Thunderbird

One of the World's Best Undeveloped Mineral Sands Projects

Diggers & Dealers Mining Forum
August 2016
ASX : SFX

sheffieldresources.com.au

DISCLAIMER

PREVIOUSLY REPORTED INFORMATION

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

"SHEFFIELD DOUBLES MEASURED MINERAL RESOURCE AT THUNDERBIRD" 5 July, 2016
"THUNDERBIRD MINERAL SANDS PROJECT - BFS UPDATE" 29 June, 2016
"PREMIUM ZIRCON AT NIGHT TRAIN", 14 April 2016
"SHEFFIELD APPOINTS HATCH TO DELIVER BFS FOR THUNDERBIRD PROJECT", 2 March 2016
"MAIDEN ORE RESERVE – THUNDERBIRD PROJECT", 22 January, 2016
"PRE-FEASIBILITY STUDY UPDATE CONFIRMS THUNDERBIRD AS THE WORLD'S BEST UNDEVELOPED MINERAL SANDS PROJECT", 14 October 2015
"NEW MINERAL SANDS DISCOVERY AT NIGHT TRAIN", 22 September 2015
"OUTSTANDING RESULTS FROM ILMENITE UPGRADE TESTWORK", 9 September 2015
"CONVENTIAL DOZER TRAP MINING CONFIRMED AS PREFERRED MINING METHOD AT THUNDERBIRD", 17 September 2015
"THUNDERBIRD HIGH GRADE RESOURCE UPDATE", 31 July 2015
"QUARTERLY REPORT FOR PERIOD ENDING 30 JUNE 2015", 27 July 2015
"PRE-FEASIBILITY STUDY CONFIRMS THUNDERBIRD AS NEXT MAJOR MINERAL SANDS PROJECT IN GLOBAL DEVELOPMENT PIPELINE", 14 May 2015
"THREE NEW MINERAL SANDS DISCOVERIES IN CANNING BASIN", 25 February 2015

These announcements are available to view on Sheffield Resources Ltd's website: 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, Ore Reserves, Pre-feasibility Study and Technical 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

FORWARD LOOKING STATEMENTS

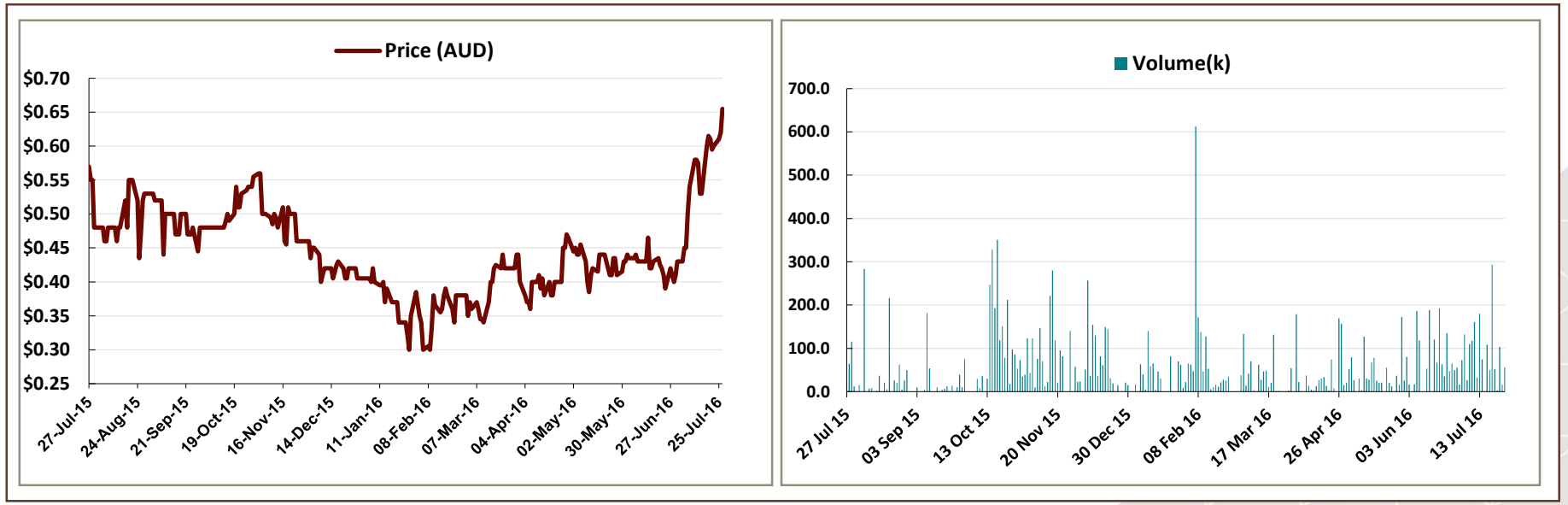
Some statements in this report regarding estimates or future events are forward-looking statements. They include indications of, and guidance on, future earnings, cash flow, costs and financial performance. Forward-looking statements include, but are not limited to, statements preceded by words such as "planned", "expected", "projected" "estimated" "may", "scheduled", "intends", "potential", "could" "nominal" "conceptual" and similar expressions. Forward looking statements, opinions and estimates included in this announcement are based on assumptions and contingencies which are subject to change without notice, as are statements about market and industry trends, which are based on interpretations of current market conditions. Forward looking statements are provided as a general guide only and should not be relied on as a guarantee of future performance. Forward looking statements may be affected by a range of variables that could cause actual results to differ from estimated results.

MINERAL RESOURCES RELATED TO PFS RESULTS

In this report that part of the Thunderbird Measured and Indicated Mineral Resource, considering the results of pit optimisations, preliminary mine designs and economic factors, that has been evaluated in the October 2015 Pre-feasibility Study is 685Mt at 11.3% HM. These considerations for the PFS are not sufficient to meet the requirements of an Ore Reserve as defined under the 2012 edition of the JORC Code and therefore should not be considered as such. Subsequent to the PFS, on 22 January 2016, Sheffield announced a maiden Ore Reserve for Thunderbird meeting the requirements of the JORC Code 2012, totalling 682.7Mt @ 11.3% HM (Proved and Probable), based on that portion of the July, 2015 Thunderbird deposit Measured and Indicated Mineral Resources within mine designs that may be economically extracted with appropriate consideration of modifying factors, costs, mineral assemblage, process recoveries and product pricing. See Appendix 1 for further details.

CORPORATE SNAPSHOT

ASX CODE	ISSUED SHARES	EMPLOYEE OPTIONS	SHARE PRICE (28 July 2016)	MARKET CAP	CASH (UNAUDITED)[2]	ENTERPRISE VALUE	TOP TWENTY SHAREHOLDERS[2]
SFX	147.6M	8.7M (AVE.EX PRICE 48c)	A$0.62	A$92M	A$5.0M	A$87M	~43%



[2]unaudited as at 30 June 2016

DIRECTORS, MANAGEMENT & REGISTER

BOARD

Will Burbury
Non-executive Chairman

Bruce McFadzean
Managing Director

David Archer
Technical Director

Bruce McQuitty
Non-executive Director

MANAGEMENT

Bruce McFadzean
Managing Director

David Archer
Technical Director

Mark Di Silvio
CFO/Company Secretary

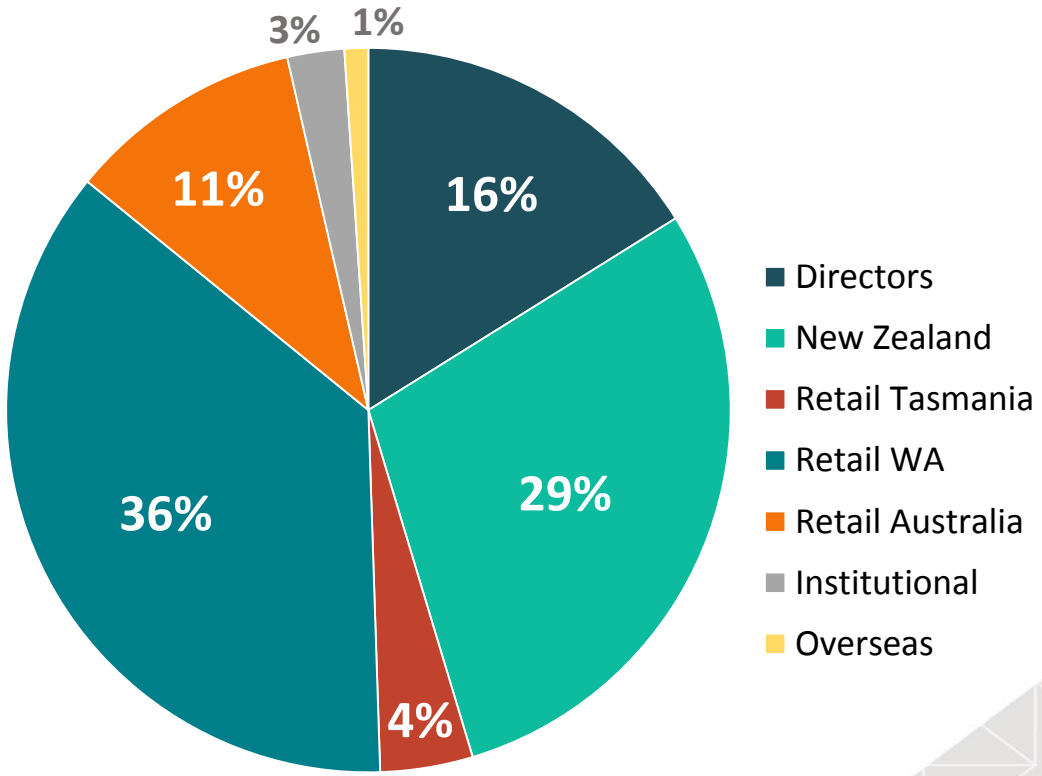
Jim Netterfield
BFS Project Manager

Neil Patten-Williams
Marketing Manager

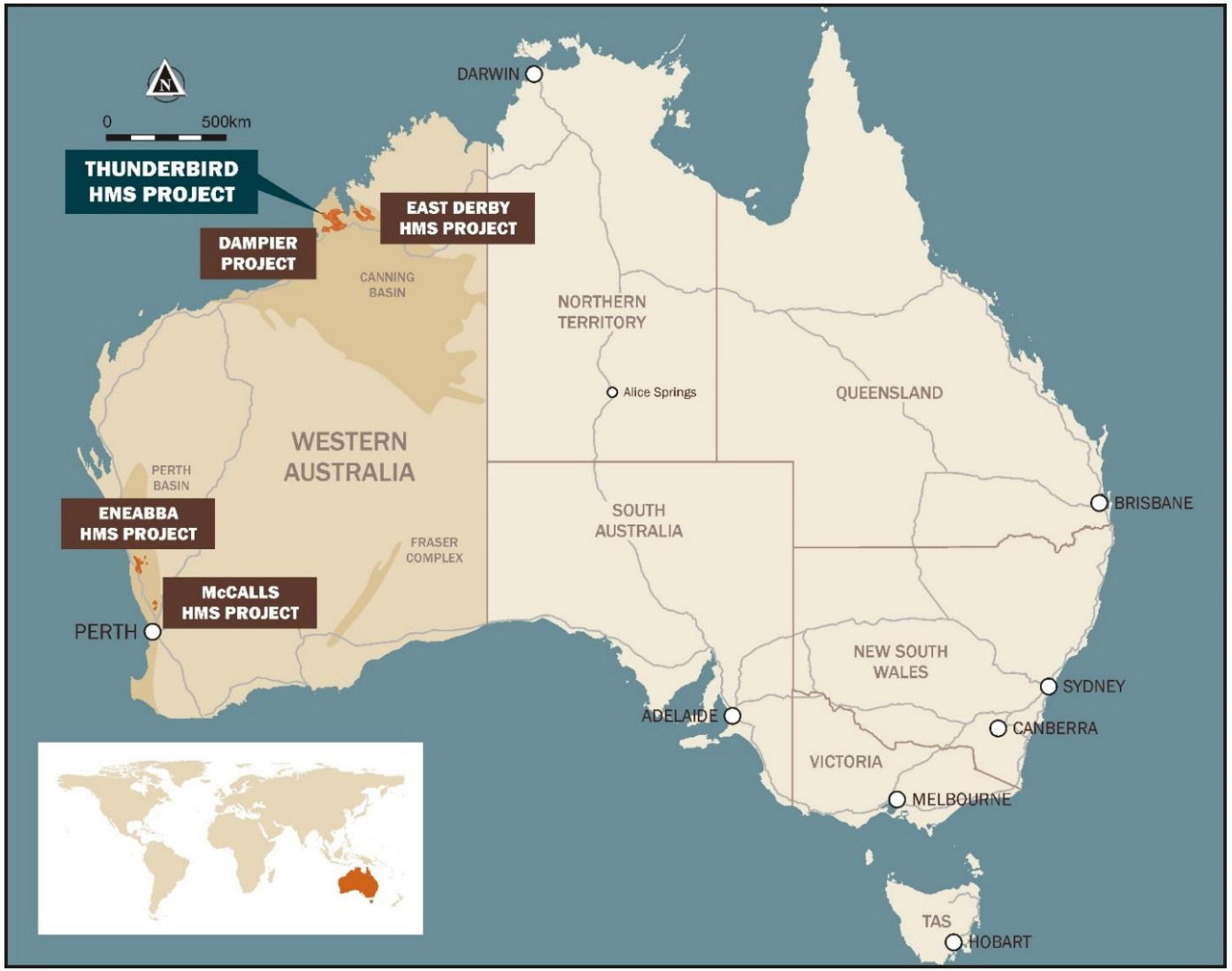
Mark Teakle
Development Manager

David Boyd
Exploration Manager

Wayne Groeneveld
Sustainability Manager



THUNDERBIRD DISCOVERY TO PRODUCTION



ASX listed
December 2010

Thunderbird Mineral Sands
Tier 1 project

From initial drill hole
to BFS in **4 Years**

Targeting first production
from Thunderbird
early 2019

Potential **Multi-decade**
(+40 year) operation

First mover status
in Canning Basin
mineral sands province

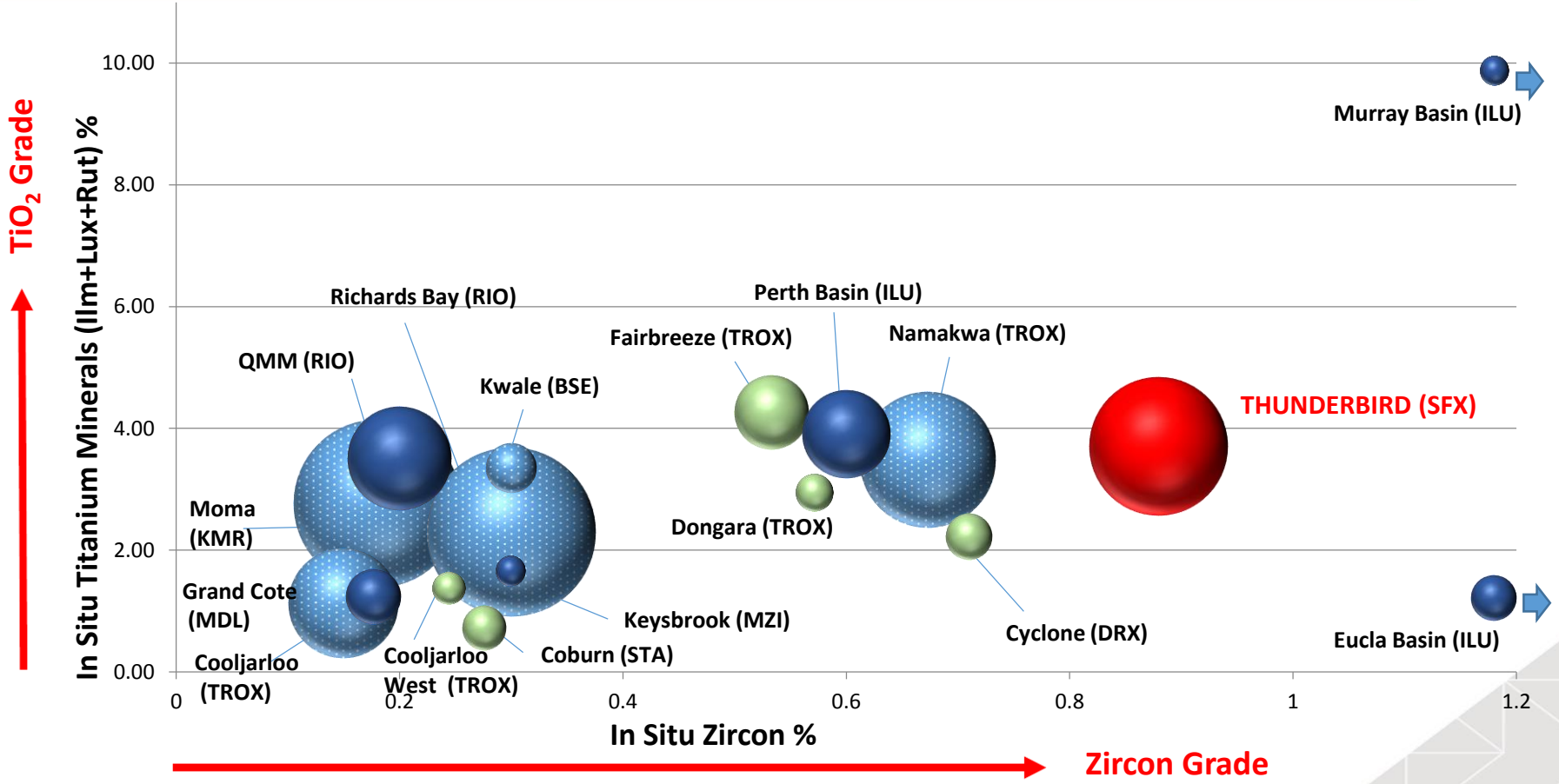
Lead Agency status with
Department of Mines and
Petroleum

2013 Explorer of the year
and 2013 Diggers and
Dealers Best Emerging
Company Award

PROSPECT AWARDS WINNER 2013 Explorer of the Year

2013 Diggers & Dealers Mining Forum Winner of The Best Emerging Company Award

THUNDERBIRD - WORLD CLASS ORE RESERVE



Amongst the world's **largest** and **highest grade zircon rich** Ore Reserves

Australia, one of the best mining jurisdictions in the world

Most of the world's minerals sands Ore Reserves are in **high risk jurisdictions**

Thunderbird Ore Reserves ranked against Ore Reserves of current mineral sands operations and projects under investigation globally
Blue bubbles are operating mines, green bubbles are Ore Reserves reported but project is not operating. Blue hatch bubbles represent operating African mines' Ore Reserves
Bubble size proportional to tonnes of contained VHM. Only Ore Reserves > 4Mt contained VHM shown.
Data compiled by Sheffield from public sources

TARGET KEY METRICS

FINANCIALS

- **Capital: <A$300M[1] (US$220M)**
- <4 year payback
- A$12B gross revenue (LOM)
- Zircon and Ilmenite rich revenue stream
- Revenue 60% zircon, 32% ilmenite & 8% HiTi

PHYSICALS

- **Multi decade (>40 year) LOM**
- Low strip ratio 0.7:1.0 (LOM)
- Strip ratio 0.2:1.0 (yrs 1-7)
- 80% premium grade zircon
- Ilmenite LTR >57% TiO_2

COST & PRICE FORECAST

- **Targeting A$308/t C1 cost[2]**
- LOM Zircon price US$1371/t (~US$1,000 current)
- LOM Ilmenite price US$185/t (~US$135 current)
- LOM HiTi88 price US$700/t (~US$400 current)
- Exchange rate $0.74 ($0.75 current)

Target Key Metrics based on results of Pre-feasibility Study announced on 14 October 2015.
[1] Includes contingency.
[2] Including government royalty

BFS STRATEGY

KEY DELIVERABLES

Targeting:

- BFS Completion late 2016
- Targeting 7.5-10.0 Mt initial capacity with potential scope to double capacity >year 4
- Further improvements from LTR ilmenite roasting
- Simplification of product process flow sheet
- Capital efficient design
- Optimise recoveries

COMMUNITY/EMPLOYMENT

Targeting:

- Local DIDO workforce
- Promotion of Aboriginal employment and business opportunities
- Positive community support
- Promotion of local business participation
- Long mine life opportunity for local communities

PERMITTING

- Government support via "Lead Agency Status" from Department of Mines and Petroleum (DMP)
- Public Environmental Review process commenced
- Native Title approvals targeted in 2016
- Local government approval processes commenced

BFS UPDATE

Tier 1 Engineering House HATCH managing the BFS delivery

PROCESS TEST WORK

- 40t bulk sample testing on full-scale and scalable equipment
- Increased HM grade of feed to Wet Concentration Plant (WCP) to 26.2%
- Stage recoveries increased for ilmenite and zircon from PFS in WCP and Concentrate Upgrade Plant (CUP)

LOW TEMP. ROAST

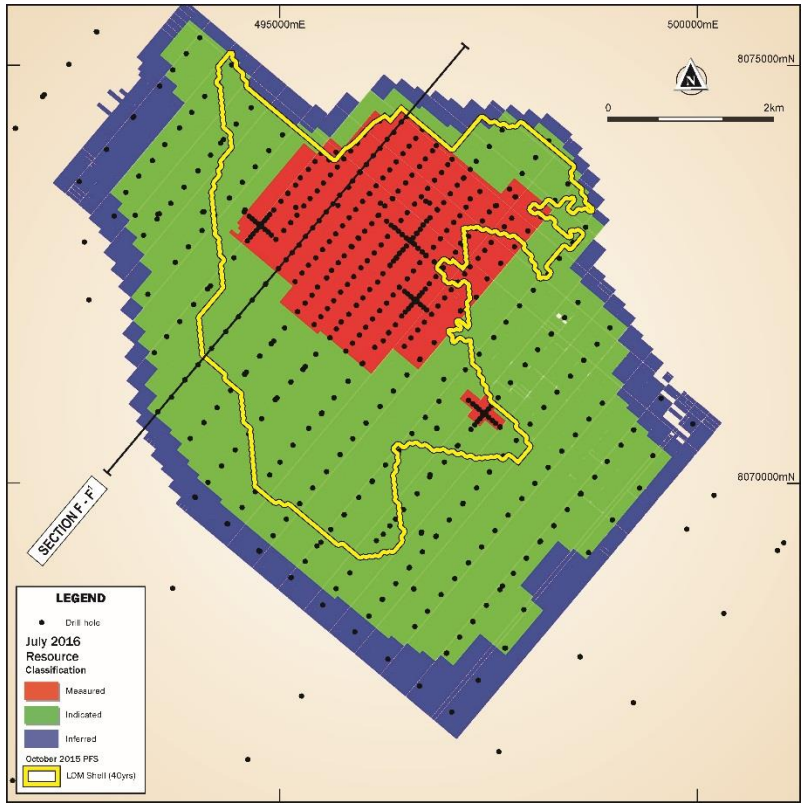
- High-grade LTR Ilmenite (57.9% TiO_2) produced from bench-scale test work
- Outstanding improvements in the $FeO:Fe_2O_3$ ratio to >1.0 – potential game-changer for sulphate ilmenite market
- Pilot-scale continuous-flow test at Hazen Laboratories, Colorado USA on Thunderbird ilmenite
- Final product samples to be generated for customers

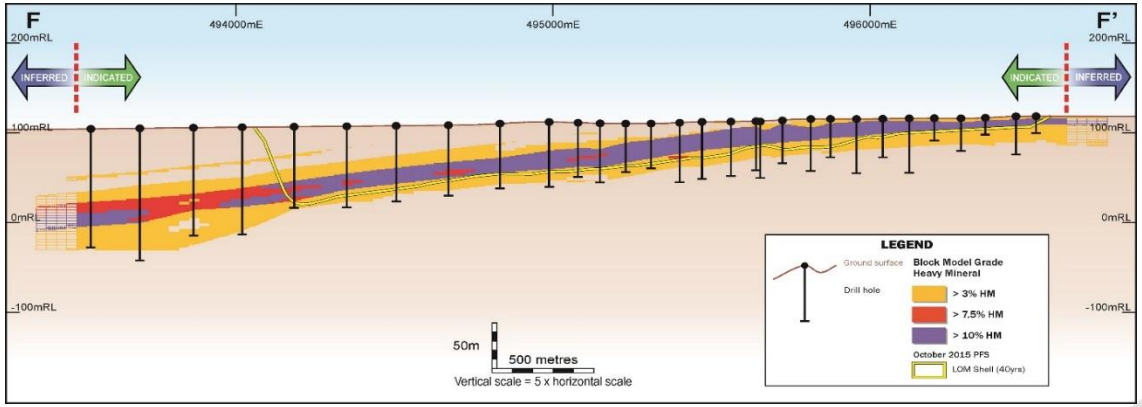
OTHER

- Mineral Resource Update doubles Measured Resources to 220Mt @ 14.5% HM
- Trenching confirms BFS production rates will be readily achieved with D11 dozers
- Project Environmental Scoping Document (ESD) approved by the Western Australian Environmental Protection Authority (EPA)
- Native Title negotiations remain on target for completion before the end of 2016

Refer to ASX Announcements dated 29 June and 5 July 2016 for further details

THUNDERBIRD - WORLD CLASS DEPOSIT





- Thunderbird has a **continuous High Grade Zone of up to 46m thickness**
- **HG zone is surface outcropping** in the northern part of the deposit
- Deposit geometry and grade consistency **favours large scale mining**
- **Very low strip Ratio** (<0.7:1:0) targeted

CONVENTIONAL PROCESSING

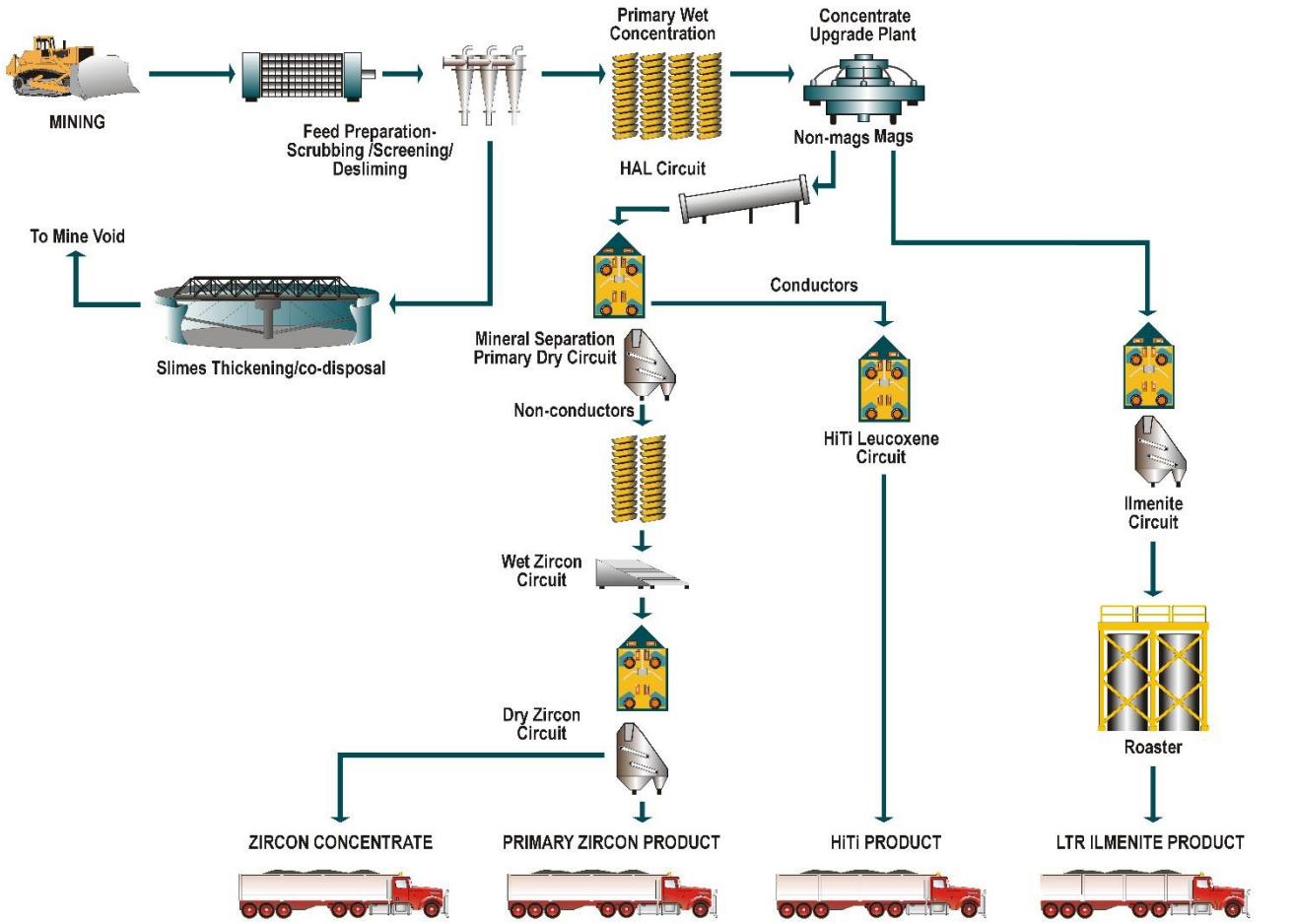
Conventional heavy mineral sands processing circuit to deliver zircon, ilmenite, and HiTi88 products[1]

The process includes an ilmenite upgrade step using **a low temperature roast** ("LTR")

LTR upgrades the primary ilmenite by 22% to produce a **high grade sulphate ilmenite**

BFS targeting further **LTR ilmenite upgrades[2]**

BFS targeting **premium zircon** product and a secondary zircon concentrate



[1] Process design by Robbins Engineering, based on metallurgical testwork carried out on a 40t bulk sample using full scale & scalable equipment
[2] BFS test work has achieved ferric/ferrous ratio >1. Further work in progress.

INFRASTRUCTURE & LOGISTICS POTENTIAL

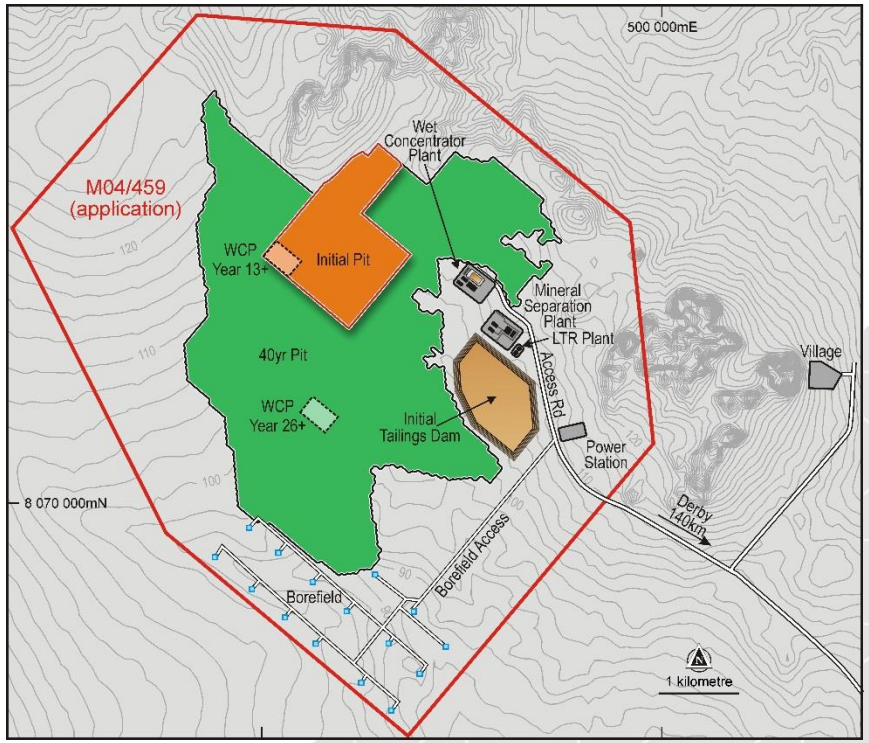
TARGETED MINING & SITE INFRASTRUCTURE

- Targeting initial 7.5mtpa dry mining capacity
- Conventional dozer trap mining (eg. JA, Kwale)
- Proposed mining to commence in shallow northern sector of deposit
- WCP, MSP and initial tailings dam adjacent to deposit
- Only 2 WCP moves expected during mine operations

PRODUCT HANDLING & EXPORT TARGETS:

- Products trucked 150km from mine to Derby
- Access agreement over bulk handling facility at Derby
- Product storage & loading at Derby Port
- Barging & transhipment of bulk ilmenite product
- Close proximity to potential markets

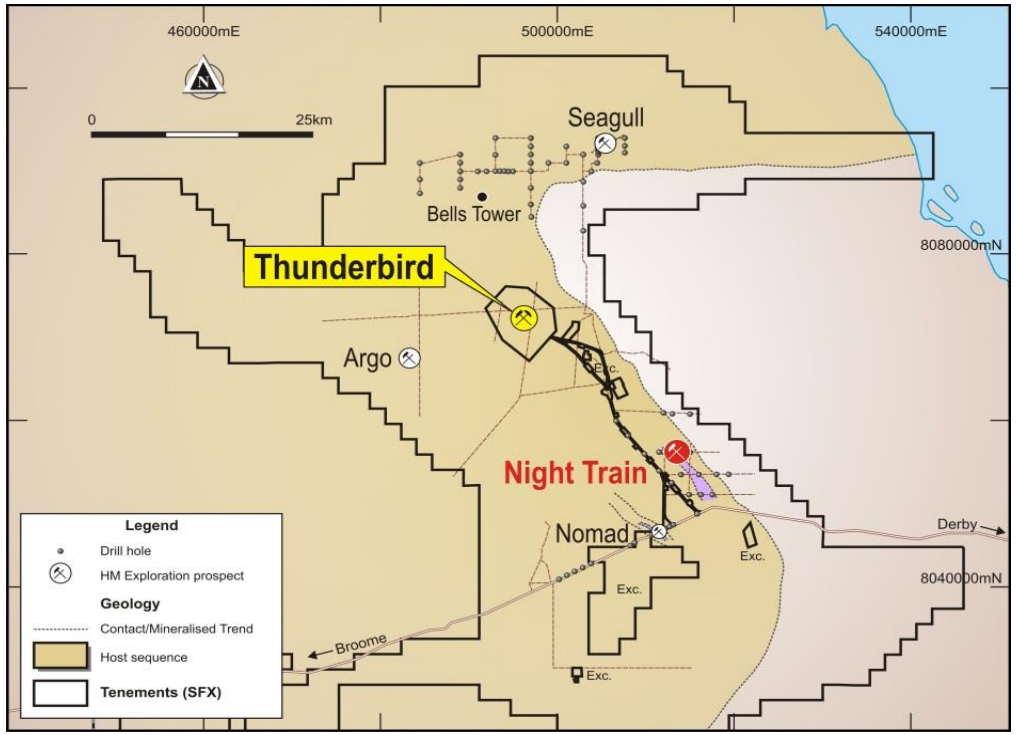
THUNDERBIRD SITE LAYOUT PLAN

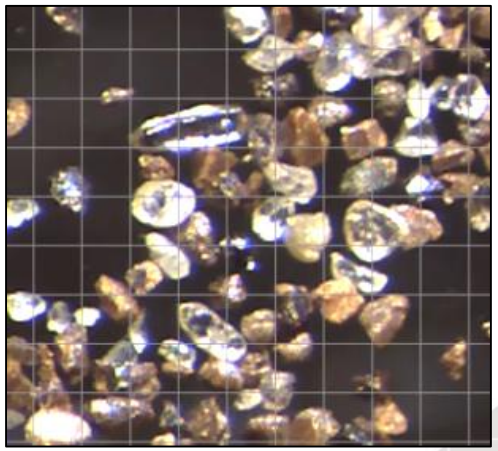


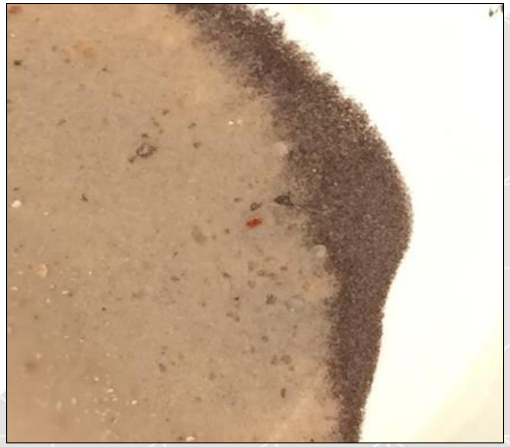
REGIONAL EXPLORATION POTENTIAL

NEW PROVINCE – MULTIPLE DISCOVERIES

- New discoveries from limited scout drilling including the zircon rich Night Train prospect, significant results include[1]
  - 7.5m @ 8.23% HM
  - 12.0m @ 5.48% HM
  - 7.5m @ 7.23% HM
- Night Train has a high value mineral assemblage: **92% VHM**, including 15% zircon, 61% leucoxene + HiTi [1]
- High quality zircon produced from metallurgical test sample[2]
- Test sample contained **17.4% zircon** in heavy mineral assemblage [2]
- New fertile province = high rate of discovery
- Large, strategic tenement holding over most prospective Formations
- Further drilling planned during 2H 2016







1 refer ASX:SFX announcements of 22 September 2015 and 25 February 2015
2 refer ASX:SFX announcements of 14 April 2016

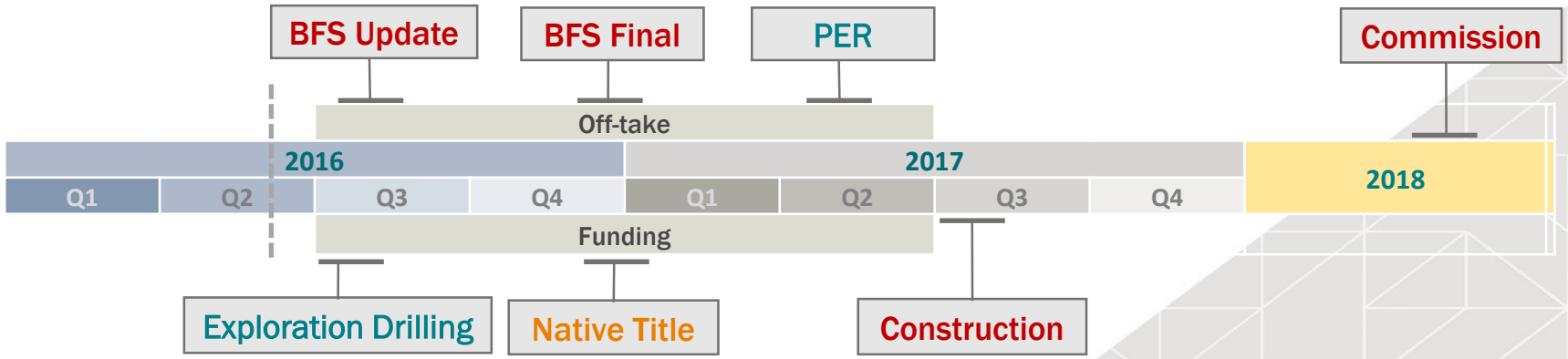
THUNDERBIRD KEY TARGETS & NEXT STEPS[1]

TARGETS

- Further reductions in capital 2016
- BFS – complete in 2016
- Native Title Agreement 2016
- Environmental permitting 2016/17
- Off-take partners sought 2016/17
- Funding options assessed 2016
- Exploration drilling 2016
- Partner identified 2016
- Construction commences 2017
- Commissioning 2018

TARGETED NEXT STEPS

Secure exclusive port access	completed
Appointment of BFS Study Manager	completed
40t bulk sample met test work	commenced
Flow sheet optimisation	completed
Ore Reserve	completed
Environmental	commenced
Native Title Agreement and Permitting	commenced
Marketing Manager	appointed
Debt Advisor	commenced
Off-take partners	commenced



1 There is no guarantee that these targets and steps will be achieved.

KEY INVESTMENT HIGHLIGHTS

- ✓ **Tier 1, high grade, large scale mineral sands project**
  - Among the world's largest and highest grade deposits
  - Located in the world's best mining jurisdiction
- ✓ **Well advanced asset – BFS underway**
  - Updated PFS completed in late 2015, BFS underway with completion targeted in 2016
- ✓ **Technically simple project utilising conventional mining and processing methods**
  - Targeting low strip ratio (<0.7:1.0)
  - Premium zircon and ilmenite products
  - Robust metallurgical test program
- ✓ **Targeted strong cash flow over multi-decade (+40 year) mine life**
  - Targeted revenue to cash cost ratio of 2:1 across LOM provides strong cash margins
- ✓ **Logistics and export infrastructure potential**
  - Port access agreement in place and close proximity to key Asian markets
- ✓ **Favourable mineral sands market dynamics**
  - Project commissioning targeted in late 2018

APPENDIX 1

THUNDERBIRD DEPOSIT ORE RESERVES[1,2]

Valuable Heavy Mineral (VHM) in-situ grade

Ore Reserve Category	Ore Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Valuable HM Grade (In-situ)[2]				Slimes (%)	Osize (%)
				Zircon %	HiTi Leuc %	Leuc %	Ilmenite %		
Proved	115.1	15.8	13.7	1.01	0.29	0.28	3.67	17.3	12.7
Probable	567.6	61.9	10.9	0.85	0.27	0.29	3.03	16.1	10.2
Total	**682.7**	77.1	**11.3**	**0.88**	**0.27**	**0.29**	**3.14**	**16.3**	**10.6**

Mineral assemblage as percentage of HM grade

Ore Reserve Category	Ore Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Mineral Assemblage[3]				Slimes (%)	Osize (%)
				Zircon (%)	HiTi Leuc (%)	Leuc (%)	Ilmenite (%)		
Proved	115.1	15.8	13.7	7.4	2.1	2.1	26.8	17.3	12.7
Probable	567.6	61.9	10.9	7.8	2.5	2.6	27.9	16.1	10.2
Total	**682.7**	77.1	**11.3**	**7.7**	**2.4**	**2.5**	**27.7**	**16.3**	**10.6**

[1] Calculations have been rounded to the nearest 100,000 t, 0.1 % grade. Differences may occur due to rounding. Ore Reserves are based upon the published July 2015 Mineral Resource, reported by economic cut-off with appropriate consideration of modifying factors, costs, mineral assemblage, process recoveries and product pricing.
[2] The in-situ grade is determined by multiplying the HM Grade by the percentage of each valuable heavy mineral within the heavy mineral assemblage.
[3] Mineral Assemblage is reported as a percentage of HM Grade, it is derived by dividing the in-situ grade for each mineral by the HM grade.

APPENDIX 1

THUNDERBIRD DEPOSIT MINERAL RESOURCE[1,2]

Cut-off (HM%)	Mineral Resource Category	Material Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Valuable HM Grade (In-situ)[3]				Slimes (%)	Osize (%)
					Zircon (%)	HiTi Leuc (%)	Leuc (%)	Ilmenite (%)		
> 3% HM	Measured	510	45	8.9	0.71	0.20	0.19	2.4	18	12
	Indicated	2,120	140	6.6	0.55	0.18	0.20	1.8	16	9
	Inferred	600	38	6.3	0.53	0.17	0.20	1.7	15	8
	Total	**3,230**	**223**	**6.9**	**0.57**	**0.18**	**0.20**	**1.9**	**16**	**9**
>7.5% HM	Measured	220	32	14.5	1.07	0.31	0.27	3.9	16	15
	Indicated	640	76	11.8	0.90	0.28	0.25	3.3	14	11
	Inferred	180	20	10.8	0.87	0.27	0.26	3.0	13	9
	Total	**1,050**	**127**	**12.2**	**0.93**	**0.28**	**0.26**	**3.3**	**15**	**11**

Cut-off (HM%)	Mineral Resource Category	Material Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Mineral Assemblage[4]				Slimes (%)	Osize (%)
					Zircon (%)	HiTi Leuc (%)	Leuc (%)	Ilmenite (%)		
> 3% HM	Measured	510	45	8.9	8.0	2.3	2.2	27	18	12
	Indicated	2,120	140	6.6	8.4	2.7	3.1	28	16	9
	Inferred	600	38	6.3	8.4	2.6	3.2	28	15	8
	Total	**3,230**	**223**	**6.9**	**8.3**	**2.6**	**2.9**	**28**	**16**	**9**
>7.5% HM	Measured	220	32	14.5	7.4	2.1	1.9	27	16	15
	Indicated	640	76	11.8	7.6	2.4	2.1	28	14	11
	Inferred	180	20	10.8	8.0	2.5	2.4	28	13	9
	Total	**1,050**	**127**	**12.2**	**7.6**	**2.3**	**2.1**	**27**	**15**	**11**

THUNDERBIRD DEPOSIT CONTAINED VALUABLE HM (VHM) IN MINERAL RESOURCES[1,2,5]

Cut-off (HM%)	Mineral Resource Category	Zircon Tonnes (thousands)	HiTi Leucoxene Tonnes (thousands)	Leucoxene Tonnes (thousands)	Ilmenite Tonnes (thousands)	**Total VHM Tonnes (thousands)**
>3% HM	Measured	3,600	1,000	1,000	12,000	17,700
	Indicated	11,800	3,800	4,300	39,100	59,000
	Inferred	3,200	1,000	1,200	10,500	15,900
	Total	**18,600**	**5,900**	**6,500**	**61,700**	**92,600**
>7.5% HM	Measured	2,300	700	600	8,400	12,000
	Indicated	5,800	1,800	1,600	21,000	30,200
	Inferred	1,600	500	500	5,600	8,200
	Total	**9,700**	**3,000**	**2,700**	**35,000**	**50,400**

[1]The Thunderbird Mineral Resources are reported inclusive of (not additional to) Ore Reserves. The Mineral Resource reported above 3% HM cut-off is inclusive of (not additional to) the Mineral Resource reported above 7.5% HM cut-off. Mineral Resources for the Dampier Project were prepared and first disclosed under the JORC Code 2012. [2]All tonnages and grades have been rounded to reflect the relative accuracy and confidence level of each estimate and to maintain consistency throughout the table, therefore the sum of columns may not equal. [3]The in-situ grade is determined by multiplying the HM Grade by the percentage of each valuable heavy mineral within the heavy mineral assemblage. [4]The Mineral Assemblage is represented as the percentage of HM grade. For Dampier the mineral assemblage was determined by screening and magnetic separation. Magnetic fractions were analysed by QEMSCAN for mineral determination as follows: >90% liberation and; Ilmenite 40-70% TiO_2; Leucoxene 70-94% TiO_2; High Titanium Leucoxene (HiTi Leucoxene) >94% TiO_2 and Zircon 66.7% ZrO_2+HfO_2. The non-magnetic fraction was analysed by XRF and minerals determined as follows: Zircon ZrO_2+HfO_2/0.667 and HiTi Leucoxene TiO_2/0.94. [5]The VHM resource inventory is derived from information in the Mineral Resource table.

APPENDIX 2

THUNDERBIRD HIGH GRADE MINERAL RESOURCE AT 7.5% HM CUT-OFF 31 JULY 2015

Resource	Mineral Resources [1]		Valuable HM Grade (in situ) [2]			
	Material Mt	HM %	Zircon %	HiTi Leuc %	Leucoxene %	Ilmenite %
Measured	220	14.5	1.07	0.31	0.27	3.9
Indicated	640	11.8	0.90	0.28	0.25	3.3
Inferred	180	10.8	0.87	0.27	0.26	3.0
Total	**1,050**	**12.2**	**0.93**	**0.28**	**0.26**	**3.3**

Globally Significant > 1Bt at 12.2% HM

Measured + Indicated > 80% of Resource

1. Refer to Appendix 1 for full Resources Tabulation. Tonnes have been rounded to reflect the relative accuracy and confidence level of the estimate.
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.

APPENDIX 3: **PRODUCT ASSESSMENT STUDY BY TZMI**

HIGH QUALITY PRODUCTS

ZIRCON (60% OF REVENUE)

- Primary zircon product meets the requirements for premium classification for use in the ceramic sector (80%)
- Targeting combination of secondary and special zircon products into a single zircon concentrate (20%)

LTR ILMENITE (32% OF REVENUE)

- LTR ilmenite (56.1% TiO_2) is suitable feedstock for sulphate pigment manufacture and, due to low impurities could be a preferential blend feed
- Low in key impurities Cr, Ca and Mg
- Smelter modelling shows TiO_2 content of the simulated slag product exceeded levels of typical chloride grade slags available from western ilmenite smelters
- Test work targeting increased reactivity and grade of the LTR ilmenite

HITI88 (8% OF REVENUE)

- HiTi88 product (87.7% TiO_2 content) is suitable for welding electrode application, particularly for flux core wires