Zircon Industry Association
Conference 2018

Tom O'Leary, Managing Director, Iluka Resources
6 September 2018
Disclaimer – Forward Looking Statements

This presentation has been prepared by Iluka Resources Limited (Iluka). By accessing/attending this presentation you acknowledge that you have read and understood the following statement.

Forward Looking Statements

This presentation contains certain statements which constitute “forward-looking statements”. Often, but not always, forward looking statements can generally be identified by the use of forward looking words such as “may”, “will”, “expect”, “plan”, “believes”, “estimate”, “anticipate”, “outlook” and “guidance”, or similar expressions, and may include, without limitation, statements regarding plans; strategies and objectives of management; anticipated production and production potential; estimates of future capital expenditure or construction commencement dates; expected costs or production outputs; estimates of future product supply, demand and consumption; statements regarding future product prices; and statements regarding the expectation of future Mineral Resources and Ore Reserves.

Where Iluka expresses or implies an expectation or belief as to future events or results, such expectation or belief is expressed in good faith and on a reasonable basis. No representation or warranty, express or implied, is made by Iluka that the matters stated in this presentation will in fact be achieved or prove to be correct.

Forward looking statements are only predictions and are subject to known and unknown risks, uncertainties, assumption and other important factors that could cause the actual results, performances or achievements of Iluka to differ materially from future results, performances or achievements expressed, projected or implied by such forward-looking statements. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date thereof. Such risks and factors include, but are not limited to: changes in exchange rate assumptions; changes in product pricing assumptions; major changes in mine plans and/or resources; changes in equipment life or capability; emergence of previously underestimated technical challenges; increased costs and demand for production inputs; and environmental or social factors which may affect a licence to operate, including political risk.

Capital estimates include contingency and risk allowances commensurate with international estimating classification systems.

To the extent permitted by law, Iluka, its officers, employees and advisors expressly disclaim any responsibility for the accuracy or completeness of the material contained in this presentation and exclude all liability whatsoever (including in negligence) for any loss or damage which may be suffered by a person as a consequence of any information in this presentation or any error or omission therefrom. Iluka does not undertake to release publicly any revisions to any forward-looking statement to reflect events or circumstances after the date of this presentation, or to reflect the occurrence of unanticipated events, except as may be required under applicable securities laws.

No independent third party has reviewed the reasonableness of the forward looking statements or any underlying assumptions.

Non-IFRS Financial Information

This document contains non-IFRS financial measures including cash production costs, non production costs, Mineral Sands EBITDA, Group EBITDA, EBIT, free cash flow, and net debt amongst others. Iluka management considers these to be key financial performance indicators of the business and they are defined and/or reconciled in Iluka’s annual results materials and/or Annual report. Non-IFRS measures have not been subject to audit or review.

All figures are expressed in Australian dollars unless stated otherwise.
Key Messages

1. Tight market in 2018 reflecting sustained demand and reduced production
2. Iluka’s approach directed toward sustainability for the zircon industry
3. ZIA has important role to play representing the industry, informing debate & settings standards
Today’s Zircon Market
Solid Demand Fundamentals

- Solid demand broadly based, both regionally and by application
- European ceramics industry benefitting from growth in domestic and export markets
- Industrial activity in US and Japan delivering growth in refractory and foundry applications
- Overall zircon consumption in Asia-Pacific region expected to be stable
  - 2018 Chinese consumption impacted by environmental closures limiting production
  - Indian and SE Asian tile makers penetrating traditional Chinese export markets
2018 Supply and Consumption Balanced

Global Zircon Supply and Consumption

- Significant supplier inventory depleted in recent years
  - 2016 to 2018 supply = production + inventory draw
- Existing producers’ mines mature and entering decline in coming years
- 2019 market expected to remain tight
  - Global demand greater than mine production rates
Iluka’s Production Response

Iluka’s Zircon Production and Sales

Iluka’s response to tight market conditions:
- Guided 2018-2020 zircon production of ~335ktpa
  - Cataby project tonnes available in 2019
  - early Ambrosia mine move (smoothing production)
- Potential for additional Zircon in Concentrate production

1. Production denotes finished zircon product. Over the period 2012-16 Iluka built a significant stockpile of heavy mineral concentrate at its zircon dominant mine – Jacinth Ambrosia
2. 2018-2020 production guidance of 335ktpa and 2018 sales assumes 2018 H1 and H2 sales evenly weighted, as guided
Industry Response

• Aside from Iluka, current industry response limited to Kalimantan

**Chinese imports from Indonesia / Indonesian exports**

- Inducement price for Kalimantan exports generally regarded to be ~US$1,400/t
- Indonesian exports currently ~50ktpa rate

Source: Iluka, TZMI, Export Genius
Approach to Pricing

- Supply / demand fundamentals have driven recent price trajectory
- Iluka approaching pricing decisions mindful of history and of potential impacts of decision
- Pricing cadence slowed
- Focus on monitoring:
  - zircon customer and ‘end user’ behaviour
  - price of major zircon substitutes
  - Indonesian ‘swing’ production

### Zircon Price History

<table>
<thead>
<tr>
<th>Year</th>
<th>Price Range</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017 Q4</td>
<td>US$1,190/t</td>
<td>6 months</td>
</tr>
<tr>
<td>2018 Q2</td>
<td>US$1,410/t</td>
<td>6 months</td>
</tr>
<tr>
<td>2018 Q4</td>
<td>US$1,580/t</td>
<td>6 months</td>
</tr>
</tbody>
</table>

Source: Iluka

* Zircon Reference Price is based on 2 tonne bag of Zircon Premium, DAT, ex-China warehouse
Iluka’s Approach to Zircon - Sustainability

**Production / Marketing / Sales Approach**
- Maintain security of supply to customers
  - draw inventory and release to market
  - guided production 2018-2020
  - invest in new production
  - potentially mobilise more concentrates
- Endeavour to satisfy genuine customer demand only
  - do not support speculation

**Pricing Approach**
- Consider quantum of price increases in market context
- Monitor customers and end-users
- Prudent pricing cadence to permit monitoring of impacts and price absorption through value chain
- Demonstrated ability to adapt to market
Modernisation, Substitution and Thrifting
Zircon Price and Consumption: 2008-2018

2009:
• One off ~250kt temporary reduction in zircon consumption

2010-2011:
• Strong recovery helped by Chinese economic stimulus package
• Price escalation and limited short term supply response

2012:
• Rapidly increasing prices hastened changes to downstream production techniques
• Permanent market destruction of ~250kt due to modernisation, thrifting and substitution

2013-2014
• New production induced by price spike leads to over-supply and further price weakness
## Lessons Learned

Industry myths ‘debunked’ after 2012 …

<table>
<thead>
<tr>
<th>Myth</th>
<th>2012 experience</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No substitute for zircon - demand inelastic to price</strong></td>
<td>Alumina, feldspar and other materials were used to reduce zircon loading. Double charging and other new manufacturing techniques reduced the loading of zircon in tiles.</td>
</tr>
<tr>
<td><strong>Quantity of zircon per tile meant that cost is immaterial to end consumer and large cost increases can be easily absorbed</strong></td>
<td>Zircon is a meaningful percentage of downstream purchasing manager’s portfolio. Cadence and magnitude of price increases were too fast and too large.</td>
</tr>
</tbody>
</table>
Where Zircon Demand Was Lost

Modernisation, Thrifting and Substitution - by Region (kt)

- Total demand destruction ~250kt
- Largest impact in areas with lowest technical/adoption hurdles (ceramics and foundry)
- European producers had already started modernisation process well before 2011
- Impact now fully reflected, zircon growing from new, but lower base

Modernisation, Thrifting and Substitution - in Chinese Porcelain Tiles (kt)

Source: Iluka, TZMI, Roskill, Asian Ceramics
Zircon Substitution

Zircon attributes
- Opacity – whiteness
- Hardness
- Low thermal expansion
- High melting point
- Low thermal conductivity
- Chemically inert
- Low neutron absorption

Although substitutes exist, zircon is the better product

Adoption of substitutes has value-in-use and technical limitations

- Alumina
- Feldspar
- Kaolin
- Chromite
- Synthetic Mullite
## Substitution Landscape

<table>
<thead>
<tr>
<th>Market</th>
<th>Application</th>
<th>% of zircon market (est)</th>
<th>Major Substitute</th>
<th>Adoption Hurdle</th>
<th>Mitigation</th>
</tr>
</thead>
</table>
| **Ceramics**    | Body                         | 16                       | Calcined alumina; white clays; white feldspar; kaolinite | Medium          | Alumina content in tile formulation  
Final product attributes (e.g. porosity, dimensions)  
Declining availability and quality of ceramic clay and feldspar deposits |
|                 | Engobes & glazes             | 27                       | Calcined alumina                                 | Medium/High     | Alumina content in tile formulation  
Final product quality (e.g. water mark, melting point, chemistry, gloss)  
Increasing demand for higher-quality and HD digital glazed tiles           |
|                 | Ceramic frits                | 9                        | Titanium frits                                   | High            | Zircon’s effects unmatched  
Titanium frits limited volume                                             |
| **Chemicals**   | Pigments (zirconia)          | 20                       | Nil                                              | High            | ZrO$_2$’s effectiveness to provide crystal encapsulation for specific colours |
|                 | Medical Applications         |                          | Nil                                              | High            | Highly specific functions                                                  |
|                 | Advanced materials           |                          | Nil                                              | High            | Highly specific functions (e.g. fuel rods, oxygen sensors, high-temperature turbine coatings) |
| **Refractory**  | Glass refractory             | 16                       | Nil                                              | High            | Highly specific function  
High-impact failures if cheaper substitutes fail                             |
|                 | Steel refractory             |                          | High-purity alumina; spinel                      | Medium/High     | High-impact failures if cheaper substitutes fail                             |
| **Foundry**     | Sand-casting                 | 2                        | Synthetic mullite; chromite                      | Low             | Limitation in performance of substitutes (e.g. desired high-level surface finish and chilling effects) |
|                 | Coatings                    | 10                       | Alumina; synthetic mullite                       | High            | Limitations in performance of substitutes (e.g. resistance to molten metal) |
|                 | Precision Casting            |                          | Fused silica; WFA; synthetic mullite            | High            | Limitations in performance of substitutes (e.g. surface finish quality, coating slurry instability) |

**Adoption Hurdle**
- **Low** = Likely requires only in-house competencies to trial and implement the change. Change could likely be achieved in less than a year. Low economic risk.
- **Medium** = Focussed effort needed, external specialist knowledge may be required. Change may require between one to three years.
- **High** = Technical limitations, Deep and specialised technical knowledge to study, trial or implement the changes. May require more than three years of efforts. High potential economic risk from any trials.
Ceramics Zircon Intensity

Reduced loading of zircon appears to have approached technical limits
Rise of digital printing is supporting zircon intensity in tiles

Source: Ceramic World Review, TZMI

- Modernisation, thrifting and substitution in ceramics reached technical limits
- Digital printing could bring higher quality tiles (higher zircon content) to traditionally low quality markets (India/Brazil) and has allowed emerging producers to compete easier
- Trend to higher quality tiles positive for zircon (both volume and value-in-use)
Role of the ZIA
Role of Industry Associations

- Development of industry standards
- Product promotion and innovation
- Forum for information exchange and debate
- Promote Corporate and Social Responsibility
- Influencing policy and regulation development and setting
Key Messages

1. Tight market in 2018 reflecting sustained demand and reduced production
2. Iluka’s approach directed toward sustainability for the zircon industry
3. ZIA has important role to play representing the industry, informing debate & settings standards
For more information contact:
Matthew Blackwell
Head of Marketing and Procurement
matthew.blackwell@iluka.com
+61 (0) 498 989 969