



# Arafura Resources Limited

“Accelerating Towards Final Investment Decision”

November 2018

Metal Events- International Rare Earths Conference

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The information in this presentation that relates to Exploration Results or Mineral Resources is based on information compiled by Mr Kelvin Hussey BSc (Hons). Mr Hussey is a Member of the Australian Institute of Geoscientists and he 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 a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (The JORC Code)". Mr Hussey consents to the inclusion in this presentation of the matters based on his information in the form and context in which it appears. Mr Hussey is a full-time employee of Arafura Resources.

# Agenda

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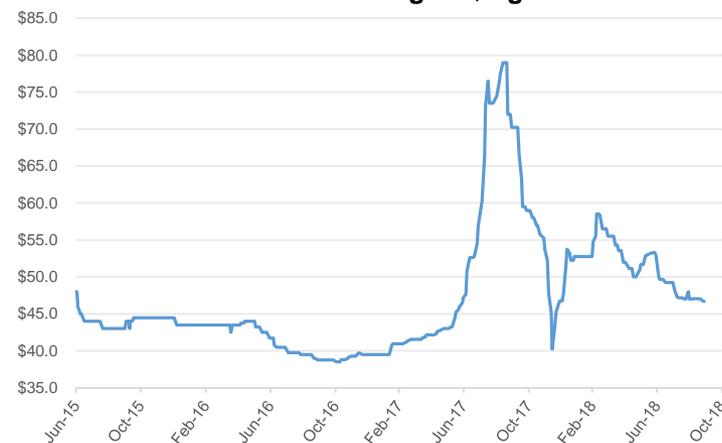
1. Introducing Arafura
2. NdPr Market Update
3. Funding New NdPr Supply
4. Nolans Project
5. Timeline

# Introducing Arafura

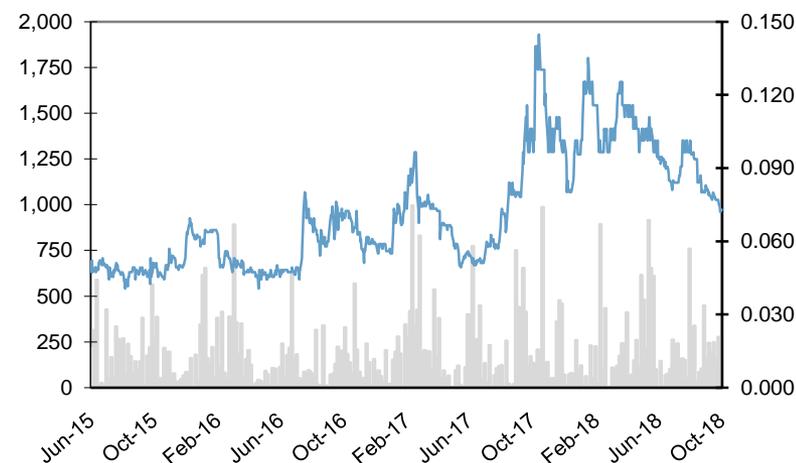
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- Arafura Resources Limited (“**Arafura**”, “**Company**”) is an ASX listed company focussed on developing its 100% owned Nolans Rare Earths Project located in the Northern Territory, Australia.
- Neodymium-Praseodymium (“**NdPr**”) are two rare earth elements which are essential ingredients in rare earth permanent magnets. Rare earth magnets are used in electric vehicles, wind turbines and advanced weapon systems.
- China continues to dominate the global supply chain being the world's largest producer accounting for approximately 80% of the NdPr for global rare earth permanent magnet production.
- Lynas Corporation Ltd (ASX:LYC) is the only significant miner and processor of rare earth materials outside China enjoying a market capitalisation in excess of \$1bn.
- Nolans Project nearing final investment decision.

**NdPr Oxide Pricing US\$/kg**



**Share Price Performance and Volume**



# Investment Highlights

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- **Globally Strategic Asset** – Nolans Rare Earth Project is one of the world’s largest undeveloped NdPr projects with an existing JORC Compliant Resource of 56Mt at 2.6% TREO with 26.4% NdPr enrichment that could come to provide 5-10% of global demand of NdPr oxide for use in permanent magnets.
- **Highly Leveraged to Forecast NdPr Price Increases** – NdPr accounts for 85% of Nolans rare earth composition by value making Arafura highly leveraged to forecast increases in NdPr prices.
- **Lowest Cost Quartile** – Very low estimated OPEX of US\$6.23/kg TREO and US\$24.40/kg NdPr makes Arafura the lowest amongst peers and underpins a 30+ year mine life.
- **Tier 1 Jurisdiction** – 100% owned Nolans Rare Earth Project is located in the Northern Territory, Australia 10 km from Stuart Highway, 135km from Alice Springs railyard and adjacent to Amadeus natural gas pipeline.
- **Advanced Project** –environmental approvals secured, final stages of pilot program nearing completion, DFS results scheduled December 2018 and final investment decision expected in 2019.

Highly Leveraged  
to NdPr Price

Low OPEX

Australian Project

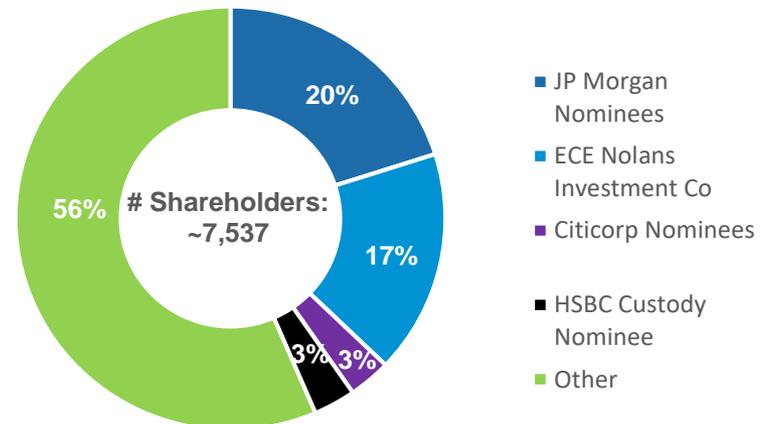
DFS December  
2018

Final Investment  
Decision 2019

# Corporate Snapshot

Capital Structure	
ASX Code	ARU
ASX Share Price (15 Oct)	\$0.07
Shares on Issue	629,595,910
Market Cap (15 Oct)	\$44.1m
12 Month Liquidity	\$25.0m
Cash (30 Sept '18)	\$8.1m
Debt	Nil
Enterprise Value	\$36.0m
ECE Nolans Invest. Co	17.42%

Board	Position
Ian Kowalick	Non-Executive Chairman
Gavin Lockyer	Managing Director
Terry Grose	Non-Executive Director
Chris Tonkin	Non-Executive Director
Quansheng Zhang	Non-Executive Director
Mark Southey	Non-Executive Director



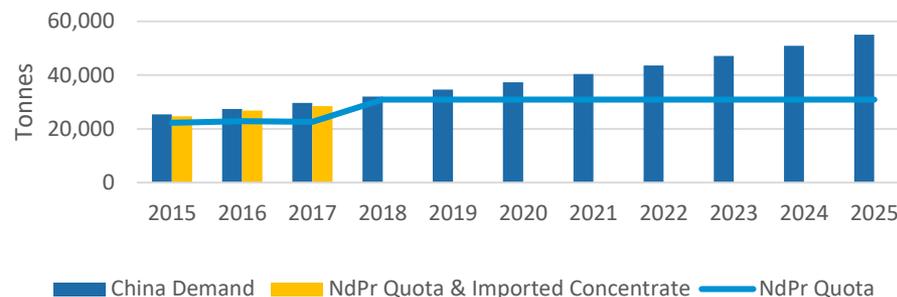
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# NdPr Market Update

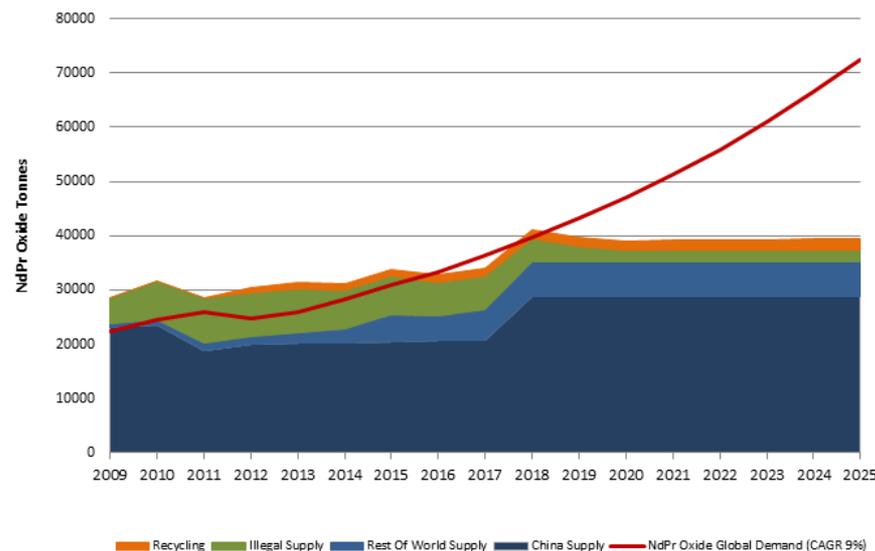
# China Becoming a Net Importer of NdPr

- China's domestic NdPr consumption will increase by over 30% in the next 5 years as it pursues clean energy objectives and global leadership in EV manufacturing.
- Supply reforms, industry consolidation and higher environmental standards will constrain China's ability to rapidly increase NdPr production.
- ROW supply is being sourced from Malaysia, China imported concentrate and notionally illegal China sources.
- Increased NdPr consumption combined with constrained supply could result in China moving from being the world's major source of NdPr to a net importer by the early 2020s.
- With overall NdFeB magnet growth at 9% CAGR additional non-Chinese supply will be required to meet demand as China struggles to maintain additional supply year-on-year.

**NdPr Oxide China**



**NdPr Oxide Supply & Demand**



Source: ACREI, Adamas Intelligence, Asian Metal and Shanghai Metals Market

# China's NdPr Supply – Capital Constrained ?

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- China's growth in production
  - From 1980 to 2000 China's rare earth production **increased** by an average 14% annually
  - From 2005 to 2011 China's NdPr production **increased** by an average of 4.5% annually
  - 2011 to 2015, China's NdPr production **reduced** by an average of 5.7%
- China's supply has not always been driven by demand. Policy and access to finance have been significant drivers of NdPr supply capacity.
- Recent policy has seen NdPr supply from China continue to contract through the removal of unsustainable production
- Access to traditional sources of funding for China based NdPr producers has changed
- China's capital investment is moving along the value chain, in the 10 years since the financial crisis China's share in medium high tech production has tripled to 32%, its now the worlds dominant producer
- Its likely the US trade war will encourage China to increase its focus of moving along the supply chain and make them more competitive in this space
- Future growth in China's NdPr production through supportive policy and access to capital will happen but only to the extent its aligned with its strategy of moving along the supply chain

# Funding - New NdPr Supply

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## The Challenges

- NdPr market relatively niche, research and data is limited, no commodity exchange
- Price volatility, historically not demand – supply driven
- China has a legacy position as the dominate producer
- Perceived technology and environmental risk for new producers, heightened outside of China
- Non – China project promoters generally have relatively small market capitalisation
- Promoters balance sheets will not facilitate funding through traditional debt sources

# Funding - New NdPr Supply

Source	Details	Advantages	Disadvantages
Bonds and 144A Offerings	Structured Loans & Debt Securities	<ul style="list-style-type: none"> <li>• Tolerate risk</li> <li>• Flexible</li> <li>• Fast to execute</li> </ul>	<ul style="list-style-type: none"> <li>• Requires credit rating</li> <li>• Opportunistic timing</li> </ul>
Mineral Royalty / Stream Financing	Funding tied to revenue stream	<ul style="list-style-type: none"> <li>• Subordinated to debt</li> <li>• Flexible</li> </ul>	<ul style="list-style-type: none"> <li>• No commodity exchange</li> <li>• May suit by products</li> <li>• Impacts borrowing capacity</li> <li>• Reduces equity upside</li> </ul>
Private Equity & Mining Funds	Stake in Company and or Project	<ul style="list-style-type: none"> <li>• Cornerstone equity</li> <li>• Strategic partner may validate project</li> </ul>	<ul style="list-style-type: none"> <li>• Timing critical</li> <li>• Loss of control</li> <li>• Ensure objectives linked</li> <li>• Understand exit strategy</li> </ul>
ECA Funding	Debt or g'tees tied to offtake or procurement from the lender's jurisdiction	<ul style="list-style-type: none"> <li>• Low cost and long tenor</li> <li>• Validates strategic nature of project</li> </ul>	<ul style="list-style-type: none"> <li>• Sponsors position on the value chain is critical</li> <li>• Improves sponsors leverage</li> <li>• Increased time &amp; complexity</li> </ul>

# Funding New NdPr Supply

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## The Solutions

- Alignment with offtake and strategic partners that removes some market risk
- Offtake contracts will need to be engineered to manage downside price risk for low cost/ efficient producers
- Piloting at scale to remove materials handling and commissioning risk
- Traceability for product and waste management certainty, permitting needs to be robust
- NdPr is a strategic input- leverage this to access funding: ECAs, industry and commercial banks

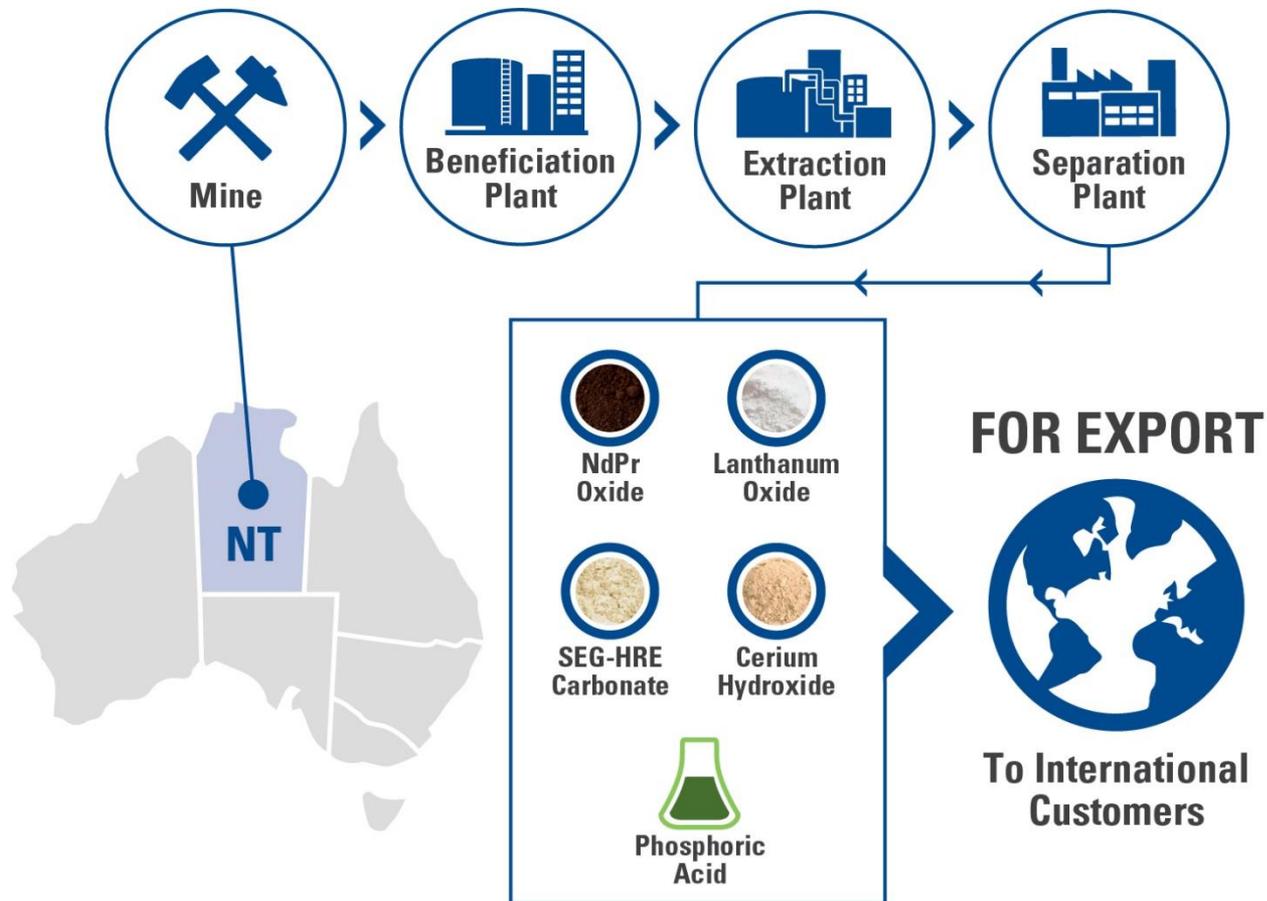
## The Future

- China's capital will be more strategically focused
- Greater linkage between markets, producers and funding (China and ROW)
- LYC performance has re-introduced NdPr to institutional equity investment
- Funding challenges will prevent a rush of new NdPr producers, China & ROW

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# Nolans Project

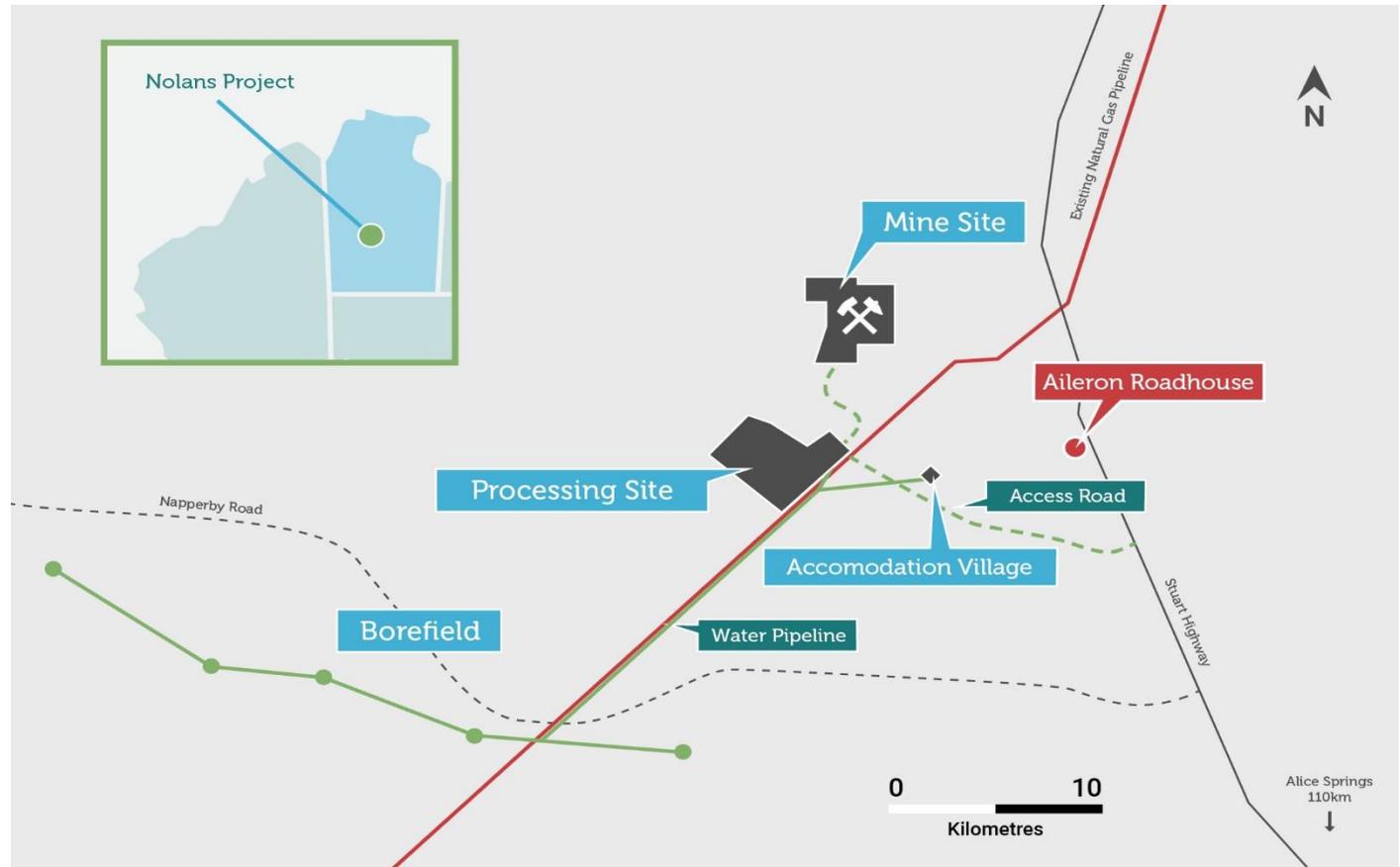
# Project Configuration



# Close To Key Infrastructure

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- Stuart Highway is 10 km east
- Alice Springs railyard, airport and other services are 135 km south
- Amadeus natural gas pipeline is adjacent to project site. Water supply is 30 km south.
- Tailings and process wastes remain at site.
- Product traceability and waste management certainty



# Favourable Project Economics

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- Ultra competitive operating costs US\$6.23/kg TREO or US\$24.38/kg NdPr oxide is the lowest amongst peers.
- Highly leveraged to forecast NdPr price increases with NdPr accounting for 85% of Nolans rare earth composition by value.
- 30+ years LOM.
- CAPEX of US\$680m can be reduced through project sell down.
- Final investment decision expected 2019.

Mining & Processing	
Mine life (years)	30+
Production	
TREO equivalent (tpa)	14,000
NdPr oxide (tpa)	3,600
La oxide (tpa)	2,660
SEG-HRE carbonate (tpa TREO equivalent)	660
Phosphoric Acid (tpa MGA)	110,000
Financial	
Capital cost (US\$m)	\$680
Operating cost (US\$m pa)	\$125
Operating cost (US\$/ kg TREO)	\$8.89
Operating cost (US\$/ kg TREO; less credit phos acid)	\$6.23
Operating cost (US\$/ kg NdPr; less credit phos acid)	\$24.38

*Refer Arafura ASX release 7 June 2017 for additional and qualifying information on the Mineral Resources that underpin the production target and provides the material assumptions on which the production target is based*

*The Company confirms that all material assumptions underpinning the forecast financial information derived from its 14,000 tpa TREO production target and the production target itself, continue to apply and have not materially changed since the 7 June 2017 ASX release*

*Based on 14,000 tpa TREO production processing Measured and Indicated Mineral Resources as per Appendix A*

# Flowsheet Piloting Nearing Completion

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Phase 1 Beneficiation	Phase 2 Phosphate Extraction	Phase 3 Bulk Pre-Leach	Phase 4 Acid Bake	Phases 5 & 6 Rare Earth Processing	Phase 7 Rare Earth Separation
<ul style="list-style-type: none"> <li>• 5,000 kg high-phosphate concentrate</li> <li>• &gt;82% NdPr recovery</li> <li>• &gt;90% P2O5 recovery</li> <li>• Met performance objectives</li> </ul>	<ul style="list-style-type: none"> <li>• Merchant grade phosphoric acid suitable for fertilizers</li> <li>• 3% TREO losses to gypsum waste</li> <li>• Met performance objectives</li> </ul>	<ul style="list-style-type: none"> <li>• 2,000 kg pre-leach residue</li> <li>• Met performance objectives</li> </ul>	<ul style="list-style-type: none"> <li>• Successful use of paddle dryer technology</li> <li>• Met performance objectives</li> </ul>	<ul style="list-style-type: none"> <li>• Pilot setup and operation scheduled</li> </ul>	<ul style="list-style-type: none"> <li>• Planning well advanced</li> </ul>
<b>SUCCESSFULLY COMPLETED</b>	<b>SUCCESSFULLY COMPLETED</b>	<b>SUCCESSFULLY COMPLETED</b>	<b>SUCCESSFULLY COMPLETED</b>	<b>ADVANCED</b>	<b>ADVANCED</b>

- Program reduces execution risk by addressing all key engineering and operational considerations prior to commissioning of the commercial facility.
- Draws on independent expert advice from specialist consultants and equipment vendors.



Beneficiation Pilot Plant



Phosphate Extraction Pilot Plant



Bulk Pre-Leach Pilot Plant



Acid Bake Pilot Plant



Phase 5 & 6 Rare Earth Processing

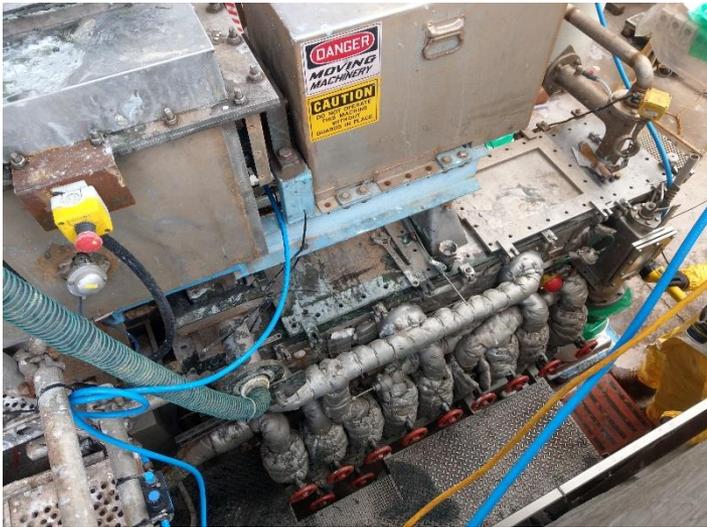
# Acid Bake Pilot Complete

## Acid Bake Plant



# Acid Bake Pilot Complete

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Paddle Dryer used  
for bake and cooling



Final Sulphated  
Rare Earth Material



# Definitive Feasibility Study

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- DFS on track for reporting in 2018
- Activities with independent expert advice from **specialist consultants**

Process plant,  
infrastructure and lead  
study engineer

**HATCH**

Mining planning and ore  
reserve

  
MINING PLUS

Tailings storage facility design,  
geotechnical and surface water  
management

Geotechnical site evaluation  
complete

 **Knight Piésold**  
CONSULTING

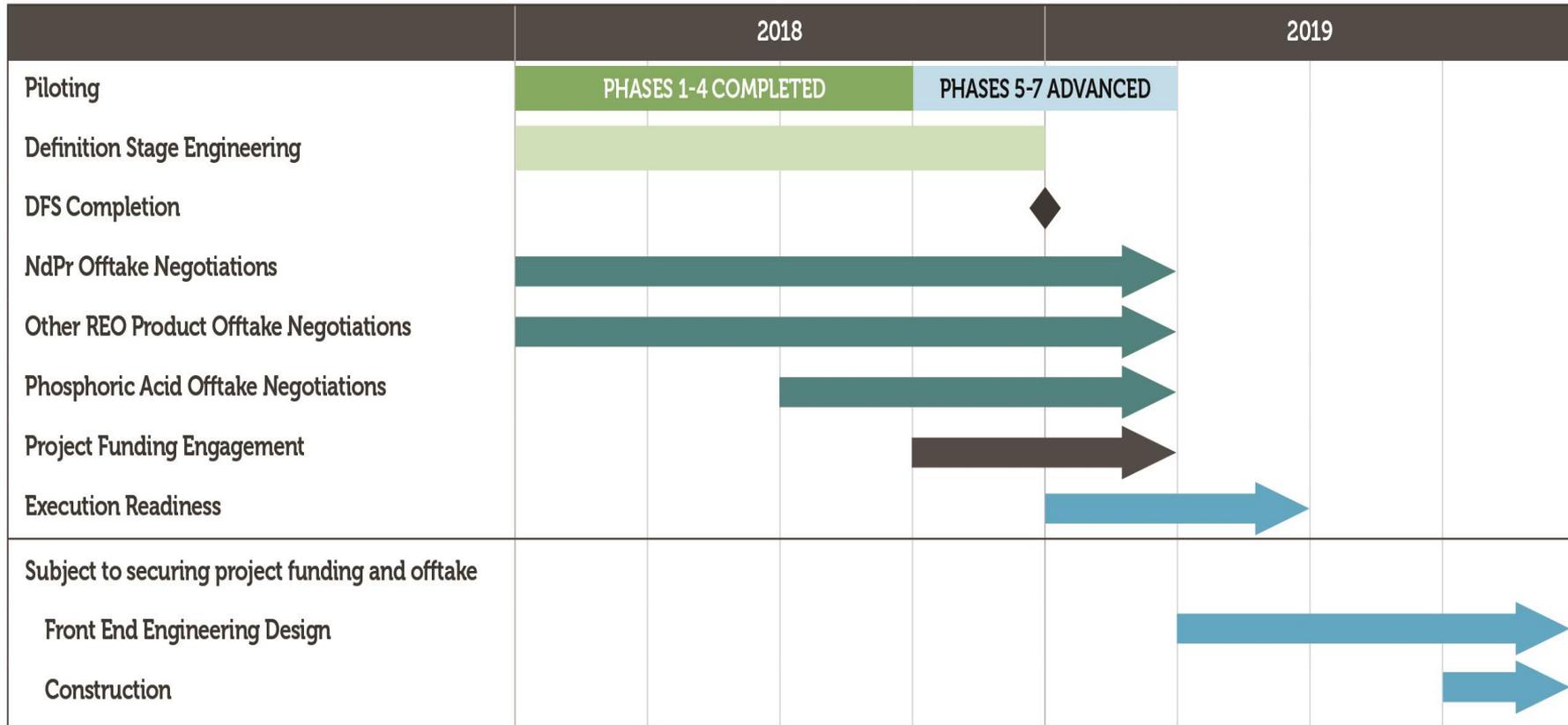
Hydrogeology and water supply  
studies advanced and  
environmental approval secured



Logistics study for transport and  
storage of reagents from port to  
site

  
**QUBE**  
LOGISTICS

# Timeline & Targets



# Why Arafura?

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- ✓ Australian project of global strategic importance.
- ✓ 100% owned asset with 30+ year mine life.
- ✓ Highly leveraged to forecast NdPr price increases.
- ✓ Environmental approval secured.
- ✓ DFS results December 2018.
- ✓ Final investment decision 2019.

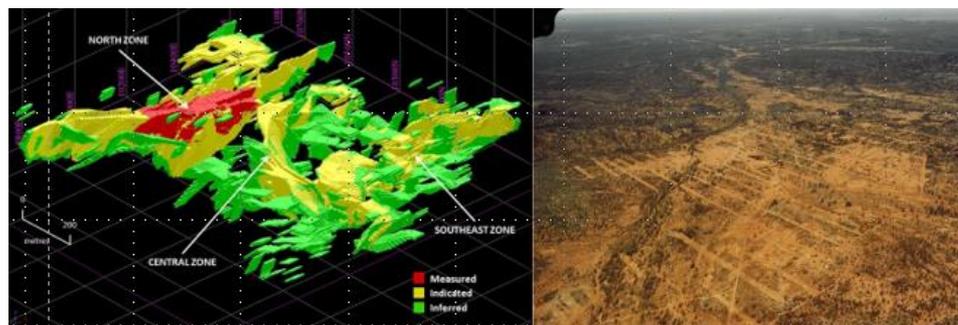
# Appendices

# Appendix A: Mineral Resources

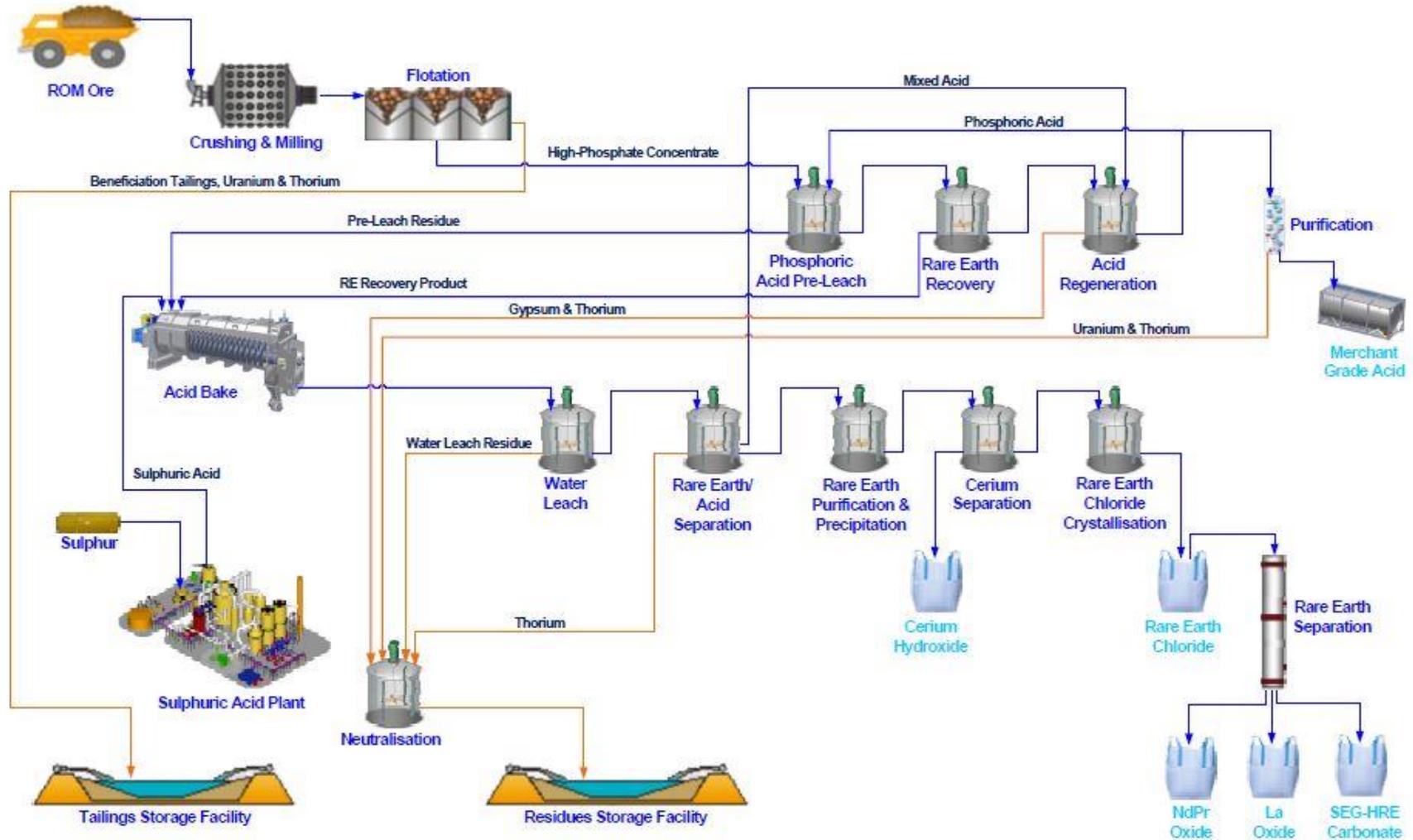
RESOURCES	TONNES (m)	RARE EARTHS TREO %	PHOSPHATE P <sub>2</sub> O <sub>5</sub> %	NdPr Enrichment %
Measured	4.9	3.2	13	26.1
Indicated	30	2.7	12	26.4
Inferred	21	2.3	10	26.5
<b>TOTAL</b>	<b>56</b>	<b>2.6</b>	<b>11</b>	<b>26.4</b>

1% TREO cut-off grade. Numbers may not compute exactly due to rounding. "NdPr enrichment" is the proportion of TREO comprising Nd<sub>2</sub>O<sub>3</sub> and Pr<sub>6</sub>O<sub>11</sub>.

- Low resource risk via extensive drilling and detailed material type studies.
- Mineralization at surface and open at depth, below 215m.
- 90,000 metres of drilling.
- Amenable to low-cost open cut mining and standard beneficiation techniques.
- Apatite is the most abundant REE-bearing mineral.



# Appendix B: Process Flowsheet



# Appendix C: Experienced Board



**IAN KOWALICK**  
NON-EXECUTIVE CHAIRMAN

Ian Kowalick has qualifications in science, engineering, economics, and finance. From 1995 to 2000, he held the most senior management position in the South Australian public sector, and is currently the Chairman of the South Australian Forestry Corporation Board. Ian is a board member of the Northern Territory Power and Water Corporation.



**TERRY GROSE**  
NON-EXECUTIVE DIRECTOR

Terry Grose has a strong commercial background gained over 30 years as a senior business executive, consultant, and director, in Australia and internationally. Terry worked in Hong Kong for over a decade in a senior financial role before establishing his own business, Grose International, a commercial and financial consultancy with clients throughout Asia.



**GAVIN LOCKYER**  
MANAGING DIRECTOR

Gavin Lockyer's diverse, global experience has provided management and leadership opportunities in a range of disciplines including; Accounting, Financial & Investment Banking, Major Resource Development & Operations, and Global Bank Treasuries. Over the past 20 years his career has exposed him to business practices in North America, Europe, and Australasia.



**QUANSHENG ZHANG**  
NON-EXECUTIVE DIRECTOR

Quansheng Zhang holds a Doctoral degree in Engineering and a Masters degree in Geophysical Prospecting. He is based in Nanjing in the Peoples Republic of China and is the General Manager of Hong Kong East China Non-Ferrous Mineral Resources Co Ltd (HKECE). Quansheng has over 30 years of mineral prospecting and exploration experience, and expertise in mineral resource surveys and geophysics.



**CHRIS TONKIN**  
NON-EXECUTIVE DIRECTOR

Chris Tonkin has over 35 years' experience as a senior business executive with a broad industry background in business generation, management, and strategy development. He is a member of Arafura Resources' Remuneration and Nomination and Audit and Risk Committees and is also Chairman of Lakes Oil NL.



**MARK SOUTHEY**  
NON-EXECUTIVE DIRECTOR

Mark Southey has previously held senior executive positions with Honeywell and ABB both in Australia and internationally, and more recently was part of the global executive leadership team within WorleyParsons, where he held the position of Group Managing Director for the Minerals, Metals and Chemicals Sector.

# Appendix D: Experienced Management



**RICHARD BRESCIANINI**  
GENERAL MANAGER EXPLORATION & DEVELOPMENT

Richard has over 30 years' experience in the minerals industry. He worked with BHP Minerals on base and precious metals exploration programs throughout Australasia and North America, contributing to significant economic discoveries at Eloise (copper-gold) and Cannington (silver-lead-zinc). Thereafter he led the Northern Territory Government's Geological Survey as its Director from 2003 to 2007 before joining Arafura.



**LLOYD KAISER**  
GENERAL MANAGER SALES, MARKETING & TECHNOLOGY DEVELOPMENT

Lloyd has more than 10 years' experience in the sales and marketing of industrial minerals into high value sector markets including the nuclear, automotive, and advanced ceramics sectors. Prior to joining Arafura, he held several senior positions in account management, business development and marketing across a diverse range of commodities and chemicals including alumina, coal, industrial minerals, refractories, and ceramics.



**PETER SHERRINGTON**  
CHIEF FINANCIAL OFFICER & COMPANY SECRETARY

Peter commenced employment with Arafura in 2008 as Commercial Manager and was appointed Chief Financial Officer in July 2013. He has more than 20 years' experience in professional and corporate roles in Perth. Prior to working with Arafura, he held senior finance and commercial positions with several ASX and public unlisted entities. He has also worked in public practice for 10 years in the areas of business services and corporate advisory.



**BRIAN FOWLER**  
GENERAL MANAGER NT & SUSTAINABILITY

Brian has worked for over 40 years in private sector mineral companies developing a range of commodities, including rare earths, base metals, and gold. Brian is a member of the Northern Territory Mining Board, Management Board of the Northern Territory Minerals Council of Australia, and a member of Work Health & Safety Advisory Council of the Northern Territory.



**STEWART WATKINS**  
PROJECT MANAGER – NOLANS PROJECT

Stewart has 25 years' experience in many facets of the mining industry including operations, engineering consulting, project development and management. Stewart is a Fellow of the AusIMM.