Sheffield Resources LIMITED

SHEFFIELD DOUBLES MEASURED MINERAL RESOURCE AT THUNDERBIRD

HIGHLIGHTS

- 100% increase in Measured category of high-grade Mineral Resource
- Outstanding in-situ zircon grade of 1.07% in Measured Resource category (>7.5% HM cut off)
- Coherent high grade zone of 1.05Bt @ 12.2% HM (7.5% HM cut-off)

Sheffield Resources Limited ("Sheffield", "the Company") (ASX:SFX) today announced an updated Mineral Resource of 3.23 billion tonnes @ 6.9% heavy minerals (HM) for its 100% owned, world-class Thunderbird Mineral Sands Project, near Derby in northern Western Australia (Figure 7).

The new Mineral Resource, which was updated to include 110 infill holes drilled in the "up-dip" region of the deposit (see ASX announcement dated 10 December 2015), includes a coherent high grade zone of 1.05Bt @12.2% HM at a 7.5%HM cut-off (Measured, Indicated and Inferred). This high grade zone contains 9.7Mt of zircon, 3.0Mt of high-titanium leucoxene and 35Mt of ilmenite.

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 %	Total VHM %
Measured	3.0	510	8.9	0.71	0.20	0.19	2.4	3.5
Indicated	3.0	2,120	6.6	0.55	0.18	0.20	1.8	2.8
Inferred	3.0	600	6.3	0.53	0.17	0.20	1.7	2.6
Total	**3.0**	**3,230**	**6.9**	**0.57**	**0.18**	**0.20**	**1.9**	**2.9**
Measured	**7.5**	**220**	**14.5**	**1.07**	**0.31**	**0.27**	**3.9**	**5.5**
Indicated	7.5	640	11.8	0.90	0.28	0.25	3.3	4.7
Inferred	7.5	180	10.8	0.87	0.27	0.26	3.0	4.4
Total	**7.5**	**1,050**	**12.2**	**0.93**	**0.28**	**0.26**	**3.3**	**4.8**

Significantly, the Measured category of the Thunderbird Mineral Resource has been doubled to 220Mt @ 14.5% HM (at a 7.5% HM cut-off) with minimal change in the high in-situ zircon and ilmenite grades of 1.07% and 3.9% respectively (Table 1, Figure 1). The Measured component of the Mineral Resource alone places Thunderbird in the top tier of mineral sands deposits globally, including those currently in production.

[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 at the resource block model scale.
[3] Tonnes and grades have been rounded to reflect the relative accuracy and confidence level of the estimate, thus the sum of columns may not equal.

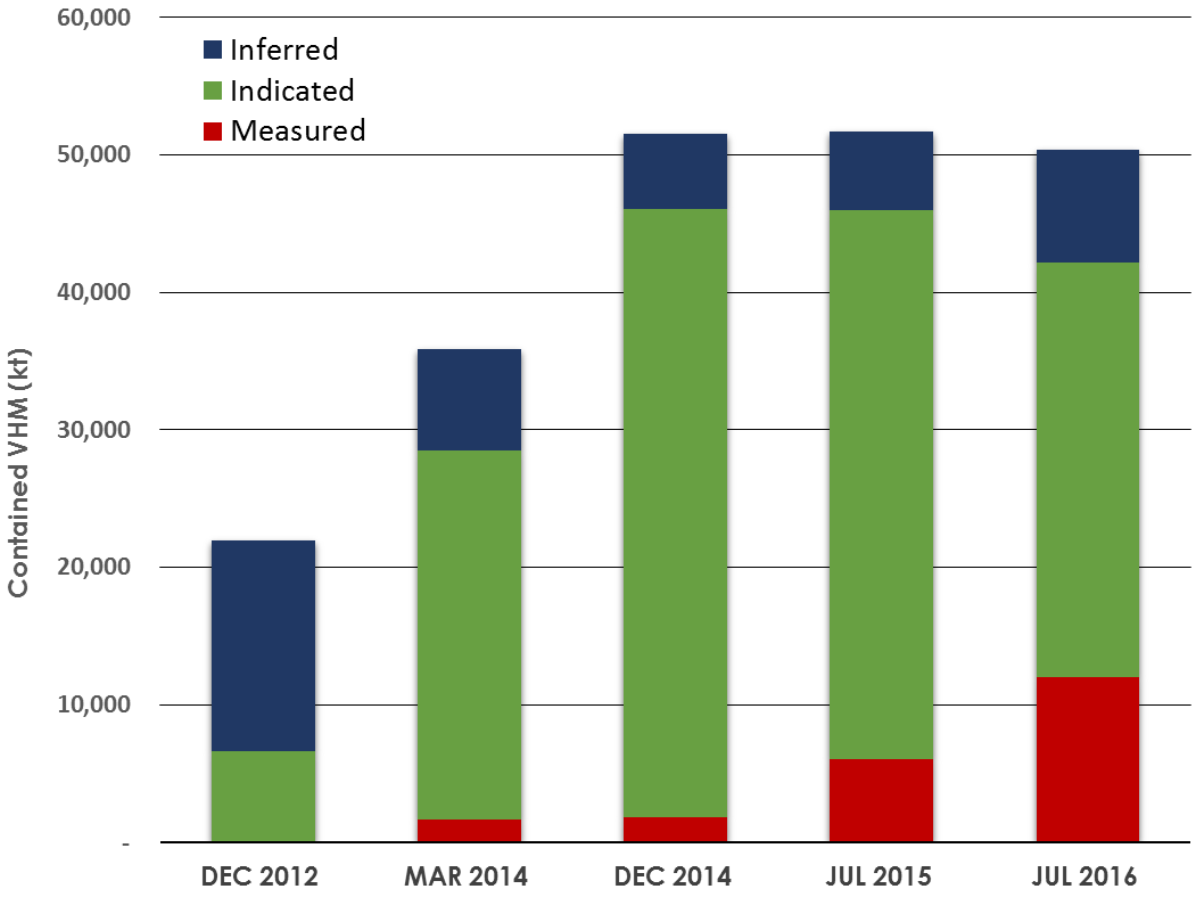

Figure 1: Thunderbird high grade (>7.5% HM) Mineral Resource total contained tonnes of VHM

The Measured Resource occurs in the near-surface portion of the deposit, which Sheffield is targeting in early production years. This area also contains the majority of the current Proved Ore Reserve (see ASX announcement dated 22 January 2016). The Bankable Feasibility Study (BFS) will employ a start-up strategy that targets mining of the shallow portion of the Measured Mineral Resource containing very high in-situ zircon and ilmenite grades to maximise revenues in early production years (Figure 2).

Sheffield's Managing Director Bruce McFadzean said the doubling of tonnes in the highest-confidence Measured Resource category is consistent with the Company's strategy of delivering a high-quality BFS. The BFS, which is being managed by leading engineering firm Hatch, is progressing extremely well and remains on schedule for completion by the end of 2016.

"The updated Mineral Resource provides a robust platform for comprehensive optimisation studies, mine design and detailed scheduling. In conjunction with the BFS update released last week, which outlined material improvements in metallurgical performance, it further highlights the significance of the project on a global scale.

"Thunderbird has a projected mine life of over 40 years and is one of the few Western Australian mining projects that enjoys 'Lead Agency' status with the Department of Mines and Petroleum. The project is commanding significant interest from both producers and consumers alike, due to its long mine life, zircon-rich mineral assemblage, high quality products, low-risk jurisdiction and exploration upside including the exciting new Night Train discovery."

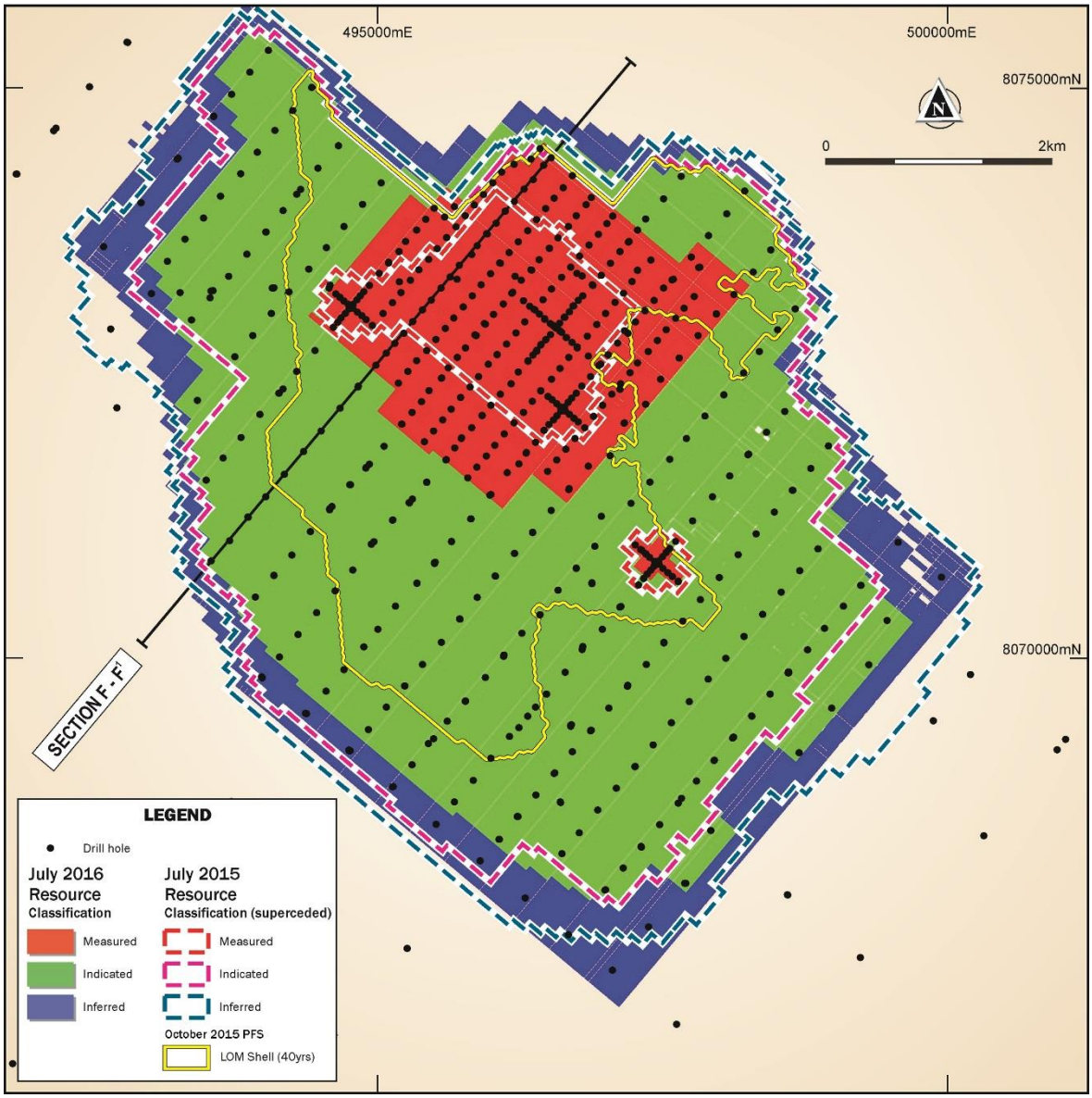

Figure 2: Thunderbird Resource block model resource category plan, and comparison with July 2015 resource category boundaries and October 2015 PFS pit shell

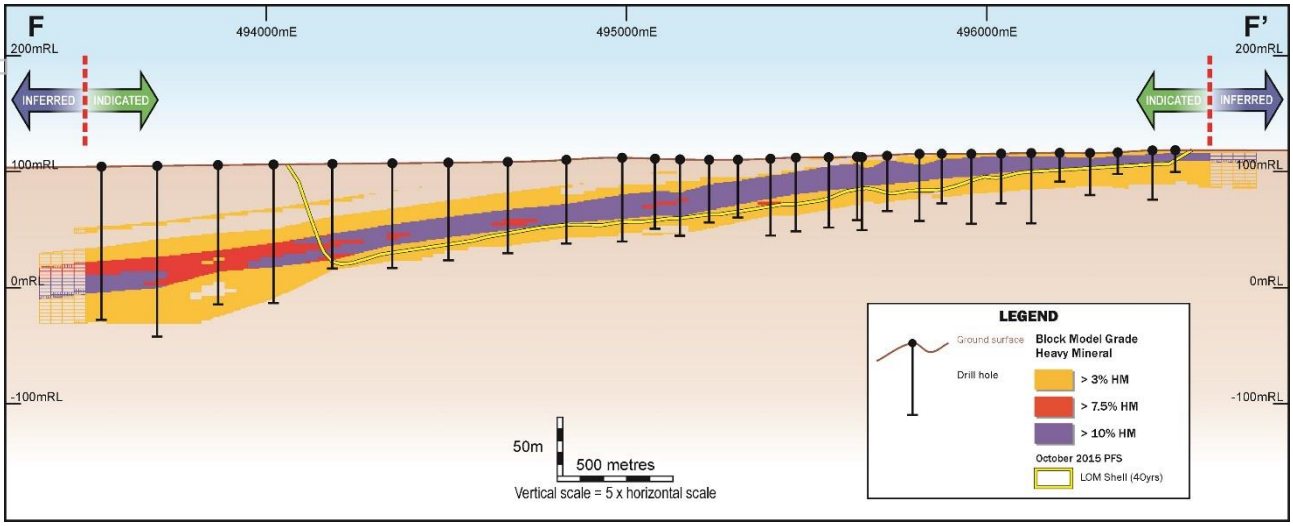

Figure 3: Cross-section F-F' through the Thunderbird resource block model showing the current Resource HM grade and October 2015 PFS pit shell outline

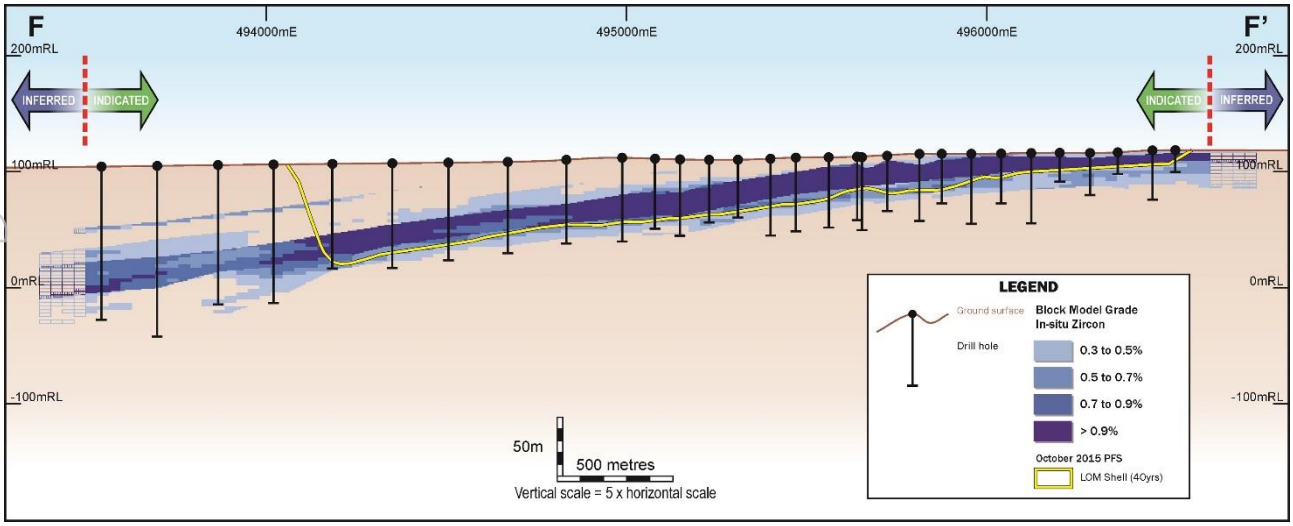

Figure 4: Cross-section F-F' through the Thunderbird resource block model showing the current Resource Zircon grade and October 2015 PFS pit shell outline

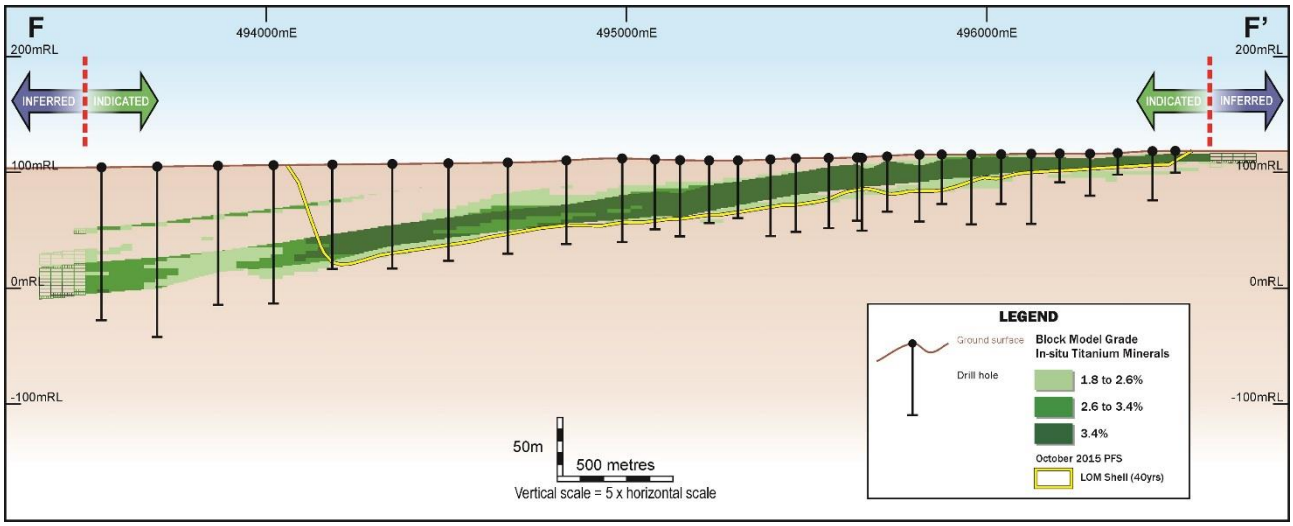

Figure 5: Cross-section F-F' through the Thunderbird Resource block model with the current Resource Titanium minerals grade and October 2015 PFS pit shell outline

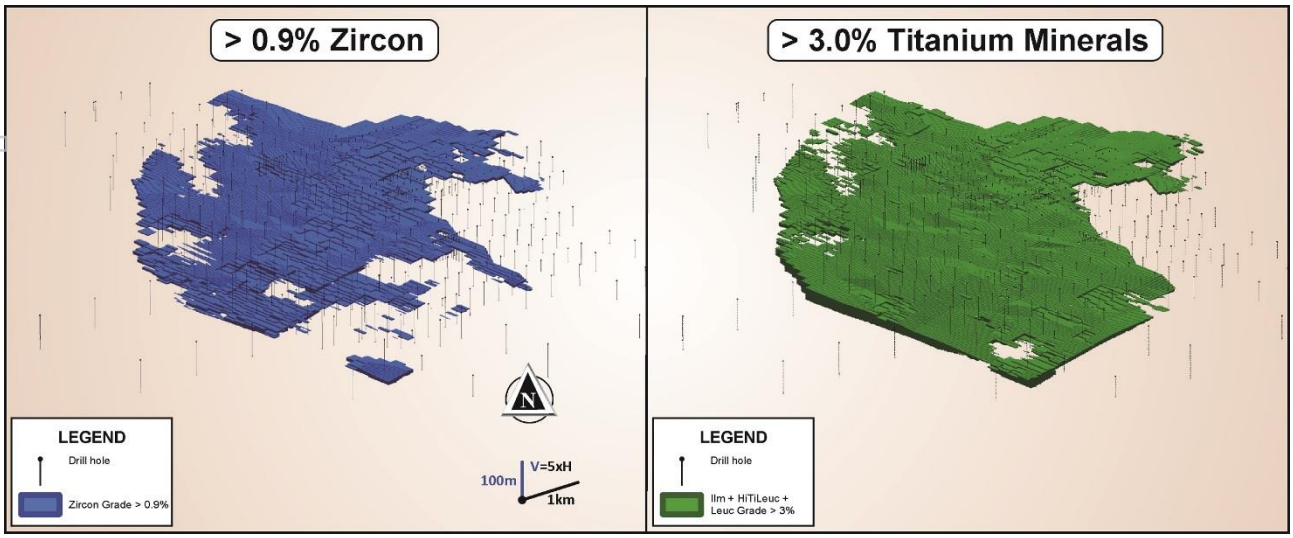

Figure 6: Thunderbird Resource block model >0.9% in-situ zircon left and >3% TiO_2 minerals right

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 Highway joining Derby and Broome (Figure 7).

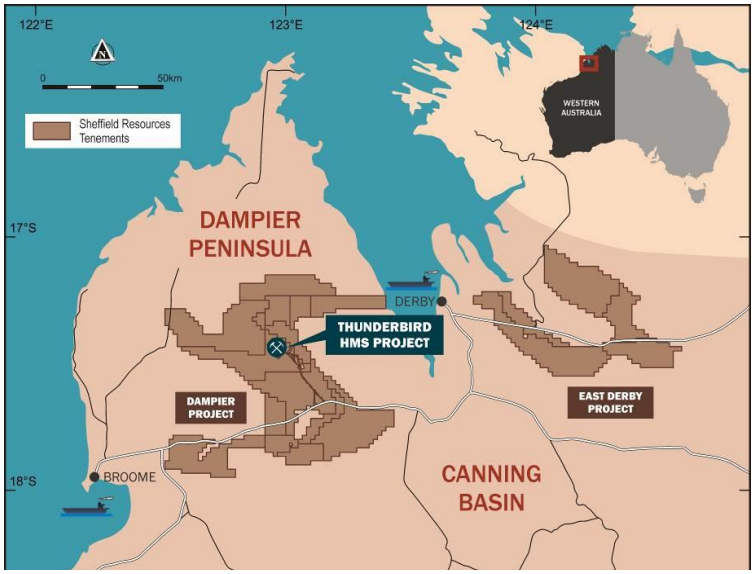

Figure 7: Location of the Thunderbird Mineral Sands Project

Thunderbird is the first major mineral sands deposit to be discovered in the Canning Basin, which is rapidly emerging as an important mineral sands province. Sheffield has a strategic tenement holding in the region of over 5,795km^2.

The Thunderbird deposit has many attributes that favour large scale mining. Mineralisation occurs as a gently-dipping, thick, broad sheet-like body. A high grade zone (+7.5% HM) averaging 16m thickness is encased within a halo of lower grade (+3% HM) mineralisation averaging 42m thickness (Figure 3). 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 shallower half of the deposit has high in-situ valuable heavy mineral (VHM) grades, with the overall mineralised package thickening down-dip (Figures 3 to 5). The continuity of mineralisation is exceptional, with high VHM grades defining very large, coherent bodies as shown by zircon (+0.9%) and titanium mineralisation (+3.0%) in figures 4 to 6.

A maiden Ore Reserve for Thunderbird, based on the July 2015 Mineral Resource and calculated in conjunction with the October 2015 Pre-Feasibility Study (PFS), was announced in January this year comprising 683Mt @ 11.3% HM (total Proved and Probable Reserves). The PFS supported a 40-year mine life for the Project with a life-of-mine strip ratio (waste:ore) of 0.67:1 (see ASX announcements dated 22 January, 2016 and 14 October, 2015).

Mineral Resource

This updated Mineral Resource incorporates results from 670 drill holes for a total 37,076 metres drilled by Sheffield between 2012 and 2015, including 110 new infill holes drilled during 2015 (refer to ASX release dated 10 December 2015). The resource in this announcement supercedes previously announced Mineral Resources for Thunderbird.

At a 3% HM cut-off, the Resource covers an area which is 8km 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 depth of 136m. The average depth to the top of main body of mineralisation is 24m and the average mineralised thickness is 42m (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 a 7.5% HM cut-off the Resource covers an area approximately 8km 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, and 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 124m. The average

depth to the top of the high-grade mineralisation is 35m and the average mineralised thickness is 16m (Figures 3-5). Approximately 28% of the >7.5% resource area is within 15m of surface.

The Resource includes the results of 759 samples which were analysed to determine the HM assemblage, representing 63% of the metres drilled within mineralisation. The analytical method used a combination of screening, magnetic separation, QEMSCAN and XRF. The method was developed following mineralogical trials guided by bulk sample metallurgical test work.

At a 3% HM cut-off, the HM assemblage of the total Resource comprises 8.3% zircon, 2.6% high-titanium leucoxene, 2.9% leucoxene and 28% ilmenite for a total VHM component of 42%. Process test work has shown that these 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 stratigraphic units. Its areal extent, thickness, grainsize, excellent grade and geological continuity are thought to indicate an off-shore, sub-wave base depositional environment.

The deposit is hosted by fine to very fine well-sorted compacted sand, highly weathered sandstone and minor discontinuous iron-cemented bands. The full mineralised unit is over 90m thick, very rich in heavy minerals (up to 40% HM), and contains a continuous high grade zone (>7.5% HM). The high grade zone is up to 46m thick (average 16m), occurs over an area about 8km x 4.5km, strikes approximately north-south, follows the dip of the host sequence and is open along strike.

ENDS

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Table 2: Thunderbird Deposit Mineral Resource[1]

Resource Category	Cut off (HM%)	Mineral Resources: Material (Mt)	Bulk Density	HM %	Slimes %	Osize %	In-situ HM (Mt)	Mineral Assemblage[2]: Zircon %	HiTi Leuc %	Leuc %	Ilmenite %
Measured	**3.0**	510	2.1	8.9	18	12	45	8.0	2.3	2.2	27
Indicated	**3.0**	2,120	2.0	6.6	16	9	140	8.4	2.7	3.1	28
Inferred	**3.0**	600	2.0	6.3	15	8	38	8.4	2.6	3.2	28
Total	**3.0**	3,230	2.0	6.9	16	9	223	8.3	2.6	2.9	28
Measured	**7.5**	220	2.1	14.5	16	15	32	7.4	2.1	1.9	27
Indicated	**7.5**	640	2.1	11.8	14	11	76	7.6	2.4	2.1	28
Inferred	**7.5**	180	2.0	10.8	13	9	20	8.0	2.5	2.4	28
Total	**7.5**	1,050	2.1	12.2	15	11	127	7.6	2.3	2.1	27

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**	3,600	1,000	1,000	12,000	17,700
Indicated	**3.0**	11,800	3,800	4,300	39,100	59,000
Inferred	**3.0**	3,200	1,000	1,200	10,500	15,900
Total	**3.0**	18,600	5,900	6,500	61,700	92,600
Measured	**7.5**	2,300	700	600	8,400	12,000
Indicated	**7.5**	5,800	1,800	1,600	21,000	30,200
Inferred	**7.5**	1,600	500	500	5,600	8,200
Total	**7.5**	9,700	3,000	2,700	35,000	50,400

[1] All tonnages and grades have been rounded to reflect the relative uncertainty of the estimate, thus sum of columns may not equal. [2] 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.

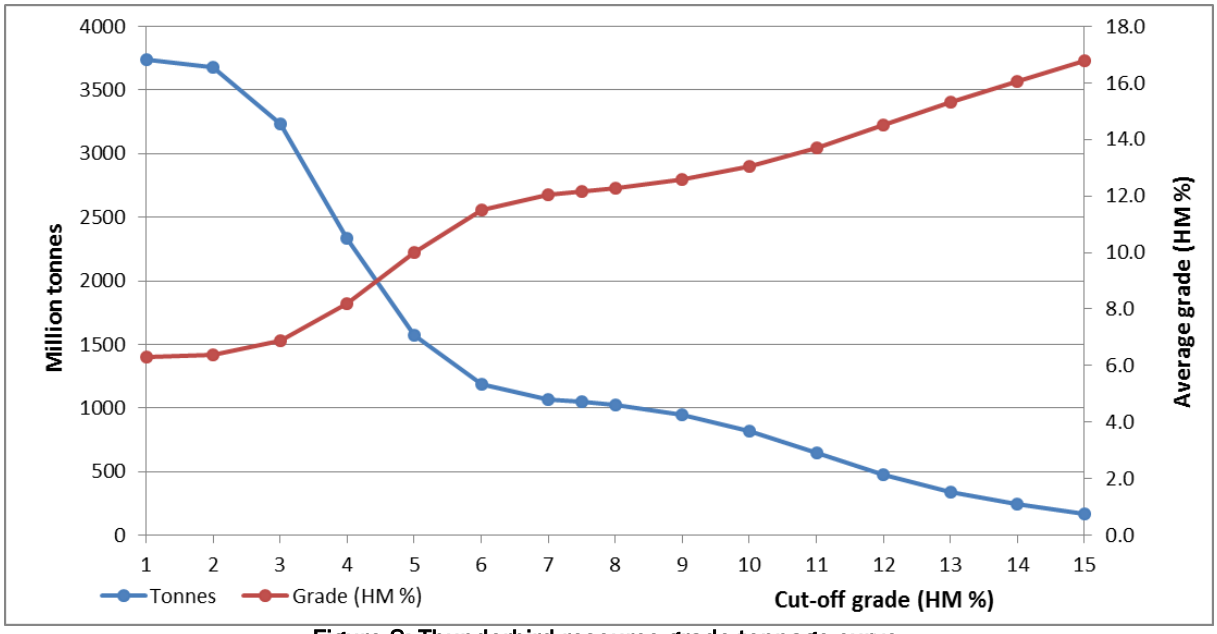

Figure 8: Thunderbird resource grade-tonnage curve.

COMPLIANCE STATEMENTS

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 Mrs Christine Standing, who is a Member of the Australasian Institute of Mining and Metallurgy (AusIMM). Mrs Standing is a full time employee of Optiro 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 she 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'. Mrs Standing consents to the inclusion in this report of the matters based on her information in the form and context in which it appears.

PREVIOUSLY REPORTED INFORMATION

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

- BFS Update: *"THUNDERBIRD MINERAL SANDS PROJECT - BFS UPDATE"* 29 June, 2016.
- Thunderbird Maiden Ore Reserve: *"MAIDEN ORE RESERVE – THUNDERBIRD PROJECT"* 22 January, 2016.
- Thunderbird infill drilling: *"NEW HIGH-GRADE RESULTS FROM INFILL DRILLING AT THUNDERBIRD"* 10 December, 2015.
- Thunderbird Pre-feasibility Study: *"PRE-FEASIBILITY STUDY UPDATE CONFIRMS THUNDERBIRD AS THE WORLD'S BEST UNDEVELOPED MINERAL SANDS PROJECT"* 14 October, 2015
- Thunderbird Bauer drilling: "*CONVENTIONAL DOZER TRAP MINING ASSESSED AS PREFERRED MINING METHOD AT THUNDERBIRD"* 17 September 2015
- Previous (superseded) Thunderbird Mineral Resource: *"THUNDERBIRD HIGH GRADE RESOURCE UPDATE"* 31 July, 2015

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

FORWARD LOOKING AND CAUTIONARY 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", "targeting", "likely", "scheduled", "intends", "potential", "prospective" and similar expressions.

ABOUT SHEFFIELD RESOURCES

Sheffield Resources Limited (Sheffield) is focused on developing its 100% owned, world class Thunderbird Mineral Sands Project, located in north-west Western Australia. Sheffield continues to explore the Dampier Project for other mineral sands opportunities, including the exciting Night Train deposit 20km south west of Thunderbird along with other targets identified within the region.

Sheffield is also exploring the Eneabba and McCalls regions north of Perth, Western Australia for mineral sands deposits. As an exploration company, Sheffield continues to assess other regional exploration opportunities.

THUNDERBIRD MINERAL SANDS

Thunderbird is one of the largest and highest grade mineral sands discoveries in the last 30 years.

The deposit is rich in zircon, which sets it apart from many of the world's operating and undeveloped mineral sands projects which are dominated by lower value ilmenite.

Sheffield's Pre-Feasibility study shows Thunderbird is a modest capex project that generates strong cash margins from globally significant levels of production over a 40 year mine life.

The Company is targeting project construction commencing in 2017 with initial production in 2019. The initial planned production profile is aligned with expected emerging supply gaps in global mineral sands markets.

ASX Code:	SFX	Market Capitalisation:	$63m
Issued shares:	147.4m	Cash (31 Mar 2016):	$7m (approx.)

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; for Thunderbird these include zircon, ilmenite, leucoxene and HiTi Leucoxene.

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 (70mm) and HQ (90mm) 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 method, etc).*	• Aircore system; NQ size for 39% of drill database (14,285m); HQ diameter for 61% (22,791m). • Blade drill bit used for majority (80%) of drilling. • Where hard rock layers were intersected and unable to drill with blade bit, a pencil (open-hole) or reverse circulation hammer was used. • System used as an industry standard for HMS deposits.

Criteria	JORC Code explanation	Commentary
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 sample database, 32% were collected as wet samples and 4% were classed as having poor recovery. • Historically a small negative bias in HM% and OS% and a small positive bias in SL% for dry compared with wet samples has been identified, as well as 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 (2%), 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. • Recent work at Thunderbird drilling of 20 sonic core holes as part of geotechnical investigations, and 5 large diameter Bauer holes for bulk sample collection. Assay results from these programs have not been incorporated into this resource estimate because the sample collection method is not of sufficient quality. However, visual observations have been incorporated into the geological interpretation of the deposit.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube 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.*	**HM%, SL% OS% Determination** Drill Site • A 2-3kg sample is collected at 1.5m intervals 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

Criteria	JORC Code explanation	Commentary
	• *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.*	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 (21% of sample database): screened and weighed. • 2013 - 2015 samples (79% 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 (for 97% of the assay database) or 1 in every 15 samples (for 3% of the assay database). • Laboratory internal standard inserted 1 in every 40 samples (for 97% 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. • 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 test work. • 4% 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

Criteria	JORC Code explanation	Commentary
		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 (28% of samples) or 38µm (72% 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 (97% 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 15% 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. **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 and is dominated by cemented sand aggregates). 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:

Criteria	JORC Code explanation	Commentary
		- 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. • 101 twinned drill holes have been examined for comparison of assay data between factors such as year drilled, hole diameter, drill type and assay method. A further 24 twinned drill holes have been examined to compare 2015 drilling with previous years' programs. ○ Analysis of the 101 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. ○ Analysis of the 24 drill hole twins show the 2015 program is biased significantly high in SL%, insignificantly low in OS%, and no bias in HM%. This is interpreted to be caused by the extended use of a reverse circulation hammer bit during the 2015 program (primarily to improve drilling efficiency). • All data was used in the Resource estimate. • The 2012 drill assay HM% and SL% data that was screened at 45µm (21% of assay database) was adjusted to 38µm data. The regression equations applied were from 38µm and 45µm data that has correlation coefficients of over 0.97 for HM% and SL%. • The 2015 drill assay SL% and OS% data was adjusted based on results of twinned holes to remove the bias introduced by the differing drill

Criteria	JORC Code explanation	Commentary
		and assay methods (9% of assay database). • 43 twinned drill holes 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 (702 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 after 2012 (88% of the database) in order to ensure a consistent determination method across the deposit. • 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. • 22 drill holes of the 670 (3%) 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). • Vertical datum geoid model is AUSGEOID09 (Australia). • Drill hole RL for Resource estimation is determined by projection of surveyed drill 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. Infill drilling has reduced the nominal spacing to 125m x 250m in the up-dip area of the resource. 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 670 holes, totalling 37,076m, with 24,688 samples assayed totalling 36,918m (99.6% of metres drilled). Of that, 15,163 assayed samples totalling 22,660m (61%) are

Criteria	JORC Code explanation	Commentary
		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. • 759 composites from 374 holes totalling 14,308m are used in the resource estimate. This represents 63% of the total length of drill holes 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 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 Resource consultancy Optiro. • The (previous) July 2015 Mineral Resource and associated data was reviewed in December, 2015 by an external Resource consultancy. This review found the sampling techniques and data to be sound and suitable for use in resource estimation. Recommendations were made to address the low bias in HM% values from 2012 drill holes, and obtain measurements for bulk density determination.

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, Sheffield will apply for an extension of the term of the tenement prior to its expiry. 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.

Criteria	Statement	Commentary
		• Sheffield has been operating successfully in the region for more than 4 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 the deeply weathered Lower Cretaceous-aged Broome Sandstone stratigraphic unit. Valuable heavy minerals (VHM) contained within the deposit include altered ilmenite, ilmenite, zircon, leucoxene and rutile. • 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, width, grade, geological continuity and grainsize of the Thunderbird mineralisation are interpreted to indicate an off-shore, sub-wave base depositional environment. • Sheffield geologists have defined three stratigraphic units within the deposit area using a combination of surface mapping and drill hole lithological logs. These are referred to locally as the Fraser Beds, Melligo and Thunderbird Formations. Of these the Thunderbird Formation is the most important, 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 compacted sand, highly weathered sandstone and minor discontinuous iron-cemented bands. It is up to 90m thick 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 up to 6.5km wide. • The iron cemented sandstone layers are thin (typically 5-10cm thick and rarely >30cm thick) and discontinuous and are not considered to present any increased risk to potential mining of the deposit. • Mineralisation is predominantly within compacted sand, except where it occurs within ~12m of surface where it is present mostly as a highly weathered (weakly indurated) sandstone.

Criteria	Statement	Commentary
		Process test work and excavation studies show typical recovery levels of high-quality VHM products are achieved from both material types (refer to Sheffield's website for further information on recovery and excavatability studies). • Also within the Formation is a continuous, very-high grade HM (>7.5%) zone named the GT Zone. This Zone is up to 46m thick over an area at least 8km x 4.5km, 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:* ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *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.*	• 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. • 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*	• See body of announcement for plan and cross section views and Mineral Resource tabulations.

Criteria	Statement	Commentary
	of drill hole collar locations and appropriate sectional views.	
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, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• Sheffield has previously reported deposit information for Thunderbird including a maiden Mineral Resource estimate (December 2012) and Mineral Resource Updates (March 2014, December 2014 and July 2015); Scoping Study results (April, 2104); Pre-feasibility Study results (May 2015 and October 2015); maiden Ore Reserve (January 2016); and updates related to the Bankable Feasibility Study (BFS) currently underway (March and June 2016). These include information on mineral assemblage, mineral processing, VHM product recoverability, quality and marketability and mining and financial evaluation. • 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.*	• A Bankable Feasibility Study (BFS) is currently underway for Thunderbird, and is due for completion by the end of 2016. This Mineral Resource will be used as a basis to update the Thunderbird Ore Reserve following detailed optimisation, mine design and scheduling studies as part of the BFS. • At this stage no additional resource updates are planned.

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 was further verified and validated by Optiro 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 - 2015 during operations. • Mrs Standing has not visited the Thunderbird site. • 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*	• As described above, Sheffield geologists have defined three stratigraphic units within the deposit

Criteria	JORC Code explanation	Commentary
	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.*	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 >1-2% 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 670 drill holes as well as surface geology has been used to develop the interpretation and this is supported by HM%, slimes% and oversize% assays. The result is excellent geological (and grade) continuity in the model (see diagrams above), as expected for this style of HM deposit. • The resource T1 domain imposes an approximate 1-2% HM cut-off on the resource, and at its upper boundary corresponds closely with a natural geological boundary (between Melligo and Thunderbird Formations). This allows higher cut-off grades (e.g. 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 block model covers an area about 8km 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 up to 136m. For the main body of the resource (i.e. excluding small isolated pods of mineralisation) the average depth to the top of mineralisation is 24m (range 0m to 84m) and the average mineralised thickness is 42m (range 2m to 85m). 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 block model covers an area about 8km 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% HM but strikes north-south, extending from surface to a maximum depth of 124m. For the main body of the resource (i.e. excluding small isolated pods of mineralisation) the average depth to the top of mineralisation is 35m (range 0m to 90m) and the average mineralised

Criteria	JORC Code explanation	Commentary
		thickness is 16m (range 1m to 46m). Approximately 28% of the >7.5% HM 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), slimes and oversize quantities were estimated using ordinary kriging (OK) into blocks of 50m East by 200m North by 3m RL. Zircon, HiTi leucoxene, leucoxene, ilmenite and 'other' material percentages were estimated using inverse distance (ID) into the parent blocks. Block dimensions were selected from kriging neighbourhood analysis and reflect the variability of the deposit and the model's practicality for future mine planning. Sub-cells to a minimum dimension of 50m E by 50m N by 0.5m RL were used to represent volume. For the definition of the topographical surface and soil horizon (of 20 cm) sub-celling was reduced to 5 mE by 10 mN by 0.2 mRL. • 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. Infill drilling in the area where the high grade domain outcrops at surface, conducted as part of the 2014 drilling campaign, has reduced the nominal spacing to 125m x 250m. Four separate close-spaced 'crosses' have been drilled at a nominal spacing of 60m both along and across strike. • Data analysis and estimation was undertaken using Snowden Supervisor and Datamine software. • Drill samples were composited to 1.5 m for estimation. • Wireframe 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. • Optiro assessed the robustness of these domains by critically examining the geological interpretation and by 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. • All variables were estimated separately and independently. • Hard boundaries were applied to the estimation of HM within mineralisation domains and a combination of hard and soft boundaries were applied for the estimation of SL, OS and the VHM components. • Grade capping was applied to HM%, SL% and OS%. The top cut levels were determined using a combination of top cut analysis tools, including grade histograms, log probability plots and the coefficient of variation. • Variogram analysis was undertaken to determine the kriging estimation parameters used for OK estimation of HM, slimes and oversize and the search dimensions used for ID estimation of the VHM components. • HM mineralisation continuity was interpreted from variogram analyses to have an along strike range of 1,300 m and an across strike range of 600 m. • The VHM continuity was interpreted from

Criteria	JORC Code explanation	Commentary
		variogram analyses to have an along strike range of 1,350 m and an across strike range of 600 m. • Kriging neighbourhood analysis was performed in order to determine the block size, sample numbers and discretisation levels. • Three estimation passes were used for HM; the first search was based upon the variogram ranges; the second search was 2 times the initial search and the third search was up to 6 times the initial search, with reduced sample numbers required for estimation. The majority of blocks (67%) were estimated in the first pass, 22% in the second pass and 10% in the third pass. • The HM, slimes and oversize estimated block model grades were visually validated against the input drill hole data and comparisons were carried out against the declustered drill hole data and by northing, easting and elevation slices. • The VHM estimated block model grades were visually validated against the input drill hole data and comparisons were carried out against the drill hole data and by northing and easting slices.
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 for 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 technical and economic assessment carried out during Pre-Feasibility studies. Optiro has reviewed the parameters used to support these cut-offs grades and believe them to be reasonable. • At a 3% HM cut-off, the HM grade of the Thunderbird Resource is 6.9% and the in situ VHM grade is approximately 2.9%. This compares favourably with other HMS deposits either recently or currently being mined. • The 7.5% HM cut-off has been 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 8) 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 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*	• In determining the criteria for 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. • 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

Criteria	JORC Code explanation	Commentary
	should be reported with an explanation of the basis of the mining assumptions made.	determining resource block sizes, and resource classification. • In addition, Sheffield has previously announced positive financial results from a Pre-Feasibility Study (see ASX announcement dated 14 October 2015) and an Ore Reserve (see ASX announcement dated 22 January, 2016) for Thunderbird. • 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, 5t and 12.5t 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 that 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 Pre-Feasibility Study (see ASX announcement dated 14 October 2015) and updates to the Bankable Feasibility Study in progress (see ASX announcement dated 29 June, 2016). • 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.
Environmen-tal 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 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 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,*	• Bulk density measurements of mineralisation were made during the large diameter Bauer drilling program (see ASX announcement dated 17 September 2015) through approximately 100t combined of topsoil, mineralised and non-mineralised materials. • The results of this work confirmed the bulk density values predicted from an industry-standard formula (used in previous resource estimates at

Criteria	JORC Code explanation	Commentary
	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.*	Thunderbird) which accounts for the HM and slimes content of heavy mineral sand deposits. • This formula has been applied to predict bulk density for the 2016 resource estimate.
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 estimate has been classified according to the guidelines of the JORC Code (2012), into Measured, Indicated and Inferred Resources 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 encompass an area inclusive of the 125 m by 250 m infill drilling and the four separate 'crosses' of close-spaced drilling, where drill spacing is 60 m along strike and 60 m across strike. • Indicated Resources are defined where drilling is at 500 m centres along strike by 250 m. • Inferred Resources are defined around the margins of Indicated Resource, where the drill spacing is 500 m by 500 m.
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 Optiro. • No external audit or review of the current 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.*	• The assigned classification of Measured, Indicated and Inferred reflects the Competent Persons' assessment of the accuracy and confidence levels in the Mineral Resource estimate. • The confidence levels reflect production volumes on a monthly basis. • No production has occurred from the deposit.

Sheffield Resources LIMITED

Appendix 2: Optiro Thunderbird Mineral Resource Statement Memorandum

– Following pages (p26 to p28) –

Memo

Optiro

To: David Boyd, Sheffield Resources Ltd

From: Christine Standing

Date 4 July 2016

Re: **THUNDERBIRD MINERAL SANDS DEPOSIT – MINERAL RESOURCE STATEMENT**

Optiro Pty Ltd (Optiro) has provided Sheffield Resources Ltd (SFX) with a resource model and Mineral Resource statement for the Thunderbird heavy mineral sands deposit, 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. At a 3% HM cut-off the Mineral Resource covers an area which is 8.5 km along strike and between 3 km and 6.5 km wide. The Mineral Resource occurs from surface to depths of up to 136 m, with an average depth to the top of the main body of mineralisation of 24 m, and an average mineralised thickness of 42 m. The heavy minerals within the Thunderbird deposit are interpreted to have been deposited and concentrated in an off-shore, sub-wave base depositional environment.

This Mineral Resource estimate is based on aircore (AC) and reverse circulation (RC) drilling data collected by SFX from 2012 to 2015. The drillhole database used to define the Mineral Resource comprises 670 vertical AC and RC drillholes for a total of 37,076 m, with 24,688 samples assayed totalling 36,918 m. Of that, 15,163 assayed samples totalling 22,660 m are within the mineralised zones of the resource. Almost 97% of the samples were taken over an interval of 1.5 m, thus the drill samples were composited to 1.5 m downhole intervals for resource estimation.

The nominal drill spacing is approximately 250 m by 500 m with the margins of the deposit drilled at a spacing of 500 m by 500 m and 1,000 m by 500 m. Infill drilling in the area where the high grade domain outcrops at surface, conducted as part of the 2014 and 2015 drilling campaigns, has reduced the nominal spacing to 125 m by 250 m. Four separate close-spaced 'crosses' have been drilled at a nominal spacing of 60 m both along and across strike.

Optiro has reviewed the quality of the drill data (location, recovery, sampling and assay quality) and concludes that it is of acceptable quality for use in Mineral Resource estimation and subsequent mine planning.

Wireframe solid model interpretations of mineralisation were made by SFX based on geological logging and heavy mineral (HM) content, using a nominal cut-off grade of 1% HM to define a low grade domain and 7.5% HM to define a high grade domain. Optiro verified the geological interpretation against the drillhole data and statistical and geostatistical analyses.

Ordinary kriging was used to estimate HM %, slimes % and oversize %. Variogram analysis was undertaken to determine the kriging estimation parameters and a kriging neighbourhood analysis was performed in order to determine the block size, sample numbers and discretisation. Grade capping was applied to HM, slimes and oversize. The top cut levels were determined using a combination of top cut analysis tools including grade histograms, log probability plots and the coefficient of variation.

The mineral assemblage of the Thunderbird Mineral Resource was estimated from mineralogical analyses of 759 composites created from 374 drillholes, totalling 14,308 m, from the 2013, 2014 and 2015 drilling programmes. 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 the Mineral Resource tabulations (Table 1). The composites consisted of samples taken from discrete intervals from within five geological units across multiple holes and combined. The composites used to estimate the valuable heavy mineral (VHM) content of the HM are well distributed throughout the deposit. An inverse distance approach was used to estimate zircon %, high titanium ('HiTi') leucoxene %, leucoxene % and ilmenite %.

The HM, slimes, oversize and VHM estimates were validated by Optiro as follows:

- visual checking of the interpolation results compared with drilling in both plan and section
- comparison of the global input (composites) and output (model) statistics, including clustered and declustered composites
- examination of trend plots of the input data and estimated block grades.

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

Bulk density measurements of mineralisation were made during the large diameter Bauer drilling programme (see ASX announcement dated 17 September 2015) through approximately 100 t combined of topsoil, mineralised and non-mineralised materials. The results of this work confirmed the bulk density values predicted from an industry-standard formula (used in previous resource estimates at Thunderbird) which accounts for the HM and slimes content of heavy mineral sand deposits. This formula has been applied to predict bulk density for the 2016 Mineral Resource estimate.

The Mineral Resource estimate has been classified (according to the definitions of the JORC Code, 2012) into Measured, Indicated and Inferred Resources, 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 encompass an area inclusive of the 125 m by 250 m infill drilling and the four separate 'crosses' of close-spaced drilling, where drill spacing is 60 m along strike and 60 m across strike. Indicated Resources are defined where drilling is 500 m along strike by 250 m across strike and Inferred Resources are defined around the margins of Indicated Resource, where the drill spacing is 500 m by 500 m.

The Thunderbird Mineral Resource estimate has been reported at both 3% HM and 7.5% HM cut-off grades. These cut-off grades were selected by SFX based on technical and economic assessments carried out during the Pre-Feasibility study, and by comparison with similar deposits currently being or recently 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 only by drilling. The Thunderbird Mineral Resource estimate, as at the 30 June 2016, is summarised in Table 1.

Table 1 Thunderbird Deposit Mineral Resource as at 30 June 2016

Resource category	Cut-off HM %	Million tonnes	Bulk Density	HM %	Slimes %	Oversize %	% of heavy mineral			
							Zircon	HiTi Leucoxene	Leucoxene	Ilmenite
Measured	3.0	510	2.1	8.9	18	12	8.0	2.3	2.2	27
Indicated	3.0	2,120	2.0	6.6	16	9	8.4	2.7	3.1	28
Inferred	3.0	600	2.0	6.3	15	8	8.4	2.6	3.2	28
Total	**3.0**	**3,230**	**2.0**	**6.9**	**16**	**9**	**8.3**	**2.6**	**2.9**	**28**
Measured	7.5	220	2.1	14.5	16	15	7.4	2.1	1.9	27
Indicated	7.5	640	2.1	11.8	14	11	7.6	2.4	2.1	28
Inferred	7.5	180	2.0	10.8	13	9	8.0	2.5	2.4	28
Total	**7.5**	**1,050**	**2.1**	**12.2**	**15**	**11**	**7.6**	**2.3**	**2.1**	**27**

Notes:
- *HM is within the +38um to -1mm size fraction and reported as a percentage of the total material*
- *All tonnages and grades have been rounded to reflect the relative uncertainty of the estimate, thus the sums of columns may not equal.*
- *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_2/0.9.*

Yours faithfully
OPTIRO

Christine Standing,
BSc (Hons), MSc, MAusIMM, MAIG
Principal Consultant

Competent Person's Statement

The information in this report that relates to the estimation of Mineral Resources is based on information compiled by Mrs Christine Standing, who is a Member of the Australasian Institute of Mining and Metallurgy (AusIMM). Mrs Standing is a full time employee of Optiro 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 she 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'. Mrs Standing consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.