

“Meeting the Challenges of Supply this Decade”

by

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Disclosure

Dudley J. Kingsnorth, through the Industrial Minerals Company of Australia Pty Ltd (“IMCOA”) provides rare earths market and project development advice to Molycorp Minerals, LLC (owners of the Mountain Pass Project), Alkane Resources Ltd (owners of the Dubbo Zirconia Project), Rare Element Resources (owners of the Bear Lodge Project) and Northern Uranium Ltd (owners of the John Galt Project and the Browns Range Project). He consults to other rare earths companies on an occasional basis. This advice is provided on a fee for service basis; with no success or promotional fees or obligations. There are Confidentiality Agreements in place with these companies, but this does not preclude comment on public information.

IMCOA owns securities in Alkane Resources Ltd and Northern Uranium Ltd.

Summary of Presentation

- The rare earths industry today
- China
- Present and future demand and supply
- 'Balance'
- Potential future new suppliers
- Sustainability through diversity

The Rare Earths Market Today

- Estimated demand in 2010: 125,000t REO
- Prices: Early 2010 US\$11-13/kg; Now US\$40-80/kg REO
- Value of Output: US\$2-4Billion in 2010
- China is dominant (supplying 95% and consuming 60% of global supply/demand)
- Constraints on Chinese exports are creating opportunities for non-Chinese projects
- Several non-Chinese rare earths projects being evaluated

Rare Earths – Some Concepts

- Rare earths are not commodities – customer specific
- Capital intensive (>US\$40,000/t annual capacity)
- Long start-up; limited expertise outside China
- Supply and demand for individual REOs is not in balance
- Used in small quantities:
 - REO price has negligible impact on final product price
 - Limited recycling

Rare Earths – Development Concepts

- Each orebody is different; so the process route is project specific
- All rare earths orebodies have U and Th associated with them; requiring safe disposal
- Western rare earths enterprises are single project companies (debt has to be non-recourse project funded)
- Pilot plant studies (for non-Chinese projects) required to:
 - Demonstrate technical viability
 - Generate samples for customer approval as basis for sales contracts
 - Provide data for bankable feasibility study
 - Generate data for environmental impact statement

China: RE Export Transition

- 1970s: Rare earth mineral concentrates.
- 1980s: Mixed rare earth chemical concentrates.
- Early 1990s: Separated rare earth oxides and metals.
- Late 1990s: Magnets, phosphors, polishing powders.
- 2000s: Electric motors, computers, batteries, LCDs, mobile phones.

China: Industry Constraints

- Export quotas – recent reduction of 40%
- Production quotas – reserves limited
- Export taxes: 15-25%
- VAT rebate on exports withdrawn
- “Co-ordinated pricing”
- Industry consolidation
- Environmental legislation enforced
- **Lack of Transparency**

Global RE Consumption 2010

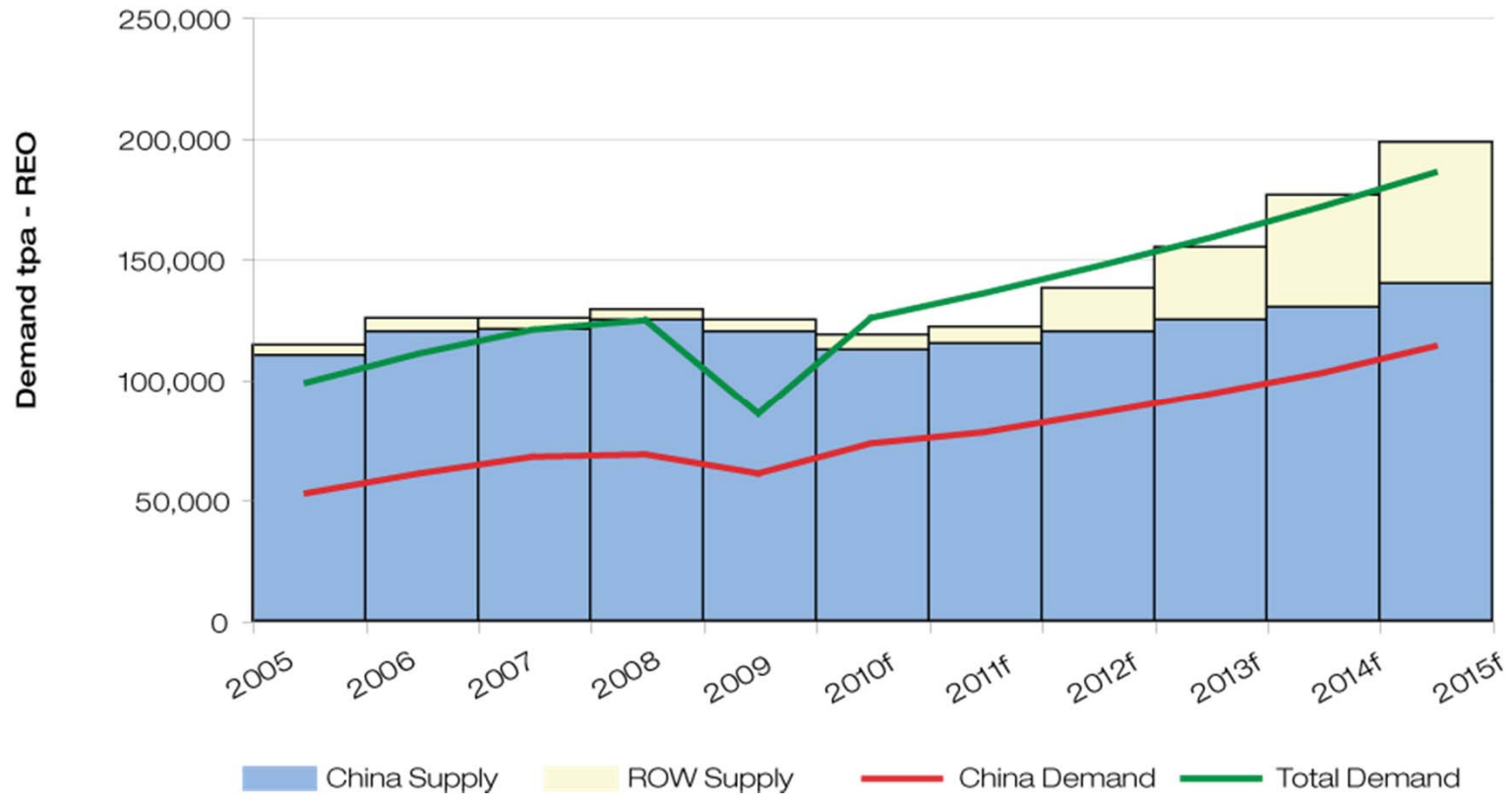
Estimated Global Rare Earths Demand in 2010 (t REO ±15%)
 (Source: IMCOA and Rare Earths Industry Stakeholders)

Application	China	Japan & NE Asia	USA	Others	Total
Catalysts	9,000	3,000	9,000	3,500	24,500
Glass	7,000	1,500	1,000	1,500	11,000
Polishing	9,500	7,000	1,000	1,500	19,000
Metal Alloys	14,500	5,500	1,000	1,000	22,000
Magnets	20,500	4,000	500	1,000	26,000
Phosphors	5,500	2,000	500	500	8,500
Ceramics	2,500	2,500	1,500	500	7,000
Other	4,000	2,000	500	500	7,000
Total	72,500	27,500	15,000	10,000	125,000

The Last 18-24 Months

- China suspends shipments of rare earths to Japan for political reasons (September 2010)
- Chinese export quotas reduced significantly
- Global financial crisis (Growth set back 2 years)
- China declares 'heavy' rare earths resources are finite (approximately 15 years)
- Chinese rare earths industry consolidation
- Mt Weld & Mountain Pass to rapidly move to 20,000tpa & 40,000tpa REO respectively.

Rare Earths Supply & Demand



Source: IMCOA, Roskill, CREIC, Discussions with Rare Earths Industry Stakeholders

The Issue of 'Balance' in 2015

Forecast Supply and Demand for Selected Rare Earths in 2015

<u>Rare Earth Oxide</u>	<u>Demand @ 175-190,000tpa REO</u>	<u>Supply @ 195-210,000tpa REO</u>
Cerium	65-70,000t REO	75-80,000t REO
Lanthanum	45-50,000t REO	50-55,000t REO
Neodymium	35-40,000t REO	30-35,000t REO
Terbium	450-500t REO	400-450t REO
Dysprosium	2,750-3,000t REO	1,750-2,000t REO

Rare Earths Project Development

Steps 1-3

1. Resource

- Grade (and waste:ore ratio).
- REO distribution.
- Ready access to labour, power and water.

2. Mineralogy

- Identify rare earths mineral(s).
- Liberation size not too fine.
- If mine separate from processing plant then should be able to beneficiate to >30% REO.

3. Scoping Study

Rare Earths Project Development

Steps 4-7

4-6. Pilot Plant (Beneficiation, Extraction, Separation)

- Demonstrate technical viability and flexibility; operated on a continuous basis
- ‘Products’ meet customer specifications.
- Data from plant for Capex and Opex estimates.
- Data for environmental management plan.

7. Environmental Approval

- EPA approval
- Community approval

Rare Earths Project Development

Steps 8-10

8. Marketing Plan

- Consistent with future customer needs.
- Realistic market share/growth.
- Cognisant of 'balance' issue.

9. Definitive Feasibility Study (incl. Funding)

10. Construction and Start-up

- Schedule is realistic.
- Provide adequate training for start-up.
- Provide adequate working capital.

Potential North American Suppliers

<u>Factor</u>	<u>Mountain Pass</u> (USA) Molycorp Minerals, LLC	<u>Hoidas Lake</u> (Canada) Great Western Minerals Group	<u>Nechalacho</u> (Canada) Avalon Ventures Ltd	<u>Bear Lodge</u> (USA) Rare Element Resources Ltd
Status	Full environmental approvals in place Mining has resumed. Construction of new integrated processing facility underway.	Advanced exploration. Some preliminary test work completed. Could be supplemented by Steenkampskraal Project in South Africa	Pre-feasibility study underway. Some preliminary test work completed.	Resource engineering study underway. Process development commenced
Resource	20Mt @9.2% REO 1.8Mt REO contained (a proven reserve)	1.4Mt @ 2.6% REO 0.04Mt REO (inferred)	65Mt @2.5%REO 1.6Mt REO (inferred)	9 Mt @ 4.1% REO 0.4 Mt REO (inferred)
Potential Production	Target: 19,050t pa REO; start-up in 2012. Phase #2 : +100% expansion approved	Hoidas : 3-5,000 tpa REO Start-up post 2014. Steenkampskraal maybe in 2013/14	3-5,000 tpa REO Start-up post 2015	Targeting 10,000tpa in 2015/16
Critical Issues	<ul style="list-style-type: none"> ■Funding issues resolved ■New facilities based on past experience ■Established customer base 	<ul style="list-style-type: none"> ■Define ore reserve ■Develop process ■Complete DFS ■Approvals ■Customer support 	<ul style="list-style-type: none"> ■Define ore reserve ■Develop process ■Complete DFS ■Approvals ■Customer support 	<ul style="list-style-type: none"> ■Define ore reserve ■Develop process ■Complete DFS ■Approvals ■Customer support

Other Potential Suppliers

<u>Factor</u>	<u>Mt Weld</u> (Australia/Malaysia) Lynas Corporation Ltd	<u>Dubbo Zirconia</u> (Australia) Alkane Resources Ltd	<u>Nolans</u> (Australia) Arafura Resources Ltd	<u>Dong Pao</u> (Vietnam) Toyota, Sojitz & Govt of Vietnam
Status	Start-up in late 2011. Commissioning of beneficiation plant commenced. Construction of processing facility in Malaysia well advanced	3 rd generation pilot plant in 'production' for customer samples. Approvals process well advanced	Pre-feasibility study complete. Pilot plant well advanced. Approvals process started.	Feasibility studies well advanced – key is Toyota support
Resource	12Mt @ 9.7% REO 1.2Mt REO contained (a proven reserve)	73Mt @ 0.9% REO 0.65Mt REO contained (a proven reserve)	30Mt @ 2.8% REO 0.85Mt REO contained	0.65Mt REO contained in major resource
Potential Production	10,500t REO pa in 2011. Many sales contracts in place. Increase to 21,000t REO in 2013/14	1,200-1,400tpa REO in 2013/14. REOs (rich in Y) will be by-products to zirconium chemical and niobium production.	20,000 tpa REO in 2014(?). Phosphate, calcium chloride & uranium co-products.	Target is 2-3,000tpa REO in 2013 rising to 5,000tpa REO in 2015
Critical Issues	<ul style="list-style-type: none"> ■Funding issues now resolved - no debt. ■Separation of mining and processing ■Technology agreement with Rhodia 	<ul style="list-style-type: none"> ■Complete DFS ■Approvals (started) ■Customer support 	<ul style="list-style-type: none"> ■Define ore reserve ■Confirm process ■Complete DFS ■Approvals (started) ■Customer support 	<ul style="list-style-type: none"> ■Complete DFS ■Approvals

Projects with Japanese Support

- **Sumitomo/Kazatomprom:**
Sareco JV to treat Y-rich tailings in Kazakhstan. 3ktpa in 2013?
- **Toyota/Sojitz/Govt of Vietnam;**
Based on Dong Pao orebody. 3ktpa in 2013?
- **Toyota/Indian Rare Earths JV:**
New monazite processing plant in Orissa. Target 10ktpa 2015?
- **Mitsubishi/Neo Material Technologies:**
Based on treatment of tailings from Pitinga Sn/Ta/Nb mine in Brazil.

Rare Earths Prices 4Q 2007 - 10

Comparison of Selected Rare Earths Prices US\$/kg REO 2005-10

(Notes: 1. Source is *metal pages*© 2. Prices have been rounded 3. US\$1.00 = C¥6.65 to 6.85)

Rare Earths Product	Rare Earths Price FOB China				Rare Earths Price FOB China 25/2/11
	4Q2007	4Q2008	4Q2009	4Q2010	
Lanthanum Oxide	US\$4.65	US\$8.20	US\$5.20	US\$53	US\$90
Cerium Oxide	US\$3.65	US\$4.55	US\$3.85	US\$50	US\$90
Praseodymium Oxide	US\$29.95	US\$17.60	US\$17.75	US\$77	US\$135
Neodymium Oxide	US\$30.30	US\$17.80	US\$18.25	US\$80	US\$145
Europium Oxide	US\$340	US\$490	US\$480	US\$625	US\$750
Terbium Oxide	US\$600	US\$490	US\$350	US\$605	US\$750
Dysprosium Oxide	US\$90	US\$110	US\$110	US\$295	US\$450
Yttrium Oxide	US\$9.80	US\$15.35	US\$10.25	US\$56	US\$105
Rare Earth Carbonate (in China)	US\$2.15	US\$0.90 to 1.80	US\$1.50	US\$5.75	US\$9

The Ten Steps to Rare Earths Commercial Production

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7	STEP 8	STEP 9	STEP 10
Establish Resource	Minerology	Scoping	PILOT PLANT(S)			EIS Approval	Letters of Intent (LOI)	DFS & Funding	EPC & Startup
			Beneficiation	Extraction	Separation				

Mt Weld
(Lynas)



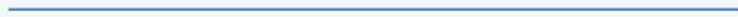
Mountain Pass
(Molycorp)



Dubbo
(Alkane)



Nolans
(Arafura)



Steenkampskraal
(RareCo)



Nechalacho
(Avalon)



Bear Lodge
(Rare Element)



Dong Pao
(Vietnam)



Sustainability through Diversity

USA/EU adopt purchasing codes that require all included 'strategic minerals' used in the total supply chain are sourced within the following guidelines:

- No more than 30/40% of imported 'strategic minerals' originate in any one country outside the EU (unless a bilateral trade agreement exists).
- No stockpiles or 'picking commercial winners'.
- It is not specific to rare earths and/or China.
- Independent verification of supply chain.
- If it is simple other entities will adopt the code.
- Allow time; say, effective 1st January 2015.
- EU, Japan, USA and Australia to co-operate in the development of rare earths technologies (need critical mass).

The Outlook for 2010-2015

- China will not directly deny the ROW of rare earths, but it will take whatever measures are necessary to maximise 'value add' manufacturing in China.
- Chinese constraints could constrain global growth.
- Supply will be tight.
- 'Balance' will still be an issue; so prices for Nd, Eu and Dy will remain strong.
- First of new projects will be on-stream and looking to expand.
- *Next generation* projects could be in early stages of start up.

Some Comments

- Rare earths prices
- China's rare earths production capacity
- Research and development
- Operational expertise
- Environmental standards

Thank you – Any Questions?

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