

## Process optimisation study boosts Ngualla's operating margin

Peak Resources Limited (ASX: **PEK**) ("**Peak**" or the "**Company**") is pleased to provide a project update as a result of process optimisation work completed since the Ngualla Rare Earth Project Bankable Feasibility Study ("**BFS**") of April 2017.

### Highlights:

- Annual operating margin (EBITDA) improved by 20% or US \$29 million from US \$145m p.a at BFS to US \$174m p.a\*
- Unit operating cost reduced by 5.7% from US \$34.20 /kg NdPr to US 32.24 /kg NdPr.
- Post Tax and Royalties NPV<sub>10</sub> and IRR increased from US\$ 445 million and 21% at BFS to US \$ 579 million and 24%\*
- Annual neodymium-praseodymium oxide ("NdPr") production increased by 16% to 2,810 tonnes per annum\*.

Managing Director, Darren Townsend said: *"This is an outstanding outcome by the Peak team that drives Ngualla's already low unit costs even lower and delivers a large increase in operating margin, reinforcing Ngualla as the leading development project for NdPr. The more than 100% increase in NdPr prices this year, combined with these significant operating improvements support our main focus now, which is to progress a mining licence application in order to fast track Ngualla towards production in time for the increased demand for NdPr from electric vehicles."*

### Compliance Information

\*See ASX Announcement "BFS positions Ngualla one of world's lowest cost RE Projects" of 12 April 2017 for the mining, processing, economic and price assumptions, which remain unchanged except for as summarised in this announcement (**Project Update**), and for the application of a new 1% clearing fee for product export from Tanzania as per the Finance Act, 2017. BFS price assumptions include US \$85/kg for NdPr, which is estimated to contribute 90% of Ngualla's future product value.

The increased production rate is based on the Ngualla Ore Reserve (ASX Announcement "Ngualla Rare Earth Project – Updated Ore Reserve" of 12 April 2017), which together with the BFS summarises the Material Assumptions underpinning this Project Update, which continue to apply and have not materially changed except where indicated in this announcement. A revised mine plan was not generated for this Project Update. The increased production rate is based on a compressed BFS mine schedule, which would reduce the operational life to 26 years, from 31 years at BFS.

Peak will require new funding for its 75% share in the Ngualla Rare Earth Project in order to achieve the stated financial outcomes, which will result in some dilution of existing shares, the quantum of which will depend on the final debt to equity ratio of the financing package that is yet to be arranged.

## Technical Report

### Summary

**Increased capacity through Ngualla's Multi-stage Processing Facility:** The final, lower cost flotation collector selected in the BFS for use in the on-site processing plant at Ngualla has a lower residence time compared to the equivalent pilot plant regime. A new study has identified that the lower residence time allows the production capacity of the Ngualla Facility to be increased over the BFS throughput with the addition of US \$4 million extra capital expenditure at the Ngualla site.

**Allows for a 16% increase in NdPr production:** the increased output available from the Ngualla Facility can be treated at the Teesside Refinery with only a relatively small adjustment to the plant design, estimated at a US \$5million increase in the total construction capital at the Refinery.

### Collector Screening Testwork

New studies on the testwork completed to select the optimal flotation collector for the BFS show that the final lower cost reagent regime chosen not only produced comparable flotation performance (grade and recovery) to the equivalent pilot plant regime (ASX Announcement "Concentrate grades exceed expectations in pilot testwork" of 30 December 2015), but also has the added advantage of faster flotation kinetics.

The testwork was undertaken at bench scale by reagent suppliers and also the Peak team at ALS Metallurgy, Perth, on a composite sample of Ngualla's ore similar to the pilot plant feed, achieving grades consistently over 40% REO.

The lower residence time offers a significant advantage for an increase in flotation circuit production capacity without changing the existing BFS plant design.

### Process Optimisation

A capacity analysis of the Multi stage Processing Facility at Ngualla identified the Rare Earth flotation stage as the primary bottleneck in the circuit as designed for the BFS. The capacity of this stage of the circuit is a function of the size and number of the flotation cells and the residence time that the ore must stay in each cell to achieve the desired recovery. A reduced residence time thus means the amount of ore passing through the circuit can be increased without changing the size or number of cells.

Removing the process bottleneck from the rare earth flotation cells shifts the capacity constraint to the ball mill. By maximising the throughput of the existing ball mill at an additional capital cost of US \$4million and a slightly accelerated BFS mining schedule, the average mill feed and corresponding concentrate production can be increased by approximately 16% per annum.

Analysis of the Teesside refinery identified that the capacity constraints to increasing the throughput to take the additional processed product from Ngualla were the three solid liquid

separation processes. Internal estimates to increase the required capacity of these filters and thickeners are an additional capital of US\$ 5 million.

## Financial Analysis

The Project Update Study adjusts the BFS production statistics and forecasts as shown in Table 1.

**Table 1:** Comparison of Production Assumptions: BFS to Project Update

Production Assumptions	BFS	Project Update
Life of Operation	31 years	26 years
<b>Average Annual Production (tonnes)</b>		
Ore Mill Feed	624,000	711,000
Processed Mineral Concentrate	28,300	32,700
NdPr mixed oxide 2N	2,420	2,810
La oxide equivalent (final product: La carbonate)	3,650	4,230
Ce oxide equivalent (final product Ce carbonate)	1,660	1,920
SEG and Mixed Heavy oxide equivalent (final product mixed carbonate)	280	330

*\*post ramp up*

The Company has evaluated the potential impact of the Project Update increased production scenario using the rare earth price assumptions and financial model developed for the BFS with the following results:

**Table 2:** Financial Analysis of Project Update increased production compared to BFS

Capital Costs	BFS	Project Update
Total Capital cost*	US \$356m	US \$365m
Average Annual Consolidated Sustaining Capital	US \$5m	US \$5m
<b>Operating Costs</b>		
Average Annual Operating cost <sup>#</sup>	US \$83m	US \$91m
Unit operating cost <sup>&gt;</sup> (/ kg NdPr)	US \$34.20	US \$32.24
<b>Financial Metrics</b>		
Consolidated Average Annual Revenue	US \$228m	US \$265
Average Annual Operating margin (EBITDA)	US \$145m	US \$174m
Average Annual Consolidated (Post Tax) Cashflow	US \$104m	US \$126
NPV <sub>8</sub> Post Tax and Royalties	US \$633m	US \$776
NPV <sub>10</sub> Post Tax and Royalties	US \$445m	US \$579
IRR Post Tax and Royalties	21%	24%
Operating Margin	64%	66%
Payback Period (from start of operations)	5 years	4 years
<b>Commodity Price Assumptions average LOM</b>		
NdPr mixed oxide 2N Min 75% Nd <sub>2</sub> O <sub>3</sub>	US \$85.00/kg	US \$85.00/kg
Lanthanum oxide equivalent	US \$4.41/kg	US \$4.41/kg
Cerium oxide equivalent	US \$2.25/kg	US \$2.25/kg
SEG mixed heavy oxide equivalent	US \$8.00/kg	US \$8.00/kg

*\*Total pre production Capex, for Ngualla mine and Multi-stage Processing Facility and Tees Valley refinery combined.*

*<sup>#</sup>Material assumptions are as per BFS and Ore Reserve ASX Announcements of 12 April 2017 except where indicated in this report. <sup>></sup>OCBRITDA=Operating cost before royalties, interest, tax, depreciation and amortization.*



For and on behalf of Peak Resources Limited.

**Darren Townsend**  
Managing Director

#### **Competent Person Statements**

The information contained in this announcement relating to Ore Reserves was previously announced to ASX by the Company on 12 April 2017 in an announcement titled 'Ngualla Rare Earth Project – Updated Ore Reserve' (Previous Ore Reserve Announcement) with the written consent of Mr Ryan Locke, a Principal Consultant with Orelogy Consulting Pty Ltd who are an independent consultant to the Company (Competent Person). The Company is not aware of any new information or data that materially affects the information included in the Previous Ore Reserve Announcement. The Company confirms the material assumptions and technical parameters underpinning the Ore Reserve estimates in the Previous Ore Reserve Announcement continue to apply and have not materially changed. The Company also confirms that the form and context in which the Competent Person's findings are presented have not been materially modified.

The information in this announcement that relates to metallurgical test work results is based on information compiled and / or reviewed by Mr Roy Gordon who is a Member of The Australasian Institute of Mining and Metallurgy. Roy Gordon is the Metallurgist of the Company and has sufficient experience relevant to the activity which he is undertaking to be recognized as competent to compile and report such information. Roy Gordon consents to the inclusion in the announcement of the matters based on his information in the form and context in which it appears.

The information in this announcement that relates to infrastructure, project execution and cost estimating is based on information compiled and / or reviewed by Lucas Stanfield who is a Member of the Australian Institute of Mining and Metallurgy. Lucas Stanfield is the General Manager - Development for Peak Resources Limited and is a Mining Engineer with sufficient experience relevant to the activity which he is undertaking to be recognized as competent to compile and report such information. Lucas Stanfield consents to the inclusion in the announcement of the matters based on his information in the form and context in which it appears.