

ASX Announcement

Quarterly Activities Report and Appendix 5B

30 September 2018



Highlights

- **Definitive Feasibility Study on Nolans NdPr Project advances to plan - consultants appointed and study progressing well in all areas**
- **Geotechnical site evaluation completed**
- **Final Acid Bake (Phase 4) pilot plant performs to expectations and demonstrates suitability of paddle dryer technology for Acid Bake process**
- **China's NdPr industry encouraged to focus its resources on downstream value-added business strategies**
- **U.S. legislates the John McCain National Defense Authorization Act to prevent the purchase of neodymium (NdFeB) magnets, from prohibited countries including China**
- **NdPr offtake MoU signed with Tier 1 magnet manufacturer, JingCi**
- **Accelerated entitlement offer raises \$4.3m in August and September**
- **Cash position \$8.1 million at 30 September 2018 further bolstered by the receipt of a \$2.1 million Research and Development tax offset in October**

Nolans NdPr Project

Engineering Update

The definitive feasibility study (DFS) on Arafura's Nolans Neodymium Praseodymium (NdPr) Project in the Northern Territory is currently underway and remains on schedule for the reporting of the results in December 2018. Following on from the appointment of Hatch for process plant, infrastructure and lead study engineer, numerous other consultants have now been appointed and are progressing all critical DFS tasks including:

- Mining Plus Pty Ltd (mining engineering and ore reserves);
- AMC Consultants (mine geotechnical review)



Quarterly Activities Report and Appendix 5B

- Knight Piésold (tailings impoundment design, geotechnical and surface water management design);
- GHD Pty Ltd and Ride Consulting (hydrogeology and water supply);
- Strategic Human Resources (human resources);
- GHD Darwin (Darwin port infrastructure);
- IPS Consulting and Wave International (project support and project services);
- Qube Holdings Limited (logistics); and
- Simulus Engineers (process modelling).

Mining engineering activities commenced including preliminary mine design and estimating contract mining costs. A preliminary mine area layout was finalised in the period which incorporates pit designs, waste rock dump designs, surface water management and infrastructure layouts. Mining cost estimates have been received and are currently under review and will form the basis of the final mine optimisation, scheduling and design. Preliminary costs were also developed for the surface water management construction as well as geological grade control which were used as inputs into the preliminary cost estimates.

Process plant design work progressed significantly in the quarter including tendering of mechanical and other supply packages, completion of process plant plot plan and overall layout, completion of earthwork designs and material take-offs and work being done on concrete, structural, piping and electrical layouts.

Geotechnical Site Evaluation Completed

The geotechnical site evaluation for the processing plant and other infrastructure at Nolans was completed during the quarter, with Knight Piésold planning and supervising the work. The program involved the excavation of 74 geotechnical test pits in the process plant, tailings impoundment, access roads and surface water diversion channel areas. A total of six geotechnical bore holes were drilled in the process plant and tailings impoundment areas and two hydrogeological boreholes were fitted out as monitoring bores in the tailings impoundment area. In addition, a total of nine sample pits were drilled for potential construction materials. Remediation of all works was performed in line with the Mine Management Plan and Company procedures.

Arafura completed extensive geotechnical programs around the site of the proposed Nolans mine during 2008-2011 aimed at gathering data for the design of the mine and waste dumps. Information from both 2008-11 and the recently completed geotechnical programs will be used in the DFS design of the Nolans process plant foundations, tailings impoundment dams, access roads, and mine site creek diversion.

Quarterly Activities Report and Appendix 5B

Figure 1 Geotechnical core drilling at the site of the Nolans process plant (L) and standard penetration test (R)

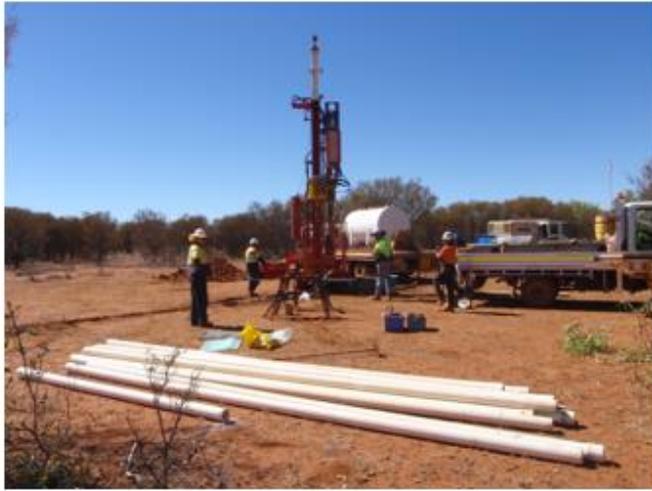


Figure 2: Geotechnical test pit excavation at the site of the Nolans process plant



Quarterly Activities Report and Appendix 5B

Separation Plant Site

Arafura has planned for the rare earth Separation Plant to be co-located alongside an existing offshore chemical precinct. The DFS has identified process and configuration efficiencies through locating the Separation Plant at Nolans. The efficiencies identified for the Nolans Separation Plant site option are currently being assessed against the alternate overseas location. The Separation Plant site study is well advanced, and Arafura will provide further information from the study findings during Q4 CY2018.

Technology Phase 4 Acid Bake Piloting Complete

Key objectives from the recently completed Acid Bake (sulphation) pilot plant are to acquire process performance, materials handling and mechanical engineering design data for the DFS, as well as to generate sufficient quantities of final NdPr product to allow for a comprehensive program of pre-qualification testing by Arafura's key customers in the rare earth magnet manufacturing sector.

Drawing on the successful application of paddle dryer technology to sulphuric acid bake in the small-scale trials conducted in late 2017 (*refer to ASX announcements 19 October and 13 December 2017*), Arafura proceeded to design, build, test, commission and operate a larger-scale pilot to replicate the sulphation area of Arafura's flowsheet. This area of the flowsheet uses concentrated sulphuric acid to convert rare earth minerals in pre-leach residue (PLR) to water-soluble rare earth sulphate material. It includes an acid mix, acid bake, and cooling stage in series.

In advance of operating the pilot, the Company, in partnership with Bossong Engineering, SGS Australia, ANDRITZ Gouda and Curtin University, undertook an extensive program of equipment testing using synthetic analogues of process material and phosphate-rich material types from Nolans (*refer to ASX announcement 19 April 2018*). This program helped drive optimisations of the pilot setup ahead of its construction, including but not limited to the relative positioning of feed points, angles of inclination, and paddle shaft rotation speeds. Once equipment parameters had been optimised, commissioning of the pilot plant was conducted, allowing the evaluation of residence time distribution across each of the pilot's unit operations.

The pilot ran over a four-day period at SGS Australia's metallurgical facility in Perth (*refer to ASX announcement 7 August 2018*), processing a total of 2.0 tonnes of five different NdPr-enriched feeds which together cover a broad range of potential feed characteristics. Most of the material was processed at feed rates of 40 kilograms per hour and 50 kilograms per hour during continuous operation to produce 4.1 tonnes of sulphated material. Corrosion coupons were inserted to allow an assessment of corrosivity of materials of construction. Samples of off-gas were collected and numerous operating parameters were logged at regular intervals over the duration of the program.

An important feature of Arafura's Acid Bake pilot has been the adoption of paddle dryer technology for both baking and subsequent cooling of the sulphated material. Paddle dryers are used in a variety of applications in the chemical, environmental and food industries, and offer substantial operational advantages over rotary kilns, including efficient heat transfer and mixing which facilitates continuous processing of high viscosity material.

A representative of processing solutions specialist ANDRITZ Gouda attended the duration of the pilot. The continuous baking and cooling tests in the paddle dryer and paddle cooler units, respectively,

Quarterly Activities Report and Appendix 5B

demonstrated good flowability of (sulphuric) acid-PLR product, with good contact with paddles, good heat transfer, no fouling, and normal power consumption. Refer to the Company’s website for the link to the Arafura Youtube channel to access video for the Nolans flowsheet piloting programs, including phase 4.

Figure 3: Phase 4 Acid Bake Pilot Plant at SGS



Figure 4: Sulphated Nolan’s material being cooled in Gouda (L) and discharging (R)



Quarterly Activities Report and Appendix 5B

Planning Advances on Phases 5, 6 and 7 Piloting

Scoping and vendor quotes for Phases 5 and 6 of the pilot programs (collectively termed Rare Earth Processing; see Figure 5) have been completed and mobilisation is underway for the pilot set up. The design of the Separation Plant has already been advanced and vendor equipment enquiries have also commenced.

Figure 5: Nolans Pilot Program Phases

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"> ✓ 5,000 kg high-phosphate concentrate ✓ >82% NdPr recovery ✓ >90% P₂O₅ recovery ✓ Met performance objectives 	<ul style="list-style-type: none"> ✓ Merchant grade phosphoric acid suitable for fertilizers ✓ 3% TREO losses to gypsum waste ✓ Met performance objectives 	<ul style="list-style-type: none"> ✓ 2,000 kg pre-leach residue ✓ Met performance objectives 	<ul style="list-style-type: none"> ✓ Successful use of paddle dryer technology ✓ Met performance objectives 	<ul style="list-style-type: none"> • Pilot setup and operation scheduled 	<ul style="list-style-type: none"> • Planning well advanced

Exploration

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

EL 29701 (the Bonya project) is located 280 kilometres north-east of Alice Springs. Arafura holds a 60% interest in the Bonya project. As previously reported Rox agreed to sell its 40% interest to Thor Mining Plc (Thor). Settlement and completion of the acquisition by Thor from Rox is now complete with Thor receiving ministerial consent from Department of Primary Industry and Resources regarding the transfer (*refer to THR: ASX announcement 25 September 2018*). Commercial discussions are currently being held with the aim of finalising and executing the Deed of Assignment for Thor to assume Rox's rights and obligations under the existing JV agreement.

Corporate

NdPr & Policy Changes

In the period from July to September, the (NdPr) oxide price (FOB China) traded in the range of US\$46.70 to US\$50.00/kg. The recent announcement of some significant policy developments in China and elsewhere may provide some market direction in the December quarter.

China's Continued Focus on Sustainability

China remains the leading source of NdPr with Roskill reporting China produced over 80% of global rare earth production in the first half of 2018. The Chinese rare earth supply chain is becoming increasingly sophisticated with continued focus on removing illegal production and improved traceability. In September it was reported the Jiangxi provincial government has given notice of a crackdown on illegal rare earth mining and separation operations. The crackdown is expected to run through to January 2019.

Quarterly Activities Report and Appendix 5B

It is expected this activity will cover a number of companies, some of which are state-owned enterprises and extend from production to trading. It's been reported some of the major groups in Jiangxi have low environmental standards with low operating costs being pursued at the expense of environmental management with damage reported to mountain plantations and water pollution.

Strategic Supply & Downstream Processing

The Vice-Minister of China's Industry and Information Technology, Wang Jiangping, provided an overview of industry strategy at the tenth China Baotou Rare Earth Forum in September. In addition to targeting improved environmental standards and improved efficiency the ministry is considering "reinforcing the strength of the big six rare earth groups and encouraging the formation of two to three deep processing companies that take a lead in the industry". The statement is entirely consistent with China's 2025 strategy of focusing on downstream value-adding. Wang called on the industry to further develop technologies to meet demand from high-tech and new materials sectors.

Focus on Sustainability and Value Adding – ROW Supply Impact

China's removal of unsustainable NdPr production is real and ongoing. Wang Jiangping at the Baotou conference indicated resources and quota will be focused on groups that follow the lead of being environmentally sustainable. In line with China's 2025 strategy new rare earth investment is focused on downstream value-added businesses.

China's ability to flex NdPr production to meet growth in world demand is restricted by greater focus on sustainability. Any increase in production will require an investment in capital to re-tool existing non-sustainable mines and processing capability. In line with China's 2025 strategy new investment appears focused on downstream value-adding. Supply growth in China will be constrained by sustainability and access to capital. Investment in new NdPr sources will most likely require private funds. This contrasts with China's growth in NdPr production in the period from the 1990s to the 2000s which was significantly enabled through access to government funding and supportive policy. Central government incentive to expand NdPr production has moved from a mine focus to downstream value-adding. This is an emerging issue for the rest of the world.

China currently produces greater than 80% of the world's NdPr. China's NdPr consumption is expected to grow by 30% over the next five years. In the early 2020s China will need to secure new sources of NdPr to meet its own consumption. China's NdPr producers and NdFeB magnet producers are already looking at opportunities to secure the resources for the longer-term growth requirements from Australia, Greenland and Africa. China will look to leverage its domestic NdPr for the purposes of creating manufacturing capacity in higher value downstream processing.

US Tariffs & John S. McCain National Defense Authorization Act

In early July the US Trade Representative applied a 10% tariff on a range of imported goods including rare earth compounds, metals and alloys. The introduction of tariffs traditionally targets increased consumption for locally produced material in substitution of imported products.

Quarterly Activities Report and Appendix 5B

In August, as part of a wider initiative U.S. legislators passed the *John S. McCain National Defense Authorization Act* into law, to reduce its reliance on foreign-sourced critical minerals and materials. Section 871 of this bill prevents the purchase of rare earth (NdFeB and SmCo) magnets from prohibited countries, including China, by the Department of Defense. This move is widely regarded as a significant boost for non-China magnet and NdPr producers and advanced stage development companies, with the potential to support higher NdPr prices as the market adjusts to a possible shortfall in sanctioned magnet production.

The US is currently largely reliant on China for the supply of all rare earth materials and it will require time and investment before the tariff and Defence Authorization would achieve the objective of developing a non-China NdPr and NdFeB magnet supply chain.

Offtake Negotiations

The Company is in the process of negotiating offtake arrangements with various parties for the supply of NdPr oxide as well as other rare earth products and merchant grade phosphoric acid (MGA). There has been an ongoing engagement process with potential customers over several years, in 2018 this process has escalated to run concurrently with the pilot programs and the DFS. There is an increasing awareness of the value in diversifying NdPr supply and this has provided the Company with increased traction with potential offtake negotiations.

In October 2018 the Company announced that it had signed a non-binding Memorandum of Understanding (MoU) with JingCi Material Science Co. Ltd for the supply of NdPr oxide. JingCi is a Tier 1 Chinese manufacturer of Neodymium Iron Boron (NdFeB) permanent magnets and produces approximately 6,500 tonnes per annum. JingCi operates under Hitachi Metals' worldwide patents and sells approximately 85% of its products outside of China to globally recognised automotive, wind energy, consumer electronics and industrial motor companies as well as to original equipment manufacturers (OEMs) in the supply chain.

The MoU expects up to 900 tonnes per annum of NdPr to be supplied to JingCi, which represents a quarter of Nolans forecasted annual output (*refer ASX announcement dated 15 October 2018*). The MoU provides a framework for negotiating a final offtake agreement. JingCi may assist Arafura with project funding, potentially through the introduction of OEMs to the process.

Cash Position and Timetable

Arafura had \$8.1 million in cash reserves at 30 September 2018 and continues to be in a strong position to advance the Nolans NdPr Project. The September cash position has been further bolstered by the receipt of a \$2.1 million Research and Development refundable tax offset in October.

In August, the Company announced an accelerated non-renounceable 4 for 1 entitlement offer to raise money to progress further development of the Nolans NdPr Project. The entitlement offer consisted of an institutional component, which closed on 15 August, and a retail component, which closed on 12 September. The Company raised a total of \$4.3m in the offer from the issue of 53.8m shares.

Quarterly Activities Report and Appendix 5B

For the quarter ended 30 September 2018 average monthly cash expenditure was \$1,356,000 compared with \$930,000 for the June 2018 quarter. The Company expects the expenditure profile for the December 2018 quarter to be elevated as flowsheet piloting and engineering activities continue to run concurrently. Flowsheet piloting and engineering are both key work streams and the Company's 2018 targets include:

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

Figure 6: Pilot & DFS Program Timeline



Annual General Meeting

Arafura's Annual General Meeting will be held at 9am on Thursday 22 November 2018 at the Governance Institute of Australia at 8 Victoria Avenue, Perth, Western Australia. Shareholders are encouraged to attend.

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 ₂ O ₅)	NdPr Enrichment (%)
Measured	4.9	3.2	13	26.1
Indicated	30	2.7	12	26.4
Inferred	21	2.3	10	26.5
Total	56	2.6	11	26.4

Note: Numbers may not compute due to rounding. "NdPr Enrichment" is the proportion of TREO comprising Nd₂O₃ and Pr₆O₁₁.

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	Quarter ended ("current quarter")
22 080 933 455	30 September 2018

Consolidated statement of cash flows	Current quarter \$A'000	Year to date (3 months) \$A'000
1. Cash flows from operating activities		
1.1 Receipts from customers	-	-
1.2 Payments for		
(a) exploration & evaluation	(2,786)	(2,786)
(b) development	-	-
(c) production	-	-
(d) staff costs	(417)	(417)
(e) administration and corporate costs	(623)	(623)
1.3 Dividends received (see note 3)	-	-
1.4 Interest received	52	52
1.5 Interest and other costs of finance paid	(1)	(1)
1.6 Income taxes paid	-	-
1.7 R&D refund - Non Capitalised Portion	-	-
1.8 Other (provide details if material)	-	-
1.9 Net cash from / (used in) operating activities	(3,775)	(3,775)
2. Cash flows from investing activities		
2.1 Payments to acquire:		
(a) property, plant and equipment	(4)	(4)
(b) tenements (see item 10)	-	-
(c) investments	-	-
(d) other non-current assets	-	-

Quarterly Activities Report and Appendix 5B

Consolidated statement of cash flows		Current quarter \$A'000	Year to date (3 months) \$A'000
2.2	Proceeds from the disposal of:		
	(a) property, plant and equipment	-	-
	(b) security deposits on tenements (see item 10)	-	-
	(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)	-	-
2.6	Net cash from / (used in) investing activities	(4)	(4)
3.	Cash flows from financing activities		
3.1	Proceeds from issues of shares	4,307	4,307
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	(289)	(289)
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)	-	-
3.10	Net cash from / (used in) financing activities	4,018	4,018
4.	Net increase / (decrease) in cash and cash equivalents for the period		
4.1	Cash and cash equivalents at beginning of period	7,874	7,874
4.2	Net cash from / (used in) operating activities (item 1.9 above)	(3,775)	(3,775)
4.3	Net cash from / (used in) investing activities (item 2.6 above)	(4)	(4)
4.4	Net cash from / (used in) financing activities (item 3.10 above)	4,018	4,018

Quarterly Activities Report and Appendix 5B

Consolidated statement of cash flows		Current quarter \$A'000	Year to date (3 months) \$A'000
4.5	Effect of movement in exchange rates on cash held	-	-
4.6	Cash and cash equivalents at end of period	8,113	8,113

5.	Reconciliation of cash and cash equivalents at the end of the quarter (as shown in the consolidated statement of cash flows) to the related items in the accounts	Current quarter \$A'000	Previous quarter \$A'000
5.1	Bank balances	2,363	1,224
5.2	Call deposits	5,750	6,650
5.3	Bank overdrafts	-	-
5.4	Other (provide details)	-	-
5.5	Cash and cash equivalents at end of quarter (should equal item 4.6 above)	8,113	7,874

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	(223)
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
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.

Quarterly Activities Report and Appendix 5B

8. Financing facilities available <i>Add notes as necessary for an understanding of the position</i>	Total facility amount at quarter end \$A'000	Amount drawn at quarter end \$A'000
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. Estimated cash outflows for next quarter	\$A'000
9.1 Exploration and evaluation	4,175
9.2 Development	-
9.3 Production	-
9.4 Staff costs	400
9.5 Administration and corporate costs	600
9.6 Other (provide details if material)	-
9.7 Total estimated cash outflows	5,175

10. Changes in tenements (items 2.1(b) and 2.2(b) above)	Tenement reference and location	Nature of interest	Interest at beginning of quarter	Interest at end of quarter
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.			

Quarterly Activities Report and Appendix 5B

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: 31 October 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 30 September 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%	
EL 28473 EL 28498 EL 29509 EL 31096 EL 31097 EL 31224 EL 31284 EL 31957	Aileron–Reynolds, NT	Arafura Resources Ltd	Exploration Licence	100% 100% 100% 100% 100% 100% 100% 0%	100% 100% 100% 0% 0% 100% 100% 100%	Application Lodged
EL 29701	Bonya JV, NT	Arafura Resources Ltd	Exploration Licence	60%	60%	Thor Mining Plc 40%, Arafura Resources Limited 60%