Australian Abrasive Minerals (AAM)

Harts Range Garnet Project

Project 5367
May 2013

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1 EXECUTIVE SUMMARY

Independent Metallurgical Operations ("IMO") were requested by senior representatives Curtis and Robert Brand of Australian Abrasive minerals ("AAM") to conduct a review of the internally developed Harts Range Garnet Project Feasibility Study.

IMO conducted a full review of the client provided data that formed the basis of the study including mineralogical information, metallurgical testwork, design interpretation, as well as costing and financial outputs.

IMO concur the study has been conducted to the necessary level of detail to satisfy the projects technical and financial robustness. From a technical standpoint the study focused on the key areas of the major financial driver of garnet production. IMO envisage further economic upside to the project when scavenging recovery of garnet, bi-production of zircon and fines product optimisation are undertaken and included.

The flowsheet designed is robust in respect to achieving product quality. The recoveries (72-73% to product) reported from testwork and included in the financial model could potentially be improved upon with optimisation over the course of operation. Equipment sizing and selection is concurrent with industry standard and minimal risk is present in relation the plant design and projected performance.

IMO were also requested to undertake an investigation of second hand equipment / plant to verify the underlying principal of the capital cost contained within the study. IMO can confirm that significant portions of the process capital cost can be acquired for significantly less than the purchase of new plant with an estimated saving of $AU2-5M to the project. IMO recommend that a figure of $12M be utilised for the capital component to reflect inflation and exchange rate increases since the Study release in November 2011.

2 INTRODUCTION

Independent Metallurgical Operations Pty Ltd (IMO) was requested by Mr Curtis and Mr Robert Brand of **Australian Abrasive Minerals** ("AAM") to carry out an audit of the internally developed Feasibility Study on the Spinifex Ridge Garnet project located approximately 140 kilometres northeast of Alice Springs.

The most recent iteration of the study was released in November 2011. AAM are conducting an independent scale review of major project input costs to more accurately reflect 2014 entry costs. IMO have made some comment within this document in relation to the scale up. These should be merely noted as comments and are by no means accurate reflections or directions to AAM.

IMO's major purpose is to review and verify the integrity of the technical input, equipment selection and project costings within the Feasibility Study document in relation to date of release.

3 PROJECT SUPPORTING TESTWORK & PLANT DESIGN

In general IMO finds the Allied Minerals Laboratory ("AML") test report conducted for the then Olympia Resources to be a good basis from which a comprehensive plant design basis could be formed.

The 12.4 tonne bulk sample selection is comprised of mineralogy that appears representative of the main ore type under investigation and represents the target grades for the first phase of the project.

3.1 FLOWSHEET SELECTION

The principle flowsheet selected by AAM for the treatment of the Harts Range ore is consistent with other inland, shallow surface, scrape mining mineral sands operations such as Douglas Victoria (Iluka Resources) and Loxton South Australia (Australian Zircon).

3.1.1 Ore Beneficiation

Both processes of coarse particle rejection (+2mm) and desliming are justified and form a solid basis for improving the material characteristics for subsequent unit operations. The cost of crushing and size reduction cannot be justified in recovering significantly low grade small quantities of mineral. The spiral performance is drastically inhibited by the inclusion of slimes and the rejection of this material is paramount to the project achieving grade and recovery.

Consideration could also be given to including another screen deck with a cut at >10mm for assessing "stone" quality coarse gem minerals at a later date. The area has a history of artesian fossicking and gem production in garnets, aquamarines and other stones. IMO would recommend an ore sorter for this small scale +10mm application.

3.1.2 Gravity Separation

The rougher spiral performance of 91% recovery to cons and mids in one pass justifies the process selection by which no scavenger circuit is required. The middlings performance of 45% recovery from 19% of the total entering garnet with an upgrade of four times is reasonable, however IMO see potential improvement if this circuits operation was conducted on coarse and fines. At a rate of 36tph there is little cost in size separation and some the 55% loss may be recovered.

3.1.3 Wet Plant Screen Undersize (Fines)

The -250µm are rejected to tails at this stage. It is prudent for a Feasibility to ignore material with no market specification or obvious value. It has been identified a low grade cheap abrasive material could be made from this stream able to off-set some portion of the operating cost. IMO recommend a marketing and technical study be undertaken to identify any potential bi-product from this stream. If it is to be rejected IMO suggest rejecting it earlier in the flowsheet as inherently it comprises ~70% of the incoming mass.

3.1.4 Low Intensity Magnetic Circuit

The magnetic material from the LIMS is rejected, comprising 1% of the entering mass, as it has no economic value. The non-mags are rejected at a rate of approximately 10tph. This stream can be expected to contain minerals like quartz and kyanite and the opportunity for further simple gravity separation in order to produce a quality zircon product exists for future consideration.

3.1.5 Air Tabling

Air tabling the Mag circuit middlings at a rate of 11tph proved very effective in separating hornblende from garnet. Air tables have a limit on feed capacity meaning many units will need to be installed but IMO concur the unit selection to be the correct one. The alternative is returning to a less effective wet tabling process and ultimately loss of product.

3.1.6 Rare Earth Drum Final Separation

The final stage of separation is a final magnetic pass. The AML report does not disclose the exact gauss measurements or magnetic field intensity utilised in the tests. From IMO's experience we presume this to be in the range of 2500 to 4000 gauss to reject misreporting or carry-over of less magnetic susceptible material, giving a final clean garnet concentrate of >94% garnet mineralisation.

3.2 PLANT DESIGN

IMO have reviewed the expected plant mass balance based upon resource average feed grade and the recovery / mass separations observed in the AML testwork report.

The mass balance and unit selection allows for inherent variability and contains enough capacity and flexibility to manage ore variability, changes in feed grade and accommodate the batch style dry plant processing to produce three separate garnet products.

Please refer to 5367-P-003 in Appendix A for IMO's interpreted Process Flow Diagrams and Mass Balance based upon the Feasibility Study Block Flow Diagram.

4 CAPITAL COST

IMO reviewed AAM's capital cost figures (CAPEX). In order to assess it in full and put the detail into perspective, IMO approached the review in four parts.

1. Critical component review and Vendor price check
2. Transferred AAM's number directly into the IMO Feasibility Factored Capital Model
3. Adjusted line items to brand new 2013 pricing
4. Reverse estimated the cost savings of procuring second hand plant.

In general, all critical components were accounted for in the CAPEX supplied by AAM. There were several smaller omissions, listed below, that IMO recommends including in the final CAPEX figure to ensure the plant can maintain the expected availability

- Introduce redundancy capabilities to essential equipment, typically water and slurry pumps throughout the Wet Plant
- Include 5 x 22kL bore water tanks as depicted in the flowsheet
- Include the Stage 1 - 425µm screen in the Dry Plant
- The addition of a double stage RED separator (four in total) as depicted in the flowsheet
- The addition of an Oliver 160 Air Table (15 in total) as depicted in the flowsheet

The direct labour costs breakdown supplied by AAM's CAPEX include a unit rate of $80/hr for direct labour which, in IMO's experience, is far too low. A figure of $150/hr is more appropriate given the current labour market and the remoteness of the project. In addition to this, the total man hours allowed for mechanical installation of equipment seems low at just under 6,000 man hours. IMO has increased this to approximately 7,500 man hours to allow for appropriate installations.

It is understood that AAM has assumed good quality second hand equipment in its cost figures. IMO has supplied a capital cost which has replaced the second hand equipment with 2013 as new equipment. From this total, the cost savings on a second hand plant have been applied to calculate the total CAPEX including second hand material.

Table 1 displays a summary of these four CAPEX options. Please refer to 5367-P-007A and 5367-P-007B in Appendix B for more detail.

Table 1: CAPEX Summary

CAPEX Source	Costs (excluding contingencies)		
	Installed Equipment	Direct	Total
01. AAM CAPEX	$3,816,510	$8,641,521	**$9,084,861**
02. AAM CAPEX Transcribed to IMO Format	$3,899,427	$8,823,016	**$10,499,389**
03. Updated IMO CAPEX (As New)	$5,779,503	$12,569,232	**$14,957,387**
04. Updated IMO CAPEX (Second Hand)	$4,175,809	$7,614,770	$8,376,247
- Procure, Relocate & Install			$3,900,000
- Total			**$ 12,276,247**

The discrepancy between the as supplied AAM CAPEX and the AAM CAPEX transcribed to the IMO format comes to $1.4M or roughly 16%. This can be almost entirely attributed to an extra $1.37M of EPCM costs that IMO has included. Typically, total EPCM costs are 19% of the total direct costs of a project and AAM had allowed a little over $300k, or 3%.

IMO's updated CAPEX, adding in the omitted equipment, increasing the unit rate for direct labour to $150/hr, increasing equipment installation direct labour and assuming all new equipment, increases the CAPEX by $5.8M or 65%.

The procurement of a second hand wet concentrator plant has been assessed by IMO and it can be confirmed that process suitable comparative plants are available for acquisition. IMO estimate the procurement figure to be in the order of $750K to $1.4M. Refurbishment, relocation and re-erection costs are expected to be approximately $2.5M.

The second hand procurement option can be compared to the 5367-P-007B brand new install estimate with major area savings as follows:

- Area Direct Equipment – IMO have conservatively estimated 50% of the equipment cost can be saved, given that other equipment is required to make the flowsheet and process site specific.
- Wet Plant installation – removed from scope as this is covered in the relocation and re-erection allowance. Approximately 1000 hours should remain for other newly acquired equipment required for the flowsheet.
- EPCM – a 200tph wet plant requires significant structure and design of a 5 storey building. IMO estimate the EPCM figure for a 22tph dry shed and project ancillaries will save up to 60% of the $ 1.96M figure.
- Structural – It is estimated that the Wet Concentrator Plant contains 75% of the $1.3M figure.
- Electrical – The electrical figure, whilst very much dependent on condition – is expected to be reduced in the event of second hand plant to approximately 50%, particularly if substations and distribution stations are included.

Re-running the model with the above considerations taken into account, IMO believe the project figure to be approximately $8.5M. Assuming the high end of the possible purchase price and including refurbishment costs gives a total price of $12.3M.

This can only be confirmed after purchase and a thorough condition report generated.

5 OPERATING COST

The operating costs (OPEX) calculated by IMO matched those supplied by AAM quite well, with processing costs of $45.33 and $46.40/t of Garnet respectively (excluding mining, product transport and head office functions) for the first 4 years of mining.

Total costs are highly dependent on transport costs with trucking costs ranging from $84/t to Adelaide to $224/t to MacKay.

Clarification is required on the Site Personnel Schedule. It is unclear whether the shift staff will be on salary or hourly rates. If employees are on salary more staff will be required to cover off shifts, and if staff are contracted the rates are likely too low. Staff associated with the head office have only been allocated 9% on-costs, as opposed to the typical 20%.

The purchase of the CAT 966H and 972H Front End Loaders have been included in the OPEX. While the costs have been captured, this would typically be classified as Working Capital as the significant outlay every 1.6 years and will have an effect on the overall NPV.

6 PROJECT ECONOMICS

The project economics as supplied by AAM are simplistic, however the workings are generally correct. Adjusting a minor error in the NPV (Before Tax) calculation changes it from $42,718,000 to $47,417,000, and similarly, the NPV (After Tax) changes from $27,384,000 to $30,396,000.

Issues may be raised by lenders with the following oversimplifications.

- Initial capital expenditure falls is spent in one financial year (typically this is not the case).
- Secondary capital expenditure (for upgrade) is the only other capital expenditure allowance.
- Purchase of the mining equipment, and any other working capital, to be included in the CAPEX rather than OPEX will reduce the NPV and IRR.
- The payback period of the initial loan is simplistic with interest only payments before a lump sum in year 5. This may be the case however it will likely attract further scrutiny.

Particular note should be paid to the price sensitivity of the Garnetblende product as the price delivered to Singapore is only $10/t more than the cost of transport.

APPENDIX A PROCESS FLOW DIAGRAMS & MASS BALANCE

Tonnes Per Hour	% Solids
% Garnet	Slurry m3/h

BOREFIELD PUMPS

STORAGE TANK

SLIME THICKENER

25	55
5%	40

PROCESS WATER DAM

SLIME DAM

PROCESS WATER TANK

22	20%
5%	42

TAILINGS FROM DRY PLANT

Final Tails Pump Hopper

Dewatering Screen

216.6	95%
5%	78

TAILINGS TO MINE VOID

240	100
22	-

FRONT END LOADER

CONSTANT DENSITY TANK

500 µm Hydrosizer

Cleaner Spiral

T M C

250 µm Hydrosizer

Scalping Screen

13	80%
6%	6.25

+2mm Rejects

Rougher Spiral

T M C

"B/C" Product Screen

18.7	97%
28%	5.1

+250 µm Concentrate

"B/C" Concentrate

"A" Product Screen

4.7	97%
43%	1.2

+850 µm Concentrate

"A" Concentrate

227	%sol
garnet	m3/hr

90	25%
5%	134

43	45%
86%	24

REV.	DESCRIPTION	DATE	BY	REFERENCE
A	WET GARNET CONCENTRATION PLANT WITH FLOW ESTIMATES	1/05/2013	JC	

INDEPENDENT METALLURGICAL OPERATIONS PTY LTD
88 Thomas Street West Perth WA 6005 Phone : 08 9254 6900
Fax : 08 9322 1808 website : www.indmetops.com.au

CLIENT: **Australian Abrasive Minerals**

CHECKED BY	J Childs	01/05/2013	APPROVED	S Hoban	01/05/2013
DRAWN	S Peters	01/05/2013	CLIENT		

PROJECT: **Harts Range Garnet Project**

TITLE: **Wet Plant PFD**

DRG No.

REV. **A**

SIZE **A3**

Tonnes Per Hour	% Solids
% Garnet	Slurry m3/h

“A” CONC STOCKPILE

“B/C” CONC STOCKPILE

22	97%
28%	5.5

ROTARY DRIER

1.7 mm SCREEN

600 MICRON SCREEN

425 MICRON SCREEN
20 tph

COARSE STREAM

COARSE MAGNETIC SEPARATORS

NON-MAG

TOP MAG 1

TOP MAG 2

BOTTOM MAG

FINE STREAM

SINGLE RED MAGNET x 1

NON-MAG

MIDS

MAGS

2 AIR TABLES

COARSE AIR TABLES

5 AIR TABLES

600 MICRON SCREEN

Splitter

50% Split

2.8	-
97.0%	0.7

B GRADE GARNET BIN

C GRADE GARNET BIN

1.6	-
97.2%	0.4

BAGGING UNIT

FORKLIFT

BAG STORE

NON-MAG

TOP MAG 1

TOP MAG 2

BOTTOM MAG

SINGLE RED MAGNET x 2

NON-MAG

MAGS

MIDS

6 AIR TABLES

CONC

TAIL

MID

FINE AIR TABLES

2 AIR TABLES

TAIL

CONC

MID

FINE MAGNETIC SEPARATORS

TO FINAL TAILS HOPPER (WET PLANT)

C GRADE GARNETBLENDE BIN

PROPOSED FUTURE EXPANSION

REV.	DESCRIPTION	DATE	BY	REFERENCE
A	DRY GARNET CONCENTRATION PLANT WITH FLOW ESTIMATES	1/05/2013	JC	

INDEPENDENT METALLURGICAL OPERATIONS PTY LTD
88 Thomas Street West Perth WA 6005 Phone : 08 9254 6900
Fax : 08 9322 1808 website : www.indmetops.com.au

CLIENT **Australian Abrasive Minerals**

PROJECT **Harts Range Garnet Project**

TITLE **DRY PLANT PFD**

CHECKED BY	J Childs	01/05/2013	APPROVED S Hoban	01/05/2013
DRAWN	S Peters	01/05/2013	CLIENT	

DRG No. **5367-B-002** REV. **A** SIZE **A3**

APPENDIX B CAPITAL COST MODELS

Hart's Range - Capital Cost Estimate

CLIENT:	**Australian Abrasive Minerals**	**JOB No:**	**5367**	**DATE:**	**26-Apr-13**	**PREPARED BY:**	**D KELLY**
PROJECT:	**Hart's Range Garnet Project**	**DOC No:**	**5367-P-008A**	**REV:**	**1**	**CHECKED BY:**	
DESCRIPTION:	**AAM Supplied Equipment Costs Transcribed to IMO Cost Model**			**REV. DESC.**	**FINAL ISSUE**	**APPROVED BY:**	**S HOBAN**

Description	Equipment Number	Equipment Supply				Installation Labour				Other (Freight, Insurance, Taxes)				Line Item Total	Comments
					Subtotal		Quantity Required	Units	Subtotal				Subtotal		
DIRECT COSTS															
Process Equipment															
AREA 0000 Borefield					$108,850		10	m/hrs	$800				$6,531	$116,181	
AREA 0010 Wet Plant					$797,148		1439	m/hrs	$115,120				$47,829	$960,097	
AREA 0020 Dry Plant					$2,336,405		4332	m/hrs	$346,560				$140,184	$2,823,149	
Subtotal					$3,242,403		5781	m/hrs	$462,480				$194,544	$3,899,427	
Site Preparation															
5% of process equipment	- - -												$162,120	$162,120	
Subtotal													$162,120	$162,120	
Civil and Concrete															
20% of process equipment	- - -												$648,481	$648,481	
Subtotal													$648,481	$648,481	
Structural															
30% of process equipment	- - -												$972,721	$972,721	
Subtotal													$972,721	$972,721	
Piping															
20% of process equipment	- - -												$648,481	$648,481	
Subtotal													$648,481	$648,481	
Electrics															
30% of process equipment	- - -												$972,721	$972,721	
Subtotal													$972,721	$972,721	
Instrumentation															
15% of process equipment	- - -												$486,360	$486,360	
Subtotal													$486,360	$486,360	
Insulation															
0% of process equipment	- - -												$0	$0	
Subtotal													$0	$0	
Painting / Paving / Proratables/Roads/ Infrastructure Other															
7.25% of process equipment													$235,074	$235,074	
Subtotal													$235,074	$235,074	
Construction Equipment															
39% of Direct Field Labour	- - -												$180,367	180,367	
Subtotal													$180,367	$180,367	
Plant Total Direct Costs														$8,205,752	
OTHER DIRECT COSTS															
Spares										$3,242,403	5.00%	%	$162,120	$162,120	5% of equipment supply cost
Commissioning & Start Up										$8,205,752	2.00%	%	$164,115	$164,115	2% of total direct plant costs
First Fills										$8,205,752	0.50%	%	$41,029	$41,029	0.5% of total direct plant costs
Supplier Commissioning										$250,000	1	Lot	$250,000	$250,000	allowance
Subtotal														$617,264	
Total Direct Costs														$8,823,016	
INDIRECT COSTS															
Construction Facility										$8,823,016	1%	%	$88,230	$88,230	1% of total direct costs
Engineering Drafting & Design - Total										$8,823,016	15%	%	$1,323,452	$1,323,452	15% of total direct costs
Construction Management										$8,823,016	3%	%	$264,690	$264,690	3% of total direct costs
Total Indirect Costs														**$1,676,373**	
SUBTOTAL														**$10,499,389**	
Contingency							20%		0	lot				$0	*$0*
TOTAL COST ESTIMATE														$10,499,389	

Harts Range Garnet Project
Australian Abrasive Minerals
Capital Cost Estimate

Equipment Description					Quantity	Equipment Supply			Direct Labour				Other				Line Item Total	Equipment Details								Rev.
Area	Equip	No.	Equip. Tag	Name		Unit Cost	Units	Subtotal	Unit Cost	Quantity	Units	Subtotal	Unit Cost	Quantity	Units	Subtotal		Dimensions	Capacity	Materials of Construction	Drive	Installed Power (kW)	Proposed Vendor	Model	Description / Comments	
0000				Borefield Pumps	3	$ 32,000	Ea	$ 96,000	$ 80	0	m/hrs	$ -	6%	1	%	$ 5,760	$ 101,760									
0000				Borefield Pump Tank	0	$ 6,000	Ea	$ -	$ 80	0	m/hrs	$ -	6%	1	%	$ -	$ -		22kL								
0000				Water Transfer Pump	1	$ 6,850	Ea	$ 6,850	$ 80	10	m/hrs	$ 800	6%	1	%	$ 411	$ 8,061	3/2 AH Warman			22					
0000				Water Transfer Tank	1	$ 6,000	Ea	$ 6,000	$ 80	0	m/hrs	$ -	6%	1	%	$ 360	$ 6,360		35kL								
						Area Equip Supply Sub-total		$ 108,850		Area Labour Sub-total		$ 800			Area Sub-total		$ 116,181									
0010				Dump Hopper	1	$ 47,500	Ea	$ 47,500	$ 80	20	m/hrs	$ 1,600	6%	1	%	$ 2,850	$ 51,950									
0010				Hopper Extraction Conveyor	1	$ 10,000	Ea	$ 10,000	$ 80	16	m/hrs	$ 1,280	6%	1	%	$ 600	$ 11,880	1000mm wide								
0010				Screen Feed Conveyor	1	$ 11,000	Ea	$ 11,000	$ 80	48	m/hrs	$ 3,840	6%	1	%	$ 660	$ 15,500	450mm wide by 16m								
0010				O/S Conveyor	0	$ 12,500	Ea	$ -	$ 80		m/hrs	$ -	6%	1	%	$ -	$ -	600mmwide by 10m								
0010				Primary Screen	1	$ 45,000	Ea	$ 45,000	$ 80	4	m/hrs	$ 320	6%	1	%	$ 2,700	$ 48,020	VE 16/32				Linatex				
0010				Primary Screen Hopper	1	$ 19,000	Ea	$ 19,000	$ 80	10	m/hrs	$ 800	6%	1	%	$ 1,140	$ 20,940									
0010				U/F Pump & Motor	1	$ 17,950	Ea	$ 17,950	$ 80	12	m/hrs	$ 960	6%	1	%	$ 1,077	$ 19,987	6/4 AH Warman			90					
0010				Spray Water Pump & Motor	1	$ 11,140	Ea	$ 11,140	$ 80	12	m/hrs	$ 960	6%	1	%	$ 668	$ 12,768	Ajex 100-150			37					
0010				Sump Pump	1	$ 7,400	Ea	$ 7,400	$ 80	2	m/hrs	$ 160	6%	1	%	$ 444	$ 8,004									
0010				Diesel Dewatering Pump	1	$ 11,000	Ea	$ 11,000	$ 80	2	m/hrs	$ 160	6%	1	%	$ 660	$ 11,820									
0010				Tails Return Water Hopper	1	$ 19,000	Ea	$ 19,000	$ 80	12	m/hrs	$ 960	6%	1	%	$ 1,140	$ 21,100									
0010				Tails Return Water Pump & Motor	1	$ 15,130	Ea	$ 15,130	$ 80	12	m/hrs	$ 960	6%	1	%	$ 908	$ 16,998	6/4 AH Warman			55					
0010				Tailings Cyclone	1	$ 9,200	Ea	$ 9,200	$ 80	8	m/hrs	$ 640	6%	1	%	$ 552	$ 10,392									
0010				Flocculant Tank	1	$ 600	Ea	$ 600	$ 80	6	m/hrs	$ 480	6%	1	%	$ 36	$ 1,116	700L								
0010				Flocculant Dosing System	1	$ 80,000	Ea	$ 80,000	$ 80	50	m/hrs	$ 4,000	6%	1	%	$ 4,800	$ 88,800									
0010				Air Compressor	1	$ 1,660	Ea	$ 1,660	$ 80	12	m/hrs	$ 960	6%	1	%	$ 100	$ 2,720									
0010				Wet Plant Feed Thickener, High Rate 24m	1	$ 80,000	Ea	$ 80,000	$ 80	80	m/hrs	$ 6,400	6%	1	%	$ 4,800	$ 91,200	24m Diameter								
0010				CD Tank	1	$ 66,500	Ea	$ 66,500	$ 80	78	m/hrs	$ 6,240	6%	1	%	$ 3,990	$ 76,730									
0010				Thickener Underflow Pump & Drive	1	$ 6,850	Ea	$ 6,850	$ 80	19	m/hrs	$ 1,520	6%	1	%	$ 411	$ 8,781	3/2 AH Warman			22					
0010				Deslime Cyclone 50µm 500SU	1	$ 8,800	Ea	$ 8,800	$ 80	8	m/hrs	$ 640	6%	1	%	$ 528	$ 9,968									
0010				Deslime Pump Motor & Drive	1	$ 3,140	Ea	$ 3,140	$ 80	8	m/hrs	$ 640	6%	1	%	$ 188	$ 3,968	6/4 AH Warman			37					
0010				Rougher Spirals (ex stock)	32	$ -	Ea	$ -	$ 80	0.5	m/hrs	$ 1,280	6%	1	%	$ -	$ 1,280	Triple Start MG5D								
0010				Rougher Feed Pump	1	$ 14,390	Ea	$ 14,390	$ 80	6	m/hrs	$ 480	6%	1	%	$ 863	$ 15,733	6/4 AH Warman			37					
0010				Spiral Distributors & Hoses	2	$ 9,672	Ea	$ 19,344	$ 80	24	m/hrs	$ 3,840	6%	1	%	$ 1,161	$ 24,345									
0010				Spiral Launders, Liners & Discharge Lines	3	$ 14,244	Ea	$ 42,732	$ 80	16	m/hrs	$ 3,840	6%	1	%	$ 2,564	$ 49,136									
0010				Plant Final Tails Hopper	1	$ 26,600	Ea	$ 26,600	$ 80	16	m/hrs	$ 1,280	6%	1	%	$ 1,596	$ 29,476									
0010				Plant Final Tails Pump & Motor	1	$ 14,390	Ea	$ 14,390	$ 80	12	m/hrs	$ 960	6%	1	%	$ 863	$ 16,213	6/4 AH Warman								
0010				Primary Spiral Cons Pump	1	$ 6,908	Ea	$ 6,908	$ 80	14	m/hrs	$ 1,120	6%	1	%	$ 414	$ 8,442									
0010				Pump Hoppers	6	$ 5,383	Ea	$ 32,300	$ 80	9	m/hrs	$ 4,320	6%	1	%	$ 1,938	$ 38,558									
0010				Primary Hydrosizer Cyclone 1x375	1	$ 7,500	Ea	$ 7,500	$ 80	8	m/hrs	$ 640	6%	1	%	$ 450	$ 8,590									
0010				Primary Hydrosizer 1x800	1	$ 56,924	Ea	$ 56,924	$ 80	24	m/hrs	$ 1,920	6%	1	%	$ 3,415	$ 62,259									
0010				Primary Hydrosize UF Pump	1	$ 6,908	Ea	$ 6,908	$ 80	8	m/hrs	$ 640	6%	1	%	$ 414	$ 7,962	3/2 AH Warman								
0010				Secondary Hydrosizer Cyclone	1	$ 5,500	Ea	$ 5,500	$ 80	8	m/hrs	$ 640	6%	1	%	$ 330	$ 6,470									
0010				Secondary Hydrosizer 1x1200	1	$ 40,000	Ea	$ 40,000	$ 80	8	m/hrs	$ 640	6%	1	%	$ 2,400	$ 43,040									
0010				Secondary Hydrosizer UF Pump	1	$ 6,908	Ea	$ 6,908	$ 80	16	m/hrs	$ 1,280	6%	1	%	$ 414	$ 8,602									
0010				Secondary Hydrosizer OF Pump	1	$ 6,908	Ea	$ 6,908	$ 80	16	m/hrs	$ 1,280	6%	1	%	$ 414	$ 8,602									
0010				Secondary Spirals (ex stock)	4		Ea	$ -	$ 80	0.5	m/hrs	$ 160	6%	1	%	$ -	$ 160	Triple Start MG5D								
0010				Secondary Spirals Cyclone	1	$ 5,500	Ea	$ 5,500	$ 80	8	m/hrs	$ 640	6%	1	%	$ 330	$ 6,470									
0010				Secondary Spirals Con Pump	2	$ 6,908	Ea	$ 13,816	$ 80	16	m/hrs	$ 2,560	6%	1	%	$ 829	$ 17,205									
0010				Stockpile A dewatering Screen 850µm	1	$ 8,400	Ea	$ 8,400	$ 80	50	m/hrs	$ 4,000	6%	1	%	$ 504	$ 12,904									
0010				Product Discharge Cyclones (ex stock)	2	$ -	Ea	$ -	$ 80	7	m/hrs	$ 1,120	6%	1	%	$ -	$ 1,120									
0010				Plant Overflow Pump	1	$ 11,250	Ea	$ 11,250	$ 80	12	m/hrs	$ 960	6%	1	%	$ 675	$ 12,885	6/4 AH Warman								
0010				Install Labour	1	$ -	Ea	$ -	$ 80	600	m/hrs	$ 48,000	6%	1	%	$ -	$ 48,000									
						Area Equip Supply Sub-total		$ 797,148		Area Labour Sub-total		$ 115,120			Area Sub-total		$ 960,097									
0020				Feed Hopper	1	$ 47,500	Ea	$ 47,500	$ 80	24	m/hrs	$ 1,920	6%	1	%	$ 2,850	$ 52,270									
0020				Rotary Drier	1	$ 150,000	Ea	$ 150,000	$ 80	210	m/hrs	$ 16,800	6%	1	%	$ 9,000	$ 175,800	15m x 1.5m diameter								
0020				Inclined Belt Conveyor	1	$ 20,000	Ea	$ 20,000	$ 80	62	m/hrs	$ 4,960	6%	1	%	$ 1,200	$ 26,160									
0020				Feed Screw Conveyor	1	$ 18,925	Ea	$ 18,925	$ 80	16	m/hrs	$ 1,280	6%	1	%	$ 1,136	$ 21,341									
0020				Discharge Elevator - 9m High	1	$ 19,719	Ea	$ 19,719	$ 80	24	m/hrs	$ 1,920	6%	1	%	$ 1,183	$ 22,822									
0020				Scalping Screen 1.7mm	1	$ 26,000	Ea	$ 26,000	$ 80	24	m/hrs	$ 1,920	6%	1	%	$ 1,560	$ 29,480									
0020				Screen Elevator - 9m	1	$ 29,719	Ea	$ 29,719	$ 80	42	m/hrs	$ 3,360	6%	1	%	$ 1,783	$ 34,862									
0020				Stage 1 Screen - 425µm	0	$ 26,000	Ea	$ -	$ 150	24	m/hrs	$ -	6%	1	%	$ -	$ -									
0020				Screen Discharge Elevator	1	$ 29,719	Ea	$ 29,719	$ 80	54	m/hrs	$ 4,320	6%	1	%	$ 1,783	$ 35,822									
0020				Double Stage RED Separators	3	$ 134,000	Ea	$ 402,000	$ 80	20	m/hrs	$ 4,800	6%	1	%	$ 24,120	$ 430,920									
0020				Single Stage RED Separators	3	$ 87,000	Ea	$ 261,000	$ 80	13.33333	m/hrs	$ 3,200	6%	1	%	$ 15,660	$ 279,860									
0020				Double RED Feed Elevators 10m	2	$ 39,719	Ea	$ 79,438	$ 80	23	m/hrs	$ 3,680	6%	1	%	$ 4,766	$ 87,884									
0020				Single RED Feed Elevators 10m	2	$ 33,719	Ea	$ 67,438	$ 80	24	m/hrs	$ 3,840	6%	1	%	$ 4,046	$ 75,324									
0020				Tailings Conveyor - Sanki	1	$ 9,800	Ea	$ 9,800	$ 80	16	m/hrs	$ 1,280	6%	1	%	$ 588	$ 11,668					Sanki				
0020				RED Product Elevators 9m	3	$ 20,719	Ea	$ 62,157	$ 80	20	m/hrs	$ 4,800	6%	1	%	$ 3,729	$ 70,686									
0020				RED Product Conveyors - Sanki	4	$ 9,250	Ea	$ 37,000	$ 80	15.5	m/hrs	$ 4,960	6%	1	%	$ 2,220	$ 44,180					Sanki				
0020				Air Compressor	1	$ 5,000	Ea	$ 5,000	$ 80	4	m/hrs	$ 320	6%	1	%	$ 300	$ 5,620									
0020				Air Tables - Oliver 160	14	$ 47,000	Ea	$ 658,000	$ 80	12.57143	m/hrs	$ 14,080	6%	1	%	$ 39,480	$ 711,560									
0020				Conveyors	10	$ 13,600	Ea	$ 136,000	$ 80	6	m/hrs	$ 4,800	6%	1	%	$ 8,160	$ 148,960	MR35				Sanki				
0020				Table Feed Elevators	5	$ 19,719	Ea	$ 98,595	$ 80	19.2	m/hrs	$ 7,680	6%	1	%	$ 5,916	$ 112,191									
0020				Table Product Elevators	3	$ 16,719	Ea	$ 50,157	$ 80	32	m/hrs	$ 7,680	6%	1	%	$ 3,009	$ 60,846									
0020				Screen - 600 µm	2	$ 39,000	Ea	$ 78,000	$ 80	18	m/hrs	$ 2,880	6%	1	%	$ 4,680	$ 85,560									
0020				Screen Elevators - 9m high	2	$ 19,719	Ea	$ 39,438	$ 80	30	m/hrs	$ 4,800	6%	1	%	$ 2,366	$ 46,604									
0020				Tailings Conveyor	1	$ 10,800	Ea	$ 10,800	$ 80	16	m/hrs	$ 1,280	6%	1	%	$ 648	$ 12,728									
0020				Install Labour	1	$ -	Ea	$ -	$ 80	3000	m/hrs	$ 240,000	6%	1	%	$ -	$ 240,000									
						Area Equip Supply Sub-total		$ 2,336,405		Area Labour Sub-total		$ 346,560			Area Sub-total		$ 2,823,149									

Hart's Range - Capital Cost Estimate

CLIENT:	**Australian Abrasive Minerals**	**JOB No:**	**5367**	**DATE:**	**26-Apr-13**	**PREPARED BY:**	**D KELLY**
PROJECT:	**Hart's Range Garnet Project**	**DOC No:**	**5367-P-008B**	**REV:**	**1**	**CHECKED BY:**	
DESCRIPTION:	**Cost Model Updated with As New Equipment Costs**			**REV. DESC.**	**FINAL ISSUE**	**APPROVED BY:**	**S HOBAN**

Description	Equipment Number	Equipment Supply				Installation Labour				Other (Freight, Insurance, Taxes)				Line Item Total	Comments
					Subtotal		Quantity Required	Units	Subtotal				Subtotal		
DIRECT COSTS															
Process Equipment															
AREA 0000 Borefield					$220,000		296	m/hrs	$44,400				$13,200	$277,600	
AREA 0010 Wet Plant					$1,626,220		3866	m/hrs	$579,900				$97,573	$2,303,693	
AREA 0020 Dry Plant					$2,543,405		3348	m/hrs	$502,200				$152,604	$3,198,209	
Subtotal					$4,389,625		7510	m/hrs	$1,126,500				$263,378	$5,779,503	
Site Preparation															
5% of process equipment	- - -												$219,481	$219,481	
Subtotal													$219,481	$219,481	
Civil and Concrete															
20% of process equipment	- - -												$877,925	$877,925	
Subtotal													$877,925	$877,925	
Structural															
30% of process equipment	- - -												$1,316,888	$1,316,888	
Subtotal													$1,316,888	$1,316,888	
Piping															
20% of process equipment	- - -												$877,925	$877,925	
Subtotal													$877,925	$877,925	
Electrics															
30% of process equipment	- - -												$1,316,888	$1,316,888	
Subtotal													$1,316,888	$1,316,888	
Instrumentation															
15% of process equipment	- - -												$658,444	$658,444	
Subtotal													$658,444	$658,444	
Insulation															
0% of process equipment	- - -												$0	$0	
Subtotal													$0	$0	
Painting / Paving / Proratables/Roads/ Infrastructure Other															
7.25% of process equipment													$318,248	$318,248	
Subtotal													$318,248	$318,248	
Construction Equipment															
39% of Direct Field Labour	- - -												$439,335	439,335	
Subtotal													$439,335	$439,335	
Plant Total Direct Costs														$11,804,635	
OTHER DIRECT COSTS															
Spares										$4,389,625	5.00%	%	$219,481	$219,481	5% of equipment supply cost
Commissioning & Start Up										$11,804,635	2.00%	%	$236,093	$236,093	2% of total direct plant costs
First Fills										$11,804,635	0.50%	%	$59,023	$59,023	0.5% of total direct plant costs
Supplier Commissioning										$250,000	1	Lot	$250,000	$250,000	allowance
Subtotal														$764,597	
Total Direct Costs														$12,569,232	
INDIRECT COSTS															
Construction Facility										$12,569,232	1%	%	$125,692	$125,692	1% of total direct costs
Engineering Drafting & Design - Total										$12,569,232	15%	%	$1,885,385	$1,885,385	15% of total direct costs
Construction Management										$12,569,232	3%	%	$377,077	$377,077	3% of total direct costs
Total Indirect Costs														**$2,388,154**	
SUBTOTAL														**$14,957,387**	
Contingency							20%		0	lot			$0	*$0*	
TOTAL COST ESTIMATE														$14,957,387	

Harts Range Garnet Project
Australian Abrasive Minerals
Capital Cost Estimate

Equipment Description					Quantity	Equipment Supply			Direct Labour				Other				Line Item Total	Equipment Details								Rev.
Area	Equip	No.	Equip. Tag	Name		Unit Cost	Units	Subtotal	Unit Cost	Quantity	Units	Subtotal	Unit Cost	Quantity	Units	Subtotal		Dimensions	Capacity	Materials of Construction	Drive	Installed Power (kW)	Proposed Vendor	Model	Description / Comments	
0000				Borefield Pumps	5	$ 32,000	Ea	$ 160,000	$ 150	24	m/hrs	$ 18,000	6%	1	%	$ 9,600	$ 187,600									
0000				Borefield Pump Tank	5	$ 6,000	Ea	$ 30,000	$ 150	24	m/hrs	$ 18,000	6%	1	%	$ 1,800	$ 49,800		22kL							
0000				Water Transfer Pump	2	$ 12,000	Ea	$ 24,000	$ 150	16	m/hrs	$ 4,800	6%	1	%	$ 1,440	$ 30,240	3/2 AH Warman				22				
0000				Water Transfer Tank	1	$ 6,000	Ea	$ 6,000	$ 150	24	m/hrs	$ 3,600	6%	1	%	$ 360	$ 9,960		35kL							
						Area Equip Supply Sub-total		$ 220,000			Area Labour Sub-total	$ 44,400				Area Sub-total	$ 277,600									
0010				Dump Hopper	1	$ 47,500	Ea	$ 47,500	$ 150	20	m/hrs	$ 3,000	6%	1	%	$ 2,850	$ 53,350									
0010				Hopper Extraction Conveyor	1	$ 40,000	Ea	$ 40,000	$ 150	16	m/hrs	$ 2,400	6%	1	%	$ 2,400	$ 44,800	1000mm wide								
0010				Screen Feed Conveyor	1	$ 40,000	Ea	$ 40,000	$ 150	48	m/hrs	$ 7,200	6%	1	%	$ 2,400	$ 49,600	450mm wide by 16m								
0010				O/S Conveyor	0	$ 12,500	Ea	$ -	$ 150		m/hrs	$ -	6%	1	%	$ -	$ -	600mmwide by 10m								
0010				Primary Screen	1	$ 100,000	Ea	$ 100,000	$ 150	200	m/hrs	$ 30,000	6%	1	%	$ 6,000	$ 136,000	VE 16/32					Linatex			
0010				Primary Screen Hopper	1	$ 19,000	Ea	$ 19,000	$ 150	20	m/hrs	$ 3,000	6%	1	%	$ 1,140	$ 23,140									
0010				U/F Pump & Motor	2	$ 36,700	Ea	$ 73,400	$ 150	20	m/hrs	$ 6,000	6%	1	%	$ 4,404	$ 83,804	6/4 AH Warman				90				
0010				Spray Water Pump & Motor	2	$ 11,140	Ea	$ 22,280	$ 150	12	m/hrs	$ 3,600	6%	1	%	$ 1,337	$ 27,217	Ajex 100-150				37				
0010				Sump Pump	1	$ 7,400	Ea	$ 7,400	$ 150	20	m/hrs	$ 3,000	6%	1	%	$ 444	$ 10,844									
0010				Diesel Dewatering Pump	1	$ 11,000	Ea	$ 11,000	$ 150	20	m/hrs	$ 3,000	6%	1	%	$ 660	$ 14,660									
0010				Tails Return Water Hopper	1	$ 19,000	Ea	$ 19,000	$ 150	12	m/hrs	$ 1,800	6%	1	%	$ 1,140	$ 21,940									
0010				Tails Return Water Pump & Motor	2	$ 30,000	Ea	$ 60,000	$ 150	12	m/hrs	$ 3,600	6%	1	%	$ 3,600	$ 67,200	6/4 AH Warman				55				
0010				Tailings Cyclone	1	$ 9,200	Ea	$ 9,200	$ 150	20	m/hrs	$ 3,000	6%	1	%	$ 552	$ 12,752									
0010				Flocculant Tank	1	$ 600	Ea	$ 600	$ 150	24	m/hrs	$ 3,600	6%	1	%	$ 36	$ 4,236	700L								
0010				Flocculant Dosing System	1	$ 80,000	Ea	$ 80,000	$ 150	50	m/hrs	$ 7,500	6%	1	%	$ 4,800	$ 92,300									
0010				Air Compressor	1	$ 1,660	Ea	$ 1,660	$ 150	20	m/hrs	$ 3,000	6%	1	%	$ 100	$ 4,760									
0010				Wet Plant Feed Thickener, High Rate 24m	1	$ 500,000	Ea	$ 500,000	$ 150	2000	m/hrs	$ 300,000	6%	1	%	$ 30,000	$ 830,000	24m Diameter								
0010				CD Tank	1	$ 66,500	Ea	$ 66,500	$ 150	78	m/hrs	$ 11,700	6%	1	%	$ 3,990	$ 82,190									
0010				Thickener Underflow Pump & Drive	2	$ 12,320	Ea	$ 24,640	$ 150	50	m/hrs	$ 15,000	6%	1	%	$ 1,478	$ 41,118	3/2 AH Warman				22				
0010				Deslime Cyclone 50µm 500SU	1	$ 8,800	Ea	$ 8,800	$ 150	20	m/hrs	$ 3,000	6%	1	%	$ 528	$ 12,328									
0010				Deslime Pump Motor & Drive	2	$ 3,140	Ea	$ 6,280	$ 150	20	m/hrs	$ 6,000	6%	1	%	$ 377	$ 12,657	6/4 AH Warman				37				
0010				Stockpile Reclaim Feeder 3	0	$ 150,000	Ea	$ -	$ 150	75	m/hrs	$ -	6%	1	%	$ -	$ -									
0010				Rougher Spirals (ex stock)	32	$ -	Ea	$ -	$ 150	10	m/hrs	$ 48,000	6%	1	%	$ -	$ 48,000	Triple Start MG5D								
0010				Rougher Spirals Feed Pump	2	$ 33,140	Ea	$ 66,280	$ 150	40	m/hrs	$ 12,000	6%	1	%	$ 3,977	$ 82,257	6/4 AH Warman				37				
0010				Spiral Distributors & Hoses	2	$ 9,672	Ea	$ 19,344	$ 150	24	m/hrs	$ 7,200	6%	1	%	$ 1,161	$ 27,705									
0010				Spiral Launders, Liners & Discharge Lines	3	$ 14,244	Ea	$ 42,732	$ 150	16	m/hrs	$ 7,200	6%	1	%	$ 2,564	$ 52,496									
0010				Plant Final Tails Hopper	1	$ 26,600	Ea	$ 26,600	$ 150	16	m/hrs	$ 2,400	6%	1	%	$ 1,596	$ 30,596									
0010				Plant Final Tails Pump & Motor	2	$ 33,140	Ea	$ 66,280	$ 150	12	m/hrs	$ 3,600	6%	1	%	$ 3,977	$ 73,857	6/4 AH Warman								
0010				Primary Spiral Cons Pump	2	$ 12,000	Ea	$ 24,000	$ 150	14	m/hrs	$ 4,200	6%	1	%	$ 1,440	$ 29,640									
0010				Pump Hoppers	6	$ 5,383	Ea	$ 32,300	$ 150	20	m/hrs	$ 18,000	6%	1	%	$ 1,938	$ 52,238									
0010				Primary Hydrosizer Cyclone 1x375	1	$ 7,500	Ea	$ 7,500	$ 150	20	m/hrs	$ 3,000	6%	1	%	$ 450	$ 10,950									
0010				Knelson Feed Pump	0	$ 20,000	Ea	$ -	$ 150	50	m/hrs	$ -	6%	1	%	$ -	$ -									
0010				Primary Hydrosizer 1x800	1	$ 56,924	Ea	$ 56,924	$ 150	24	m/hrs	$ 3,600	6%	1	%	$ 3,415	$ 63,939									
0010				Primary Hydrosize UF Pump	2	$ 12,000	Ea	$ 24,000	$ 150	20	m/hrs	$ 6,000	6%	1	%	$ 1,440	$ 31,440	3/2 AH Warman								
0010				Secondary Hydrosizer Cyclone	1	$ 5,500	Ea	$ 5,500	$ 150	20	m/hrs	$ 3,000	6%	1	%	$ 330	$ 8,830									
0010				Secondary Hydrosizer 1x1200	1	$ 40,000	Ea	$ 40,000	$ 150	20	m/hrs	$ 3,000	6%	1	%	$ 2,400	$ 45,400									
0010				Secondary Hydrosizer UF Pump	1	$ 12,000	Ea	$ 12,000	$ 150	16	m/hrs	$ 2,400	6%	1	%	$ 720	$ 15,120									
0010				Secondary Hydrosizer OF Pump	1	$ 12,000	Ea	$ 12,000	$ 150	16	m/hrs	$ 2,400	6%	1	%	$ 720	$ 15,120									
0010				Secondary Spirals (ex stock)	4	$ -	Ea	$ -	$ 150	10	m/hrs	$ 6,000	6%	1	%	$ -	$ 6,000	Triple Start MG5D								
0010				Secondary Spirals Cyclone	1	$ 5,500	Ea	$ 5,500	$ 150	8	m/hrs	$ 1,200	6%	1	%	$ 330	$ 7,030									
0010				Secondary Spirals Con Pump	2	$ 12,000	Ea	$ 24,000	$ 150	16	m/hrs	$ 4,800	6%	1	%	$ 1,440	$ 30,240									
0010				Stockpile A dewatering Screen 850µm	1	$ 24,000	Ea	$ 24,000	$ 150	50	m/hrs	$ 7,500	6%	1	%	$ 1,440	$ 32,940									
0010				Product Discharge Cyclones (ex stock)	2	$ -	Ea	$ -	$ 150	50	m/hrs	$ 15,000	6%	1	%	$ -	$ 15,000									
0010				Plant Overflow Pump	1	$ 30,000	Ea	$ 30,000	$ 150	12	m/hrs	$ 1,800	6%	1	%	$ 1,800	$ 33,600	6/4 AH Warman								
0010																										
						Area Equip Supply Sub-total		$ 1,626,220			Area Labour Sub-total	$ 579,900				Area Sub-total	$ 2,303,693									
0020				Feed Hopper	1	$ 47,500	Ea	$ 47,500	$ 150	24	m/hrs	$ 3,600	6%	1	%	$ 2,850	$ 53,950									
0020				Rotary Drier	1	$ 150,000	Ea	$ 150,000	$ 150	210	m/hrs	$ 31,500	6%	1	%	$ 9,000	$ 190,500	15m x 1.5m diameter								
0020				Inclined Belt Conveyor	1	$ 20,000	Ea	$ 20,000	$ 150	62	m/hrs	$ 9,300	6%	1	%	$ 1,200	$ 30,500									
0020				Feed Screw Conveyor	1	$ 18,925	Ea	$ 18,925	$ 150	16	m/hrs	$ 2,400	6%	1	%	$ 1,136	$ 22,461									
0020				Discharge Elevator - 9m High	1	$ 19,719	Ea	$ 19,719	$ 150	24	m/hrs	$ 3,600	6%	1	%	$ 1,183	$ 24,502									
0020				Scalping Screen 1.7mm	1	$ 26,000	Ea	$ 26,000	$ 150	24	m/hrs	$ 3,600	6%	1	%	$ 1,560	$ 31,160									
0020				Screen Elevator - 9m	1	$ 29,719	Ea	$ 29,719	$ 150	42	m/hrs	$ 6,300	6%	1	%	$ 1,783	$ 37,802									
0020				Stage 1 Screen - 425µm	1	$ 26,000	Ea	$ 26,000	$ 150	24	m/hrs	$ 3,600	6%	1	%	$ 1,560	$ 31,160									
0020				Screen Discharge Elevator	1	$ 29,719	Ea	$ 29,719	$ 150	54	m/hrs	$ 8,100	6%	1	%	$ 1,783	$ 39,602									
0020				Double Stage RED Separators	4	$ 134,000	Ea	$ 536,000	$ 150	60	m/hrs	$ 36,000	6%	1	%	$ 32,160	$ 604,160									
0020				Single Stage RED Separators	3	$ 87,000	Ea	$ 261,000	$ 150	40	m/hrs	$ 18,000	6%	1	%	$ 15,660	$ 294,660									
0020				Double RED Feed Elevators 10m	2	$ 39,719	Ea	$ 79,438	$ 150	46	m/hrs	$ 13,800	6%	1	%	$ 4,766	$ 98,004									
0020				Single RED Feed Elevators 10m	2	$ 33,719	Ea	$ 67,438	$ 150	100	m/hrs	$ 30,000	6%	1	%	$ 4,046	$ 101,484									
0020				Tailings Conveyor - Sanki	1	$ 9,800	Ea	$ 9,800	$ 150	16	m/hrs	$ 2,400	6%	1	%	$ 588	$ 12,788						Sanki			
0020				RED Product Elevators 9m	3	$ 20,719	Ea	$ 62,157	$ 150	60	m/hrs	$ 27,000	6%	1	%	$ 3,729	$ 92,886									
0020				RED Product Conveyors - Sanki	4	$ 9,250	Ea	$ 37,000	$ 150	62	m/hrs	$ 37,200	6%	1	%	$ 2,220	$ 76,420						Sanki			
0020				Air Compressor	1	$ 5,000	Ea	$ 5,000	$ 150	20	m/hrs	$ 3,000	6%	1	%	$ 300	$ 8,300									
0020				Air Tables - Oliver 160	15	$ 47,000	Ea	$ 705,000	$ 150	12	m/hrs	$ 26,400	6%	1	%	$ 42,300	$ 773,700									
0020				Conveyors	10	$ 13,600	Ea	$ 136,000	$ 150	60	m/hrs	$ 90,000	6%	1	%	$ 8,160	$ 234,160	MR35					Sanki			
0020				Table Feed Elevators	5	$ 19,719	Ea	$ 98,595	$ 150	96	m/hrs	$ 72,000	6%	1	%	$ 5,916	$ 176,511									
0020				Table Product Elevators	3	$ 16,719	Ea	$ 50,157	$ 150	96	m/hrs	$ 43,200	6%	1	%	$ 3,009	$ 96,366									
0020				Screen - 600 µm	2	$ 39,000	Ea	$ 78,000	$ 150	36	m/hrs	$ 10,800	6%	1	%	$ 4,680	$ 93,480									
0020				Screen Elevators - 9m high	2	$ 19,719	Ea	$ 39,438	$ 150	60	m/hrs	$ 18,000	6%	1	%	$ 2,366	$ 59,804									
0020				Tailings Conveyor	1	$ 10,800	Ea	$ 10,800	$ 150	16	m/hrs	$ 2,400	6%	1	%	$ 648	$ 13,848									
0020																										
						Area Equip Supply Sub-total		$ 2,543,405			Area Labour Sub-total	$ 502,200				Area Sub-total	$ 3,198,209									

APPENDIX C OPERATING COST MODELS

Harts Range Garnet Project

Client: Australian Abrasive Minerals
Date: 28-Apr-13
Revision: Final
Currency: AUD

INPUTS		
Feed to Plant (Mined Ore)	1,730,000	dry tpa
Garnet Recovery	84,770	tpa
Plant Availability	85%	%
Available Hours	7446	hrs
Power Cost	27.7	AUDc/kWh
Diesel Cost	1.15	AUD/L

includes government rebate

OPERATING COST SUMMARY

	% Total Cost	Total, AUD/yr	AUD/ t mined	AUD/ t Garnet
MINING	**Excluded**			
LABOUR	40%	1,530,470	0.88	18.05
POWER	27%	1,043,131	0.60	12.31
REAGENTS	2%	87,308	0.05	1.03
CONSUMABLES	20%	762,930	0.44	9.00
MAINTENANCE MATERIALS	7%	278,886	0.16	3.29
PRODUCT TRANSPORT	0%	0	0.00	0.00
GENERAL & ADMINISTRATION	4%	140,000	0.08	1.65
TOTAL		**3,842,725**	**2.22**	**45.33**

LABOUR

	People on plant	Day/Night	FIFO Roster	No. of shifts	Total people	Base salary $/ yr	On cost %	Total $/ yr
Mining	**Excluded**							
Process Plant								
Mine Manager/Metallurgist	1	Day	5/2	1	1	200,000	20%	240,000
Lab Tech/ Office Asst	1	Day	5/2	1	1	60,000	20%	36,000
Supervisor/Fitter/Refief Operator	1	Day	5/2	1	1	139,776	20%	167,731
Loader Operator	1	Shift	2/1	2	2	122,640	20%	294,336
Wet Plant Operator (Shift Boss)	1	Shift	2/1	2	2	144,540	20%	346,896
Dry Plant Operator	1	Shift	2/1	2	2	109,500	20%	262,800
Mechanical Fitter	1	Day		1	1	89,856	20%	107,827
General Hand/Screening/Bagging	1	Day		1	1	62,400	20%	74,880
TOTAL NUMBER OF PEOPLE	**8**				**11**			
Grand Sub Total								1,530,470
CONTINGENCY						0%		0
TOTAL LABOUR COST, $/ yr								1,530,470

ELECTRIC POWER

AREA	Duty Connected Power kW	Utility Factor	Avail %	Drawn Power kW	Annual kWh	Cost $/ yr
010 Wet Plant						
In-Pit Grizzly	159	100%	85%	135	1,006,327	278,753
Wet Plant	167	100%	85%	142	1,056,960	292,778
Process Water	21	100%	85%	18	132,911	36,816
Tailings	27	100%	85%	23	170,886	47,335
020 Dry Plant						
Dry Plant	170	100%	85%	145	1,075,947	298,037
Amenities	51	100%	85%	43	322,784	89,411
Grand Sub Total	595			506		1,043,131
CONTINGENCY					0%	0
TOTAL POWER COST, $/ yr						1,043,131

REAGENTS

ITEM	Unit Consumption Amount	Unit	Usage t/a	Unit Cost $	Total $/ yr
010 Wet Plant					
Flocculant - Thickener	65	kg/day	23.7	3,680	87,308
020 Dry Plant					
Grand Sub Total					87,308
CONTINGENCY				0%	0
TOTAL REAGENT COST, $/ yr					87,308

CONSUMABLES

ITEM	Consumption Amount	Unit	Quantity per annum	Unit Cost $	Total $/ yr
010 Wet Plant					
020 Dry Plant					
Bulk Bags	0.5	bags/t	84,770	18	762930
Grand Sub Total					762,930
CONTINGENCY				0%	0
TOTAL CONSUMABLES COST, $/ yr					762,930

MAINTENANCE

AREA	CAPEX $	Factor, % of Directs	Maintenance Cost $/ yr
010 Wet Plant	797,148	8.0%	63,772
020 Dry Plant	2,336,405	8.0%	186,912
Electrical Infrastructure	940,066	3.0%	28,202
Grand Sub Total	4,073,619		278,886
CONTINGENCY		0%	0
TOTAL MAINTENANCE COST, $/ yr			278,886

GENERAL AND ADMINISTRATION

ITEM		Quantity per Annum	Unit Cost $	Total $/yr
General Freight (excl. reagents) to Site	Allowance	50	200	10,000
Consultants	Allowance			50,000
Site Administration	Allowance			80,000
Head Office	Allowance			0
Grand Sub Total				140,000
CONTINGENCY			0%	0
TOTAL ADMINISTRATION COST, $/ yr				140,000

PRODUCT TRANSPORT

ITEM	Quantity t	Unit Cost $/t	Total $/ yr
Average transport cost (domestic and export)	84,770	116	9,808,886
NOT INCLUDED IN PROJECT SUMMARY			
Grand Sub Total			9,808,886
CONTINGENCY		0%	0
TOTAL TRANSPORT COST, $/ yr			9,808,886