

**ASX and Media Release**

**25 March 2013**

**WORLD CLASS STATUS OF THUNDERBIRD CONFIRMED BY METALLURGICAL TESTWORK**

**KEY POINTS**

- **Outstanding results from metallurgical testwork at Thunderbird HMS deposit**
- **High quality zircon, ilmenite, rutile and leucoxene products**
- **Primary zircon is expected to meet specifications of the premium market**
- **Thunderbird mineralisation responds well to conventional processing methods**
- **World class status of Thunderbird deposit confirmed**

**Sheffield Resources (“Sheffield”, “the Company”) (ASX:SFX)** today announced outstanding results from initial metallurgical testwork on the Thunderbird HMS deposit at its Dampier heavy mineral sand (HMS) Project near Derby in the Canning Basin region of Western Australia (Figure 3).

Managing Director, Bruce McQuitty said the primary objective of the metallurgical testwork was to optimise Thunderbird’s potential product quality.

“The results of this work are excellent and indicate that the Thunderbird material has the potential to generate high quality, marketable products, including premium grade zircon, using conventional processing technology.”

“This is a major step forward for the Thunderbird deposit, and a terrific outcome for our shareholders.”

“Thunderbird is one of the largest and highest grade mineral sands deposits to be discovered in the last decade. These results underscore the world-class status of this important discovery and pave the way for scoping and pre-feasibility work to commence.”

**Metallurgical Testwork Results**

High quality mineral products were obtained via conventional Primary Concentration (gravity) Plant (PCP) and Mineral Separation Plant (MSP) processing, including magnetic, electrostatic and gravity separation techniques. Sizing analyses data indicate heavy mineral to be fine to medium grained with a median diameter (d50) of 75-90 microns. Modern processing techniques recover down to 38 microns.

A high-quality primary zircon product containing 66.2% ZrO<sub>2</sub> was produced, with product specifications tabulated below (Table1) and shown in Figure 1. This product is expected to attract premium pricing.

ZrO <sub>2</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	U ppm	Th ppm
66.2	0.05	0.06	0.10	320	221

**Table 1: Primary Zircon Specifications**

A primary ilmenite product assaying 48.3% TiO<sub>2</sub> with low levels of contaminants was obtained at a high recovery using a typical magnetic/electrostatic separation circuit. An upgrading stage utilizing a low temperature roast to reduce iron oxides produced an ilmenite product containing 57.7% TiO<sub>2</sub>, with chemistry comparable to existing sulphate ilmenite producers (Table 2).

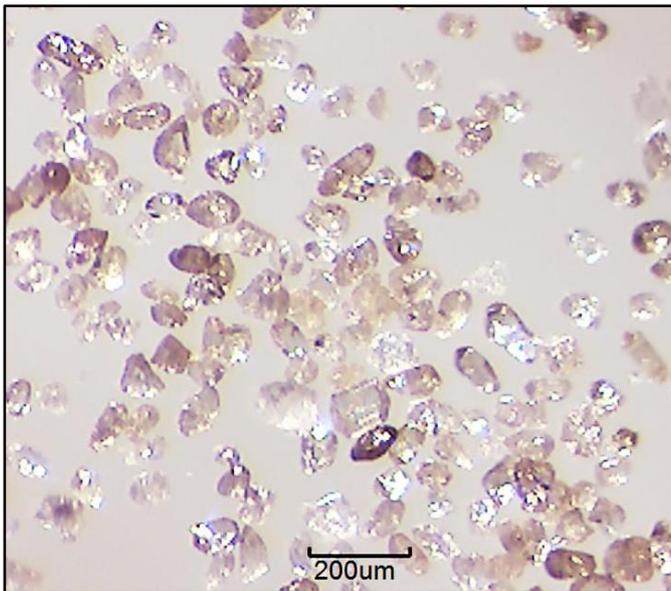
TiO <sub>2</sub> %	FeO %	Fe <sub>2</sub> O <sub>3</sub> %	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Cr <sub>2</sub> O <sub>3</sub> %	MgO %	MnO %	ZrO <sub>2</sub> %	CaO %
57.7	24.2	14.3	0.9	0.4	0.08	0.2	1.7	0.08	0.0

**Table 2: Ilmenite Product Specifications**

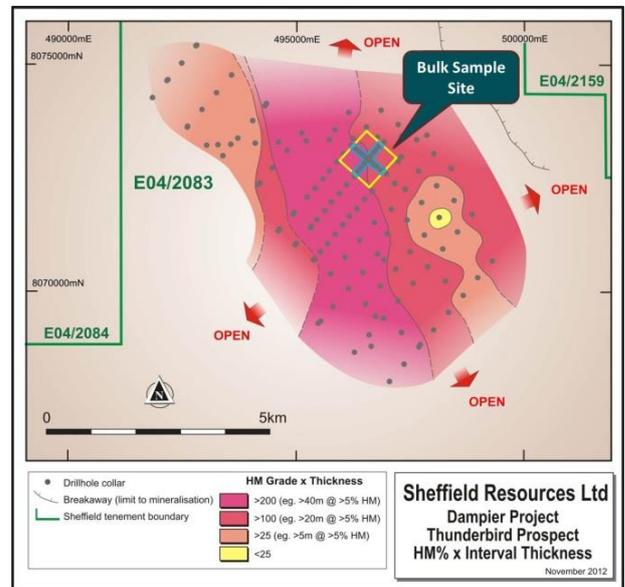
Products of rutile at 94.9% TiO<sub>2</sub>, leucoxene at 92.1% TiO<sub>2</sub>, and a secondary ilmenite at 60.1% TiO<sub>2</sub> were prepared. These also contain low levels of contaminants.

Processing indicates the Thunderbird slimes have a low clay content and exhibit high settling rates at low flocculant dosage rates of 20-30 grams per tonne. XRD analyses indicate 72% of the slimes consist of quartz and 24% kaolin. No smectite or smectite-bearing clays are present.

Analysis of the bulk sample head resulted in a HM grade of 7.7% containing 8.6% zircon. This represents a 15% higher HM content and 36% higher zircon content than that indicated by corresponding drill hole intervals (6.7% HM, 6.3% zircon). This difference requires further investigation, but is regarded as positive, in that it indicates the current resource estimate is potentially underestimating HM and zircon grades achievable through mineral processing.



**Figure 1: Photomicrograph of Thunderbird zircon product**



**Figure 2: Location of bulk sample**

### Metallurgical Testwork Methodology

The metallurgical testwork was undertaken by Robbins Metallurgical Pty Ltd, Brisbane using a six tonne bulk sample collected from the 2012 exploration drilling programme. The sample was composited from 31 aircore holes drilled at 60m spacing on a cross pattern near the central part of the deposit (Figure 2). These drill holes sampled the full width of the mineralised horizon at a visually estimated 2% HM cut-off.

The bulk sample was deslimed using conventional cyclones and processed through a 6 stage spiral (gravity) circuit. Heavy mineral concentrate (HMC) was then upgraded to +90%HM

concentrates via a two-stage wet, high-intensity magnetic separation (WHIMS), attritioning and gravity concentrate upgrade stages to produce magnetic and non-magnetic ilmenite and zircon/high TiO<sub>2</sub> concentrates, respectively.

Mineral products were obtained via conventional Mineral Separation Plant (MSP) processing techniques, including attritioning, magnetic, electrostatic and gravity separation techniques.

Whilst the testwork was optimised toward product quality, overall ZrO<sub>2</sub> and TiO<sub>2</sub> recoveries are considered acceptable, and further work will be directed at optimising recoveries.

### Thunderbird - a World Class HMS deposit

The Thunderbird deposit is one of the largest and highest grade mineral sands deposits to be discovered in the last decade. The deposit has Indicated and Inferred mineral resources at 2% HM cut-off totalling **1.37Bt @ 6.1% HM** for 83Mt of contained HM, including 5.7Mt of zircon, 1.3Mt of rutile, 3.6Mt of leucoxene and 24Mt of ilmenite.

The resource includes a coherent high grade core (at 7.5% HM cut-off) of **517Mt @ 10.1% HM** (Indicated and Inferred) containing 3.6Mt of zircon, 0.8Mt of rutile, 2.2Mt of leucoxene and 15.2Mt of ilmenite. This zone, which averages 20m thickness, represents an attractive target for initial development studies.

### About Thunderbird

Thunderbird is located on crown land (pastoral lease) in the central part of the Dampier Peninsula, close to existing ports, sealed highways, recent gas discoveries and abundant sources of unallocated fresh groundwater suitable for processing (Figure 4).

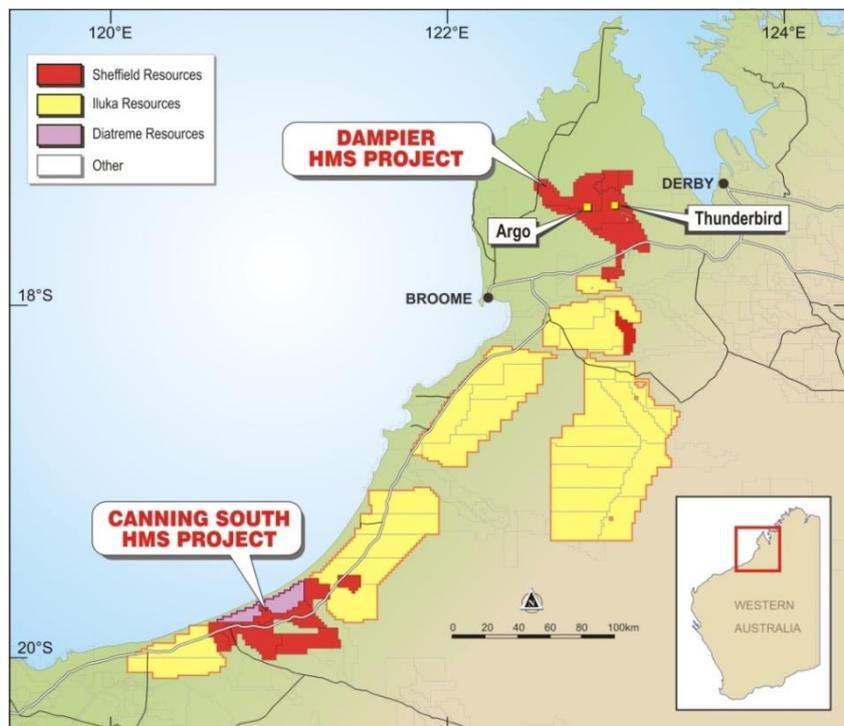


Figure 3: Location of Thunderbird deposit and Dampier Project tenements

The deposit has favourable geometry, occurring as a thick (up to 52m) shallowly-dipping sheet 7km x 5km in area, extending from surface and open in most directions. Due to the shallow dip of the deposit, approximately 40% of the total resource area has less than 3m of overburden.

Thunderbird is the first major mineral sands deposit to be discovered in the Canning Basin, which is emerging as a new mineral sands province. As an early mover, Sheffield has secured over 4,000km<sup>2</sup> of prospective tenure within the Canning Basin which it plans to explore for further large scale deposits.

### **Future Work**

Scoping studies have commenced and are expected to lead into pre-feasibility studies in Q3-Q4 2013.

A second drilling programme is planned to commence in June 2013 and will comprise infill and extension drilling at Thunderbird and an initial test of the Argo deposit, located 12km to the west. The infill drilling at Thunderbird is designed to increase the component of the deposit in the Indicated Resource category and to provide additional sample for metallurgical testing. Further metallurgical testwork is planned to optimise the processing flowsheet and obtain products for marketing.

Level two environmental survey work to support the environmental approvals process is due to commence in early April and is expected to take 12 months to complete.

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### **COMPETENT PERSONS' STATEMENT**

The information in this announcement that relates to resource estimation is based on information compiled by Mr Trent Strickland. Mr Strickland is a full time employee of Quantitative Group (QG) and a Member of the Australasian Institute of Mining and Metallurgy (AusIMM). Mr Strickland has sufficient experience in the minerals industry to satisfy the requirements to act as the competent person for this estimate as defined in the 2004 Edition of the Australasian Code for Reporting of Mineral Resources and Ore Reserves. Mr Strickland consents to the inclusion in this report of the Thunderbird Mineral Sands resource estimate.

The information in this announcement that relates to reporting of resource and exploration results is based on information compiled under the guidance of Mark Teakle. Mr Teakle is a full time employee of the Company. Mr Teakle is a Member of the Australasian Institute of Geoscientists and the Australasian Institute of Mining and Metallurgy and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and the activity to which they are undertaking to qualify as Competent Person as defined in the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves ("JORC Code")'. Mr Teakle consents to the inclusion in the report of the matters based on their information in the form and context in which it appears.

### **FORWARD LOOKING STATEMENTS**

Some statements in this announcement regarding estimates or future events are forward-looking statements. They involve risk and uncertainties that could cause actual results to differ from estimated results. Forward-looking statements include, but are not limited to, statements concerning the Company's exploration programme, outlook, target sizes and mineralised material estimates. They include statements preceded by words such as "expected", "planned", "target", "scheduled", "intends", "potential", "prospective", "strategy" and similar expressions.

## ABOUT SHEFFIELD RESOURCES

Sheffield Resources Limited (**Sheffield**) is a rapidly emerging heavy mineral sands (HMS) company.

ASX Code – SFX

Market Cap @ 69cps - \$70.1m

Issued shares – 101.7m

Cash - \$6.0m (at 31/12/2012)

The Company has over 6,000km<sup>2</sup> of highly prospective tenure, all situated within the state of Western Australia.

### HEAVY MINERAL SANDS

The Dampier project, located near Derby in WA's Kimberley region, contains the global scale, high grade zircon-rich Thunderbird HMS deposit.

The Eneabba project comprises multiple HMS deposits and is located near Eneabba approximately 140km south of the port of Geraldton in WA's Mid-West region.

Sheffield is also evaluating the large McCalls chloride ilmenite project, located 110km to the north of Perth.

### NICKEL-COPPER

Sheffield's 525km<sup>2</sup> Red Bull project is located in the highly prospective Fraser Complex within 20km of Sirius Resources NL's (ASX:SIR) Nova Ni-Cu discovery. Targets include three strong bedrock conductors which the Company intends to drill in Q2 2013.

### IRON

Sheffield has identified iron mineralisation on four of its tenements in the Pilbara iron ore province. Thick hematite mineralisation was intersected in first pass RC drilling at the Three Pools project, 20km north of Newman.