

# OPERATING COSTS REDUCED AT NOLANS

PROJECT WELL POSITIONED TO SUPPLY RARE EARTH MAGNET MARKET

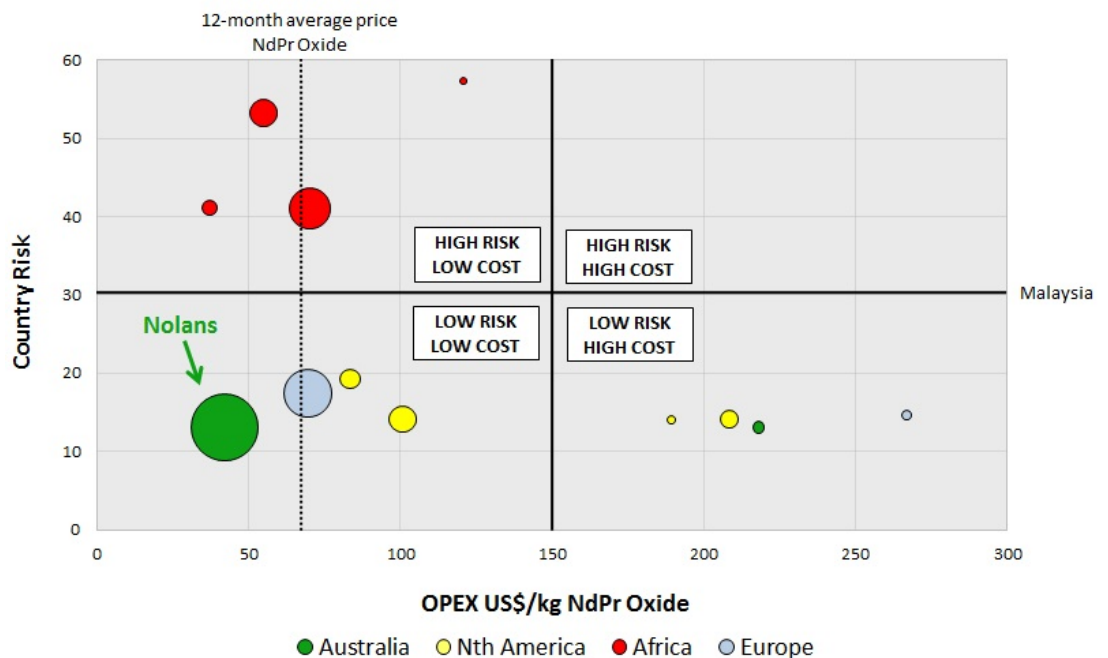
- Operating costs at Nolans now US\$11.22/kg of REO equivalent
- Magnet-feed rare earths production cost among world’s lowest
- Magnet demand forecast to grow 7-10% pa over the next decade
- Arafura ideally positioned as a secure, low-risk future supplier of magnet-feed rare earths

Australian Rare Earths company, **Arafura Resources Limited (ASX: ARU)** (“Arafura” or the “Company”) provides an update on the progress of the Nolans Project Definitive Feasibility Study (“DFS”).

## NOLANS COSTS UPDATE

Arafura is pleased to report a significant reduction in operating costs at the Nolans Rare Earths (“RE”) Project following a review of the Company’s optimisation programs that were undertaken in China and Australia in 2014 and 2015.

Operating costs have further reduced by 7.4% to A\$14.51/kg of REO equivalent (US\$11.22/kg @ A\$1 = US\$0.773) at the commencement of nameplate production. Previously, operating costs were estimated at A\$15.67/kg (US\$14.06/kg @ A\$1 = US\$0.897) in the Nolans Development Report (“NDR”; ASX: ARU 02/09/14). The decrease reflects material reductions in sulphuric acid and process (waste) residues, which are expected to impact favourably on the Project’s environmental and community risks. It also reinforces Arafura’s position as a potential low cost producer of critical magnet-feed rare earths Neodymium and Praseodymium (“NdPr”). Annual operating expenditure per kilogram of NdPr Oxide produced is estimated to be US\$41.55, as shown in the chart below.



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Final outcomes of the process testwork programs in China and Australia are imminent. These are required prior to commencing integrated pilot plant testwork and the subsequent phase of engineering activities for the DFS.

In addition, Arafura has undertaken a review of equipment and re-estimated capital costs for the Nolans Project. This has resulted in no significant change in capital expenditure on the NDR estimate of A\$1,408 million (US\$1,263 million @ A\$1 = US\$0.897). The revised estimate is now A\$1,437 million (US\$1,111 million @ A\$1 = US\$0.773), inclusive of 15% contingency. Capital estimates for both the Australian domiciled and offshore facilities were generated by independent engineering consultants Lycopodium Minerals Pty Ltd of Perth, Western Australia.

The capital and operating cost estimates are based on a production target of 20,000 tonnes per annum of REO equivalent from Measured and Indicated Mineral Resources at Nolans Bore. These Mineral Resources are summarised in the table below.

### **NdPr AND RARE EARTH MAGNETS**

Permanent magnets are fundamental to a transition to a low carbon economy and developments of ultra-strong Neodymium-Iron-Boron (“NdFeB”) magnets have found greater use and innovation in clean technologies aimed at reducing emissions and improving energy efficiency in the auto industry, wind energy, industrial motors and energy saving home electrical appliances.

Industry experts<sup>1</sup> anticipate strong demand growth of NdPr in permanent magnets of 7-10% CAGR over the next five to ten years. China faces major challenges to reduce emissions and develop a low carbon economy, and Chinese policy makers have identified the use of permanent magnet motors in transportation and industry as a key driver to meet its objectives.

Future availability of NdPr to meet the demand for permanent magnets is potentially at risk. Production control by authorities and maldistribution of critical REs in Chinese reserves may create supply instability and supply disruptions for NdPr in the future. Alternative long-term supply of NdPr from secure locations will be necessary to meet global demand and to reduce dependency on China.

### **NOLANS NdPr VALUE PROPOSITION**

Rare earth projects that are highly leveraged to NdPr are attractive and have high economic importance for use in permanent magnets. Arafura’s Nolans Project is positioned to be one of the few new non-Chinese suppliers of NdPr this decade and NdPr is more strongly represented at Nolans than in any other RE project being advanced for development. This high value product is expected to generate 75-80% of the total Project revenue when production commences.

Advanced RE projects are assessed on several criteria including resource size, RE composition, projected costs, product revenue, and return on investment. Equally important is mitigating a project’s technical, operating, environmental, community, funding and

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<sup>1</sup> Adamus Intelligence, IMCOA-Curtin University, Roskill, Shanghai Metals Market, Stormcrow



sovereign risks. A number of such projects are being developed in various jurisdictions across the globe, and these are rated in the chart above on the cost of production of NdPr Oxide and the risk represented by establishing and operating the project in the host jurisdiction. Rare earth buyers seeking to diversify their supply chain with non-Chinese production will ideally look at procurement opportunities in low-risk jurisdictions.

Nolans has one of the lowest production costs per kilogram of NdPr Oxide and, being located in Australia's Northern Territory, has very low country risk compared with challenging RE projects being advanced in developing countries.

#### **CHINA EXERTS CONTROL ON RARE EARTHS PRODUCTION**

At the beginning of May, and as a result of its unsuccessful appeal against the World Trade Organisation ruling, China's Ministry of Commerce ("MOFCOM") abolished longstanding trade restrictions on rare earths by removing export duties (taxes), export quotas and limitations on enterprises to export rare earths. These measures have been replaced by a licensing system that requires exporters to obtain a permit to trade rare earths. Exports of rare earths will now only occur through nine designated ports with export permits issued on the basis of international trade contracts.

In a parallel move that sees the focus of Chinese government control of the RE industry move from exports to production, China's Ministry of Industry and Information Technology ("MIIT") has accelerated the implementation of a resource tax for REs.

Chinese exports of REs were relatively strong over the first quarter of 2015 according to ACREI<sup>2</sup>, building on a 25% increase in exports in 2014. Demand for NdPr represents strong forward growth prospects for use in permanent magnets. Prior to May, NdPr prices had been relatively stable compared with other REs such as Europium and Yttrium.

Arafura's view is that the combination of new resource taxes, tighter environmental regulations, and a shift from export control to production control will result in increased RE prices in the medium term as a consequence of a higher production cost base in China.

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<sup>2</sup> Association of China Rare Earth Industry



### Chart Assumptions

1. Projects shown have planned annual production >500t NdPr and have advanced to at least PFS stage.
2. Cost and planned TREO production data sourced from company securities exchange disclosures. Costs allow for planned project output: either mixed RE intermediate products or separated RE products.
3. Size of circle proportional to planned annual production of NdPr, based on 100% recovery of the *in-situ* composition. Nolans is 5,300tpa. Smallest African project is 600tpa.
4. Country risk data from *The Economist Intelligence Unit*. This metric is an aggregate of threats facing business operations, including political stability, legal, foreign trade, financial, labour market and infrastructure. By way of example, Malaysia has an overall operational risk score of 30.
5. 12-month average NdPr Oxide price sourced from [Metal-Prices](#).

### Cost Estimate Assumptions

The capital and operating cost estimates reported herein are based on a production target of 20 years of 20,000 tonnes per annum of REO equivalent from Measured and Indicated Mineral Resources at Nolans Bore. These Mineral Resources were estimated and reported by AMC Consultants Pty Ltd (ASX: ARU 09/12/14) following the guidelines of the JORC Code 2012. Classification of total resources at Nolans Bore into Measured, Indicated and Inferred Resource categories, using a 1.0% REO cut-off grade, is shown in the table below. Contained (*in-situ*) resources of rare earths, phosphate and uranium are also shown.

RESOURCES	TONNES (million)	RARE EARTHS REO %	TONNES REO	PHOSPHATE P <sub>2</sub> O <sub>5</sub> %	TONNES P <sub>2</sub> O <sub>5</sub>	URANIUM U <sub>3</sub> O <sub>8</sub> lb/t	TONNES U <sub>3</sub> O <sub>8</sub>
Measured	4.3	3.3	144,000	13	572,000	0.57	1,120
Indicated	21	2.6	563,000	12	2,614,000	0.42	4,090
Inferred	22	2.4	511,000	10	2,220,000	0.37	3,610
<b>TOTAL</b>	<b>47</b>	<b>2.6</b>	<b>1,217,000</b>	<b>11</b>	<b>5,407,000</b>	<b>0.41</b>	<b>8,830</b>

Numbers may not compute exactly due to rounding. REO grade excludes Yttrium (Y).

### Competent Person's Statement

The information in this report that relates to Mineral Resources is based on information compiled by Mr John Tyrrell, a Competent Person who is a Member of Australasian Institute of Mining and Metallurgy. Mr Tyrrell is a full time employee of AMC Consultants Pty Ltd. Mr Tyrrell has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken 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 ("JORC Code 2012"). Mr Tyrrell consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.