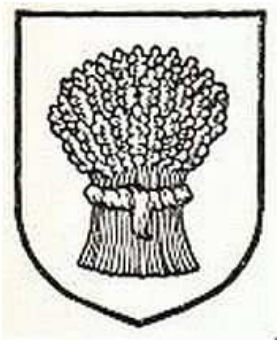
Friday, March 3, 2023



HALLGARTEN & COMPANY

Initiation of Coverage

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Sheffield Resources

(ASX:SFX)

Strategy: LONG

Key Metrics	
Price (AUD)	$0.535
12-Month Target Price (AUD)	$0.88
Upside to Target	64%
12mth hi-low	$0.40-$0.665
Market Cap (AUD mn)	$185.39
Shares Outstanding (millions)	346.53
Options (millions)	3.80
Fully Diluted (millions)	350.33

Sheffield Resources

Funding in the Bag

- + **In late 2022 the company achieved the impressive task of fully financing the construction of the Thunderbird mineral sands project in Western Australia on no-onerous terms**
- + **Construction already at 79% complete, so project on schedule for first dispatch of product in early 2024**
- + **A financing for $30mn consisting of a placement (already committed) and a rights issue**
- + **Deal has been inked to earn-in to a major mineral sands project in the south of Brazil**
- ✘ **Pre-commitment of all production from initial phases top a Chinese buyer/investor seems kind of retro in light of the Zeitgeist**

Funding in the Bag

We have never added a mineral sands project to the Model Resources Portfolio before. Late in 2021 we were tempted when we had been introduced to this company, and then had a follow-up call with the London-based CEO. We held fire wanting to see if the financing could be put in place. Things have moved along very positively since then and the goal of fully-funding the project has been achieved and yet, such is the poor state of the market's mojo that no major rerating has been given to the valuation for achieving this herculean task.

The company is now entirely focused on achieving early production from its Thunderbird Mineral Sands Project after a couple of smaller mineral sands projects in WA were divested in early 2022. The Thunderbird project is a 50/50 joint venture between Sheffield and YGH Australia Investment Pty Ltd (part of China's Yansteel grouping), formed in 2021 to develop the Thunderbird Mineral Sands Project.

Beyond the Titanium potential, Thunderbird's large-scale, high-grade, high *in-situ* Zircon content is globally significant. We would remind investors that we have previously written a dedicated report on the subject of Zircon/Hafnium.

Background

Sheffield Resources dates back to 2007 as a listed company on the ASX and is focused on developing its flagship Thunderbird Mineral Sands Project, the world's biggest zircon-rich mineral sands deposit.

Thunderbird is located midway between Broome and Derby in northern Western Australia, a low-risk mining jurisdiction with close proximity to Asian markets. Thunderbird is one of the largest and highest-grade mineral sands discoveries in the last 30 years. The 2022 Bankable Feasibility Study shows

Thunderbird to be a technically low risk, project which generates strong cash margins from globally significant levels of production over a 36-year mine-life.

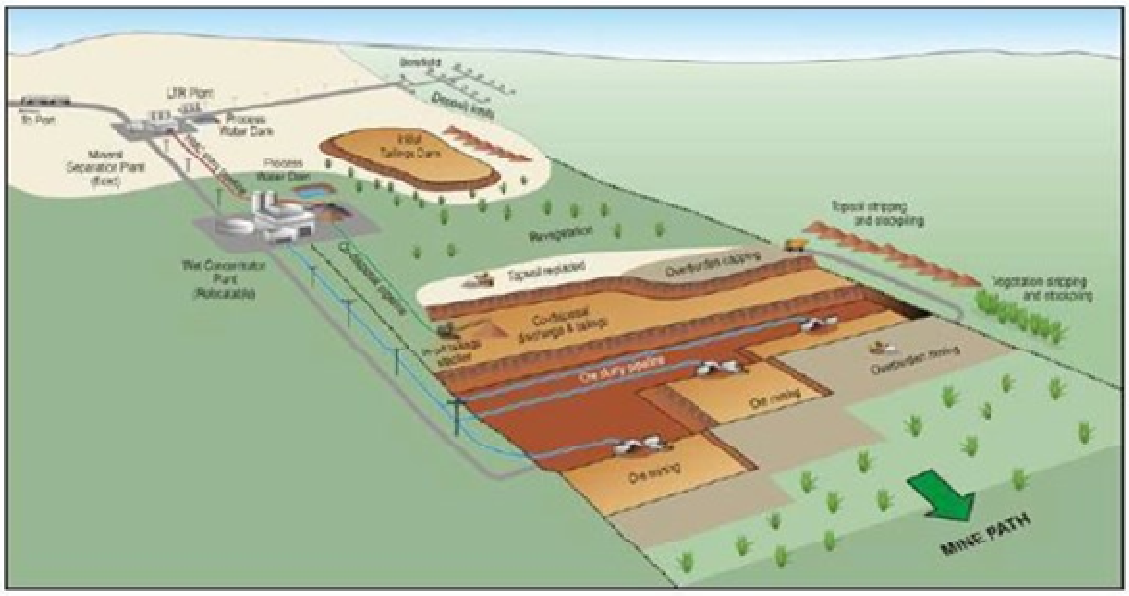
Thunderbird is owned by Kimberley Mineral Sands Pty Ltd, a 50/50 joint venture between Sheffield and YGH Australia Investment Pty Ltd (Yansteel), formed specifically in 2021 to develop the project.

The project will produce a suite of mineral sands concentrate products suited to market requirements. These products include a zircon concentrate and a magnetic concentrate that contains a high-quality ilmenite suitable for smelting into chloride slag or for manufacturing titanium dioxide pigment.

Thunderbird is Go

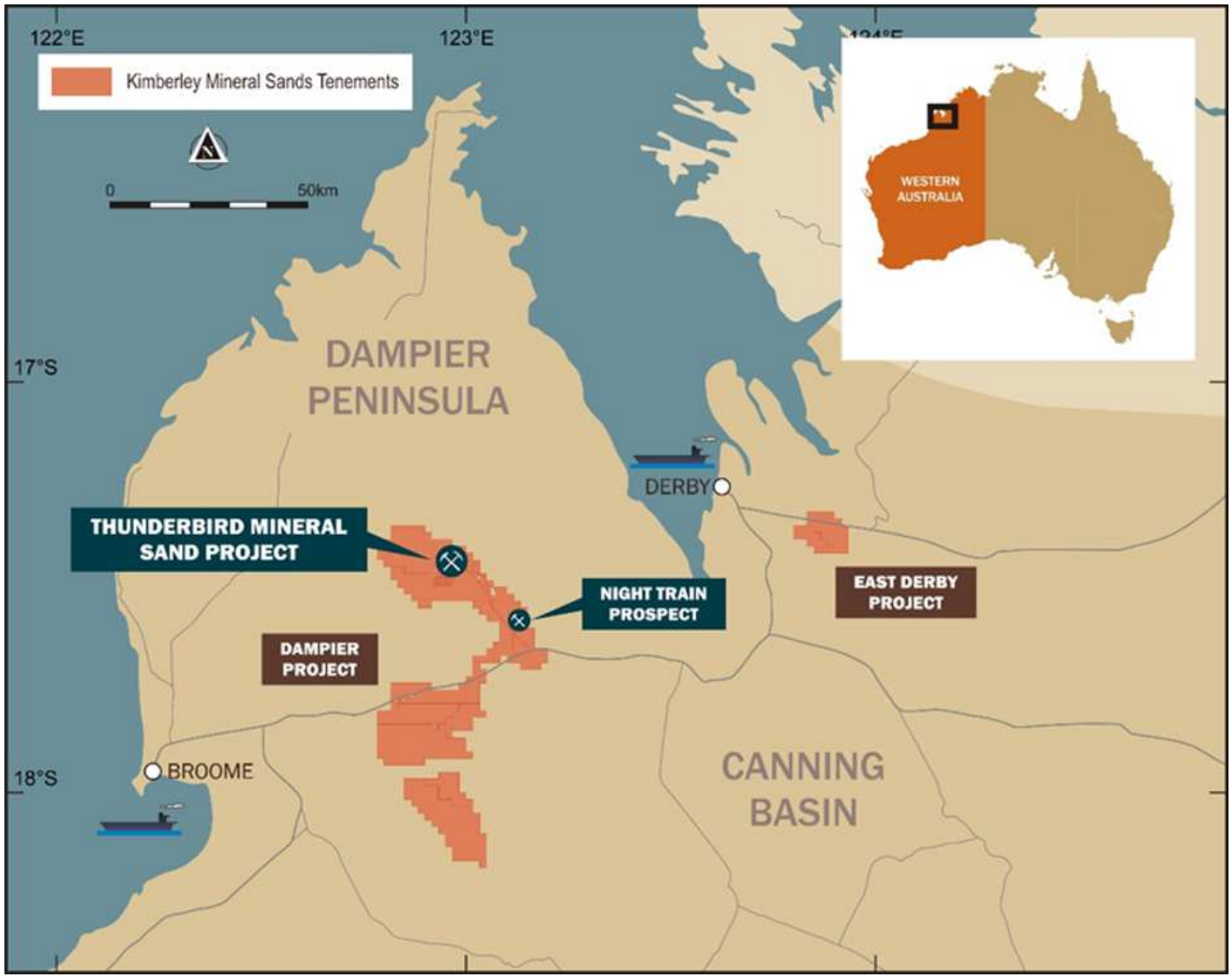
Despite the last piece of the funding having only been announced in September, it was more of a chronicle of a deal foretold as the company had already completed 38% of the mine/processing plant construction at the end of August and subsequently issued a mining services contract for mine commissioning in 12 months. The project is now nearly 80% complete, such is the pace of construction. First production is scheduled for Q1 of 2024.

A schematic of the whole complex is shown below:



The Studies

Sheffield completed a Scoping Study in 2014 and Pre-Feasibility Study and PFS Update in 2015, leading to the announcement of a maiden Ore Reserve in January 2016 (to be discussed anon). A Bankable Feasibility Study (BFS) on Thunderbird was completed in March 2017 demonstrating the project could produce and market high-quality Zircon and ilmenite products at large volumes near to Asian markets.


122°E
123°E
Kimberley Mineral Sands Tenements
0
50km
WESTERN AUSTRALIA
17°S
DAMPIER PENINSULA
DERBY
THUNDERBIRD MINERAL SAND PROJECT
NIGHT TRAIN PROSPECT
EAST DERBY PROJECT
DAMPIER PROJECT
18°S
BROOME
CANNING BASIN

An updated BFS completed in March 2022 confirmed Thunderbird as a sizeable mineral sands project based on a 36-year mine life and significant annual production of Zircon and ilmenite.

The Resource/Reserves

The Thunderbird BFS is underpinned by one of the world's largest and highest-grade, Zircon and ilmenite-rich mineral sands ore reserves. The ore reserve stands at 754mn tonnes @ 11% Heavy Minerals (HM), both proven and probable, while the Mineral Resource contains 3.23 billion tonnes @ 6.9% HM, including a higher-grade component of 1.05 million tonnes @ 12.2 % HM with very high in-situ Zircon (0.93%) and ilmenite (3.3%) grades (Measured, Indicated and Inferred).

Thunderbird Ore Reserves: Valuable Heavy Mineral in-situ grade[1]

				Valuable Heavy Mineral Grade (In-situ)[2]					
Ore Reserve Category	Ore Tonnes (Mt)	In-situ HM Tonnes (Mt)	HM Grade (%)	Zircon (%)	HiTi Leucoxene (%)	Leucoxene (%)	Ilmenite (%)	Oversize (%)	Slimes (%)
Proved	239	31	12.9	0.96	0.29	0.28	3.4	14	16
Probable	514	52	10.1	0.79	0.26	0.27	2.9	11	15
Total	754	83	11.0	0.84	0.27	0.27	3.1	12	15

The Economics

The Stage 1 Upfront Capex is AUD$361mn, while the Stage 2 capex is AUD$258mn.

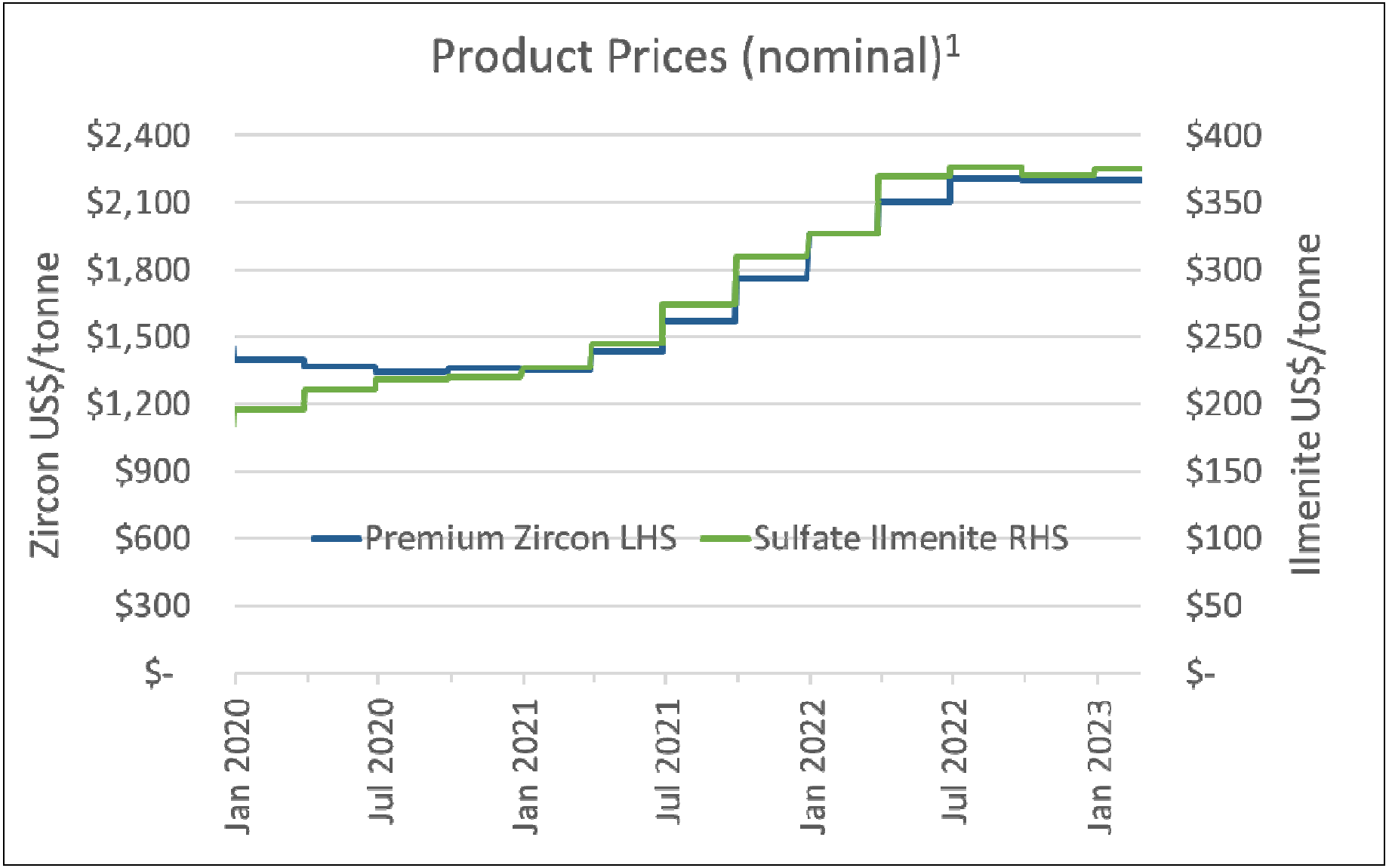
The Stage 1 & 2 economics are:

- Post-tax NPV8 of AUD$1.28bn – (of which the share for SFX shareholders is $640mn)
- IRR post-tax 27.5%

The total funding required for Stage 1 amounts to AUD$484mn (the difference with the $361mn being working capital, financing costs and over-run contingencies).

Product Pricing for Thunderbird Products

The chart on the following page is rather self-evident as to the pricing progression in recent times of the metals targeted at the Thunderbird project.


Product Prices (nominal)[1]
Zircon US$/tonne
Ilmenite US$/tonne
$2,400
$2,100
$1,800
$1,500
$1,200
$900
$600
$300
$-
$400
$350
$300
$250
$200
$150
$100
$50
$-
Premium Zircon LHS
Sulfate Ilmenite RHS
Jan 2020
Jul 2020
Jan 2021
Jul 2021
Jan 2022
Jul 2022
Jan 2023

The Yansteel Deal

As is well-known we are not unalloyed fans of having Chinese as partners in any Western mining venture. However, in the case of Sheffield it is the relationship with a Chinese group that has been instrumental in getting the ducks in a row on the financing front. In January 2021, Sheffield and Yansteel executed binding agreements for the formation of a 50/50 Joint Venture under the name Kimberley Mineral Sands Pty Ltd (KMS) to own and develop the Thunderbird project and adjacent tenements on the Dampier Peninsula. The parties agreed that the development concept for Stage 1 of the Project would be a 10.4mn tonne per annum mine and process plant producing a Zircon-rich non-magnetic concentrate and LTR ilmenite.

Yansteel is a wholly-owned subsidiary of Tangshan Yanshan Iron & Steel Co, a privately-owned steel manufacturer headquartered in Hebei, China, producing approximately 10mn tonnes per annum of steel products with annual revenues of ~AUD$6bn. It is, however, a newbie in the titanium space.

The investment of Yansteel is thus AUD$13mn in Sheffield for a shade under 10% of the equity, and AUD$130mn for its 50% of the JV.

Offtakes

In March of 2022 the company announced that Yansteel and Thunderbird Operations Pty Ltd (TOPL - the wholly-owned subsidiary of Kimberley Mineral Sands Pty Ltd) had executed an amended offtake agreement representing 100% of magnetic concentrate forecast to be produced from Stage 1, with a similar offtake right of first refusal from later stages.

Yansteel is currently constructing a 500k tpa integrated titanium dioxide processing facility, including a titanium slag smelter. This complex will consume the Low Temperature Roast (LTR) ilmenite offtake from Stage 1 of the Thunderbird project.

The pricing of the material going to Yansteel will be via arms-length fixed price reflecting contained TiO^2 content for an initial five-year period; and an arms-length market price for the remaining mine life. The 100% offtake with Yansteel, as co-owner of KMS, mitigates the potential market risk associated with producing a magnetic concentrate.

The company had earlier executed Zircon concentrate offtake agreements in June of 2021. Some 75% of the Zircon concentrates is spoken for to three Chinese processors, with a potential to sell the balance to a non-Chinese buyer. The deals cover a minimum contract volume of 170,000 tonnes of Zircon concentrate annually for an initial five-year period, with annual contract extensions thereafter The terms are “take or pay” for the minimum contracted volume. Pricing is linked to the ZrO^2, TiO^2 and other saleable product content of the concentrate.

With these deals, KMS had secured offtake contracts for approximately 80% of the revenue from Stage 1 production.

Funding

Markets are pretty gruesome for financing currently particularly when the amounts are large. Raising a debt piece by conventional means (such as a debenture) is made more difficult, indeed impossible, by the credit being a private JV vehicle rather than a listed corporation.

Thus, the A$484mn funding is made up of:

- AUD$36mn each from Sheffield (covered by its $40mn currently in the bank) and Yansteel
- The A$130mn that Yansteel vested into KMS in taking up a 50% stake
- An AUD$160mn debt financing package from the Northern Australia Infrastructure Facility (NAIF)
- A US$110mn (AUD$155mn) Production Linked Facility from Orion Mining Finance

NAIF Funding

In late July the company announced that the Western Australian government had signed off on the AUD$160mn debt financing package from the Northern Australia Infrastructure Facility (NAIF).

The borrower in this instance is TOPL. The guarantors (at least until project completion) are Sheffield Resources Limited and YGH Australia Investment Pty Ltd and Kimberley Mineral Sands Pty Ltd.

The aggregate facility amount is up to AUD$160mn, inclusive of a term loan and cost overrun facility The term is up to 12 years from the date of financial close (subject to any earlier repayments and prepayments). There is a comprehensive senior security package over assets and rights of Thunderbird project.

Orion

In early October Sheffield announced it had, with Orion Mining Finance, executed binding and definitive documentation for a US$110mn Production Linked Facility.

Over and beyond the interest rate component (at SOFR - subject to a minimum of 2%, plus a 5% margin) there is a royalty stream to Orion:

- Royalty Rate: 1.6% of FOB gross revenue (0.35% escalation provision applies where a Facility default circumstance takes place)
- Royalty Scope: Limited to Stage 1 production capacity (i.e. capped at an annual production rate of 8.2m tonnes of ore)
- Term: 25 years (subject to a buyback provision, curtailing the term to 12.5 years)

- Commencement: Earlier of full repayment of facility obligations or 7 years following the date of the Production Linked Facility agreement

As for the SOFR plus 5%, management comments that this is around 150bps below market.

Zircon/Hafnium – Icing on the Cake

These two minerals appear in some mineral sands formations and are present at the Thunderbird project. Reference should be made to our Hafnium Review of August 2020.

Zirconium is as a corrosion-resistant material of construction for the chemical processing industry. It is also used to make superconducting magnets, with additional uses include surgical instruments, photographic flashbulbs and in making glass for televisions.

Hafnium is a good absorber of neutrons and is used to make control rods, such as those found in nuclear power stations and submarines. Hafnium has been alloyed with several metals including iron, titanium and niobium. It is also used for microprocessors/chips. It is combined with other elements to make compounds that can endure extreme temperatures. Hafnium oxide is used as an electrical insulator in microchips, while hafnium catalysts have been used in polymerisation reactions.

Rare Earths – a Sleeper By-Product

We would note that ilmenite sands have a monazite component, and that product is being sourced mainly from Madagascar currently (Iluka & RTZ) and potentially from new players, like Sheffield, that have sellable monazite ores.

In the last three years the Rare Earths space has gone from mild buzzing to a full furore. Despite this there has not been a massive burgeoning of projects, as in 2009-11, nor has there been many additions to the number of viable projects in the United States

The awakening in Rare Earths has been spurred by the invective related to the almost total dependence of the US economy (and its military) upon externally-sourced Rare Earths, primarily from China.

The renewed interest of politicians and investors coincides with the on-going slide in China's own internal production (particularly in Heavy Rare Earths). This changes the dynamic from the one which has reigned for the last eight years, where China definitively had the whip hand. With Chinese supplies under a cloud and the West having added no capacity in recent years, the scenario is one of shortages and rationing, particularly for REEs most used in EVs and 5G.

REE Producers Still Thin on the Ground

From over 300 claimants to be potential Rare Earth producers in 2011, at the end of the last Rare Earths boom, the number of developers had shrunk to less than twenty survivors by 2019.

While Mountain Pass (then embedded in Molycorp) was advanced to production by the time the curtain came down in 2011, and Lynas entered the tiny ranks of producers, all other projects from the 2009-2012 period have been marking time (or have vaporized). Mountain Pass died (but has been born again) and the others have been doing a Rip Van Winkel.

On Monazite Sands

In the first Rare Earths boom the overwhelming chatter of the promotional classes was related to bastnäsite, carbonatites, and even eudialyte. Monazite sands got some attention but were largely downplayed due to the issue of radioactivity.

While the other much vaunted mineralisations have fallen by the wayside, increasingly the focus, for better or worse, has been on lesser-known host mineralisations, with Ionic Adsorption Clays, monazite sands and recycling of urban waste and miscellaneous tailings all making a running.

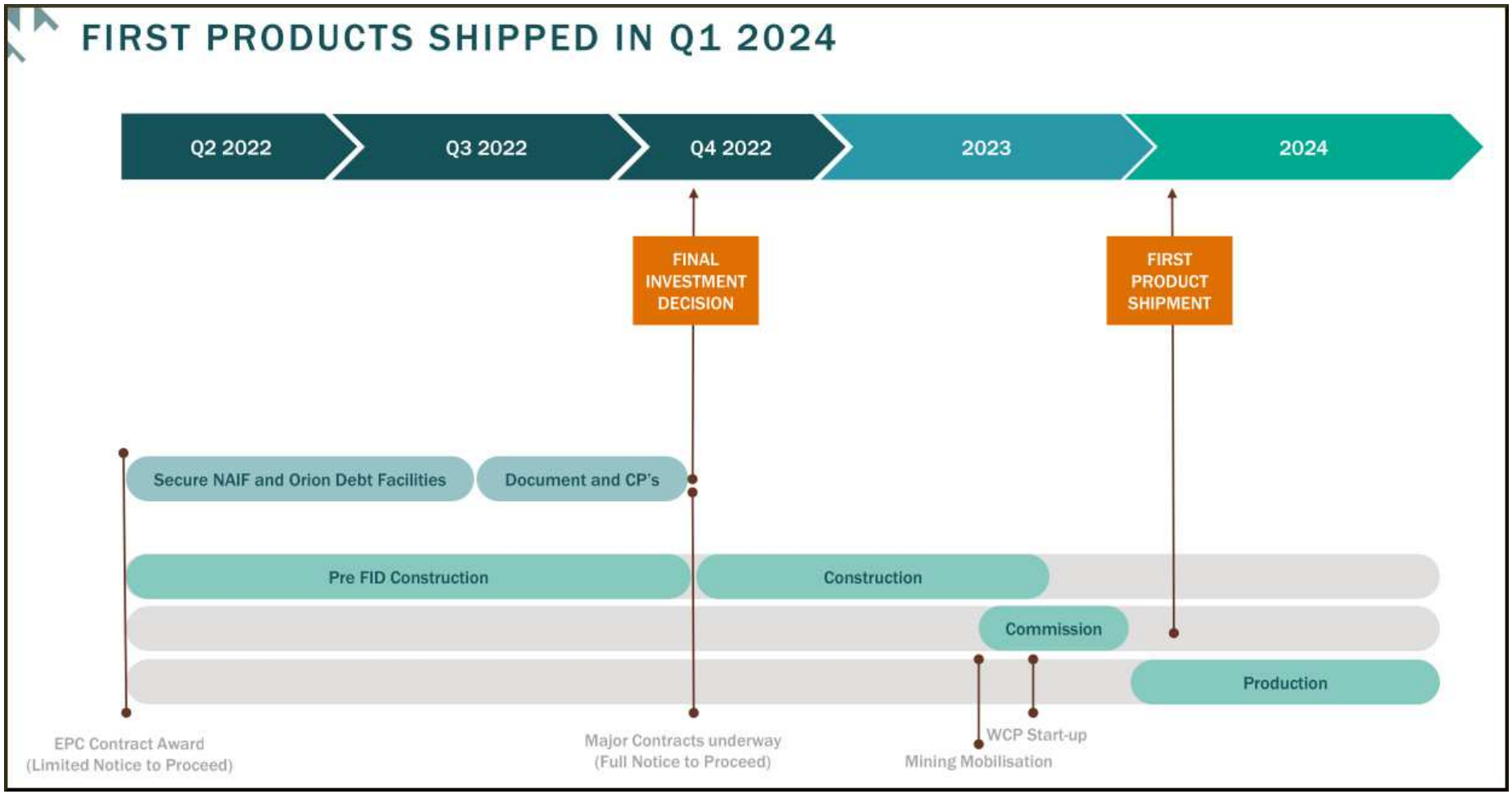
Monazite is a primarily reddish-brown phosphate mineral that contains Rare Earth elements. It is an important ore for Thorium, Lanthanum, and Cerium. It is often found in placer deposits with India, Madagascar, and South Africa having large deposits of monazite sands. The deposits in India are particularly rich in monazite. Monazite is radioactive due to the presence of thorium and, less commonly, uranium.

In fact, monazite was the only significant source of commercial Lanthanides from the first exploitation of Rare Earths through until the start of the so-called Mountain Pass era. Concern over the disposal of the radioactive daughter products in monazite, such as Thorium, resulted in bastnäsite displacing monazite in the production of lanthanides in the 1960s due to its much lower thorium content.

The radioactive element of monazite sands has not stopped the evolution of projects such as that of Energy Fuels (NYSE: UUUU, TSX: EFR) in the US, which is processing sands sourced from the operations of Chemours (NYSE:CC) in Georgia. Reputedly though Energy Fuels are importing material for processing at their White Mesa mill where they extract the radioactive element form the ore. In May of 2022, EFR acquired over seventeen mineral concessions in the State of Bahia, Brazil totaling 15,089 hectares, that hold significant quantities of heavy minerals, including monazite, to feed Energy Fuels' emerging REE supply chain.

Monazite ores can be transported internationally in Class 7 sealed shipping containers. If buyers are prepared to take and process the material from the Thunderbird project, then it should not prove a hindrance to expanding REE as a revenue silo for Sheffield.

In our talks with management they noted that there is minimal monazite in the product going to Yansteel and they will not recover it. Sheffield's Zircon and paramag concentrates do however contain a monazite component, most of which they shall be paid for, and this shall be extracted by processors in China and elsewhere.


FIRST PRODUCTS SHIPPED IN Q1 2024
Q2 2022
Q3 2022
Q4 2022
2023
2024
FINAL INVESTMENT DECISION
FIRST PRODUCT SHIPMENT
Secure NAIF and Orion Debt Facilities
Document and CP's
Pre FID Construction
Construction
Commission
Production
EPC Contract Award
(Limited Notice to Proceed)
Major Contracts underway
(Full Notice to Proceed)
WCP Start-up
Mining Mobilisation

Timeline to Production and Revenues

On the previous page can be seen the company's latest timeline projecting first shipments in 1Q24 (not fiscal).

Disposals

The company has been narrowing its geographical focus also with the sale in mid-March 2022, to Image Resources NL (ASX:IMA), of its McCalls Mineral Sands Project, located 100km north of Perth.

The McCalls project consists of four exploration licences (ELs) covering two project areas (McCalls and Mindarra Springs) and contains Mineral Resources (JORC 2012) estimated at 5.8 billion tonnes at 1.4% total heavy minerals (THM) for 84 million tonnes contained THM, and 75 million tonnes of contained valuable heavy minerals (VHM) with Mineral Resources in the JORC Code 2012 Indicated and Inferred categories. Total consideration for the acquisition was AUD$12mn in cash.

In a separate transaction, but with the same buyer, the Eneabba project was sold for AUD$24mn.

Financing

At the start of March the company announced an equity raising of up to approximately AUD$30 million (before transaction costs) at $0.50 cents per share for, amongst other things, the South Atlantic Project.

The financing is comprised of a placement of 36 million ordinary shares to raise AUD$18mn and a one for fourteen *pro rata* non-renounceable rights issue of new shares to raise up to a further AUD$12 million. Firm commitments have been received from sophisticated/professional investors for the entirety of the placement.

This announcement walloped the share price sending it 20% lower.

Brazil

In recent days the company has announced its entry into Brazil via a loan/earn-in arrangement. This remains for discussion in any further coverage we might publish.

Board & Management

Bruce Griffin, the Executive Chairman, most recently held the position of Senior Vice President Strategic Development of China's Lomon Billions Group, the world's third largest producer of high-quality titanium dioxide pigments. He previously held executive management positions in several resource companies, including serving as Chief Executive Officer and director of TZ Minerals International Pty. Ltd. (TZMI), the leading independent consultant on the global mineral sands industry, World Titanium Resources, a development stage titanium project in Africa and as Vice President Titanium for BHP Billiton .Bruce was a consultant to Sheffield for the Yansteel negotiations and on their commitment was appointed Executive Chairman.

John Richards, non-executive director, is an economist with more than 35 years' experience in the resources industry; holding various positions within mining companies, investment banks and private equity groups. He has been involved in a wide range of mining M&A transaction in multiple jurisdictions. He is an Independent Non-Executive Director; holding previous positions at Normandy Mining Ltd, Standard Bank, Buka Minerals and Global Natural Resources Investments; he is a Non-Executive Director of Northern Star Limited and a Non-Executive Chair of Sandfire Resources Limited.

Vanessa Kickett, non-executive director, has extensive experience and involvement with Aboriginal engagement, native title and heritage matters throughout Western Australia. A member of the Whadjuk Noongar community, she is currently Deputy Chief Executive Officer of the South West Aboriginal Land and Sea Council, responsible for the recent implementation and operation of the South West (Western Australia) native title settlement. She has also held a variety of roles in the public sector, leading the development of heritage and native title policy and frameworks on behalf of Water Corporation in Western Australia.

Gorden Crowe, non-executive director, is a qualified mechanical engineer with over 30 years' experience, He has had significant involvement in leading business start-up, planning and delivery of multiple complex projects including Mining & Mineral Processing, Oil & Gas and Resources based infrastructure projects globally. He has enjoyed an extensive career with leading contractors (including Bechtel and Worley Parsons) and project owners on a wide range of projects.

Ian Macliver, non-executive director, is the Executive Chairman of Grange Consulting Group Pty Ltd & Grange Capital Partners. Prior to establishing Grange he held positions in various listed and corporate advisory companies. His experience covers all areas of corporate activity including capital raisings, acquisitions, divestments, takeovers, business and strategic planning, debt and equity reconstructions, operating projects and financial review and valuations. He is the Non-Executive Chairman of Western Areas Ltd and Non-Executive Chairman of MMA Offshore Limited.

Risks

The whole specialty metals complex finds itself in a different world, with some constants from the Commodity Supercycle period of 2002-2008 which was the last “day in the sun” for the exotica of the metals space, and yet much changed, as well. It is worth enumerating some of the risks that may be faced:

- Titanium prices moving lower
- A return to weak Rare Earth prices
- The REE market is still controlled largely by China

Rare Earth prices are not likely to go lower than the levels they have been at in recent years, even the Chinese are not running a charity anymore. Prices have been ebullient for the last three months but there is no rationale for them to even vaguely test the highs of 2011-12. The Chinese have learnt their

lesson from last boom and that lesson is that the best way to maintain control and discipline market players is by aggressive predatory pricing.

We might also note that, at least for now, the Chinese are the main buyers for monazite sands, and they hold the whip hand in dictating prices (particularly discounts to the going market rates for REE concentrates with certain mixes of REEs and radioactive elements). However, the Chinese are increasingly forced buyers of REE concentrates if they are to have any chance of remaining the dominant player in REEs now that they have lost their dominance in the production of Heavy Rare Earths. They would not want this repeated in the "Lights" such as Nd and Pr.

With the EV "revolution" finally gaining traction outside of China the potential for greater demand for REE magnets from the quarter is enhanced. We see no reason for REE demand to slacken and indeed there is the potential for it to finally start to meet some of the bullish projections of 10 years ago.

The issue for monazite sands is radioactivity. This has not stopped the evolution of projects such as that of Energy Fuels in the US .

Investment Thesis

The Orion facility completes the project financing requirements for Thunderbird. All of the production that needs to be sold forward to achieve this has been done, with still more product potentially to be vended out of Stage 1 (25% of the Zircon without counting the monazite potential).

That the company has been able to bag all the financing without an equity issue is the truly impressive thing and indeed a Stakhanovite effort. This has paid off with the construction nearly 80% complete. Thunderbird is somewhat of a stealth mover in the mineral sands space creeping up fro0m nowhere to almost production with few having noticed.

The company's cash balance was AUD$5.2mn at the end of December 2022 so the current funding is a wise move to keep sufficient padding in place and to move forward to the new Brazilian opportunity. The GS&A expenses are around AUD$2mn per annum. The market cap is currently around about AUD$160mn.

In our view, the only negative at the company is the clunker of a name… and that is easily solved.

During September, we initiated a **LONG** position in Sheffield Resources in the Model Resources Portfolio and reiterate our 12-month target price of AUD$0.88.


AU:SFX Daily
3/03/23
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
Volume
©BigCharts.com
2.0
1.5
1.0
0.5
0.0
Millions
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
23
Feb
Mar

Important disclosures

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