



Sheffield Resources (ASX: SFX)

Sheffield Resources takes the Night Train

The Night Train deposit looks set to boost Sheffield Resources' (ASX: SFX) world-class, 3.2 billion tonne high-grade Thunderbird heavy minerals project in Western Australia. *By Mark Mentiplay*

THE NIGHT TRAIN DISCOVERY ADDED a new expansionist dimension to Sheffield Resources' already world-class, zircon-rich, 683 million tonnes, 11.3 per cent heavy minerals (HM) reserve Thunderbird project.

As the bankable feasibility study (BFS) nears conclusion before the end of 2016 and with production expected in 1H 2019, initial scoping metallurgical test work on Night Train, 20 kilometres south-east of Thunderbird, shows it has the potential to produce a premium zircon product.

This is in addition to Thunderbird's current resources of 3.2 billion tonnes at 6.9 per cent HM, making it, what Sheffield claims, to be the world's best undeveloped mineral sands project.

The Night Train results show high-quality zircon, meeting ceramic grade specifications, can be produced using conventional mineral sands processing techniques.

Composite samples average 4.7 per cent HM containing a high, 174 per cent zircon, with low iron contamination.

Zircon is able to be produced without an enhancing leaching stage.

Follow-up shallow exploration reverse circulation and aircore drilling is planned for August-September this year, along with more detailed test-work.

Drilling is likely to be to about the same depth as Thunderbird's average of only 30 to 40 metres.

"Night Train could be a significant new discovery, emphasising the excellent exploration potential of the Canning Basin, with Thunderbird being the first major mineral sands discovery in the basin," Sheffield Resources managing director Bruce McFadzean told *The Resources Roadhouse*.

"Although Thunderbird is our primary focus, targeting additional zircon-rich deposits underpins shareholder growth and supports our long-term product supply strategy for this exciting new mineral sands province.

"Thunderbird is among the world's largest and highest grade zircon-rich deposits, which, along with its high ilmenite (titanium) grades and initial 40-year mine life, set it apart globally.

"It's a monster. Whether you are a producer, consumer or investor, you just have to look at this project.

"Its true significance as the next big heavy minerals project globally will become apparent within the next 12-months."

The focus now is now on the BFS, marketing and native title and environmental documentation.

"The metallurgy, which just keeps on getting better, is almost completed," McFadzean said.

The BFS, being carried out by leading engineering group Hatch, is assessing capital and operating costs, and risk improvement opportunities, including a reduced initial plant size to a single train processing 7.5 million tonnes per annum for years one to three, to fund a second train and ramping up to 15 million tonnes per annum from year four on.

The PFS flagged a 12 million tonnes per annum plant via two trains from years 1-7, with throughput rising to 18 million tonnes per annum with production beginning in H1 2019, which make Thunderbird one of the world's largest dry mining mineral sands operations.

Thunderbird's 3.2 billion tonnes measured-indicated-inferred resources at 6.9 per cent HM, includes a coherent higher grade component of 1.09 billion tonnes at 11.9 per cent HM with very high 0.91 per cent in-situ zircon, 0.28 per cent HiTi leucoxene, 0.25 per cent leucoxene and 3.3 per cent ilmenite using a 7.5 per cent HM cut-off.

The PFS envisages pre-production capex of \$296.6 million for the development of a 40-year-plus strip-mining/backfill operation and slurry pipeline typical of dry mining operations in the mineral sands industry.

Low environmental impact mining known as 'moving hole mining,' is a technique that mines ore from a single hole or pit, which is backfilled as the mining advances leaving the operation with a small sized opening at the end of a very long life.

The processing only uses about five per cent of what material is mined.

The PFS sees life of mine production of 100,000 tonnes per



annum zircon, 26,000 tonnes per annum HiTi88, 382,000 tonnes per annum LTR ilmenite and 14,000 tonnes per annum primary ilmenite, with a 60 per cent value stream from zircon, 30 per cent from ilmenite and 10 per cent from leucoxene.

Once in full production, Thunderbird has the potential to supply about 8 per cent and 4 per cent of the world's zircon and ilmenite respectively.

"A key aspect setting Thunderbird apart from other mineral sands projects globally is the amount and quality of established zircon, backed by a healthy amount of both high-grade sulphate ilmenite and HiTi leucoxene," McFadzean said.

"Another is that Thunderbird's reserves/resources are in one big chunk, ranging from a thickness of 14m to 48m, four kilometres wide and six kilometres long, with an incredibly low strip ratio of 0.67:1, including 0.22:1 over the first seven years."

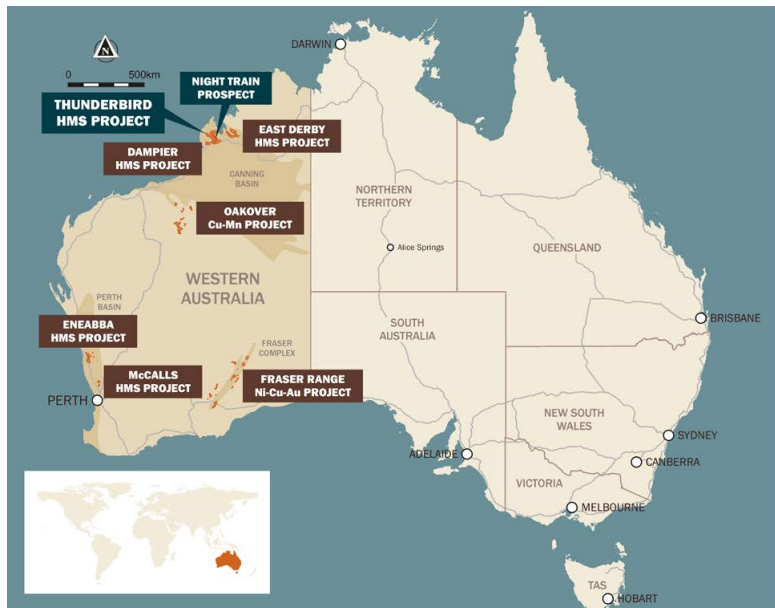
The PFS estimates the project will deliver average annual EBITDA of \$148 million for the first 10-years and \$120 million per annum over 40-years.

Operating cash flow is calculated at \$163 million per annum for the first 10-years, when it will incorporate higher-grade mineralisation with less overburden, enabling capital payback within 3.6 years.

Sheffield has identified a robust mine-to-port logistics chain, after being granted preferred proponent status for a bulk handling facility and product storage area at the nearby Derby port expected to hit about 500,000 tonnes at peak production, 20 per cent zircon and the rest ilmenite.

With Thunderbird growing and about \$5 million in the bank, Sheffield is working on managing what McFadzean calls "the BFS black hole" in terms of news flow.

"We are working through a number of funding options, including



partnering on a project basis and off-take deals," he explained.

"We've got a tight 150 million share structure and we want to keep it that way.

"We are getting a lot of interest from potential off-takers looking for longevity of supply and grade quality to guarantee their own product supply and we can offer 40-years plus.

"The global mineral sands product markets are ones that don't go away, products like paints, ceramics, plastics, aircraft components, high-strength steel devices and medical implant uses, mostly involved in urbanisation, rather than industrialisation.

"I'm sure the BFS will again show we have a great, world-class mineral sands project in Australia, one of the best, if not the best, mining jurisdiction in the world.

"So the project itself will ensure the funding—good projects get funded."

The Thunderbird story dates back to an eight-hole program drilled by Rio Tinto, from 2005-2007, which hit the outer edge of the current resource.

Rio pulled out of its Australian mineral sands exploration in 2009 and ex RGC/Iluka Resources geologists and founding Sheffield directors David

Archer and Bruce McQuitty picked up the ground in late 2010, shortly after listing Sheffield earlier that year.

The first Sheffield hole was drilled at Thunderbird in 2012—reaching BFS in three years.

For McFadzean, a pragmatic mining engineer with more than 35 years' experience and a strong production/technical background, it is his first venture into the mineral sands business.

He chalked up 15-years with both BHP Billiton and Rio, but is probably best known for his four years as MD of WA gold miner Catalpa Resources, which he took from a market cap of \$3 million to \$1.2 billion via a merger forming Evolution Mining in November 2011, now the second biggest gold miner in Australia. 📍

The Short Story

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MAJOR SHAREHOLDERS

| | |
|----------------|----|
| Will Burbury | 6% |
| Bruce McQuitty | 6% |
| David Archer | 6% |