

# Panda Hill Niobium Project "The Next Niobium Producer"

Africa Down Under Conference - September 2015



## **Panda Hill Niobium Project**

- Cradle and its joint venture partner own 50% of the Panda Hill niobium project in Tanzania (and exclusive right to acquire remaining 50%)
- Panda Hill has post-tax NPV<sub>10</sub> of US\$420 million¹ (Cradle's 50% share US\$210 million)
- Panda Hill is well advanced
  - ESIA and renewal of mining licences to November 2026 complete
  - DFS on track for completion in Q1 2016
  - Decision to mine expected early 2016
- Cradle's construction funding requirement is ~US\$50 million
  - Panda Hill equity contribution, expected to be ~US\$40 million
  - Pre-production and working capital of ~US\$30 million



## Cradle presents a standout investment proposition

- Panda Hill is a strategic, long life asset
- Located in Tanzania, a favourable African jurisdiction
- Differentiated commodity in niobium with favourable industry dynamics
- Low technical risk simple open-pit mining and processing
- Low capex and compelling economics
- Attractive entry point for incoming investor(s)

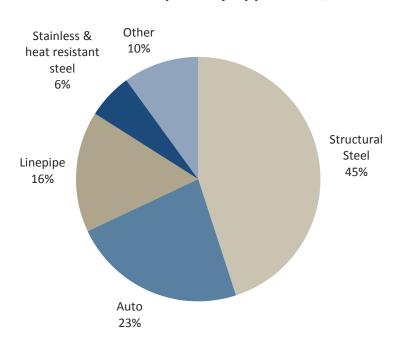
## Commercial niobium projects are very rare, strategic and valuable

- Niobium makes stronger, lighter & corrosion resistant steel products i.e. high-strength lowalloy steels (HLSA)
- Niobium production generates in excess of \$800 million in annual operating profits
- Lack of any direct substitutes Vanadium closest substitute for strength, however only where low temperature toughness is not required
- Low intensity of use in emerging countries, especially China & India, underpins long term demand
- Only 3 major niobium producers world wide (99% of global supply)
- China is the largest consumer globally and has no commercially viable niobium projects
- Limited prospects of new project supply potential niobium projects often plagued by complex metallurgy and marginal economics - i.e. no new projects have transitioned to mines in last 40 years



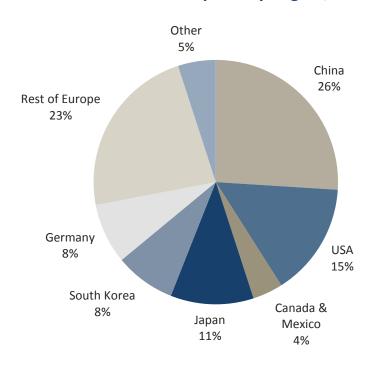
## 90% of niobium is used for producing high-strength low-alloy steels

### **Ferroniobium Consumption by Application, 2012**



### Ferroniobium Consumption by Region/Country, 2012

5



Source: Roskill

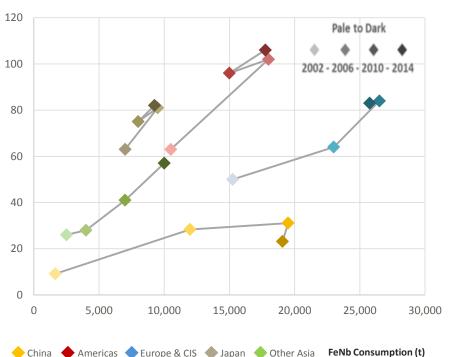


## **Intensity of Use**

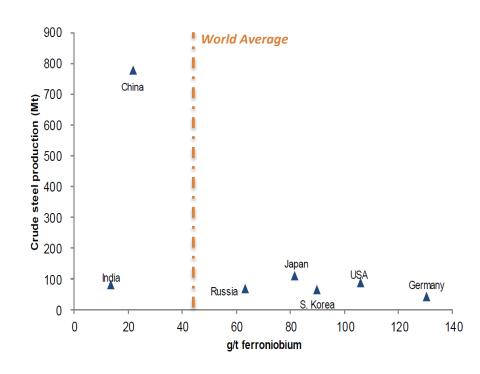
# Low intensity of use in emerging countries, especially China & India, demonstrates potential for significant uplift in niobium demand

#### FeNb Intensity of Use vs. FeNb Consumption

#### Nb Intensity (FeNb g/t)



#### Crude Steel Production vs. FeNb Intensity of Use, 2013



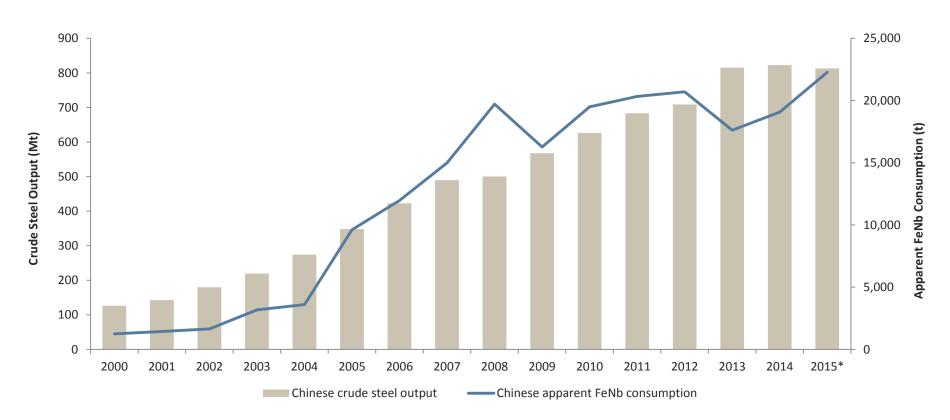
Source: Camet, Roskill



## **Consumption in China**

# Despite a slowdown in Chinese steel production, ferroniobium consumption in China grew in excess of 21% in the first five months of 2015

Chinese Crude Steel Output (Mt) vs Chinese Ferroniobium Consumption (t FeNb)



Source: Camet

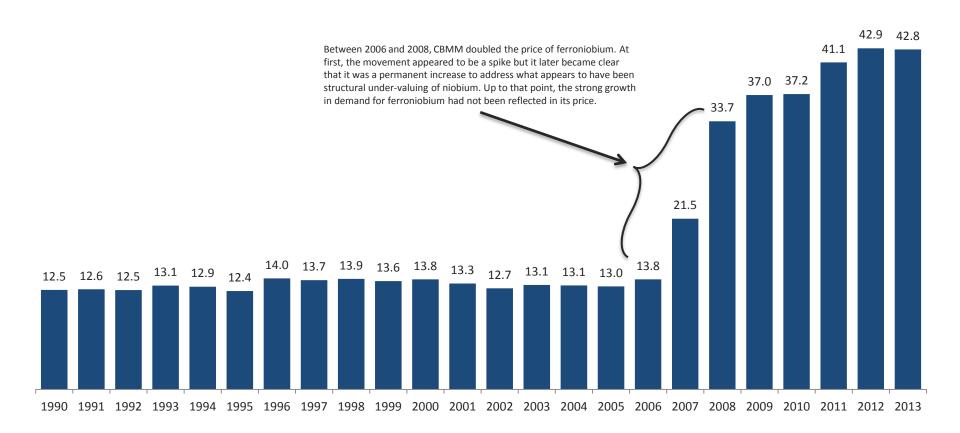


3 mines dominate global niobium supply (~99%) with Panda Hill set to become the world's 4<sup>th</sup> niobium mine with minimal supply impact expected (~6%)<sup>1</sup>



# Niobium has a long history of stable prices given long term contracts, increasing underlying demand and supply responsibility

Niobium Price History (US\$/kg) (Average annual value of ferroniobium imports)



Source: Roskill



## Panda Hill has the key attributes required for a successful niobium project

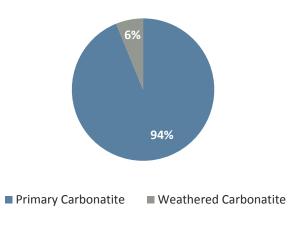
- Relatively high grade
- Favourable metallurgy
- Simple open-pit mining and non-complex processing
- Favourable jurisdiction
- Excellent access to infrastructure
- Low capex and compelling economics



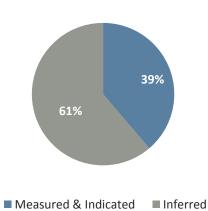
## **Strong Resource Base**

## Resource is carbonatite hosted and can support +30 year mine life

## **Resource Mineralisation (Mt)**



#### **Resource Classification**



### **JORC Resource Summary**

JONE Resource Summary					
Primary Carbonatite					
Classification	Mt	Nb <sub>2</sub> O <sub>5</sub> %	Nb <sub>2</sub> O <sub>5</sub> (kt)		
Measured	14	0.62	84		
Indicated	50	0.49	247		
Inferred	103	0.48	496		
Total	167	0.50	827		
Weathered Carbonatite					
Classification	Mt	Nb <sub>2</sub> O <sub>5</sub> %	Nb <sub>2</sub> O <sub>5</sub> (kt)		
Measured	2	0.67	15		
Indicated	3	0.53	15		

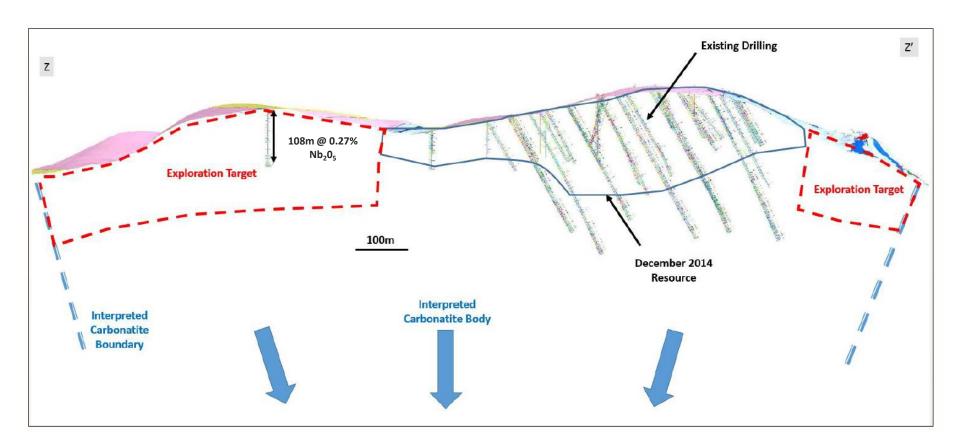
Classification	IVIT	ND <sub>2</sub> O <sub>5</sub> %	$ND_2O_5(Kt)$
Measured	2	0.67	15
Indicated	3	0.53	15
Inferred	6	0.52	32
Total	11	0.55	63
	Comb	nined	

Combined				
Classification	Mt	Nb <sub>2</sub> O <sub>5</sub> %	Nb <sub>2</sub> O <sub>5</sub> (kt)	
Measured	16	0.63	99	
Indicated	53	0.50	263	
Inferred	109	0.48	528	
Total	178	0.50	891	



## **Significant Resource Upside**

An additional 200Mt to 400Mt of resources are expected - only a third of carbonatite outcrop tested to date and deposit remains open at depth\*

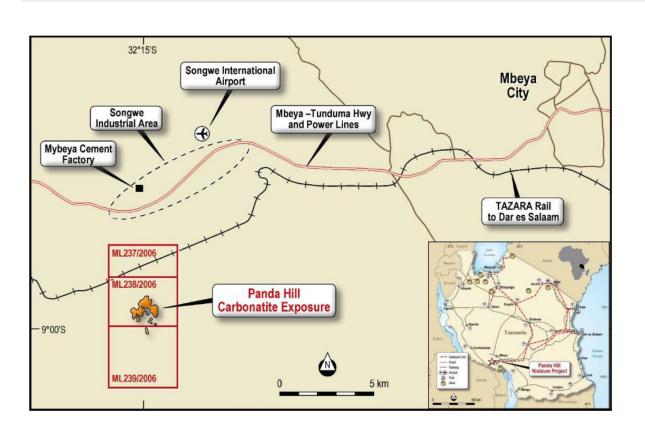


<sup>\*</sup>JORC statement: The Exploration Target is conceptual in nature as there has been insufficient exploration to define a Mineral Resource. It is uncertain if further exploration will result in the determination of a Mineral Resource under the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, the JORC Code" (JORC 2012). The Exploration Target is not being reported as part of any Mineral Resource or Ore Reserve. Work activities including mapping, chip sampling and drilling are expected to be undertaken in 2015 and 2016.



## **Excellent Infrastructure**

Well located to key infrastructure (air, road, rail, water & power) which provides valuable advantages, especially in relation to capex efficiency









## **Robust PFS & DFS Scenario**

Post robust PFS in March 2015, DFS being advanced as staged production scenario in order to minimise any supply disruption (i.e. now ~6% global supply vs. ~10%)

## **Updated PFS Case vs. Management Case**

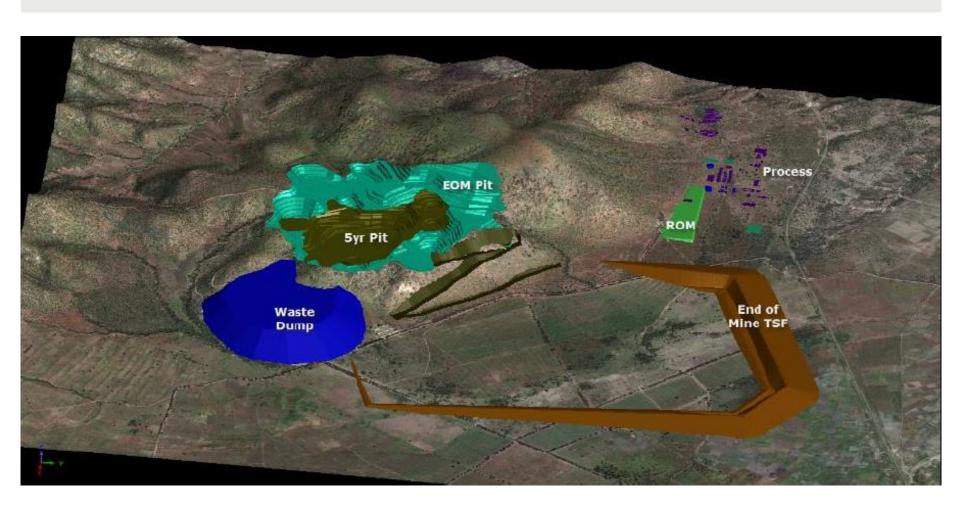
	Adjusted PFS Case	Management Case
Mining Inventory	60Mt	67Mt
Throughput Capacity	2Mtpa	1.3Mtpa building to 2.6Mtpa in Year 5
Upfront Capital Expenditure	US\$195m	US\$155m
Mine Life	30 years	30 years
Production (Average LOM)	6,800tpa ferroniobium (4,600tpa Nb)	7,600tpa ferroniobium (5,200tpa Nb)
EBITDA (Average LOM)	US\$90m	US\$105m
NPV <sub>10</sub> (post-tax)	US\$424m¹	US\$420m
IRR (post-tax)	37.7%²	32.4%
Initial Capex Payback Period (post-construction)	2.5 years <sup>2</sup>	4.7 years
Initial Capex Payback Period (start of construction)	4.5 years²	6.7 years

<sup>1.</sup> Adjusted for inclusion of Mine Closure Costs

<sup>2.</sup> IRR and payback adjusted to start of stage 1 construction. Stage 2 construction will be funded through cashflow and project finance



## Straightforward layout with footprint of only 3km<sup>2</sup>

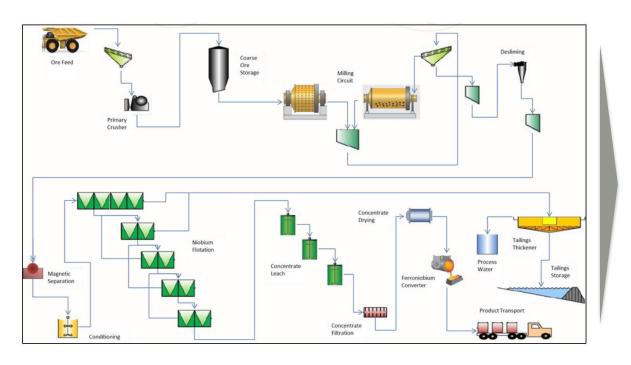




# **Non-Complex Processing**

# Non-complex process able to upgrade the materials to ferroniobium - similar processing method to Niobec mine

#### **Process Flow Sheet**



#### **Key Metallurgical Results** (Management Case)

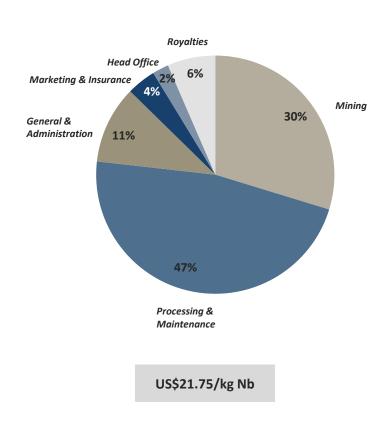
	Years 1-10	LOM
% Fresh Carb	40%	50%
Av Feed Grade	0.70% Nb <sub>2</sub> O <sub>5</sub>	0.54% Nb <sub>2</sub> O <sub>5</sub>
Av Nb Recovery	61%	62%
Av FeNb Prod	7,900kt	7,400kt



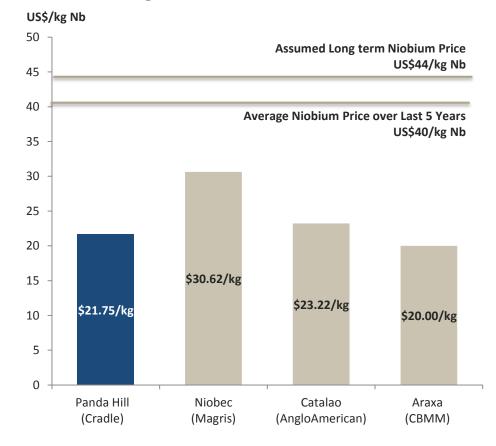
# **Robust Operating Costs**

# Operating costs are predominately mining & processing and provide a robust margin relative to long term niobium price

### LOM All-in Cost Breakdown (Management Case)



### All-in Sustaining Costs (Management Case)



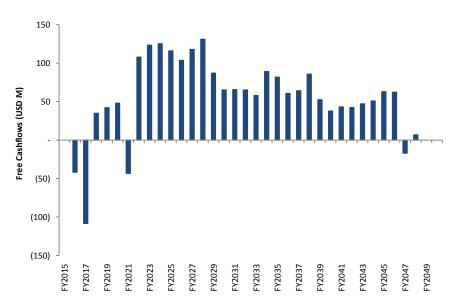
Source: Roskill



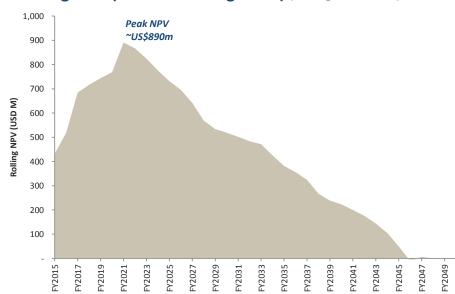
## **Compelling Economics**

Low capex, strong margin & long life generates compelling economics and returns with significant leverage to positive niobium outlook

### Project Free Cashflow (Management Case)



### Rolling NPV (100% basis ungeared) (Management Case)



### NPV & IRR Sensitivity to LT Niobium Price (Management Case)

Niobium Price (US/kg Nb)	39.6	41.8
NPV <sub>10</sub> (post-tax)	304	362
IRR (post-tax)	27%	30%

Assumed	Case
Assumed	Cusc

44	46.2	48.4
420	478	535
32%	35%	37%



# **Development Schedule**

## Panda Hill is set to commence production in early 2018

#### **Today**

	10	aay						
Project Activities	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018
Definitive Feasibility Study								
Piloting Test Work								
Basic Design								
Environmental Certificate								
Reporting								
Front End Engineering								
Detailed Design								
Procurement								
Construction								
Fabrication								
Delivery								
Construction								
Commissioning								
Operations								
Ramp-up								
Steady State								



# **Capital Structure**

## ASX-listed Cradle's board, management & founders together own ~45%

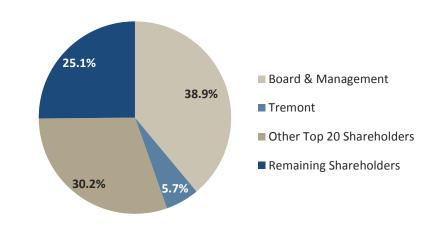
#### **Capital Structure**

CXX:ASX	
Quoted Shares	128,727,617
Performance Shares <sup>1</sup>	18,750,000
Total Shares (fully diluted)	147,477,617
Share Price (As at 27 Aug 2015)	A\$0.25
Market Capitalisation <sup>2</sup>	A\$36.8m
Net Cash (As at 30 June 2015) <sup>2</sup>	A\$2.3m
Enterprise Value <sup>2</sup>	A\$34.5m

### **Performance Rights & Options**

Total		13,025,000
Unlisted Options	Ex \$0.25, Exp Oct 2018	2,500,000
Unlisted Option	Ex \$0.25, Exp April 2018	1,000,000
Unlisted Options	Ex \$0.2667, Exp May 2016	7,687,500
Performance Rights		1,837,500

### Key Shareholders (assuming all performance shares vest)



#### **Broker Research**

Broker	Date	Target Price
Patersons	May-15	\$0.39
GMP	Apr-15	\$0.40
Mirabaud	Mar-15	\$0.56
Argonaut	Mar-15	n/a
Consensus		\$0.45

<sup>1.</sup> Performance shares convert to ordinary shares subject to completion of DFS delivering an NPV<sub>10</sub> of US\$400m or greater. Predominately held by Verona Capital Pty Ltd (and its principals) 2. Note figures have been rounded



# **Board & Management Team**

## Cradle is led by a highly experienced board and management team

## **Board & Management**

Name	Role	Background	Experience
Craig Burton	Chairman	Resource Entrepreneur	Panoramic, Exco, Capital Drilling, Mirabela
<b>Grant Davey</b>	Managing Director	Mining Engineer	Senior operational management AGA, Anglo American
Evan Cranston	Non-Executive Director	Lawyer & Resource Entrepreneur	Ampella, Carbine, Boss Resources, Attila
Didier Murcia	Non-Executive Director	Lawyer	Honorary Consul for Tanzania, Chairman of law firm Murcia Pestell Hillard
Keith Bowes	Project Manager	Metallurgist	Project management, Anglo American, BHP, Vale
Neil Inwood	Geology Manager	Geologist	Principal consultant Coffey, Barrick
Claude Dufresne	Marketing Consultant	Mining / Metallurgy Engineer	Marketing of Niobec product for 13 years



## Cradle and Panda Hill makes for an attractive investment opportunity

- Panda Hill is well advanced DFS underway and expected decision to mine in early 2016
- Strategic commodity with stable pricing
- World class Mineral Resource with low technical risk
- Located in a "mining-friendly" jurisdiction close to well-developed existing infrastructure
- High margin, long life asset with low capex leading to strong economics
- Attractive entry point for investor(s) to benefit in bridging significant valuation gap



## **Site Work Photos**







Mineralised Carbonatite Outcrop



**Drilling Water Test Bores** 



**Bulk Sampling** 



Irrigation Canal Relining



Geotechnical Drilling



#### **Disclaimer and Competent Person**

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All statements, trend analysis and other information contained in this document related to markets for Cradle, trends in revenue, gross margin and anticipated expense levels, as well as other statements about anticipated future events or results, constitute forward-looking statements. Forward-looking statements often, but not always, are identified by the use of words such as "seek', 'anticipate', 'believe', 'plan', 'estimate', 'expect', 'intend', 'forecast', 'project', 'likely', 'potential', 'target' and 'possible' and statements that an event or result 'may', 'will', 'would', 'should', 'could' or 'might' occur or be achieved and other similar expressions. Forward-looking statements are subject to known and unknown business and economic risks and uncertainties and other factors that could cause actual results of operations to differ materially from those expressed or implied by the forward-looking statements. Forward-looking statements are based on estimates and opinions of management at the date the statements are made.

Cradle does not undertake any obligation to update forward-looking statements even if circumstances or management's estimates or opinions should change. For the reasons set forth above, investors should not place undue reliance on forward-looking statements.

Cautionary Statement concerning Production Targets including Inferred Resources: Cradle advises that the PFS results and production targets reflected in this announcement are preliminary in nature as conclusions are drawn from partly from Indicated Mineral Resources and partly from Inferred Mineral Resources and partly from Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated or Measured Mineral Resources or that the production target itself will be realised.

#### **Competent Person's Statement**

The information in this document that relates to the Exploration Target, Exploration Results and Resources is based on information compiled or reviewed by Mr Neil Inwood who is a Fellow of The Australasian Institute of Mining and Metallurgy and a Member of the Australian Institute of Geoscientists. Mr Inwood is a full time employee of Verona Capital Pty Ltd. Mr Inwood has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Inwood consents to the inclusion in this document of the matters based on his information in the form and context in which it appears.

The information relating to the Mineral Resource is extracted from the report entitled 'Significant Resource Upgrade for Panda Hill Niobium Project' created on 20th January 2015 and is available to view on <a href="https://www.cradleresources.com.au">www.cradleresources.com.au</a>. The information relating to the Pre-Feasibility Study is extracted from the report entitled 'Positive Pre-Feasibility Study results For Panda Hill Created on 31st March 2015 and the update announcement on 14th July 2015 entitled 'Updated Panda Hill Site and Study Progress' and is available to view on <a href="https://www.cradleresources.com.au">www.cradleresources.com.au</a>. The information referring to the Exploration Target is extracted from the report 'Panda Hill Progress Update and Exploration Target' created on 23rd April 2015 and is available to view on <a href="https://www.cradleresources.com.au">www.cradleresources.com.au</a>. Other than as specified in this announcement and the mentioned announcements, 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, Exploration Target or Ore Reserves 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 announcements.



# THANK YOU

For additional information contact: Grant Davey Managing Director E: admin@cradleresources.com.au T +61 8 9389 2000