Answers

1 Balkan Inc

The following points should only be regarded as indicative. Other solutions to the case study may have been acceptable.

(a) Option 1 – AIM listing

Preliminary workings

The revenues from the mining operations can be calculated as follows:

	Year ended				
	2008	2009	2010	2011	2012
A. Tonnes of nickel ore mined	1,500,000	1,800,000	2,000,000	2,400,000	2,000,000
B. Amount recovered (75% × A)	1,125,000	1,350,000	1,500,000	1,800,000	1,500,000
C. Pure nickel content (1·4% × B)	15,750	18,900	21,000	25,200	21,000
D. Price per tonne ($)	17,340	17,860	18,396	19,132	19,897
Gross revenue $OOOs (C × D)	273,105	337,554	386,316	482,126	417,837

Annual depreciation and write off charges will be as follows:

	$000
Capex [($235m – $30m) × 20%)]	41,000
Licence ($1m x 20%)	200
Feasibility study costs ($12·5m × 20%)	2,500
Clean-up costs	4,000
	47,700

Cash fixed costs are $78·0m – $47·7m = $30·3m

(i) NPV calculations

The net present value of the project is as follows:

	2008 $000	2009 $000	2010 $000	2011 $000	2012 $000	2013 $000
Revenue	273,105	337,554	386,316	482,126	417,837	
Refinery costs (30%)	(81,932)	(101,266)	(115,895)	(144,638)	(125,351)	
Capex	(235,000)				30,000	
Working capital (15%)	(40,966)	(9,667)	(7,314)	(14,372)	9,643	62,676
Variable operating costs	(90,000)	(108,000)	(120,000)	(144,000)	(120,000)	
Cash fixed costs	(30,300)	(30,300)	(30,300)	(30,300)	(30,300)	
Clean-up costs						(20,000)
Tax (20% op.profit)		(4,635)	(10,058)	(14,484)	(23,098)	(18,897)
Cash flows	(205,093)	83,686	102,749	134,332	158,731	23,779
Disc. Rate 10%	0·909	0·826	0·751	0·683	0·621	0·564
Present value	(186,430)	69,125	77,164	91,749	98,572	13,411
NPV	163,591					

(ii) Discounted payback period

The discounted payback period is calculated as follows:

	2008 $000	2009 $000	2010 $000	2011 $000	2012 $000	2013 $000
PV	(186,430)	69,125	77,164	91,749	98,572	13,411
Cumulative		(117,305)	(40,141)	51,608	150,180	163,591

Thus, the project pays back during 2011

(iii) Annual net profits (losses)

Annual net profits (losses) are as follows:

	2008 $000	2009 $000	2010 $000	2011 $000	2012 $000
Revenue	273,105	337,554	386,316	482,126	417,837
Refinery costs (30%)	(81,932)	(101,266)	(115,895)	(144,638)	(125,351)
Variable operating costs	(90,000)	(108,000)	(120,000)	(144,000)	(120,000)
Fixed costs	(78,000)	(78,000)	(78,000)	(78,000)	(78,000)
Operating profit	23,173	50,288	72,421	115,488	94,486
Interest	(7,000)	(7,000)	(7,000)	(7,000)	(7,000)
Net profit	16,173	43,288	65,421	108,488	87,486
Tax (20%)	(3,235)	(8,658)	(13,084)	(21,698)	(17,497)
Net profit after tax	12,938	34,630	52,337	86,790	69,989

Option 2 – AIM listing plus joint venture

Preliminary workings

Additional transportation costs are:

	2008	2009	2010	2011	2012
Nickel hydroxide (tonnes)	1,125,000	1,350,000	1,500,000	1,800,000	1,500,000
Additional costs ($000)	2,250	2,700	3,000	3,600	3,000*

* Based on nickel hydroxide extracted. However, calculations based on nickel ore mined could also have been used.

(i) NPV calculations

The net present value of the project is as follows:

	2008 $000	2009 $000	2010 $000	2011 $000	2012 $000	2013 $000
Revenue	273,105	337,554	386,316	482,126	417,837	
Refinery costs (25%)	(68,276)	(84,389)	(96,579)	(120,532)	(104,459)	
Capex	(235,000)				30,000	
Working capital (15%)	(40,966)	(9,667)	(7,314)	(14,372)	9,643	62,676
Variable operating costs	(90,000)	(108,000)	(120,000)	(144,000)	(120,000)	
Additional transportation costs	(2,250)	(2,700)	(3,000)	(3,600)	(3,000)	
Cash fixed costs	(30,300)	(30,300)	(30,300)	(30,300)	(30,300)	
Clean-up costs						(20,000)
Tax (20% op. profit)		(6,916)	(12,893)	(17,747)	(27,199)	(22,476)
Cash flows	(193,687)	95,582	116,230	151,575	172,522	20,200
Disc. rate 10%	0·909	0·826	0·751	0·683	0·621	0·564
Present value	(176,061)	78,951	87,289	103,526	107,136	11,393
NPV	212,234					

The NPV will be divided equally as follows:

	$000
Balkan Inc.	106,117
Zagros Mining	106,117
	212,234

(ii) Discounted payback period

The discounted payback period is calculated as follows:

	2008 $000	2009 $000	2010 $000	2011 $000	2012 $000	2013 $000
PV	(176,061)	78,951	87,289	103,526	107,136	11,393
Cumulative		(97,110)	(9,821)	93,705	200,841	212,234

Thus, the project pays back during 2011.

(iii) Annual net profits (losses)

Total annual operating profits are as follows:

	2008 $000	2009 $000	2010 $000	2011 $000	2012 $000
Revenue	273,105	337,554	386,316	482,126	417,837
Refinery costs (25%)	(68,276)	(84,389)	(96,579)	(120,532)	(104,459)
Variable operating costs	(90,000)	(108,000)	(120,000)	(144,000)	(120,000)
Additional transportation costs	(2,250)	(2,700)	(3,000)	(3,600)	(3,000)
Fixed costs	(78,000)	(78,000)	(78,000)	(78,000)	(78,000)
Operating profit	34,579	64,465	88,737	135,994	112,378

Balkans share of the operating profits is 50%, hence annual net profits for the company are:

	2008 $000	2009 $000	2010 $000	2011 $000	2012 $000
Balkan share 50%	17,290	32,233	44,369	67,997	56,189
Interest	(7,000)	(7,000)	(7,000)	(7,000)	(7,000)
Net profit	10,290	25,233	37,369	60,997	49,189
Tax (20%)	(2,058)	(5,047)	(7,474)	(12,199)	(9,838)
Net profit after tax	8,232	20,186	29,895	48,798	39,351

Option 3 – Private equity

Preliminary workings

The revenues from the mining operations can be calculated as follows:

	Year ended				
	2008	2009	2010	2011	2012
A. Tonnes of nickel ore mined	1,575,000	1,890,000	2,100,000	2,520,000	2,100,000
B. Amount recovered (78% × A)	1,228,500	1,474,200	1,638,000	1,965,600	1,638,000
C. Pure nickel content (1·40% × B)	17,199	20,639	22,932	27,518	22,932
D. Price per tonne	17,340	17,860	18,396	19,132	19,897
Gross revenue $000s (C × D)	298,231	368,613	421,857	526,474	456,278

Depreciation and write off charges will be as follows:

	$000
Capex [($244m – $39m) × 20%]	41,000
Licence ($1m × 20%)	200
Feasibility study costs ($12·5m × 20%)	2,500
Clean-up costs	4,000
	47,700
Cash fixed costs are	30,300
Total fixed costs are	78,000

(i) NPV calculations

The net present value of the project is as follows:

	2008 $000	2009 $000	2010 $000	2011 $000	2012 $000	2013 $000
Revenue	298,231	368,613	421,857	526,474	456,278	
Refinery costs (30%)	(89,469)	(110,584)	(126,557)	(157,942)	(136,883)	
Capex	(244,000)				39,000	
Working capital (15%)	(44,735)	(10,557)	(7,987)	(15,693)	10,529	68,443
Variable operating costs	(94,500)	(113,400)	(126,000)	(151,200)	(126,000)	
Additional transportation costs	(15,750)	(18,900)	(21,000)	(25,200)	(21,000)	
Cash fixed costs	(30,300)	(30,300)	(30,300)	(30,300)	(30,300)	
Clean-up costs						(20,000)
Tax (20% op. profit)	–	(4,102)	(9,546)	(14,060)	(22,826)	(18,879)
Cash flows	(220,523)	80,770	100,467	132,079	168,798	29,564
Disc. rate 10%	0·909	0·826	0·751	0·683	0·621	0·564
Present value	(200,455)	66,716	75,451	90,210	104,824	16,674
NPV	153,420					

(ii) Discounted payback period

The discounted payback period is calculated as follows:

	2008 $000	2009 $000	2010 $000	2011 $000	2012 $000	2013 $000
PV	(200,455)	66,716	75,451	90,210	104,824	16,674
Cumulative		(133,739)	(58,288)	31,922	136,746	153,420

Thus, the project pays back during 2011

(iii) Annual net profits (losses)

Annual net profits (losses) are as follows:

	2008 $000	2009 $000	2010 $000	2011 $000	2012 $000
Revenue	298,231	368,613	421,857	526,474	456,278
Refinery costs (30%)	(89,469)	(110,584)	(126,557)	(157,942)	(136,883)
Variable operating costs	(94,500)	(113,400)	(126,000)	(151,200)	(126,000)
Additional transportation costs	(15,750)	(18,900)	(21,000)	(25,200)	(21,000)
Fixed costs	(78,000)	(78,000)	(78,000)	(78,000)	(78,000)
Operating profit	20,512	47,729	70,300	114,132	94,395
Interest	(7,000)	(7,000)	(7,000)	(7,000)	(7,000)
Net profit (loss)	13,512	40,729	63,300	107,132	87,395
Tax (20%)	(2,702)	(8,146)	(12,660)	(21,426)	(17,479)
Net profit after tax	10,810	32,583	50,640	85,706	69,916

Discussion points may include:

- All options provide a positive NPV as well as profits in each year of operations;
- Option 1 gives the highest NPV and Option 2 the lowest in absolute terms;
- Option 2 gives Balkan the best NPV per £ invested but to maximise shareholder wealth, it is the absolute returns that are important;
- All options have similar payback periods;
- Some form of risk assessment using scenario analysis, sensitivity analysis etc is required to gain a better understanding of each option;
- The strongest cash flows and highest profits occur in the final two years of mining operations.

(b) Option 1

Shares issued = (3 × 500,000) to founders + 4,500,000 to investors
= 6,000,000

The value of the equity = NPV – Value of debt*
= $163,591,000 – $100,000,000
= $63,591,000

Value per share = $63,591,000/6,000,000
= $10·60

Option 2

Shares issued = (3 × 500,000) to founders + 2,250,000 to investors
= 3,750,000

The value of the equity = NPV – Value of debt*
= $106,117,000 – $100,000,000
= $6,117,000

Value per share = $6,117,000/3,750,000
= $1·63

Option 3

The value of the equity = NPV – Value of debt*
= $153,420,000 – $100,000,000
= $53,420,000

Value per share = $53,420,000/6,000,000
= $8·90

* It is assumed that the issued value of debt reflects its market value.

(c) The following calculations show the wealth generated for each founder-member of the company under each of the three options:

Option 1

500,000 × $10·60 = $5,300,000

Option 2

500,000 × $1·63 + $5,000,000 =$5,815,000

Option 3

500,000 × $8·90 = $4,450,000

Thus, from the perspective of the founder memnbers, Option 2 provides the best return. Other points that may have been discussed include:

- The benefits and problems associated with AIM listing (access to capital, raised profile of business, risk of failed issue, threat of takeover, increased scrutiny, pressure to perform in the short-term, etc)
- The benefits and problems associated with entering into a joint venture (fewer shares issued leading to less dilution of control, sharing of risks, pooling of expertise, loss of autonomy in decision making, risk of disputes, etc)
- The benefits and problems of private equity funding (enhanced reputation, financial discipline, access to expertise and contracts, loss of control to a shareholder with a controlling interest, appointment of board member to represent private equity interest, possible interference in decision making, sale of controlling interest at the end of five years, etc)
- The need to take a strategic approach and to consider the long-term aspirations of the founder members.

(d) The operational and economic risks that need to be managed may include the following:

- **Economic and nickel price volatility.** Nickel prices are susceptible to volatility and are affected by global economic conditions;
- **Currency risks.** The company is likely to deal with different currencies to meet its operations and financing requirements. For example, the sale of nickel is quoted in $, the finance raised under an AIM flotation would be in £ sterling and many operational expenses will be incurred in Bulgarian levs. Some of the currencies employed may be 'soft' currencies and so hedging the risks involved is likely to be extremely important;
- **Exploration risks.** These include the suitability of the proposed extraction methods, the problems of identifying precisely the level of reserves available and the problems that may be encountered in extracting the reserves;
- Mining and processing risks. These include the risks of industrial accidents, geological and geotechnical problems, processing problems, plant shutdowns, labour disputes and environmental risks;
- **Key personnel.** The founder members may be critical to the success of the venture and their services cannot be guaranteed;
- **Political and economic risks.** Bulgaria is still undergoing a period of transition to a democracy and market economy. Although much progress has been made, changes to the political, economic and legal system may occur which may have an adverse effect on operations;
- **Environmental protests.** The damage that mining does to the landscape has already brought the threat of disruptive action from environmentalists;
- **Inflation risks.** Inflation is usually a problem when evaluating long-term projects. Not all costs and benefits rise in line with the general rate of inflation and this must be taken into account. The company may either discount money values at the money cost of capital or use real values discounted at a real cost of capital;
- **Legal and regulatory risks.** The transition from a communist state to a market economy has led to the introduction of new laws to protect property. However, further laws may be enacted that have an adverse effect on operations. The new property laws are still largely untested and the judges and courts may come to unpredictable decisions if any property disputes arise.

1	**(a)**	8 marks for each NPV analysis, 2 marks for each discounted payback period and 5 marks for each forecast profit statement	45
	(b)	2 marks for each share value calculated	6
	(c)	6 marks for calculating wealth of founder member, 4 marks for joint venture issues, 4 marks, private equity issues and 4 marks AIM issues, 3 marks other issues	21
	(d)	2 marks for each risk identified and 2 marks for how they might be managed	28
			100