

## ASX Announcement

# Quarterly Activities Report and Appendix 5B

31 March 2018

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## Highlights

- **Arafura awards lead engineering contract to Hatch for completion of the Nolans NdPr Project Definitive Feasibility Study**
- **Arafura makes key appointments – Mark Southey as Non-Executive Director and Stewart Watkins as Nolans Project Manager**
- **Northern Territory Environment Protection Authority recommends environmental approval for the Nolans NdPr Project and Australian Government assessment advances**
- **Final Phase 4 Acid Bake continuous pilot plant to commence operation in early May**
- **Supply reform in China continues to strengthen NdPr prices in 2018**
- **Cash position \$10.7 million at 31 March 2018**
- **Reporting of results of the Nolans Definitive Feasibility Study on schedule for completion December 2018**

## Nolans NdPr Project

### Engineering - Hatch Awarded Consulting Services Contract

In March the Company appointed engineering consultancy firm Hatch Ltd (Hatch) as Lead Engineering Study Manager for the Nolans Project Definitive Feasibility Study (DFS).

Hatch is a globally recognised tier one engineering consultancy that has significant technical expertise in mineral processing, hydrometallurgy, detailed design and DFS development for rare earth projects and specialty minerals companies. It has recently completed several similar engagements with clients comparable to Arafura.

In March the Company also appointed Stewart Watkins as Project Manager for the Nolans Project. Stewart is a chemical engineer and a fellow of the Australasian Institute of Mining and Metallurgy (AusIMM) with more than 25 years' experience in mineral processing disciplines including operations, engineering consulting, project development and management. Stewart has held executive positions

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with listed companies Continental Nickel and IMX Resources and his experience includes the successful completion of feasibility studies and project delivery across a diverse range of commodities working for engineering consultants and contractors.

The appointment of Stewart Watkins and Hatch are both major milestones for the Company for the delivery of the DFS results by the end of this calendar year.

### Technology Phase 4 Acid Bake Piloting

The first stage batch trials of Phase 4 Acid Bake piloting using a paddle dryer were successfully concluded in October 2017. Paddle dryers offer advantages over other bake/roasting equipment including a large heat transfer area, dual rotating paddle shafts to keep material flowing, and the ability to process highly viscous materials. Arafura's October trials using NdPr-rich pre-leach residue (PLR) feedstock from the Phase 2 pilot plant produced excellent results (*refer to ASX announcement 13 December 2017*) featuring 98.5% extraction of light rare earths, including NdPr, to sulphated (acid baked) material (Table 1). The Company expects to confirm these results in the final Phase 4 Acid Bake continuous pilot plant.

**Table 1: Acid Bake First Stage Extraction Results**

<i>Rare Earths</i>	<b>Static Testwork Extraction</b>	<b>Dynamic Acid Bake Extraction</b>
<i>NdPr (and LRE)</i>	96.6%	<b>98.5%</b>
<i>SEG</i>	86.0%	<b>91.3%</b>
<i>HRE</i>	72.0%	<b>80.6%</b>

*LRE includes La, Ce, Pr and Nd. SEG includes Sm, Eu and Gd. HRE includes Tb, Dy, Ho, Er, Tm, Yb, Lu and Y.*

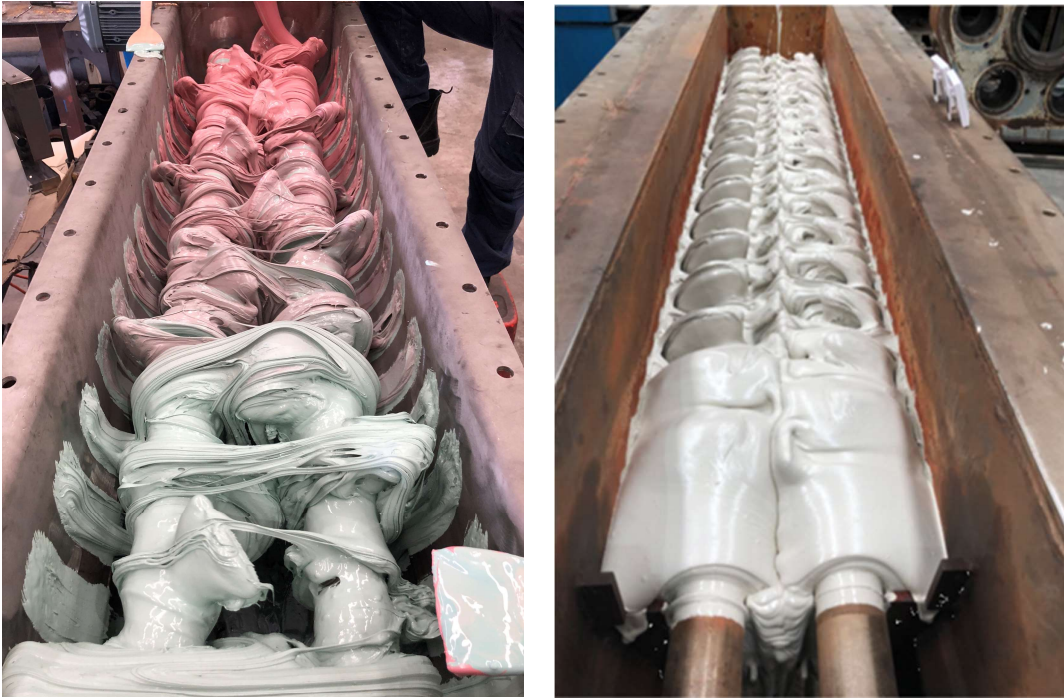
Commencement of the Phase 4 continuous pilot operation has been delayed from the original timetable for several reasons. The continuous acid bake is operated at a larger scale and required the procurement and fabrication of suitable equipment. Significant delays were experienced in the construction and delivery of a pug mixer for (pre-bake) sulphuric acid-PLR mixing by an overseas vendor. On delivery quality issues were identified with the pug mixer construction. This required unplanned rectification, fabrication and assembly works by one of Arafura's partners in the Phase 4 pilot, Bossong Engineering (Bossong), to prepare the unit for commissioning and operation to meet Australian Standards. This work is now complete.

The Company commissioned additional test work, in conjunction with SGS Australia (SGS) and Curtin University, to develop synthetic inert materials with material flow properties that replicate acid bake feed and sulphated material produced in the October trials. This was done to test the pug mixer and paddle dryer in Bossong's workshop to enable optimisation of the equipment prior to moving it to SGS and enabled finalisation of the operating parameters in preparation for continuous piloting. The tests

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using the synthetic materials were successful in demonstrating the smooth transfer of material in both unit operations (Figure 2).

**Figure 2: Synthetic Testing of Pug Mixer (L) and Paddle Dryer (R) Exhibiting Flow Behaviour Consistent with Nolans Material**

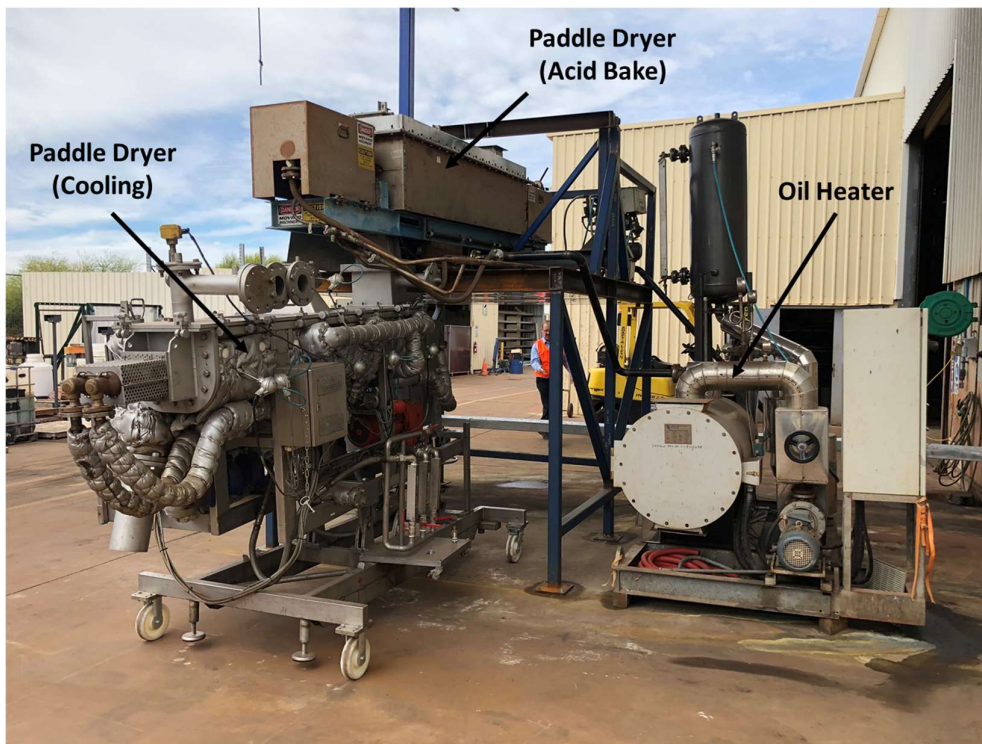


To ensure no further piloting schedule slippage occurs, Arafura and SGS have been working together to keep all piloting activities in line with the updated schedule and take advantage of the first available piloting window at SGS's facility. Arafura now anticipates operating the Phase 4 continuous Acid Bake pilot plant (Figure 3) during the first half of May (Figure 7).



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Figure 3: Phase 4 Acid Bake Pilot Plant at SGS Awaiting Installation of PLR Feeder and Pug Mixer



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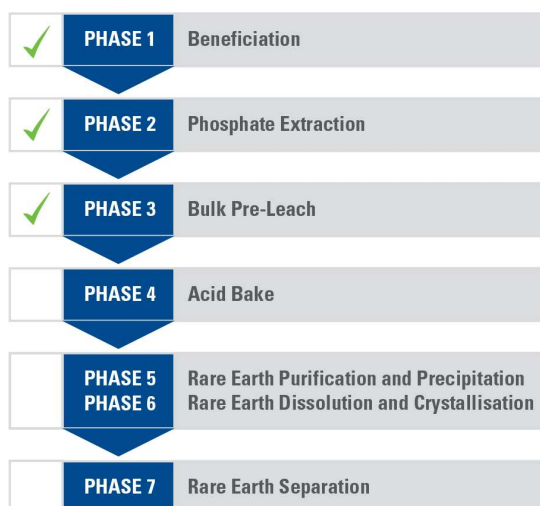
### Planning Advances on Phases 5, 6 and 7 Piloting

Phases 5 and 6 of the pilot program (collectively termed Rare Earth Processing; see Figure 4) are planned to commence immediately after the Phase 4 Acid Bake pilot. Potential service providers for these phases of work will be provided with the scope of work in May.

The delay in commencement of Phase 4 and the knock-on effect for Phases 5 and 6 is not expected to delay reporting the results of the Nolans DFS which is scheduled for the end of 2018 (Figure 7).

A possible flow-on effect from the delay to Phase 4 is that data acquired during the final phase of piloting (Phase 7 – Rare Earth Separation; see Figure 4) may not be available for the Nolans DFS. The Company, however, already has operational and process data from previous rare earth separation work completed on Nolans feedstock during 2011 and 2012 (*refer to ASX announcements 17 January 2012, 6 June 2012 and 24 January 2013*), and feasibility study level-of-accuracy engineering design and cost data from a Separation Plant engineering cost study completed by Lycopodium in 2013. The Company and lead engineer Hatch are examining the option of incorporating this data into the Nolans DFS as this aspect of the project remains unchanged.

Figure 4: Nolans Pilot Program Phases



### Regulatory Approvals – Environmental Impact Assessment

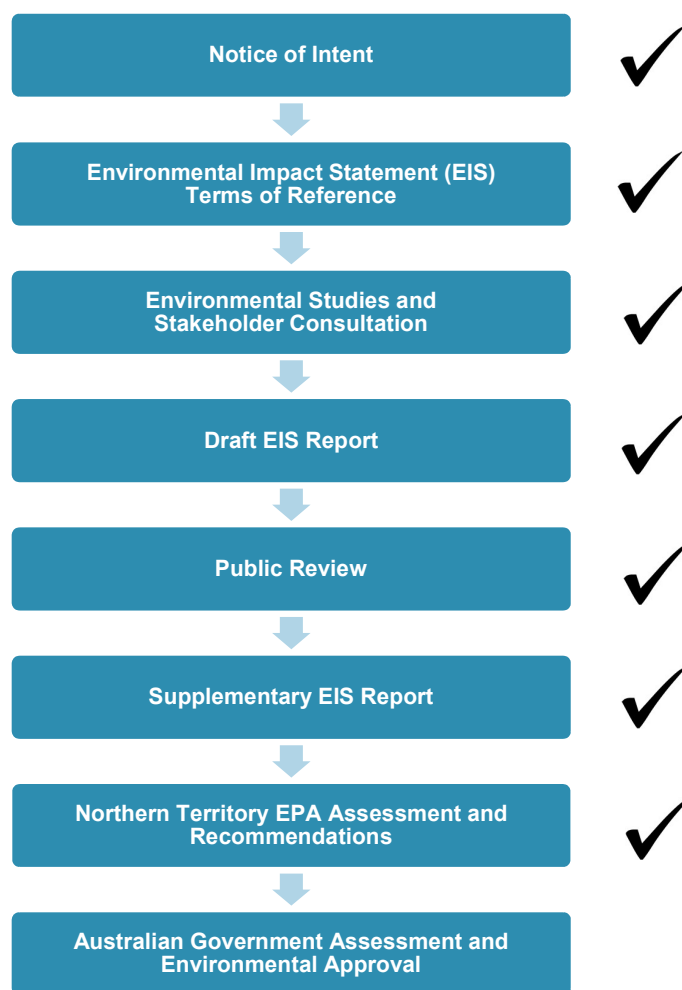
In January the Northern Territory Environment Protection Authority (NT EPA) completed its environmental impact assessment for the Nolans NdPr project and recommended environmental approval subject to conditions regarding appropriate operational controls (*refer to ASX announcement 5 January 2018*).

The NT EPA issued its Environmental Impact Assessment Report and recommendations to the relevant Northern Territory Government Ministers and the Australian Government's Department of the Environment and Energy (DoEE) for its assessment under the *Environment Protection and Biodiversity Conservation Act*. The Company had anticipated the DoEE would issue its recommendation and

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conditions in the March 2018 quarter but understands due to a heavy case load this is now likely to occur in the June 2018 quarter. Subject to a positive recommendation from the DoEE the Company will be required to incorporate the DoEE and NT EPA conditions into the pre-development Mining Management Plan (MMP) for the project. On approval of the activities in the MMP and the issue of a mining authorisation by the Northern Territory Department of Primary Industry and Resources, the project's final construction and operating approvals will be secured (Figure 5).

**Figure 5: Nolans Environmental Approval Process**



## Exploration

### **Bonya Joint Venture (Base and Precious Metals; Tungsten; Iron-Vanadium)**

As previously reported Rox Resources Ltd (Rox) holds a 51 per cent interest in the base and precious metal rights on Arafura's EL 29701 (Jervois, now known as Bonya), located 280 kilometres north-east of Alice Springs. Arafura holds the remaining 49% interest in the base and precious metal rights and 100% of the other residual metal rights. Arafura and Rox agreed to restructure the Bonya Joint Venture (JV) terms to simplify and encourage further development for the other residual metal rights.

The restructure of the JV interest resulted in Rox divesting an interest in the JV metals to Arafura. In return Arafura transferred a direct interest in the residual metal rights to Rox. The effect of this restructure was for each party to own a direct interest in the underlying tenement, with the percentage interests of the parties in the JV being Arafura 60% and Rox 40% (*refer to Rox ASX announcement 16 March 2018*).

Subsequent to the restructure of the Rox and Arafura interests, Thor Mining Plc (Thor) agreed to acquire Rox's 40% interest in Bonya. The consideration for the purchase of the interest is \$550,000 of Thor shares but the transaction also includes adjacent EL 29599 which is owned 100% by Rox and is not part of the Arafura-Rox JV (*refer to Thor ASX announcement 28 March 2018*). Arafura has declined to exercise its pre-emptive right to match the Thor offer for Rox's interest.

Thor is currently developing its 100% owned Molyhil Tungsten – Molybdenum Project which is located approximately 30 kilometres west of Bonya. Thor has identified that the Bonya JV area hosts outcropping tungsten mineral prospects, and has sought to acquire the Bonya interest to potentially increase both the scale and life of the proposed Molyhil operation and to assist in the commercialisation of the development. If the transaction is settled, Thor will assume Rox's rights and obligations under the existing JV agreement which requires the parties to contribute to exploration activities in accordance with their relevant interests. In the event one party elects not to contribute to the agreed exploration program, dilution provisions apply.

## Corporate

### **NdPr Price Performance**

In the period from January to March 2018, the NdPr oxide price (FOB China) traded in the range of US\$46.75- US\$58.50/kg. Prices strengthened through January on tight supply in the lead up to the Lunar New Year in mid-February. In February prices remained flat on low demand. March saw increased buying activity peaking at US\$58.50/kg, on the back of increased demand. There were also reports of tightening supply with sellers being unwilling to sell at low prices due to upward operating cost pressures. In late March and early April, the NdPr oxide price softened to US\$54.30/kg but achieved an overall increase of 16% on a year-to-date basis.

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Over the period from January 2017 to March 2018 the NdPr oxide price has increased by over 40%. A strong upward price trend has prevailed over most of this period. There was increased price volatility in the period around September 2017, and this has been explained by traders entering the market to ensure they were holding sufficient inventories to cover any downturn in NdPr production as China switched its focus to the National Congress of the Communist Party in October. The positive price trend over the period from January 2017 can largely be attributed to supply reform within China.

A continued focus on sustainability objectives for mining and smelting combined with consolidation of producers has led to constricted supply of NdPr from China. Consolidation of China-based producers has resulted in a more sophisticated supply chain with increased traceability. Illegal producers now have reduced access to market and this has resulted in less “swing” production entering the market when demand peaks. It is also apparent the increased focus on environmental sustainability has increased production costs. It is expected producers will look to pass these costs onto the market.

Environmental and supply reform has been a consistent theme within China for many industries and is not unique to NdPr production. Across other industries China has sought to rationalise domestic production for high cost operators, improve sustainability, reduce overcapacity and encourage improved efficiency. This has been highly visible for coal and iron ore production. Policy driven changes for these industries has resulted in significant reductions in capacity, and the consensus is that this capacity has been permanently removed. It is plausible the structural changes to rare earth production in China have also permanently removed some NdPr production capacity. Conceivably the bulk of the upward NdPr price movement can be attributed to supply reform.

It is widely forecast that NdPr demand over the coming years will be impacted by incremental new demand for electric vehicles (EV), robotics and other energy efficient applications. This forecast increase in NdPr demand is in direct conflict with constrained NdPr supply.



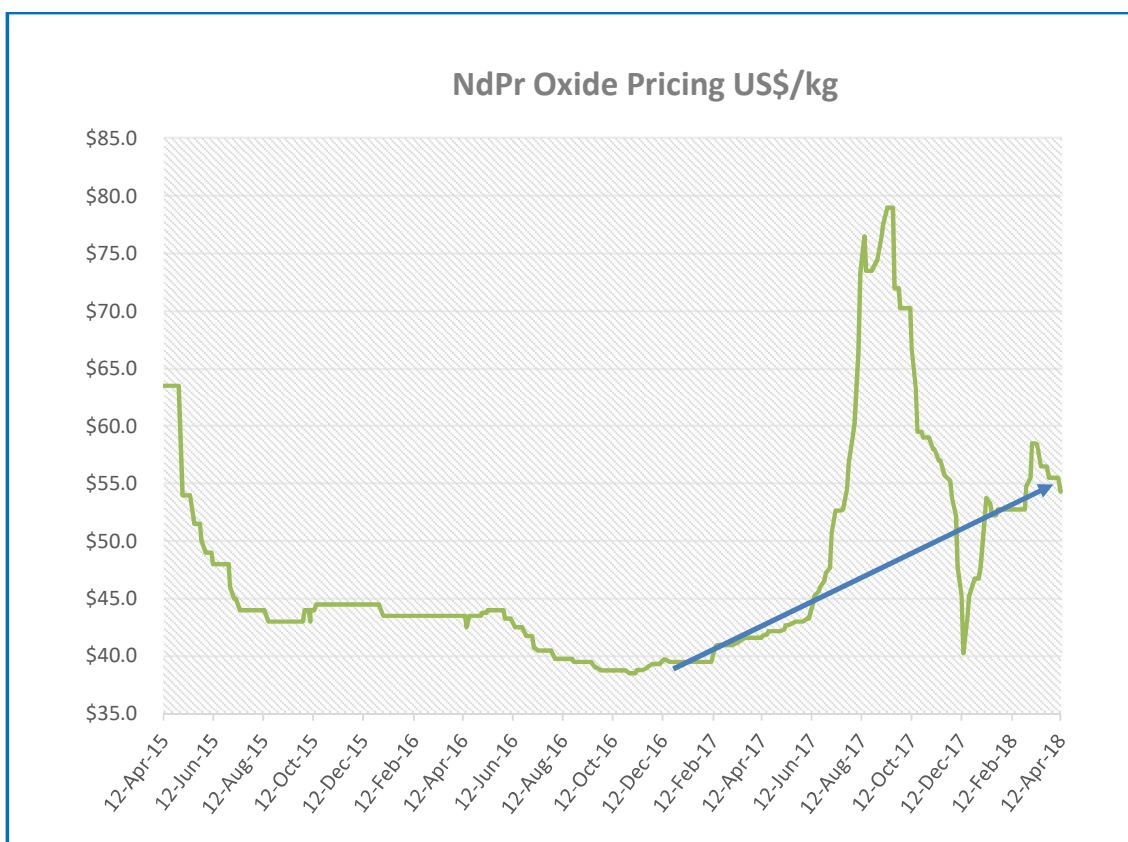


Figure 6: NdPr Oxide Price FOB US\$/kg

### Asian Demand for Robotics to Drive Growth in NdFeB Magnet Production

There has been significant analysis of the penetration and growth for EV sales and the flow-on impact for NdPr demand. Less emphasis has been focused on the growth of demand for robotics and its impact on NdFeB magnet production; however, the International Federation of Robotics (IFR) forecasts that by 2020 more than 1.7 million new industrial robots will be installed in the factories across the globe. The increase in robotics utilisation is expected to be strongest in China. The IFR estimates at the end of 2016 the worldwide operational stock of robots was 1,828,000 units and forecasts by 2020 this figure will increase to 3,053,000, representing an annual growth rate of 14%.

Industrial robots require servo motors, stepper motors, linear motors and pager motors. It is estimated over 70% of industrial robotics use NdFeB magnets as the technology to power these motors. As technology improves and performance specifications become more demanding, the use of NdFeB magnets in robotics is anticipated to grow. According to research completed by the Association of China Rare Earth Industry (ACREI), the average industrial robot produced will contain 20 kilograms of NdFeB magnets.

It is expected that growth in installation of new robotic manufacturing capacity will be more dramatic in China than in any other country. The Made in China 2025 strategy is to move itself along the value chain

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and increase revenue derived from the manufacture of high-value finished goods. One obvious example of this objective is China's significant efforts to become an industry leader in EV manufacturing. As the cost of labour and technical demands for Chinese manufacturing increases, it will need to remain cost competitive and this should see significant investment in robotic manufacturing capability in the 2020s.

**Table 2: Comparative Robotics Utilisation**

Region	Units per 10,000 employees
World Average	74
Europe	99
Americas	84
Asia	63

### Director Appointment

In January the Company announced the appointment of Mr Mark Southey to the Arafura Board as Non-Executive Director.

Mr Southey holds BSc (Hons) in Engineering with Business Studies from the University of Portsmouth, has an MBA from the University of Sydney Business School, and is a Member of the Australian Institute of Company Directors. Mr Southey has previously held a number of senior executive positions and more recently was part of the global executive leadership team within WorleyParsons, a leader in the engineering, procurement and construction of projects in the energy and resources sector where he held the position of Group Managing Director for the Minerals, Metals and Chemicals Sector.

The Board recognised the need to broaden its skillset to facilitate the transition of the Company from development through to production. Mr Southey brings a wealth of mining, project realisation and technical experience to Arafura's Board to help guide this transition through to project execution.

### Cash Position and Timetable

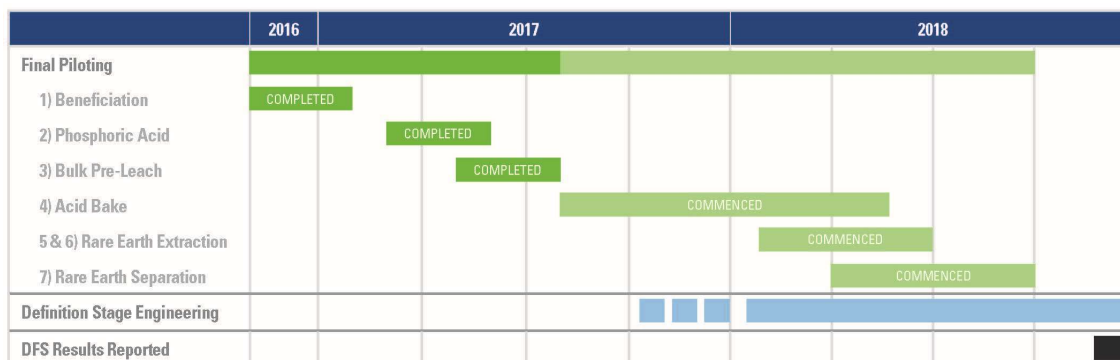
The Company had \$10.7 million in cash reserves at 31 March 2018, placing it in a strong position to continue to advance the Nolans NdPr Project. For the quarter ended 31 March 2018 average cash expenditure was \$670,000 per month. The Company expects the expenditure profile for the June 2018 quarter to be higher as piloting and engineering activities will run concurrently. Flowsheet piloting and engineering are both key work streams and the Company's 2018 targets include:

- Finalising flowsheet piloting;
- Securing environmental approvals;

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- Advancing NdPr offtake arrangements;
- Completing the DFS and definition stage engineering; and
- Engaging with strategic partners for capital equipment procurement and project funding.

Figure 7: Pilot & DFS Program Timeline



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### Nameplate Production

Measured and Indicated Mineral Resources at Nolans support the project's nameplate production target of 14,000 tonnes per annum of TREO equivalent. The Mineral Resources were estimated and reported by the Company (*refer to ARU announcement 7 June 2017*) following the guidelines of the JORC Code 2012. Classification of Total Mineral Resources at Nolans into Measured, Indicated and Inferred, using a 1.0% TREO cut-off grade, is shown below.

Mineral Resources	Tonnes (Millions)	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>

*Note: Numbers may not compute 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>.*

### Competent Persons Statement

The information in this report that relates to Exploration Results and Mineral Resources is based on information compiled by Mr Kelvin Hussey, a Competent Person who is a Member of the Australian Institute of Geoscientists. Mr Hussey is a full-time employee of Arafura Resources Limited. Mr Hussey 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 Hussey consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

## Appendix 5B

### Mining exploration entity and oil and gas exploration entity quarterly report

Introduced 01/07/96 Origin Appendix 8 Amended 01/07/97, 01/07/98, 30/09/01, 01/06/10, 17/12/10, 01/05/13, 01/09/16

#### Name of entity

Arafura Resources Ltd

#### ABN

22 080 933 455

#### Quarter ended ("current quarter")

31 March 2018

Consolidated statement of cash flows	Current quarter \$A'000	Year to date (9 months) \$A'000
<b>1. Cash flows from operating activities</b>		
1.1 Receipts from customers	-	-
1.2 Payments for		
(a) exploration & evaluation	(1,046)	(4,113)
(b) development	-	-
(c) production	-	-
(d) staff costs	(375)	(1,139)
(e) administration and corporate costs	(465)	(1,252)
1.3 Dividends received (see note 3)	-	-
1.4 Interest received	52	198
1.5 Interest and other costs of finance paid	(1)	(4)
1.6 Income taxes paid	-	-
1.7 R&D refund - Non Capitalised Portion	-	660
1.8 Other (provide details if material)	-	-
<b>1.9 Net cash from / (used in) operating activities</b>	<b>(1,835)</b>	<b>(5,650)</b>
<b>2. Cash flows from investing activities</b>		
2.1 Payments to acquire:		
(a) property, plant and equipment	(167)	(312)
(b) tenements (see item 10)	-	-
(c) investments	-	-
(d) other non-current assets	-	-



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Consolidated statement of cash flows		Current quarter \$A'000	Year to date (9 months) \$A'000
2.2	Proceeds from the disposal of:		
	(a) property, plant and equipment	-	-
	(b) tenements (see item 10)	-	31
	(c) investments	-	-
	(d) other non-current assets	-	-
2.3	Cash flows from loans to other entities	-	-
2.4	Dividends received (see note 3)	-	-
2.5	Other (R&D Refund – Capitalised Portion)	-	1,174
<b>2.6</b>	<b>Net cash from / (used in) investing activities</b>	<b>(167)</b>	<b>893</b>
<b>3.</b>	<b>Cash flows from financing activities</b>		
3.1	Proceeds from issues of shares	-	3,174
3.2	Proceeds from issue of convertible notes	-	-
3.3	Proceeds from exercise of share options	-	-
3.4	Transaction costs related to issues of shares, convertible notes or options	-	(198)
3.5	Proceeds from borrowings	-	-
3.6	Repayment of borrowings	-	-
3.7	Transaction costs related to loans and borrowings	-	-
3.8	Dividends paid	-	-
3.9	Other (provide details if material)	-	-
<b>3.10</b>	<b>Net cash from / (used in) financing activities</b>	<b>-</b>	<b>2,976</b>
<b>4.</b>	<b>Net increase / (decrease) in cash and cash equivalents for the period</b>		
4.1	Cash and cash equivalents at beginning of period	12,693	12,472
4.2	Net cash from / (used in) operating activities (item 1.9 above)	(1,835)	(5,650)
4.3	Net cash from / (used in) investing activities (item 2.6 above)	(167)	893
4.4	Net cash from / (used in) financing activities (item 3.10 above)	-	2,976
4.5	Effect of movement in exchange rates on cash held	-	-
<b>4.6</b>	<b>Cash and cash equivalents at end of period</b>	<b>10,691</b>	<b>10,691</b>

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5.	<b>Reconciliation of cash and cash equivalents</b> at the end of the quarter (as shown in the consolidated statement of cash flows) to the related items in the accounts	<b>Current quarter \$A'000</b>	<b>Previous quarter \$A'000</b>
5.1	Bank balances	8,150	11,500
5.2	Call deposits	2,541	1,193
5.3	Bank overdrafts	-	-
5.4	Other (provide details)	-	-
<b>5.5</b>	<b>Cash and cash equivalents at end of quarter (should equal item 4.6 above)</b>	<b>10,691</b>	<b>12,693</b>

**6. Payments to directors of the entity and their associates**

Current quarter \$A'000
----------------------------

6.1 Aggregate amount of payments to these parties included in item 1.2

(217)

6.2 Aggregate amount of cash flow from loans to these parties included in item 2.3

-

6.3 Include below any explanation necessary to understand the transactions included in items 6.1 and 6.2

Salaries, fees and superannuation of Directors of the Company.

**7. Payments to related entities of the entity and their associates**

Current quarter \$A'000
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7.1 Aggregate amount of payments to these parties included in item 1.2

-

7.2 Aggregate amount of cash flow from loans to these parties included in item 2.3

-

7.3 Include below any explanation necessary to understand the transactions included in items 7.1 and 7.2

N/A.

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8. <b>Financing facilities available</b> <i>Add notes as necessary for an understanding of the position</i>	<b>Total facility amount at quarter end \$A'000</b>	<b>Amount drawn at quarter end \$A'000</b>
8.1 Loan facilities	-	-
8.2 Credit standby arrangements	-	-
8.3 Other (please specify)	-	-
8.4 Include below a description of each facility above, including the lender, interest rate and whether it is secured or unsecured. If any additional facilities have been entered into or are proposed to be entered into after quarter end, include details of those facilities as well.		

N/A

9. <b>Estimated cash outflows for next quarter</b>	<b>\$A'000</b>
9.1 Exploration and evaluation	3,522
9.2 Development	-
9.3 Production	-
9.4 Staff costs	390
9.5 Administration and corporate costs	459
9.6 Other (provide details if material)	-
9.7 <b>Total estimated cash outflows</b>	<b>4,371</b>

10. <b>Changes in tenements (items 2.1(b) and 2.2(b) above)</b>	<b>Tenement reference and location</b>	<b>Nature of interest</b>	<b>Interest at beginning of quarter</b>	<b>Interest at end of quarter</b>
10.1 Interests in mining tenements and petroleum tenements lapsed, relinquished or reduced	See Appendix A below.			
10.2 Interests in mining tenements and petroleum tenements acquired or increased	See Appendix A Below.			

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### Compliance statement

- 1 This statement has been prepared in accordance with accounting standards and policies which comply with Listing Rule 19.11A.
- 2 This statement gives a true and fair view of the matters disclosed.



Sign here: .....  
 (Company secretary)

Date: 30 April 2018.

Print name: Peter Sherrington

### Notes

1. The quarterly report provides a basis for informing the market how the entity's activities have been financed for the past quarter and the effect on its cash position. An entity that wishes to disclose additional information is encouraged to do so, in a note or notes included in or attached to this report.
2. If this quarterly report has been prepared in accordance with Australian Accounting Standards, the definitions in, and provisions of, AASB 6: Exploration for and Evaluation of Mineral Resources and AASB 107: Statement of Cash Flows apply to this report. If this quarterly report has been prepared in accordance with other accounting standards agreed by ASX pursuant to Listing Rule 19.11A, the corresponding equivalent standards apply to this report.
3. Dividends received may be classified either as cash flows from operating activities or cash flows from investing activities, depending on the accounting policy of the entity.

### Appendix A – Mining Tenements Held as at 31 March 2018

Tenement reference	Project	Holder	Nature of interest (note (2))	Interest at beginning of quarter	Interest at end of quarter	Notes
ML 26659	Nolans, NT	Arafura Rare Earths Pty Ltd	Mineral Lease	100%	100%	Application Lodged
ML 30702				100%	100%	Application Lodged
ML 30703				100%	100%	Application Lodged
ML 30704				100%	100%	Application Lodged
EL 28473 EL 28498 EL 29509 EL 31096 EL 31097 EL 31224 EL 31284	Aileron–Reynolds, NT	Arafura Resources Ltd	Exploration Licence	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	
EL 29701	Bonya JV, NT	Arafura Resources Ltd	Exploration Licence	100%	60%	Refer to Rox Resources (RXL) ASX announcement 19 March 2018 for further information