



21 November 2008

Manager Announcements  
Company Announcements Office  
ASX Limited  
20 Bridge Street  
Sydney NSW 2000

Dear Sir,

**PRESENTATION**

Attached is a copy of a presentation to the 4<sup>th</sup> International Rare Earth Conference being held in Hong Kong.

A copy of this presentation will also be available on the Company's website [www.alkane.com.au](http://www.alkane.com.au).

Yours faithfully,  
for **ALKANE RESOURCES LTD**

A handwritten signature in black ink, appearing to read 'D I Chalmers'. The signature is written in a cursive, flowing style.

D I Chalmers  
**Managing Director**



**ALKANE RESOURCES LTD**  
ABN 35 000 689 216

## ***Dubbo Zirconia Project Australia***

***A new source of supply for the rare earths sector***

***4<sup>th</sup> International Rare Earth Conference  
Hong Kong November 2008***

Roskill Information Services Ltd

Metal Events Ltd



## **ALKANE**

Public company listed on the ASX since 1969  
2,700 mostly Australian shareholders

Multi commodity explorer and miner, focussed in the  
Central West of New South Wales, Australia

Gold production from Peak Hill mine 1996 - 2005  
New gold (+1Moz) development planned at Tomingley

Major gold discovery at McPhillamys (+2.5Moz)

### **Board**

|               |                               |
|---------------|-------------------------------|
| John Dunlop   | <i>Chairman</i>               |
| Ian Chalmers  | <i>Managing Director</i>      |
| Tony Lethlean | <i>Non-executive director</i> |
| Ian Gandel    | <i>Non-executive director</i> |
| Ian Cornelius | <i>Non-executive director</i> |



The Board at Dubbo Project Pilot Plant at ANSTO

## Central West NSW Alkane Projects

**Significant Infrastructure**  
State grid power  
National grid gas  
Water

**Population base of  
150,000 within the 120km  
diameter area**



## DUBBO ZIRCONIA PROJECT

### Location and Infrastructure

**Dubbo region pop 80,000**

**Major mixed agriculture**

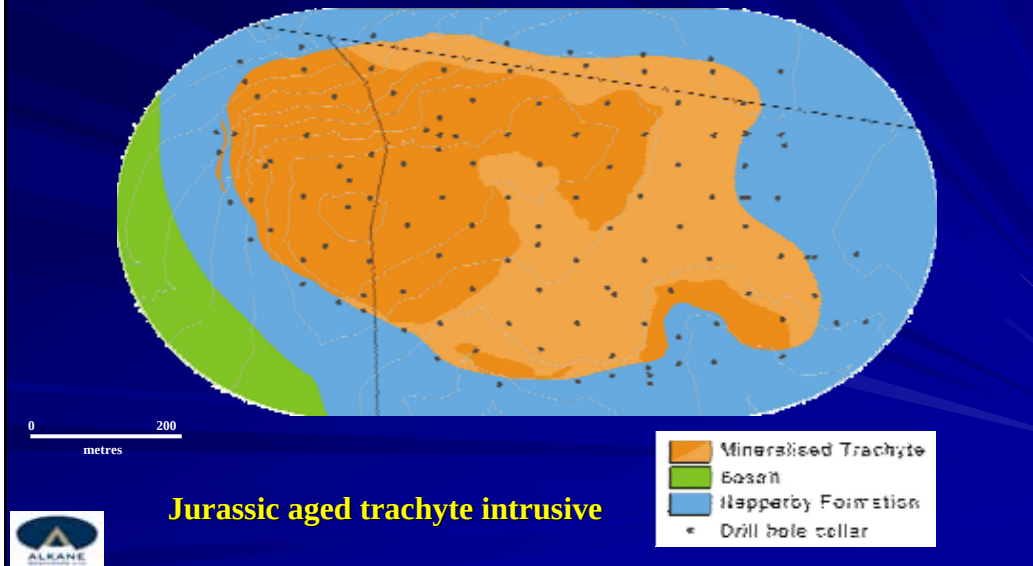
**Transport hub**

**Substantial light industry**



# DUBBO ZIRCONIA PROJECT

## Geology



# DUBBO ZIRCONIA PROJECT

## RESOURCES

|                                             |   |                                                                                                                                                                                                                                                               |
|---------------------------------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Measured Resource</b><br>0 - 55 metres   | : | 35.7 million tonnes grading<br>1.96% ZrO <sub>2</sub> , 0.04% HfO <sub>2</sub> , 0.46% Nb <sub>2</sub> O <sub>5</sub> ,<br>0.03% Ta <sub>2</sub> O <sub>5</sub> , 0.14% Y <sub>2</sub> O <sub>3</sub> , 0.75% REO<br>and 0.014% U <sub>3</sub> O <sub>8</sub> |
| <b>Inferred Resource</b><br>55 - 100 metres | : | 37.5 million tonnes at similar grades                                                                                                                                                                                                                         |
| <b>TOTAL</b>                                | : | 73.2 million tonnes                                                                                                                                                                                                                                           |

Major world resource of zirconium, hafnium, niobium, tantalum, yttrium and rare earth elements

Although the ore is not classified as a radioactive deposit, it contains 23 million lbs (10,200t) of uranium

Production of uranium is currently prohibited in NSW



## DUBBO ZIRCONIA PROJECT ORE MINERALOGY

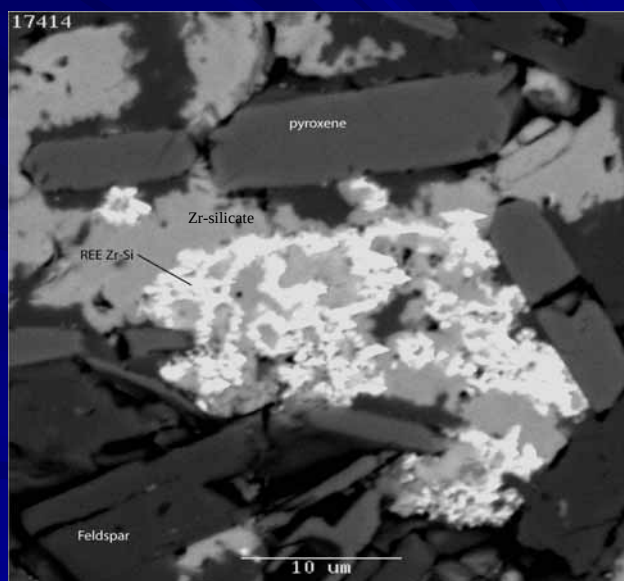
|                              |                                  |                                                                 |                                      |
|------------------------------|----------------------------------|-----------------------------------------------------------------|--------------------------------------|
| <b>Zirconium</b>             | eudialyte<br>armstrongite        | $\text{ZrSiO}_4 \pm \text{Ca, Y, REE, H}_2\text{O} + ?\text{U}$ | < 2 $\mu\text{m}$ - 50 $\mu\text{m}$ |
| <b>Yttrium</b>               | yttrium silicates<br>and with Zr | $\text{YSiO}_4 \pm \text{REE, Be, Fe, As, Nb}$                  | < 50 $\mu\text{m}$                   |
| <b>Niobium/<br/>Tantalum</b> | natroniobite                     | $\text{NaNbO}_3 + \text{Ta ? Th}$<br>also $\text{NbFeSiO}_4$    | < 30 $\mu\text{m}$                   |
| <b>Rare Earths</b>           | calcian<br>basnaesite            | $\text{Ca(REE)(CO}_3\text{)F}$                                  | < 100 $\mu\text{m}$                  |
|                              | rare ancylite                    | $\text{Sr(REE)(CO}_3\text{)H}_2\text{O}$                        |                                      |



## DUBBO ZIRCONIA PROJECT ORE MINERALOGY

BSE image x 2300: REE-rich Zr-Si hosted within Zr-silicate

ANSTO March 2007

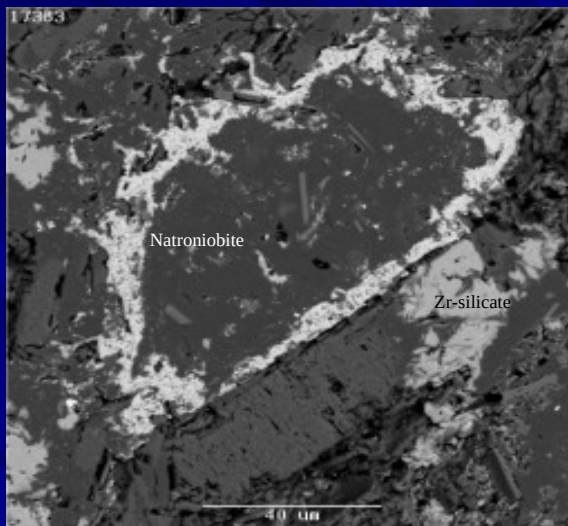




## DUBBO ZIRCONIA PROJECT ORE MINERALOGY

BSE image x 600:  
Nb mineral in Fe-Mn  
carbonate

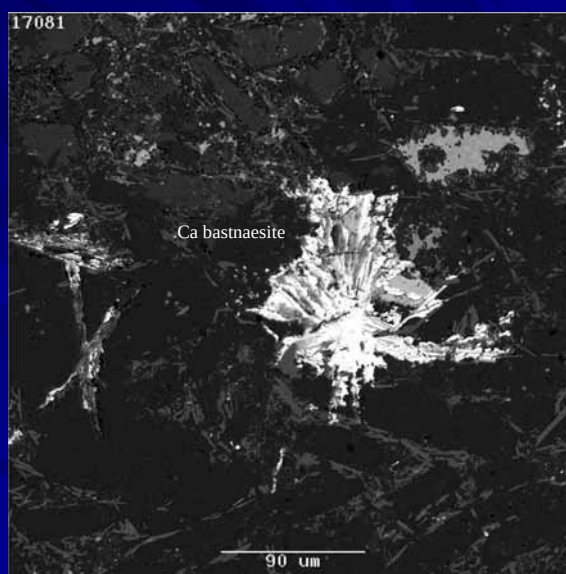
ANSTO March 2007



## DUBBO ZIRCONIA PROJECT ORE MINERALOGY

BSE image x 250:  
Altered Ca-bastnaesite

ANSTO March 2007



# DUBBO ZIRCONIA PROJECT

## Early Metallurgical Test Work

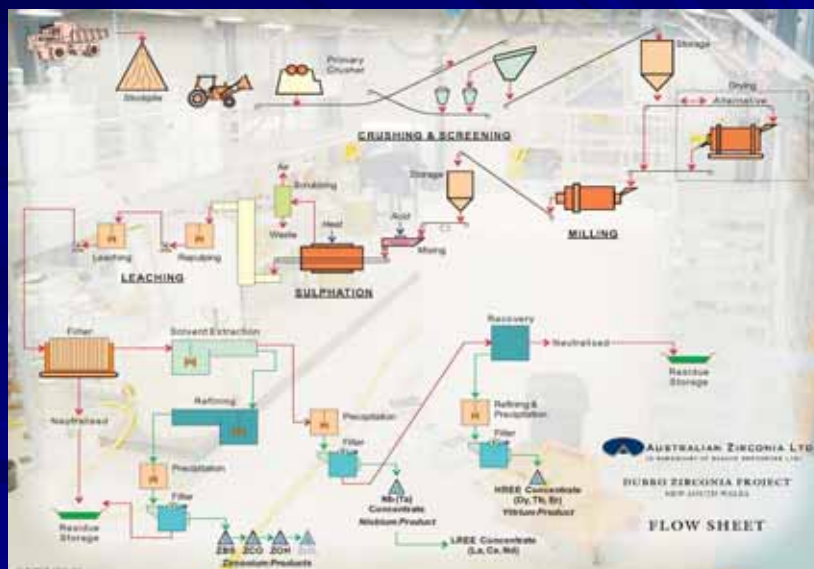
- Preliminary test work on HCl, HF, NaOH leaching, and H<sub>2</sub>SO<sub>4</sub> roasting and leaching
- Preliminary flotation to assess potential for pre-concentration
- Scan of various physical separation processes
- Definitive flotation test work for pre-concentration

Only H<sub>2</sub>SO<sub>4</sub> leach gave potentially viable process  
Full feasibility commenced 2002



# DUBBO ZIRCONIA PROJECT

## PROCESS FLOW SHEET - 2008



# DUBBO ZIRCONIA PROJECT

## Current Program

**AusIndustry Commercial Ready Grant of A\$3.29M in April 2006 on dollar for dollar basis to complete process optimisations, and construct and operate the Demonstration Pilot Plant (DPP).**

**Laboratory program to optimise flow sheet commenced at ANSTO Lucas Heights (Australian Nuclear Science and Technology Organisation) July 2006, with Demonstration Pilot Plant commissioned March 2008**

**Substantial product samples from DPP to be distributed late 2008- early 2009. Samples in 50 to 100kg lots**

**Market update completed late 2007 – strong growth predicted in most products**

**Revise and update the 2002 feasibility study by mid to late 2009. DFS managed by Perth based consultants TZ Minerals International Pty Ltd.**



# DUBBO ZIRCONIA PROJECT

## Feasibility Study Team

**DFS study manager:** Steve Gilman TZ Minerals International Pty Ltd  
Gavin Diener; Machiel Keegel; Dave McCoy - Engineering TZMI

**Marketing:** Martin Lynch TZMI  
Philip Murphy TZMI

**Special Marketing Consultants:** Dudley Kingsnorth IMCOA - REE  
Alister MacDonald TCMS - Zirconium + REE

**ANSTO Minerals:** Bob Ring, Doug Collier, Karin Soldenoff, Des Levins

**DPP Operations:** Adrian Manis, Peter Fleming, Prakash Rajalingam + the crew

**DPP Ext Engineering:** Worley Parsons





ANSTO is located at Lucas Heights about 30km south of the Sydney CBD and is one of Australia's premier research facilities.

For 50 years ANSTO has undertaken research in nuclear science and technology with applications which assist in solving problems in such diverse areas as environment, climate change, human health, agriculture, manufacturing, mining, construction, minerals, structural integrity, and nuclear nuclear proliferation.

ANSTO has several internal divisions and an associated Technology Park. These include Minerals, Environment, Radiopharmaceutical, Materials Engineering (ceramics, synroc), Bragg Institute (neutron, x-rays).

Silex operate in the Technology Park and have a world first laser uranium enrichment process.



## DUBBO ZIRCONIA PROJECT



Mining and crushing of ore at Dubbo



Delivery of crushed Zirconia ore to 4000T

October 2006  
Bulk sample for  
Demonstration pilot plant



## DUBBO ZIRCONIA PROJECT

Demonstration Pilot Plant - Shed



# DUBBO ZIRCONIA PROJECT

Demonstration Pilot Plant – Shed Internal



# DUBBO ZIRCONIA PROJECT

Demonstration Pilot Plant - Kiln



# DUBBO ZIRCONIA PROJECT

Demonstration Pilot Plant – Primary Filter



# DUBBO ZIRCONIA PROJECT

Demonstration Pilot Plant – Solvent Extraction Circuit





# DUBBO ZIRCONIA PROJECT

Demonstration Pilot Plant – Zirconium Recovery

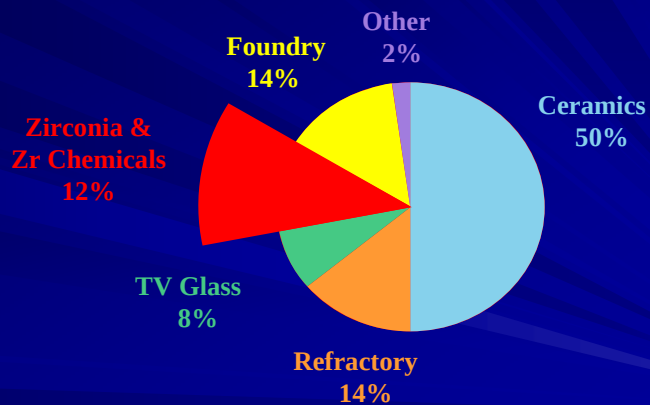


## DUBBO ZIRCONIA PROJECT

Zircon industry

### CURRENT ZIRCON USES

Global output  
1,400,000 tpa



Source: Iluka / TZMI



# DUBBO ZIRCONIA PROJECT

Zircon consumption for zirconia – zirconium chemical production

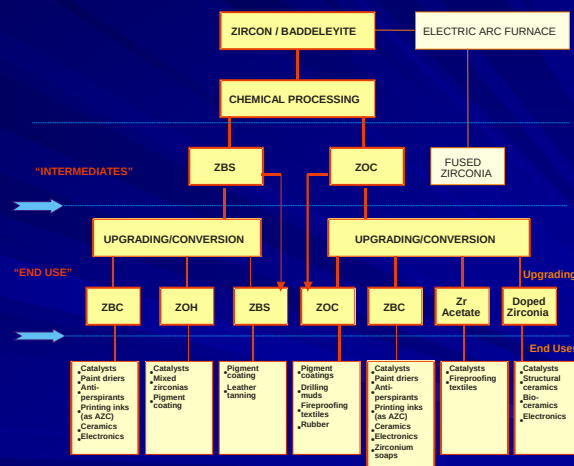
Demand for zirconia and Zr chemicals to grow zircon consumption from 160ktpa to +300ktpa by 2015



# DUBBO ZIRCONIA PROJECT

**Zirconium Chemicals Industry Structure and Market Entry Points**

2007 ~ 160,000t zircon converts to 96,000t of zirconia (equivalent) products and 13,000 Zr metal

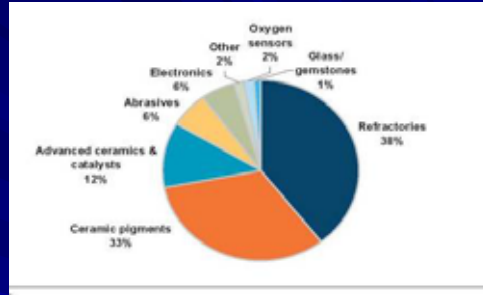


Products range from US\$5 to +US\$20/kg (ZrO<sub>2</sub> units) depending upon quality and use



## DUBBO ZIRCONIA PROJECT

### Current Zirconia Zirconium chemical Uses



**2007 Consumption** 96,000 tonnes ( $ZrO_2$  units)  
**2010 Estimated** 126,000 tonnes with industry growth rate of 4.5%pa

**High growth areas:** Advanced ceramics and catalysts 13.0%pa  
 Ceramic pigments 8.0%pa



Source: TZ Minerals International

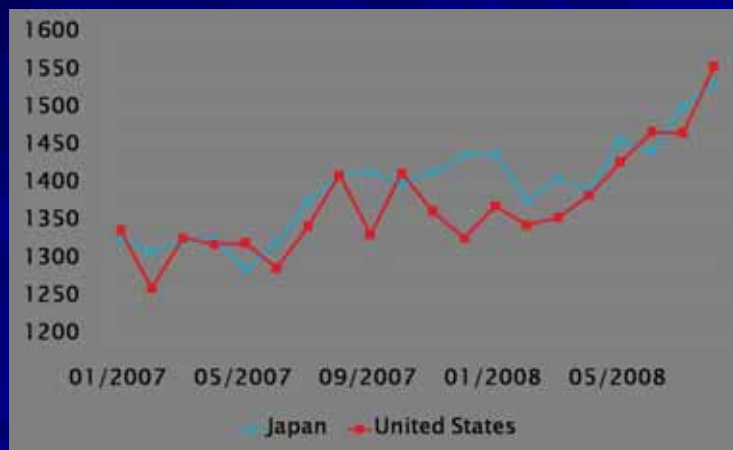
## DUBBO ZIRCONIA PROJECT

Zirconium oxychloride (ZOC) price – sets base price for Zr chemicals

### Chinese ZOC price trends US\$/tonne

Mid 2008  
 \$1550/t = \$5000/t  
 $ZrO_2$  units

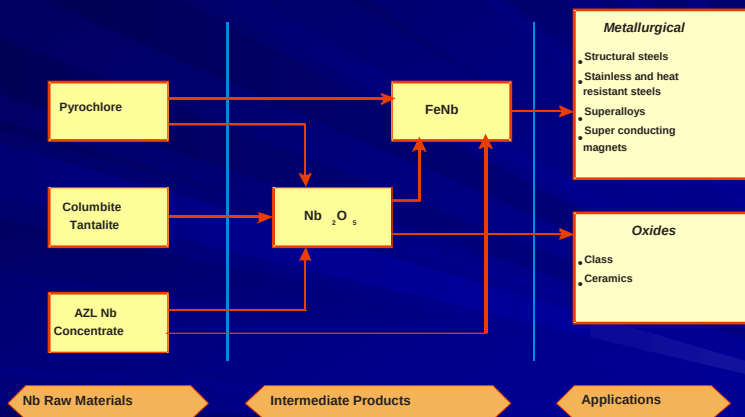
2009  
 Estimated to be  
 US\$6,000/t



Source: Technical Ceramic Marketing Services

## DUBBO ZIRCONIA PROJECT

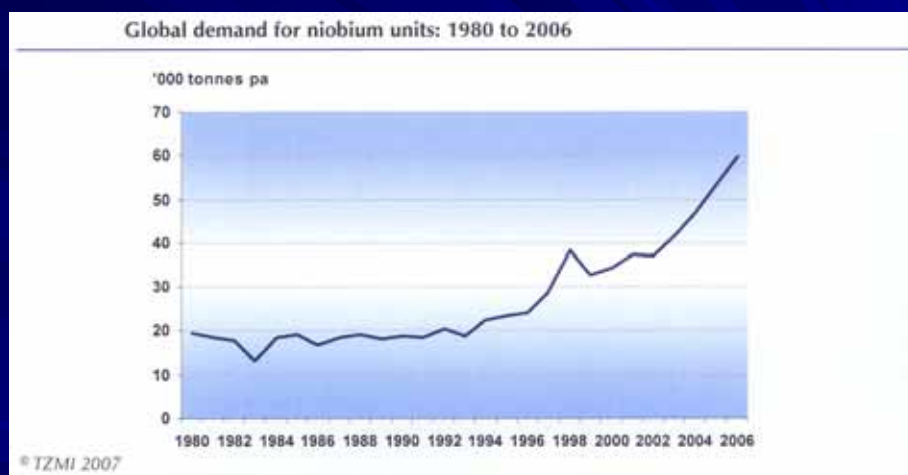
### Schematic of Niobium Industry Structure



Source: TZ Minerals International

## DUBBO ZIRCONIA PROJECT

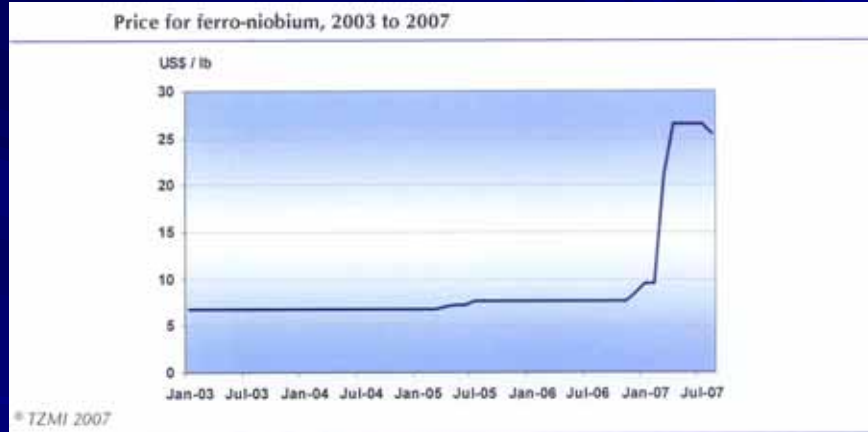
### Niobium Demand



Niobium 2007 (Ferro-niobium units) consumption ~ 63,000t – 90% Brazil  
Estimate for 2012 ~ 100,000t

## DUBBO ZIRCONIA PROJECT

### Niobium Price – As ferro-niobium units



Ferro-niobium price spiralled to US\$60/kg in March 07  
and is currently around US\$40 - 50/kg

Long term expected to be in US\$25 - \$35/kg



## DUBBO ZIRCONIA PROJECT

### Yttrium - Rare Earth Distribution in Ore

|                                 | ppm  | Wt %  |
|---------------------------------|------|-------|
| La <sub>2</sub> O <sub>3</sub>  | 1799 | 19.5% |
| CeO <sub>3</sub>                | 3393 | 36.7% |
| Pr <sub>6</sub> O <sub>11</sub> | 373  | 4.0%  |
| Nd <sub>2</sub> O <sub>3</sub>  | 1302 | 14.1% |
| Sm <sub>2</sub> O <sub>3</sub>  | 203  | 2.5%  |
| Eu <sub>2</sub> O <sub>3</sub>  | 6    | 0.1%  |
| Gd <sub>2</sub> O <sub>3</sub>  | 198  | 2.1%  |
| Tb <sub>4</sub> O <sub>7</sub>  | 31   | 0.3%  |
| Dy <sub>2</sub> O <sub>3</sub>  | 189  | 2.0%  |
| Ho <sub>2</sub> O <sub>3</sub>  | 39   | 0.4%  |
| Er <sub>2</sub> O <sub>3</sub>  | 107  | 1.2%  |
| Tm <sub>2</sub> O <sub>3</sub>  | 15   | 0.2%  |
| Yb <sub>2</sub> O <sub>3</sub>  | 92   | 1.0%  |
| Lu <sub>2</sub> O <sub>3</sub>  | 13   | 0.1%  |
| Y <sub>2</sub> O <sub>3</sub>   | 1460 | 15.8% |
| Total                           | 9249 | 100%  |



## DUBBO ZIRCONIA PROJECT

### Yttrium - Rare Earth Distribution in Ore Minerals

**Rare Earth Content of Major Source Minerals (% total REO)**

|                                 | <u>Monazite</u>               |              |                            | <u>Apatite</u>              | <u>Bastnaesite<br/>Eudialyte</u> |
|---------------------------------|-------------------------------|--------------|----------------------------|-----------------------------|----------------------------------|
|                                 | <u>Mt Weld,<br/>Australia</u> | <u>India</u> | <u>Guandong,<br/>China</u> | <u>Nolans<br/>Australia</u> | <u>Dubbo<br/>Australia</u>       |
| La <sub>2</sub> O <sub>3</sub>  | 25.1                          | 23.0         | 23.0                       | 18.5                        | 19.5                             |
| CeO <sub>2</sub>                | 48.5                          | 46.0         | 42.7                       | 47.8                        | 36.7                             |
| Pr <sub>6</sub> O <sub>11</sub> | 5.3                           | 5.5          | 4.1                        | 6.1                         | 4.0                              |
| Nd <sub>2</sub> O <sub>3</sub>  | 16.7                          | 20.0         | 17.0                       | 21.4                        | 14.1                             |
| Sm <sub>2</sub> O <sub>3</sub>  | 2.2                           | 4.0          | 3.0                        | 2.4                         | 2.5                              |
| Eu <sub>2</sub> O <sub>3</sub>  | 0.6                           | -            | 0.1                        | 0.5                         | 0.1                              |
| Gd <sub>2</sub> O <sub>3</sub>  | 0.9                           | -            | 2.0                        | 1.2                         | 2.1                              |
| Tb <sub>4</sub> O <sub>7</sub>  | 0.1                           | -            | 0.7                        | 0.1                         | 0.3                              |
| Dy <sub>2</sub> O <sub>3</sub>  | 0.2                           | -            | 0.8                        | 0.3                         | 2.0                              |
| Y <sub>2</sub> O <sub>3</sub>   | 0.3                           | -            | 2.4                        | 1.5                         | 15.8                             |
| <b>Total</b>                    | <b>99.9</b>                   | <b>98.5</b>  | <b>95.8</b>                | <b>99.8</b>                 | <b>97.1</b>                      |



Source: IMCOA

## DUBBO ZIRCONIA PROJECT

### Yttrium - Rare Earth Distribution in Ore Minerals

**Rare Earth Content of Major Source Minerals (% total REO)**

|                                 | <u>Bastnaesite</u>                         |                                                  | <u>Xenotime</u>                      |                             | <u>Ion adsorption clays</u>          |                                        | <u>Bastnaesite<br/>Eudialyte</u> |
|---------------------------------|--------------------------------------------|--------------------------------------------------|--------------------------------------|-----------------------------|--------------------------------------|----------------------------------------|----------------------------------|
|                                 | <u>Baiyun Obo,<br/>Mongolia,<br/>China</u> | <u>Mountain<br/>Pass,<br/>California<br/>USA</u> | <u>Lahat<br/>Perak,<br/>Malaysia</u> | <u>Guangdong<br/>,China</u> | <u>Xunwu,<br/>Jiangxi,<br/>China</u> | <u>Longnan,<br/>Jiangxi,<br/>China</u> | <u>Dubbo<br/>Australia</u>       |
| La <sub>2</sub> O <sub>3</sub>  | 23.0                                       | 33.2                                             | 1.2                                  | 1.2                         | 42.0                                 | 1.8                                    | 19.5                             |
| CeO <sub>2</sub>                | 50.0                                       | 49.1                                             | 3.1                                  | 3.0                         | 2.3                                  | 0.4                                    | 36.7                             |
| Pr <sub>6</sub> O <sub>11</sub> | 6.2                                        | 4.3                                              | 0.5                                  | 0.6                         | 8.8                                  | 0.7                                    | 4.0                              |
| Nd <sub>2</sub> O <sub>3</sub>  | 18.5                                       | 12.0                                             | 1.6                                  | 3.5                         | 30.8                                 | 3.0                                    | 14.1                             |
| Sm <sub>2</sub> O <sub>3</sub>  | 0.8                                        | 0.8                                              | 1.1                                  | 2.2                         | 3.8                                  | 2.8                                    | 2.5                              |
| Eu <sub>2</sub> O <sub>3</sub>  | 0.2                                        | 0.1                                              | trace                                | 0.2                         | 0.5                                  | 0.1                                    | 0.1                              |
| Gd <sub>2</sub> O <sub>3</sub>  | 0.7                                        | 0.2                                              | 3.5                                  | 5.0                         | 2.9                                  | 6.9                                    | 2.1                              |
| Tb <sub>4</sub> O <sub>7</sub>  | 0.1                                        | trace                                            | 0.9                                  | 1.2                         | trace                                | 1.3                                    | 0.3                              |
| Dy <sub>2</sub> O <sub>3</sub>  | 0.1                                        | trace                                            | 8.3                                  | 9.1                         | trace                                | 6.7                                    | 2.0                              |
| Y <sub>2</sub> O <sub>3</sub>   | trace                                      | 0.1                                              | 61.0                                 | 59.3                        | 8.0                                  | 65.0                                   | 15.8                             |
| <b>Total</b>                    | <b>99.6</b>                                | <b>99.8</b>                                      | <b>81.2</b>                          | <b>85.3</b>                 | <b>99.1</b>                          | <b>88.7</b>                            | <b>97.1</b>                      |



Source: IMCOA



# DUBBO ZIRCONIA PROJECT

## Probable Outputs

Base case models of 200,000 to 500,000 tonnes per year of ore processed

| Product           | 200ktpa                       | 500ktpa                        |
|-------------------|-------------------------------|--------------------------------|
| ZBS, ZOH, ZCO     | 9,000tpa (3ktpa $ZrO_2$ )     | 22,500tpa (7.5ktpa $ZrO_2$ )   |
| Nb-Ta concentrate | 1,000tpa (0.7ktpa $Nb_2O_5$ ) | 2,500tpa (1.75ktpa $Nb_2O_5$ ) |
| LREE concentrate  | 990tpa (REOs)                 | 2,475tpa (REOs)                |
| YREE concentrate  | 301tpa (REOs)                 | 753tpa (REOs)                  |

▪ ZBS = zirconium basic sulphate; ZOH = zirconium hydroxide; ZCO = zirconium carbonate

▪ Nb-Ta concentrate = ~80%  $Nb_2O_5$ ; 1.5%  $Ta_2O_5$  calcined basis



# DUBBO ZIRCONIA PROJECT

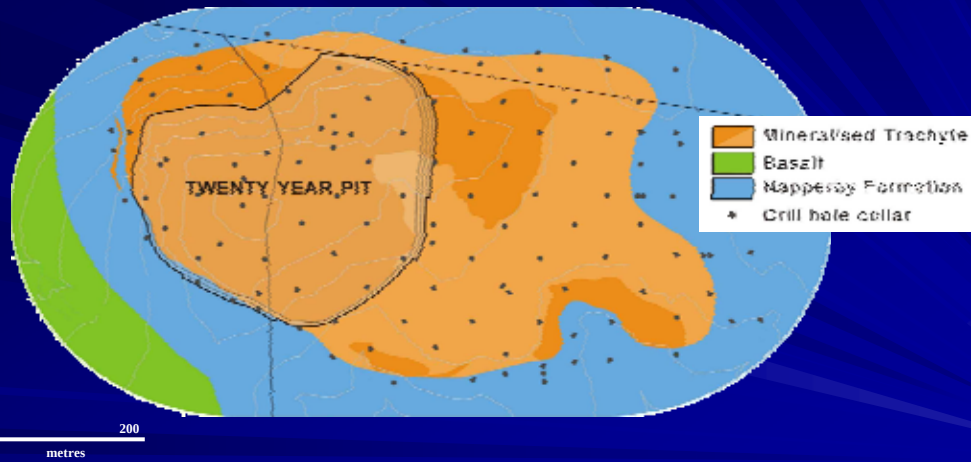
## Yttrium - Rare Earth Individual Production (assumed 70% recovery)

|                    | 200ktpa        | 500ktpa        |
|--------------------|----------------|----------------|
| $La_2O_3$          | 252            | 630            |
| $CeO_3$            | 475            | 1188           |
| $Pr_6O_{11}$       | 52             | 131            |
| $Nd_2O_3$          | 182            | 456            |
| $Sm_2O_3$          | 28             | 71             |
| <b>Total LREE</b>  | <b>990tpa</b>  | <b>2475tpa</b> |
| $Eu_2O_3$          | 1              | 2              |
| $Gd_2O_3$          | 28             | 69             |
| $Tb_4O_7$          | 4              | 11             |
| $Dy_2O_3$          | 26             | 66             |
| $Ho_2O_3$          | 5              | 14             |
| $Er_2O_3$          | 15             | 37             |
| $Tm_2O_3$          | 2              | 5              |
| $Yb_2O_3$          | 13             | 32             |
| $Lu_2O_3$          | 2              | 5              |
| $Y_2O_3$           | 204            | 511            |
| <b>Total YHREE</b> | <b>301tpa</b>  | <b>753tpa</b>  |
| <b>Total YREE</b>  | <b>1291tpa</b> | <b>3228tpa</b> |



## DUBBO ZIRCONIA PROJECT

### Geology and 20 Year Pit



Open pit life at 200kpta ore processed = +400 years  
 Open pit life at 500kpta ore processed = +160 years



## Dubbo Zirconia Project

### Toongi rail siding and process plant site



# DUBBO ZIRCONIA PROJECT

## Why is this project different

Majority of “downstream” zirconium products are derived from zircon, whose output is governed by ilmenite/rutile from mineral sands mining operations.

Niobium (and tantalum) production dominated by one major company in one country. Nb by CBMM in Brazil (and Ta by Talison in Australia).

Production costs are spread across the four metal outputs – zirconium (hafnium), niobium (tantalum), light rare earths and yttrium-heavy rare earths.

Project located in region with very favourable infrastructure and legislative framework, both at a State and Federal level.

The DZP provides an alternative source for a number of strategically important metals, and is capable of producing for hundreds of years from one ore body.



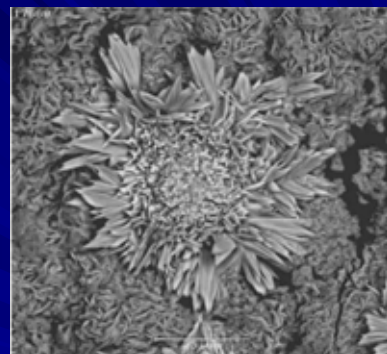
## ALKANE RESOURCES LTD

ABN 35 000 689 216

### ***Dubbo Zirconia Project Moving Forward***

***A world class project***

[www.alkane.com.au](http://www.alkane.com.au)



Zirconium sulphate crystals

#### **Disclaimer:**

This presentation contains certain forward looking statements and forecasts, including possible or assumed reserves and resources, production levels and rates, costs, prices, future performance or potential growth of Alkane Resources Ltd, industry growth or other trend projections. Such statements are not a guarantee of future performance and involve unknown risks and uncertainties, as well as other factors which are beyond the control of Alkane Resources Ltd. Actual results and developments may differ materially from those expressed or implied by these forward looking statements depending on a variety of factors.

Nothing in this presentation should be construed as either an offer to sell or a solicitation of an offer to buy or sell securities.

#### **Competent Person:**

Mr D I Chalmers, FAusIMM, FAIG, (director of the Company) 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 Competent Person as defined in the 2004 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Ian Chalmers consents to the inclusion in the presentation of the matters based on his information in the form and context in which it appears.