Dr Chris Baker
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BRIDGE STREET
CAPITAL PARTNERS

SHEFFIELD RESOURCES LTD (SFX AU, $0.43)

Significantly improved economics expected from BFS update: Lower capex bill, enhanced revenue and lower equity requirement

- There is one key characteristic of Tier 1 mining assets: they are very hard to kill, whatever is thrown at them. The Thunderbird zircon/ilmenite project is no exception.
- The decision to accept A$95m in low cost, 20 year funding from the Northern Australian Infrastructure Fund allowed SFX to bring a number of elements of infrastructure in house (power station, port upgrade, camp). On top of this there was a scope change and (at the time) approximately 30% additional funding (working capital, fees and a cost overrun facility) which would have taken the total pre-production capital requirement to around A$600m and a ca.$250m gap to be funded by equity.
- This was not handled well and came as a huge surprise to the market. The subsequent collapse in the SFX share price in late 2018 reflected the market's disbelief that Thunderbird could ever be funded. Furthermore, there was no sign of an equity partner to assist.
- Desperate times demanded urgent solutions. SFX's management and their consultants revisited the project concept and decided to defer one element of the process design, the LTR ilmenite circuit. This could reduce Thunderbird's capex by as much as $100m. Revenue lost from the LTR ilmenite sales will be replaced by zircon production, driven by a 38% increased mining rate.
- We have estimated that cash costs will reduce by as much as 10%, helping to propel Thunderbird towards the top of the global margin curve. As well, working capital demands appear to have contracted.
- And as a final sweetener, the company announced full offtake of un-beneficiated ilmenite by a subsidiary of China National Building Materials, Bengbu, an emerging Chinese pigment producer.
- Together, this has seen a significant improvement in our estimate of the project's economic return. Our post tax IRR increases from 24% to 32%; our NPV_{10} increases by some 19% to A$730m with unchanged commodity prices. Clearly these are based on our projections and estimates which need to be verified following the release of the revised BFS in late July.
- From a project finance perspective, the Loan Life Cover Ratio looks more than comfortable and therefore the existing banking syndicate should remain with the project. That Taurus was prepared to advance a A$10m working capital facility suggests they remain committed.
- If our assumptions above are correct, the equity 'gap' will have contracted significantly. With capex savings and what we believe is a reduction in working capital demand we estimate the gap to now be around A$150m.
- An equity partner for the project is currently being sought, a process now being managed by Investment Bank UBS.
- We present two debt and equity funding scenarios in this report, one which involves the sale of 25% of the project to a third party, and one which sees SFX's equity requirement drop to zero in exchange for a significant share in the project. Our valuation for SFX is $1.43 and $1.58 per share respectively.
- We believe investors should use the current share price weakness to build positions in SFX and gain exposure to a true Tier 1 mineral sands asset. The stock is dramatically undervalued in our view.

Overview

Somewhat unexpectedly SFX delivered an announcement in mid-June regarding updates to the Thunderbird BFS. As stated in the announcement the revisions had the aim of…

"reducing capital expenditure and increasing zircon production. The updated BFS is expected to be finalised during early Q32019. It focuses on increasing zircon production and deferring the low temperature roast (LTR) ilmenite circuit to the Stage 2 development. In effect, an updated BFS sets out to defer capital expenditure, and replace ilmenite revenue with zircon revenue, whilst targeting an optimisation of debt carrying capacity. Preliminary investigations indicate potential for substantial improvements to Thunderbird's project economics, enabling a material reduction to the Stage 1 capital expenditure and targeting a significant reduction to the projected equity funding requirement. This study work also addresses updates to Ore Reserves, commodity pricing, consumables, EPC contract and other commercial elements, many of which have moved positively since the BFS was completed more than two years ago." (Source SFX release 11 June 2019)."

In a further unexpected announcement (1 July 2019) SFX announced that the company had locked in full off-take of an unroasted ilmenite product to a large emerging Chinese chloride pigment producer, Bengbu.

SFX states that this will have the effect of:

- **Reducing the upfront capex for Thunderbird with the deferral of the LTR ilmenite circuit.**
- **Enhancing the revenue with the production of more zircon on an annual basis.**
- **Further enhancing revenue with the sale of a by-product ilmenite product, which would otherwise have been stockpiled for later retreatment.**
- **Reducing operating costs.**

It this report we examine what we think is going on in the revised Thunderbird BFS and makes some estimates as to what the project could now be worth, both on a stand-alone basis and in the hands of shareholders.

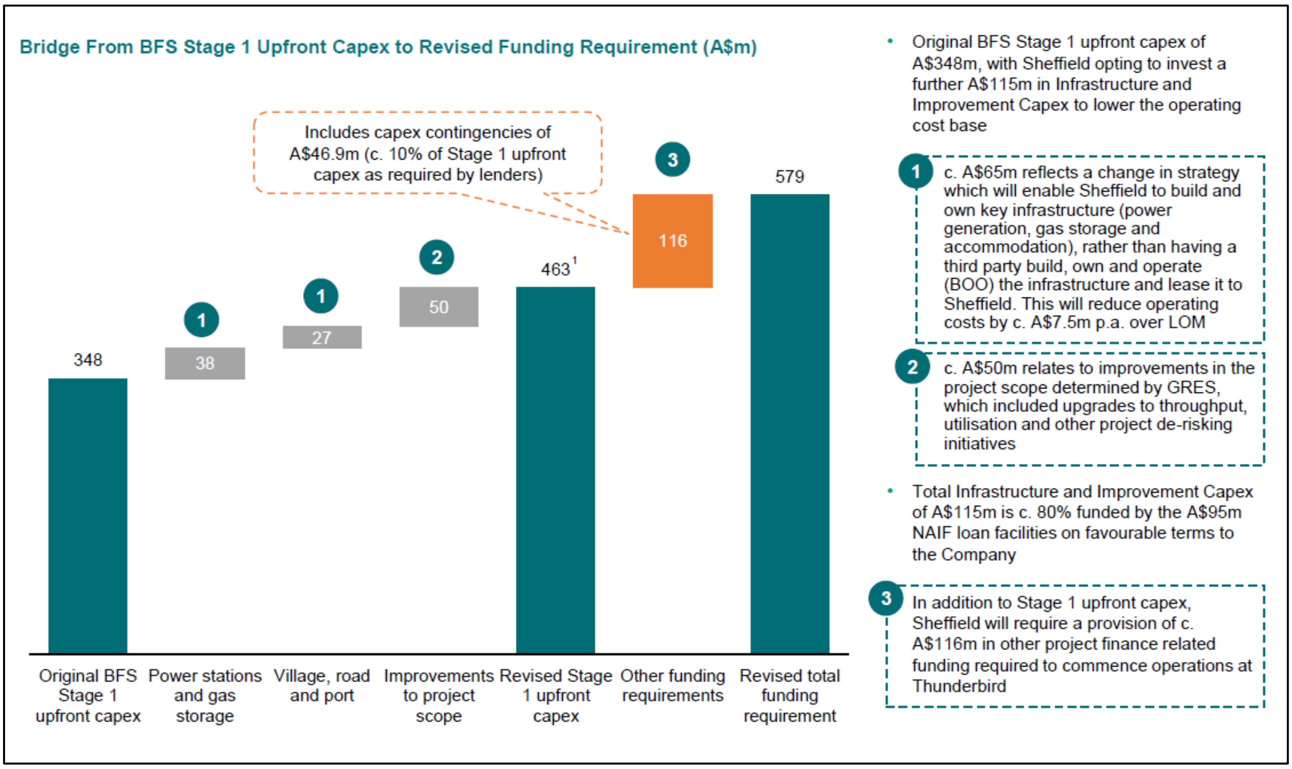
It should be stressed that the conclusions of this report will be conjectural, and we await release of the revised BFS in several weeks.

A Bit of History

While good mines are often the product of grass roots discovery, better mines are delivered by repetitively testing and re-testing development concepts and addressing market conditions for their products. It is therefore relevant to look at the development history of the Thunderbird project.

- The precursor to the Thunderbird project discovered by Rio Tinto Exploration in 2003 following up radiometric anomalies identified by BHP.
- **Discovery of the resource potential of Thunderbird in 2012**.

- During 2014 the resource rapidly grew to over **1 billion tonnes containing 11.8% heavy minerals**.
- **In May 2015, a PFS was released** and presented a case for an 18Mtpa plant throughput, delivering an average of 114ktpa zircon and 439ktpa ilmenite. Capex was estimated at A$394m with a life-of-mine (LOM) cash cost expressed on a revenue to cost ratio of 1.82:1 based on forecast commodity prices and 1:42:1 based on spot commodity prices.
- It was generally thought at this point that this project was unlikely to be bankable.
- **In October 2015 a revised PFS was considered** in an attempt to reduce capex and enhance the marketability of the ilmenite. A critical breakthrough was the introduction of a low temperature roasting phase for the magnetic heavy mineral (HM) stream, which enabled the production of a higher grade (>55% TiO2) ilmenite, again aimed at sulphate pigment producers.
- **Plant throughput was reduced from 18 to 12Mtpa** expanding back to 18mtpa some 8 years after initial production. Capex reduced 26% to A$271m. Zircon production was estimated at 100ktpa LOM with ilmenite at 382ktpa. R/C costs improved to 2.02:1.
- The SFX board considered this to be a potentially bankable proposition and the project was advanced to a bankable feasibility study (BFS).
- **In March 2017 SFX released the results of the BFS**. A two-stage development path was still envisaged commencing with a plant throughput of 8.5Mtpa expanding to 17Mtpa in year 5 for a 42 year mine life.
- Average zircon production (expressed on a pure zircon basis) was proposed at around 110ktpa, ilmenite at an average of 388ktpa and minor by-product credits. At BFS commodity price assumptions, zircon would make up some 63% of revenue.
- **Cash costs (R/C basis) remained around 2:1, placing the project at the top of the 2nd quartile margin curve. Capex had risen to A$348M (including at $24m contingency).**
- Importantly the project economics were quite attractive with a project IRR of 24.9% and NPV of A$676m (at a pretax level).
- The investment environment was enhanced by some useful commodity price tailwinds, with tightening zircon and ilmenite markets.
- The board pressed the 'go' button, debt advisors were appointed and debt was actively sought for this potentially world scale project.
- **Taurus were appointed to provide US$175m in senior debt in 4Q17**. Subsequently the Federal Government agency the Northern Australian Infrastructure Fund arrived with a low cost debt facility to assist with the funding of specific elements of infrastructure, together with a modest exposure to the project itself.
- **Marketing of the product proceeded particularly well**, with 100% of Stage 1 zircon production fully committed to off-takers. Offtake agreements for around 50% of the LTR ilmenite was secured (with Bengbu a key customer).
- **Capital costs for the project itself edged** up following a detailed review by the debt provider's consultants and EPCM contractor, GR Engineering. In our view there was a "belt and braces" component to this capex upgrade with terms such as "de-risk", "contingency" present in the release. As well there was a $9m escalation (due to the later start date for the project) and a $4m "additional weather allowance".



Source: SFX presentation, June 2019

- On a like-for-like basis capex had moved up from A$348m in the BFS to A$362m, a 4% increase.
- **A further $50m capex increase were scope changes**, requested by EPCM contractor GR Engineering who were then awarded a fixed price, turnkey contract.
- **Capex over and above the full project capex number of A$398m included approximately A$65m** for infrastructure which had previously been outsourced. The cost benefit of bringing this infrastructure within SFX was estimated at A$7.5m/year.
- **It should be remembered also that there had been significant delays in permitting**, with the most severe relating to a resolution of Native Title (finally resolved in November 2018) and the final grant of environmental permits (September 2018). These event alone had created significant frustration amongst investors.

SFX's annus horribilis: the failed equity funding of Thunderbird

We only need to look at the share price chart for SFX to know that things did not end well into late 2018. In October the share price was $1.20. By the end of the year it had collapsed to 64c. In a wave of what looked to have been irrational pre-June selling, the stock traded as low as A$0.30 which represented a market capitalisation of under A$80m. SFX hadn't seen that market value since the worst of the 2015 bear market.

The share price weakness was driven by a number of issues, including:

- The misguided belief that capex had blown out from $348m to around $600m. As discussed above this was not the case.
- The inability of SFX to raise anything other than modest working capital during the turbulent 4th quarter of 2018.
- Market rumours that Thunderbird was un-fundable. Clearly quality debt providers Taurus and NAIF thought otherwise.
- Further rumours that there were unacceptable technical risks within the project, especially the low temperature roasting stage to optimise the ilmenite circuit. This is despite sign-offs by the BFS engineers, Hatch, consultants IHC Robbins and consultants used by the debt providers. GR Engineering had also provided performance guarantees as part of the EPCM contract.
- A slow start to a search for an equity partner in the project. This search is now well underway under the supervision of UBS, but appears to have been delayed by the recent re-engineering of the project.
- A depletion of SFX's working capital over the ensuing 6 months leading to the belief that SFX would be a forced issuer of equity despite a very weak share price. The working capital issue has been resolved with a recently issued $10m working capital facility provided by Taurus.

Thunderbird BFS Stage 2: what could it contain?

SFX's recent release has confirmed that the upgraded BFS is near completion and will be released in several weeks.

What do we know about "BFS Stage 2" from recent releases? This is what we can glean from SFX's recent announcements and our interpretation of this information.

> *It (the study) focuses on increasing zircon production and deferring the low temperature roast (LTR) ilmenite circuit to the Stage 2 development. In effect, an updated BFS sets out to defer capital expenditure, and replace ilmenite revenue with zircon revenue (June 11 announcement).*

The LTR circuit was a key breakthrough in the metallurgy of the Thunderbird project. In 2015 and 2016 zircon prices were bottom of cycle and could not carry the project alone. Ilmenite was perceived to be of poor quality containing unacceptable proportions of iron oxide rich trash. The BFS delivered an elegant metallurgical solution, low temperature roasting then magnetic separation of the ilmenite and trash. A coincidental benefit was to produce very high quality ilmenite (+55% TiO_2) which was suitable for use by sulphate and chloride process pigment producers. This we believed could be sold with a ca. 20% premium price to benchmark ilmenite.

The ilmenite upgrade comes with a reasonable capital investment, some A$78m or 27% of the then capex of the project, but delivering (according to our numbers) some 35% of the revenue for perhaps an incremental 10% of the costs. As it stands, it makes perfect economic sense to proceed with the project. But if capital is a key consideration, as it currently is, the ilmenite could be separately stockpiled and treated at a later date.

If 27% is still the right number, then 27% of the new capital cost would represent **a capex saving of around A$100m** should the ilmenite circuit be left out.

How then can ilmenite revenue be replaced with additional zircon revenue?, We believe the mining rate is to be increased and we'd imagine that the mineral separation plant has been modified (at low capital cost) to accommodate selectively mined higher grade ore.

1. *An annual supply contract of 650,000 tonnes of primary ilmenite with Bengbu Zhongheng New Materials S&T Co., Ltd. This represents all of the estimated volume of primary ilmenite to be produced during Thunderbird Stage 1. (paraphrased from July 1 announcement).*

So, just as soon as SFX engineered the unroasted ilmenite out of the sales mix, the marketing team managed to find a market for it. **This is an extraordinary result**, and provides even better economic returns. As we discuss below, it shows how tight the supply of feedstock suitable for the chloride pigment process is becoming.

The big unknown is what price will SFX achieve for this product. It looks to us to be a mix of ilmenite (which could sell in an upgraded form in a range of US$180-220/t CIF) and titanomagnetite (priced in the BFS at US$48/t CIF). A weighted average of these prices suggests a US$120-130/t theoretical value, but of course Bengbu will want its slice of the pie and will likely use it for direct feed into a titanium slag furnace, in turn providing feedstock to their new chloride pigment plants. (See further commentary later in the report). A best guess for an FOB price for SFX might be around US$80-90/t.

SFX then retains the option to install the low temperature roasting option down the track to capture some of this value. In the meanwhile, the project might enjoy an incremental US$50m in revenue per year for its present 30-40 year mine life.

The question should be asked: why weren't these options investigated during the PFS and BFS?

We think the answer is quite simple. During the preparation of the PFS, commodity prices were low. Premium zircon was under US$1000/t and the A$ was quite strong. The project needed revenue from ilmenite.

The low temperature roast provided the answer, and delivered more than expected. The LTR ilmenite was perfect for the sulphate pigment producers and was starting to attract the attention of the chloride producers.

In the meanwhile, the zircon price had moved strongly to over US$1500/t. Had SFX been able to access equity markets, or had a partner come along at the right time, the LTR circuit might still be part of the circuit. Circumstances conspired otherwise, and a low capex option needed to be found.

That the un-beneficiated ilmenite stream could be monetised seems to have come as a welcome, last minute surprise.

Impact on Thunderbird's economics

Our "what if" analysis of the revised BFS includes the following assumptions:

- Removal of the LTR ilmenite circuit at a cost of A$100m,
- An increase of 30% to previous zircon production levels, Stage 1 and 2,

- Removal of the sale of ca. 240ktpa of LTR ilmenite and titanomagnetite, replaced with the sale of 650ktpa of "mixed feedstock blend" for US$80/t (FOB) during Stage 1 and increasing proportionally for Stage 2, and
- Reduction of mine cash costs by around10% (mainly reduced cost of gas for the LTR furnace).
- No changes to commodity price and currency assumptions.

Below are our assumptions and the results of our analysis, compared with the original BFS.

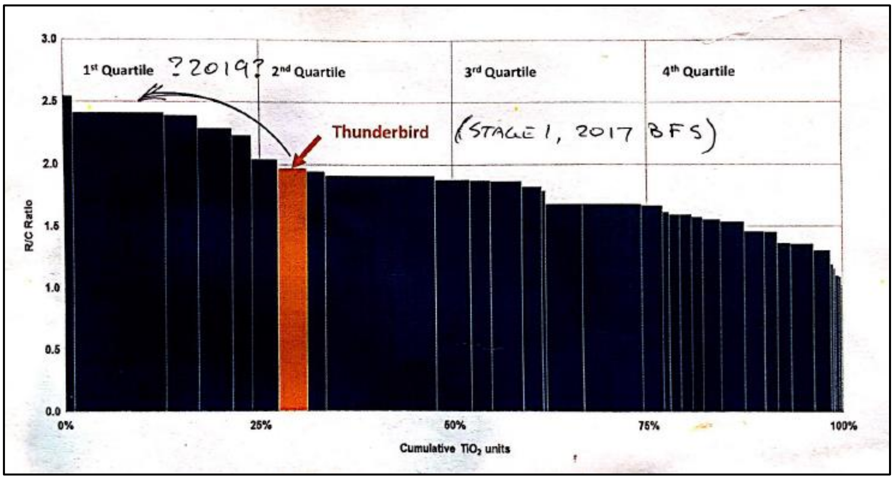
Thunderbird mineral sands project		BFS (2017)	BFS (2019)*
Price assumptions			
Zircon, premium	US$/t, FOB	1550	1550
Ilmenite, LTR	US$/t, FOB	220	-
Ilmenite+, DSO	US$/t, FOB	-	80
AUD/USD		0.75	0.75
Production			
Stage 1 (years 1-5, average, incl. ramp up)			
Zircon, premium	Ktpa	54	73
Zircon in concentrate	Ktpa	59	79
Ilmenite, LTR	Ktpa	300	-
Ilmenite +, DSO	Ktpa	-	528
Stage 2 (year 6 onward, average, incl. ramp up)			
Zircon, premium	Ktpa	80	108
Zircon in concentrate	Ktpa	90	122
Ilmenite, LTR	Ktpa	400	-
Ilmenite +, DSO	Ktpa	-	845
Mine life	Years	42	35
Revenue			
Stage 1 (years 1-5, average, incl. ramp up)	A$/tonne VHM	463	347
Stage 2 (year 6 onward, average, incl. ramp up)	A$/tonne VHM	449	348
Costs			
Stage 1 (years 1-5, average, incl. ramp up)	A$/tonne VHM	225	160
Stage 2 (year 6 onward, average, incl. ramp up)	A$/tonne VHM	204	145
Revenue/cost ratio			
Stage 1		2.1	2.2
Stage 2		2.2	2.4
NPV(10), pretax	A$m	917	1045
NPV(10), post tax	A$m	615	730
IRR, pretax	%	27.8	36.8
IRR, post tax	%	23.5	31.6
* BSCP assumptions only. Results from the revised BFS due out in 3Q19			

- It must be stressed that there are a lot of assumptions embedded in our assessment of the 'new look' BFS. Nonetheless, the assumptions used above are consistent with the information provided by the company thus far. Note as well that our numbers vary slightly from the BFS reported by the company, largely due to differing commodity price and currency assumptions.
- **The impact on project economics is impressive. Our estimate of NPV_{10} (post tax) increases by nearly 20% and a sub-25% IRR moves to over 30%.** This is driven by lower capex, increased

revenue with additional zircon and by-product un-beneficiated ilmenite, assisted by an improvement to cash margins with the elimination of the low temperature roast process.

Thunderbird looks to be moving into the highest margin quartile

- Based on our estimates above, **we believe Thunderbird will move into the highest margin (ie lowest cash cost) quartile for the industry**. As reported by SFX, the earlier BFS delivered a high margin, but 2nd quartile project for Stage 1. (The revenue to cost ratio for Stage 2 was estimated at 2.3, so all else being equal, Thunderbird Stage 2 would have moved into the highest margin quartile beyond 2026).
- We estimate that Stage 1 of the revised (2019) BFS can deliver a R/C ratio of around 2.2 to 2.3 which, if correct, would cement Thunderbird firmly in the highest margin quartile.



Source: Modified from Sheffield presentations.

- It should be noted that this cost curve was generated by consultants TZMI over two years ago. While it's unlikely the shape of the curve has changes significantly, it is unlikely to be exactly the same.

New ore reserves

- New reserves will be released with the updated BFS (late July). These should have little or no impact on our project economics as Thunderbird already has a very long mine life.

Impact on debt financing

- **The BFS has enabled SFX to attract high quality debt providers, Taurus and NAIF**. Should \$100m be taken out of the capex, will the full ca. A\$335m in debt still be available? We infer that Thunderbird capex will drop by \$100m to \$373m, so debt to capex is a fairly Ritzy 90%.
- **Can that be acceptable to the banks?** In theory the same revenue seems likely driven by more zircon at the expense of ilmenite income together with lower capex should make the project even more bankable. But is it?
- One of the key metrics undoubtedly used by the debt providers is the **Project Life Cover Ratio** (PLCR). This is defined as the discounted cashflow available for debt service divided by the

debt outstanding. A number significantly greater than one would be optimal. Our model of Thunderbird Stage 1, at our commodity/currency forecasts derives a PLCR of 3.6, so very comfortable. Discount commodity prices by 25% and the number remains more than acceptable at 1.7. Take the zircon price down to cyclical lows of US$950/t, and the PLCR we calculate is 1.2.

- A second metric likely to be critical to the bank's decision to proceed is the **Loan Life Cover Ratio** (LLCR). This is defined as the discounted cashflow over the term of the loan, divided by the debt outstanding. Again, a number over one will make the project bankable. In the case of the Thunderbird project finance, this would be measured over the US$75m tranche A facility, amortised over the first 7 years of the project's life, and repayable in years 3.5 to 7.
- At our commodity price assumptions, the LLCR is a comfortable 4.7. Drop zircon by 25% and it remains at 2.3. The 'break even' (LLCR of 1) zircon price is US$950/t, which represents the price at the bottom of the last cycle. **We think this should tick all the banks' boxes**.

Impact on the valuation per share for Sheffield

- The fall in the SFX share price and disclosure of the possible equity requirements forced us back to the valuation drawing board in our December 2018 report.
- At around 45c, the cost of SFX equity capital is roughly three times what it might have been in 3Q18. Looking forward SFX is likely to formally evaluate the involvement of another party, at either project or corporate level. SFX changed corporate advisors and appointed investment bank UBS Australia to engage equity partners in the project. This was a positive move, in our view.
- There appear to be several equity financing option available to Sheffield. We consider two scenarios.

Scenario 1: sell down of equity at the project level

- Our base case remains a 25% investment from another party at project level in Thunderbird. Now that the project is fully permitted, "shovel ready" together with two high quality debt providers, and a signed-up EPC contractor (GR Engineering, one of the best in the business), we are of the view that an incoming party could pay 50% (or perhaps more) of NPV for this world class project. Our after tax NPV_{10} of Thunderbird is now A$730m, assuming a US$1550/t (FOB) long term zircon price and A$/US$ of 75c. The sell-down of 25% of the project could provide $90m in equity to SFX. We assume an additional $50m of new equity would be raised by the company.
- We assume in our valuation, summarised below, that future equity is raised at A$0.40.
- On this basis our NAV_{10} for Sheffield is A$1.43/share, still a significant premium to the prevailing share price.

Thunderbird (NPV10), post tax	A$m	$	729.6	
Add back capex	A$m	$	373.0	
Thunderbird (NPV10)	A$m	$	1,102.6	Unfunded NPV, pre capex
Mine site exploration	A$m	$	40.0	Notional
Equity NPV	A$m	$	1,142.6	
Project debt	A$m	-$	335.0	90% debt/capex
NPV less debt	A$m	$	807.6	
Ownership by SFX			75%	Assumed sell-down
Implied SFX equity	A$m	$	605.7	
Cash	A$m	$	5.0	Post recent raise + SPP
PV of corporate costs	A$m	-$	100.0	Estimate
Other exploration	A$m	$	-	
Taurus working capital facility	A$m	-$	10.0	
Corporate NAV	A$m	$	500.7	
Number of shares, current	m		260.6	Post recent raise + SPP
New equity required	A$m	$	50.0	Estimate
Number of new shares	m		125.0	Raised at $0.40/share
Total number of shares	m		385.6	Post final raise
NAV adding new cash	A$m	$	550.7	
NAV/share	A$	**$**	**1.43**	

Scenario 2: Incoming partner to fund 100% of the equity requirement of the project

- Is the following scenario just as likely? Work we have been recently doing on the lithium sector highlighted the rewarding deal for Kidman Resources and the deal with lithium giant, SQM.
- Two years ago, a deal was done to allow SQM to take 50% equity in the 100% KDR-owned Mt Holland spodumene project. US$30m was as a cash payment to KDR and $80m was to be used to fund completion of the BFS, construction of the mine and concentrator and to fund a feasibility study into a lithium hydroxide refinery.
- The KDR share price at the time was ca. $0.55 for a market capitalisation of A$183m. The market took this very well, and within a year the share price had moved to over $2.40 (admittedly following a strong rally in lithium prices and the sector in general). 12 months later, KDR is bid for by industry outsider Wesfarmers, valuing the company at over $770m. Investors that stayed in during the rollercoaster ride made returns of over 300%.

Source: Modified from ASX

- It in the following table, we speculate that the incoming party acquires 49% on the Thunderbird project by funding the outstanding equity requirement of A$154m. While this might sound at face value somewhat onerous, it is actually less dilutive at current share prices than Scenario 1.

Thunderbird (NPV10), post tax	A$m	$	729.6	
Add back capex	A$m	$	373.0	
Thunderbird (NPV10)	A$m	$	1,102.6	Unfunded NPV, pre capex
Mine site exploration	A$m	$	40.0	Notional
Equity NPV	A$m	$	1,142.6	
Project debt	A$m	-$	335.0	90% debt/capex
NPV less debt	A$m	$	807.6	
Equity capital required	0	$	154.0	Payment for 49% equity
SFX equity in Thunderbird after selldown			51%	
SFX NAV of Thunderbird		$	411.9	
New equity required by SFX		$	-	No new equity required
Number of shares, current	m		260.6	
NAV/share	A$	$	1.58	

- SFX share holders would hold only 51% equity in what will likely become a world class mineral sands project. But at the current market value for SFX, that might be the price that has to be paid.
- Either way, the project is funded, and SFX can move ahead with construction.

Conclusion

- SFX seems to be emerging from its annus horibilis with a significantly stronger project.
- If we are right the new BFS will demonstrate better returns from a lower capital investment. This is reflected in an 8.1% increase in our appraised rate of return now sitting at 31.6% (after tax).
- We have long viewed Thunderbird as a Tier 1 mineral sands project, based on the following elements:
    - It is one of the largest deposits found in the last 30 years, 3-4 times larger than the Jacinth-Ambrosia discovery of Iluka in 2004 for similar in situ value.
    - Long mine life (+30 years).
    - High grade. Significantly higher grades than most of its peers.
    - Low cash costs helped by a low strip ratio and relatively high grades. The BFS upgrade may now place the project into the highest margin quartile
    - Located in Western Australia, the world's most attractive mining jurisdiction. Most of the world's mineral sand ore reserves are now in geopolitically risky areas.
    - Good access to existing port infrastructure.
    - Good access to technical services.
    - Good access to labour, skilled and unskilled.
- We believe the existing banking consortium will remain with the project and the UBS will be able to secure a suitable strategic partner and minimise dilution to existing SFX shareholders.
- We believe the cynics and competitors will fail to halt the development of Thunderbird. The current share continues to reflect doubts regarding the project's final funding solution. We believe that a suitable equity funding solution will be secured, and the SFX will wind up owning 50-75% equity in the project.

Capital Structure

Sheffield Resources Ltd (SFX AU)		
Share price	A$	$0.43
Number of shares (fpo)	m	258
Market capitalisation	A$m	$110.9
Share options (av 45c)	m	15.8
Cash (at 3/19)	A$m	$5.30
Debt	A$m	$0.00
Top 50 shareholders, appr.		50%
Insitutional holding, appr.		35%
Directors, management		11%

Sensitivities

		EBIT (2022e)		Project NPV(10), post tax	
Change from base	*Base*	*+10%*	*-10%*	*+10%*	*-10%*
Capital costs (pre prod'n)	A$373m	0%	0%	-4%	4%
Opex	A$132/t	-15%	8%	-11%	11%
Zircon price	US$1550/t	15%	-15%	21%	-21%
Ilmenite conc. price	US$80/t	5%	-5%	6%	-6%
A$/US$	0.75	22%	-18%	30%	-25%

Update on mineral sand prices and trends

Certainly the biggest story of the last few months as far as mineral sand supply is concerned is the announcement by Rio Tinto of the go-ahead of the Zulti South Project, with the aim of "sustaining Richards Bay Minerals current capacity and extend mine life" as the grades of the North orebody decline. Construction is due to start in mid 2019, assuming all permits are obtained. First production is expected in late 2021. It is to be fully funded from internal cashflow and RIO quote an IRR of 24% (without specifying commodity price assumptions).

We have always been doubtful as to whether RIO would commit capital to RBM. South Africa is hardly a favoured investment destination, and social unrest has been on the increase. Together with relatively high inflation in the country and rising power costs, it is hardly surprising the Zulti South decision is nearly 5 years late.

But without Zulti South, RBM would have continued its downward value decline, until closure in around 15 years.

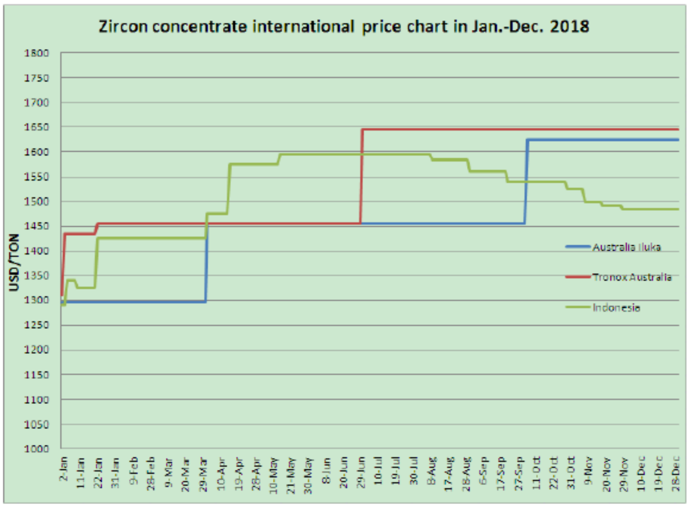
The stated capital cost of US$463M is much lower than we had thought, which suggests this is unlikely to build RBM back to is former glory. At its peak, RBM produced around 250ktpa of zircon. We think current production is around half this level (RIO do not disclose production levels for zircon). We are forecasting that production will move back toward 200ktpa from 2022.

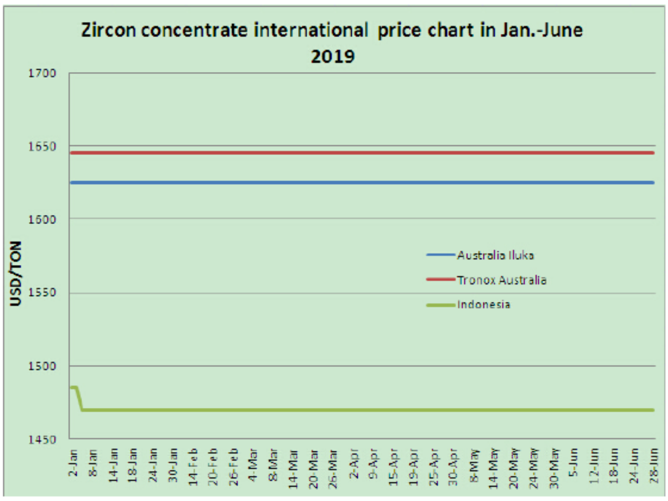
As we describe in the following sections, despite a subdued Chinese economy, zircon rpoducers have been able to maintain ca. US$1600/t reference pricing. Titanium feedstock prices have recovered from a post Chinese New Year dip.

Zircon

Despite a slowing of Asian economies, Australian producers are maintaining their reference prices.

Zircon pricing, January 2018 to June 2019. (Note units expressed are US$/tonne, CIF)





Source: Ferroalloynet.com

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With the go-ahead of RBM's Zulti South project, we have revisited our zircon supply/demand model, below.

Zircon forecast supply (pure zircon equivalent basis)			**2000**	**2018e**	**2019e**	**2020e**	**2021e**	**2022e**	**2023e**
Country	Location	Company							
Australia	Eucla Basin	Iluka		270	270	270	270	240	220
S.Africa	Richards Bay	Rio Tinto		160	144	130	123	150	175
S.Africa	Namakwa	Tronox		121	121	121	121	121	121
Australia	Thunderbird	Sheffield		0	0	0	20	80	100
Mozambique	Moma	Kenmare Resources		70	70	70	70	70	70
Senegal	Grande Cote	TiZir (Eramet/MDM JV)		70	70	70	70	70	70
Australia	Boonanaring	Image Resources		0	50	70	70	70	70
USA	Florida	Chemours		65	65	65	65	65	65
Australia	Western/Eastern Aust.	Cristal Mining		60	60	60	60	60	60
Australia	Fingerboards	Kalbar		0	0	0	10	60	60
S.Africa	Fairbreeze	Tronox		46	50	55	55	55	55
Australia	Narngulu tailings	Iluka		0	0	50	50	50	50
Indonesia	**Various**	**Various**		**40**	**50**	**50**	**50**	**50**	**50**
Australia	Perth Basin	Iluka		40	30	60	60	60	40
Australia	Western Australia	Tronox		30	30	30	30	30	30
Kenya	Kwale	Base Resources		35	32	25	25	25	25
S.Africa	Tormin	Mineral Commodities Ltd		25	25	25	25	25	25
Brazil	Mataraca, Paraiba	Millennium Inorganic Chemicals		25	25	25	25	25	25
Australia	Murray Basin,NSW	Cristal Mining		25	25	25	25	25	25
Madagascar	Port Dauphin	QMM		20	20	20	20	20	20
India	Tamil Nadu	Tata Steel		20	20	20	20	20	20
		Total	**988**	**1,235**	**1,267**	**1,268**	**1,291**	**1,398**	**1,403**
		Growth in supply		*4.1%*	*2.6%*	*0.0%*	*1.9%*	*8.3%*	*0.4%*
		Growth in demand		*2.8%*	*2.8%*	*2.8%*	*2.8%*	*2.8%*	*2.8%*
		Surplus/deficit		2	0	-35	-48	21	-12
		Surplus/deficit without new projects			0	-85	-128	-169	-222

Source: BSCP data, company data

What was looking like a deficit market in 2018 has been brought back into balance by Iluka with the release of product from inventory. As well we have seen higher prices incentivise additional production out of Indonesia. For the next 2-3 years, a potential deficit should also be balanced by ILU likely delivering zircon-in-concentrate from Narngulu tailings (WA) at a rate of 40-50ktpa. Based on our numbers this will not quite be sufficient to balance the market, which suggests prices will remain strong at least until new supply emerges from 2021-22. Even then it is hard to see zircon in dramatic oversupply for the next 10 years.

As shown in the last line of the table above, without these new zircon projects, a 20% supply deficit is forecast to develop by 2023.

We see no reason to change our long term US$1550/t (FOB) price forecasts, and remain of the view that prices need to remain at this level to incentivise new production to fill an emerging supply gap.

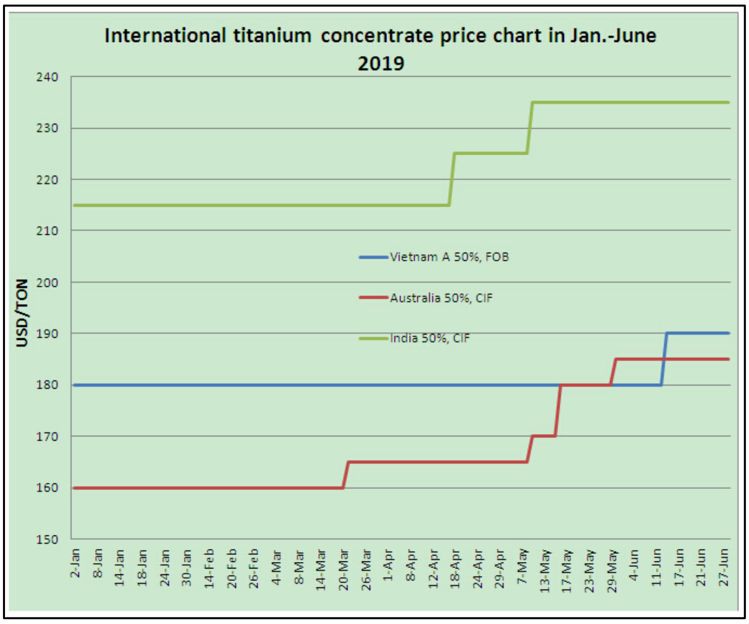
Note that we have pushed back start-up of Thunderbird and Kalbar's Fingerboards projects by 6 months, the latter due to permitting delays.

Iluka and Tronox appear to be managing the zircon market well. We sense they wish to revert to a stable pricing outlook and avoid demand destruction we saw over the past 5 years. Our long term price of US$1550/t (FOB) remains unchanged.

TiO2 feedstock

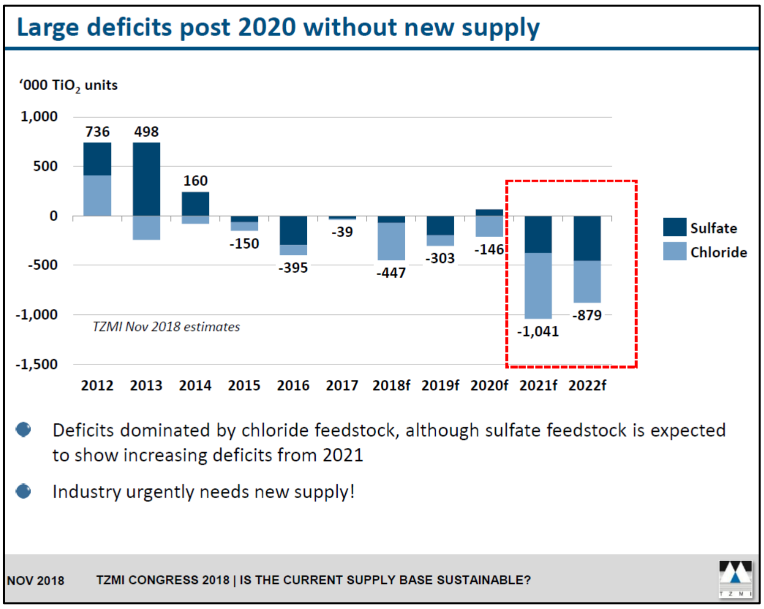
The feedstock market has been tightening as well. On the demand side many pigment plants globally are already running at high operating rates, and previously depleted inventories are being rebuilt. We are seeing increasing growth in chloride pigment capacity (especially in China) and demand for high grade feedstock is increasing.

On the supply side here have been a number of disruptions (especially at ILU's Sierra Rutile operations) and inventory levels are reportedly low.



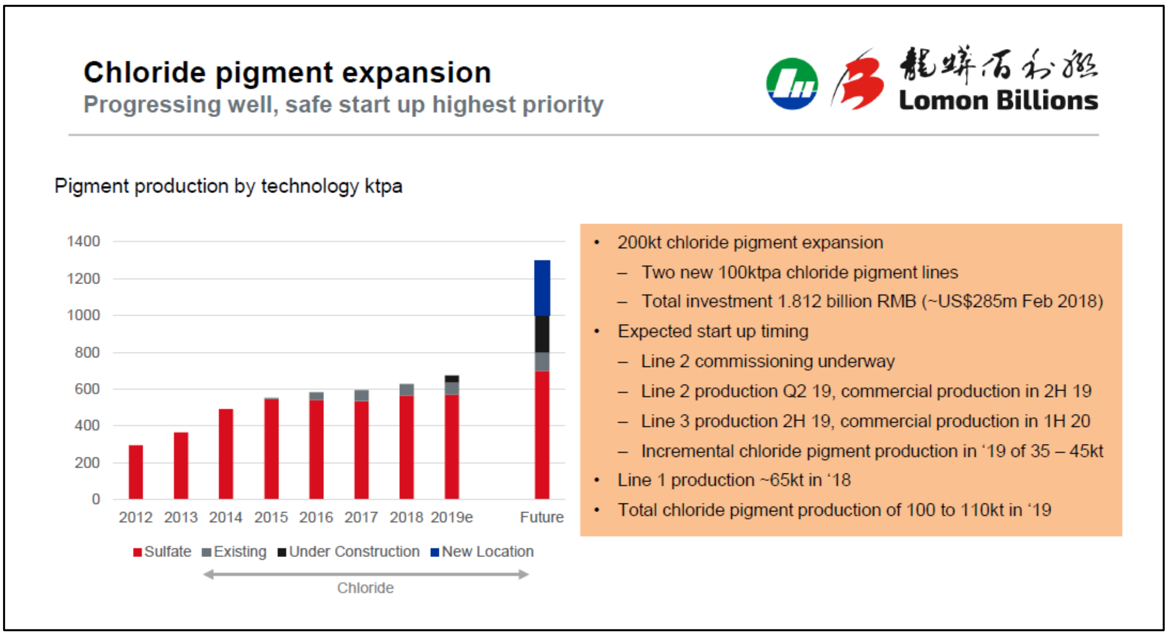
Source: Ferroalloynet.com

Recent presentations from consultants TZMI have pointed to the potential for increased supply constraints for titanium dioxide feedstock, especially of a quality suitable for the chloride pigment process.



Source: TZMI Mineral sands Conference, 2018

As highlighted by leading Chinese pigment producer, Lomon Billions, growth in Chinese pigment production is forecast to be strong over the next decade, and much of this will be chloride.



Source: Lomon Billions presentation to New York TZMI conference, 2018

So perhaps no surprise that premium Indian ilmenite, itself the subject of supply disruption, has seen prices move toward record levels. And perhaps no surprise that emerging pigment producer Bengbu, have sought to lock in long term supply with Sheffield.

We retain a positive medium-term view on titanium dioxide feedstock, and see further upside for prices.

Who is Bengbu? Sheffield introduced us to Bengbu Zhongheng New Materials S&T Co., Ltd as one of the key offtake partners for the LTR ilmenite. Bengbu is a subsidiary of a listed company, Triumph Science and Technology Co. (600552.SS), which is in turn a subsidiary of China Triumph International Engineering (CITEC), in turn a subsidiary of the huge SOE, China National Building Materials (CNBM). CNBM is China's largest producer of cement, gypsum board and plate glass. It also has extensive engineering capabilities. One of CITEC's subsidiaries is the largest producer of fused zirconia in China (and perhaps globally), consuming some 80-90ktpa of zircon. It is difficult to get details regarding Bengbu's intentions regarding its entry into the pigment space. Clearly it is sensitive commercially as the pigment industry in China is fragmented and highly competitive. We have found a single reference to the company's proposal to build out 200ktpa of chloride pigment capacity (Source: CITEC website). A budget of 5 billion yuan has been allocated. There is no timetable provided, but we understand construction of the first 100ktpa module has begun.

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Disclosures

Dr Chris Baker, an authorised representative of BCP, certifies that the advice in this report reflects his honest view of the company. He has 29 years investment experience in wholesale capital markets. He worked as a mining analyst for brokers BZW and UBS for 11 years and has a further 16 years' experience as a mining analyst and portfolio manager with Colonial First State and Caledonia Investments. He now provides independent financial advice on a part time basis. He may own securities in companies he recommends, but will declare this when providing advice. He currently owns shares and options in SFX. He is not paid a fee by BSCP for providing this report. BSCP are Corporate Advisors to SFX and have received fees from SFX for services provided. BSCP was co-lead manager in the recent $16m capital raise, and received fees for that.

Appendix 1

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