

Arafura's Gavin Lockyer on the rising rare earths market

May 17, 2018 – “What I will say about this slide though is that our project is one of only 12 in Australia that has been granted major project status by both the federal government and our local Northern Territory government. I think that reflects the strategic importance of rare earths, in particular, to Australia and its export partners.” states Gavin Lockyer, Managing Director of Arafura Resources Ltd. (ASX: ARU), in a recent presentation at the 7th Annual InvestorIntel Summit – Buds, Batteries & Blockchain 2018.

Gavin Lockyer: My name is Gavin Lockyer. I am Managing Director of Arafura Resources. I have been with the company for around 12 years now. I commenced as CFO and company Secretary and stepped into the managing director role about 3½ years ago. Also, traveling with me is our General Manager for Business Development and Exploration, Mr. Richard Brescianini, who is standing over to the side there. If you have any technical questions about the project later on please feel free to seek out Richard or myself. Richard has also got some little toys which we can pass around because we all talk about these magnets, but not all of us have seen them all, been able to feel how strong they actually are. Richard has got a couple of toys there to play with. As you heard earlier if you were around when I was on the panel, we are developing the Nolans Bore Project, which sits in the middle of Australia. It is enriched in the rare earths in particular NdPr or neodymium, praseodymium. These are the key feed materials for these high-strength magnets. I will not bore you with all the standard details. What I like to do in these presentations is to talk a little bit about the market, about what we are experiencing at the moment so perhaps it might not correlate with the slides that are on the screen. I think you are all educated enough to

jump on the website and download a standard presentation. I think it is probably more beneficial if we have some interaction around what we are actually seeing in the real world from our discussions with magnet producers, both in China, Japan, etc. What I will say about this slide though is that our project is one of only 12 in Australia that has been granted major project status by both the federal government and our local Northern Territory government. I think that reflects the strategic importance of rare earths, in particular, to Australia and its export partners. What this means really it just gives us a dedicated case officer in Canberra and also in Darwin, the capital of the Northern Territory where we can coordinate relationships through government and, not fast-track, but supposedly grease our way through the wheels of bureaucracy. I will touch on some of our permitting stuff a bit later on. As we have all heard, the NdPr market is critical to the high-performance magnets. We are seeing renewed interest in capital markets in particular around the fact that a lot of these guys have made money out of the battery metals. A lot of the fund managers, etc, we are speaking to now have all made money in graphite, cobalt, lithium. They are starting to think, well, what is the next technology metal that is going to take off? Inevitably the battery technology has been the key enabler around the electrification of transportation fleets. Those batteries have to drive something. Inevitably it is an electric motor. Those electric motors, as we have heard from Nick from Alkane earlier, if you want that motor to be lighter and more efficient it will have NdPr magnets in it...to access the complete presentation, [click here](#)

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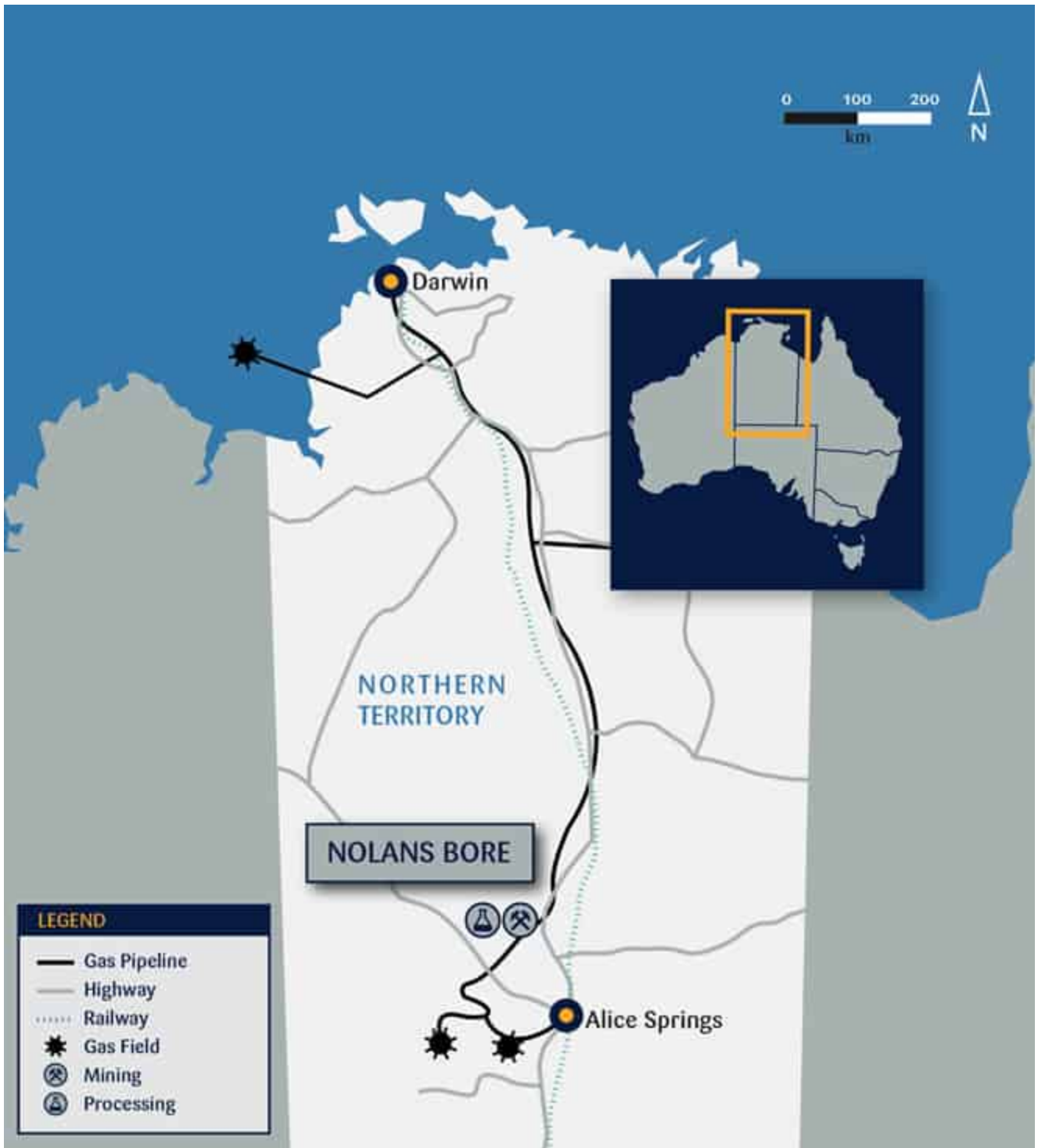
Rare earths at the right time, right place and right price?

The Rare Earth world seems to be dividing into an **Us** and **Them** dichotomy. The **Them** is China with its long dominance of the space, the **Us** is the Western based companies who have found that they just cannot play in the same sandbox as the Chinese. For the Chinese there will always be the over-arching priority of “national interest” which will be the trumpcard that is worth more than anything else in the game. The realization of this has meant that the hardy band of survivors in the rare earth element (“REE”) space have been busily carving out niches, awaiting the turn in prices and plotting their return to greater levels of activity and hopefully development to the production phase.

Arafura Resources Ltd. (ASX: ARU) is an interesting example that we have not written on for some time. Initially it was courted by the Chinese and still has a powerful Chinese presence on its share register, but of late it has been refocusing on the potential of Korea as the market for its REE output. In this analysis we shall look at what it has and what it might be doing next.

Nolan's Bore

The Nolans Bore rare earths-phosphate-uranium deposit was originally discovered in 1995 with the original goal being uranium. The property is located deep in the Northern Territory (in Australia) about 135 kilometres north-north-west of Alice Springs and ten kilometres over the Sturt Highway.



At Nolans Bore the most abundant REE-bearing minerals at site are fluorapatite and allanite. The deposit contains 56 million tonnes of Mineral Resources at an average grade of 2.6% rare earth oxides (REO) with, surprisingly, around 20% of mix being Neodymium. This is unique amongst deposits we have looked at. Over 50% of the M&I Mineral Resources have been converted to Ore Reserves. According to the company these Ore Reserves are sufficient to support mining and processing operations for 23

years.

Resources	Tonnes (million)	Rare Earths TREO %	Tonnes TREO	Phosphate P ₂ O ₅ %	Uranium U ₃ O ₈ lb/t
Measured	4.9	3.2	158,000	13	0.54
Indicated	30	2.7	816,000	12	0.44
Inferred	21	2.3	489,000	10	0.36
TOTAL	56	2.6	1,462,000	12	0.42

1% TREO cut-off grade. Numbers may not compute exactly due to rounding. 1 lb/t U₃O₈ = 0.0454% U₃O₈.

It is interesting to note that REE companies have gone full circle. Many started out in other minerals (many in uranium) and then downplayed these aspects and now they are proudly included (as in this case) these other elements in not only their resources but in their planning processes as by-product credits.

Capex – The Feet of Clay

Unfortunately for Arafura as one of the first companies into the space it originally marched to the beat of conventional wisdom that bigger was better, rather than heed the cry in the wilderness of Jack Lifton that “rightsizing” was the way to go. Time has moved on and some of those with truly gargantuan projects have paid the price in terms of shriveled market cap and a lingering death. The dilemma was made even more delectable for Arafura in that it had offtakers, so shrinking the project to something like a pilot plant on a cheap and cheerful basis is not the “try before you buy” approach that big offtakers want to hear.

The company engaged in an exercise of cutting its coat to suit its cloth. The original August 2012 base case capex was AU\$1.9 bn which by March 2014 had been whittled back to AU\$1.4bn to match the new realities of the financing market. These savings were achieved through material improvements in, and simplification of, the process configuration, and simplification of the supply chain.

It then found that this slashing was not enough and management

tossed away the butter-knife and took a machete to the budget getting it down to the current USD680mn. However, currently the budget is still in the upper decile of the REE project Capex numbers that are in circulation.

The metrics on the project as it currently stands are:

MINING & PROCESSING (1,2 & 3)		
ROM feed (tpa)		525,000
Recovery (ROM to final product)	Total rare earths	76%
	NdPr	75%
	La	75%
	SEG-HRE	68%
PRODUCTION		
TREO equivalent (tpa)		14,000
NdPr oxide (tpa)		3,601
La oxide (tpa)		2,658
SEG-HRE carbonate (tpa TREO equivalent)		657
Phosphoric acid (tpa merchant grade)		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 for phosphoric acid)		\$6.23

Phosphoric Acid

The long misery period of the REE space has refocused companies' managements on the potential of by-products to juice up the potential revenue streams from projects and indeed in some cases tip the projects from the "not doable" list into the realms of the possible. In Arafura's case the obvious avenue to pursue was the phosphoric acid by-product stream. As can be seen from the metrics above the potential output at 110,000 tpa is not to be lightly dismissed. The prime use of this acid is in the production of phosphate salts for fertilizers.

Back in mid-April the company confirmed that its Phosphate

extraction circuit pilot plant was successfully completed on schedule with planning underway for subsequent stages of pilot program.

The phosphate extraction pilot plant is the second stage of Arafura's final piloting of the Nolans process flow sheet. The phosphate extraction piloting operation was conducted over a 10-day period during March at SGS Australia's facilities in Perth. This period of operation included commissioning and operation under two different process conditions to evaluate their impact on performance across the circuit.

The pilot is expected to confirm previous bench scale test results, and samples collected throughout pilot operations would indicate this has been achieved. The program consumed around 400 kilograms of HPC and resulted in the production of NdPr-rich pre-leach residue (PLR) and REE recovery precipitate, merchant grade phosphoric acid and waste gypsum.

Arafura is now planning for Phase 3 of the Nolans Pilot Program: the bulk preparation of PLR by pre-leaching the balance of the HPC produced from the Phase 1 beneficiation pilot. This work is planned to be conducted during 2017.

The Korean Scenario

The one thing that has continually mystified us about the REE space has been the absence of discussion of the Korean (and Taiwanese) potential. The former have a massive automobile industry and will inevitably need to make the jump to EVs and HEVs to remain in the game against the Japanese (and Chinese) and yet (publicly) there seems to have been little in the way of courting or involvement.

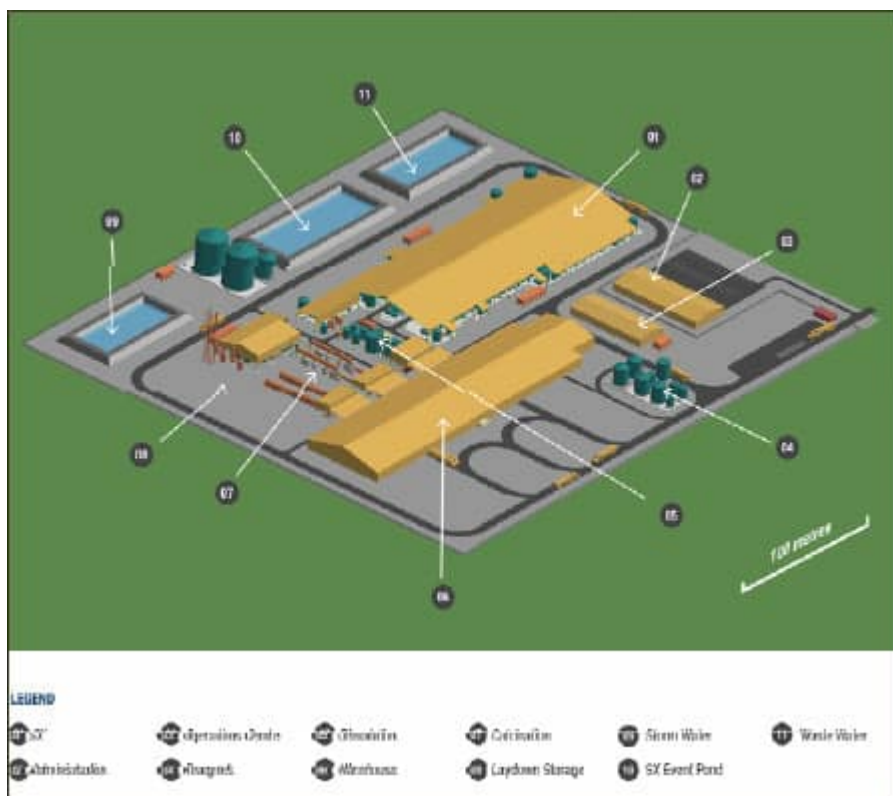
It was interesting then to see that Arafura has been courting the Koreans and even has a plan to locate a JV Toll processing plant in a Free Economic Zone in South Korea with an estimated CAPEX of US\$85m. The plant should employ around 70 people.

The plant would take 16,450 tpa of REE intermediate product from Australia to be refined to produce:

- 3,601 tpa NdPr oxide
- 3,315 tpa other rare earth products

Arafura has signed an MOU with The chemical group OCI to develop this plant with the deal including long-term supply of raw materials under a tolling agreement. Speculation suggested that it would be located in the vicinity of OCI's Gunsan chemical plant, about 200km south of Seoul, near the Saemangeum Free Economic Zone.

A graphic of how the plant layout might look is shown below:



Shareholders

It is worth mentioning in passing the current shareholder makeup of the company. This can be seen below.



The Chinese component is primarily East China Mineral Exploration and Development Bureau (Arafura's major shareholder which had 24.86% when we last wrote about the company but is now closer to 20%). It has been the strategic partner for Arafura since 2009

Conclusion

Arafura is not mistaken in going after the potential of the Korean buyers of Rare Earths. The processing plant that is being talked about meshes with our "Next Big Thing" of downstreaming and ticks the boxes of right time, right place and right price. As with so many others that we have highlighted who are pursuing this trend they are, in entering the midstream, essentially becoming their own customer for mine output.

The big challenge now is going to be raising the AUD\$680mn required for the capex of the main project or somehow rejigging the project (along the lines that Northern Minerals, for instance, have done) into a phased operation or a more modular approach.

The important thing in recent years has been survival in the space and Arafura has passed that test. As we have noted before the trigger for a Rare Earth renaissance will be a firming of prices, more than a surge, and the first signs of

an improvement are becoming evident. In pursuing the Korean “option” the company is not wrong. This is obviously fertile ground while adding a phosphoric acid to its circuit gives it by-product credits and a product line that is always in demand from the agricultural sector.

Arafura’s Rare Earths Resource Intrinsically Competitive

Gavin Lockyer, Managing Director of Arafura Resources Ltd. (ASX: ARU) in an interview with InvestorIntel CEO Tracy Weslosky discuss the Nolans Bore Project’s competitive advantage. The asset supplies neodymium and praseodymium. These two rare earths are essential to the magnets found in motors running on graphite batteries. Arafura’s extraction program takes advantage of the phosphate infused ore by using the phosphate to digest the ore from within. This cost effective technique creates residual phosphate acid, providing revenue from the fertilizer industry. Gavin tells us to anticipate the continuation of piloting activities and an upcoming feasibility study.

Tracy Weslosky: It’s fantastic to see you all the way over from Australia. For those out there in InvestorIntel, we’ve been with Arafura for years. You’re one of the original rare earth companies we started following in 2008-2009.

Gavin Lockyer: We think that InvestorIntel does a great service. We were happy to support them in any way we can.

Tracy Weslosky: The InvestorIntel audience may remember the

boom in the rare earth industry where we went from approximately 7 to 10 rare earth companies to over 500. Can you provide us with an overview of Arafura's competitive advantage?

Gavin Lockyer: I think the obvious one Tracy is around our resource itself. Very few other projects out there are enriched in neodymium and praseodymium as Arafura's Nolans Bore project is. That's a natural competitive advantage. Combine that with the phosphate that gives us operating credit, I think we've got some real advantages over our competitors.

Tracy Weslosky: I'd like to bring up our analyst, Lara Smith, who recently had a headline: "Massive Cash Injection For Anticipated Rare Earth Development." What exactly does she mean by that?

Gavin Lockyer: We came and tested the market earlier this year and we were pleasantly surprised that on the back of the lithium and the battery technology metals the market's now starting to understand that all those batteries must drive an electric motor and that electric motor to be efficient must have neodymium-praseodymium magnets in...to access the full interview, [click here](#)

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