



LARGE HIGH GRADE MAIDEN RESOURCE FOR THUNDERBIRD HMS DEPOSIT

KEY POINTS

- **Mineral Resource for Thunderbird of 1.37 billion tonnes (Bt) @ 6.1% heavy mineral (HM) (Indicated and Inferred) containing 5.7 million tonnes (Mt) zircon, 1.3Mt rutile, 3.6Mt leucoxene and 24Mt ilmenite**
- **Includes a higher grade component of 517Mt @ 10.1% HM (Indicated and Inferred)**
- **Thunderbird is a globally significant discovery defining a new mineral sands province**
- **Metallurgical testwork (due Q1 2013) to pave the way for scoping studies to commence in Q2 2013**

Mineral sands explorer Sheffield Resources (“Sheffield”) (ASX:SFX) today announced a maiden mineral resource of **1.37Bt @ 6.1% HM** (Indicated and Inferred) for **83Mt of contained HM** for the Thunderbird prospect at its Dampier heavy mineral sand (HMS) Project near Derby in the Kimberley Region of Western Australia (Figure 1, Tables 1-3).

Table 1: Thunderbird Prospect Mineral Resource¹ Summary

Resource Category	Cut-off HM%	Mineral Resources		Valuable HM Grade (In-situ) ²			
		Material Million Tonnes ³	HM %	Zircon %	Rutile %	Leucoxene %	Ilmenite %
Indicated	2.0	299	7.2	0.50	0.11	0.31	2.1
Inferred	2.0	1,075	5.8	0.40	0.09	0.25	1.7
Total	2.0	1,374	6.1	0.42	0.10	0.26	1.8
Indicated	7.5	137	11.5	0.79	0.18	0.49	3.3
Inferred	7.5	379	9.6	0.66	0.15	0.41	2.8
Total	7.5	517	10.1	0.70	0.16	0.44	2.9

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. The in-situ valuable heavy mineral (VHM) grades² for this zone of **0.70% zircon, 0.16% rutile, 0.44% leucoxene and 2.9% ilmenite** place Thunderbird within the top tier of HMS deposits globally.

Thunderbird is the first major mineral sands deposit to be discovered in the Canning Basin, which is emerging as an important new mineral sands province and is favourably located close to Asian markets. As an early mover, Sheffield has secured over 4,000km² of prospective tenure within the Canning Basin which it plans to aggressively explore for further large scale deposits (Figure 1).

¹ Data is sourced from Tables 2 & 3 (below).

² The In-situ grade is determined by multiplying the percentage of HM by the percentage of each valuable heavy mineral within the heavy mineral assemblage.

³ Tonnes have been rounded to reflect the relative uncertainty of the estimate.

Thunderbird is one of two HMS occurrences within Sheffield's Dampier Project (Figure 1), located on crown land (pastoral lease) on the Dampier Peninsula about 60km west of the port at Derby, and 25km north of the sealed Great Northern Hwy joining Derby and Broome.

Managing Director, Bruce McQuitty said the Thunderbird resource has exceeded expectations.

"Thunderbird has a large tonnage, high grade resource close to surface - these three qualities position Thunderbird as a globally significant mineral sands deposit."

"To deliver such a large maiden resource within 15 months of the grant of the tenement is a great achievement by our exploration team and an outstanding result for our shareholders. We are grateful to all stakeholders, including the Traditional Owners for facilitating heritage and environmental surveys to achieve this outcome."

"The next key milestone, expected in Q1 2013, is results of metallurgical testwork, currently being performed on a six tonne bulk sample from Thunderbird. Results from this work will pave the way for Scoping Studies to commence in Q2 2013."

"Importantly, the mineralisation at Thunderbird remains open in all directions. Next year's drilling campaign will target extensions to the deposit and provide an initial test of the Argo deposit, located 12km to the west."

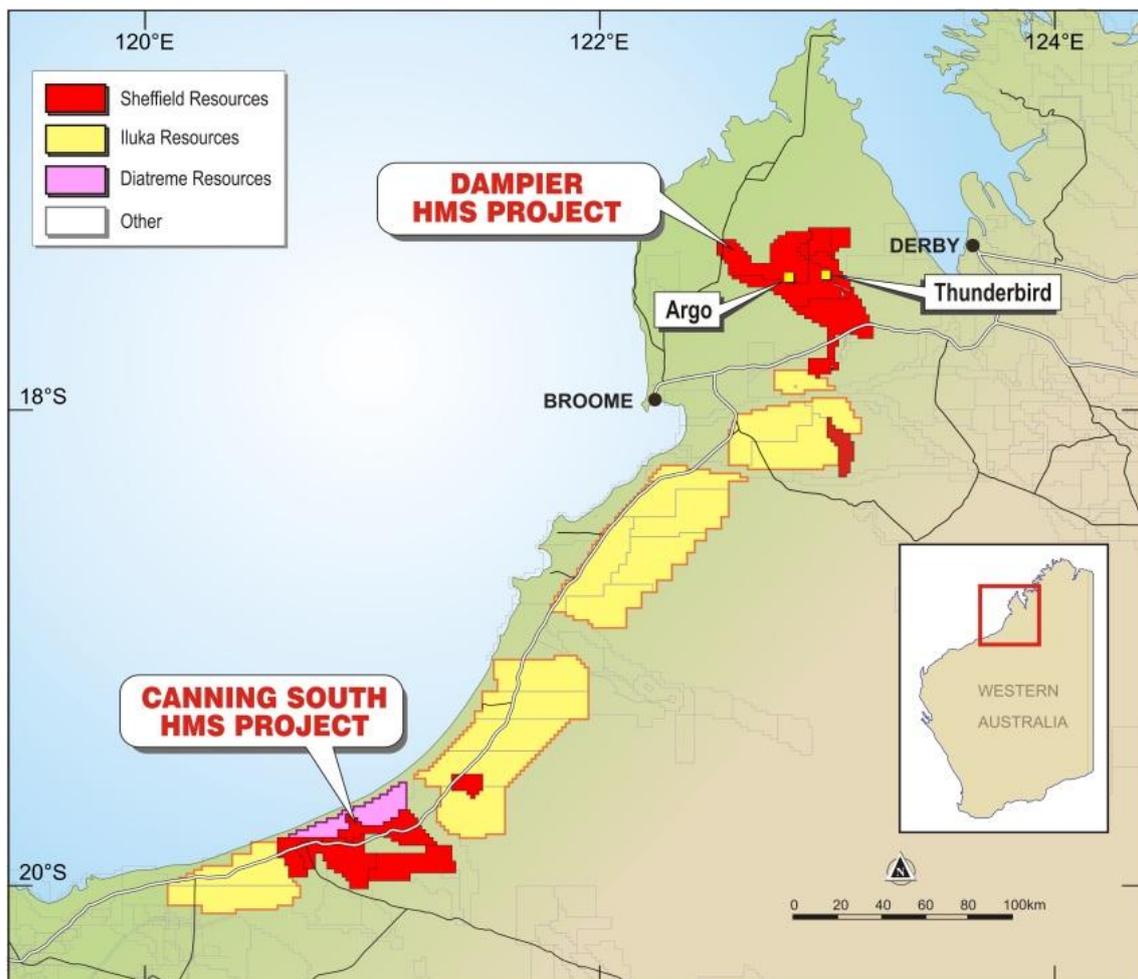


Figure 1: Location of the Thunderbird Deposit & Sheffield's tenement holding in the Canning Basin

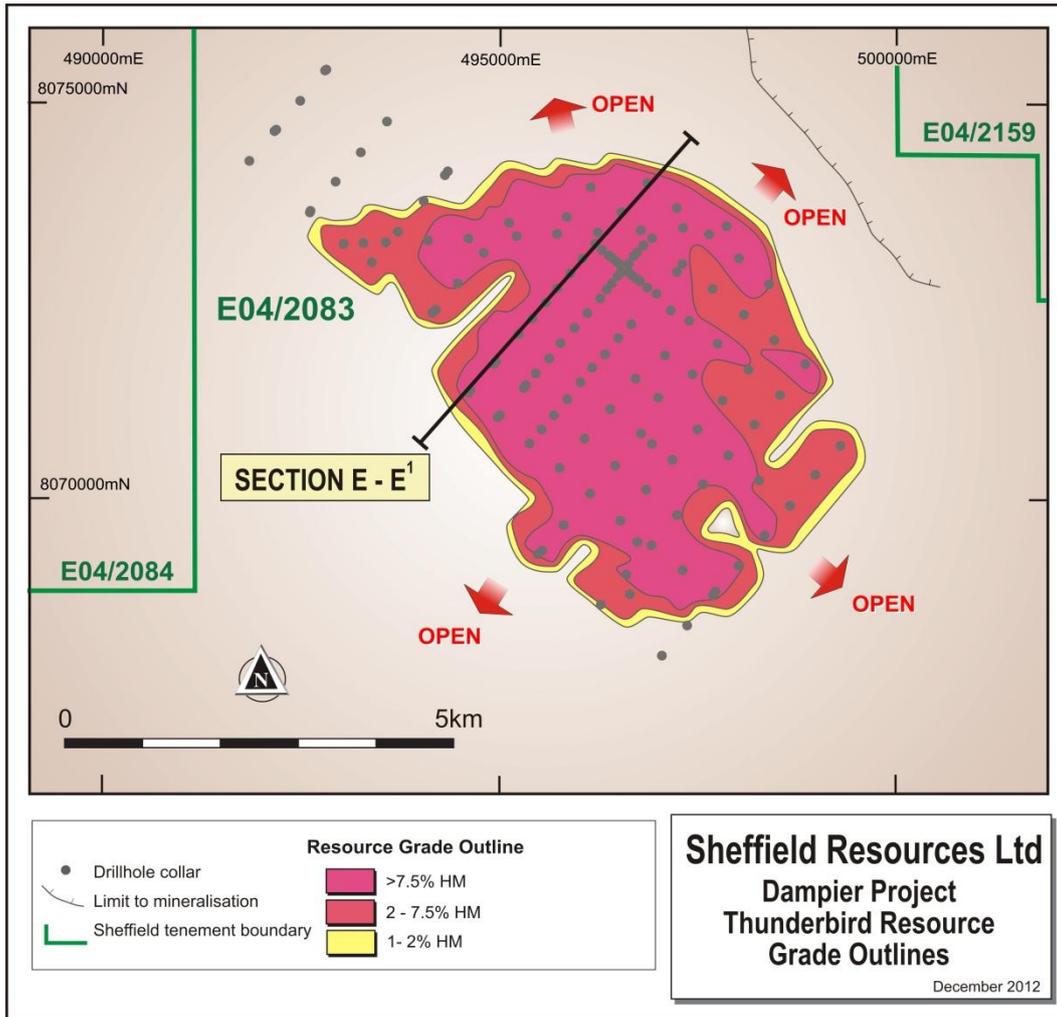


Figure 2: Thunderbird resource grade outline plan

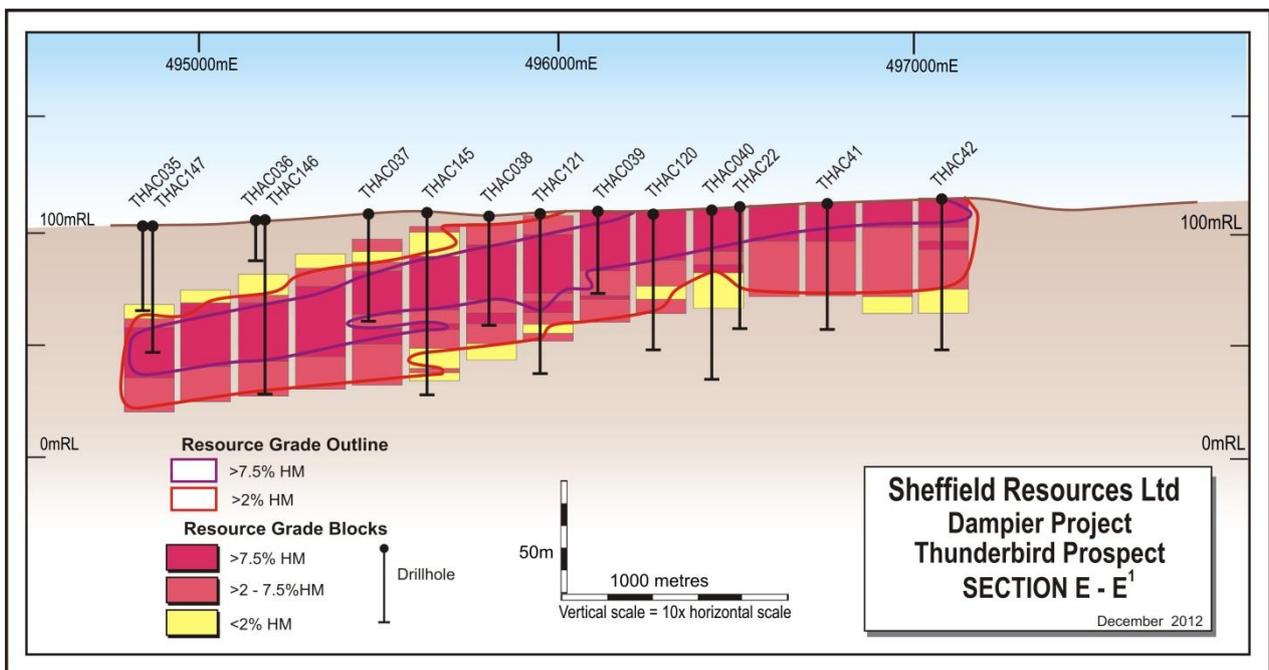


Figure 3: Section E-E¹ through the Thunderbird resource, showing the change in cover thickness as the dip of mineralisation increases to the south-west

About the Thunderbird Deposit

Thunderbird's maiden mineral resource is based on data from Sheffield's 2012 aircore drilling programme of 164 drill holes for 7,517m, which targeted the prospect over an 8km strike length.

At 2% HM cut-off the mineralisation covers an area about 7km x 5km, and remains open in all directions. The mineralisation occurs in a thick, shallowly southwesterly-dipping, sheet-like body extending from surface to a maximum depth of 94m. The average depth to the top of mineralisation is 17m and the average mineralised thickness is 38m (see cross section Figure 3). Significantly, the dip of the deposit rolls over from flat to low angle along the north-eastern half, to moderate along the south-western half, resulting in around 40% of the total resource area occurring within 3m of surface.

The mineral assemblage, as determined by QEMSCAN, comprises 42% of the total heavy mineral (THM) as valuable heavy mineral (VHM).

Thunderbird is hosted in deeply weathered Cretaceous-aged formations and is interpreted to represent a sub-wave base style of deposit.

Further Work

Results of initial metallurgical testwork on a six tonne bulk sample collected as part of the 2012 exploration programme are expected to be available during Q1 2013. This will be followed by scoping work and further drilling during Q2-Q3 2013.

ENDS

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COMPETENT PERSONS' STATEMENT

¹The 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.

²The 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 @ 49.5cps - \$48.8m

Issued shares – 98.6m

Cash - \$7.3m (at 30/9/2012)

The Company has over 6,000km² 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 large, 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 525km² Red Bull project is located in the highly prospective Fraser Complex within 20km of Sirius Resources NL's (ASX:SIR) Nova Ni-Cu discovery.

IRON

Sheffield has identified iron mineralisation on three 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.

Table 2: Thunderbird prospect Mineral Resource (at 2% and 7.5% HM cut-off)¹

Resource Category	Cut off (HM%)	Mineral Resources					Mineral Assemblage ²				
		Material (Mt)*	Bulk Density	HM %	Slimes % ³	Osize %	In-situ HM (Mt)*	Zircon %	Rutile %	Leuc. %	Ilmenite %
Indicated	2.0	299	2.1	7.2	19	14	21.5	6.9	1.6	4.3	29
Inferred	2.0	1,075	2.1	5.8	17	16	61.9	6.9	1.6	4.3	29
Total	2.0	1,374	2.1	6.1	17	15	83.4	6.9	1.6	4.3	29
Indicated	7.5	138	2.1	11.5	18	16	15.8	6.9	1.6	4.3	29
Inferred	7.5	379	2.1	9.6	16	19	36.5	6.9	1.6	4.3	29
Total	7.5	517	2.1	10.1	16	18	52.3	6.9	1.6	4.3	29

Table 3: Thunderbird prospect contained Valuable HM (VHM) Resource Inventory (at 2% and 7.5% HM cut-off)

Resource Category	Cut off (HM%)	Zircon (kt)*	Rutile (kt)*	Leuc. (kt)*	Ilmenite (kt)*	Total VHM (kt)*
Indicated	2.0	1,483	344	924	6,256	9,007
Inferred	2.0	4,270	990	2,661	18,007	25,927
Total	2.0	5,753	1,334	3,585	24,262	34,934
Indicated	7.5	1,089	252	678	4,592	6,611
Inferred	7.5	2,521	585	1,571	10,631	15,307
Total	7.5	3,609	837	2,249	15,223	21,918

*Tonnes have been rounded to reflect the relative uncertainty of the estimate.

¹ This estimate is classified and reported in a manner compliant with the JORC code and guidelines (JORC, 2004). ² The Mineral Assemblage is represented as the percentage of the Heavy Mineral (HM) component of the deposit, as determined by QEMSCAN. TiO₂ minerals defined according to the following ranges: Rutile >95% TiO₂; Leucoxene 70-95% TiO₂; Ilmenite 40-70% TiO₂.

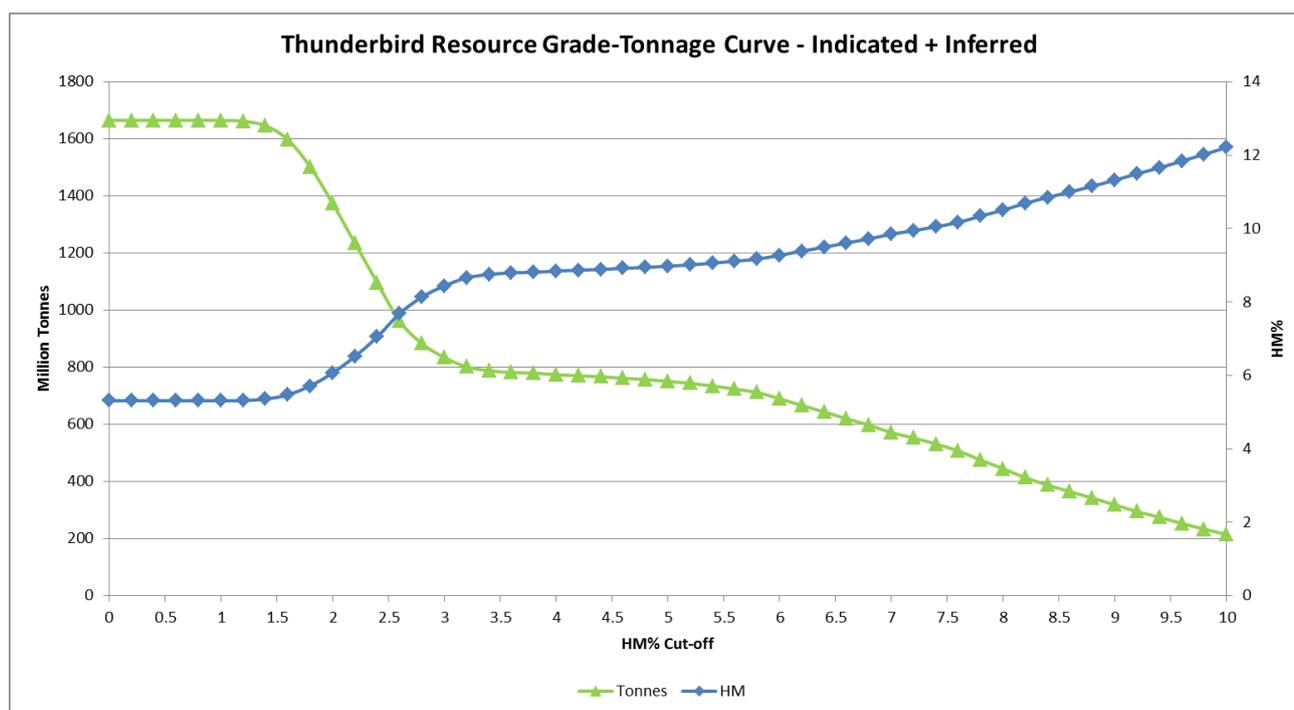


Figure 4: Thunderbird resource grade-tonnage curve.

ANNEXURE 1 – TECHNICAL DETAILS

The Dampier Project area was originally explored by Rio Tinto during 2003-2009, identifying two areas of HM mineralisation from limited drilling along existing tracks. Following a review of Rio Tinto's results, Sheffield applied for tenement E04/2083 in December 2010, which was subsequently granted in September 2011.

From July 2012, Sheffield completed a 164-hole drilling program over the Thunderbird prospect on spacing ranging from 60m apart on two short lines (for geostatistical and QAQC evaluation), to 250m x 500m, 500m x 500m and 1km x 1km (Figure 2). Holes were drilled as NQ-sized aircore for a total of 7,517m; 5,476 samples were collected (including QAQC). These drillholes were used in the resource estimate, no historic drillholes or data were considered.

Drill hole locations were surveyed by RTK-GPS using licenced surveyors. To account for topographic changes between sections, all drill hole RL (height) data was projected to a digital elevation model (DEM) generated from spot data supplied by Landgate (accuracy +/- 1.5m) and discretised to 20m x 20m. This DEM was subsequently used in the resource estimation process to provide a consistent land surface between drill holes.

Heavy mineral (HM), slimes and oversize (Osize) determinations were by Heavy Liquid Separation (HLS) to determine slimes (-45µm), HM (+45µm / -1mm) and oversize (+1mm), with static separation in TBE (SG 2.96).

The data were domained for the estimate using a combination of grade and geological factors driven by deposit continuity into low grade (1.1% HM) and high grade (5% HM) domains (see Annexure 2 for further detail).

Bulk Density was determined using an industry-standard formula which assumes density and proportionately accounts for the grain size and mineral component of the material.

The mineral assemblage of the resource was determined from results of QEMSCAN analysis by Bureau-Veritas of 83 Heavy Mineral Concentrate (HMC) composite samples collected throughout the deposit. The QEMSCAN process uses observed mass and chemistry to classify particles according to their average chemistry, and then report mineral abundance by % mass. For TiO₂ minerals at Thunderbird specific breakpoints are used to distinguish between rutile (>95% TiO₂), leucoxene (70-95% TiO₂) and ilmenite (40-70% TiO₂). These breakpoints are chosen to best reflect the mineral assemblage expected from conventional mineral separation processing techniques, based on Sheffield's observations of the deposit and composite material.

At Thunderbird, the composites are known to contain aggregated material (<1mm in size) which does not contain significant amounts of valuable HM (zircon, rutile, leucoxene, and ilmenite). In order to focus the QEMSCAN study on the valuable HM minerals, all composites were first screened at 212µm and the -212µm material submitted for QEMSCAN analysis. The +212µm fraction was recorded by weight as a percentage of the original sample, and then this value added back to the mineral mass % of the -212µm to balance the total mass % reported for each composite.

Resource estimation was by Mr Trent Strickland from Quantitative Group (QG), an internationally recognised, independent consultancy group specialising in resource evaluation. Details of the estimation methodology are contained in Annexure 2.

The resource is quoted at a 2% HM and 7.5% cut-off to reflect the variation in tonnes and grade of the deposit (Figure 4). At a 2% cut-off, the resource extends from surface to a maximum depth of 94m over an area 7km along strike x 5km across (maximum), with an average thickness of 38m and average cover thickness of 17m. At a 7.5% cut-off, the resource extends from surface to a maximum depth of 82m over an area 6km along strike x 4km across (maximum), with an average thickness of 20m and average cover thickness of 23m. Significantly, the dip of the deposit rolls over from flat to low angle along the north-eastern half, to moderate along the south-western half, resulting in around 40% of the total resource area occurring within 3m of surface.

ANNEXURE 2 – ESTIMATION METHODOLOGY



Quantitative Group
Our Skills On *Your* Team™

Sheffield Resources Ltd
14 Prowse Street
West Perth WA 6005

Attention: Mr Bruce McQuitty

17th December 2012

Geostatistics
Resources & Reserves
Reconciliation & Grade Control
Audit and Due Diligence
Strategic Mine Planning
Geometallurgical Modelling
Mine Geology
Training

Dear Sir,

Re: Thunderbird Mineral Sands Deposit Resource Estimate

The Mineral Resource estimate of the Thunderbird Mineral Sands deposit as of the 17th of December 2012 is presented in the attached tables (Table 1 and 2).

The estimate was prepared 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 the report of the Thunderbird Mineral Sands resource estimate.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Trent Strickland', is placed over a white rectangular background.

Trent Strickland
Senior Consultant

ANNEXURE 2 – ESTIMATION METHODOLOGY



Quantitative Group
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Geostatistics
Resources & Reserves
Reconciliation & Grade Control
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Technical Notes on Mineral Resource Estimation

A 1.1% heavy mineral (HM) grade domain was defined to model the low grade mineralisation and a 5.0% HM domain to model the high grade mineralisation. HM grade was used along with specific geological considerations to define the domain wireframe. The robustness of these domains was assessed by QG using a variety of measures including statistical and geostatistical analysis and by critically examining the geological interpretation. The domains are considered geologically robust in the context of the resource classification applied to the estimate.

Estimation of HM%, slime % and oversize % was by Ordinary Kriging (OK) and the search (or 'neighbourhood') employed was optimised using Quantitative Kriging Neighbourhood Analysis (QKNA). Density was assigned globally to the estimated domains.

Mineral assemblage results from 83 Heavy Mineral Concentrate (HMC) composites totalling 931.5m, intersected both the high grade and low grade domains. All results were weighted by the interval length, averaged and assigned to both domains to represent the heavy mineral assemblage within the Thunderbird deposit. Any composite with more than 50% of its length located outside of the domain wireframes was excluded from the dataset.

The estimate was validated by QG as follows:

- A visual checking of the interpolation results in both plan and section;
- Global input vs. output statistics were compared, including clustered and declustered composites; and
- Semi-local input vs. output statistics using moving window averages.

The estimate was considered to be robust on the basis of the above checks.

Classification of the Thunderbird estimate takes into account all aspects of the integrity of the estimate, including: data quality, geological interpretation, domaining approach, data distribution and density, spatial continuity and estimation confidence. The centre of the estimate is classified as Indicated, surrounded by a broader area of Inferred material.

The following tables summarise the Mineral Resource estimate at a cut-off of 2% HM (Table 1) and 7.5% HM (Table 2).

ANNEXURE 2 – ESTIMATION METHODOLOGY



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Strategic Mine Planning
Geometallurgical Modelling
Mine Geology
Training

Mineral Resource Category	Material Million Tonnes*	Bulk Density	HM %	Slimes %	Osize %	In-situ HM Million Tonnes*
Indicated	299	2.1	7.2	19	14	21.5
Inferred	1,075	2.1	5.8	17	16	61.9
TOTAL	1,374	2.1	6.1	17	15	83.4

Mineral Resource Category	In-situ HM Million Tonnes*	Mineral Assemblage (% of HM Tonnes)				
		Zircon	Rutile	Leucoxene	Ilmenite	Total VHM
Indicated	21.5	6.9	1.6	4.3	29	42
Inferred	61.9	6.9	1.6	4.3	29	42
TOTAL	83.4	6.9	1.6	4.3	29	42

*Tonnes have been rounded to reflect the relative uncertainty of the estimate.

¹ The Mineral Assemblage is represented as the percentage of the Heavy Mineral (HM) component of the deposit, as determined by QEMSCAN. TiO₂ minerals defined according to the following ranges: Rutile >95% TiO₂; Leucoxene 85-95% TiO₂; Ilmenite <55-85% TiO₂.

Table 1. Thunderbird resource estimate at a 2% HM cut-off.

Mineral Resource Category	Material Million Tonnes*	Bulk Density	HM %	Slimes %	Osize %	In-situ HM Million Tonnes*
Indicated	138	2.1	11.5	18	16	15.8
Inferred	379	2.1	9.6	16	19	36.5
TOTAL	517	2.1	10.1	16	18	52.3

Mineral Resource Category	In-situ HM Million Tonnes*	Mineral Assemblage (% of HM Tonnes)				
		Zircon	Rutile	Leucoxene	Ilmenite	Total VHM
Indicated	15.8	6.9	1.6	4.3	29	42
Inferred	36.5	6.9	1.6	4.3	29	42
TOTAL	52.3	6.9	1.6	4.3	29	42

*Tonnes have been rounded to reflect the relative uncertainty of the estimate.

¹ The Mineral Assemblage is represented as the percentage of the Heavy Mineral (HM) component of the deposit, as determined by QEMSCAN. TiO₂ minerals defined according to the following ranges: Rutile >95% TiO₂; Leucoxene 85-95% TiO₂; Ilmenite <55-85% TiO₂.

Table 2. Thunderbird resource estimate at a 7.5% HM cut-off.