

## 2. Cash Flow Analysis for the Central Open Pit

The production is assumed to be 100,000 t, which is the same as the underground for comparison, with 0.44% copper ore grade (same as 2001) when the open pit operation reached capacity. In 2001, 70% of the total treated ore was from the open pit in the copper process circuit so this result is adopted by assuming a 22.83% concentrate copper grade and 81.09% copper recovery.

### Cost Assumption

The unit mining, processing and miscellaneous costs in processing for 2001 are used for the trial calculation. The indirect cost is assumed to be same as the underground as shown in Table 5.

The analysis is in Table 6, which shows a deficit of US\$ 289,000. The reason for the deficit in spite of much lower costs than the underground cost is from the very low ore grade of the open pit. Accordingly, continuation of the operation is judged to be impossible, the same as the underground operation.

Table 5 Cost Assumptions for the Central Open Pit

Item	Cost	Note
Unit mining cost	\$1.70/t	2001
Unit processing cost	\$2.68/t	2001
Unit miscellaneous cost in processing	\$0.98/t	2001
Indirect cost	\$1,330	1/4 of 2001

A break-even copper price was calculated. Its result is US\$ 2,325 per ton, as shown in Table 7, which indicates a higher price than the price for underground because of the lower ore grade.

**Table 6 Economic Simulation for the Central Open Pit**

1	Item	Unit	2002
2	<b>Central Open Pit</b>		
3	1 Crude ore	000' t	100
4	2 Cu grade in crude ore	Cu %	0.44
5	<b>★Mining Costs for Central Open Pit</b>		
6	Unit mining cost for Central Open Pit	\$/t	1.70
7	Total mining costs for Central Open Pit	\$000's	170
8	<b>Central Open Pit Concentrate Production</b>		
9	3 Crude ore treated	000't	100
10	4 Cu grade in crude ore	Cu %	0.44
11	5 Cu recovery	%	81.09
12	6 Cu grade in concentrate	Cu %	22.83
13	7 Cu concentrate produced	tons	1,563
14	8 As grade in concentrate	As %	0.7
15	9 Sb grade in concentrate	Sb %	0.01
16	<b>★Processing Costs for Central Open Pit</b>		
17	Unit processing cost for Central Open Pit ore	\$/t	2.68
18	Unit miscellaneous cost in processing	\$/t	0.98
19	Total processing costs for Central Open Pit ore	\$000's	366
20	<b>Total Operating Cost for Central Open Pit</b>		
21	Total processing costs for Central Open Pit ore	\$000's	536
22	Unit operating cost for Central Open Pit ore	\$/t	5.36
23	<b>★Cost for Non-Production</b>		
24	<b>Total Cost for Non-Production</b>	\$000's	1.33
25	Unit cost for non-production	\$/t	0.01
26	<b>Total Cost for Central Open Pit</b>	\$000's	537
27	Unit cost for Central Open Pit	\$/t	5.37
28	<b>★Capital Costs</b>		
29	12 Mining equipment	\$000's	0
30	13 Processing equipment	\$000's	0
31	14 Ancillary equipment	\$000's	0
32	15 Working capital	\$000's	0
33	<b>Total Capital Cost</b>	\$000's	0
34	<b>Total Costs including Capital</b>	\$000's	537
35	<b>Central Open Pit Concentrates Prices Calculation</b>		
36	<b>★Copper Concentrate Net Value</b>		
37	16 Moisture content	%	11
38	17 Copper price	\$/t	1479.6
39	18 Unit deduction	% Cu	1.0
40	19 Percentage payable	%	100
41	20 Treatment cost	\$/t	80
42	21 Refining cost	\$/lb.	0.065
43	22 Penalty for As	\$/0.1%	2.5
44	25 Transportation cost	\$/wet t	30
45	26 Revenue per ton concentrate	\$/t	323
46	27 Treatment charge per t concentrate	\$/t	80
47	28 Refining charge per t concentrate	\$/t	32.72
48	29 Penalty for As per t concentrate	\$/t	17.50
49	32 Transportation cost per t concentrate	\$/t	33.71
50	33 <b>Cu net value per t concentrate</b>	\$/t	159.07
51	34 <b>Revenue for Central U/G Cu concentrates</b>	\$000's	248.60
52	<b>Total Revenue</b>	\$000's	249
53	<b>Total Cost</b>	\$000's	537
54	<b>Net Revenue Before Tax</b>	\$000's	-289

**Table 7 Break-even Copper Price Calculation for the Central Open Pit**

1	Item	Unit	2002
2	<b>Central Open Pit</b>		
3	1 Crude ore	000' t	100
4	2 Cu grade in crude ore	Cu %	0.44
5	<b>★Mining Costs for Central Open Pit</b>		
6	Unit mining cost for Central Open Pit	\$/t	1.70
7	Total mining costs for Central Open Pit	\$000's	170
8	<b>Central Open Pit Concentrate Production</b>		
9	3 Crude ore treated	000't	100
10	4 Cu grade in crude ore	Cu %	0.44
11	5 Cu recovery	%	81.09
12	6 Cu grade in concentrate	Cu %	22.83
13	7 Cu concentrate produced	tons	1,563
14	8 As grade in concentrate	As %	0.7
15	9 Sb grade in concentrate	Sb %	0.01
16	<b>★Processing Costs for Central Open Pit</b>		
17	Unit processing cost for Central Open Pit ore	\$/t	2.68
18	Unit miscellaneous cost in processing	\$/t	0.98
19	Total processing costs for Central Open Pit ore	\$000's	366
20	<b>Total Operating Cost for Central Open Pit</b>		
21	Total processing costs for Central Open Pit ore	\$000's	536
22	Unit operating cost for Central Open Pit ore	\$/t	5.36
23	<b>★Cost for Non-Production</b>		
24	<b>Total Cost for Non-Production</b>	\$000's	1.33
25	Unit cost for non-production	\$/t	0.01
26	<b>Total Cost for Central Open Pit</b>	\$000's	537
27	Unit cost for Central Open Pit	\$/t	5.37
28	<b>★Capital Costs</b>		
29	12 Mining equipment	\$000's	0
30	13 Processing equipment	\$000's	0
31	14 Ancillary equipment	\$000's	0
32	15 Working capital	\$000's	0
33	<b>Total Capital Cost</b>	\$000's	0
34	<b>Total Costs including Capital</b>	\$000's	537
35	<b>Central Open Pit Concentrates Prices Calculation</b>		
36	<b>★Copper Concentrate Net Value</b>		
37	16 Moisture content	%	11
38	17 <b>Copper price</b>	\$/t	2325
39	18 Unit deduction	% Cu	1.0
40	19 Percentage payable	%	100
41	20 Treatment cost	\$/t	80
42	21 Refining cost	\$/lb.	0.065
43	22 Penalty for As	\$/0.1%	2.5
44	25 Transportation cost	\$/wet t	30
45	26 Revenue per ton concentrate	\$/t	508
46	27 Treatment charge per t concentrate	\$/t	80
47	28 Refining charge per t concentrate	\$/t	32.72
48	29 Penalty for As per t concentrate	\$/t	17.50
49	32 Transportation cost per t concentrate	\$/t	33.71
50	33 <b>Cu net value per t concentrate</b>	\$/t	343.62
51	34 <b>Revenue for Central U/G Cu concentrates</b>	\$000's	537.02
52	<b>Total Revenue</b>	\$000's	537
53	<b>Total Cost</b>	\$000's	537
54	<b>Net Revenue Before Tax</b>	\$000's	0

### **3. Cash Flow Analysis for the Kadzor Open Pit**

The Central Open Pit with a very low operation cost is found not to be profitable. Therefore the study calculates the profitability of the Kadzor Open Pit, which is located northwest of the current Central Open Pit.

Production is assumed to be 100,000 t, the same as the other cases. The crude ore grade is assumed to be 1.44% because its ore reserve grade is said to be about 2.0% and its realization coefficient is 0.72 as shown in Table 3-3-12 in the Interim Report. The concentrate copper grade and copper recovery are assumed to be 22.83% and 81.09%, respectively, the same as the Central Open Pit.

The cost assumptions are also same as Table 5. The quantity of stripping waste was said to be little.

The analysis in Table 8 shows a profit of US\$ 276,000. This is a good result because the ore grade is three times higher than the Central Open Pit under a very low operating cost, which is an advantage for the open pit operation. If the ore reserve grade is ascertained, the preparation for production must be immediately done.

**Table 8 Economic Simulation for the Kadzor Open Pit**

1	Item	Unit	2002
2	<b>Kadzor Open Pit</b>		
3	1 Crude ore	000' t	100
4	2 Cu grade in crude ore	Cu %	1.44
5	<b>★Mining Costs for Kadzor</b>		
6	Unit mining cost for Kadzor Open Pit	\$/t	1.70
7	Total mining costs for Kadzor Open Pit	\$000's	170
8	<b>Kadzor Concentrate Production</b>		
9	3 Crude ore treated	000't	100
10	4 Cu grade in crude ore	Cu %	1.44
11	5 Cu recovery	%	81.09
12	6 Cu grade in concentrate	Cu %	22.83
13	7 Cu concentrate produced	tons	5,115
14	8 As grade in concentrate	As %	0.7
15	9 Sb grade in concentrate	Sb %	0.01
16	<b>★Processing Costs for Kadzor Open Pit</b>		
17	Unit processing cost for Kadzor Open Pit ore	\$/t	2.68
18	Unit miscellaneous cost in processing	\$/t	0.98
19	Total processing costs for Kadzor Open Pit ore	\$000's	366
20	<b>Total Operating Cost for Kadzor Open Pit</b>		
21	Total processing costs for Kadzor Open Pit ore	\$000's	536
22	Unit operating cost for Kadzor Open Pit ore	\$/t	5.36
23	<b>★Cost for Non-Production</b>		
24	<b>Total Cost for Non-Production</b>	\$000's	1.33
25	Unit cost for non-production	\$/t	0.01
26	<b>Total Cost for Kadzor Open Pit</b>	\$000's	537
27	Unit cost for Kadzor Open Pit	\$/t	5.37
28	<b>★Capital Costs</b>		
29	10 Mining equipment	\$000's	0
30	11 Processing equipment	\$000's	0
31	12 Ancillary equipment	\$000's	0
32	13 Working capital	\$000's	0
33	<b>Total Capital Cost</b>	\$000's	0
34	<b>Total Costs including Capital</b>	\$000's	537
35	<b>Kadzor Open Pit Concentrates Prices Calculation</b>		
36	<b>★Kadzor Cu Conc. Net Value</b>		
37	14 Moisture content	%	11
38	15 Copper price	\$/t	1479.6
39	16 Unit deduction	% Cu	1.0
40	17 Percentage payable	%	100
41	18 Treatment cost	\$/t	80
42	19 Refining cost	\$/lb.	0.065
43	20 Penalty for As	\$/0.1%	2.5
44	21 Transportation cost	\$/wet t	30
45	22 Revenue per ton concentrate	\$/t	323
46	23 Treatment charge per t concentrate	\$/t	80
47	24 Refining charge per t concentrate	\$/t	32.72
48	25 Penalty for As per t concentrate	\$/t	17.50
49	26 Transportation cost per t concentrate.	\$/t	33.71
50	27 <b>Cu net value per t Kadzor concentrate</b>	\$/t	159.07
51	28 <b>Revenue for Kadzor Cu concentrates</b>	\$000's	813.59
52	<b>Total Revenue</b>	\$000's	814
53	<b>Total cost</b>	\$000's	537
54	<b>Net Revenue Before Tax</b>	\$000's	276

#### 4. Cash Flow Analysis for the Shahumian Mine

Production is assumed to be 100,000 t for an easy comparison with the other cases. The ore grade is estimated to be Cu 0.30%, Zn 1.29%, Au 1.56g/t and Ag 26.88g/t, the same as 2001 result. In the same manner, the copper concentrate grade and copper recovery are assumed to be 15.18% and 68.56%, respectively, gold and silver recoveries in copper concentrate are 54.38% and 63.97%, respectively, zinc concentrate grade and zinc recovery are 55.93% and 69.66%, respectively, and gold and silver recoveries in zinc concentrate are 18.44% and 18.92%, respectively.

##### Cost Assumptions

The unit operating cost has been improved by the increased production so the unit mining cost, processing and miscellaneous costs in processing are assumed to be same as the result of 2001. The indirect cost is estimated as half of the total indirect cost for 2001. Cost assumptions are listed in Table 9.

Table 9 Cost Assumptions for the Shahumian Mine

Item	Cost	Note
Unit mining cost	\$5.58/t	2001
Unit processing cost	\$5.70/t	2001
Unit miscellaneous cost in processing	\$0.98/t	2001
Indirect cost	\$2,660	1/2 of 2001

The analysis in Table 10 shows a profit of US\$ 210,000. The Shahumian Mine is found to be profitable under the current operation.

At the same time, a simulation was calculated for the condition that the mine may produce the same ore grade as 1996 by means of good dilution control. Its result is shown in Table 5-11. It shows a profit of US\$ 1,283,000 that is about six times more than the current simulation. Therefore, the improvement of dilution is understood easily to be a powerful countermeasure to increasing the profitability.

**Table 10 Economic Simulation for the Shahumian Mine**

1	Item	Unit	2002
2	<b>Shahumian Production</b>		
3	1 Crude ore	000't	100
4	2 Cu grade in crude ore	Cu %	0.30
5	3 Zn grade in crude ore	Zn %	1.29
6	4 Pb grade in crude ore	Pb %	0.21
7	5 Au grade in crude ore	Au g/t	1.56
8	6 Ag grade in crude ore	Ag g/t	26.88
9	7 Cu in crude ore	Cu t	300
10	8 Zn in crude ore	Zn t	1,290
11	9 Pb in crude ore	Pb t	210
12	10 Au in crude ore	Au kg	156
13	11 Ag in crude ore	Ag kg	2,688
14	<b>Copper Concentrate from Shahumian</b>		
15	12 Cu recovery	%	68.56
16	13 Au recovery	%	54.38
17	14 Ag recovery	%	63.97
18	15 Cu in concentrate	Cu t	209
19	16 Au in concentrate	Au kg	85
20	17 Ag in concentrate	Ag kg	1,720
21	18 Cu grade in concentrate	Cu %	15.18
22	19 Cu concentrate produced	tons	1,377
23	20 Au grade in concentrate	Au g/t	61.6
24	21 Ag grade in concentrate	Ag g/t	1249.0
25	22 As grade in concentrate	As %	0.3
26	23 Sb grade in concentrate	Sb %	0
27	24 Hg grade in concentrate	Hg g/t	2
28	<b>Zinc Concentrate from Shahumian</b>		
29	25 Zn recovery	%	69.99
30	26 Au recovery	%	18.44
31	27 Ag recovery	%	18.92
32	28 Zn in concentrate	Zn t	903
33	29 Au in concentrate	Au kg	29
34	30 Ag in concentrate	Ag kg	509
35	31 Zn grade in concentrate	Zn %	55.93
36	32 Zn concentrate produced	tons	1,614
37	33 Au grade in concentrate	Au g/t	17.8
38	34 Ag grade in concentrate	Ag g/t	315.0
39	35 Cd grade in concentrate	Cd g/t	4100
40	36 As grade in concentrate	As %	0.02
41	37 Sb grade in concentrate	Sb %	0.06
42	38 Hg grade in concentrate	Hg g/t	0
43	<b>★Mining Cost for Shahumian</b>		
44	Unit mining cost for Shahumian	\$/t	5.58
45	Total mining costs for Shahumian	\$000's	558
46	<b>★Processing Costs for Shahumian</b>		
47	Unit processing cost for polymetallic ore	\$/t	5.70
48	Unit miscellaneous cost for processing	\$/t	0.98
49	Total processing cost for polymetallic ore	\$000's	668
50	<b>Total Shahumian Operating Cost</b>	\$000's	1,226
51	Unit operating cost for polymetallic ore	\$/t	12.26
52			
53	<b>★Cost for Non-Production</b>		
54	<b>Total Cost for Non-Production</b>	\$	2,660
55	Unit cost for non-production	\$/t	0.03
56	<b>Total Cost for Shahumian (excl. Capital)</b>	\$000's	1,229
57	Unit cost for Shahumian	\$/t	12.29
58	<b>★Capital Costs</b>		
59	39 Mining equipment	\$000's	0
60	40 Processing equipment	\$000's	0
61	41 Ancillary equipment	\$000's	0
62		\$000's	0
63	42 Working capital	\$000's	0
64	<b>Total Costs including Capital</b>	\$000's	1,229
65	<b>Shahumian Concentrates Prices Calculation</b>		
66	<b>★Copper Concentrate Net Value</b>		
67	43 Moisture content	%	10
68	<b>Cu in Copper Concentrate</b>		
69	44 Copper price	\$/t	1479.6

70	45 Unit deduction	% Cu	1.0
71	46 Percentage payable	%	100
72	47 Treatment cost	\$/t	80
73	48 Refining cost	\$/lb.	0.065
74	49 Penalty for As	\$/0.1%	2.5
75	50 Transportation cost	\$/wet t	30
76	51 Cu value per ton concentrate	\$/t	209.81
77	52 Treatment charge per t concentrate	\$/t	80
78	53 Refining charge per t concentrate	\$/t	21.76
79	54 Penalty for As per t concentrate	\$/t	7.50
80	55 Transportation cost per t concentrate	\$/t	33.33
81	<b>56 Cu Net Value per t Concentrate</b>	\$/t	<b>67.22</b>
82	<b>Au in Copper Concentrate</b>		
83	57 Gold price	\$/oz	310.3
84	58 Unit deduction	g/t Au	1
85	59 Percentage payable	%	90
86	60 Refining cost	\$/oz	6
87	61 Au value per ton concentrate	\$/t	544.30
88	62 Refining charge per t concentrate	\$/t	11.89
89	<b>63 Au Net Value per t Concentrate</b>	\$/t	<b>532.42</b>
90	<b>Ag in Copper Concentrate</b>		
91	64 Silver price	\$/oz	4.562
92	65 Unit deduction	g/t Ag	30
93	66 Percentage payable	%	90
94	67 Refining cost	\$/oz	0.4
95	68 Ag value per ton concentrate	\$/t	160.92
96	69 Refining charge per t concentrate	\$/t	16.06
97	<b>70 Ag Net Value per t Concentrate</b>	\$/t	<b>144.85</b>
98	<b>71 Net Value per t Cu concentrate</b>	\$/t	<b>744.49</b>
99	<b>72 Revenue for Shahumian's Cu Conc.</b>	\$000's	<b>1024.92</b>
100	<b>★Zinc Concentrate Net Value</b>		
101	73 Moisture content	%	8.58
102	<b>Zn in Zinc Concentrate</b>		
103	74 Zinc price	\$/t	747.6
104	75 Unit deduction	% Zn	0
105	76 Percentage payable	%	85
106	77 Treatment cost	\$/t	175
107	78 Refining cost	\$/lb.	0
108	79 Penalty for As	\$/t	2
109	80 Transportation cost	\$/wet t	30
110	81 Zn value per ton concentrate	\$/t	355.41
111	82 Treatment charge per t concentrate	\$/t	175
112	83 Refining charge per t concentrate	\$/t	0.00
113	84 Penalty for Cd per t concentrate	\$/t	2
114	85 Transportation cost per t concentrate	\$/t	32.82
115	<b>86 Zn Net Value per t Concentrate</b>	\$/t	<b>145.60</b>
116	<b>Au in Zinc Concentrate</b>		
117	87 Gold price	\$/oz	310.3
118	88 Unit deduction	g/t Au	2
119	89 Percentage payable	%	60
120	90 Refining cost	\$/oz	6
121	91 Au value per ton concentrate	\$/t	94.69
122	92 Refining charge per t concentrate	\$/t	3.44
123	<b>93 Au Net Value per t Concentrate</b>	\$/t	<b>91.26</b>
124	<b>Ag in Zinc Concentrate</b>		
125	94 Silver price	\$/oz	4.562
126	95 Unit deduction	g/t Ag	50
127	96 Percentage payable	%	60
128	97 Refining cost	\$/oz	0.4
129	98 Ag revenue per ton concentrate	\$/t	23.32
130	99 Refining charge per t concentrate	\$/t	4.05
131	<b>100 Ag Net Value per t Concentrate</b>	\$/t	<b>19.27</b>
132	<b>101 Net Value per t Zn Concentrate</b>	\$/t	<b>256.13</b>
133	<b>102 Revenue for Shahumian's Zn Concentrate</b>	\$000's	<b>413.46</b>
134			
135	<b>Total Shahumian's Revenue</b>	\$000's	<b>1,438</b>
136	<b>Total Shahumian's Cost</b>	\$000's	<b>1,229</b>
137	<b>Net Shahumian's Revenue Before Tax</b>	\$000's	<b>210</b>
138			

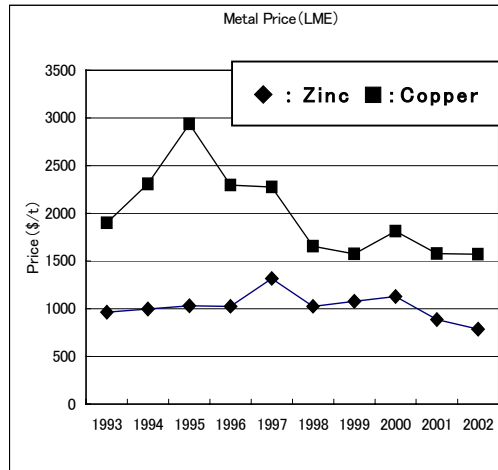


**Table 11 Economic Simulation for the Shahumian Mine with Improved Dilution**

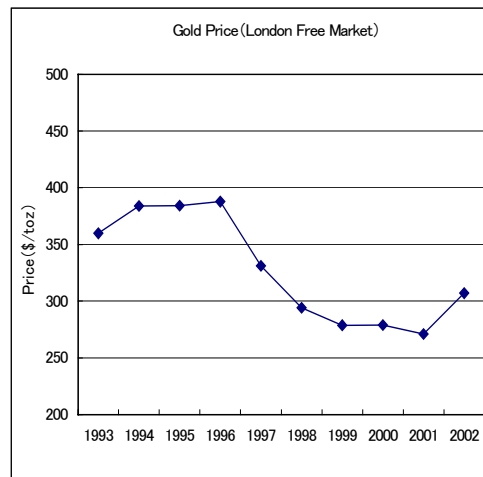
1	Item	Unit	2002
2	<b>Shahumian Production</b>		
3	1 Crude ore	000't	100
4	2 Cu grade in crude ore	Cu %	0.33
5	3 Zn grade in crude ore	Zn %	1.92
6	4 Pb grade in crude ore	Pb %	0.12
7	5 Au grade in crude ore	Au g/t	3.08
8	6 Ag grade in crude ore	Ag g/t	35.22
9	7 Cu in crude ore	Cu t	330
10	8 Zn in crude ore	Zn t	1,920
11	9 Pb in crude ore	Pb t	120
12	10 Au in crude ore	Au kg	308
13	11 Ag in crude ore	Ag kg	3,522
14	<b>Copper Concentrate from Shahumian</b>		
15	12 Cu recovery	%	68.56
16	13 Au recovery	%	54.38
17	14 Ag recovery	%	63.97
18	15 Cu in concentrate	Cu t	230
19	16 Au in concentrate	Au kg	167
20	17 Ag in concentrate	Ag kg	2,253
21	18 Cu grade in concentrate	Cu %	15.18
22	19 Cu concentrate produced	tons	1,514
23	20 Au grade in concentrate	Au g/t	110.6
24	21 Ag grade in concentrate	Ag g/t	1487.8
25	22 As grade in concentrate	As %	0.3
26	23 Sb grade in concentrate	Sb %	0
27	24 Hg grade in concentrate	Hg g/t	2
28	<b>Zinc Concentrate from Shahumian</b>		
29	25 Zn recovery	%	69.99
30	26 Au recovery	%	18.44
31	27 Ag recovery	%	18.92
32	28 Zn in concentrate	Zn t	1,344
33	29 Au in concentrate	Au kg	57
34	30 Ag in concentrate	Ag kg	666
35	31 Zn grade in concentrate	Zn %	55.93
36	32 Zn concentrate produced	tons	2,403
37	33 Au grade in concentrate	Au g/t	23.6
38	34 Ag grade in concentrate	Ag g/t	277.3
39	35 Cd grade in concentrate	Cd g/t	4100
40	36 As grade in concentrate	As %	0.02
41	37 Sb grade in concentrate	Sb %	0.06
42	38 Hg grade in concentrate	Hg g/t	0
43	<b>★Mining Cost for Shahumian</b>		
44	Unit mining cost for Shahumian	\$/t	5.58
45	Total mining costs for Shahumian	\$000's	558
46	<b>★Processing Costs for Shahumian</b>		
47	Unit processing cost for polymetallic ore	\$/t	5.70
48	Unit miscellaneous cost for processing	\$/t	0.98
49	Total processing cost for polymetallic ore	\$000's	668
50	<b>Total Shahumian Operating Cost</b>	\$000's	1,226
51	Unit operating cost for polymetallic ore	\$/t	12.26
52			
53	<b>★Cost for Non-Production</b>		
54	<b>Total Cost for Non-Production</b>	\$	2,660
55	Unit cost for non-production	\$/t	0.03
56	<b>Total Cost for Shahumian (excl. Capital)</b>	\$000's	1,229
57	Unit cost for Shahumian	\$/t	12.29
58	<b>★Capital Costs</b>		
59	39 Mining equipment	\$000's	0
60	40 Processing equipment	\$000's	0
61	41 Ancillary equipment	\$000's	0
62		\$000's	0
63	42 Working capital	\$000's	0
64	<b>Total Costs including Capital</b>	\$000's	1,229
65	<b>Shahumian Concentrates Prices Calculation</b>		
66	<b>★Copper Concentrate Net Value</b>		
67	43 Moisture content	%	10
68	<b>Cu in Copper Concentrate</b>		
69	44 Copper price	\$/t	1479.6

70	45 Unit deduction	% Cu	1.0
71	46 Percentage payable	%	100
72	47 Treatment cost	\$/t	80
73	48 Refining cost	\$/lb.	0.065
74	49 Penalty for As	\$/0.1%	2.5
75	50 Transportation cost	\$/wet t	30
76	51 Cu value per ton concentrate	\$/t	209.81
77	52 Treatment charge per t concentrate	\$/t	80
78	53 Refining charge per t concentrate	\$/t	21.76
79	54 Penalty for As per t concentrate	\$/t	7.50
80	55 Transportation cost per t concentrate	\$/t	33.33
81	<b>56 Cu Net Value per t Concentrate</b>	\$/t	<b>67.22</b>
82	<b>Au in Copper Concentrate</b>		
83	57 Gold price	\$/oz	310.3
84	58 Unit deduction	g/t Au	1
85	59 Percentage payable	%	90
86	60 Refining cost	\$/oz	6
87	61 Au value per ton concentrate	\$/t	984.09
88	62 Refining charge per t concentrate	\$/t	21.34
89	<b>63 Au Net Value per t Concentrate</b>	\$/t	<b>962.75</b>
90	<b>Ag in Copper Concentrate</b>		
91	64 Silver price	\$/oz	4.562
92	65 Unit deduction	g/t Ag	30
93	66 Percentage payable	%	90
94	67 Refining cost	\$/oz	0.4
95	68 Ag value per ton concentrate	\$/t	192.43
96	69 Refining charge per t concentrate	\$/t	19.13
97	<b>70 Ag Net Value per t Concentrate</b>	\$/t	<b>173.30</b>
98	<b>71 Net Value per t Cu concentrate</b>	\$/t	<b>1203.27</b>
99	<b>72 Revenue for Shahumian's Cu Conc.</b>	\$000's	<b>1822.17</b>
100	<b>★Zinc Concentrate Net Value</b>		
101	73 Moisture content	%	8.58
102	<b>Zn in Zinc Concentrate</b>		
103	74 Zinc price	\$/t	747.6
104	75 Unit deduction	% Zn	0
105	76 Percentage payable	%	85
106	77 Treatment cost	\$/t	175
107	78 Refining cost	\$/lb.	0
108	79 Penalty for As	\$/t	2
109	80 Transportation cost	\$/wet t	30
110	81 Zn value per ton concentrate	\$/t	355.41
111	82 Treatment charge per t concentrate	\$/t	175
112	83 Refining charge per t concentrate	\$/t	0.00
113	84 Penalty for Cd per t concentrate	\$/t	2
114	85 Transportation cost per t concentrate	\$/t	32.82
115	<b>86 Zn Net Value per t Concentrate</b>	\$/t	<b>145.60</b>
116	<b>Au in Zinc Concentrate</b>		
117	87 Gold price	\$/oz	310.3
118	88 Unit deduction	g/t Au	2
119	89 Percentage payable	%	60
120	90 Refining cost	\$/oz	6
121	91 Au value per ton concentrate	\$/t	129.52
122	92 Refining charge per t concentrate	\$/t	4.56
123	<b>93 Au Net Value per t Concentrate</b>	\$/t	<b>124.96</b>
124	<b>Ag in Zinc Concentrate</b>		
125	94 Silver price	\$/oz	4.562
126	95 Unit deduction	g/t Ag	50
127	96 Percentage payable	%	60
128	97 Refining cost	\$/oz	0.4
129	98 Ag revenue per ton concentrate	\$/t	20.01
130	99 Refining charge per t concentrate	\$/t	3.57
131	<b>100 Ag Net Value per t Concentrate</b>	\$/t	<b>16.44</b>
132	<b>101 Net Value per t Zn Concentrate</b>	\$/t	<b>287.00</b>
133	<b>102 Revenue for Shahumian's Zn Concentrate</b>	\$000's	<b>689.57</b>
134			
135	<b>Total Shahumian's Revenue</b>	\$000's	<b>2,512</b>
136	<b>Total Shahumian's Cost</b>	\$000's	<b>1,229</b>
137	<b>Net Shahumian's Revenue Before Tax</b>	\$000's	<b>1,283</b>
138			

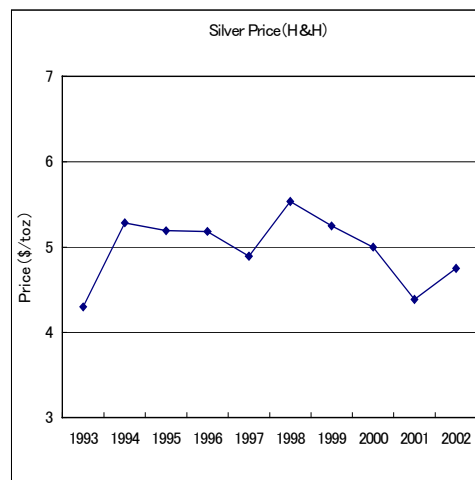
# Appendix 3-16



## Non-ferrous Metal Prices



## Gold Price



## Silver Price

## Appendix 3-17

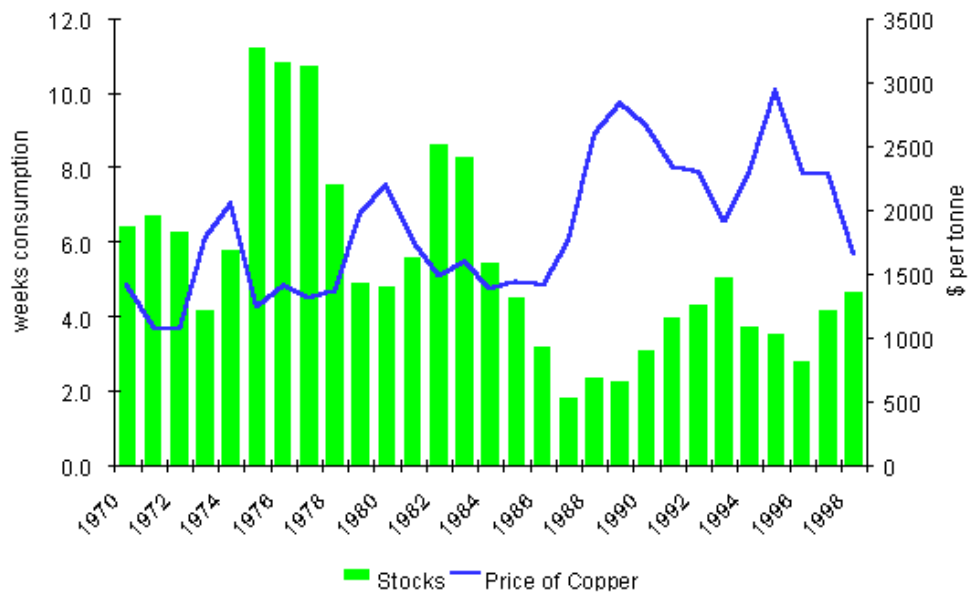
### Economic Simulation for the Long-term Plan of the Kapan Mining Complex

Item	Unit	Year									
		1	2	3	4	5	6	7	8	9	10
<b>Kadzor Open Pit Production</b>											
1 Crude ore	000't	50	100	200	350	500	500	500	500	500	500
2 Cu grade in crude ore	Cu %	1.44	1.48	1.52	1.56	1.60	1.60	1.60	1.60	1.60	1.60
3 Cu in crude ore	Cu t	720	1,480	3,040	5,460	8,000	8,000	8,000	8,000	8,000	8,000
<b>Copper Concentrate from Kadzor</b>											
4 Cu recovery	%	81.0	81.5	82.0	82.5	83.0	83.0	83.0	83.0	83.0	83.0
5 Cu in concentrate	Cu t	583	1,206	2,493	4,505	6,640	6,640	6,640	6,640	6,640	6,640
6 Cu grade in concentrate	Cu %	23	23	23	23	25	25	25	25	25	25
7 Cu concentrate produced	tons	2,536	5,244	10,838	19,585	26,560	26,560	26,560	26,560	26,560	26,560
8 As grade in concentrate	As %	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
9 Sb grade in concentrate	Sb %	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
<b>★Mining Costs for Kadzor Open Pit</b>											
Unit mining cost for Kadzor Open Pit	\$/t	2.55	2.55	2.21	2.21	2.04	2.04	1.87	1.87	1.87	1.87
Total mining cost for Open Pit	\$000's	128	255	442	774	1,020	1,020	935	935	935	935
<b>★Processing Costs for Kadzor</b>											
Unit processing cost for Kadzor	\$/t	2.68	2.68	2.41	2.41	2.14	2.14	2.01	2.01	2.01	2.01
Unit miscellaneous cost in process	\$/t	0.98	0.98	0.88	0.88	0.78	0.78	0.74	0.74	0.74	0.74
Total processing cost for Kadzor	\$000's	183	366	658	1,152	1,460	1,460	1,375	1,375	1,375	1,375
<b>Total Kadzor Operating Cost</b>	\$000's	311	621	1,100	1,925	2,480	2,480	2,310	2,310	2,310	2,310
Unit operating cost for Kadzor	\$/t	6.21	6.21	5.50	5.50	4.96	4.96	4.62	4.62	4.62	4.62
<b>Shahumian Production</b>											
10 Crude ore	000't	90	115	130	150	180	220	260	300	300	300
11 Cu grade in crude ore	Cu %	0.30	0.31	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
12 Zn grade in crude ore	Zn %	1.30	1.40	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
13 Au grade in crude ore	Au g/t	1.6	1.7	1.8	1.9	2.0	2.0	2.0	2.0	2.0	2.0
14 Ag grade in crude ore	Ag g/t	27	28	30	32	33	33	33	33	33	33
15 Cu in crude ore	Cu t	270	356.5	416	480	576	704	832	960	960	960
16 Zn in crude ore	Zn t	1,170	1,610	1,950	2,250	2,700	3,300	3,900	4,500	4,500	4,500
17 Au in crude ore	Au kg	144	195.5	234	285	360	440	520	600	600	600
18 Ag in crude ore	Ag kg	2,430	3,220	3,900	4,800	5,940	7,260	8,580	9,900	9,900	9,900
<b>Copper Concentrate from Shahumian</b>											
19 Cu recovery	%	70	71	72	73	73	73	73	73	73	73
20 Au recovery	%	55	55	55	55	55	55	55	55	55	55
21 Ag recovery	%	65	65	65	65	65	65	65	65	65	65
22 Cu in concentrate	Cu t	189	253	300	350	420	514	607	701	701	701
23 Au in concentrate	Au kg	79	108	129	157	198	242	286	330	330	330
24 Ag in concentrate	Ag kg	1,580	2,093	2,535	3,120	3,861	4,719	5,577	6,435	6,435	6,435
25 Cu grade in concentrate	Cu %	15.0	15.5	16.0	16.5	16.5	16.5	16.5	16.5	16.5	16.5
26 Cu concentrate produced	tons	1,260	1,633	1,872	2,124	2,548	3,115	3,681	4,247	4,247	4,247
27 Au grade in concentrate	Au g/t	62.9	65.8	68.8	73.8	77.7	77.7	77.7	77.7	77.7	77.7
28 Ag grade in concentrate	Ag g/t	1253.6	1281.7	1354.2	1469.2	1515	1515	1515	1515	1515	1515
29 As grade in concentrate	As %	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
<b>Zinc Concentrate from Shahumian</b>											
30 Zn recovery	%	70	71	72	73	73	73	73	73	73	73
31 Au recovery	%	18.5	19.0	19.5	20.0	20.0	20.0	20.0	20.0	20.0	20.0
32 Ag recovery	%	19.0	19.5	20.0	20.5	21.0	21.0	21.0	21.0	21.0	21.0
33 Zn in concentrate	Zn t	819	1,143	1,404	1,643	1,971	2,409	2,847	3,285	3,285	3,285
34 Au in concentrate	Au kg	27	37	46	57	72	88	104	120	120	120
35 Ag in concentrate	Ag kg	462	628	780	984	1,247	1,525	1,802	2,079	2,079	2,079
36 Zn grade in concentrate	Zn %	55.0	55.5	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0
37 Zn concentrate produced	tons	1,489	2,060	2,507	2,933	3,520	4,302	5,084	5,866	5,866	5,866
38 Au grade in concentrate	Au g/t	17.9	18.0	18.2	19.4	20.5	20.5	20.5	20.5	20.5	20.5
39 Ag grade in concentrate	Ag g/t	310.1	304.9	311.1	335.5	354.4	354.4	354.4	354.4	354.4	354.4
40 Cd grade in concentrate	Cd g/t	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100
<b>★Mining Cost for Shahumian</b>											
Unit mining cost for Shahumian	\$/t	10.50	10.50	8.40	8.40	7.35	7.35	6.30	6.30	6.30	6.30
Total mining costs for Shahumian	\$000's	945	1,208	1,092	1,260	1,323	1,617	1,638	1,890	1,890	1,890
<b>★Processing Costs for Shahumian</b>											
Unit processing cost for polymetal	\$/t	5.70	5.70	5.13	5.13	4.56	4.56	4.28	4.28	4.28	4.28
Unit miscellaneous cost for process	\$/t	0.98	0.98	0.88	0.88	0.78	0.78	0.74	0.74	0.74	0.74
Total processing cost for polymetal	\$000's	601	768	781	902	961	1,175	1,305	1,506	1,506	1,506
<b>Total Shahumian Operating Cost</b>	\$000's	1,546	1,976	1,873	2,162	2,284	2,792	2,943	3,396	3,396	3,396
Unit operating cost for polymetal	\$/t	17.18	17.18	14.41	14.41	12.69	12.69	11.32	11.32	11.32	11.32
<b>Total Operating Cost</b>	\$000's	1,857	2,597	2,973	4,087	4,764	5,272	5,253	5,706	5,706	5,706
Unit operating cost for new Kapan	\$/t	13.26	12.08	9.01	8.17	7.01	7.32	6.91	7.13	7.13	7.13

Item	Unit	Year									
		1	2	3	4	5	6	7	8	9	10
<b>Total Cost for Non-Production</b>	\$000's	5.32	5.32	4.26	4.26	3.72	3.72	2.66	2.66	2.66	2.66
Unit cost for non-production	\$/t	0.04	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
<b>Total Cost ex. Capital</b>	\$000's	1,862	2,602	2,978	4,091	4,768	5,276	5,256	5,709	5,709	5,709
Unit cost for new Kapan	\$/t	13.30	12.10	9.02	8.18	7.01	7.33	6.92	7.14	7.14	7.14
<b>★Working Capital</b>	\$000's	500	740	376	1,113	677	508	-20	453	0	-4,347
<b>Total Cost in Working Capital</b>	\$000's	2,362	3,342	3,353	5,204	5,445	5,783	5,236	6,161	5,709	1,362
<b>Concentrates Prices Calculation</b>											
<b>★Kadzor Copper Concentrate Net Value</b>											
41 Moisture content	%	12	11	10	10	10	10	10	10	10	10
42 Copper price	\$/t	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
43 Unit deduction	% Cu	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
44 Percentage payable	%	100	100	100	100	100	100	100	100	100	100
45 Treatment cost	\$/t	80	80	80	80	80	80	80	80	80	80
46 Refining cost	\$/lb.	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065
47 Penalty for As	\$/0.1%	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
48 Transportation cost	\$/wet t	30	30	30	30	30	30	30	30	30	30
49 Revenue per ton concentrate	\$/t	385	385	385	385	420	420	420	420	420	420
50 Treatment charge per t conc.	\$/t	80	80	80	80	80	80	80	80	80	80
51 Refining charge per t conc.	\$/t	32.96	32.96	32.96	32.96	35.83	35.83	35.83	35.83	35.83	35.83
52 Penalty for As per t concentrat	\$/t	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25
53 Transportation cost per t conc.	\$/t	34.09	33.71	33.33	33.33	33.33	33.33	33.33	33.33	33.33	33.33
54 <b>Cu Net Value per t Conc.</b>	\$/t	221.69	222.08	222.45	222.45	254.59	254.59	254.59	254.59	254.59	254.59
55 <b>Revenue for Kadzor Conc.</b>	\$000's	562.1	1164.7	2411.0	4356.7	6761.8	6761.8	6761.8	6761.8	6761.8	6761.8
<b>Shahumian Concentrates</b>											
<b>★Copper Concentrate Net Value</b>											
56 Moisture content	%	15	14	13	12	11	10	10	10	10	10
<b>Cu in Copper Concentrate</b>											
57 Copper price	\$/t	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
58 Unit deduction	% Cu	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
59 Percentage payable	%	100	100	100	100	100	100	100	100	100	100
60 Treatment cost	\$/t	80	80	80	80	80	80	80	80	80	80
61 Refining cost	\$/lb.	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065
62 Penalty for As	\$/0.1%	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
63 Transportation cost	\$/wet t	30	30	30	30	30	30	30	30	30	30
64 Cu value per ton concentrate	\$/t	245	254	263	271	271	271	271	271	271	271
65 Treatment charge per t conc.	\$/t	80	80	80	80	80	80	80	80	80	80
66 Refining charge per t conc.	\$/t	21.50	22.22	22.93	23.65	23.65	23.65	23.65	23.65	23.65	23.65
67 Penalty for As per t concentrat	\$/t	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50
68 Transportation cost per t conc.	\$/t	35.29	34.88	34.48	34.09	33.71	33.33	33.33	33.33	33.33	33.33
69 <b>Cu net value per t conc.</b>	\$/t	100.71	109.15	117.59	126.01	126.39	126.77	126.77	126.77	126.77	126.77
<b>Au in Copper Concentrate</b>											
70 Gold price	\$/oz	300	300	300	300	300	300	300	300	300	300
71 Unit deduction	g/t Au	1	1	1	1	1	1	1	1	1	1
72 Percentage payable	%	90	90	90	90	90	90	90	90	90	90
73 Refining cost	\$/oz	6	6	6	6	6	6	6	6	6	6
74 Au value per ton concentrarte	\$/t	536.96	562.90	588.12	632.06	665.78	665.78	665.78	665.78	665.78	665.78
75 Refining charge per t conc.	\$/t	12.13	12.70	13.26	14.24	14.99	14.99	14.99	14.99	14.99	14.99
76 <b>Au Net Value per t Conc.</b>	\$/t	524.84	550.20	574.85	617.82	650.79	650.79	650.79	650.79	650.79	650.79
<b>Ag in Copper Concentrate</b>											
77 Silver price	\$/oz	5	5	5	5	5	5	5	5	5	5
78 Unit deduction	g/t Ag	30	30	30	30	30	30	30	30	30	30
79 Percentage payable	%	90	90	90	90	90	90	90	90	90	90
80 Refining cost	\$/oz	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
81 Ag value per ton concentrate	\$/t	177.02	181.09	191.58	208.22	214.86	214.86	214.86	214.86	214.86	214.86
82 Refining charge per t conc.	\$/t	16.12	16.48	17.41	18.89	19.48	19.48	19.48	19.48	19.48	19.48
83 <b>Ag net value per t conc.</b>	\$/t	160.90	164.61	174.16	189.32	195.38	195.38	195.38	195.38	195.38	195.38
84 <b>Net value per t Cu conc.</b>	\$/t	786.4	824.0	866.6	933.2	972.6	972.9	972.9	972.9	972.9	972.9
85 <b>Revenue for Cu concentraete</b>	\$000's	990.9	1345.5	1622.3	1981.7	2478.4	3030.4	3581.4	4132.3	4132.3	4132.3
<b>★Zinc Conc. Net Value</b>											
86 Moisture content	%	13	12	11	10	9	9	9	9	9	9
<b>Zn in Zinc Concentrate</b>											
87 Zinc price	\$/t	900	900	900	900	900	900	900	900	900	900
88 Unit deduction	% Zn	0	0	0	0	0	0	0	0	0	0
89 Percentage payable	%	85	85	85	85	85	85	85	85	85	85
90 Treatment cost	\$/t	175	175	175	175	175	175	175	175	175	175
91 Refining cost	\$/lb.	0	0	0	0	0	0	0	0	0	0
92 Penalty for As	\$/t	2	2	2	2	2	2	2	2	2	2
93 Transportation cost	\$/wet t	30	30	30	30	30	30	30	30	30	30
94 Zn value per ton concentrate	\$/t	420.8	424.6	428.4	428.4	428.4	428.4	428.4	428.4	428.4	428.4
95 Treatment charge per t conc.	\$/t	175	175	175	175	175	175	175	175	175	175

Item	Unit	Year									
		1	2	3	4	5	6	7	8	9	10
96 Refining charge per t conc.	\$/t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97 Penalty for Cd per t concentrat	\$/t	2	2	2	2	2	2	2	2	2	2
98 Transport cost per t concentrat	\$/t	34.48	34.09	33.71	33.33	32.97	32.97	32.97	32.97	32.97	32.97
<b>99 Zn Net Value per t Conc.</b>	\$/t	209.3	213.5	217.7	218.1	218.4	218.4	218.4	218.4	218.4	218.4
<b>Au in Zinc Concentrate</b>											
100 Gold price	\$/oz	300	300	300	300	300	300	300	300	300	300
101 Unit deduction	g/t Au	2	2	2	2	2	2	2	2	2	2
102 Percentage payable	%	60	60	60	60	60	60	60	60	60	60
103 Refining cost	\$/oz	6	6	6	6	6	6	6	6	6	6
104 Au value per ton concentrate	\$/t	91.96	92.79	93.75	100.89	106.81	106.81	106.81	106.81	106.81	106.81
105 Refining charge per t conc.	\$/t	3.45	3.48	3.51	3.75	3.95	3.95	3.95	3.95	3.95	3.95
<b>106 Au Net Value per t Conc.</b>	\$/t	88.5	89.3	90.2	97.1	102.9	102.9	102.9	102.9	102.9	102.9
<b>Ag in Zinc Concentrate</b>											
107 Silver price	\$/oz	5	5	5	5	5	5	5	5	5	5
108 Unit deduction	g/t Ag	50	50	50	50	50	50	50	50	50	50
109 Percentage payable	%	60	60	60	60	60	60	60	60	60	60
110 Refining cost	\$/oz	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
111 Ag revenue per ton conc.	\$/t	25.08	24.58	25.18	27.54	29.36	29.36	29.36	29.36	29.36	29.36
112 Refining charge per t conc.	\$/t	3.99	3.92	4.00	4.31	4.56	4.56	4.56	4.56	4.56	4.56
<b>113 Ag Net Value per t Conc.</b>	\$/t	21.10	20.66	21.18	23.22	24.80	24.80	24.80	24.80	24.80	24.80
<b>114 Net Value per t Zn Conc.</b>	\$/t	318.87	323.46	329.12	338.43	346.10	346.10	346.10	346.10	346.10	346.10
<b>115 Revenue for Zn Concentrate</b>	\$000's	474.8	666.2	825.1	992.6	1,218.2	1,488.9	1,759.6	2,030.3	2,030.3	2,030.3
<b>Total Shahumian's Revenue</b>	\$000's	1,466	2,012	2,447	2,974	3,697	4,519	5,341	6,163	6,163	6,163
<b>Total Revenue</b>	\$000's	2,028	3,176	4,858	7,331	10,458	11,281	12,103	12,924	12,924	12,924
<b>Total Cost</b>	\$000's	2,362	3,342	3,353	5,204	5,445	5,783	5,236	6,161	5,709	1,362
<b>Net Revenue Before Tax</b>	\$000's	-334	-166	1,505	2,127	5,013	5,498	6,866	6,763	7,216	11,562
<b>★Capital Costs(\$000's)</b>											
116 Debt repayment	\$000's	7,000									
117 Mining equipment	\$000's	200	200	200		300			300		
118 Ore transportation equipment	\$000's	200				200			200		
119 Kadzor Open Pit equipment	\$000's	200	200	200		500			500		
120 Processing equipment	\$000's		200	500		500			500		
121 Zinc sulfate producing line	\$000's	100									
122 Tailing dam reconstruction	\$000's	500				200			200		
<b>Total Capital Cost</b>	\$000's	8,200	600	900	0	1,700	0	0	1,700	0	0
<b>Net Present Value</b>	\$000's	12,114									
<b>Internal Rate of Return</b>		28%									

## Appendix 3-18



LME Price and Stocks

## Profit and Loss of ACP for Different LME Prices

### Increase of Blister Copper Production up to Full Capacity and Export to Germany

Summary		
LME Cu US\$/t	1,600	
<b>Blister A+B</b>	20,000 ton	
	ADM x 1000	USD x 1000
Sales revenue	16,204,239	28,428
Material cost	13,965,042	24,500
Operating cost	798,793	1,401
Factory benefit	1,440,404	2,527
Over head	1,314,037	2,305
Transportation cost	1,311,000	2,300
Benefit	▲ 1,184,633	▲ 2,078

Summary		
LME Cu US\$/t	2,100	
<b>Blister A+B</b>	20,000 ton	
	ADM x 1000	USD x 1000
Sales revenue	21,063,039	36,953
Material cost	17,882,338	31,373
Operating cost	798,793	1,401
Factory benefit	2,381,909	4,179
Over head	1,314,037	2,305
Transportation cost	1,311,000	2,300
Benefit	▲ 243,128	▲ 427

Summary		
LME Cu US\$/t	2,600	
<b>Blister A+B</b>	20,000 ton	
	ADM x 1000	USD x 1000
Sales revenue	26,361,790	46,249
Material cost	22,841,590	40,073
Operating cost	798,793	1,401
Factory benefit	2,721,408	4,774
Over head	1,314,037	2,305
Transportation cost	1,311,000	2,300
Benefit	96,371	169

### Electrolytic Copper Production and Export

Summary		
LME Cu US\$/t	1,600	
<b>Electrolytic copper</b>	19,900 ton	
	ADM x 1000	USD x 1000
Sales revenue	18,160,278	31,860
MATERIAL COST	13,965,042	24,500
Operating cost	1,339,559	2,350
Factory benefit	2,855,677	5,010
Over head cost	1,314,037	2,305
Transportation cost	1,304,445	2,289
Benefit	237,195	416

Summary		
LME Cu US\$/t	2,100	
<b>Electrolytic copper</b>	19,900 ton	
	ADM x 1000	USD x 1000
Sales revenue	23,831,778	41,810
MATERIAL COST	17,882,338	31,373
Operating cost	1,339,559	2,350
Factory benefit	4,609,882	8,088
Over head cost	1,314,037	2,305
Transportation cost	1,304,445	2,289
Benefit	1,991,400	3,494

Summary		
LME Cu US\$/t	2,600	
<b>Electrolytic copper</b>	19,900 ton	
	ADM x 1000	USD x 1000
Sales revenue	29,503,278	51,760
MATERIAL COST	22,841,590	40,073
Operating cost	1,339,559	2,350
Factory benefit	5,322,130	9,337
Over head cost	1,314,037	2,305
Transportation cost	1,304,445	2,289
Benefit	2,703,648	4,743

### Electrolytic Copper Production and Domestic Sale

Summary		
LME Cu US\$/t	1,600	
<b>Electrolytic copper</b>	19,900 ton	
	ADM x 1000	USD x 1000
Sales revenue	18,160,278	31,860
MATERIAL COST	13,965,042	24,500
Operating cost	1,339,559	2,350
Factory benefit	2,855,677	5,010
Over head cost	1,314,037	2,305
TRANSPORTATION FEE	397,005	697
Benefit	1,144,635	2,008

Summary		
LME Cu US\$/t	2,100	
<b>Electrolytic copper</b>	19,900 ton	
	ADM x 1000	USD x 1000
Sales revenue	23,831,778	41,810
MATERIAL COST	17,882,338	31,373
Operating cost	1,339,559	2,350
Factory benefit	4,609,882	8,088
Over head cost	1,314,037	2,305
Transportation cost	397,005	697
Benefit	2,898,840	5,086

Summary		
LME Cu US\$/t	2,600	
<b>Electrolytic copper</b>	19,900 ton	
	ADM x 1000	USD x 1000
Sales revenue	29,503,278	51,760
MATERIAL COST	22,841,590	40,073
Operating cost	1,339,559	2,350
Factory benefit	5,322,130	9,337
Over head cost	1,314,037	2,305
Transportation cost	397,005	697
Benefit	3,611,088	6,335



## Appendix 3-20

### Countries with Copper Fabricating Industry

	Mining	Smelting	Refining	SX-EW	Manufacture
USA	2,101	1,910	2,771	648	3,738
Japan		1,651	1,365		2,080
German		160	703		1,341
China	620	1,269	1,555		1,325
Italy		129	119		934
France					630
Benelux					421
Brazil	50	200	202		319
Spain	65	320	303		233
Mexico	401	392	617	77	230
Poland	462	494			230
Sweden	55	140	140		188
UK		55	60		178
Russia	617	921	840		165
India	87	312	299		160
Malaysia					160
Thailand					152
Greece					107
Finland		134	125		107
S.Africa	221	201	163		106

derived from "Camara Minera de Mexico Report. LXII Asamblea General Ordinaria de 1999"

**A) Concentrate Export**

'000 ton

	Mining	Smelting	Refining	SX-EW	Manufacture	Conc. Export
Chile	4,594	1,540	2,759	1,449	80	3,054
Indonesia	790	160	160		85	630
Argentina	220				52	220
Papua	210					210
Peru	585	380	441	121	40	205
Australia	770	570	687	107		200
USA	2,101	1,910	2,771	648	3,738	191
Mongolia	162			22		162
Porto gal	141				1	141
Turkey	72		122			72
Zambia	630	579	470		16	51
Iran	193	160	155	15	56	33
Botswana	22					22
Zimbabwe	21			15	15	21
S.Africa	221	201	163		106	20
Armenia	13					13
Albania	11					11
Mexico	401	392	617	77	230	9

**B) Electrolytic Copper Export**

'000 ton

	Mining	Smelting	Refining	SX-EW	Manufactur	Copper export
Chile	4,594	1,540	2,759	1,449	80	4,128
Australia	770	570	687	107		794
Peru	585	380	441	121	40	522
Canada	662	714	678	15	225	468
Mexico	401	392	617	77	230	464
Zambia	630	579	470		16	454
Kazakhstan	304	435	380			380
China	620	1,269	1,555		1,325	230
India	87	312	299		160	139
Philippines	72	190	175		45	130
Turkey	72		122			122
Iran	193	160	155	15	56	114
Congo	175	180	80	31		111
Uzbekistan	80	140	100		10	90
Bulgaria	111	134	76	16	11	81
Indonesia	790	160	160		85	75
N.Korea	15	80	65			65
S.Africa	221	201	163		106	57

**C) Concentrate Import**

'000 ton

	Mining	Smelting	Refining	SX-EW	Manufacture	Conc. Import
Japan		1,651	1,365		2,080	1,651
China	620	1,269	1,555		1,325	649
Korea		350	410		618	350
Russia	617	921	840		165	304
Spain	65	320	303		233	255
India	87	312	299		160	225
Belgium		200	470		344	200
German		160	703		1,341	160
Brazil	50	200	202		319	150
Finland		134	125		107	134
Kazakhstan	304	435	380		0	131
Italy		129	119		934	129
Philippines	72	190	175		45	118
Sweden	55	140	140		188	85
Yugoslavia	118	200	200		79	82
Romania	27	98	85		15	71
N.Korea	15	80	65		0	65
Uzbekistan	80	140	100		10	60
UK		55	60		178	55
Canada	662	714	678	15	225	52
Bulgaria	111	134	76	16	11	23

**D) Electrolytic Copper Import**

'000 ton

	Mining	Smelting	Refining	SX-EW	Manufacture	Copper import
Italy		129	119		934	815
Japan		1,651	1,365		2,080	715
German		160	703		1,341	638
France					630	630
Taiwan					588	588
Benelux					421	421
USA	2,101	1,910	2,771	648	3,738	319
Korea		350	410		618	208
Malaysia					160	160
Thailand					152	152
UK		55	60		178	118
Brazil	50	200	202		319	117
Greece					107	107
Argentina	220				52	52
Sweden	55	140	140		188	48
Czech+Slovakia					40	40
Venezuela					23	23
Hungary					13	13

Derived from "Main customers and Producers of Copper

**Appendix 3-21**

## Appendix 3-22

### Consumption of Sulfuric Acid in SX-EW

Mine	rain mm/y	Copper produced		Leaching Method	Cu leach t/d	Consumption	
		% leachable	% non-leach			kg/t.ore	t/t.Cu
Cyprus Miami	457	0.35	0.2	Heap	193	13.6-15.9	4.14
Cyprus Sierrita	380	0.15	0.125	Heap		8	5.33
Tyrone	400	0.12	0.13	Heap	205.5	6.7	5.58
Chino	440	0.4	0.6	Stock pile	195		
Silver Bell	307	0.22	0.18	Dump	52.2	3.7	1.68
San manuel	450	0.46	0.15	Heap	70	15	3.26
Pinto Valley	560	0.02	0.08	Heap	22.7	11.3	56.50
Copper Miami	560			In-situ	27.2		
Scociedad Minera	65	0.5	0.2	Heap	120	5.7	1.14
Scociedad Contractuel	29	0.71	0.08	Heap	625	17-19	2.54
Colorado	10	1.16	0.04	Heap	310	10-15	1.08
Radliro Tomic	40			Heap	79	7-9	
El Teniente		0.08	1.27				
Zaldivar	8			Heap	37	11	
Girililabone	500	0.8	0.1	Heap	41	15	1.88
Mt.Cuthbert	900	1.6	0.2	Heap	15	27	1.69
Hellenic Copper	350			Heap	15	20	

In the above table, the consumption of sulfuric acid is about 2 to 6t/t.Cu and varies rather widely.

In Armenia, a bio-leaching test was done by the Mining Metallurgical Institute during the former Soviet Union period but it has not been finalized. A construction of a pilot plant was planned but it was not executed either due to fall of FSU.

The material for leaching tests (laboratory scale) conducted in the past are listed as follows;

- ① the low grade ore and waste in the open pit of the Agarak Mine
- ② the low grade ore and waste in the open pit of the Kajaran Mine
- ③ the low grade ore in the underground of the Shamloak Mine

Commercially operating SX-EW method is adopted for the oxide ore which is found in the Tekhut and Aygedzor deposits. The SX-EW test for both deposits oxide ore has not been carried out yet. Because the oxide ore cannot be recovered by the conventional flotation and it was treated as waste together with stripped soil so it was not treated as an object of leaching process.

Basic data on the possibility of consuming total 90,000t/y sulfuric acid planned by Alaverdi were not presented, so further tests are necessary in future.

## Appendix 3-23

### Main Management Indexes For the Kapan Mining Complex

Item	Year 1999	Year 2000	Year 2001
<b>1.Profitability (Earning Power)</b>			
(1) Profit vs. Sales			
1 Gross Profit to Revenue	-56.3%	-16.4%	-26.8%
2 Operating Profit to Revenue	-92.8%	-35.5%	-42.7%
3 Administrative Cost to Revenue	36.5%	19.2%	15.9%
4 Before-tax Profit to Revenue	-92.8%	-35.5%	-42.7%
(2) Profit vs. Assets/Capital			
1 Operating Profit to Total assets	-19.3%	-7.1%	-10.1%
2 Before-tax Profit to Owned Capital	-169.7%	-6177%	117.3%
3 Before-tax Profit to Total Assets	-19.3%	-7.1%	-10.1%
(3) Profit per capita(AMD)			
1 Before-tax Profit per capita(AMD)	-751.7	-341.4	-512.8
<b>2. Financial Stability</b>			
1 Owned capital to Total Assets	11.4%	0.1%	-8.6%
2 Non-current Assets to Owned Capital	655.8%	54593.4%	-618.1%
3 Current Assets to Current Debts	28.7%	37.0%	43.1%
4 Borrowed Money to Revenue	426.4%	497.7%	458.7%
<b>3. Utilization of Assets</b>			
1 Revenue to Total Assets	0.21	0.2	0.24
2 Revenue to Non-current Assets	0.28	0.32	0.44
3 Revenue to Short-term Receivables	1.07	1.76	4.95
4 Revenue to Inventories	3.56	3.84	5.37
<b>4. Revenue Growth</b>			
1 Annual Growth of Revenue	-16.5%	9.4%	37.2%
<b>5. Revenue per capita</b>			
1 Revenue per Employee (AMD)	810,318	960,488	1,201,633

Source: Kapan CJSC, Financial Statements

## Appendix 3-24

### Main Management Indexes for the Armenian Coper Programme

Item	Year 2000	Year 2001
<b>1. Profitability (Earning Power)</b>		
(1) Profit vs. Sales		
1 Gross Profit to Revenue	15.4%	5.3%
2 Operating Profit to Revenue	2.5%	-14.7%
3 Administrative Expenses to Revenue	7.6%	14.2%
4 Before-tax Profit to Revenue	-1.3%	-18.8%
(2) Profit vs. Assets/Capital		
1 Operating Profit to Total Assets	7.6%	14.7%
2 Before-tax Profit to Capital & Reserves	-14.2%	-35.0%
3 Before-tax Profit to Total Assets	-4.0%	-18.8%
(3) Profit per capita		
1 Before-tax Profit per capita(AMD) (No. of Employees: 460 in 2000, 680 in 2001)	-172.98	-1,449,365
<b>2. Financial Stability</b>		
1 Capital & Reserves to Total Assets	-27.9%	53.8%
2 Non-current Assets to Capital & Reserve	-58.9%	147.7%
3 Non-current Assets to Capital, Reserves and Long-term Liabilities	34.4%	138.1%
4 Current Assets to Current Liabilities	160.0%	48.5%
<b>3. Utilization of Assets</b>		
1 Revenue to Total Assets	3.1	1
2 Revenue to Non-current Assets	18.6	1.3
3 Revenue to Trade & other Receivables	5.1	9.2
4 Revenue to inventories	13.4	10.5
<b>4. Revenue Growth</b>		
1 Yearly Growth of Revenue	-	-14.3%
<b>5. Revenue per capita</b>		
1 Revenue per Employee(AMD)	13,321,550	7,719,888

Source: ACP CJSC, Financial Statements