ASX and Media Release

12 December 2014

THUNDERBIRD HIGH GRADE RESOURCE SURPASSES ONE BILLION TONNES

KEY POINTS

- **46% increase in high grade component of resource to 1.08 billion tonnes (Bt) @ 11.8% heavy mineral (HM) (Measured, Indicated and Inferred)**
- **Thunderbird Project economics expected to be strongly enhanced by new high grade resources added in shallow up-dip region of deposit**
- **Total mineral resource for Thunderbird now stands at 3.2Bt @ 6.8% HM (Measured, Indicated and Inferred), containing 95 million tonnes (Mt) of valuable heavy mineral**
- **Improved confidence levels: 82% of total mineral resource in Measured and Indicated categories**
- **Thunderbird one of the largest accumulations of zircon in the world**
- **Resource sets an exceptional foundation for Pre-Feasibility Study scheduled for Q1 2015**

Mineral sands company Sheffield Resources ("Sheffield") (ASX:SFX) today announced an updated mineral resource of **3.205Bt @ 6.8% HM** (Measured, Indicated and Inferred) for the Thunderbird heavy mineral sand (HMS) Project near Derby in north-west Western Australia (Figure 1, Tables 1-3).

Table 1: Thunderbird Deposit Mineral Resource[1] Summary

		Mineral Resources		Valuable HM Grade (In-situ)[2]			
Resource Category	Cut-off HM%	Material Million Tonnes[3]	HM %	Zircon %	HiTi Leucoxene %	Leucoxene %	Ilmenite %
Measured	3.0	75	7.9	0.71	0.21	0.19	2.4
Indicated	3.0	2,550	7.0	0.60	0.19	0.22	2.0
Inferred	3.0	580	5.6	0.47	0.16	0.20	1.5
Total	**3.0**	**3,205**	**6.8**	**0.58**	**0.19**	**0.21**	**1.9**
Measured	7.5	35	12.7	1.1	0.32	0.27	3.7
Indicated	7.5	920	11.9	0.93	0.29	0.26	3.3
Inferred	7.5	125	10.8	0.83	0.25	0.24	3.0
Total	**7.5**	**1,080**	**11.8**	**0.92**	**0.28**	**0.25**	**3.3**

This compares with the previous March 2014 mineral resource of 2.62Bt @ 6.5% HM (Measured, Indicated & Inferred) at 3% HM cut-off (see Figure 1 and ASX release dated 19 March 2014).

The updated resource includes a coherent high grade zone of **1.080Bt @ 11.8% HM** at 7.5% HM cut-off (Measured, Indicated and Inferred), containing **10.0Mt of zircon, 3.1Mt of high-titanium leucoxene, 2.8Mt of leucoxene and 36Mt of ilmenite**.

[1] Data is sourced from Appendix 2, and also presented in Tables 2 & 3 (below). Refer to Appendix 1 for further information.
[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 and grades have been rounded to reflect the relative uncertainty of the estimate, thus the sum of columns may not equal.

The high in-situ valuable heavy mineral (VHM) grades for this zone of 0.92% zircon, 0.28% high-titanium leucoxene, 0.25% leucoxene and 3.3% ilmenite place Thunderbird in the top tier of mineral sands deposits globally.

The resource includes a significant new high grade component in the near-surface, up-dip region of the deposit (Figure 2). This component, comprising 95Mt @ 12.0% HM (Indicated) and 25Mt @ 12.2% HM (Inferred) (at 7.5% HM cut-off) containing 1.1Mt of zircon and 3.7Mt of ilmenite, is expected to further enhance the already robust project economics.

The Thunderbird Scoping Study, released on 14 April 2014, showed the project has the potential to generate consistently strong cash margins from globally significant levels of production over an initial 32-year mine life.

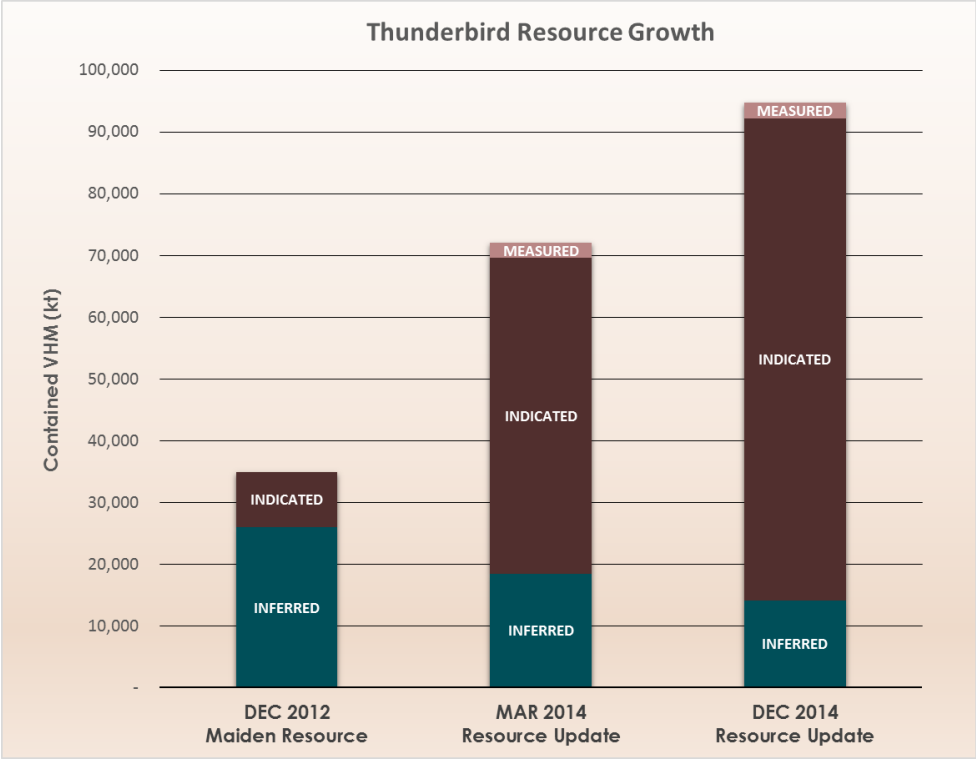

Figure 1: Thunderbird Resource Growth

Managing Director Bruce McQuitty said the resource update represented an exceptional foundation for the Thunderbird Pre-Feasibility Study (PFS), due for completion in Q1 2015.

"We are delighted to have achieved two important objectives. Firstly, we have added shallow, high grade resources in the up-dip region and, subject to optimisation studies, this is expected to add more years of high grade feed to the front end of the mining schedule.

"Secondly, we have substantially increased the Indicated Resource component. The Scoping Study excluded Inferred Resources, most of which have now been upgraded to the Indicated Resource category and will be incorporated in the PFS.

"In addition, the high grade component of the resource has increased by 46% to more than one billion tonnes.

"The contained zircon of the total Resource now stands at 19.3 million tonnes, making Thunderbird one of the largest accumulations of zircon in the world.

"This resource update is another outstanding achievement by our exploration team who have delivered two resource updates this year."

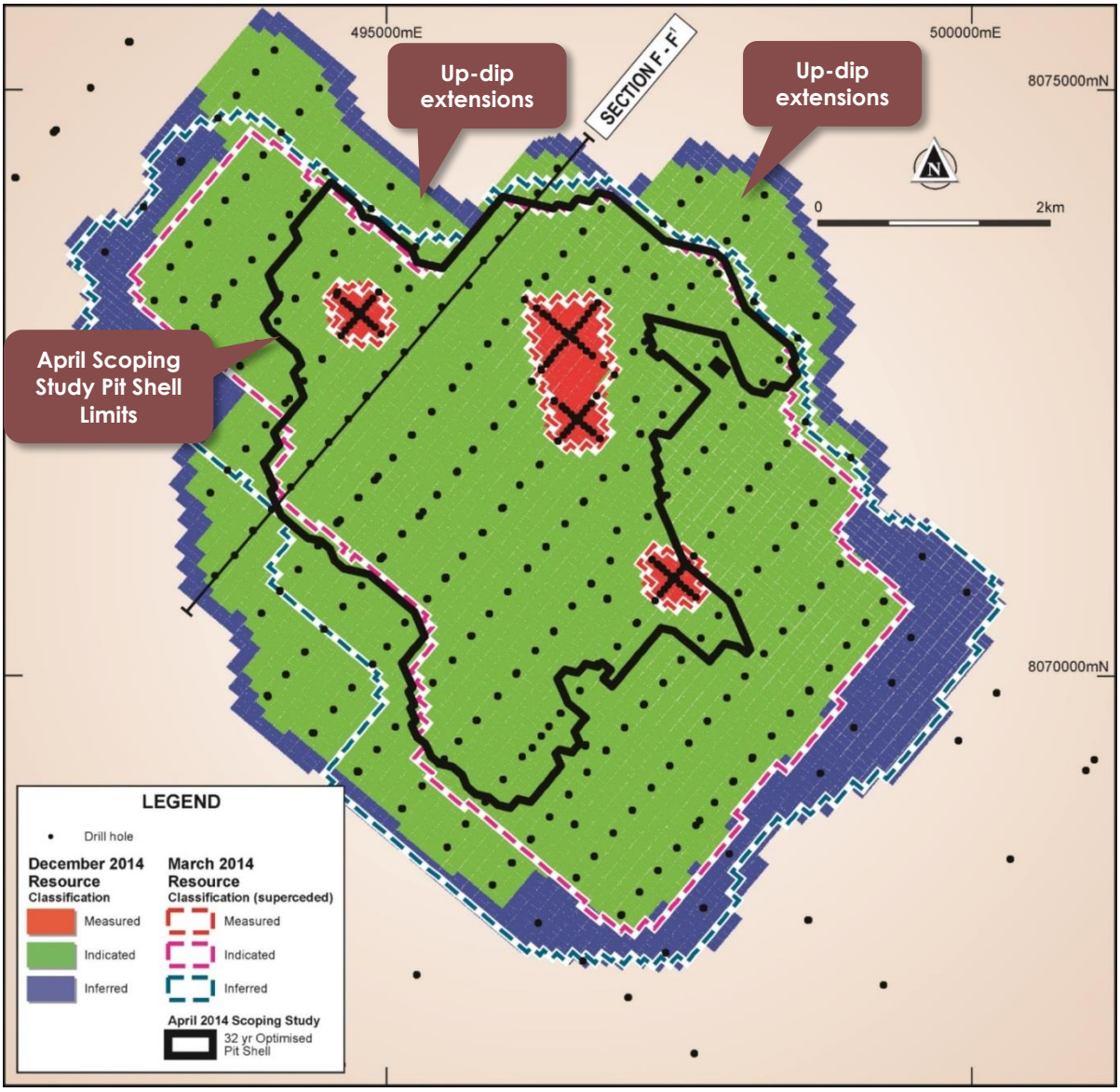

Figure 2: Thunderbird Resource block model resource category plan, and comparison with March 2014 resource category boundaries and April 2014 Scoping Study 32 year pit shell

The Thunderbird deposit has several attributes which favour large scale mining. Mineralisation occurs as a gently-dipping, thick, broad sheet-like body. A high grade zone (+7.5% HM) averaging 15m thickness is encased within a halo of lower grade (+3% HM) mineralisation averaging 43m thickness (Figures 3 and 4). In the north-east sector of the deposit, the upper part of the mineralised sequence has been eroded, leaving an extensive zone of high grade mineralisation with minimal overburden. Sheffield is prioritising this area of the deposit for early production years.

The April 2014 Scoping Study, based on the previous Resource, indicated a very low waste-to-ore ratio of 0.2:1 for the first 10 years and 0.6:1 for the life of mine (32 years).

The continuity of high grade mineralisation is exceptionally strong, with high grade zircon (+0.9%) and titanium mineralisation (+3.0%) occurring as coherent bodies (Figures 5-7).

The shallower half of the deposit has higher in-situ VHM grades, while the overall mineralised package thickens down-dip (Figures 3, 5 and 6).

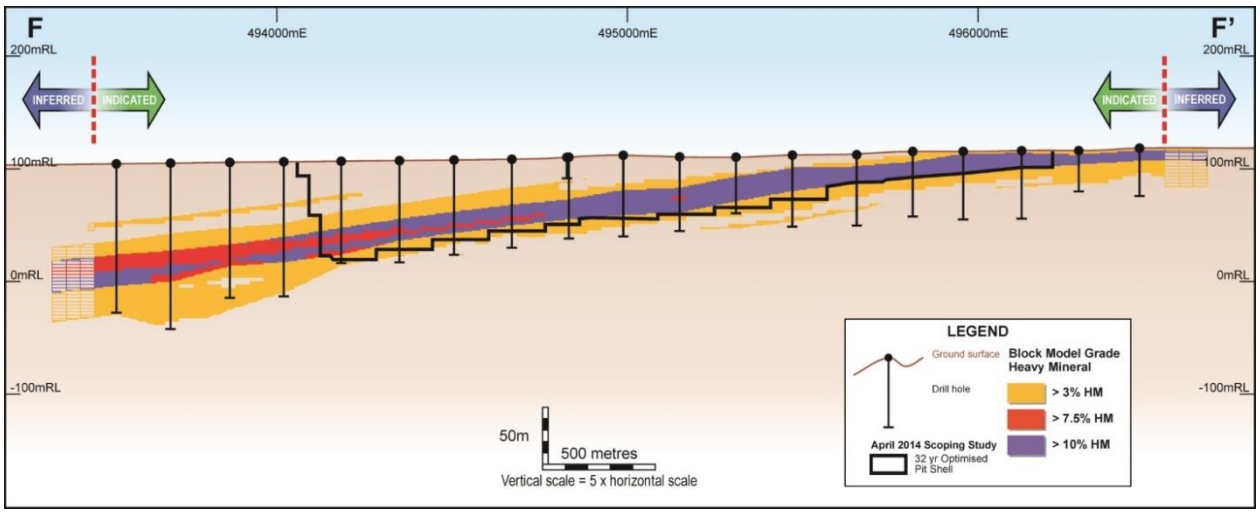

Figure 3: Cross-section F-F' through the Thunderbird resource block model showing the current Resource HM grade and April 2014 Scoping Study 32-Year pit shell outline

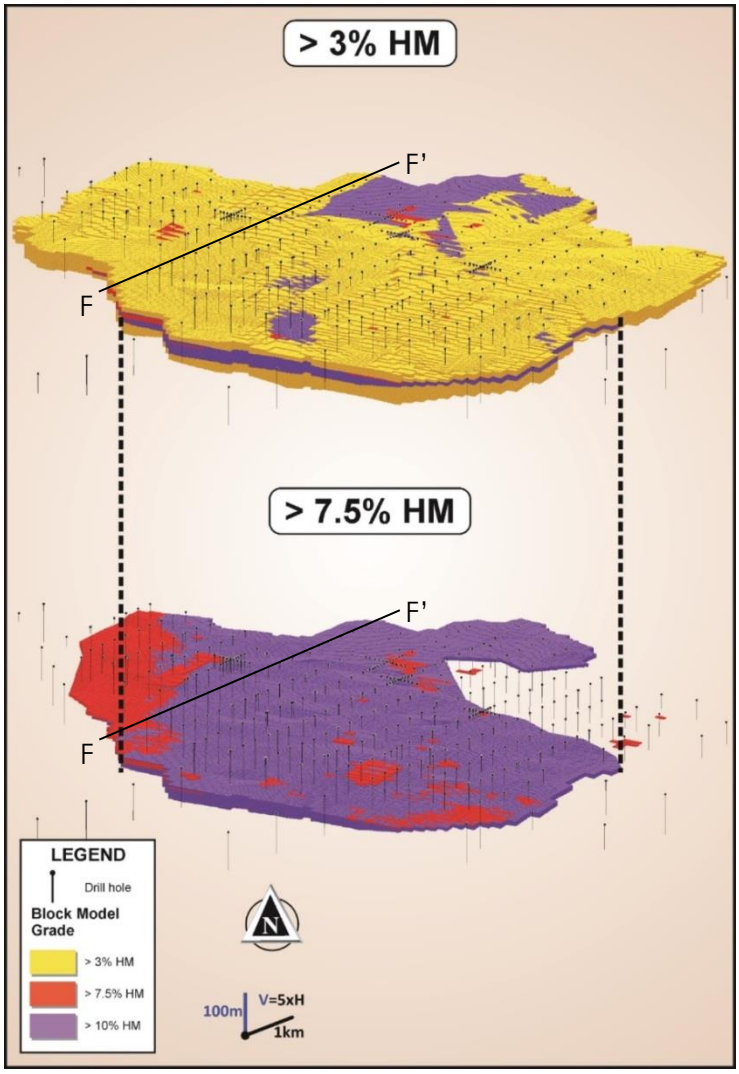

Figure 4: Thunderbird Resource block model HM grade at 3% and 7.5% HM cut-off, orthogonal view (looking north)

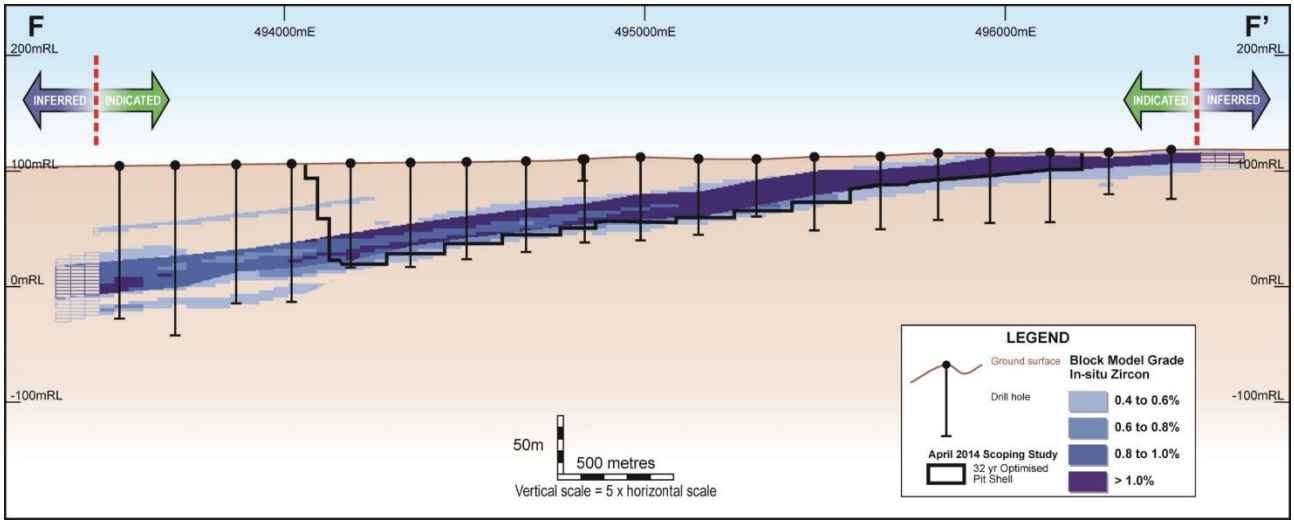

Figure 5: Cross-section F-F' through the Thunderbird resource block model showing the current Resource Zircon grade and April 2014 Scoping Study 32-Year Pit Shell Outline

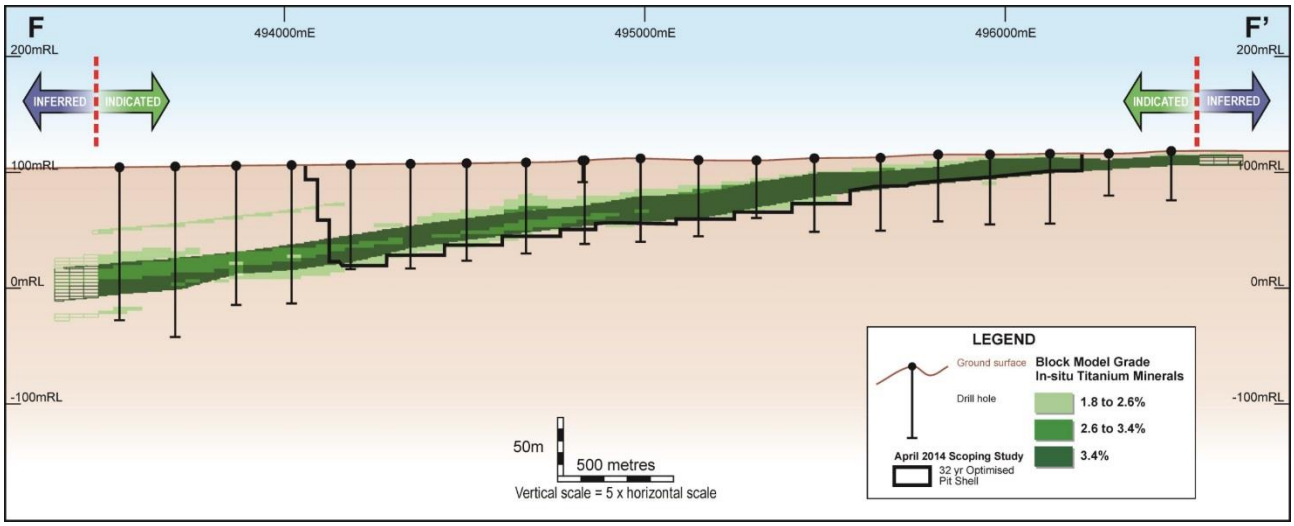

Figure 6: Cross-section F-F' through the Thunderbird Resource block model with the current Resource Titanium minerals grade and April 2014 Scoping Study 32-Year Pit Shell Outline

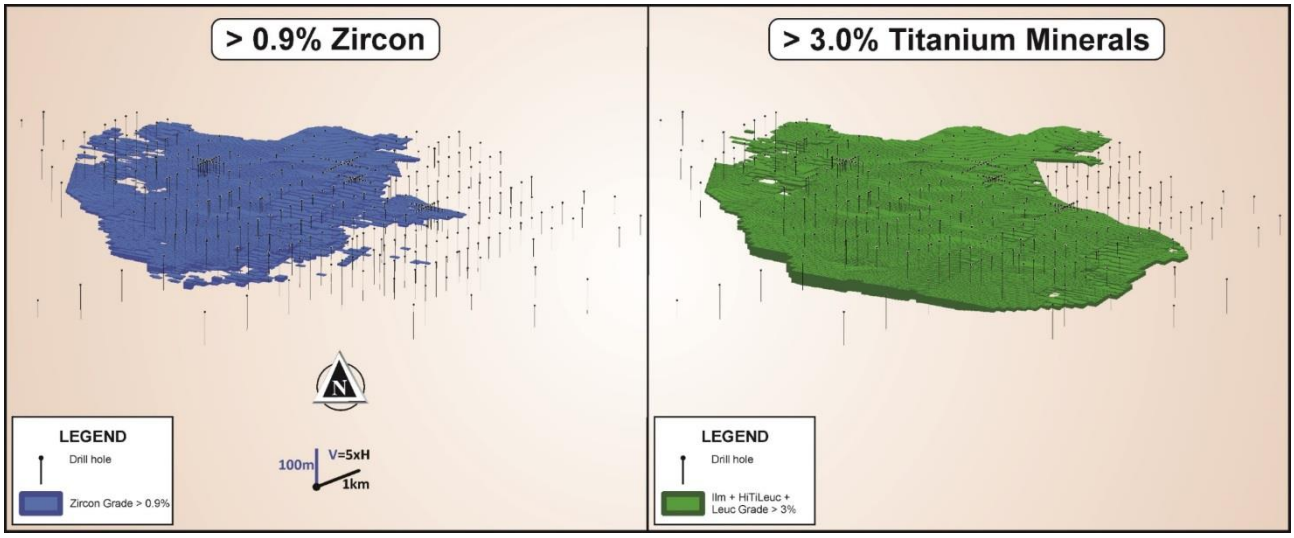

Figure 7: Thunderbird Resource block model >0.9% in-situ zircon left and >3% TiO_2 minerals right

About the Thunderbird Deposit

The Thunderbird deposit is located on the Dampier Peninsula about 60km west of Derby, and 25km north of the sealed Great Northern Hwy joining Derby and Broome (Figure 8).

Thunderbird is the first major mineral sands deposit to be discovered in the Canning Basin, which is rapidly emerging as an important new mineral sands province. Sheffield has a strategic tenement holding of over 2,500km^2.

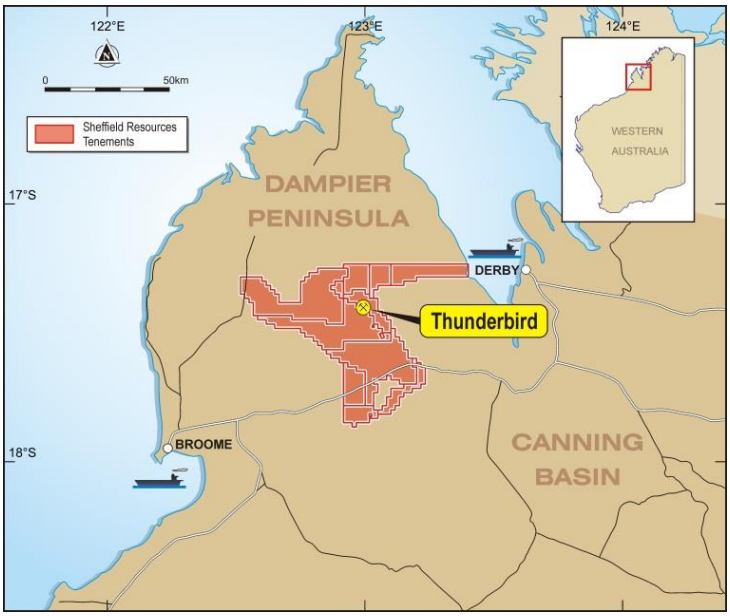

Figure 8: Location of the Thunderbird Deposit and Sheffield's tenement holding in the Canning Basin

Mineral Resource

This updated mineral resource incorporates results from 509 aircore drill holes for 31,283m drilled by Sheffield between 2012 and 2014, including 68 new holes drilled during the 2014 program (refer to ASX releases dated 23 July; 17 September and 10 November 2014. The resource in this announcement supercedes all previously announced Mineral Resources for Thunderbird.

At 3% HM cut-off the Resource covers an area which is 8.5km long and between 3km and 6.5km wide and remains open in most directions. The mineralisation occurs as a thick, broad sheet-like body striking northwest, extending from surface to a maximum modelled depth of 155m. The average depth to the top of mineralisation is 21m and the average mineralised thickness is 45m (Figures 3-5). The deposit is flat-lying along the north-eastern flank, but the dip steepens to 4 degrees along the south-western flank. Around 31% of the total resource area occurs within 6m of surface.

At 7.5% HM cut-off the Resource covers an area about 7.5km long by 2.5km to 6.5km wide, and remains open to the north and south. This higher grade mineralisation is enclosed within the 3% cut-off Resource envelope, but has a north-south long axis orientation which is oblique to the regional strike. The high grade mineralisation extends from surface to a maximum modelled depth of 125m. The average depth to the top of the high-grade mineralisation is 36m and the average mineralised thickness is 15m (Figures 3-5). Approximately 40% of the >7.5% resource area is within 15m of surface.

The Resource includes the results of 565 samples which were analysed to determine the HM assemblage. The analytical method used a combination of screening, magnetic separation, Qemscan and XRF. The method was developed following mineralogical trials guided by earlier bulk sample metallurgical testwork.

At a 3% HM cut-off, the HM assemblage of the Resource is 8.9% zircon, 2.9% high-titanium leucoxene, 3.7% leucoxene and 28% ilmenite for a total VHM component of 43%. Process testwork has shown that the valuable heavy minerals can be recovered using standard mineral sands processing techniques.

Further information relating to the Mineral Resource is included in Appendix 1 and 2 of this announcement.

Geology

The Thunderbird deposit is hosted by deeply weathered Cretaceous-aged formations. Its areal extent, thickness, grainsize, excellent grade and geological continuity are thought to indicate an off-shore, sub-wave base depositional environment.

Sheffield geologists have defined five stratigraphic units within the deposit area using a combination of surface mapping and drillhole lithological logs. These are referred to locally as the Fraser Beds, Reeves, Melligo, Thunderbird and Jowlaenga Formations. Of these, the Thunderbird Formation is the main mineralised unit.

The Thunderbird Formation comprises medium to dark brown/orange, fine to very fine well-sorted loose sands. It is over 90m thick and is very rich in heavy minerals (up to 40% HM). Within the Formation are layers of iron cemented sandstone, interpreted to have been formed by post-depositional chemical processes involving ancient water table movements leaching iron oxides from iron-bearing minerals such as ilmenite. They are a minor component of the overall mineralised sequence and have a patchy distribution, they are typically 5-10cm thick and cannot be traced between adjacent drill holes (closest drill spacing is currently about 60m).

Within the Thunderbird Formation is a continuous zone of very high grade HM (>7.5%) named the "GT Zone". The GT Zone is up to 43m thick (average 15m) over an area about 7.5km x 4km, strikes approximately north-south, follows the dip of the Thunderbird Formation and is open along strike. The GT Zone is interpreted to have formed in off-shore higher wave energy shoals.

Metallurgy and Products

Sheffield has previously announced the results of a comprehensive Scoping Study for Thunderbird (see ASX release of 14 April 2014). This incorporated development of a processing flowsheet on the basis of metallurgical process flow diagrams produced by test programmes on two bulk samples totalling 11 tonnes, collected from drill samples at Thunderbird. Potential final products were obtained and assessed for their marketability by industry experts TZMI, and Chinese marketing group Ruidow Information Technology Co Ltd with the following findings:

- The primary zircon product meets the premium classification for the requirements of the ceramic zircon sector, and is considered readily saleable.
- The primary ilmenite product is a suitable feedstock for the sulphate-route TiO_2 pigment process, or as a feed for either titanium sulphate- or chloride-slag manufacture. The low levels of alkalis and chromium also make this an attractive feedstock for blending with ilmenite from other deposits with higher levels of these contaminants.
- Secondary ilmenite, high-TiO_2 leucoxene and rutile are likely to be produced in smaller volumes. These products can be combined into a HiTi80 product with specifications suited to the welding rod market. This has the advantage of simplifying the conductors circuit in the MSP.

Pre-Feasibility Study

Pre-feasibility work is well advanced and is on schedule to be finalised in Q1 2015, including incorporation of the results of this Mineral Resource update. Details of the work currently being undertaken are included in Sheffield's September Quarterly Report (see ASX announcement of 28 October, 2014).

ENDS

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Table 2: Thunderbird Deposit Mineral Resource[1]

		Mineral Resources						Mineral Assemblage[2]			
Resource Category	**Cut off (HM%)**	Material (Mt)	Bulk Density	HM %	Slimes %	Osize %	**In-situ HM (Mt)**	Zircon %	HiTi Leuc %	Leuc %	Ilmenite %
Measured	**3.0**	75	2.1	7.9	19	11	**6**	9.3	2.7	2.7	30
Indicated	**3.0**	2,550	2.1	7.0	16	9	**180**	8.9	2.9	3.6	28
Inferred	**3.0**	580	2.0	5.6	16	9	**32**	8.8	3.0	4.1	28
Total	**3.0**	**3,205**	**2.1**	**6.8**	**16**	**9**	**218**	**8.9**	**2.9**	**3.7**	**28**
Measured	**7.5**	35	2.2	12.7	18	14	**4**	8.7	2.6	2.2	30
Indicated	**7.5**	920	2.1	11.9	15	10	**110**	7.9	2.4	2.2	28
Inferred	**7.5**	125	2.0	10.8	14	9	**14**	7.7	2.4	2.2	28
Total	**7.5**	**1,080**	**2.1**	**11.8**	**15**	**10**	**128**	**7.9**	**2.4**	**2.2**	**28**

Table 3: Thunderbird Deposit contained Valuable HM (VHM) Resource Inventory[1]

Resource Category	**Cut off (HM%)**	Zircon (kt)	HiTi Leucoxene (kt)	Leucoxene (kt)	Ilmenite (kt)	**Total VHM (kt)**
Measured	**3.0**	500	200	200	1,800	**2,600**
Indicated	**3.0**	15,900	5,200	6,500	50,400	**78,100**
Inferred	**3.0**	2,800	1,000	1,300	9,000	**14,100**
Total	**3.0**	19,300	6,300	8,000	61,100	**94,800**
Measured	**7.5**	400	100	100	1,300	**1,800**
Indicated	**7.5**	8,600	2,600	2,400	30,700	**44,300**
Inferred	**7.5**	1,100	300	300	3,800	**5,400**
Total	**7.5**	10,000	3,100	2,800	35,700	**51,500**

[1] All tonnages and grades have been rounded to reflect the relative uncertainty of the estimate, thus sum of columns may not equal. [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] Estimates of Mineral Assemblage are presented as percentages of the Heavy Mineral (HM) component of the deposit, as determined by magnetic separation, QEMSCAN and XRF. Magnetic fractions were analysed by QEMSCAN for mineral determination as follows: Ilmenite: 40-70% TiO_2 >90% Liberation; Leucoxene: 70-94% TiO_2 >90% Liberation; High Titanium Leucoxene (HiTi Leucoxene): >94% TiO_2 >90% Liberation; and Zircon: 66.7% ZrO_2+HfO_2 >90% Liberation. The non-magnetic fraction was submitted for XRF analysis and minerals determined as follows: Zircon: ZrO_2+HfO_2/0.667 and High Titanium Leucoxene (HiTi Leucoxene): TiO_2/0.94.

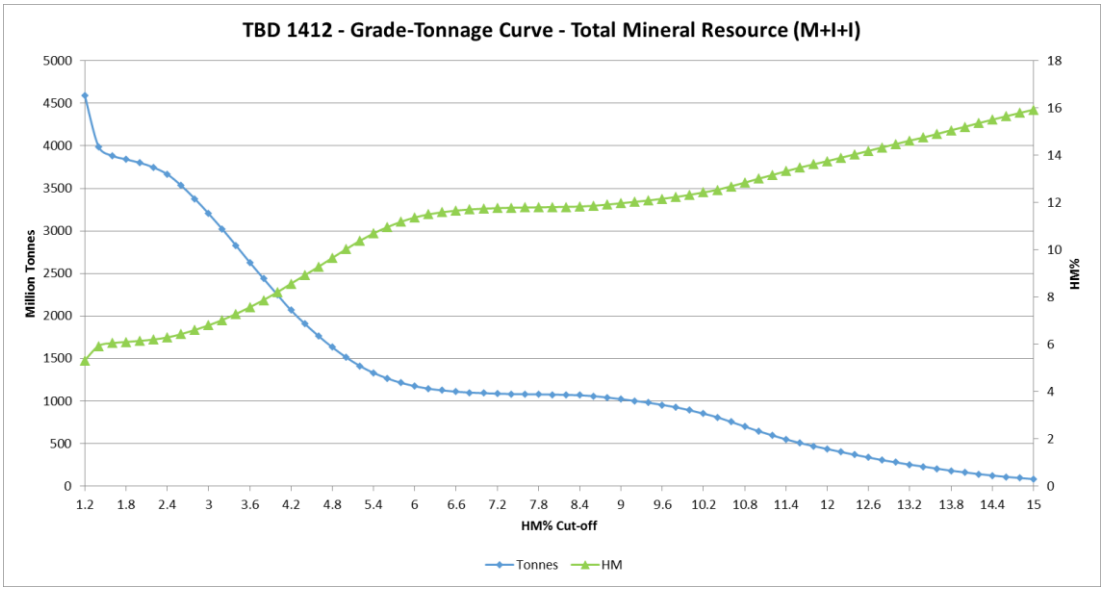

Figure 9: Thunderbird resource grade-tonnage curve.

COMPLIANCE STATEMENTS

MINERAL RESOURCES

The information in this report that relates to Mineral Resources is based on information compiled under the guidance of Mr Mark Teakle, a Competent Person who is a Member of the Australasian Institute of Geoscientists (AIG) and the Australasian Institute of Mining and Metallurgy (AusIMM). Mr Teakle is a full-time employee of Sheffield Resources Ltd and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Teakle consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The information in this report that relates to the estimation of Mineral Resources is based on information compiled by Mr Trent Strickland, a Competent Person who is a Member of the Australasian Institute of Mining and Metallurgy (AusIMM). Mr Strickland is a full-time employee of QG Australia Pty Ltd and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Strickland consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

PREVIOUSLY REPORTED INFORMATION

This report includes information that relates to Exploration Results, Mineral Resources and a Scoping Study which were prepared and first disclosed under the JORC Code 2012. The information was extracted from the Company's previous ASX announcements as follows:

- Thunderbird Resource Update: "*SHEFFIELD DOUBLES TOTAL MINERAL RESOURCES AT WORLD CLASS THUNDERBIRD HMS DEPOSIT*", 19 March 2014
- Thunderbird Scoping Study: "*SCOPING STUDY HIGHLIGHTS THUNDERBIRD'S EXCEPTIONAL FINANCIAL RETURNS*", 14 April, 2014
- Exploration Results: "*DRILLING UNDERWAY AT THUNDERBIRD MINERAL SANDS PROJECT*" 23 July 2014
- Exploration Results: "*THUNDERBIRD MINERAL SANDS PROJECT UPDATE*" 17 September 2014
- Exploration Results: "*STANDOUT DRILLING RESULTS EXTEND HIGH GRADE MINERALISATION AT THUNDERBIRD MINERAL SANDS PROJECT*" 10 November 2014.
- Pre-Feasibility Study progress: "*QUARTERLY REPORT FOR PERIOD ENDING 30 SEPTEMBER 2014*" 28 October 2014.

These announcements are available on Sheffield Resources Ltd's web site www.sheffieldresources.com.au.

The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements and, in the case of estimates of Mineral Resources and Scoping Study results, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

SCOPING STUDY

The Scoping Study referred to in this report is based on low-level technical and economic assessments, and is insufficient to support estimation of Ore Reserves or to provide assurance of an economic development case at this stage, or to provide certainty that the conclusions of the Scoping Study will be realised.

The Company believes it has a reasonable basis for making the forward looking statements in this report, including with respect to any production targets, based on the information contained in the announcement "SCOPING STUDY HIGHLIGHTS THUNDERBIRD'S EXCEPTIONAL FINANCIAL RETURNS", dated 14 April 2014, which is based on the Mineral Resource for Thunderbird as at 19 March 2014, independently compiled by QG Australia Pty Ltd, together with independent metallurgical, processing design, engineering, mining and marketing studies, product quality assessment, external commodity price and exchange rate forecasts and global operating cost data.

FORWARD LOOKING STATEMENTS

Some statements in this report 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 "anticipated", "expected", "target", "scheduled", "intends", "potential", "prospective" 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 - $92.7m
Issued shares – 134.4m	Cash - $8.7m (at 30 September 2014)

Sheffield's projects are all situated within the state of Western Australia and are 100% owned by the Company.

HEAVY MINERAL SANDS

The Dampier project, located near Derby in WA's northwest, contains the large, high grade zircon-rich Thunderbird HMS deposit. Sheffield is currently undertaking a pre-feasibility study on Thunderbird.

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 has over 2,000km^2 of tenure in the Fraser Range region, including the Red Bull project which is within 20km of Sirius Resources NL's (ASX:SIR) Nova Ni-Cu deposit.

IRON

Sheffield's Panorama and Mt Vettel DSO iron projects are located in the North Pilbara region, near existing iron ore mines and within potential trucking distance of Port Hedland.

POTASH

Oxley, located in WA's Mid-West region, is a large scale, unconventional hard rock potash project with potential to generate products for the fertiliser market.

Glossary

Heavy Mineral	("HM") Material (individual minerals or mineral aggregates) which does not pass through a screen (mesh) of nominated size (the "Slimes" screen, eg. 38µm) and does pass through a screen of nominated size (the "Oversize" screen, eg. 1mm) and has density greater than a nominated amount (typically 2.85 to 2.96g.ml).
HM%	Weight percentage of Heavy Mineral in a sample.
Oversize	("OS" or "Osize") Material that does not pass through a screen of nominated size, for Thunderbird this is universally 1mm.
OS%	Weight percentage of Oversize material in a sample.
Slimes	("SL") Material that passes through a screen of nominated size, for Thunderbird 38µm and 45µm screens were used.
SL%	Weight percentage of Slimes material in a sample.
Valuable Heavy Mineral	("VHM" or "Valuable HM") Component of Heavy Mineral which has the potential to become marketable products; eg. zircon, ilmenite, rutile, leucoxene, HiTi Leucoxene, etc.

Appendix 1: JORC (2012) Table 1 Report

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• NQ and HQ diameter aircore drilling used to collect 2-3kg samples at 1.5m intervals down-hole. • Mineral sands industry-standard drilling technique. • See below for sample and assay QAQC procedures and analysis.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what*	• Aircore system; NQ size for 40% of drill database (12,643m); HQ diameter for 56% (17,503m), 75mm diameter aircore 4% of drill database (1,137m). • Blade drill bit used for majority of drilling. • Where hard rock layers were intersected and unable to drill with blade bit, a pencil (open-

Criteria	JORC Code explanation	Commentary
	method, etc).	hole) or reverse circulation hammer was used to penetrate the layer, then changed back to blade. • Aircore system used as an industry standard for HMS deposits.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• An orientation process was undertaken at the beginning of the program to optimise the sampling system to collect a 2-3kg sub-sample from 1.5m intervals. The remainder of the drill sample (spoil) has been retained as 3m-composites for future analysis if required. • Sample weight is recorded at the laboratory • Duplicate samples are collected at the drill site (see below) to enable analysis of data precision. • Sample condition (wet to dry and good to poor qualitative recovery) is logged at the drill site. Of the total database, 37% were collected as wet samples and 4% were classed as having poor recovery. • There is a small negative bias in HM% and OS% and a small positive bias in SL% for dry compared with wet samples. • There is a small negative bias in HM% and OS% and a positive bias in SL% for samples with good recovery compared to those with poor recovery. • Recovery has a greater influence than wetness on HM%, OS% and SL% values. • The very small number of wet-poor recovery samples in the database (4%), and the conservative bias in HM grade suggests no significant effect on the resource estimate due to sample condition. • The sample quality is considered appropriate for the Mineral Resource estimation procedure and classification applied.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• Every drill sample is washed and panned, then geologically logged on-site in 1.5m intervals, recording primary, secondary and oversize lithology, qualitative hardness, grainsize, rounding, sorting, and washability, visual estimates of HM%, SL% and OS%, and depth to water table. • The entire length of the drill hole is logged; minimum (nominal) interval length is 1.5m. • Logging is suitable such that interpretations of grade and deposit geology can be used to support the Mineral Resource estimation procedure and classification applied. • Pre-feasibility work currently underway at Thunderbird included 20 sonic core holes drilled as part of geotechnical investigations. Whilst the results of this program are not available to be incorporated into this resource estimate, visual observations have been incorporated into the geological interpretation of the deposit (see below)
Sub-sampling techniques and sample	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube*	**HM%, SL% OS% Determination** Drill Site • A 2-3kg sample is collected at 1.5m intervals

Criteria	JORC Code explanation	Commentary
preparation	*sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	in numbered bags at the drill site via rotary splitter at the cyclone discharge point. • Duplicate samples (field duplicates) collected at drill site 1 in every 40 samples. • Reference standard and blank material samples inserted 1 each in every 40 samples. • Samples submitted to an external laboratory for heavy liquid separation (HLS) determination of weight per cent heavy mineral (HM%), Slimes (SL%) and Oversize (OS%). Laboratory • The 2-3kg drill sample is sub-sampled via a rotary splitter to approx. 200g for analysis. • The 200g sub-sample is soaked overnight in water. • 2012 samples: (24% of sample database) then screened and weighed. • 2013 & 2014 samples: (76% of sample database) a 5 minute attrition in a plastic bucket with low solids density, then screened and weighed. • HM%, SL% and OS% calculated as percentage of total sample weight (see below). Laboratory repeats are conducted 1 in every 20 samples (96% of the assay database) or 1 in every 15 samples (4% of the assay database). • Laboratory internal standard inserted 1 in every 40 samples (96% of the assay database). • Laboratory provides a sachet containing the Heavy Mineral Concentrate (HMC) for each sample – this is used in HM assemblage determination (see below). All • Spacing of duplicate, standard, blank and lab repeat samples are designed to identify sample misplacement or misallocation during sample collection and laboratory analysis. • Visual estimates of HM%, SL% and OS% logged at the drill site are compared against laboratory results to identify significant errors. • Analysis of field duplicate samples and laboratory repeats show the data has acceptable precision, indicating the sub-sampling and sample preparation techniques are appropriate for the deposit style and the Mineral Resource estimation procedure and classification applied. **<u>HM Assemblage Determination</u>** • Heavy Mineral Concentrate (HMC) from individual samples is combined according to HM grade and weight into (nominal) 50g – 100g composite samples for HM assemblage determination. • Weighed HMC is split via a micro-riffle to ensure HM%, SL% and OS% of the final composite sample can be correctly calculated.

Criteria	JORC Code explanation	Commentary
		• HM assemblage determination was by a combination of screening, magnetic separation, QEMSCAN™ and XRF assay to determine the component mineralogy. • This is considered an industry standard method, typically optimised according to the HM characteristics of individual deposits. • For Thunderbird the method was designed and optimised using an iterative trial process and the results of 6t and 5t bulk sample process metallurgical testwork. • 5% of samples in the HM assemblage database were repeated from the original drill sample and 4% of samples were repeated from the composite HMC. • Analysis of these repeats show the data has acceptable precision, indicating the sub-sampling and sample preparation techniques are appropriate for the deposit style and the Mineral Resource estimation procedure and classification applied.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	**HM%, SL% OS% Determination** • Assay and laboratory procedures are industry standard, although method specifics and heavy liquid composition can vary. • SL% was determined using a 45µm (32% of samples) or 38µm (68% of samples) screen. • OS% was determined using a +1mm screen. • HM% was determined using heavy liquid TBE (2.96g/ml). • The method produces a total grade as weight per cent of the primary sample. • Method does not determine the relative amounts of valuable (saleable or marketable) and non-valuable heavy mineral species. See below for details of HM assemblage determination. • Reference standard and blank material samples inserted at the drill site 1 each in every 40 samples. • Laboratory internal standard inserted 1 in every 40 samples (96% of the assay database). • The HM reference samples used are field-homogenised bulk samples with expected values and ranges determined by the Company from assay results. Blank material used is commercially available builder's sand. • Reference standards and blanks are examined for performance over time and within laboratory batches. Batches or sub-batches are re-analysed if unacceptable QAQC data are returned. • In total QAQC samples represent 14% of the total assay database. • Analysis of reference standards, blanks and laboratory repeats show the data to be of acceptable accuracy and precision for the Mineral Resource estimation procedure and classification applied.

Criteria	JORC Code explanation	Commentary
		HM Assemblage Determination • HM assemblage determination was by a combination of screening, magnetic separation, QEMSCAN™ and XRF assay to determine the component mineralogy of the HMC. • This method is considered an industry standard, typically optimised according to the HM characteristics of individual deposits. • For Thunderbird the method was designed and optimised using an iterative trial process and the results of 6t and 5t bulk sample process metallurgical testwork. • HMC was screened at 106µm and each fraction weighed (studies show Thunderbird HM with grainsize >106µm does not contain significant amounts of VHM). The -106µm fraction was then magnetically separated into highly-susceptible (H/S), magnetic 1, magnetic 2 and non-magnetic fractions, with each fraction weighed. The magnetic 1 & 2 fractions were combined and analysed by QEMSCAN™ for mineral determination as follows: - Ilmenite: 40-70% TiO_2 >90% Liberation - Leucoxene: 70-94% TiO_2 >90% Liberation - High Titanium Leucoxene (HiTi Leucoxene): >94% TiO_2 >90% Liberation - Zircon: 66.7% ZrO_2+HfO_2 >90% Liberation The non-magnetic fraction was submitted for XRF analysis and minerals determined as follows: - Zircon: ZrO_2+HfO_2/0.667 - High Titanium Leucoxene (HiTi Leucoxene): TiO_2/0.94 • Reference material was not used, other measures of accuracy and the method design is considered sufficient to establish acceptable accuracy of the data for the Mineral Resource estimation procedure and classification applied. • Analysis of laboratory repeats and comparison with bulk metallurgical testwork results show the data to be of acceptable accuracy and precision for the Mineral Resource estimation procedure and classification applied.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Data is logged electronically using "validation at point of entry" systems prior to storage in the Company's drill hole database, which is managed by Company personnel and an external consultancy. • Documentation related to data custody and validation is maintained by the Company. • A copy ("snapshot") of the Mineral Resource database is retained separately from the primary drill hole database. • No assay data have been adjusted. • 101 twinned drillholes have been examined for comparison of assay data between factors such as year drilled, hole diameter, drill

Criteria	JORC Code explanation	Commentary
		type and assay method. • Analysis of drill hole twins show the 2012 assay data (45µm screen and no attritioning step) is biased low in HM% compared with 2013 assay data (45µm screen or 38µm screen, with attritioning step). A similar high bias is seen in OS%. The bias is explained by the low energy attritioning step liberating HM from loosely-held aggregates, and the change in slimes screen from 45 µm to 38 µm used in 2013 and 2014. All data was used for the current Resource estimate, this is considered appropriate because the 2012 data introduces a conservative bias. As a consequence HM grade remains underestimated for 2012 holes rather than overestimated. The 2013 & 2014 dataset is dominant in terms of number of samples, and are distributed throughout the Resource area, therefore any spatial bias is considered insignificant. • 43 twinned drillholes have been examined for comparison of HM assemblage data between factors such as determination method, year drilled, and HM assay method. • Analysis shows HM assemblage determined by QEMSCAN™ alone on 2012 samples (90 data), and by combination magnetic separation/ QEMSCAN™/XRF on 2012 samples (106 data), has a significant bias low compared with combination magnetic separation/ QEMSCAN™/XRF on 2013 and 2014 samples (565 data). This bias cannot be explained by natural (ie. deposit-related) factors, and is a result of a change in sample preparation from 2012 to 2013 (as discussed above). As a result of this analysis, HM assemblage data used in the Resource estimate includes only samples from holes drilled in 2013 and 2014 (84% of the database) in order to ensure a consistent determination method across the deposit. The mineralogical data was also supplemented with the average mineralogy of a 6t bulk sample, sourced from the 2012 'cross' of 60m spaced drilling. • The verification and treatment of the data is considered sufficient for the Mineral Resource estimation procedure and classification applied.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• Drill hole collar locations were surveyed by licenced surveyors using a RTK GPS system with expected accuracy of +/- 0.02m horizontal and +/- 0.03m vertical. • 11 drillholes of the 509 (2.2%) in the estimate database were not surveyed, for these holes planned or approximated coordinates have been used. • Coordinates are referenced to the Map Grid of Australia (MGA) zone 51 on the Geographic Datum of Australia (GDA94).

Criteria	JORC Code explanation	Commentary
		• Vertical datum geoid model is AUSGEOID09 (Australia). • Drill hole RL for Resource estimation is determined by projection of surveyed hole collars to a regional (Landgate) DTM model. • The Mineral Resource estimate uses this model as surface topography. The average difference between surveyed and modelled RL is 0.5m which is considered negligible given the nature of the mineralisation, and the size of the Thunderbird deposit. • The quality and accuracy of the topographic control is considered sufficient for the Mineral Resource estimation procedure and classification applied.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• See figures in body of announcement for hole distribution. The nominal spacing of most drill holes is 250m x 500m, with edges at 500m x 500m and 1000m x 500m. Four areas are drilled at nominal 60m hole spacing for bulk sample collection and geostatistical data analysis. • The drill database used in the Resource estimate comprises 509 holes, totalling 31,283m, with 20,828 samples assayed totalling 31,127.9m (99.5% of metres drilled). Of that, 11,846 assayed samples totalling 17,683.4m (57%) are within the mineralised zones of the Resource (see below for criteria). • Samples for HM assemblage determination are composited on intervals according to a combination of grade and geology appropriate to reflect resource estimation domains. • 565 composites from 280 holes totalling 11,612.5m are used in the resource estimate. This represents 66% of the total length of drillholes within mineralised zones of the resource. • The data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource estimation procedure and classification applied.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• Mineralisation is flat-lying to less than 4deg. dip, vertical drill holes therefore approximate true thickness and perpendicular intersection of mineralisation. • Note sections in the body of the announcement are displayed with vertical exaggeration.
Sample security	• *The measures taken to ensure sample security.*	• Sample security is not considered a significant risk given the location of the deposit and bulk-nature of mineralisation. • Nevertheless, the use of recognised transport providers, sample dispatch procedures directly from the field to the laboratory, and the large number of samples are considered

Criteria	JORC Code explanation	Commentary
		sufficient to ensure appropriate sample security.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• All data has been validated and reviewed by at least 2 Company geologists, and by consultants QG Australia. • No external audit or review of sample techniques or data, apart from that by QG Australia, has been conducted. • External audits are not considered necessary at this stage of the Project's development.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	Statement	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The Mineral Resource reported is entirely within Exploration Licence E04/2083, located on the Dampier Peninsula about 60km west of Derby, and 25km north of the sealed Great Northern Hwy joining Derby and Broome • E04/2083 was granted on 05/09/2011 and is due to expire on 04/09/2016; it is held 100% by Sheffield Resources Ltd. On 16/07/2014 Sheffield lodged a Mining Lease Application (M04/459) over the Thunderbird deposit. • There are no known or experienced impediments to obtaining a licence to operate in the area. • Sheffield has been operating successfully in the region for more than 3 years to date.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• The Dampier project area was explored by Rio Tinto ("Rio") between 2003 and 2009. Rio completed four broadly spaced aircore drill traverses, identifying heavy mineral concentrations at Thunderbird averaging 8.07% HM with 8.0% zircon. Rio surrendered the tenements following the 2008 global financial crisis. • Further details are included in Sheffield's ASX release entitled 'New Licence Granted Over High Grade Zircon Project' dated 7 September, 2011 (available from the company's website: www.sheffieldresources.com.au).
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The Dampier Project is within the Canning Basin in the Kimberley region of Western Australia. The Canning Basin is an intracratonic basin which contains Ordovician to Cretaceous deposits covered by Cenozoic sediments. • Thunderbird is a heavy mineral sand (HMS) deposit hosted by deeply weathered Cretaceous-aged formations. Valuable heavy minerals (VHM) contained within the deposit include ilmenite, zircon, leucoxene and rutile. The mineralisation is in a thick, broad anticlinal sheet-like body striking northwest. In the core of the anticline it is at surface, rolling at about 4deg. dip about the axis, extending under cover to the southwest. The areal extent,

Criteria	Statement	Commentary
		width, grade, geological continuity and grainsize of the Thunderbird mineralisation are interpreted to indicate an off-shore, sub-wave base depositional environment. • Five stratigraphic units have been defined by Sheffield geologists within the deposit area using a combination of surface mapping and drill hole lithological logs. These are referred to locally as the Fraser Beds, Reeves, Melligo, Thunderbird and Jowlaenga Formations. Of these the Thunderbird Formation is the most important, with the Thunderbird Formation representing the main mineralised unit. Also important, the Fraser Beds act as a distinct marker unit toward the base of the Thunderbird Formation, enabling confidence in interpretation of the extent, strike and dip of the stratigraphy. • The Thunderbird Formation is described as medium to dark brown/orange, fine to very fine well sorted loose sands. It is up to 90m thick (average 46m) and is very rich in heavy minerals (up to 40% HM). It is modelled over the Resource area as at least 8.5km along strike and more than 3km to 6.5km wide. • Within the Formation are layers of iron cemented sandstone. These layers are interpreted to have been formed by post-depositional chemical processes of ferruginisation from ancient water table movements with iron oxides leached from the sand (eg. ilmenite). They occur throughout but are patchy. Pre-feasibility work currently underway at Thunderbird includes 20 sonic core holes drilled as part of geotechnical investigations. Whilst the results of this program are not available to be incorporated into this resource estimate, visual observations have confirmed observations of hard rock bands within the deposit to be narrow (typically 5-10cm thick and rarely >30cm thick) and not extensive (not extending as a single layer further than <60m). • Also within the Formation is a continuous, very-high grade HM (>7.5%) zone named the GT Zone. This Zone is up to 43m thick (average 16m) over an area at least 7.5km x 4km, strikes approximately north-south, follows the dip of the Thunderbird Formation and is open along strike. The high-grade of HM in the GT zone is interpreted to result from deposition in off-shore higher wave energy shoals.
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* o *easting and northing of the drill hole collar* o *elevation or RL (Reduced Level – elevation above sea level in metres)*	• Exploration results relating to the drillholes used in the resource have been publicly released in numerous previous Company announcements referring to the Dampier Project and Thunderbird deposit. • Information relating to the number of drillholes, assayed samples, location accuracy, orientation etc. is included in this table, and in the body of the announcement.

Criteria	Statement	Commentary
	of the drill hole collar o *dip and azimuth of the hole* o *down hole length and interception depth* o *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• Diagrams in the body of the announcement show the location of and distribution of drillholes in relation to the Mineral Resource.
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• N/A
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	• Mineralisation is flat-lying to less than 4deg. dip, vertical drill holes therefore approximate true thickness. • Refer to diagrams in the body of the announcement for visual representation of drill hole orientation vs. deposit orientation, note the vertical exaggeration used.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• See body of announcement for plan and cross section views and Mineral Resource tabulations.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• All information considered material to the reader's understanding of the database, estimation procedure and classification of the Mineral Resource has been reported.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater,*	• Sheffield has previously reported deposit information for Thunderbird including a maiden Mineral Resource estimate (December 2012), Mineral Resource Update (March, 2014), and Scoping Study results (April, 2104). These include information on mineral assemblage, mineral processing, VHM product recoverability, quality and

Criteria	Statement	Commentary
	geotechnical and rock characteristics; potential deleterious or contaminating substances.	marketability and mining and financial performance. • Where relevant this information has been included in the body of this announcement.
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Further work comprising closer-spaced drilling is in progress. • Sheffield announced positive results from its Scoping Study for Thunderbird on 14 April, 2014. Following from this, a Pre-Feasibility Study in progress and is scheduled for completion in Q1 2015. This will incorporate results from the updated Mineral Resource reported in this announcement.

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section)

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• Drill hole data was extracted directly from the Company's drill hole database which includes internal data validation protocols. • Where necessary, original drill hole log files are consulted to rectify any errors identified. • Validation of the exported data was confirmed using mining software (Micromine) validation protocols, and visually in plan and section views. • Compilation of data external to the drill database (eg. HM assemblage source data) is cross-checked manually, and through statistical comparison. • A copy ("snapshot") of the Mineral Resource database is retained separately to the primary drill hole database. • Data is further verified and validated by QG Australia upon receipt, and prior to use in the estimation.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• Mr Teakle has visited the Thunderbird site and the primary assay laboratory on numerous occasions during 2012, 2013 and 2014, during operations. • Mr Strickland inspected the Thunderbird site and the primary assay laboratory in 2013, during operations. • Where material, information relating to observations from these visits has been included in this announcement.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• As described above, Sheffield geologists have defined five stratigraphic units within the deposit area using a combination of surface mapping and drill hole lithological logs. For the purposes of resource estimation, these units were used in combination with grade criteria to define four mineralised domains, as follows: - B1 (north) and B2 (south): within Reeves Fm., grade criteria >1% HM, >6m width, >6m separation stratigraphically above the Thunderbird Fm. - T1: Thunderbird Fm., grade criteria: HM >1-

Criteria	JORC Code explanation	Commentary
		2% and <7.5-10%, >6m width, <6m internal waste - T2: Thunderbird Fm. GT Zone within T1, grade criteria HM >7.5-10%, >6m width, <6m internal waste, marked change in HM grade at boundary Domain boundaries are guided by grade rules; however geological continuity overrides grade rules where necessary. It is useful to note however that primary HM% (and SL% and OS%) is a physical characteristic of the geological units related to unit deposition. • There is good confidence in the geological interpretation of the deposit. Logged data from 509 drillholes as well as surface geology has been used to develop the interpretation and this is supported by HM%, SL% and OS% assays. The result is excellent geological (and grade) continuity in the model (see diagrams above), as expected for this style of HM deposit. • Examination of grade shells and the resource grade-tonnage curve indicate the greatest change in the deposit in terms of tonnage vs grade occurs between cutoff grades of 2.5 and 5.5%HM. Also, the deposit outline remains coherent up to 14% HM cutoff. These thresholds are well within the corresponding geological domains and so changes to these domains through alternative interpretations are unlikely to significantly affect the Mineral Resource as reported. • The resource T1 domain imposes an approximately 1-2% HM cutoff on the resource, and at its upper boundary corresponds closely with a natural geological boundary (between Reeves and Thunderbird Formations). This allows higher cutoff grades (eg. 3% as reported) to be applied and as such any change to this boundary is unlikely to significantly affect the Mineral Resource as reported.
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• At 3% HM cut-off the resource covers an area about 8.5km long by 3km to 6.5km wide, and remains open in all directions. The mineralisation occurs as a thick, broad anticlinal sheet-like body striking northwest, extending from surface to a maximum depth of 155m. The average depth to the top of mineralisation is 21m and the average mineralised thickness is 45m. The dip of the deposit changes from flat to low angle along the north-eastern flank, to 4 degrees along the south-western flank, resulting in around 31% of the total resource area occurring within 6m of surface. • At 7.5% HM cut-off the resource covers an area about 7.5km long by 2.5km to 6.5km wide, and remains open to the north and south. The mineralisation follows the dip of the resource above 3% but strikes north-south,

Criteria	JORC Code explanation	Commentary
		extending from surface to a maximum depth of 125m. The average depth to the top of mineralisation is 36m and the average mineralised thickness is 15m. Approximately 40% of the >7.5% resource area is within 15m of surface.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	• Heavy mineral (HM), slime, oversize, zircon, HiTi leucoxene, leucoxene, ilmenite, monazite and 'other' material percentages were estimated using ordinary kriging (OK) into blocks of dimension 62.5m East, by 125m North by 3m RL. These block dimensions were selected to reflect the variability of the deposit, as a concession between the drill density and the model's practicality for future mine planning. Sub-cells to a minimum dimension of 12.5m E by 25m N by 1m RL were used to represent volume. • The nominal drill spacing is approximately 250m x 500m with the margins of the deposit drilled at a spacing of 500m x 500m and 1000m x 500m. Four separate close-spaced 'crosses' have been drilled at a nominal spacing of 60m both along and across strike. • Exploratory data analysis and estimation was undertaken in Isatis software. • Drill samples were composited to 3m for estimation. • New wireframe solid model interpretations of mineralisation were made by SFX based on geological logging and heavy mineral (HM) content, using thresholds of ~1% HM to define a low grade domain and 7.5% HM to define a high grade domain. QG assessed the robustness of these domains by critically examining the geological interpretation and using a variety of measures including statistical and geostatistical analysis. The domains are considered geologically robust in the context of the resource classification applied to the estimate. Hard boundaries were applied to estimation within mineralisation domains. • Maximum extrapolation distance considered in grade domain determination was 1000m; however, this was reduced to, on average, 250m through the classification of the resource. • All variables were estimated separately and independently. • Grade capping was applied to HM% (waste only), slime% and oversize%. The cap-values were based on examination of the tail of the histogram. • Estimation parameters were chosen after taking into account output kriging estimation statistics, variogram models and data geometry. • The search used for the estimation of HM was either 1500m x 1200m x 150m (low grade, B1 and waste domains) or 2000m x 1600m x

Criteria	JORC Code explanation	Commentary
		150m (high grade and B2 domains) with long axis oriented towards 310° and a 1.5° dip towards 220°. Slime and oversize used a search of 2500m x 1200m x 250m in the same orientation. The search used a single sector with a minimum of six samples a maximum of 40. The optimum and maximum number of samples used per drill hole was between two and four. • The search used for the estimation of zircon, HiTi leucoxene, leucoxene, ilmenite, monazite and 'other' material was 2500m x 200m x 225m (2950m x 2360m x 225m for B1 and B2 domains to populate all blocks), long axis oriented towards 310° and a 1.5° dip towards 220°. The search used a minimum of four samples and a maximum of 14. • Estimates were validated visually in Minesight's 3D graphical environment, by examining reproduction of global estimation statistics, and by comparing semi-local reproduction of grade in swath plots.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• Tonnages are estimated on a dry basis
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• The Mineral Resource estimate of the Thunderbird deposit has been reported at a 3% HM and 7.5% HM cut-off. These cut-off grades were selected by SFX based on preliminary technical and economic assessment, and on comparison with similar deposits currently or recently being mined. QG have reviewed the parameters used to support these cut-offs grades and believe these to be reasonable. • At a 3% HM cut-off, the HM grade of the Thunderbird Resource is 6.8%, and the in-situ VHM grade is 2.88%. This compares favourably with other HMS deposits either recently or currently being mined. • The 7.5% HM cut-off is chosen to represent the very-high grade, continuous component of the Mineral Resource, which may become the starting point of any future mining operations. In addition, spatially the 7.5% HM threshold is associated with a grade-geological boundary throughout the deposit, which was domained separately for the purposes of resource estimation. • The grade-tonnage curve is included in the body of the announcement (Figure 9) to show the impact of cut-off grade versus total resource tonnage.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic*	• In determining the reasonable prospects for eventual economic extraction, potential mining methods considered are either dry-mining dozer-trap, or dredge mining operations, similar to those commonly and currently in use in HM mining operations both in Australia and globally.

Criteria	JORC Code explanation	Commentary
	extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	• The thickness, areal extent, and continuous nature of the mineralisation at Thunderbird are such that both selective and non-selective bulk mining methods can be appropriately considered. • These assumptions were also considered when determining resource block sizes, and resource classification. • Sheffield has previously announced positive financial results from its Thunderbird Scoping Study (see ASX release dated 14 April, 2014). • On the basis of these assumptions, the Company considers there are no mining factors which are likely to affect the assumption that the deposit has reasonable prospects for eventual economic extraction.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• As discussed earlier in this table, and in the body of the announcement, the Company has conducted bulk process metallurgical studies on 6t and 5t bulk samples from Thunderbird for the purpose of developing a process flowsheet for the deposit. The results of this work were used to design and optimise the method used to determine the HM assemblage reported in the Mineral Resource. • The results of this work are sufficient for the Company to expect the Thunderbird mineralisation will be amenable to treatment with conventional mineral sands processing techniques. • Sheffield has previously announced positive results relating to product processing and marketing in its Thunderbird Scoping Study (see ASX release dated 14 April, 2014). • On the basis of these studies, the Company considers there are no metallurgical factors which are likely to affect the assumption that the deposit has reasonable prospects for eventual economic extraction.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• The Company has completed Level 1 and Level 2 flora and fauna surveys at Thunderbird, and preliminary hydrogeological investigations. • On the basis of these studies, the Company considers there are no environmental factors which are likely to affect the assumption that the deposit has reasonable prospects for eventual economic extraction.
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of*	• No direct measurements of bulk density have been taken. • Bulk density is assumed from an industry-standard formula which accounts for the HM

Criteria	JORC Code explanation	Commentary
	the measurements, the nature, size and representativeness of the samples. • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	and slimes content of sand deposits. The resultant values are considered to be consistent with observations of the material compared with other HM deposits with known bulk density values.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• The estimates have been classified into Measured, Indicated and Inferred Resources according to the JORC Code, taking into account data quality, data density, geological continuity, grade continuity and estimation confidence. In plan, polygons were used to define zones of different classification. • Measured Resources are restricted to the four separate 'crosses' of close-spaced drilling, where drill spacing is 60m along strike and 60m across strike. • Indicated Resources are defined where drilling is at 500m centres along strike, by 250m or better. • Inferred Resources are defined around the margins of Indicated Resource, where the drill spacing is reduced to 500m x 500m.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• The Mineral Resource has been audited internally as part of normal validation processes both by the Company and QG. • No external audit or review of the Mineral Resource has been conducted.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• No geostatistical studies have been performed to quantify the relative confidence in the estimate. Such a study is not considered necessary at this stage of the Project's development. • Global estimates of tonnage and heavy mineral content are considered to have a high level of confidence. Local estimates are inevitably less confident, but the relative level of risk is considered low, with the relative level of risk reflected by classification. • The factors considered to present relatively higher sources of risk in the estimate are data quality and mineral assemblage. Geological interpretation and estimation are considered to present low risk. • No production has occurred from the deposit.

Appendix 2: QG Thunderbird Mineral Resource Statement Memorandum

- Following pages (p28 to p32) -

Memorandum

To: Sheffield Resources Ltd
From: Trent Strickland

Date: **10 December 2014**
Subject: **Thunderbird Mineral Sands Deposit Resource Statement**

This document presents the Mineral Resource Statement for the Thunderbird deposit, Western Australia.

Thunderbird Mineral Resource Statement

QG Australia Pty Ltd (QG) has provided Sheffield Resources Ltd (SFX) with a resource model for the Thunderbird heavy mineral sands deposit. The estimate is based on aircore (AC) and reverse circulation (RC) drilling data collected by SFX in 2012, 2013 and 2014.

The Thunderbird deposit is located within the Canning Basin in the Kimberley region of Western Australia. Thunderbird is a heavy mineral sand (HMS) deposit hosted by deeply weathered Cretaceous sand formations. The deposit is at least 8.5km along strike and at least 3km to 6.5km wide, and remains open in all directions. Mineralisation occurs from surface to depths of up to 155m, with an average mineralised thickness of around 45m. The areal extent, width, grade, geological continuity and grainsize of the Thunderbird mineralisation are suggestive of an off-shore, sub-wave base depositional environment.

The drill database used to define the mineral resource comprises 509 vertical AC and RC drillholes, for a total of 31,283m, with 20,828 samples assayed totalling 31,127.9m. Of that, 11,846 assayed samples totalling 17,683.4m are within the mineralised zones of the resource.

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The nominal drill spacing is approximately 250m x 500m with the margins of the deposit drilled at a spacing of 500m x 500m and 1000m x 500m. Four separate close-spaced 'crosses' have been drilled at a nominal spacing of 60m both along and across strike.

QG reviewed the quality of drill data (location, sampling and assay quality) and conclude that the data is of acceptable quality for use in resource estimation and subsequent mine planning.

New wireframe solid model interpretations of mineralisation were made by SFX based on geological logging and heavy mineral (HM) content, using thresholds of ~1% HM to define a low grade domain and 7.5% HM to define a high grade domain. QG assessed the robustness of these domains by critically examining the geological interpretation and using a variety of measures including statistical and geostatistical analysis. The domains are considered geologically robust in the context of the resource classification applied to the estimate.

Ordinary Kriging was used to estimate HM%, slime% and oversize%. The search neighbourhood employed was optimised using Quantitative Kriging Neighbourhood Analysis (QKNA). Density was calculated per block. Hard boundaries were applied to estimation within mineralisation domains. Grade capping was applied to slime% and oversize%. The cap values were based on examination of the tail of the histogram and local grade distribution.

The mineral assemblage of the Thunderbird mineral resource was estimated from mineralogical analyses of 565 composites created from 280 holes totalling 11,612.5m from the 2013 and 2014 drilling programs. Analysis was by a combination of screening, magnetic separation followed by QEMSCAN analysis of the magnetic component, and XRF determination of the non-magnetic component. Details of mineralogical calculations are provided in the footnotes to resource tabulations. The mineralogical data was also supplemented with the average mineralogy of a 6t bulk sample, sourced from the 2012 'cross' of 60m spaced drilling. The composites consisted of samples taken from discrete intervals from within five geological units across multiple holes and combined. The composites were well distributed throughout the deposit. Ordinary Kriging was used to estimate zircon%, high titanium ('HiTi') leucoxene %, leucoxene %, ilmenite %, monazite % and other material %.

The estimate was validated by QG as follows:

- Visual checking of the interpolation results compared with drilling in both plan and section;
- Comparison of the global input (composites) vs. output (model) statistics, including clustered and declustered composites; and
- Semi-local input vs. output statistics using moving window averages.

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

The estimate has been classified into Measured, Indicated and Inferred Resources according to the JORC 2012 code, taking into account data quality, data density, geological continuity, grade continuity and confidence in estimation of heavy mineral content and mineral assemblage. In plan, polygons were used to define zones of different classification. Measured Resources are restricted to the four separate 'crosses' of close-spaced drilling, where drill spacing is 60m along strike and 60m across strike. Indicated Resources are defined where drilling is at 500m centres along strike, by 250m or better. Inferred Resources are defined around the margins of Indicated Resource, where the drill spacing is reduced to 500m x 500m.

The Thunderbird mineral resource estimate has been reported at both a 3% HM and a 7.5% HM cut-off. These cut-off grades were selected by SFX based on preliminary technical and economic assessment, and on comparison with similar deposits currently or recently being mined. Based on the same technical and economic assessment, and taking into consideration the thickness, grades and depth of the deposit, it is considered that the entire deposit has a reasonable prospect of eventually being mined, and that the current extents of the deposit are limited by drilling. The Thunderbird mineral resource estimate, as at the 10th December 2014, is summarised in Table 1 and Table 2.

Mineral Resource Category	Million Tonnes[1]	Bulk Density	HM %	Slimes %	Osize %	In-situ HM Million Tonnes[1]
Measured	75	2.1	7.9	19	11	6
Indicated	2,550	2.1	7.0	16	9	180
Inferred	580	2.0	5.6	16	9	32
TOTAL	3,205	2.1	6.8	16	9	218

Mineral Resource Category	Million Tonnes[1]	HM %	Valuable HM Grade (% In-situ)[2]			
			Zircon	HiTi Leucoxene	Leucoxene	Ilmenite
Measured	75	7.9	0.71	0.21	0.19	2.4
Indicated	2,550	7.0	0.60	0.19	0.22	2.0
Inferred	580	5.6	0.47	0.16	0.20	1.5
TOTAL	3,205	6.8	0.58	0.19	0.21	1.9

Mineral Resource Category	In-situ HM Million Tonnes[1]	Mineral Assemblage (as % of HM)[3]				
		Zircon	HiTi Leucoxene	Leucoxene	Ilmenite	Valuable HM%
Measured	6	9.3	2.7	2.7	30	45
Indicated	180	8.9	2.9	3.6	28	43
Inferred	32	8.8	3.0	4.1	28	43
TOTAL	218	8.9	2.9	3.7	28	43

[1] All tonnages and grades have been rounded to reflect the relative uncertainty of the estimate, thus sum of columns may not equal.
[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] Estimates of Mineral Assemblage are presented as percentages of the Heavy Mineral (HM) component of the deposit, as determined by magnetic separation, QEMSCAN and XRF. Magnetic fractions were analysed by QEMSCAN for mineral determination as follows: Ilmenite: 40-70% TiO2 >90% Liberation; Leucoxene: 70-94% TiO2 >90% Liberation; High Titanium Leucoxene (HiTi Leucoxene): >94% TiO2 >90% Liberation; and Zircon: 66.7% ZrO2+HfO2 >90% Liberation. The non-magnetic fraction was submitted for XRF analysis and minerals determined as follows: Zircon: ZrO2+HfO2/0.667 and High Titanium Leucoxene (HiTi Leucoxene): TiO2/0.94.

Table 1. Thunderbird Mineral Resource Estimate at a cut-off grade of 3% HM.

Mineral Resource Category	Million Tonnes[1]	Bulk Density	HM %	Slimes %	Osize %	In-situ HM Million Tonnes[1]
Measured	35	2.2	12.7	18	14	4
Indicated	920	2.1	11.9	15	10	110
Inferred	125	2.0	10.8	14	9	14
TOTAL	1,080	2.1	11.8	15	10	128

Mineral Resource Category	Material Million Tonnes[1]	HM %	Valuable HM Grade (% In-situ)[2]			
			Zircon	HiTi Leucoxene	Leucoxene	Ilmenite
Measured	35	12.7	1.1	0.32	0.27	3.7
Indicated	920	11.9	0.93	0.29	0.26	3.3
Inferred	125	10.8	0.83	0.25	0.24	3.0
TOTAL	1,080	11.8	0.92	0.28	0.25	3.3

Mineral Resource Category	In-situ HM Million Tonnes[1]	Mineral Assemblage (as % of HM)[3]				
		Zircon	HiTi Leucoxene	Leucoxene	Ilmenite	Valuable HM%
Measured	4	8.7	2.6	2.2	30	43
Indicated	110	7.9	2.4	2.2	28	40
Inferred	14	7.7	2.4	2.2	28	40
TOTAL	128	7.9	2.4	2.2	28	40

[1] All tonnages and grades have been rounded to reflect the relative uncertainty of the estimate, thus sum of columns may not equal.
[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] Estimates of Mineral Assemblage are presented as percentages of the Heavy Mineral (HM) component of the deposit, as determined by magnetic separation, QEMSCAN and XRF. Magnetic fractions were analysed by QEMSCAN for mineral determination as follows: Ilmenite: 40-70% TiO_2 >90% Liberation; Leucoxene: 70-94% TiO_2 >90% Liberation; High Titanium Leucoxene (HiTi Leucoxene): >94% TiO_2 >90% Liberation; and Zircon: 66.7% ZrO_2+HfO_2 >90% Liberation. The non-magnetic fraction was submitted for XRF analysis and minerals determined as follows: Zircon: ZrO_2+HfO_2/0.667 and High Titanium Leucoxene (HiTi Leucoxene): TiO_2/0.94.

Table 2. Thunderbird Mineral Resource Estimate at a cut-off grade of 7.5% HM.

Yours faithfully,

Trent Strickland
Senior Consultant

Competent Persons Statements

The information in this report that relates to Mineral Resources is based on information compiled by Mr Trent Strickland, who is a Member of the Australasian Institute of Mining and Metallurgy (AusIMM). Mr Strickland is a full time employee of QG Australia Pty Ltd and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Strickland consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.