000	0.771361	36,826,348
3	47,742,000	0.647115	30,894,587
4	47,742,000	0.542882	25,918,278
5	47,742,000	0.455438	21,743,522
6	47,742,000	0.382078	18,241,210
7	47,742,000	0.320535	15,303,028
8	47,742,000	0.268906	12,838,111
9	47,742,000	0.225592	10,770,227
10	47,742,000	0.189255	9,035,426
11	47,742,000	0.158771	7,580,055
12	47,742,000	0.133197	6,359,107
13	47,742,000	0.111742	5,334,821
14	47,742,000	0.093743	4,475,521
15	47,742,000	0.078644	3,754,632
16	47,742,000	0.065976	3,149,859
17	47,742,000	0.055349	2,642,499
18	47,742,000	0.046434	2,216,862
19	47,742,000	0.038954	1,859,783
20	47,742,000	0.032680	1,560,221
TOTAL	\$954,840,000		\$264,401,100

DIFFERENCE = 909,017

AFTER TAXES

CASE 9-A HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .6 PCT. GRADE \$.70 CU

CALCULATION OF RETURN ON INVESTMENT
TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 14.9 PCT *****	VALUE AT COMPLETION DATE
1ST	4,000,000	1.87277	7,491,116
2ND	18,000,000	1.62992	29,338,575
3RD	22,000,000	1.41855	31,208,231
4TH	76,000,000	1.23460	93,829,638
5TH	80,000,000	1.07450	85,960,000
TOTAL	\$200,000,000		\$247,827,560
PRODUCTION CAPITAL			
0 PRESENT VALUE =			0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS AFTER TAXES	PRESENT VALUE FACTOR DISCOUNTED AT 14.9 PCT	DISCOUNTED VALUE
1	36,690,000	0.935161	34,311,057
2	36,690,000	0.813891	29,861,669
3	36,690,000	0.708347	25,989,268
4	36,690,000	0.616490	22,619,032
5	36,690,000	0.536545	19,685,842
6	36,690,000	0.466967	17,133,022
7	36,690,000	0.406411	14,911,246
8	36,690,000	0.353709	12,977,586
9	36,690,000	0.307840	11,294,679
10	36,690,000	0.267920	9,830,007
11	36,690,000	0.233177	8,555,272
12	36,690,000	0.202939	7,445,842
13	36,690,000	0.176622	6,480,280
14	36,690,000	0.153718	5,639,930
15	36,690,000	0.133784	4,908,555
16	36,690,000	0.116435	4,272,024
17	36,690,000	0.101336	3,718,036
18	36,690,000	0.088195	3,235,889
19	36,690,000	0.076758	2,816,265
20	36,690,000	0.066804	2,451,058
TOTAL	\$733,800,000		\$248,136,558

BEFORE TAXES

CASE 9-B HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .8 PCT. GRADE \$.70 CU

CALCULATION OF RETURN ON INVESTMENT
TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 29.9 PCT	VALUE AT COMPLETION DATE
1ST	4,000,000	3.27299	13,091,987
2ND	18,000,000	2.51962	45,353,304
3RD	22,000,000	1.93966	42,672,684
4TH	76,000,000	1.49320	113,483,238
5TH	80,000,000	1.14950	91,960,000
TOTAL	\$200,000,000		\$306,561,213

PRODUCTION
CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS BEFORE TAXES	PRESENT VALUE	
		DISCOUNTED AT 29.9 PCT FACTOR	DISCOUNTED VALUE
1	80,446,000	0.884911	71,187,588
2	80,446,000	0.681225	54,801,839
3	80,446,000	0.524422	42,187,712
4	80,446,000	0.403712	32,477,069
5	80,446,000	0.310787	25,001,593
6	80,446,000	0.239251	19,246,800
7	80,446,000	0.184181	14,816,628
8	80,446,000	0.141786	11,406,180
9	80,446,000	0.109150	8,780,739
10	80,446,000	0.084026	6,759,614
11	80,446,000	0.064685	5,203,706
12	80,446,000	0.049796	4,005,932
13	80,446,000	0.038334	3,083,859
14	80,446,000	0.029510	2,374,025
15	80,446,000	0.022718	1,827,579
16	80,446,000	0.017488	1,406,912
17	80,446,000	0.013463	1,083,073
18	80,446,000	0.010364	833,775
19	80,446,000	0.007978	641,859
20	80,446,000	0.006142	494,118
TOTAL	\$1,608,920,000		\$307,620,598

DIFFERENCE = 1,059,385

AFTER TAXES

CASE 9-B HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD .8 PCT. GRADE \$.70 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A

INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 25.4 PCT *****	VALUE AT COMPLETION DATE
1ST	4,000,000	2.78685	11,147,412
2ND	18,000,000	2.22237	40,002,675
3RD	22,000,000	1.77222	38,988,962
4TH	76,000,000	1.41325	107,407,608
5TH	80,000,000	1.12700	90,160,000
TOTAL	\$200,000,000		\$287,706,656
PRODUCTION CAPITAL			
0 PRESENT VALUE =			0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS AFTER TAXES	PRESENT VALUE DISCOUNTED AT 25.4 PCT FACTOR	DISCOUNTED VALUE
1	65,650,000	0.898724	59,001,236
2	65,650,000	0.716685	47,050,428
3	65,650,000	0.571519	37,520,277
4	65,650,000	0.455757	29,920,476
5	65,650,000	0.363442	23,860,029
6	65,650,000	0.289826	19,027,136
7	65,650,000	0.231121	15,173,155
8	65,650,000	0.184307	12,099,805
9	65,650,000	0.146975	9,648,967
10	65,650,000	0.117205	7,694,551
11	65,650,000	0.093465	6,136,006
12	65,650,000	0.074533	4,893,146
13	65,650,000	0.059436	3,902,031
14	65,650,000	0.047397	3,111,667
15	65,650,000	0.037797	2,481,393
16	65,650,000	0.030141	1,978,783
17	65,650,000	0.024036	1,577,976
18	65,650,000	0.019167	1,258,354
19	65,650,000	0.015285	1,003,472
20	65,650,000	0.012189	800,217
TOTAL	\$1,313,000,000		\$288,139,104

BEFORE TAXES

CASE 9-C HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD 1.0 PCT. GRADE \$.70 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 38.8 PCT *****	VALUE AT COMPLETION DATE
1ST	4,000,000	4.43161	17,726,467
2ND	18,000,000	3.19280	57,470,534
3RD	22,000,000	2.30029	50,606,458
4TH	76,000,000	1.65727	125,952,672
5TH	80,000,000	1.19400	95,520,000
TOTAL	\$200,000,000		\$347,276,130

PRODUCTION CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS BEFORE TAXES	PRESENT VALUE DISCOUNTED AT 38.8 PCT	
		FACTOR	DISCOUNTED VALUE
1	113,150,000	0.860230	97,335,087
2	113,150,000	0.619762	70,126,143
3	113,150,000	0.446514	50,523,158
4	113,150,000	0.321696	36,399,970
5	113,150,000	0.231769	26,224,762
6	113,150,000	0.166981	18,893,921
7	113,150,000	0.120303	13,612,335
8	113,150,000	0.086673	9,807,158
9	113,150,000	0.062445	7,065,676
10	113,150,000	0.044989	5,090,544
11	113,150,000	0.032413	3,667,539
12	113,150,000	0.023352	2,642,319
13	113,150,000	0.016824	1,903,688
14	113,150,000	0.012121	1,371,533
15	113,150,000	0.008732	988,136
16	113,150,000	0.006291	711,914
17	113,150,000	0.004532	512,906
18	113,150,000	0.003265	369,529
19	113,150,000	0.002352	266,231
20	113,150,000	0.001695	191,809
TOTAL	\$2,263,000,000		\$347,704,357

AFTER TAXES

CASE 9-C HYPOTHETICAL DEEP BLOCK CAVE 40,000 TPD 1.0 PCT. GRADE \$.70 CU

CALCULATION OF RETURN ON INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

YEAR OF CONSTRUCTION	EXPENDITURES FOR CONSTRUCTION	FACTOR AT 28.4 PCT	VALUE AT COMPLETION DATE
1ST	4,000,000	3.10403	12,416,128
2ND	18,000,000	2.41747	43,514,468
3RD	22,000,000	1.88276	41,420,833
4TH	76,000,000	1.46632	111,440,928
5TH	80,000,000	1.14200	91,360,000
TOTAL	\$200,000,000		\$300,152,358

PRODUCTION CAPITAL

0 PRESENT VALUE = 0

TABLE B
EARNINGS FROM PROJECT

YEAR	CASH EARNINGS AFTER TAXES	PRESENT VALUE	
		DISCOUNTED AT 28.4 PCT FACTOR	DISCOUNTED VALUE
1	75,411,000	0.889408	67,071,154
2	75,411,000	0.692685	52,236,101
3	75,411,000	0.539474	40,682,322
4	75,411,000	0.420151	31,684,051
5	75,411,000	0.327220	24,676,053
6	75,411,000	0.254844	19,218,109
7	75,411,000	0.198477	14,967,375
8	75,411,000	0.154577	11,656,834
9	75,411,000	0.120387	9,078,531
10	75,411,000	0.093759	7,070,507
11	75,411,000	0.073021	5,506,626
12	75,411,000	0.056870	4,288,649
13	75,411,000	0.044291	3,340,069
14	75,411,000	0.034494	2,601,300
15	75,411,000	0.026865	2,025,935
16	75,411,000	0.020923	1,577,831
17	75,411,000	0.016295	1,228,840
18	75,411,000	0.012690	957,041
19	75,411,000	0.009883	745,359
20	75,411,000	0.007697	580,497
TOTAL	\$1,508,220,000		\$301,193,183

DIFFERENCE = 1,040,826