



Heemskirk Tin

Review of PFS contractor rates

August 2015



Prepared for: - *Stellar Resources Ltd.*

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1.0 Introduction

Mining One previously conducted a Heemskirk Tin project Pre-Feasibility Study (PFS) directed toward the recovery of the Lower Queen Hill, Severn and Montana tin mineralisation as defined in the Mineral Resource estimate of February 2013 prepared by Resource and Exploration Geology.

In the PFS Mining One utilised typical contractor rates and costs in order to complete the evaluation. It was determined that the development advance rate and costs, in particular, should be examined in further detail. In order to facilitate this determination a summary of the PFS data was forwarded to a number of development contractors who were requested to provide cost estimates, development rates and a statement of capability regarding the provision of mining and development services for the proposed operation.

In addition further optimisation of the project has been proposed by incorporating the following: -

- Transverse Open Stopping (TOS) proposed as a mining method for wide sections of the Severn orebody.
- The use of Paste Fill to replace cemented rock fill and cemented aggregate fill.
- The use of waste rock fill to replace consolidated fill for narrow bench stopes (nominally <6m)

The data from the contractor quotations and the above changes were sequentially incorporated into the PFS cost model in order to evaluate potential savings.

2.0 Scope of Report

The purpose of this report is to summarise the above evaluations/estimations which were reviewed during July 2015 and for use as a reference for any submission regarding potential cost savings.

3.0 Data Sources

The principal reference utilised was the PFS, EPS schedule and cost model. Contractor quotations and development rates were subsequently substituted into the cost model for comparison purposes.

All references to development access refer to the Mining One PFS mine design and schedule with the exception that when TOS stoping was considered an additional 847 metres of footwall waste development was added to the schedule and 150,000 cubic metres of waste rock fill was substituted for paste fill. Similarly when waste rock filling of narrow bench stoping was considered 20% of the total consolidated fill was replaced with waste rock fill.

(The Transverse Open Stopping (TOS) method is as defined in the PFS review conducted by Polberro Consulting.)

The Mining Inventory as estimated in the PFS by Mining One is utilised as the production base for this review.

Ore Source	Tonnes	% Sn
Development	865,230	0.98
Stoping	3,085,760	1.08
Total	3,951,000	1.06

Table 1 Heemskirk Mining Inventory (Mining One 2013)

The comparisons all considered the originally proposed PFS production rate of 600,000 tonnes of ore per year.



There were a number of differences between the original PFS study, the Pybar quote and the Barminco quote as follows: -

- In the PFS study fixed costs were incorporated within the variable costs for all contractor overheads (staffing) and mobile equipment. The Pybar and Barminco quotations both evaluated fixed costs as a rate that could be assessed as a monthly charge for mobile equipment, contractor overheads and (in the case of Barminco) fixed plant such as fans and pumps etc.
- The PFS and Pybar estimates were based on a life of mine project whereas the Barminco quotation was based on a 48 month period.
- The Barminco quotation did not incorporate the \$8m vertical development program.
- The Pybar quotation did not have a separate fixed rate for fans, pumps etc whereas the Barminco estimate set aside \$1.9m for fixed plant costs.
- The PFS, Pybar and Barminco development advance rates were different. The PFS rate was considered conservative and the rates shown in Table 3 were adopted when examining the impact of accelerated development.
- Pybar mobilisation, establishment, demobilisation and disestablishment costs were much higher than either for PFS or Barminco at \$1.9m and it was assumed that a more favourable cost might be negotiable and a total of \$1.3m was correspondingly utilised in contractor models.

Whilst the Barminco quote was well set out and detailed it was not, as requested, for the same period as the PFS and Pybar estimates and as a result there was too high a potential for introducing further estimation error to use the data extensively, also from preliminary examination the quote was significantly higher than the Pybar quote. As a result the Pybar estimate was utilised to examine the PFS estimate and to further examine the impact of the proposed optimisations with cross checks performed against the Barminco data.

Both Pybar and Barminco submissions contained summary totals of all costs based upon their application of the rates to the quantities provided. On examination it was found that these summary totals were not reliable as a guide for comparison purposes for the above reasons and the inappropriate application of quantities to some of the rates.

As such it was determined that a realistic evaluation should be made by the application of the quoted fixed and variable rates directly into the PFS cost model.



4.0 Development Rate

Development rates in the Mining One PFS schedule were based upon an initial single heading rate of 120m per month (single drill jumbo working in a single heading). Once multiple headings were available the overall schedule rate per drill jumbo rose from 120m to 240m at a maximum heading rate of 80m per month.

An industry performance review indicated that a single heading development rate of between 180m and 220m per month is achievable and 240-300m for multiple headings from a single development jumbo. For the purpose of examining the impact of accelerated development the following development rates were considered: -

Single drill jumbo operating in a single heading – 180 metres per month

Drill jumbo operating in multiple headings – 240 metres per month

It should be noted that in the case of Heemskirk preliminary development rates may be impacted on by any firing restrictions resulting from the location of the mine within the township of Zeehan. Estimations of the development access time for individual sections of each orebody are shown in Table 2.

Accelerated single heading rate					
	Location	150m/mo	200m/Mo	250m/Mo	300m/Mo
A	Queen Hill Lower -Upper	13.6	10.7	8.9	7.7
B	Queen Hill Lower -Lower	20.0	15.5	12.8	10.9
C	Queen Hill North	14.5	11.6	9.9	8.7
D	Severn Upper Main	20.4	15.9	13.1	11.3
E	Severn Lower Main	26.0	20.1	16.6	14.2
F	Severn Upper South	21.1	16.6	13.9	12.1
G	Severn Lower South	26.9	21.0	17.5	15.2
H	Montana All	21.4	16.3	13.3	11.3

Table 2: Reduced development time at increasing single heading advance rate

It was observed during financial model evaluation that other than providing early access to stoping areas and thus cash flow there was no project benefit derived from development conducted significantly in advance of requirement for production. The following typical development rates were considered for comparison purposes: -

	Single Heading	Multiple Headings
Mining One PFS	120m/mo	240m/mo
Pybar	230m/mo	270m/mo
Barmenco	200m/mo	270m/mo
Accelerated Case	180m/mo	270m/mo

Table 3: Development Rates

The first three cases examined utilised the PFS development rate, the accelerated development rate was used in the final case examined. The adopted accelerated single heading rate remains slightly conservative which at this stage is prudent to accommodate unknown factors that may impact on the initial development period.



5.0 Cost Models

The original cost model from the Mining One PFS was utilised for reviewing the potential impact on costs. All variations were applied either directly in the form of unit costs or indirectly by applying the appropriate variation to schedule quantities. Power Costs for all models have been increased to 9.5c per Kwh to reflect the current estimated power cost. A total of four cases were evaluated as follows: -

5.1 Mining One PFS model.

The PFS model results are those shown in the original PFS adjusted for a 9.5c/Kwh power cost as follows: -

Mining One PFS	\$ millions	\$/t ore mined
Capital	93.1	23.56
Operating	260.7	65.99
Total	353.8	89.54

Table 4: PFS Cost Model Output Summary (adjusted power cost)

5.2 Contractor Model - Mining One PFS model with Pybar fixed and variable costs.

The first variation made to the original cost model was to substitute the fixed and variable rates contained in the Pybar quote into the above PFS model with no other changes. Detailed financial model output is shown for each case in the appendices.

Contractor Model	\$ millions	\$/t ore mined
Capital	93.7	23.72
Operating	256.2	64.86
Total	350.0	88.58

Table 5: Contractor Cost Model Output Summary

Whilst the summary total of the Pybar quote showed a greater advantage the application of the quoted rates and the appropriate quantities yielded a similar result to the PFS model confirming the accuracy of the original Mining One estimate. The use of contractor rates in this instance lowers total undiscounted costs by \$3.8m (1.1%).

5.3 Optimised Model - Contractor Model with proposed optimisation adjustments.

The following changes to the contractor model were made to examine the impact on costs of the use of the TOS mining method, the use of paste fill and the selective use of waste rock fill in narrow (<6m) bench stopes (LHS).

- In this cost model the reduced fill cost benefit of TOS stoping is incorporated by substituting 150,000 cubic metres of rock waste fill for paste fill and reducing loader costs for fill placement by 90%. An additional 847 metres of waste development (required to perform TOS method) is added.
- The use of paste fill is accommodated by incorporating an \$8m plant capital cost at 12 months and by reducing fill material costs in the PFS model for CRF and CAF from \$37/m³ & \$32/m³ to \$25/m³ after 18 months. (Prior to time that some CRF will take place in drift and fill stoping).
- In order to demonstrate the impact of the use of waste rock fill in narrow vein stoping 20% of the paste fill placed in LHS was replaced by waste rock.

As with the contractor model no change in this instance is made to the development rate and the same rate is used as for the PFS model. This analysis indicates that there is a significant potential cost benefit to be found by adopting the proposed optimisations.



Optimised Model	\$ millions	\$/t ore mined
Capital	98.6	24.97
Operating	239.0	60.49
Total	337.6	85.45

Table 6: Optimised Mining Cost Model Output Summary

The combined effect of incorporating contract mining costs and the optimisation of mining and filling methodology shows a total undiscounted cost benefit of \$16.2m (4.6%) of total project mining costs. The optimised model demonstrates a potential \$8.1m (18.5%) improvement in NPV compared to the PFS.

5.4 Accelerated Model - Optimised Model with accelerated development rates and early production.

A number of accelerated cases were examined to investigate the impact of early production resulting from earlier ore production, processing and sale.

It was found that initial earlier production has the potential to raise project NPV by up to \$4m (7.7%) compared to the optimised model provided that once the initial accelerated development required to establish early production is completed the subsequent development is effectively managed such that it is completed – at accelerated rates – at the latest time required for maintenance of production at the required level.

The impact of the accelerated development in this instance is to deliver sufficient ore for processing to commence in month 14 and to complete the project at the end of year 8.

Summary data is not presented for the accelerated model case as the output in this instance was achieved by substituting data into the schedule output rather than directly adjusting and running the EPS schedule and the results may be viewed as indicative only.



6.0 Recommendations

The summary information contain in this report and appendices is based on manipulating the original PFS schedule output and cost model. The summary data indicates the following: -

- The most significant potential improvement to project outcome is in the area of optimisation of the mining and filling methodology – adapting the PFS model indicates that an undiscounted cost saving of up to \$16.2m may be achieved through the combination of optimisation changes and the use of a suitable contract.
- The improvement in development rate has the capacity to permit earlier production from month 12 - 14 compared to the PFS (dependant on initial mill throughput).
- Earlier production has the capacity to reduce overall project life based on the current mining inventory to approximately 8 years.
- Other than the essential development to provide early production all other development should be as late as possible - with a reasonable forward lag - to optimise the project NPV.
- Earlier production with appropriate development scheduling has the potential to raise project NPV by up to \$4M when compared to the contractor case without early production.
- Early production has the potential to lower pre-production capital by up to \$4M when compared to the contractor case without early production.
- The order of accuracy of these estimates may be considered as that for the PFS except where otherwise stated.
- The principal risk affecting all assumptions regarding schedule rates in the PFS and this review is that there may be some potential for restrictions to be placed upon near surface works and blasting times.

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References

1. Heemskirk Tin Pre-Feasibility Study (*MiningOne* - Aug 2013)
2. PFS Study Review (*Polberro Consulting*- Apr 2014)
3. Pybar Statement of Capability
4. Barmenco Statement of Capability

Limitations and consent

The summary note is provided to Stellar Resources as a summary of the impact of potential optimisation to the Mining One Heemskirk PFS as examined during July 2015. The report has been prepared using information available to the author at the time of writing. The opinions stated herein are given in good faith and with the belief that the basic assumptions are factual and correct and the interpretations reasonable. The document is not intended for public release but may be used as a reference regarding potential project optimisation.

Statement of independence

Alan Fudge has no material interest or entitlement in the securities or assets of the Stellar Resources or any associated companies.

Map conventions/other

Coordinates in this report and in digital data associated with this report are recorded as GDA Zone 55. Levels (RL) in this report are MSL +1000m. References to cross sections look west and long sections look north. Surface topography is based upon lands department map information only.

Competent Person Statement (JORC 2014) - Not required



Appendix One

Mining One PFS Cost Model Summary

MINING COST SUMMARY

CAPITAL COSTS

Mobilisation	\$ 1,317,986
Development	\$ 64,365,780
Labour	\$ 5,363,755
Mine Services	\$ 14,897,003
Pre - Production Capital (transferred from operating)	\$ 7,122,205
Total Capital Costs	\$ 93,066,729
Unit Capital Costs	\$ 23.56
Adjusted Capital Costs	\$ 93,066,729
Unit Capital Costs (Adjusted)	\$ 23.56

OPERATING COSTS

Development	\$ 78,212,297
Stoping	\$ 143,329,616
Labour	\$ 22,258,218
Mine Services	\$ 24,037,575
Total Operating Costs	\$ 260,715,501
Unit Operating Costs	\$ 65.99
Total Operating Costs Adjusted	\$ 260,715,501
Unit Operating Costs Adjusted	\$ 65.99

Total Unit Mining Cost	\$ 89.54
Total Mining Cost	\$ 353,782,230

ITEM		RATES	UNITS	No.	Comments	Totals
CAPITAL						
Development						\$ -
Fixed Cost						\$ -
Development Jumbo		\$ -	mt	2		\$ -
Charge Up		\$ -	mt	1		\$ -
Loader		\$ -	mt	1	2900	\$ -
Truck		\$ -	mt	4		\$ -
						\$ -
Variable Cost						\$ -
Jumbo		\$ 2,719	m		11,436	\$ 31,092,043
Ground Support		\$ 1,616	m		11,436	\$ 18,480,007
Vertical Development (RAR)		\$ 5,000	m			\$ 7,085,010
Vertical Development (FAR)		\$ 2,100	m			\$ 840,230
Fuel		\$ 1.9	t			\$ 1,592,581
Truck Haulage		\$ 2.97	T/km		1,776,401	\$ 5,275,910
Total Capital Development Costs						\$ 64,365,780
Unit Capital Development Costs						\$ 4,935
OPERATING						
Development						\$ -
Fixed Cost						\$ -
Development Jumbo		\$ -	mt	2		\$ -
Charge Up		\$ -	mt	1		\$ -
Loader		\$ -	mt	4	1700	\$ -
Truck		\$ -	mt	4		\$ -
Variable Cost						\$ -
Jumbo		\$ 1,676	m		20,405	\$ 34,198,018
Ground Support		\$ 1,436	m		20,405	\$ 29,298,275
Vertical Development		\$ 5,000	m			\$ -
Fuel		\$ 1.9	t			\$ 2,858,311
Truck Haulage		\$ 2.97	T/km		3,992,489	\$ 11,857,693
						\$ -
Total Operating Development Costs						\$ 78,212,297
Unit Operating Development Costs						\$ 3,833
TOTAL						\$142,578,077

Stopping Costs				
Long Hole Stopping Costs		\$	Units	TOTAL
		Units		
Fixed Costs				
Production Drill	\$	-	1	\$ -
Charge Up	\$	-	1	\$ -
1700 Loader	\$	-	4	\$ -
Variable Costs				
Drilling 64mm	\$	36.59	dm	\$ 19,702,273
Charging 64mm	\$	27.66	chrgm 90%	\$ 13,404,438
Tonnes / Dm			5	
Bogging				
Stope Loading- Conventional	\$	6.06	t 40%	\$ 6,526,142
Stope Loading Remote	\$	7.59	t 60%	\$ 12,260,748
Total				\$ 51,893,602
Cut & Fill Stopping Costs		\$	Units U	TOTAL
Fixed Costs				
Production Jumbo		\$0	1	\$ -
Charge Up		\$0	1	\$ -
1700 Loader		\$0	4	\$ -
Variable Costs				
Flatback		\$26.58	tonne	\$ 10,459,488
Ground Support		\$1,435.87	56 metre	\$ 10,088,534
Bogging				
Stope Loading- Conventional		\$6.06	393,460 100%	\$ 2,384,370
Total				\$ 22,932,391
Stope Haulage		\$	Units U	TOTAL
Fixed Costs				
AD55 Truck	\$	-	4	\$ -
Variable Costs				
AD55 Truck		2.97	6,066,655 Tkm	\$ 18,017,966
Fuel		1.9		\$ 5,787,349
Total				\$ 23,805,315
Backfill				
CAF				
Fixed Costs				
1700 Loader		\$0	1	\$ -
Variable Costs				
Materials				\$ 31,280,590
CAF holes				\$ 172,500
Barricades				\$ 145,000
Loader		4.18		\$ 8,133,926
Total				\$ 39,732,016
CRF				
Fixed Costs				
1700 Loader		\$0	1	\$ -
				\$ -
Variable Costs				\$ -
Materials				\$ 1,960,744
Barricades				\$ -
Loader		4.18		\$ 504,364
				\$ -
Total				\$ 2,465,108
Waste				
Fixed Costs				
1700 Loader		\$0	1	\$ -
				\$ -
Variable Costs				\$ -
Loader		4.18		\$ 2,526,183
Total				\$ 11,164,473
Total Stopping Costs				\$ 143,354,616

LABOUR COSTS

Stellar	Number	Rates pa	Total
General Manager (ticket holder)	1	\$ 250,000	\$ 250,000
Senior Admin Assistant	1	\$ 100,000	\$ 100,000
Admin Assistant	1	\$ 65,000	\$ 65,000
Senior OH&S Advisor	1	\$ 120,000	\$ 120,000
Mining Manager	1	\$ 200,000	\$ 200,000
Mine Foreman	2	\$ 140,000	\$ 280,000
Senior Mining Engineer	1	\$ 140,000	\$ 140,000
Senior Geotechnical engineer	1	\$ 140,000	\$ 140,000
Mining Engineer	2	\$ 120,000	\$ 240,000
Geology Manager	1	\$ 160,000	\$ 160,000
Exploration Manager	1	\$ 150,000	\$ 150,000
Senior Geologist	1	\$ 115,000	\$ 115,000
Mine Geologist	2	\$ 100,000	\$ 200,000
Geological Technicians	2	\$ 70,000	\$ 140,000
Senior Surveyor	1	\$ 120,000	\$ 120,000
Mine Surveyor	2	\$ 90,000	\$ 180,000
Backfill Operators	4	\$ 70,000	\$ 280,000
			\$ 27,621,973
Contractor Overheads			
Project Manager	1	\$ -	mth
Safety and Training Officer	2	\$ -	mth
Mine Foreman	2	\$ -	mth
Maintenance Foreman	1	\$ -	mth
Electrical Supervisor	1	\$ -	mth
Storeman	1	\$ -	mth
Mine Clerk	1	\$ -	mth
Shift supervisor	4	\$ -	mth
			\$ -
Total			\$ 27,621,973

MINE SERVICES			0.095	Power cost		TOTALS
Comments			Rate	No.	Unit	
Capital Items						
	Copnsultants	Mining, Geotechnical etc	\$	1,000,000	1 Fixed	\$ 1,000,000
	Power Supply		\$	1,800,000	1 Fixed	\$ 1,800,000
	Compressor		\$	86,760	1 Fixed	\$ 86,760
	CAF Plant			1,000,000	Fixed	\$ 1,000,000
	CAF Plant Excavations			2,000,000	Fixed	\$ 2,000,000
	Primary Vent Fans		\$	2,305,000	1 Fixed	\$ 2,305,000
	Primary CAF Holes		\$	1,500	Metre	\$ 900,000
	Raw, potable and waste water		\$	100,000	1 Fixed	\$ 100,000
	Site Civils		\$	500,000	Fixed	\$ 500,000
	Fuel Tanks		\$	140,000	1 Fixed	\$ 140,000
	Office	Numbers of personnel (??)	\$	271,000	1 Fixed	\$ 271,000
	ERT Room		\$	90,000	Fixed	\$ 90,000
	Change room	Numbers of personnel (??)	\$	117,930	Fixed	\$ 117,930
	Workshop	Contractor's estimated cost	\$	271,000	Fixed	\$ 271,000
	Dayworks		\$	20,000	Monthly	\$ 1,840,000
	Computer		\$	2,500	9.00 Fixed	\$ 22,500
	Light Vehicles		\$	82,206	7.00 ea	\$ 1,150,884
	Surveying Equipment	Total station, legs, drill, CMS etc.	\$	200,000	Fixed	\$ 200,000
	Communications	Leaky Feeder	\$	75,000	Fixed	\$ 75,000
	Exploration Diamond Drilling (including assay)		\$	-	Monthly	\$ -
	Refuge Chambers		\$	201,000	ea	\$ 280,000
	Escapeway		\$	1,000	metre	\$ 400,109
	Mines Rescue	BG4 12 units	\$	17,630	ea	\$ 246,820
	Mine Ambulance		\$	100,000	ea	\$ 100,000
Total Capital			\$ 14,897,003			
Operating Services			1			
	Electrical cable	Linked to Capital Development	\$	85	4800 metre	\$ 408,000
	Mobile Lighting Tower	Linked to TKM- schedule			1 Monthly	\$ -
	Capital Development Fan - 55kW	Linked to TKM- schedule			6 Monthly	\$ -
	Mono Pump CEO 84 or equivalent (each)	Linked to TKM- schedule			1 Monthly	\$ -
	Flyght pump 20kW	Linked to Capital TKM - schedule			1 Monthly	\$ -
	Flyght pump 5kW	Linked to cut & fill - schedule			1 Monthly	\$ -
	Power Supply	Linked to Power	\$	13,147,096		\$ 13,147,096
	Vent Barricades	Number 1 per stockpile	\$	-	ea	\$ -
	Fuel Tanks	Leased	\$	5,200	montly	\$ -
	Batch Plant / agt Truck and shotcrete Machine	Check with contractor supply			0.1 Monthly	\$ -
	Comms Cable	Linked to Decline dev - schedule	\$	3	metre	\$ 34,309
	Light Vehicle Operating Cost		\$	2,400	7 vehicle/month	\$ 1,663,200
	Minor hand held	stope lights, signs, pegs, etc.	\$	100	1 month	\$ 9,900
	Computers licence	Maintenance Costs Operating	\$	3,415	2 mth	\$ 676,170
	IT	Fixed cost	\$	11,100	1 Monthly	\$ 1,098,900
	General safety items	First Fill (Contractor to Supply)	\$	-	Fixed	\$ -
		Re fill Self rescuer, PPE, light, etc.	\$	-	employee / yea	\$ -
	Definition Drilling (including assay)		\$	166,667	Monthly	\$ 7,000,000
Total Operating			\$ 24,037,575			
Total			\$ 38,934,578			



Appendix Two

Contractor Cost Model Summary

MINING COST SUMMARY	
	Total
CAPITAL COSTS	
Mobilisation	\$ 1,300,000
Development	\$ 57,778,319
Labour	\$ 10,750,734
Mine Services	\$ 14,897,003
Pre - Production Capital (transferred from operating)	\$ 8,987,670
Total Capital Costs	\$ 93,713,726
Unit Capital Costs	\$ 23.72
Adjusted Capital Costs	\$ 93,713,726
Unit Capital Costs (Adjusted)	\$ 23.72
OPERATING COSTS	
Development	\$ 81,035,499
Stoping	\$ 115,106,303
Labour	\$ 39,236,252
Mine Services	\$ 29,858,789
Total Operating Costs	\$ 256,249,172
Unit Operating Costs	\$ 64.86
Total Operating Costs Adjusted	\$ 256,249,172
Unit Operating Costs Adjusted	\$ 64.86
Total Unit Mining Costs	\$ 88.58
Total Mining Costs	\$ 349,962,898

ITEM	RATES	UNITS	No.	Comments	Totals
CAPITAL					
Development					\$ -
Fixed Cost					\$ -
Development Jumbo	\$ 34,772	mth	1.06		\$ 1,324,669
Charge Up	\$ 14,256	mth	0.93		\$ 314,434
Loader	\$ 41,200	mth	0.414	2900	\$ 1,842,134
Truck	\$ 39,263	mth	2.62		\$ 2,439,682
					\$ -
Variable Cost					\$ -
Jumbo	\$ 2,221	m		11,436	\$ 25,398,106
Ground Support	\$ 921	m		11,436	\$ 10,534,856
Vertical Development (RAR)	\$ 5,157	m		1,417	\$ 7,307,479
Vertical Development (FAR)	\$ 1,892	m		400	\$ 757,007
Loader	\$ 4.1	t		849,150	\$ 3,490,007
Truck Haulage	\$ 2.46	T/km		1,776,401	\$ 4,369,946
Total Capital Development Costs					\$ 57,778,319
Unit Capital Development Costs					\$ 3,829
OPERATING					
Development					\$ -
Fixed Cost					\$ -
Development Jumbo	\$ 34,772	mth	1.06		\$ 2,656,029
Charge Up	\$ 14,256	mth	0.93		\$ 333,040
Loader	\$ 41,200	mth	1.656	1700	\$ 1,713,852
Truck	\$ 39,263	mth	2.622		\$ 2,586,021
Variable Cost					\$ -
Jumbo	\$ 1,973	m		20,405	\$ 40,247,966
Ground Support	\$ 853	m		20,405	\$ 17,413,319
Vertical Development	\$ 5,157	m			\$ -
Loader	\$ 4.1	t		1,524,026	\$ 6,263,747
Truck Haulage	\$ 2.46	T/km		3,992,489	\$ 9,821,524
					\$ -
Total Operating Development Costs					\$ 81,035,499
Unit Operating Development Costs					\$ 3,971
TOTAL					\$11,370,876

Stoping Costs				
Long Hole Stoping Costs	\$	Allocation	Factor	TOTAL
Fixed Costs				
LHD Rig	\$ -	0.91		\$ -
Charge Up	\$ 14,256	0.93		\$ 687,066
1700 Loader	\$ 41,200	1.656		\$ 3,829,745
Variable Costs				
Drilling 64mm	\$ 28.16	dm		\$ 16,304,355
Charging 64mm	\$ 18.56	chrgm	85%	\$ 9,134,145
Tonnes / Dm		4.65		
Bogging				
Stope Loading- Conventional	\$ 4.40	t	40%	\$ 4,738,453
Stope Loading Remote	\$ 4.99	t	60%	\$ 8,060,755
Total				\$ 42,754,520
Cut & Fill Stoping Costs	\$	Allocation	Units	TOTAL
Fixed Costs				
Production Jumbo	\$34,772	0.53		\$ 1,677,054
Charge Up	\$14,256	0.93		\$ 97,333
1700 Loader	\$ 41,200	1.656		\$ 560,852
Variable Costs				
Flatback inc as Development	\$0.00		tonne	\$ -
Ground Support inc as development	\$0.00	56	metre	\$ -
Bogging				
Stope Loading- Conventional	\$4.11	393,460	100%	\$ 1,617,122
Total				\$ 3,952,361
Stope Haulage	\$	Units	Units	TOTAL
Fixed Costs				
AD55 Truck	\$ 39,263	2.62		\$ 6,086,128
Variable Costs				
AD55 Truck	2.46	6,066,655	Tkm	\$ 14,923,972
Fuel	0.0			\$ -
Total				\$ 21,010,100
Backfill CAF				
Fixed Costs				
1700 Loader	\$ 41,200	0.414		\$ 1,117,806
Variable Costs				
Materials				\$ 31,280,590
CAF holes				\$ 172,500
Barricades				\$ 145,000
Loader	4.6		1,945,915	\$ 8,951,211
Total				\$ 41,667,107
CRF				
Fixed Costs				
1700 Loader	\$ 41,200	0.414		\$ 88,117
Variable Costs				
Materials				\$ 1,960,744
Barricades				\$ -
Loader	4.6		120,661	\$ 555,041
Total				\$ 2,603,903
Waste				
Fixed Costs				
1700 Loader	\$ 41,200	0.414		\$ 363,302
Variable Costs				
Loader	4.6		604,350	\$ 2,780,010
Total			\$ 12,286,262	\$ 3,143,312
Total Stoping Costs				\$ 115,131,303

MINE SERVICES

Power Cost 0.095

					TOTALS
Comments	Rate	No.	Unit		
Capital Items					
Copnsultants Mining, Geotechnical etc	\$ 1,000,000	1	Fixed	\$	1,000,000
Power Supply	\$ 1,800,000	1	Fixed	\$	1,800,000
Compressor	\$ 86,760	1	Fixed	\$	86,760
CAF Plant	1,000,000		Fixed	\$	1,000,000
CAF Plant Excavations	2,000,000		Fixed	\$	2,000,000
Primary Vent Fans	\$ 2,305,000	1	Fixed	\$	2,305,000
Primary CAF Holes	\$ 1,500		Metre	\$	900,000
Raw, potable and waste water	\$ 100,000	1	Fixed	\$	100,000
Site Civils	\$ 500,000		Fixed	\$	500,000
Fuel Tanks	\$ 140,000	1	Fixed	\$	140,000
Office Numbers of personnel (??)	\$ 271,000	1	Fixed	\$	271,000
ERT Room	\$ 90,000		Fixed	\$	90,000
Change room Numbers of personnel (??)	\$ 117,930		Fixed	\$	117,930
Workshop Contractor's estimated cost	\$ 271,000		Fixed	\$	271,000
Dayworks	\$ 20,000		Monthly	\$	1,840,000
Computer	\$ 2,500	9.00	Fixed	\$	22,500
Light Vehicles	\$ 82,206	7.00	ea	\$	1,150,884
Surveying Equipment Total station, legs, drill, CMS etc.	\$ 200,000		Fixed	\$	200,000
Communications Leaky Feeder	\$ 75,000		Fixed	\$	75,000
Exploration Diamond Drilling (including assay)	\$ -		Monthly	\$	-
Refuge Chambers	\$ 201,000		ea	\$	280,000
Escapeway	\$ 1,000		metre	\$	400,109
Mines Rescue BG4 12 units	\$ 17,630		ea	\$	246,820
Mine Ambulance	\$ 100,000		ea	\$	100,000
Total Capital					\$ 14,897,003
					1
Operating Services					
Electrical cable Linked to Capital Development	\$ 85	4800	metre	\$	408,000
Mobile Lighting Tower		1	Monthly	\$	-
Ventilation Fans Barmingo est	\$ 1,602	0	Monthly	\$	-
Mono Pump CEO 84 or equivalent (each) Barmingo est	\$ 5,400	0	Monthly	\$	-
Workshop, offices,changehouse, crib Barmingo est inc compressor	\$ 14,850	0	Monthly	\$	-
Miscellaneous contractor items Mags, transformer,MR	\$ 7,750	0	Monthly	\$	-
Power Supply 0.7c/kwhr	\$ 13,147,096			\$	13,147,096
Grader CAT 12H Pybar FC	\$ 5,500	0.83	Monthly	\$	451,935
Forklift (Workshop) Pybar FC	\$ 3,500	\$ 1	monthly	\$	346,500
Batch Plant / agt Truck and shotcrete Machine Pybar FC	\$ 6,590	1	Monthly	\$	652,410
Comms Cable Stellar	\$ 3		metre	\$	34,309
Light Vehicle Operating Cost Pybar FC	\$ 5,500	5.4	vehicle/month	\$	2,940,300
Light Vehicle Operating Cost Stellar	\$ 2,400	7	vehicle/month	\$	1,663,200
Minor hand held stoep lights, signs, pegs, etc.	\$ 100	1	month	\$	9,900
Computers licence Maintenance Costs Stellar	\$ 3,415	2	mth	\$	676,170
IT-L120F Pybar FC	\$ 11,100	0.9374	Monthly	\$	1,030,109
Service Truck Pybar FC	\$ 8,000	0.64	Monthly	\$	506,880
Transport Bus Pybar FC	\$ 6,000	1.67	Monthly	\$	991,980
Definition Drilling (including assay) Stellar	\$ 166,667		Monthly	\$	7,000,000
Total Operating					\$ 29,858,789
Total					\$ 44,755,792

<u>Labour Costs</u>					
Stellar	Number	Rates pa		Total	Oncosts
General Manager (ticket holder)	1	\$	250,000	\$ 250,000	1.3
Senior Admin Assistant	1	\$	100,000	\$ 100,000	1.3
Admin Assistant	1	\$	65,000	\$ 65,000	1.3
Senior OH&S Advisor	1	\$	120,000	\$ 120,000	1.3
Mining Manager	1	\$	200,000	\$ 200,000	1.3
Mine Foreman	2	\$	140,000	\$ 280,000	1.3
Senior Mining Engineer	1	\$	140,000	\$ 140,000	1.3
Senior Geotechnical engineer	1	\$	140,000	\$ 140,000	1.3
Mining Engineer	2	\$	120,000	\$ 240,000	1.3
Geology Manager	1	\$	160,000	\$ 160,000	1.3
Exploration Manager	1	\$	150,000	\$ 150,000	1.3
Senior Geologist	1	\$	115,000	\$ 115,000	1.3
Mine Geologist	2	\$	100,000	\$ 200,000	1.3
Geological Technicians	2	\$	70,000	\$ 140,000	1.3
Senior Surveyor	1	\$	120,000	\$ 120,000	1.3
Mine Surveyor	2	\$	90,000	\$ 180,000	1.3
Backfill Operators	4	\$	70,000	\$ 280,000	1.3
				\$ 27,621,973	total
Contractor Overheads					
Project Manager	1	\$	22,894.00	mth	1
Mining Engineer	1	\$	15,262.00	mth	1
Safety and Training Officer	2	\$	13,082.00	mth	1
Mine Foreman	1	\$	20,277.00	mth	1
Maintenance Foreman	2	\$	17,442.00	mth	1
Electrical Supervisor	1	\$	20,750.00	mth	1
Storeman	1	\$	9,864.00	mth	1
Mine Clerk	1	\$	7,087.00	mth	1
Shift supervisor	4	\$	16,898.00	mth	1
				\$ 22,365,013	total
Total				\$ 49,986,986	



Appendix Three

Optimised Cost Model Summary

Mining Cost Summary

MINING COST SUMMARY	
CAPITAL COSTS	Totals
Mobilisation (adj)	\$ 1,300,000
Development	\$ 57,606,608
Labour	\$ 10,750,734
Mine Services	\$ 19,997,003
Pre - Production Capital (transferred from operating)	\$ 8,985,940
Total Capital Costs	\$ 98,640,286
Unit Capital Costs	\$ 24.97
Adjusted Capital Costs	\$ 98,640,286
Unit Capital Costs (Adjusted)	\$ 24.97
OPERATING COSTS	
Development	\$ 83,867,503
Stoping	\$ 95,011,540
Labour	\$ 39,236,252
Mine Services	\$ 29,858,789
Total Operating Costs	\$ 238,988,143
Unit Operating Costs	\$ 60.49
Total Operating Costs Adjusted	\$ 238,988,143
Unit Operating Costs Adjusted	\$ 60.49
Total Unit Cost of Mining	\$ 85.45
Total Cost of Mining	\$ 337,628,429

DEVELOPMENT

ITEM	RATES	UNITS	No.	Comments	Totals
CAPITAL					
Development					\$ -
Fixed Cost					\$ -
Development Jumbo	\$ 34,772	mth	1.055		\$ 1,299,233
Charge Up	\$ 14,256	mth	0.91		\$ 305,797
2900 Loader	\$ 41,200	mth	0.414	2900	\$ 1,842,134
Truck	\$ 39,263	mth	2.62		\$ 2,424,813
					\$ -
Variable Cost					\$ -
Jumbo	\$ 2,221	m		11,436	\$ 25,398,106
Ground Support	\$ 920	m		11,436	\$ 10,522,163
Vertical Development (RAR)	\$ 5,157	m		1,417	\$ 7,307,479
Vertical Development (FAR)	\$ 1,892	m		400	\$ 757,007
2900 Loader	\$ 4.1	t		849,150	\$ 3,490,007
Truck Haulage	\$ 2.46	T/km		1,731,654	\$ 4,259,870
Total Capital Development Costs					\$ 57,606,608
Unit Capital Development Costs					\$ 3,819
OPERATING					
Development					
Fixed Cost					\$ -
Development Jumbo	\$ 34,772	mth	1.055		\$ 2,662,689
Charge Up	\$ 14,256	mth	0.93		\$ 340,234
2900 Loader	\$ 41,200	mth	1.656	1700	\$ 1,750,874
Truck	\$ 39,263	mth	2.622		\$ 2,641,882
Variable Cost (847m dev added to schedule for TOS stoping)					\$ -
Jumbo	\$ 1,973	m		21,251	\$ 41,917,135
Ground Support	\$ 852	m		21,251	\$ 18,113,637
Vertical Development	\$ 5,157	m			\$ -
2900 Loader	\$ 4.1	t		1,583,808	\$ 6,509,453
Truck Haulage	\$ 2.46	T/km		4,037,236	\$ 9,931,600
					\$ -
Total Operating Development Costs					\$ 83,867,503
Unit Operating Development Costs					\$ 3,947
TOTAL					\$141,474,111

Stoping Costs				
Long Hole Stoping Costs	\$	Allocation		TOTAL
Fixed Costs				
LHD Rig	\$ 40,000	0.91		\$ 3,203,200
Charge Up	\$ 14,256	0.93		\$ 682,672
2900 Loader	\$ 41,200	1.656		\$ 3,798,555
Variable Costs				
Drilling 64mm	\$ 28.16	dm		\$ 16,304,355
Charging 64mm	\$ 18.56	chrgm	85%	\$ 9,118,026
Tonnes / Dm		4.65		
Bogging				
Stope Loading- Conventional	\$ 4.40	1,076,921	40%	\$ 4,738,453
Stope Loading Remote	\$ 4.99	1,615,382	60%	\$ 8,060,755
Total				\$ 45,906,017
Cut & Fill Stoping Costs	\$	Allocation	U	TOTAL
Fixed Costs				
Production Jumbo	\$34,772	0.53		\$ 1,677,054
Charge Up	\$14,256	0.93		\$ 96,449
2900 Loader	\$ 41,200	1.656		\$ 554,067
Variable Costs				
Flatback see OP Development	\$0.00		tonne	\$ -
Ground Support inc as OP development	\$0.00	56	metre	\$ -
Bogging				
Stope Loading- Conventional	\$4.11	393,460	100%	\$ 1,617,122
Total				\$ 3,944,692
Stope Haulage	\$	Units	U	TOTAL
Fixed Costs				
AD55 Truck	\$ 39,263	2.62		\$ 6,045,179
Variable Costs				
AD55 Truck	2.46	6,066,655	Tkm	\$ 14,923,972
Total				\$ 20,969,151
Backfill Paste				
Plant available month 19				
Fixed Costs				
2900 Loader	\$ 41,200	0.414		\$ 1,117,806
Variable Costs				
TOS CAF reduction (150,000 m3)	-149,992			-\$3,749,800
Use waste rock in narrow benches (20%)	-194,592			-\$4,864,789
Materials	972,958			\$ 24,323,943
Paste holes				\$ 152,500
Barricades				\$ 140,000
2900 Loader -- reduced by 90%	4.6		194,592	\$ 895,121
Total				\$ 18,014,781
CRF to PASTE at month 19				
Fixed Costs				
2900 Loader	\$ 41,200	0.414		\$ 88,117
Variable Costs				
Materials				\$ 1,316,705
Barricades				\$ -
2900 Loader - reduced by 90%	4.6		12,931	\$ 59,483
Total				\$ 1,464,305
Waste Rock Fill				
Fixed Costs				
2900 Loader	\$ 41,200	0.414		\$ 363,302
Variable Costs				
TOS Additional Waste	149,992			\$ 689,963
Use waste rock in narrow benches (20%)	194,592			\$ 895,121
2900 Loader	4.6		604,350	\$ 2,780,010
Total				\$ 4,728,397
Total Stoping Costs				\$ 95,027,342

MINE SERVICES				0.095	Power Cost	TOTALS
Comments		Rate	No.	Unit		
Capital Services						
Consultants	Mining, Geotechnical etc	\$ 1,000,000	1	Fixed		\$ 1,000,000
Power Supply		\$ 1,800,000	1	Fixed		\$ 1,800,000
Compressor		\$ 86,760	1	Fixed		\$ 86,760
Paste Plant Excavations	New \$8m, 2nd Hand \$5m	8,000,000		Fixed		\$ 8,000,000
Paste Plant Excavations		100,000		Fixed		\$ 100,000
Primary Vent Fans		\$ 2,305,000	1	Fixed		\$ 2,305,000
Primary CAF Holes		\$ 1,500		Metre		\$ 900,000
Raw, potable and waste water		\$ 100,000	1	Fixed		\$ 100,000
Site Civils		\$ 500,000		Fixed		\$ 500,000
Fuel Tanks		\$ 140,000	1	Fixed		\$ 140,000
Office	Numbers of personnel (??)	\$ 271,000	1	Fixed		\$ 271,000
ERT Room		\$ 90,000		Fixed		\$ 90,000
Change room	Numbers of personnel (??)	\$ 117,930		Fixed		\$ 117,930
Workshop	Contractor's estimated cost	\$ 271,000		Fixed		\$ 271,000
Dayworks		\$ 20,000		Monthly		\$ 1,840,000
Computer		\$ 2,500	9.00	Fixed		\$ 22,500
Light Vehicles		\$ 82,206	7.00	ea		\$ 1,150,884
Surveying Equipment	Total station, legs, drill, CMS etc.	\$ 200,000		Fixed		\$ 200,000
Communications	Leaky Feeder	\$ 75,000		Fixed		\$ 75,000
Exploration Diamond Drilling (including assay)		\$ -		Monthly		\$ -
Refuge Chambers		\$ 201,000		ea		\$ 280,000
Escapeway		\$ 1,000		metre		\$ 400,109
Mines Rescue	BG4 12 units	\$ 17,630		ea		\$ 246,820
Mine Ambulance		\$ 100,000		ea		\$ 100,000
Total Capital					\$ 19,997,003	
Operating Services						
Electrical cable	Stellar	\$ 85	4800	metre		\$ 408,000
Mobile Lighting Tower	Stellar		1	Monthly		\$ -
Ventilation Fans	Barmenco est	\$ 1,602	0	Monthly		\$ -
Mono Pump CEO 84 or equivalent (each)	Barmenco est	\$ 5,400	0	Monthly		\$ -
Workshop, offices, changehouse, crib	Barmenco est	\$ 14,850	0	Monthly		\$ -
Miscellaneous contractor items	Barmenco est	\$ 7,750	0	Monthly		\$ -
Power Supply	\$0.1/KW hr (elevated from 0.07)	\$ 13,147,096		KW hr		\$ 13,147,096
Grader CAT 12H	Pybar FC	\$ 5,500	0.83	Monthly		\$ 451,935
Forklift (Workshop)	Pybar FC	\$ 3,500	\$ 1	monthly		\$ 346,500
Batch Plant / agt Truck and shotcrete Machine	Pybar FC	\$ 6,590	1	Monthly		\$ 652,410
Comms Cable	Stellar	\$ 3		metre		\$ 34,309
Light Vehicle Operating Cost	Pybar FC	\$ 5,500	5.4	vehicle/month		\$ 2,940,300
Light Vehicle Operating Cost	Stellar	\$ 2,400	7	vehicle/month		\$ 1,663,200
Minor hand held	stope lights, signs, pegs, etc.	\$ 100	1	month		\$ 9,900
Computers licence Maintenance Costs	Stellar	\$ 3,415	2	mth		\$ 676,170
IT-L120F	Pybar FC	\$ 11,100	0.9374	Monthly		\$ 1,030,109
Service Truck	Pybar FC	\$ 8,000	0.64	Monthly		\$ 506,880
Transport Bus	Pybar FC	\$ 6,000	1.67	Monthly		\$ 991,980
Definition Drilling (including assay)	Stellar	\$ 166,667		Monthly		\$ 7,000,000
Total Operating					\$ 29,858,789	
Total					\$ 49,855,792	

Equipment & Labour

Labour Costs					
Stellar					
	Number	Rates pa		Total	factor
General Manager (ticket holder)	1	\$	250,000	\$ 250,000	1.3
Senior Admin Assistant	1	\$	100,000	\$ 100,000	1.3
Admin Assistant	1	\$	65,000	\$ 65,000	1.3
Senior OH&S Advisor	1	\$	120,000	\$ 120,000	1.3
Mining Manager	1	\$	200,000	\$ 200,000	1.3
Mine Foreman	2	\$	140,000	\$ 280,000	1.3
Senior Mining Engineer	1	\$	140,000	\$ 140,000	1.3
Senior Geotechnical engineer	1	\$	140,000	\$ 140,000	1.3
Mining Engineer	2	\$	120,000	\$ 240,000	1.3
Geology Manager	1	\$	160,000	\$ 160,000	1.3
Exploration Manager	1	\$	150,000	\$ 150,000	1.3
Senior Geologist	1	\$	115,000	\$ 115,000	1.3
Mine Geologist	2	\$	100,000	\$ 200,000	1.3
Geological Technicians	2	\$	70,000	\$ 140,000	1.3
Senior Surveyor	1	\$	120,000	\$ 120,000	1.3
Mine Surveyor	2	\$	90,000	\$ 180,000	1.3
Backfill Operators	4	\$	70,000	\$ 280,000	1.3
Total				\$ 27,621,973	
Contractor Overheads					
	Number	Rates pa		Total	factor
Project Manager	1	\$	22,894.00	nth	1
Mining Engineer	1	\$	15,262.00	nth	1
Safety and Training Officer	2	\$	13,082.00	nth	1
Mine Foreman	1	\$	20,277.00	nth	1
Maintenance Foreman	2	\$	17,442.00	nth	1
Electrical Supervisor	1	\$	20,750.00	nth	1
Storeman	1	\$	9,864.00	nth	1
Mine Clerk	1	\$	7,087.00	nth	1
Shift supervisor	4	\$	16,898.00	nth	1
Total				\$ 22,365,013	
Total				\$ 49,986,986	