CRITICAL MINERALS 2014

August 3-5, 2014, Denver, CO, USA

Dubbo Zirconia Project, Australia
Pilot Plant to Production

ALKANE RESOURCES LTD

MULTI-COMMODITY MINER EXPLORER

www.alkane.com.au

AusIMM THE MINERALS INSTITUTE

SME Society for Mining, Metallurgy & Exploration

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Critical Minerals

Critical Minerals are those minerals and metals that are crucial to industrial production and / or supply of energy to a nation.

Each economy has a different interpretation as to what constitutes a critical mineral, so the US has a different list to the EU, UK, Japan, Korea, etc.

Examples:

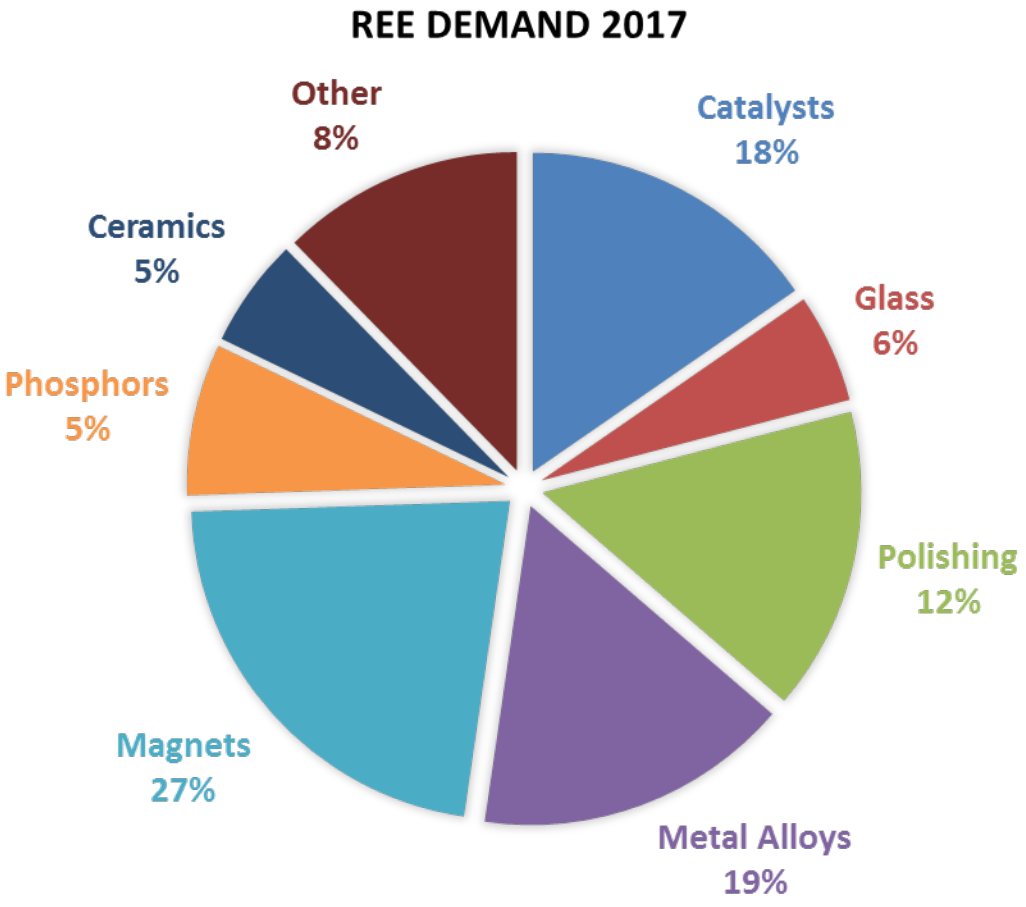
Rare Earths: There are numerous rare earth deposits defined in the world, but China produces about 95% of REs consumed today. Resources are not the problem, processing and refining technology, and costs are the issues.

Zirconium: Australia and South Africa dominate zircon production but China produces approximately 60-70% of all downstream zirconium products. Zircon is anticipated to move back into undersupply by 2020 due to diminishing resources.

Niobium: One company, CBMM, in Brazil produces about 85% of the world's niobium today. There numerous known deposits but processing and costs dictate development. In 2011, Japanese-Korean and Chinese consortiums separately acquired 15% in CBMM for US$1.9B (US$3.8B).

So criticality does not have a simple definition or resolution.

Rare Earth Industry



- Total REE consumption 2013 115,000t with annual growth estimated at 5-10% to be 153,000t in 2017
- Global market US$3-5B
- China produced about 90% of world supply in 2013 and consumed about 65%, with Japan 15% and the US 14%
- The REE industry is "imbalanced" with potential oversupply of light rare earths (Ce & La) and undersupply of heavy rare earths and neodymium
- Nd, Eu, Tb, Dy and Y are considered to be in critical supply through to at least 2020

2020 demand is estimated to be 190,000 tonnes

Source: IMCOA

Chinese Export Taxes & Controls

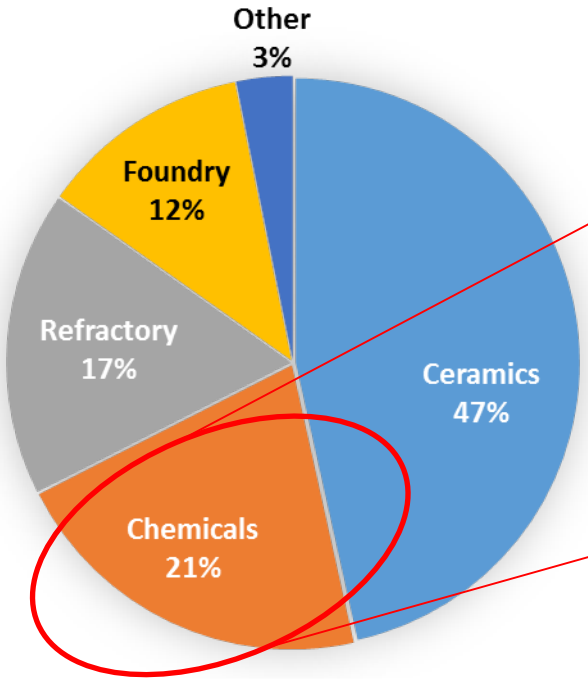
WTO Challenge to Chinese Export Taxes and Quotas??

- China is intent upon producing the value added product rather than exporting the raw materials
- As a result China's consumption of REs will rise from 65% to ~80% by 2020
- If the export tax is removed, it would be replaced by a new or additional mining tax to compensate
- Environmental compliance costs will impact Chinese RE prices for both lights and heavies
- Government approval is required by companies to export REs
- Current estimated REO capacity ~200,000tpa from 80 processors
- Operating capacity 100,000 – 125,000tpa 30 - 50 plants (only 28 have export licences)
- Consolidation of the RE industry to just six companies, all State owned
- Closure of about 100,000tpa REO capacity by the end of 2014 (27 operations involved)
- It is not logical to think China will flood the market to "wipe out" western producers
- Crack down on illegal ionic clay mining is expected to reduce smuggling and heavy RE supply

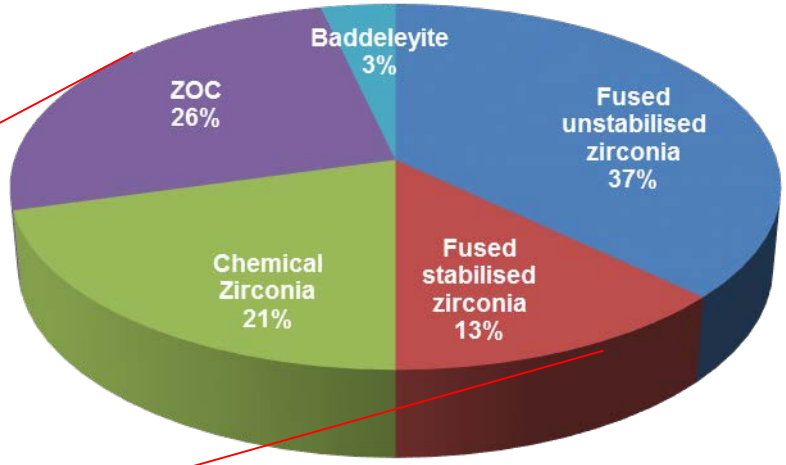
Conclusion: Chinese domestic prices will increase as demand stabilises
Export prices will increase

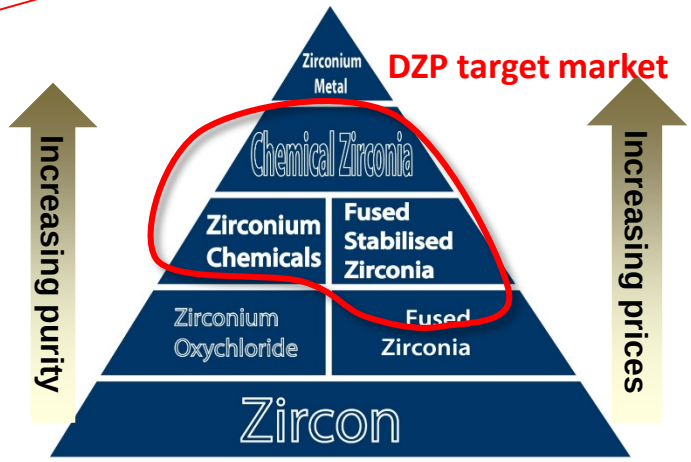
Zirconium Industry

Zircon Demand by End Use
(2013 ~ 1 million tonnes)



Zirconium Chemicals Output





- Global market US$2-3B
- 2014 consumer zircon inventories running down
- Market expected to stabilise through 2015 - 2016
- CAGR anticipated at 5% - 7% pa (CAGR 10% 2001 – 2010)

Zirconium Issues

97% of all zirconium chemicals / fused zirconia are derived from zircon

- Availability of premium zircon for fused zirconia
  - will require ~160-180,000tpa
  - low Al_2O_3 with minimal particle size < 45 micron
  - availability of zircon with <300 ppm U+Th

- Chinese zirconium industry is following the lead of the rare earth industry
  - consolidation of Chinese fused and zirconium chemical industry
  - production is about 75% of total world market
  - imports >95% of the zircon required

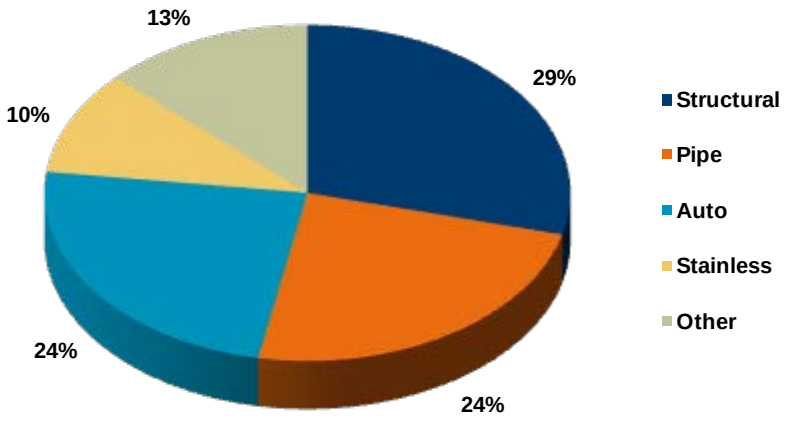
- Oriental Zirconia (largest SOE) is leading consolidation
  - Bought Zirconium Valley (Shenghua) - ZOC and Zirconia
  - Bought Wengsheng processor of zircon concentrates
  - Ownership of Murray Zircon and Australian Zircon
  - Australian operations - zircon mines to zirconium metal

- Environmental (water, air and land) and OH&S cost pressures
  - Treatment of high U+Th residues from zirconium chemicals

Source: TCMS

Niobium Industry

Current use of ferro-niobium



- 90% of Nb used in standard grade ferro-niobium for the production of high strength low alloy (HSLA) steels.
- Nb HSLA steels are primarily consumed in structural and piping, but the auto industry is becoming an increasing consumer.
- World production estimated at 80,000t Nb in 2012. CBMM in Brazil accounts for 85%.
- Global market US$3-4B. Price stability since 2008, including GFC.
- CAGR anticipated at 10% - Demand expected to be driven by greater intensity of use in steels by BRIC producers.

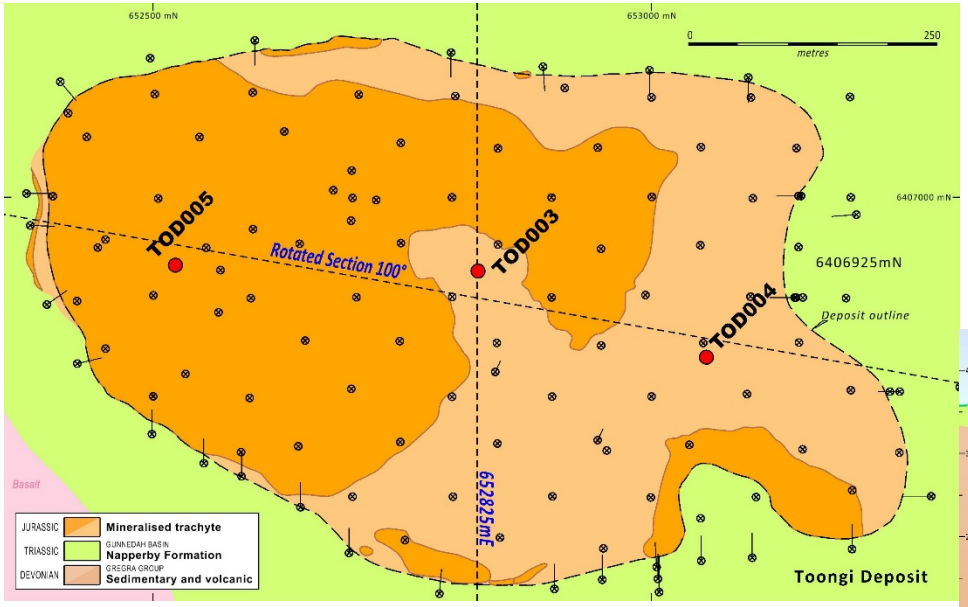
Sources: Niobec (IAMGOLD)

Dubbo Zirconia Project

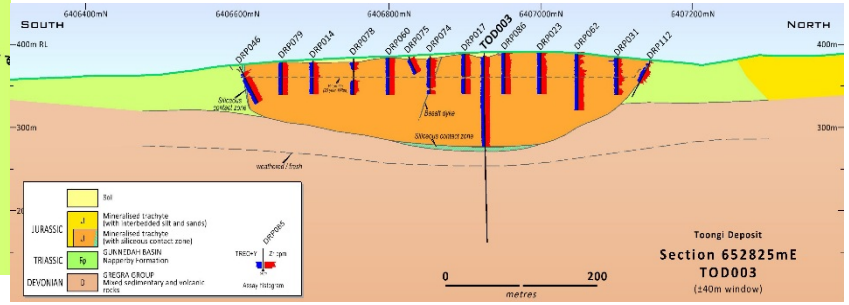
- Located 400km northwest of Sydney within a region that has substantial infrastructure – roads, rail, power, gas, light engineering, people (~100,000), being a large agricultural and mining area
- A very large polymetallic resource of the metals zirconium (hafnium), niobium (tantalum), yttrium and rare earths
- Important and strategic metal mix - 25% of rare earth output is in "heavy" group
- Reserve supports 35 year mine life at 1 million tonne ore processing per annum with defined resource potentially supporting a significantly longer operation
- Demonstrated flow sheet with pilot plant and products for market evaluation at ANSTO
- Robust technical and financial feasibility completed April 2013
- Environmental Impact Statement lodged in June 2013 and approval process proceeding
- Strong market interest in products with MoUs and off-take agreements executed

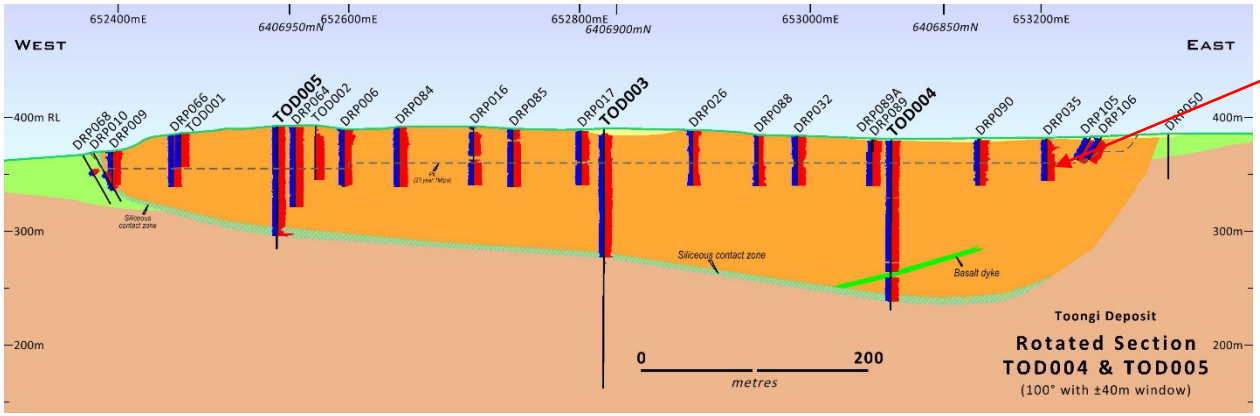
 Note: ASX announcements 16 November 2011, 11 April 2013 and 30 October 2013 - the Company confirms that all material assumptions and technical parameters underpinning the estimated Mineral Resources and Ore Reserves, and production targets and the forecast financial information as disclosed continue to apply and have not materially changed.

DZP Geology



Trachyte lava or sub-volcanic intrusive
Largely homogenous ore body
Ore mineralogy – eudialyte ("like" Zr silicate +Y and HRE), natroniobite (Nb-Ta) , bastnaesite (LRE)
All readily soluble in sulphuric acid



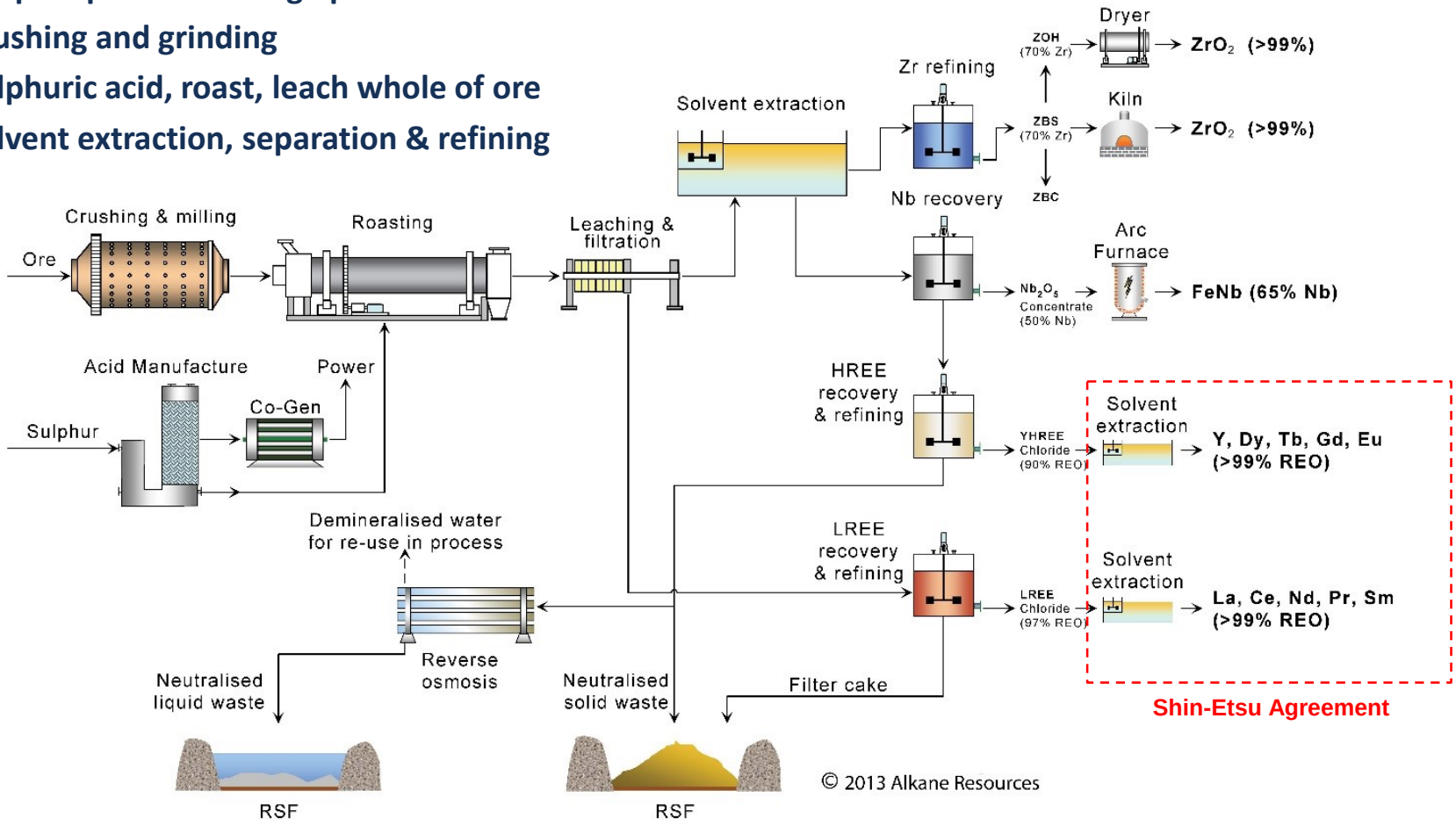


20 year pit floor
(40 metre depth)

Total resource base (100m depth):
73.2Mt @ 1.95% ZrO_2, 0.04% HfO_2,
0.46% Nb_2O_5, 0.03% Ta_2O_5,
0.14% Y_2O_3 and 0.75% REO
0.9% Total Y+REO
(see appendix for details)

DZP Process Flow Sheet

- Simple open cut mining operation
- Crushing and grinding
- Sulphuric acid, roast, leach whole of ore
- Solvent extraction, separation & refining



- Except for rare earths, the process produces a suite of products for direct consumption

DZP Demonstration Pilot Plant

DPP Filtration, PLS, SX, Zr and Nb recovery

Y and HREE refining and recovery

Zirconium refining and precipitation

Reverse osmosis and water recycle

DZP Demonstration Pilot Plant

What has the DPP achieved?

- ***Flowsheet development and optimisation***
  - Full and continuous flowsheet (ore to product) at 100kg/hour ore feed
  - Clear understanding of the process chemistry
  - Continue to improve recoveries, particularly with HREs
  - Water demand and recycle
- ***Engineering***
  - Mass balances – energy, water, reagents
  - Materials of construction
  - Operability
  - Capital costs
  - Operating costs
- ***Products***
  - Generate substantial volume for market evaluation
  - Modify products on customer feedback
  - Optimise product development to maximise revenue
- ***Environment***
  - Full classification of waste streams
  - Deportment of radionuclides within process

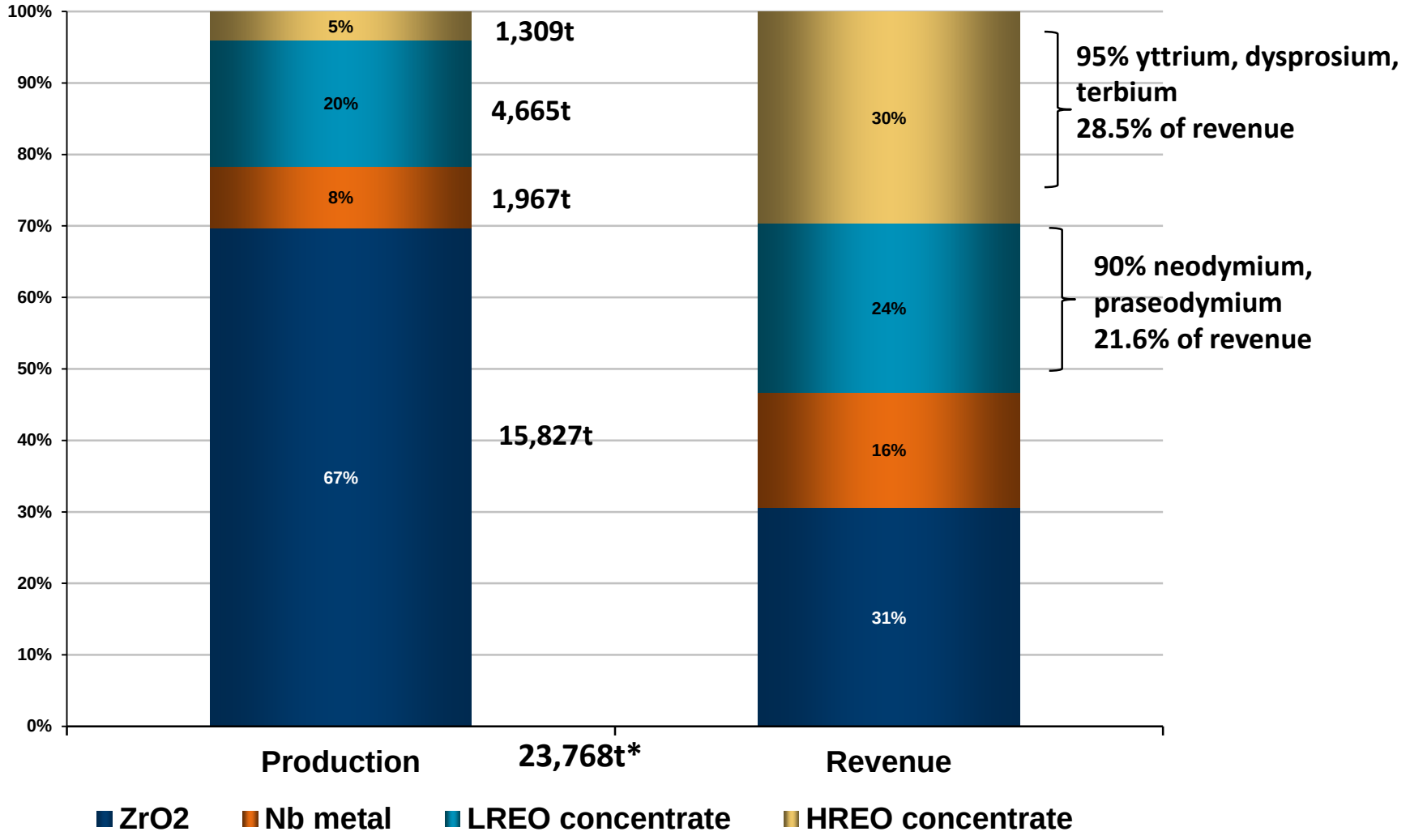
Product Applications

- ***Zirconium Materials:***
  - Electronics, ceramics, glass, refractories, chemicals, metals, catalysts
- ***Rare Earth Materials:***
  - Electronics, magnets, ceramics, glass, metal alloys, phosphors, catalysts
- ***Niobium Materials:***
  - Special steels, alloys, capacitors, glass, jewellery, coinage, superconducting magnets

Demand for these products are driven by "green" technologies: energy efficiency and alternates, and emissions minimisation

The DZP can provide a long term supply of zirconium chemicals independent of the zircon supply chain, and critical rare earths not reliant on China

DZP Estimated Product Output @ 1Mtpa



*ASX announcement 11 April 2013 - the Company confirms that all material assumptions and technical parameters underpinning the estimated production targets and the forecast financial information as disclosed continue to apply, with minor modification to reflect current product prices.

Product Value Enhancements - Offtake

Continuing Product Development for Increased Return

- Rare Earths:
  - MOU with Shin-Etsu Chemical to produce suite of separated rare earth oxides from LRE and HRE chloride concentrates / commercialisation of toll treatment off-take agreement in progress
  - Sale of products to other customers excess to Shin-Etsu's requirements
  - Further work to improve recoveries proceeding at ANSTO. Increased RE recoveries (Oct 2013) off-set lower prices and revenue
- Niobium:
  - Treibacher (Austria) JV to produce FeNb product for direct sale to end users
- Zirconium:
  - MOU with European manufacturer/trading company to market DZP products in Europe and North America
  - Zirconium development to produce increased value products of variable particle size and quality for different applications:
    - Production of yttria stabilised zirconia microsphere grinding media
    - Production of PZT – piezoelectric lead zirconate titanate
    - Ceramic colours eg yellow using praseodymium
    - Glass and steel making refractories

DZP Major Milestones

Major Milestones	2014	2015	2016	2017
Finalise Off-take agreements				
Project Approval	?			
Project Financing Program				
Front End Engineering Design (FEED)				
CONSTRUCTION				
PRODUCTION				

Estimates of times are indicative only and are subject to change.
Alkane reserves the right to vary the timetable without notice.

Conclusions

The DPP has played an integral part in commercialising the DZP

- The flowsheet is robust and can be scaled to a production plant
- Continuous improvement – optimisation and metal recoveries
- Measurement of mass balances for reagents, energy and water
- Development of opex and capex
- Continuous product development and interaction with customers
- Development of a whole of operation environmental management plan
- Financiers and their due diligence teams can observe the flowsheet and product output

The Dubbo Zirconia Project, a strategic and alternate source of heavy rare earths, zirconium and niobium products

Disclaimer

Disclaimer

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Competent Person

The information in this presentation that relates to mineral exploration, mineral resources and ore reserves is based on information compiled by 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 2012 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.

DZP Resource & Reserves

Dubbo Zirconia Project – Mineral Resources

Toongi Deposit	Tonnage (Mt)	ZrO_2 (%)	HfO_2 (%)	Nb_2O_5 (%)	Ta_2O_5 (%)	Y_2O_3 (%)	REO (%)
Measured	35.70	1.96	0.04	0.46	0.03	0.14	0.75
Inferred	37.50	1.96	0.04	0.46	0.03	0.14	0.75
Total	73.20	1.96	0.04	0.46	0.03	0.14	0.75

These Mineral Resources are based upon information compiled by Mr Terry Ransted MAusIMM (Alkane Chief Geologist) who is a competent person as defined in the 2004 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Terry Ransted consents to the inclusion in the report of the matters based on his information in the form and context in which it appears. The full details of methodology were given in the 2004 Annual Report.

Dubbo Zirconia Project – Ore Reserves

Toongi Deposit	Tonnage (Mt)	ZrO_2 (%)	HfO_2 (%)	Nb_2O_5 (%)	Ta_2O_5 (%)	Y_2O_3 (%)	REO (%)
Proved	8.07	1.91	0.04	0.46	0.03	0.14	0.75
Probable	27.86	1.93	0.04	0.46	0.03	0.14	0.74
Total	35.93	1.93	0.04	0.46	0.03	0.14	0.74

These Ore Reserves are based upon information compiled by Mr Terry Ransted MAusIMM (Alkane Chief Geologist) who is a competent person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. The reserves were calculated at a1.5% combined ZrO_2+Nb_2O_5+Y_2O_3+REO cut off using costs and revenues defined in the notes in ASX Announcement of 16 November 2011. Terry Ransted consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

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