Important Disclosure

This report has been commissioned by the company and as such the share price target and rating are not provided by GMR. All comments and forecasts are independent of the company and rely on GMR's analysis and outlook.

Recommendations

SFX	Not Rated
Price: A$0.47	Target Price: NA

Share prices as at 2 June 2023.

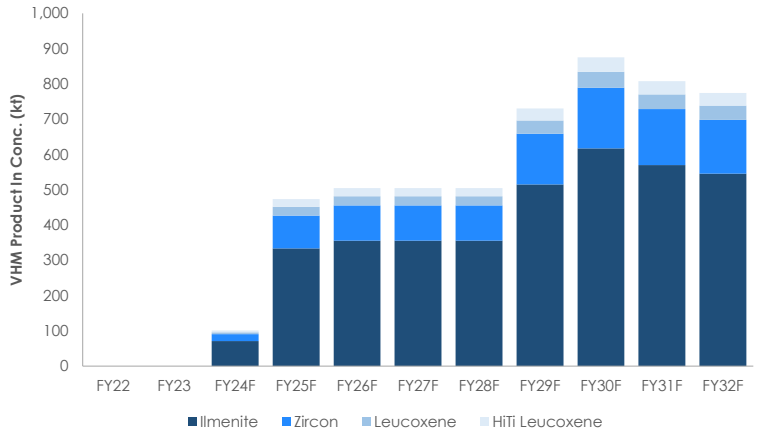
Sheffield Resources (SFX)

Stand By For Action

Sheffield Resources is a A$0.2B capitalised ASX listed mining business on the cusp of becoming a meaningful mineral sands producer. The immediate focus is delivery of its fully funded Thunderbird A$0.5B project in Western Australia by early 2024. Thunderbird is a 50:50 JV (Kimberley Mineral Sands – KMS) with well-known Chinese company Yansteel. GMR's analysis is that the zircon-rich project offers high margins. Thunderbird represents a significant mine inventory with a long life and is scalable, in a low-risk jurisdiction. This is a commissioned report.

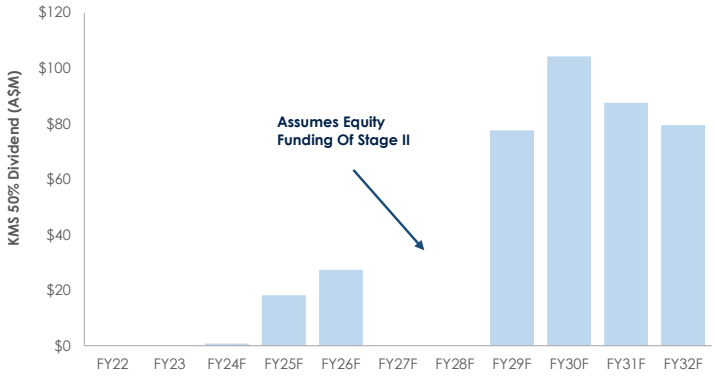
1. First mineral sands production is targeted for early 2024, but with potential to advance this into late 2023. GMR recently visited the site and found progress was on track, with plant design and layout suitable for purpose.
2. Thunderbird is not a conventional sand mine, but a critical change in management, process flowsheet and a new partner has propelled the project forward. GMR's analysis shows a high margin operation.
3. Sheffield trades at a significant valuation discount (0.3x P/NPV$_{10}$) ahead of near-term production and cash flows. The project is a zircon play (~65% of revenues) with premium spot zircon prices robust at >US$2,000/t.

Fig 1: KMS – Thunderbird Valuable Heavy Metal In Concentrate By Type (kt)



Source: Global Mining Research.

Fig 2: Sheffield 50% Share Of KMS Dividend Stream (Post Debt Sweep, A$M)



Source: Global Mining Research

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Sheffield Summary

Sheffield Resources is focused on the near-term delivery of the Thunderbird zircon-rich mineral sands project in Western Australia. The Thunderbird project and prospective licenses sit within Kimberley Mineral Sands (KMS) which is a 50%:50% JV with Chinese steel company Yansteel. KMS is a standalone entity with four directors, two each from Sheffield and Yansteel. In addition to the KMS JV, Sheffield has an option on the South Atlantic project in Brazil.

Construction Well Advanced

Construction 85% complete.

GMR visited Thunderbird in May to see the project well advanced and currently 85% complete. The plant is nearing completion with final electrical, and plumbing required ahead of plant commissioning. Contract mining equipment was arriving on site ahead of pre-stripping. All components for the plant are on site. The key critical path item currently is the mining unit plant (MUP) being fabricated off site.

KMS And Sheffield Funded To Production

KMS within project funding, Sheffield also well-funded.

Over A$250M, or half the cost of Thunderbird has been invested to date and at the end of 1Q 2023 KMS retained A$96M of cash on hand and A$140M of undrawn project financing available (including a A$54M contingency) to complete the project. Separately, Sheffield has A$25M of cash to fund it through to the commencement of dividends from KMS.

Refinancing Post Completion Could Enhance KMS Dividends

Refinancing post completion could improve midterm KMS dividends to Sheffield.

A cash flow sweep by project debt facilities likely limits near term dividends from the KMS until repayment potentially in late 2026. GMR sees two levers to potentially improve this for Sheffield shareholders: 1. To restructure project debt post ramp-up and 2. Profile Stage II capital spending (also allows for value-add opportunities).

Sheffield Trading At 0.3x P/NPV$_{10}$

SFX trades at 0.3x P/NPV$_{10}$, ahead of project delivery.

GMR values Sheffield at A$540M or A$1.36/share. The shares are trading at 0.4x NPV, and on an EV/EBITDA of 1.5x FY25. The steep discount reflects perceived market risks of project completion and ramp-up. This is typical of its position on the Lassonde Curve currently sitting between construction and commissioning.

Mineral Sands Market Robust

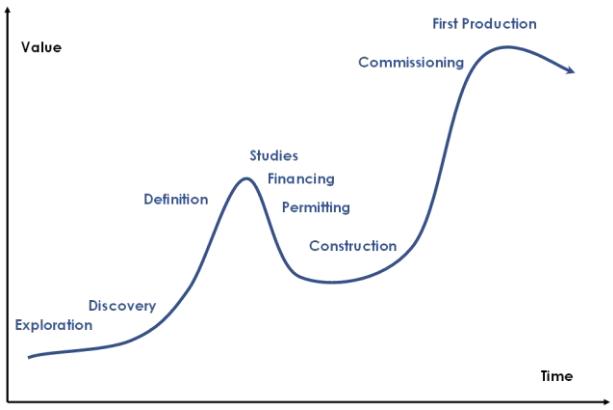
~65% of Thunderbird revenues from zircon where the supply outlook is tight / inventories low.

In 1Q 2023 both premium zircon and sulphate ilmenite prices were robust and above long-term expectations. Significantly, Thunderbird generates ~65% of revenues from zircon where the supply outlook is tight and inventories low.

Fig 3: Thunderbird Location

Source: Sheffield Resources

Fig 4: Lassonde Curve



Source: Global Mining Research

SWOT Analysis

Below GMR highlights a SWOT analysis for Sheffield Resources.

Strengths

Thunderbird 85% complete.

- Thunderbird construction is fully funded and now ~85% complete. Yansteel is a substantial and well financed JV partner. Thunderbird will be a key source of ilmenite for its new titanium dioxide processing facility in China.
- This is a zircon rich project representing ~65% of revenues from the high value product. Thunderbird has significant reserves with >80Mt of Heavy Minerals.
- A revised flow sheet in 2022 simplified the design, reducing capital costs, focusing on concentrate production, and pushed value-add projects to a later date. Thunderbird has a low strip ratio (0.8:1) employing low-cost mining (dozer push) and processing techniques commonly used in the industry.

Weaknesses

- By opting to toll treat the magnetic concentrate in China, Sheffield has limited its ability to value-add its ilmenite product stream. However, this was the trade off to financing / offtake through Yansteel which provided most of the equity.
- Not all project elements are currently in place, specifically the MUP is still being fabricated and final port location / facilities are yet to be confirmed.
- Paramag product is incremental in value, but not covered by offtake agreements.
- Both the ceramics and pigment markets are modest in size and reasonably opaque. Prices can be volatile and driven by destocking / restocking cycles.

Opportunities

- The scale of reserve inventory means the project should be readily scalable with multiple expansion opportunities. The initial Stage I project at 10.4Mtpa (mined) is expected to be followed by a Stage II doubling of capacity to 20.8Mtpa - at this rate the mine life is still expected to be over 50 years.

Refinancing could improve KMS dividends in the midterm.

- Refinancing of initial project debt to offer a less aggressive amortisation profile could allow for increased KMS dividends to Sheffield in the early years.
- Similarly, debt financing of Stage II capital estimated at A$300M could also improve potential cash payments to the JV owners.
- Regional exploration is prospective, including Night Train some 20km to the SE of Thunderbird. There are many targets worthy of follow-up, and KMS has the luxury of time to focus on higher grade potential satellite ore sources for the future.

Threats

- The ultimate test of concept is the delivery of ore to the processing plant, production of concentrates and export to customers. This remains targeted for early 2024, however, mining projects have been known to slip.
- Delivery to budget and project ramp-up to design levels also remain ahead for Thunderbird. The hard milestones of approvals and project financing are however behind the company.
- Operating risk lies primarily in that Thunderbird is not a conventional sand mine given upper zones of induration in the stratigraphy, and fine-grained nature. However, these appear well understood and planned for, with allowanced for oversize ore feed, and plant design for fine grainsize.

KMS Financials

The following series of chart highlights GMR's expectations for the Thunderbird project from the perspective of the JV vehicle KMS (Kimberly Mineral Sands). Notably, GMR assumes project capex of A$424M, with cash flows commencing in early 2024 in line with the project schedule (appears to be running ahead of plan).

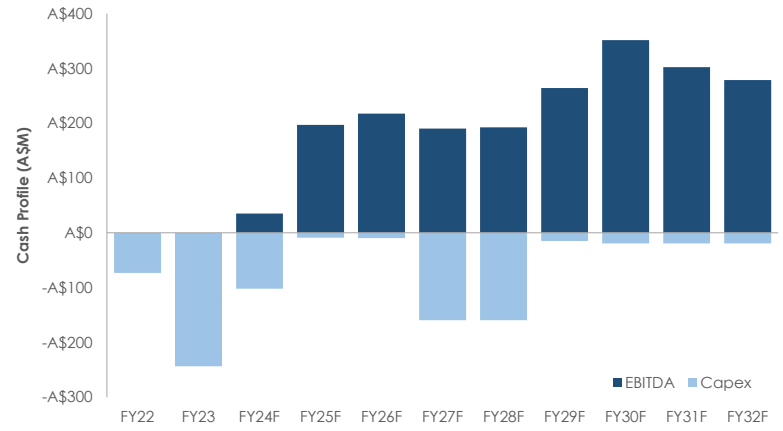
GMR assumes A$300M for Stage II development.

GMR's base case effectively defers the Stage II expansion two years. This in part allows for better profiling of capex and debt repayment. It also allows for time to "bed down" Stage I and to incorporate any learnings as well as potential product value add opportunities into Stage II. Capital for Stage II is assumed to be A$300M reflecting industry inflation since the BFS 2022 estimate of A$260M.

GMR use A$1/t processed for sustaining capital.

The BFS assumes LOM capital of A$0.8B. This appears relatively low and BFS do tend (in GMR's experience) to underestimate sustaining expenditures. GMR's base case assumption assumes an ongoing rate of A$1/t of ore processes for sustaining capital of ~A$10M/yr for Stage 1 and LOM capex of A$1.4B.

Fig 5: KMS EBITDA & Capital Profile (A$M)

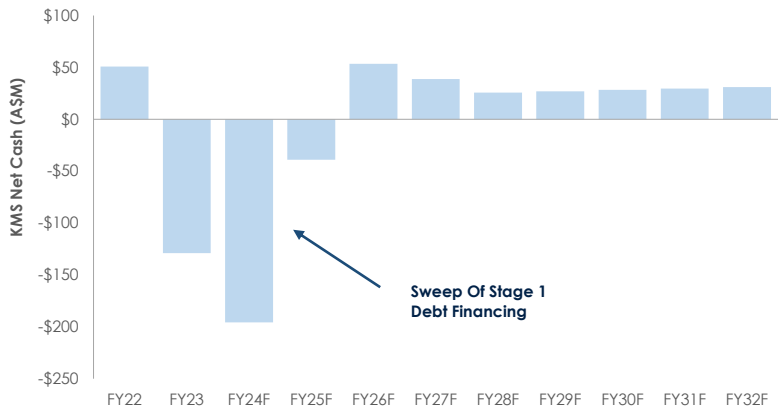


Source: Global Mining Research

KMS could repay Stage I debt in FY26 and then self-fund Stage II.

KMS Orion / NAIF debt facilities include the ability to sweep 75% of free cash flow from the project. GMR assumes this occurs over FY2024-FY26 allowing for a rapid repayment of project facilities. From FY2027 KMS is expected to self-fund Stage II.

Fig 6: KMS Net Cash / (Debt) Assumption (A$M)



Source: Global Mining Research

SFX Valuation

GMR values SFX at A$1.36/share with the current price representing a market risk discount for completion of Thunderbird.

GMR's valuation for Sheffield is based on a sum of the parts basis, with projects valued using a discounted cash flow (DCF) approach. Sheffield is valued at A$540M or A$1.36 per share. Key components of the modelling are:

(i) a 10% nominal discount rate, and key long-term commodity prices of US$1,800/t for premium zircon, US$250/t for sulphate Ilmenite, US$960/t for leucoxene and an Australian / US dollar exchange rate of $0.75,

(ii) The Thunderbird valuation is based on the discounted cash flows of the dividend stream from KMS, which is valued at A$504M or A$1.28 per share

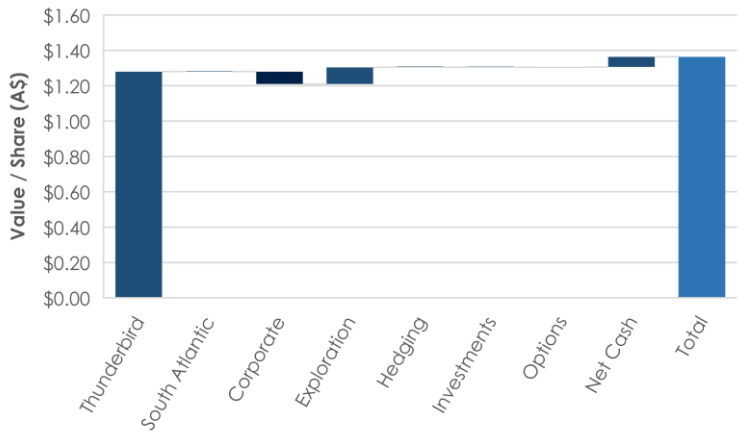
(iii) Thunderbird production commences in 1Q 2024 with the plant currently at ~85% completion. GMR assumes the Stage II expansion is self-funded by KMS with capex of A$300M and full production in 2030.

(iv) South Atlantic (discussed later) is valued at the current option of US$2.5M given its early-stage nature. This is a highly conservative estimate until the option is exercised.

(v) Exploration valued at A$38M uses a A$0.25/t value of HMs for significant defined residual Kimberley resources such as Night Train.

(vi) Current cash is estimated at A$23M and annual corporate cost of A$4M is assumed (most costs are within KMS).

Fig 7: Sheffield Resources NPV_{10} Per Share (A$)



Source: Global Mining Research

KMS Dividend

GMR's value of the 50% share of the KMS dividend steam is A$504M.

The key value for the business is the expected dividend stream from its 50% share of KMS JV. The discounted value of this dividend stream over the life of the project is estimated at A$504M (Sheffield's 2022 BSF estimate was A$640M).

A key difference to the BFS being higher operating cost assumptions.

The following table highlights the key KMS assumptions GMR has used. These are the key drivers of assumed KMS cash generation and potential dividends released after the debt sweep mechanism.

A key assumption of the GMR model 1. The impact of industry wide cost inflation since the completion of the BFS study, 2. Use of GMR price assumptions and 3. A 10% discount rate (vs 8% in BFS). Conservatively, GMR has inflated operating costs by 20% to BFS estimates (see following figure for key GMR assumptions).

Fig 8: Thunderbird Key GMR assumptions

Commodity Prices	**GMR Assumption**
LT Zircon Price	1800
LT Ilmenite Price	250
LT Leucoxene Price	960
A$	0.75
1-5yr Average Revenue	
Magnetic Conc. Price (US$/t)	139
Non-Magnetic Conc. Price (US$/t)	1031
Paramagnetic Conc. Price (US$/t)	104
Average Costs Yr 1-5	**GMR Assumption**
Operating Cost (A$/t Processed)	14.3
Operating Cost (A$/t Concentrate)	138
Total Cost (A$/t Processed)	23.1
Total Cost (A$/t Concentrate)	222
Sustaining Capital (A$/t Processed)	1.0
Revenue / Cost Ratio (x)	1.9
1-5yr Average Financials	
Revenue (A$M)	336
EBITDA (A$M)	155

Source: Global Mining Research

Material dividends expected to flow in late 2026, post debt sweep.

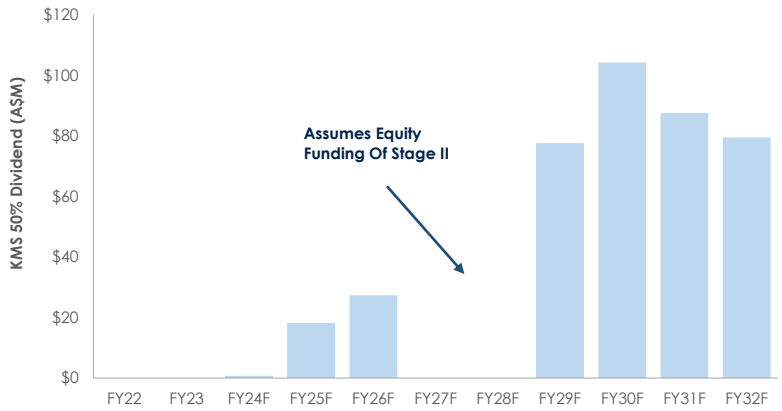
As highlighted in the chart below dividends are expected to flow materially in late 2026 once the debt sweep has repaid Stage I project financing.

In 2027/2028 GMR assumes additional capex of A$300M for the Stage II expansion. This is expected to reduce dividends on the basis that it is self-funded by the JV. However, a commitment to Stage II by inference implies success of Stage I and on that basis the opportunity to debt fund Stage II.

Debt funding Stage II would improve potential 2027/2028 dividends from KMS.

A scenario where Stage II is partly debt funded would provide some ability for dividends through the 2027/2028 period of capital expenditure, offset by slightly lower midterm dividends as Stage II debt is repaid.

Fig 9: SFX's 50% Share Of KMS Dividend Stream (A$M)



Source: Global Mining Research

Sheffield NPV Sensitives

The following table shows the valuation sensitivities to GMR's base case post-tax NPV_{10} of A$540M. Specifically, this tests the variability to some common factors which drive resource project valuations such as commodity prices, discount rates and capital.

Zircon as the highest element of KMS revenue is obviously a key driver of project value and sensitivity for the project.

Other factors of note include:

Every US$100/t in the long-term zircon price is ~A$0.11/share to the SFX NPV.

- Long term premium zircon price of US$1,800/t, compared to spot of >US$2,000/t. Note even using the BFS very conservative US$1,500/t the SFX NPV is still A$1.02/share; every US$100/t is equal to ~A$0.11/share to the SFX NPV.
- GMR uses a long-term A$1.00 to US$0.75 compared to spot of US$0.65.
- The BFS uses a discount rate of 8% compared to GMR's 10%.
- GMR has assumed 20% operating cost inflation to the BFS.
- GMR assumes A$1/t processed for sustaining capital above BFS estimates.

Fig 10: Sheffield NPV Sensitivity Analysis

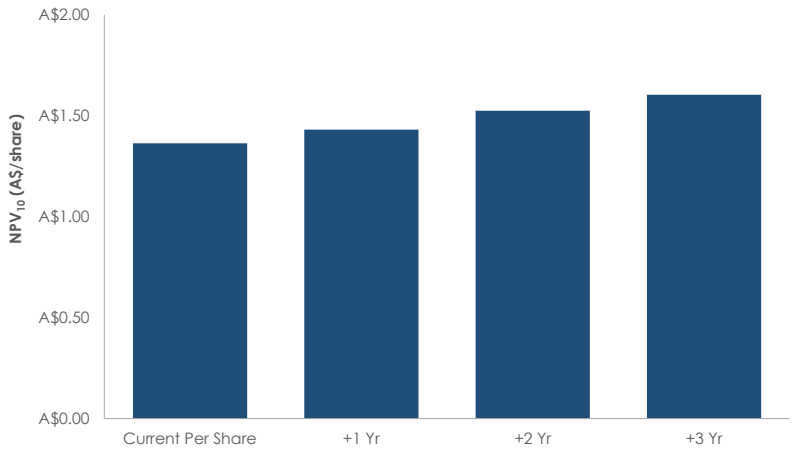
	Units	Change (A$M)	Change (%)
Zircon Price	+/- 10%	102	19%
All Commodities	+/- 10%	179	33%
Operating costs	+/- 5%	-52	-10%
Throughput	+/- 5%	47	9%
Royalties	+/- 1% NSR	-20	-4%
A$	+/- 1¢	-19	-4%
Sus Capex	+/- A$0.50/t	-31	-6%
Discount Rate	+/- 1%	61	11%

Source: Global Mining Research

NPV rises from A$1.36/share to A$1.60/share over three years.

GMR's NPV increases from A$1.36 currently to A$1.60/share in three years as capital is spent and cash flows received. Notably this continues to conservatively value the as-yet unexercised South Atlantic option.

Fig 11: SFX Roll Forward NPV (A$/share)



Source: Global Mining Research

Well Endowed District

Discovered in 2012, first production targeted for 2024.

The Thunderbird project is in the Canning Basin of Western Australia on the Dampier Peninsular, between the coastal towns of Broome and Derby (70km to the east) and 25km north of the Great Northern Highway. Discovered in 2012, Thunderbird took some 12 years to bring into production (although this does include the impact of a global pandemic).

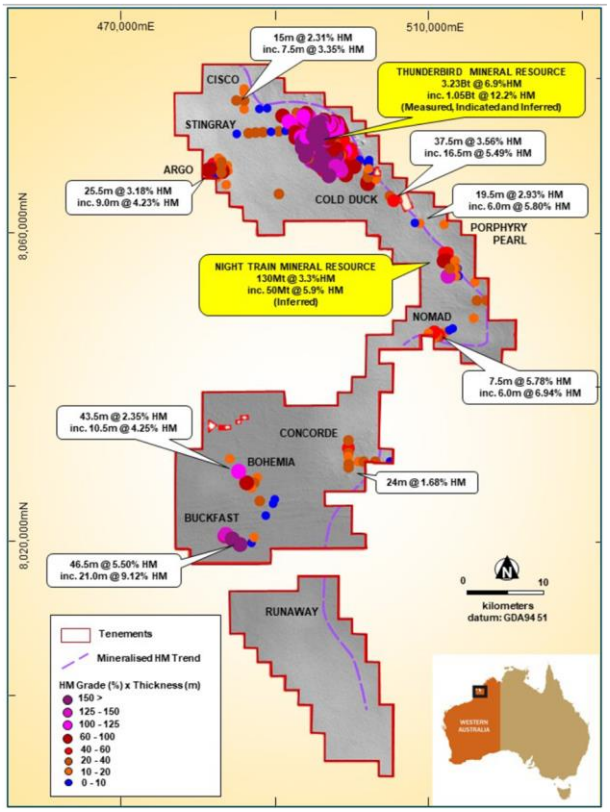
Thunderbird was formed during an Early Cretaceous marine regression. Mineralisation is hosted by Jurassic-Cretaceous fine sands and weathered sandstones, occurring as a NW striking sheet over an area 11km by 7km. The deposit has been interpreted by Sheffield geologists to have formed in an offshore, sub-wave base depositional environment. Mineralisation shows good continuity and hosted within well-sorted and rounded fine to very-fine-grained sand unit. The key difference to other Australian mineral sands deposits is the age, its fine-grained nature, and sheet geometry compared to strandlines.

On average the deposit is 45m thick starting from surface, and gently dips to the south (to ~150mbs). Thunderbird reserves stand at 742Mt of ore at a grade of 11% Heavy Mineral, with Valuable Heavy Mineral of 4.5% comprising Zircon 0.84%, HiTi Leucoxene 0.27%, Leucoxene 0.27%, and Ilmenite 3.1%. Slimes are estimated at 15% and oversize at 12%. The reserve contains 83Mt of Heavy Minerals of which the assemblage is 7.7% Zircon, 2.4% HiTi Leucoxene, 2.5% Leucoxene, and Ilmenite 28%. The balance is gangue minerals.

Exploration has plenty of opportunity to add further value. Night Train is an already identified satellite deposit.

The JV is not resource constrained with Night Train representing a satellite deposit, if smaller in scale and lower grade than Thunderbird. In addition, there remains significant regional prospectivity to access the potential for higher-grade sources of material for the plant's future needs.

Fig 12: Regional Exploration Upside



Source: Sheffield Resources

Mining At Thunderbird

In May 2023 GMR visited the test pit site, allowing evaluation of an example mining section and ore stockpiles and panning of an ore sample to produce a heavy metals tail.

Mining at Thunderbird is not a traditional mineral sands operation, which reflects that the deposit is both old and fine grained. On the other hand, there are advantages in that it is a very large resource with wide mineralised zones and is relatively shallow.

The age of the deposit is reflected in that the mineralisation is not completely free flowing and includes patchy zones of induration near the surface (first 10-12m). In terms of oversize material this is estimated in the resource at 12% of the material. Slimes are fine sands rather than clays that need to be managed.

Trial mining selected dozer push as the preferred mining technique.

As part of project reviews two trial mining studies were conducted. These trialled mining by both dozer rip/push and continuous miners (used in the iron ore sector). Interestingly in terms of produced fine screen material it was found that both approaches yielded similar results. Dozer rip/push was selected as the preferred method given its lower operating cost. As a result of the tests, it was decided to use larger equipment (D11 vs D9 dozers), to change the site of initial mining, and increase the volume of initial pre-stripping.

Simply, there are three mining Stages at Thunderbird:

1. **Dozer Rip / Push** – A fleet of D11 dozers rip / push mineralisation to the in-pit MUP. Initially five dozers are to be used. There are two principal ore domains T1 and T2 (11% and 14% HM respectively), initial mining will focus on the T2 domain. The process of pushing ore acts to mechanically help break up friable ore.

2. **Mining Unit Plant (MUP)** – Ore is deposited in the in-pit MUP by dozers where it passes through screens. Anything larger than 12mm in size is rejected as waste. The MUP has a capacity of 2,000tph providing additional mining capacity. The MUP is mobile and will move as the mining face advances.

3. **Slurry To Plant**. Screened ore material is mixed with water in-pit to create a water/sand slurry which is then transported a short distance to the processing plant. Water is sourced from local bores. This slurry Stage is another important step in liberating ore.

Fig 13: Trail Mining Pit – Dozer Push & Continuous Miner Trails

Source: Global Mining Research

Fig 14: Example Of Indurated Upper Layers

Source: Global Mining Research

Current Position

MUP is currently on the critical path.

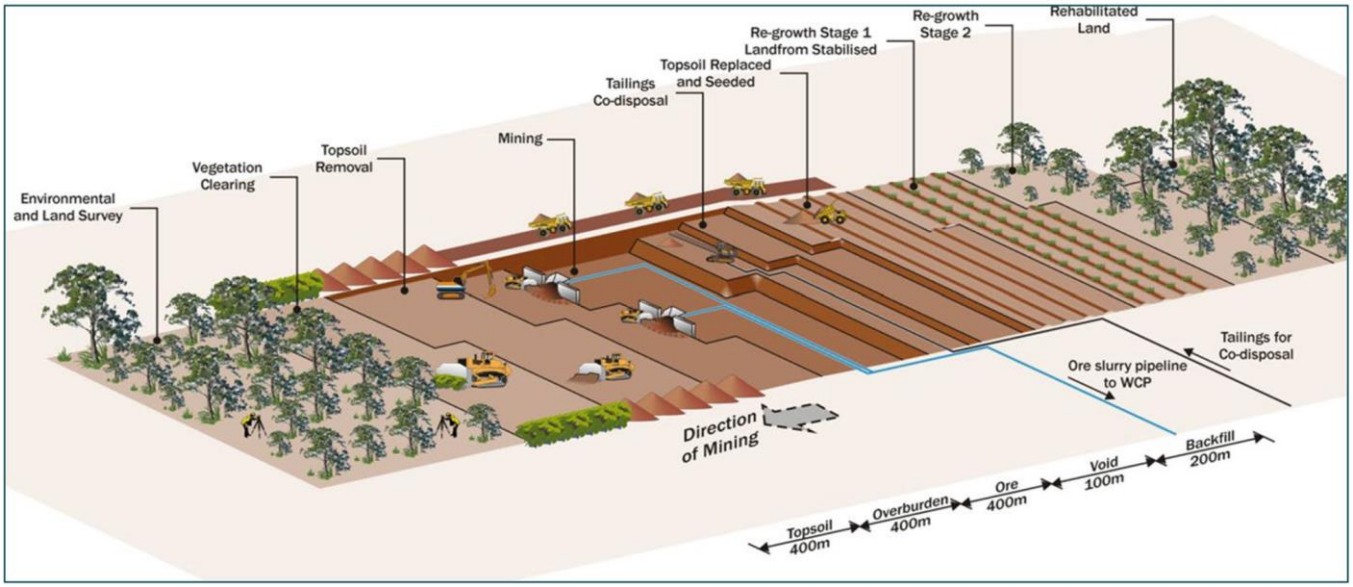
Waste pre-stripping is about to commence in June with contractor Carey Mining currently mobilising to site. Carey will then hand over to project mining contractor Piacentini & Son. The Mining Unit Plant is currently being fabricated by Piacentini & Son offsite and is the key critical path item for the project.

Pit Sequencing

After open pit mining is established over the initial few years it will move to a continuous process of stripping at one end of the mine and tailings disposal and rehabilitation at the other (as highlighted in the following figure).

The mine plan has a relatively low strip ratio with a LOM average of 0.8:1 (waste to ore). On this basis total material movement for open pit mining of Stage I is ~52ktpd.

Fig 15: Schematic Of Open Pit Mining Processes At Thunderbird



Source: Sheffield Resources

Site Infrastructure

Power to the site will be through a BOO (Build Own Operate) arrangement with gas power generation fed by LNG trucked to site. Here, KMS has a five-year agreement with Woodside and EDLLNG Fuel to supply the project with 650 TJ/year of LNG. Stage I requires 16MW of power and the cost of the power is estimated at ~A$0.20/kwh. In time KMS is expected to look at the addition of solar to the site, reducing its carbon footprint.

Water for the project will be supplied from a local bore field, with dams already constructed to provide for water storage.

Tailings will initially be stored in a 20Mt TSF facility with a life of some two years, after this period tailings are expected to be deposited back in pit. The initial TSF is well advanced and close to completion.

Fig 16: Right To Left - Indurated Sand, Friable Sand Ore, High Grade Friable Sand Ore, Mineral Sands Hand Panned Product

Source: Global Mining Research

Stage II To Double The Operation

GMR assumes a Stage II doubling of the plant, a few years lagged to the BFS estimate.

Once the Thunderbird production concept has been proven, its vast inventory lends itself to scaling.

The BFS anticipated a rapid doubling of capacity through a Stage II expansion would increase mining capacity from 10.4Mt/yt to 20.8Mt/yr in 2028.

GMR's base case assumes this is lagged with the mine operating at Stage II levels from 2030. Some additional permits are required for Stage II along with financing, but these are not seen as an impediment, once cash flow from Stage I is available.

Given the size of the resource, further expansions post Stage II are possible, but not currently assumed by GMR.

Fig 17: Thunderbird Ore Mined & HM Grade Profile (kt, %)

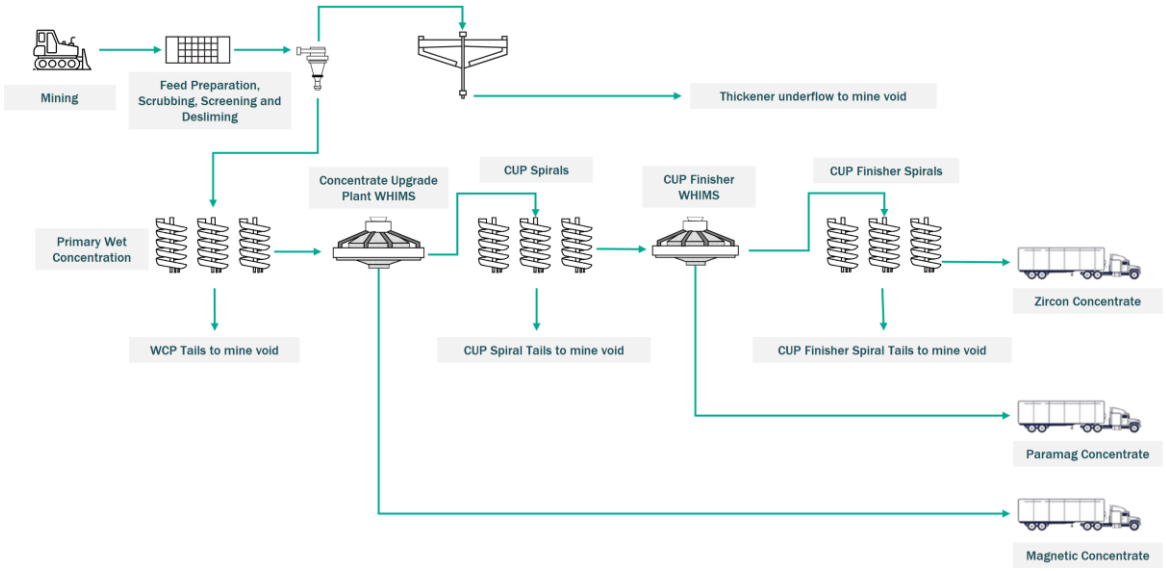
Source: Global Mining Research

Thunderbird Processing

Simplified flow sheet to produce concentrate.

Fine (<2mm) ore is slurried a short distance from the mine to the KMS processing facilities. Once at the processing plant final product in the form of three concentrate products are produced as summarised in the following flow sheet.

Fig 18: Thunderbird Process Flow Sheet



Source: Sheffield Resources

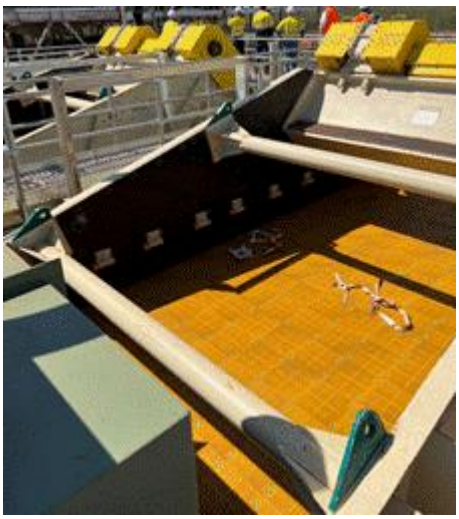
The initial stage of processing is in the form of the Wet Concentration Plant (WCP) with a capacity of 1,085tph where ore is screened to 2mm. This comprises a first stage of mechanical screens, second stage of cyclones and then spirals.

The next stage of processing is the Concentrate Upgrade Plant (CUP), where the magnetic concentrate is separated by WHIMS (wet high intensity magnets). Magnetic material separated in this stage is classified as magnetic concentrate which represents ~75% of the total concentrate produced by volume and ~30% by value. The magnetic concentrate comprises both ilmenite and leucoxene.

Fig 19: Plant Construction ~85% Complete

Source: Global Mining Research

Fig 20: First Stage Screen



Source: Global Mining Research

Non-magnetic material is then processes through the Non-Magnetic Finisher Circuit (NMFC). This comprises spirals and a finisher WHIMS. Magnetic material from this second WHIMS circuit is classified as the low volume (<10% of total product) and lower value paramag concentrate containing illmenite, leucoxene, zircon, and monazite. The presence of monazite means inert material is then added to the concentrate to reduce low level radioactivity (not unusual for mineral sands operations).

Non-magnetic zircon rich concentrate ~20% of total product volume.

The zircon rich non-magnetic heavy mineral concentrate from the second WHIMS circuit is then processed through finisher spirals. This product represents ~20% of total concentrate and is classified as the high value / zircon rich non-magnetic concentrate.

Fig 21: Second Stage Cyclones

Source: Global Mining Research

Fig 22: Third Stage Spirals

Source: Global Mining Research

Thunderbird sits almost equidistant from the Port of Derby and Broome with around 1Mt/yr of concentrate expected to be loaded into containers and trucked ~150km to port facilities. Heavy tonnage road trains are permitted in this area of Western Australia.

Both Derby and Broome have the capacity to load Handymax-sized ships. KMS has a long-term port access agreement at Derby with ability to use port infrastructure and a bulk handling facility. However, KMS is currently finalising options for container laydown and loading at both ports, with Broome currently appearing the preferred option. The use of rotational containers allows for dumping of concentrates directly into ship holds.

Fig 23: Broome Wharf

Source: Global Mining Research

Products

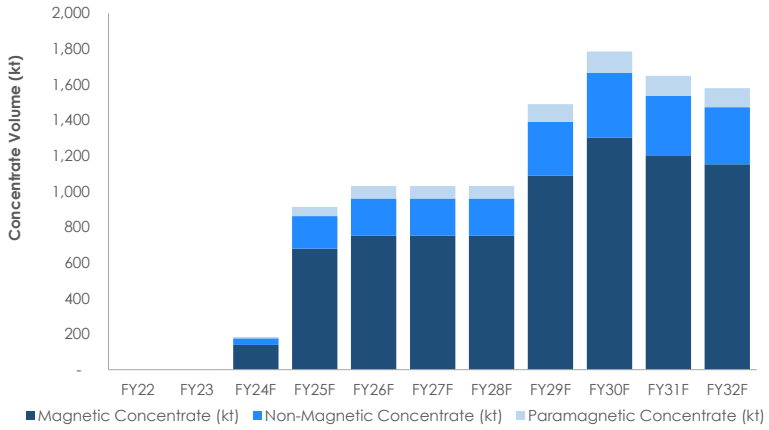
Stage I of the Thunderbird project is expected to produce ~1Mt/yr of concentrate. Production is assumed in early 2024, with full concentrate volumes in 2026.

Magnetic Concentrate

Magnetic concentrate to Yansteel, its ~75% of volume but only ~30% by value.

Ilmenite (~38.5% TiO_2) dominates magnetic concentrate and represents ~75% of the total concentrate produced by volume. Concentrate will be sold to JV partner Yansteel for the first five years at a fixed price and then a market rate. Yansteel has rights over all Stage I production and first right on Stage II. Yansteel has constructed a 500ktpa integrated titanium dioxide processing facility in China to produce pigment and high-quality pig iron as a by-product. The Yansteel agreement was key to development of the project. Critically, while representing ~75% of volume the magnetic concentrate represents only some ~30% by value.

Fig 24: Thunderbird Concentrate Volumes (kt)

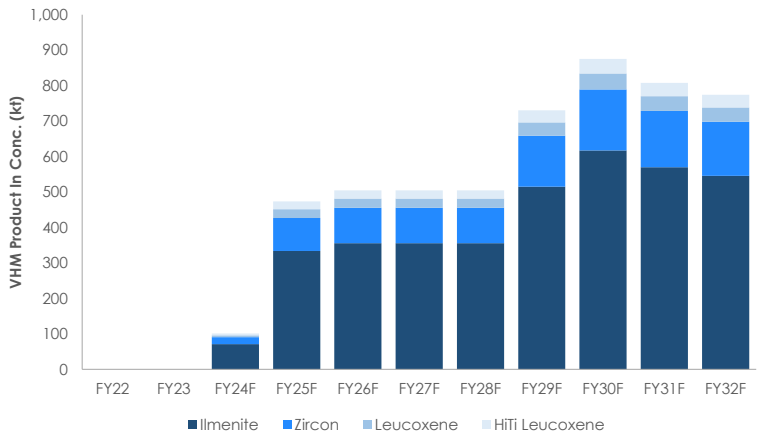


Source: Global Mining Research

Non-Magnetic Concentrate

The non-magnetic concentrate represents ~20% of the total volume (37% ZrO_2, 25% TiO_2) but around 65% by value. This reflects it is zircon rich, containing ~100kt of zircon around 60% of which is expected to be premium product. Some 75% of Stage I product has binding offtake agreements with three Chinese processors.

Fig 25: Thunderbird Valuable Product In Concentrate (kt)



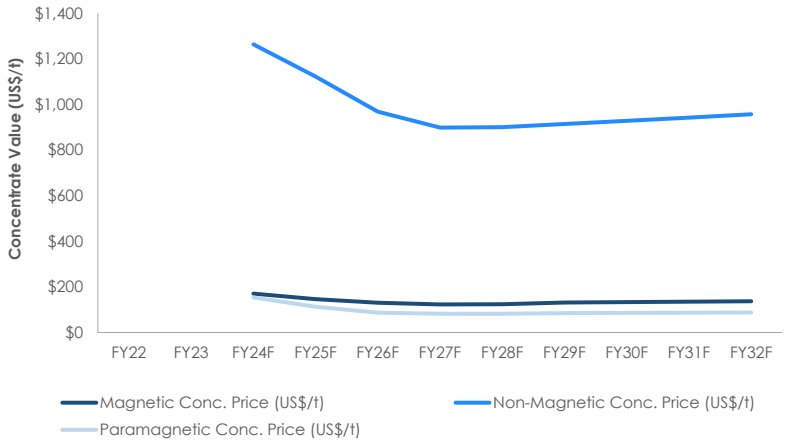
Source: Global Mining Research

ParaMag Concentrate

The third concentrate product is the paramag concentrate, which represents <10% of the total volumes and a few percent of value. There are no offtake agreements for this product with low levels of ilmenite, zircon, leucoxene and monazite (around 8% ZrO_2, 26% TiO_2). The latter contains the rare earth cerium, but also uranium and thorium oxides. KMS expects there to be customers for the product, but in any case, risks are low as it represents only incremental value at this time.

Fig 26: Thunderbird Concentrate Value (US$/t)

Non-magnetic concentrate is 20% of the volume but 65% of the expected value.



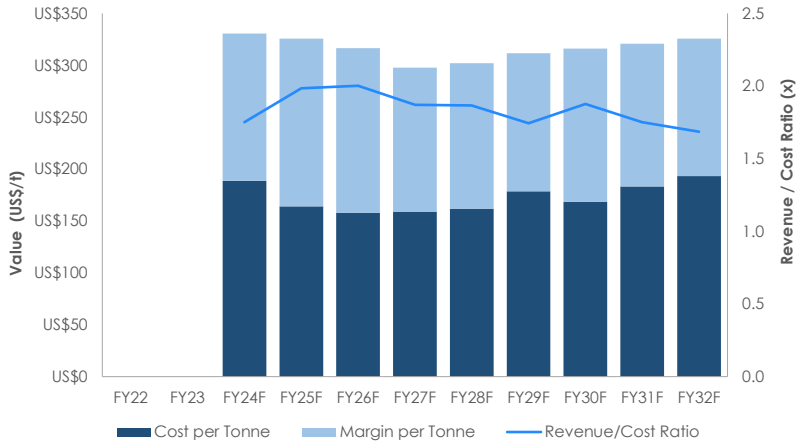
Source: Global Mining Research

Concentrate Value & Margin

The average revenue per tonne of concentrate is ~US$315/t in the first 5yrs, with a revenue to cost ratio of 1.9x.

Over the first five years GMR forecasts an average value per tonne of total concentrate of ~US$315/t. FOB costs including royalties are estimated at ~US$165/t. On this basis the average revenue to cost ratio of 1.9 times is broadly in line with BFS estimates.

Fig 27: Thunderbird Margin and Revenue / Cost Ratio (US$/t, x)



Source: Global Mining Research

South Atlantic Option

Option agreement on a potentially significant development project in Brazil.

In February 2023, Sheffield announced that it had secured an option agreement on a new mineral sands project - the South Atlantic project in the state of Rio Grande do Sul, Brazil. This represents a sequence of young dunes and beach sands which extend over an extensive 80km of strike.

South Atlantic is 100% owned by Rio Grande Mineração (RGM, 75% owned by Brazilian company MSP Group) and under the option agreement Sheffield may acquire an initial 20% interest in the project for US$15M. It has paid the first US$1M for the option loan with a further US$1.5M due by July 2024 and then US$12.5M to exercise the option. Ultimately, subject to conditions such as project financing, Sheffield has the potential to move to 100% of the project (Staged option terms not disclosed).

Four deposits have been identified with potential for >10Mt HM resource delimitation in next 18mths.

At South Atlantic four deposits have been identified Retiro, Estreito, Capao do Meio and Bujuru. Mineralisation was first discovered in 1958 and RTZ Mineracao discovered Retiro and Estreito is 1988. More recently in 2014 RGM carried out air core drilling and bulk sampling.

Exploration targets have been developed for Retiro and Bujuru, notably each target is significant. On average, each target is ~30km long on average >1km wide, with average thickness of <10m and slimes of <5%.

- The Retiro target is 250-340Mt at a grade of 3.3-4.0% HM for 10-11Mt of heavy minerals. The assemblage is estimated at 49% ilmenite, 5% altered ilmenite, 5% zircon, and 3% HiTi / rutile.
- The Bujuru target is 250-380Mt at a grade of 3.0-3.9% HM for 10-12Mt of heavy minerals. The assemblage is estimated at 53% ilmenite, 6% altered ilmenite, 6% zircon, and 3% HiTi / rutile.

Close to infrastructure, mining restrictions and other approvals required.

Part of the attractiveness of the project is its location proximal to infrastructure including power, roads, and port options. However, local legislation limits mining activities and part of the process will seek to repeal this restriction.

Funding for the next 18 months of US$3M is for drilling and resource estimation, ongoing studies, approvals, and due diligence.

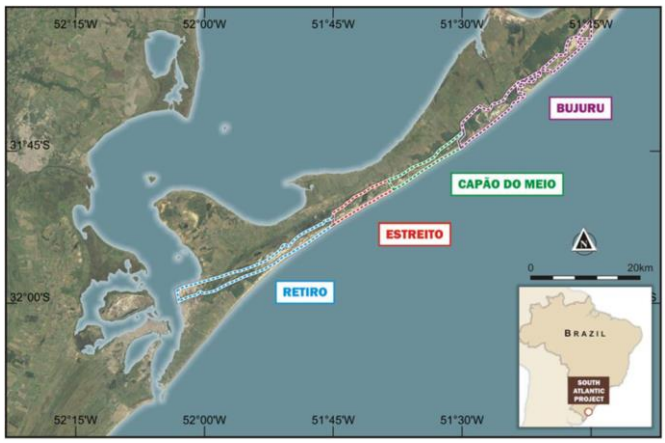
Option valued at A$4M with substantial upside.

At this early Stage GMR values South Atlantic at A$4M, the value of the option. Over the next 18 months with approvals, ongoing exploration, and delineation of a resource this could substantially increase.

Fig 28: South Atlantic Project Location

Source: Sheffield Resources

Fig 29: South Atlantic Deposits



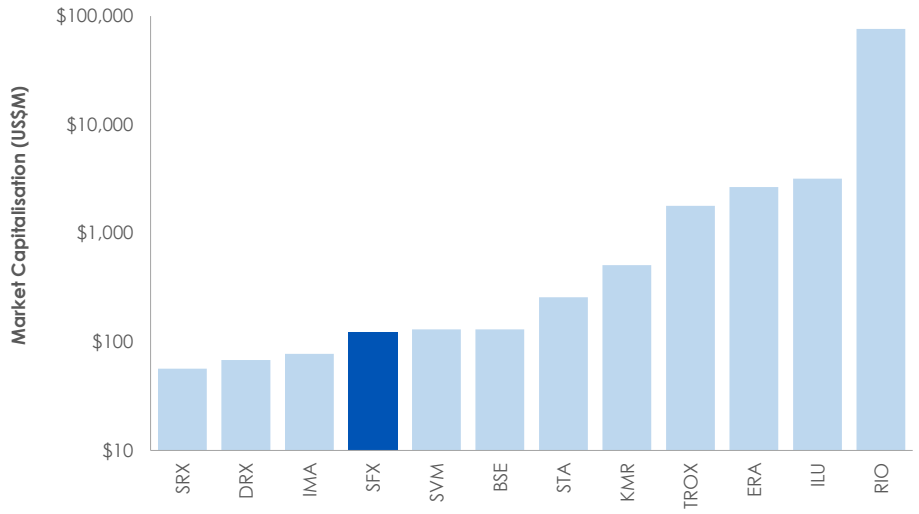
Source: Sheffield Resources

Peer Comparison

The primary mineral sands industry is very concentrated.

The mineral sands industry in terms of Western-listed equities is not a large market and in fact is concentrated. The following peer analysis highlights the core peer group of both producers and developers. Sheffield is expected to become the next producer to market.

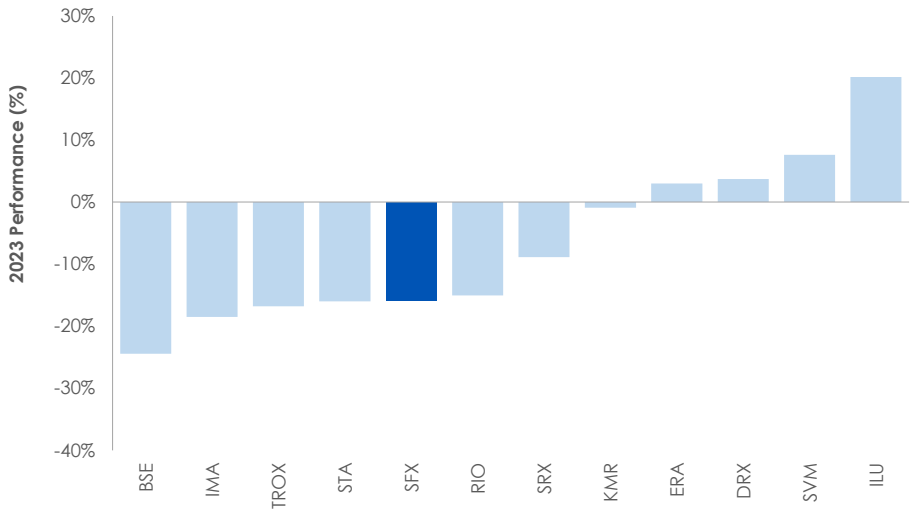
Fig 30: Mineral Sands Peer Group - Market Capitalisation (US$M)



Source: Global Mining Research, Factset. Note log scale.

Performance over 2023 has been mixed with many drivers with Sheffield middle of the pack.

Fig 31: Mineral Sands Peer Group - 2023 Performance (%)



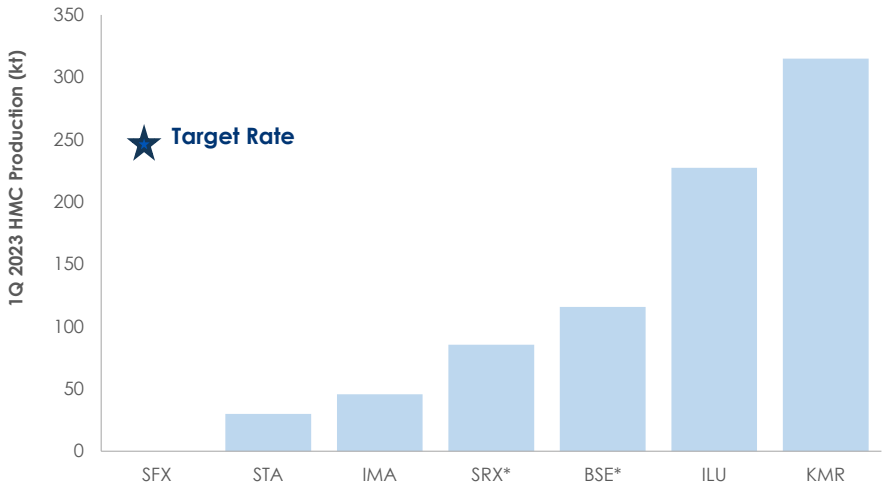
Source: Global Mining Research

No two mineral sands projects are the same, whilst production of HMC is a standard initial processing stage, many have their own mineral separation plants to value add.

Thunderbird a sizeable producer of HMC to peers.

Nevertheless, GMR thought it interesting to compare in the figure below the volumes of concentrate produced in 1Q 2023 to put Thunderbird Stage I in the context of current volumes.

Fig 32: 1Q 2023 Peer HMC Production (kt)

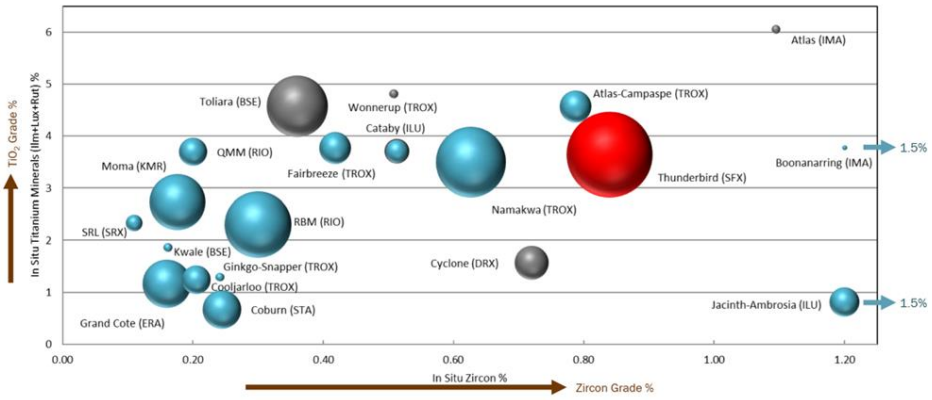


Source: Global Mining Research. * Assumes 90% recovery to HM * STA selling HMC ahead of MSP ramp-up

Significantly, Thunderbird is also a higher-grade mineral sands and zircon rich project with 0.85% in situ zircon. The multiplier effect of its large reserve endowment sees Thunderbird with a significant 6Mt of contained zircon.

Fig 33: Reserve Grade & Zircon Contained

Thunderbird is a globally significant zircon reserve.



Source: Sheffield Resources. Bubble Size = Contained Zircon

Minerals Sands

Mineral sands is the sub sector of the resources market represented by the extraction and production of titanium and zircon for the pigment and ceramics industries, respectively. The name mineral sands relate to the most common occurrence of these minerals which is in buried or outcropping sand deposits.

Geology 101

These are sand deposits which contain TiO_2 and Zircon minerals.

Deposits form through the weathering of igneous derived rocks containing titanium oxides and silicates (containing from 35-96% TiO_2) such as ilmenite, rutile, and leucoxene, and also zircon (occurring as $ZrSiO_4$). Minerals are commonly transported by water and enriched through gravity and trapped in alluvial deposits (e.g., strandlines). These can range from a few million tonnes up to billions of tonnes in size.

Grade is measured as the concentration of heavy minerals in the deposit (or HM), which is commonly in the range of 1-12% HM. Heavy minerals comprise TiO_2 minerals, zircon, and trash/gangue elements. Valuable heavy minerals (or VHM) refer to the economic grade or subset of the heavy minerals. The percentage proportion of these minerals within HM or VHM is referred to as the mineral assemblage.

Output and Key Players

Global production of ilmenite and rutile is 9.5Mtpa and a further 1.4Mtpa of zircon.

Global production of ilmenite and rutile was some 9.5Mt in 2022 with Chinese output of 3.4Mt, Mozambique at 1.2Mt and Australian at 0.9Mt according to the USGS. Similarly, global production of zircon was 1.4Mt in 2022 with Australia and South Africa representing some 0.8Mt of output combined.

The largest producers in the world of TiO_2 and zircon products include: (i) Rio Tinto who operate Richards Bay Minerals, Rio Tinto Fer et Titane and QIT Madagascar Minerals, (ii) Iluka Minerals with Australian (Eucla, Murray, Perth Basins) and (iii) Kenmare Mozambique.

Key Uses – Paints, Coatings and Ceramics

TiO_2 is primarily consumed in the production of pigments used in paint or coatings, plastics, or paper to make them bright, white, or opaque. A small part of the market ~10% is the production of welding rods and titanium metal (a strong and lightweight material used in aerospace etc.).

The process of producing TiO_2 pigment follows two methods – the chloride process is generally applied to higher grade feedstocks and the sulphate process to lower grade feedstocks. Broadly, the sulphate process (ilmenite is mixed with sulphuric acid and then heated in a kiln) represents 45% of the global market for pigment and is dominantly a Chinese product. The chloride process is 55% of the market with key producers the US and Europe.

The value of a TiO_2 feedstock corresponds to the proportion of TiO_2 contained (e.g., rutile at 92-96% TiO_2 is price higher than ilmenite at 35-65% TiO_2).

Zircon is valued for its hardness, and high melting point with its primary use in glazing of ceramics (e.g., wall tiles, toilets, sinks, baths).

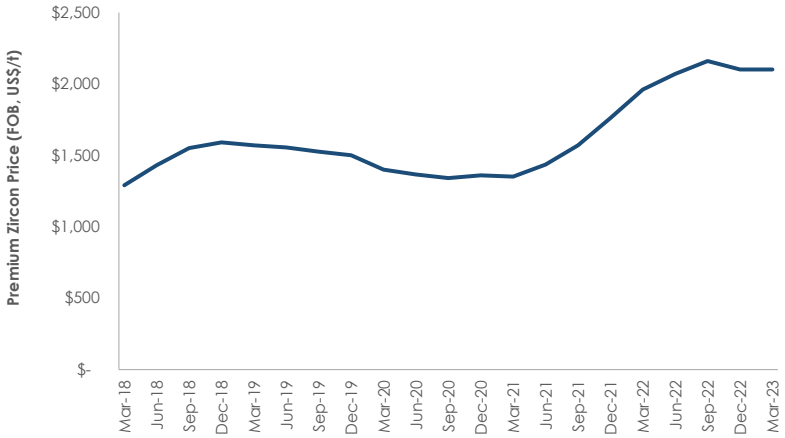
Minerals Sands Prices

Zircon

Spot premium zircon trading at >US$2,000/t

The premium zircon price has appreciated from ~US$1,300/t to current prices of US$2,100/t. Over the same time annual global production has fallen on natural decline from ~1.5Mt to ~1.4Mt currently, as highlighted by declining production from Iluka producing 334kt in 2022 down from 379kt in 2018. At the same time operating costs are up by an estimated 20%. As natural decline of existing operations continues to impact supply higher prices are needed to incentivise new production. As a result, GMR uses a long-term price assumption of US$1,800/t.

Fig 34: Premium Zircon Price (FOB, US$/t)

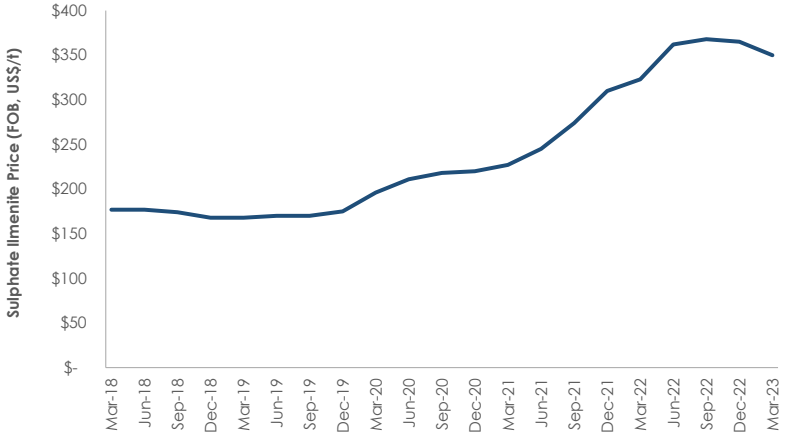


Source: Sheffield Resources

Ilmenite

Ilmenite prices have broadly followed the same trajectory over the last five years as zircon. The sulphate ilmenite price has appreciated from ~US$180/t to current prices of US$350/t. Global supply over the period has grown significantly from some 7.5Mt to 9.5Mt largely driven by China. In 2023 prices have rolled on expectations of a slight over supply, however, remain robust to historical levels.

Fig 35: Sulphate Ilmenite Price (FOB, US$/t)



Source: Sheffield Resources

Economic Environment

The minerals sands markets are characterised as being small and opaque in nature. End market demand for both zircon and TiO_2 is closely linked to industrial and commercial uses with over 50% of demand from both the Chinese and US markets. Therefore, the US and Chinese housing markets, GDP and IP are key high-level indicators of demand for mineral sands products.

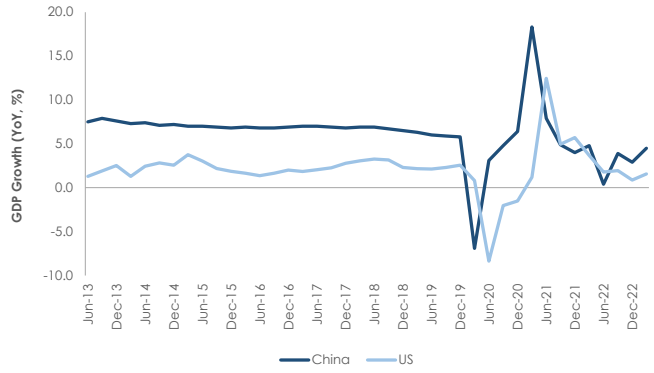
COVID impacted new supply and elevated costs.

The last few years have been far from normal in global markets with the impact of COVID and then the recovery and subsequent inflation cycle. A key result has been the physical impact on supply with projects delayed and a step change in costs which have proven sticky.

In terms of key economic indicators, despite valid concerns for the global economy 1Q 2023 has started reasonably well with both the US and China recording growth and improved industrial production.

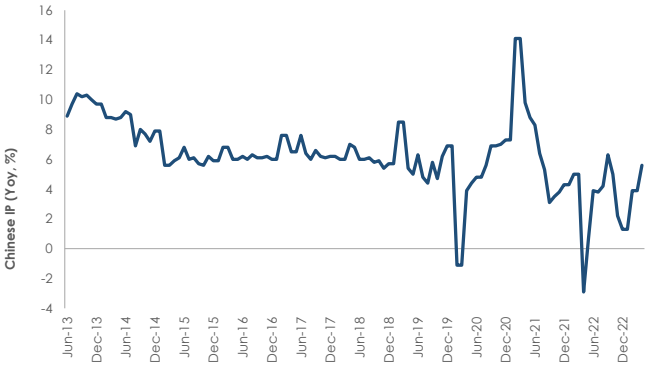
Notably, in the US housing starts have also started to rise. In China property investment has continued to weaken however residential sales measured by meterage has posted a modest Y-o-Y gain in 1Q 2023.

Fig 36: US & Chinese GDP (YoY, %)



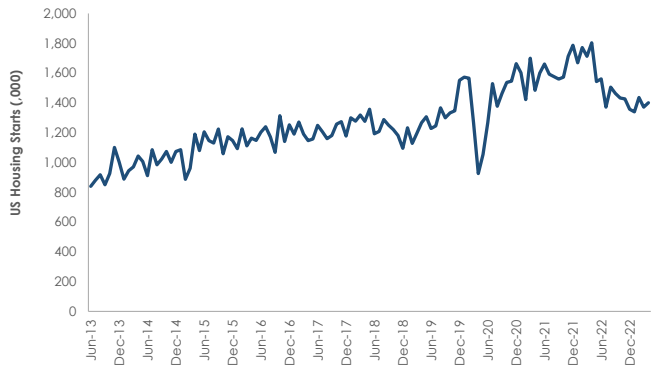
Source: Factset

Fig 37: Chinese IP (YoY, %)



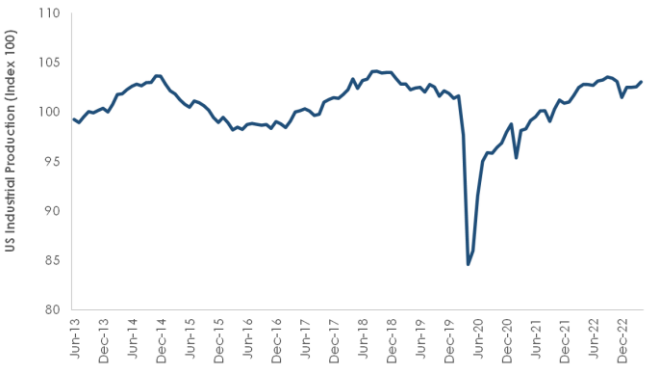
Source: Factset

Fig 38: US Industrial Production (Index 100)



Source: Factset

Fig 39: US House Starts (,000)



Source: Factset

Board and Key Management

Bruce Griffin (Executive Chairman) – Joined Sheffield in 2020 and was the former Senior VP at Lomon Billions Group (LB) the world's third largest titanium pigment producer. Bruce was also the CEO of TZMI (the leading mineral sands industry consulting group) and former VP Titanium for BHP.

Gordon Cowe (Non-Executive Director) - Gordon is mechanical engineer with over 30 years' experience. Gordon has had an extensive career with leading contractors (including Bechtel, Worley Parsons) on a wide range of projects.

Vanessa Kickett (Non-Executive Director) – Vanessa is Deputy CEO of the South West Aboriginal Land and Sea Council of WA. She has held a number of positions in the area of heritage and native title policy.

Ian Macliver (Non-Executive Director) – The Executive Chairman of Grange Consulting and Grange Capital Partners. Ian brings advisory and financial markets experience to the board.

John Richards (Non-Executive Director) – John is a Non-Executive Director of Northern Star and Non-Executive Chairman of Sandfire. He has held many senior positions in the mining industry including at Normandy and Standard Bank.

Mark Di Silvio – (Chief Finance Office) – is an accountant and finance professional with over 25 years' experience. He has held senior finance positions with Woodside, as well as CFO for Centamin and Mawson West.

Capital Structure

Sheffield has 392.6M ordinary shares on issue. In addition, there are numerous unlisted options (~3M options with strike price from A$0.33-A$0.84) and 4.9M performance rights (expiring over 2025 / 2026).

Blackrock is the key institution on the share register with an 5.6% interest. NZ based investor Walter Yovich holds 8.7%, and former MD Bruce McQuitty has a 2.1% interest.

Appendix – Sheffield Financial Summary

Fig 40: Sheffield Financial Summary

Sheffield Resources (SFX)

Recommendation		NA	**Analyst**	David Radclyffe
	As at	4-Jun-23		
Year End		June		
Share Price		$0.31 US$/share	$0.47	A$/share
Target Price		NA	NA	A$/share
Net Present Value	10%	$0.90 US$/share	$1.36	A$/share
Market Cap		122 US$M		
Ordinary Shares		393 M		
Options & Warrants		1 M		

PRICE ASSUMPTIONS - LINKED PRICES

(June Year End)		2022A	2023E	2024E	2025E	2026E
Exchange Rate	A$/US$	0.79	0.76	0.78	0.78	0.78
Zircon	US$/t	1,840	2,140	2,200	2,100	1,900
Rutile	US$/t	1,420	1,724	1,550	1,500	1,500
Ilmenite	US$/t	421	405	388	363	350
Leucoxene	US$/t	490	753	1,240	1,200	1,200
Oil	US$/bbl	88	82	69	67	70

FINANCIAL SUMMARY

(June Year End)		2022A	2023E	2024E	2025E	2026E
NPAT (pre-Abs)	**(A$M)**	**26**	**-6**	**5**	**78**	**49**
Adj. EPS	(A$/share)	0.08	-0.02	0.01	0.20	0.12
PER	**(x)**	**6.2x**	**50.0x**	**36.5x**	**2.4x**	**3.8x**
EBITDA*	(A$M)	0	0	22	106	97
EBITDA/share	(A$/share)	0.00	0.00	0.06	0.27	0.25
EV/EBITDA*	**(x)**	**50.0x**	**50.0x**	**7.6x**	**1.5x**	**1.4x**
Cash Gen/share	(A$/share)	-0.01	-0.09	-0.00	0.04	0.06
P/Cash Gen*	(x)	50.0x	50.0x	50.0x	11.5x	7.3x
FCF Yield	**(%)**	**-1%**	**-26%**	**-4%**	**8%**	**14%**
Dividend	(A$/share)	0.00	0.00	0.00	0.00	0.00
Dividend Yield	**(%)**	0.0%	0.0%	0.0%	0.0%	0.0%
Ordinary Shares	(M)	346.6	392.6	392.6	392.6	393.3

*Adjusted

PROFIT AND LOSS STATEMENT - A$M

(June Year End)	2022A	2023E	2024E	2025E	2026E
Operating Revenue	**0**	**-0**	**-0**	**-0**	**-0**
Other Revenue	0	0	0	0	0
Operating Costs	-3	-8	-6	-6	-6
Other Costs	29	0	0	0	0
EBITDA	**26**	**-7**	**-6**	**-6**	**-6**
Depreciation	0	0	0	0	0
EBIT	**26**	**-7**	**-6**	**-6**	**-6**
Interest	0	0	0	0	0
Share Of JV Profit	-1	0	10	82	53
Pretax Profit	**25**	**-7**	**3**	**76**	**47**
Tax on Recurring Income	1	1	2	2	2
Profit After Tax	26	-6	5	78	49
Minority interests	0	0	0	0	0
Adjusted Profit	**26**	**-6**	**5**	**78**	**49**
Non Recurring Items	0	0	0	0	0
NPAT	**26**	**-6**	**5**	**78**	**49**
EPS	0.08	-0.02	0.01	0.20	0.12

RESERVES/RESOURCES

Sheffield Resources (SFX)	Tonnes (Millions)	HM Grade (%)	Mine Life (Years)
Published Thunderbird Reserves	754	11%	41.9
Published Thunderbird Resources	3,360	7%	186.7

ADJUSTED EBITDA - A$M

	2022A	2023E	2024E	2025E	2026E
Thunderbird EBITDA (JV Share)	0	0	22	106	97
Other	0	0	0	0	0
EBITDA	**0**	**0**	**22**	**106**	**97**

CASH FLOW ANALYSIS - A$M

(June Year End)	2022A	2023E	2024E	2025E	2026E
Cash Flows From Operating Activities					
Receipts From Customers	0	-0	-0	-0	-0
Payments To Suppliers	-2	-5	-6	-6	-6
Other	0	1	4	4	4
Cash Flows From Investing Activities					
Acq.of Property, Plant and Equip.	0	0	0	0	0
Disposals	36	0	0	0	0
Other	-0	-36	-3	14	23
Cash Flows From Financing Activities					
Proceeds From Borrowings	0	0	0	0	0
Repayment of Borrowings	0	0	0	0	0
Other	0	22	0	0	0
Net Increase In Cash Held	34	-17	-5	12	21
Cash At Beginning of Year	7	40	23	18	30
Cash At End of Year	40	23	18	30	51

BALANCE SHEET ANALYSIS - A$M

(June Year End)	2022A	2023E	2024E	2025E	2026E
Current Assets					
Cash and Cash Equivalents	40	23	18	30	51
Other	0	0	0	0	0
Non-Current Assets					
Investments	116	0	0	0	0
Fixed Assets	0	147	147	147	147
Other	0	0	1	1	2
Current Liabilities					
Borrowings	0	0	0	0	0
Creditors	0	-0	-0	-0	-0
Other	0	0	0	0	0
Non-Current Liabilities					
Borrowings	0	0	0	0	0
Other	0	0	0	0	0
Shareholders Funds	156	170	165	177	200
Net Debt to Equity	-26%	-14%	-11%	-17%	-26%
Net Debt to Net Debt + Equity	-35%	-16%	-12%	-20%	-34%

MINERAL SANDS PRODUCTION - kt

KMS (100% Products In Conc.)	2022A	2023E	2024E	2025E	2026E
Zircon	0	0	20	93	99
Ilmenite	0	0	71	334	356
Leucoxene	0	0	5	24	26
HiTi Leucoxene	0	0	5	22	23
Total Production	**0**	**0**	**101**	**473**	**505**

MARGINS - US$/t

	2022A	2023E	2024E	2025E	2026E
Revenue	0	0	369	339	298
Cash Costs	0	0	191	165	157
Margin	0%	0%	48%	51%	47%

NET PRESENT VALUE

	10% NPV A$M	/ share
Thunderbird	504	1.28
Other Mineral Sands	4	0.00
Corporate	-28	-0.07
Exploration	38	0.10
Hedging	-0	-0.00
Investments	0	0.00
Net Cash	23	0.06
Options & Warrants	0	0.00
Total NPV	**540**	**1.36**
P/PNV		0.3x

Source: Global Mining Research

Appendix – Commodity Price Assumptions

Fig 41: GMR Commodity Price Assumptions

		Spot		GMR Quarterly Assumptions 2023				GMR Annual Assumptions								
		Spot	Spot +10%	1Q2023	2Q2023	3Q2023	4Q2023	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Precious Metals																	
Gold	US$/oz	1,944	2,139	1,890	1,950	1,850	1,800	1,873	1,750	1,700	1,675	1,656	1,664	1,673	1,681	1,690	1,698
Silver	US$/oz	23.15	25.46	22.53	26.00	24.67	24.00	24.30	23.33	22.67	22.33	22.08	22.19	22.30	22.42	22.53	22.64
Platinum	US$/oz	1,031	1,134	992	1,150	1,150	1,150	1,111	1,150	1,150	1,163	1,179	1,185	1,191	1,197	1,203	1,209
Palladium	US$/oz	1,432	1,575	1,544	1,750	2,050	2,050	1,849	2,050	2,050	2,050	2,058	2,068	2,078	2,089	2,099	2,110
Rhodium	US$/oz	6,900	7,590	10,903	11,000	12,000	12,000	11,476	4,500	4,000	4,025	4,065	4,086	4,106	4,127	4,147	4,168
Base Metals																	
Copper	US$/lb	3.67	4.03	4.05	3.80	3.80	3.80	3.86	4.08	4.20	4.25	4.30	4.36	4.43	4.50	4.56	4.63
Lead	US$/lb	0.93	1.03	0.97	1.05	1.05	1.05	1.03	1.08	1.10	1.10	1.11	1.13	1.15	1.16	1.18	1.20
Zinc	US$/lb	1.05	1.16	1.42	1.35	1.35	1.35	1.37	1.20	1.20	1.20	1.21	1.23	1.25	1.27	1.29	1.31
Moly	US$/lb	20.00	22.00	32.80	20.00	20.00	18.00	22.70	15.75	14.00	14.00	16.20	16.45	16.69	16.95	17.20	17.46
Cobalt	US$/lb	13.50	14.85	18.06	18.00	18.00	20.00	18.52	20.00	23.00	23.00	23.26	23.61	23.97	24.33	24.69	25.06
Nickel	US$/lb	9.73	10.71	11.78	12.00	10.00	10.00	10.95	9.35	9.20	9.20	9.30	9.44	9.59	9.73	9.88	10.03
Lithiums																	
Spodumene	US$/t	4,333	4,767	5,354	4,333	4,000	3,667	4,339	2,833	1,756	1,696	1,719	1,745	1,771	1,798	1,825	1,853
Lithium Carbonate	US$/t	58,500	64,350	67,754	58,500	54,000	49,500	57,439	38,250	23,710	22,570	22,552	22,891	23,236	23,586	23,941	24,301
Lithium Hydroxide	US$/t	65,000	71,500	75,215	65,000	60,000	55,000	63,804	42,500	26,344	25,438	25,788	26,176	26,570	26,970	27,376	27,788
Iron Ore																	
Lump Iron Ore Pilbara	US$/t	129.00	141.90	131.83	129.00	128.00	127.00	128.96	123.25	119.93	110.92	103.15	104.70	106.28	107.88	109.50	111.15
China 62% CFR Fines	US$/t	105.41	115.95	124.50	120.00	119.00	118.00	120.38	114.25	111.00	102.00	94.05	95.46	96.90	98.36	99.84	101.35
Pellet Iron Ore CVRD	US$/t	164.11	180.52	159.61	164.11	163.11	162.11	162.24	148.36	145.03	137.45	131.47	133.45	135.45	137.49	139.56	141.67
Coal																	
Hard Coking Coal	US$/t	230.00	253.00	345.80	275.00	260.00	220.00	275.20	200.00	180.00	180.00	182.03	184.77	187.55	190.38	193.24	196.15
Semi-Hard Coal	US$/t	187.00	205.70	235.14	187.00	176.80	149.60	187.14	136.00	122.40	122.40	123.78	125.64	127.54	129.46	131.41	133.38
Thermal Coal	US$/t	160.00	176.00	293.70	200.00	200.00	150.00	210.93	121.25	120.00	120.00	121.35	123.18	125.04	126.92	128.83	130.77
Mineral Sands																	
Zircon	US$/t	2,200.00	2,420.00	2,100.00	2,200.00	2,200.00	2,200.00	2,175.00	2,200.00	2,000.00	1,800.00	1,816.94	1,844.35	1,872.17	1,900.41	1,929.08	1,958.17
Ilmenite	US$/t	400.00	440.00	423.63	400.00	400.00	400.00	405.91	375.00	350.00	337.50	302.82	307.39	312.03	316.73	321.51	326.36
Rutile	US$/t	1,600.00	1,760.00	1,903.00	1,600.00	1,600.00	1,600.00	1,675.75	1,500.00	1,500.00	1,425.00	1,211.29	1,229.56	1,248.11	1,266.94	1,286.05	1,305.45
Foreign Exchange																	
AUD/USD		0.65		0.68	0.70	0.73	0.75	0.71	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
CAD/USD		0.73		0.74	0.78	0.78	0.78	0.77	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
USD/ZAR		19.59		17.76	16.50	16.50	16.50	16.82	15.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
USD/EUR		0.93		0.93	0.95	0.95	0.95	0.95	0.89	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
USD/GBP		0.81		0.82	0.85	0.85	0.85	0.84	0.77	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
USD/BRL		5.01		5.19	5.20	5.20	5.20	5.20	4.81	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
USD/RUB		79.90		73.37	75.00	70.00	70.00	72.09	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00

Source: Global Mining Research

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