

# ASX announcement

29 July 2021

## Nyungu Copper-Cobalt Drilling – Mobilisation to Site

Argonaut Resources NL (ASX: ARE) (*Argonaut* or the *Company*) is pleased to announce that mobilisation to site is underway in preparation for the imminent commencement of the 2,800m diamond drilling program at the Nyungu copper-cobalt deposit in North-western Zambia.

The Nyungu copper-cobalt deposit is part of Argonaut's 90% held Lumwana West project, located between Barrick Gold's Lumwana mine and First Quantum Mineral's Sentinel mine in Zambia (Figure 1).

### Highlights

#### Update

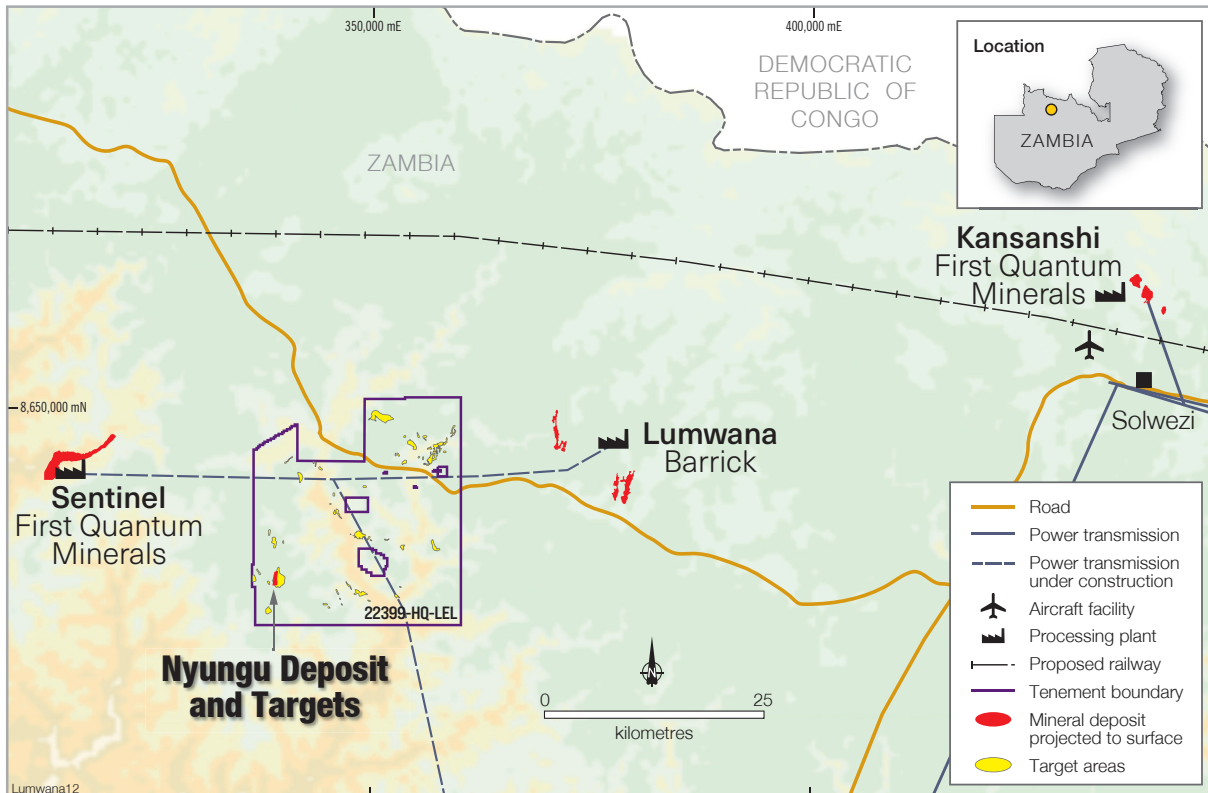
- The drilling program targeting copper and cobalt mineralisation will commence in approximately one week.
- Mobilisation and the establishment of exploration camps has commenced.
- Earthmoving contractors have constructed of an all-weather road for drilling rig access to the Nyungu copper-cobalt deposit.

#### Drilling Program

- Argonaut has contracted for 2,800m of diamond drilling which will be completed in approximately 12 weeks.
- The drilling program is designed to:
  - expand the scale of the Nyungu Central and Nyungu South deposits;
  - to provide data for resource estimation; and
  - provide sample for metallurgical testing purposes.

#### Nyungu Deposit

- The Nyungu deposit is confirmed by 50+ drill holes.
- The deposit has a 1,700m strike length and is open to the north and south (Figure 3).
- The shallower portions of the Nyungu deposit offer potential for low cap-ex, near-term, heap leach operation followed by the long-term production of copper concentrate.



**Figure 1** The Nyungu deposit is located near several major copper mines and relevant infrastructure.

## Resource Drilling with Exploration Upside

The 2021 Nyungu deposit drilling program will have a dual-purpose: exploration drilling that aims to uncover significant new zones of copper and cobalt mineralisation, and infill drilling for Resource estimation purposes. Additionally, infill drilling will provide sample for ongoing metallurgical testwork.

Argonaut has defined two exploration drilling targets that have the potential to materially increase the Resource-base at Nyungu.

*“Argonaut is excited to recommence drilling at Nyungu. The deposit urgently needs drilling to target extensions and resource drilling infill. Previous intercepts of 176m at 0.55% copper and 31m at 1.57% copper provide the team with plenty of encouragement.”*

Argonaut Director and CEO, Lindsay Owler.

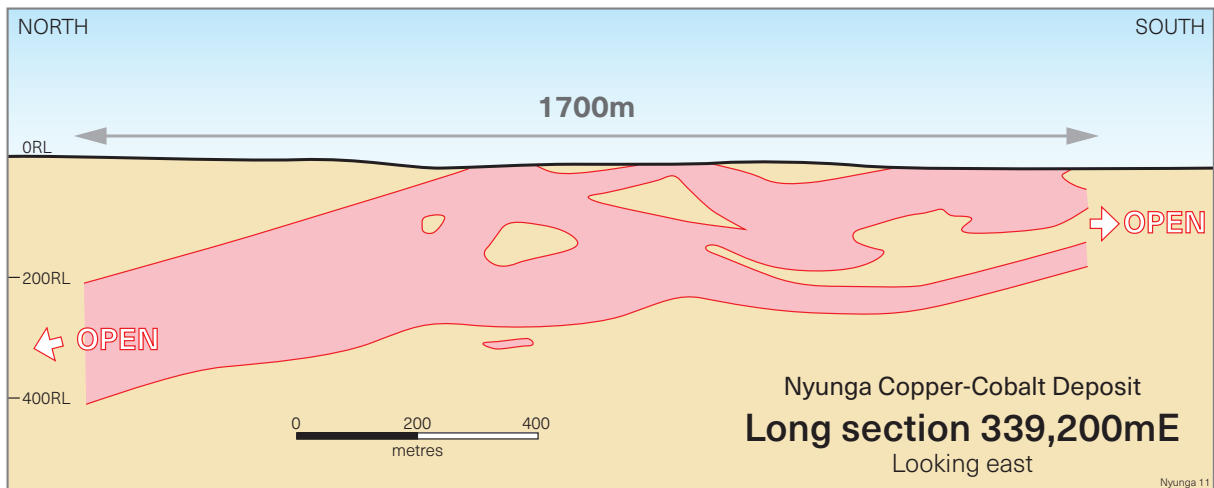
## Exploration Drilling

### Nyungu Central

The Nyungu Central deposit is open along-strike to the north and south (Figure 2). Argonaut plans to test these potential extensions to known mineralisation with a view to increasing tonnages for future Resource estimation.

### Nyungu South

The Nyungu South deposit (Figure 3) sits in a location where a copper soil anomaly and an IP geophysical anomaly (i.e. a zone that may contain disseminated sulphide minerals) are coincident. The IP anomaly continues northwards from the soil anomaly over a significant area. This extension to the IP anomaly is untested and will be drilled by Argonaut in 2021.



**Figure 2** Nyungu Central long section showing copper mineralisation.

## Resource Drilling

### Indicated JORC Resource

Existing drilling by Argonaut at Nyungu Central and Nyungu South (Figure 3) was conducted using a drill-traverse spacing of 200m. This drilling revealed excellent grade and geometry continuity between traverses at Nyungu Central but was too widely spaced to facilitate the conversion to Indicated Resource category. The drilling of infill traverses spaced approximately 100m apart is expected to allow Argonaut to estimate the tonnage and grades at Nyungu to JORC Resource standards.

### Oxide-Zone Resource

The earlier drilling by Argonaut at Nyungu targeted fresh copper sulphide mineralisation at depth via angled drilling. No early drill holes targeted near-surface oxide mineralisation. This has left a gap in the Company's understanding of the oxide zone and has affected its ability to progress metallurgical testwork on potentially significant parcel of copper ore. The 2021 drilling program aims to address these matters by specifically targeting drilling in interpreted near-surface oxide zones (Figure 4). Results from this program and metallurgical leach testwork that will follow will affect the economics of production in first 5 to ten years.

## Drilling Program

The exploration drilling program will initially involve a component of diamond drilling targeting the extension to Nyungu Central and Nyungu South mentioned above.

The Resource drilling program will involve infill diamond drilling initially targeting near-surface oxide material. This drilling will also provide metallurgical sample for forthcoming testwork.

The 2021 drilling program is budgeted to cost A\$2,000,000 for a total of 2,800m of varying diameter drill core.

The drilling program will be jointly managed by African Mining Consultants (AMC), Thomas Rogers and Argonaut Resources' staff based in Adelaide, Australia. Thomas Rogers jointly received the prestigious Thayer Lindsley Award in 2015 from the Prospectors & Developers Association of Canada (PDAC) for the discovery of the Kamao Copper Deposit in the Democratic Republic of Congo (DRC).

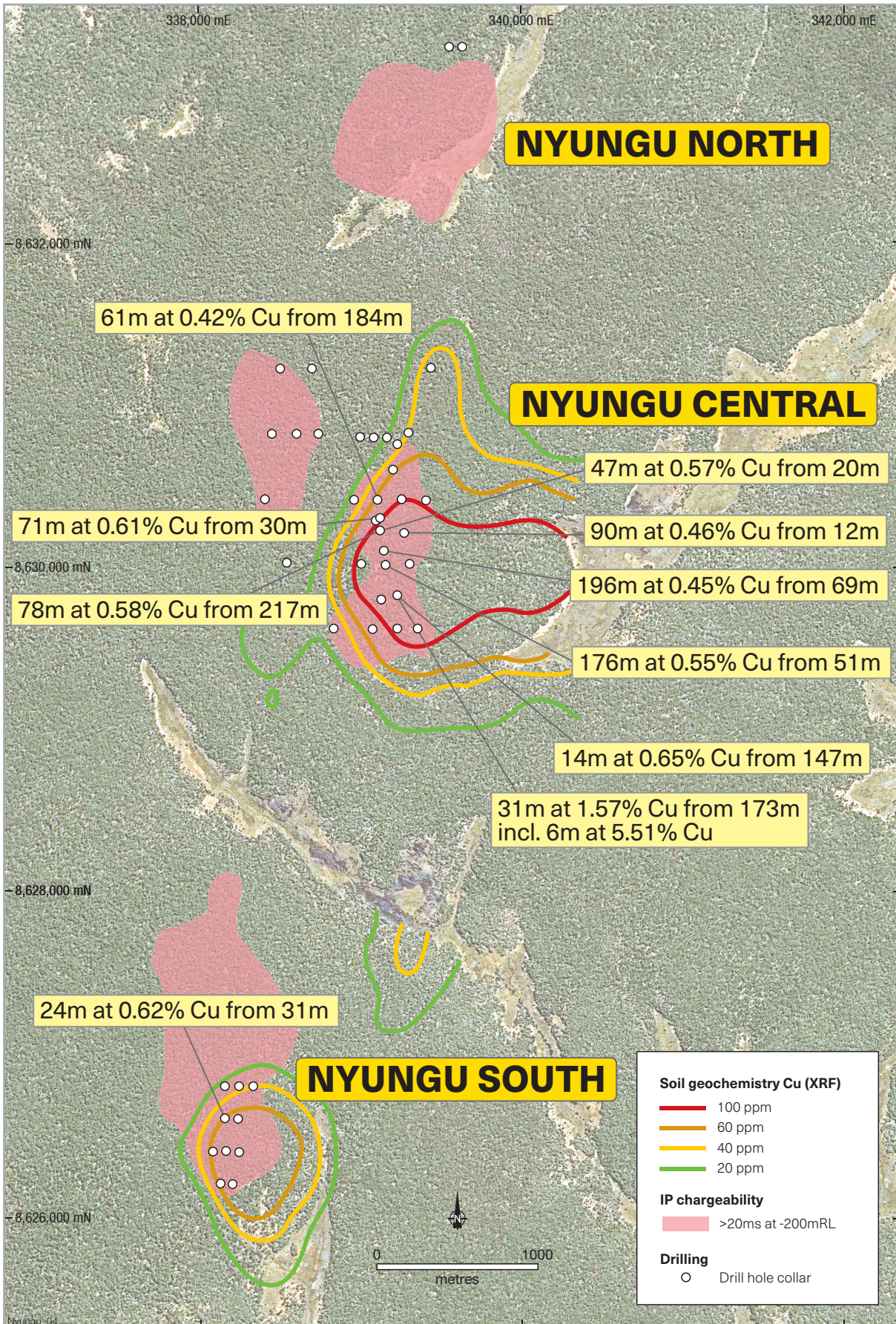


Figure 3 The Nyungu Central and Nyungu South deposits are defined by broad copper intercepts.

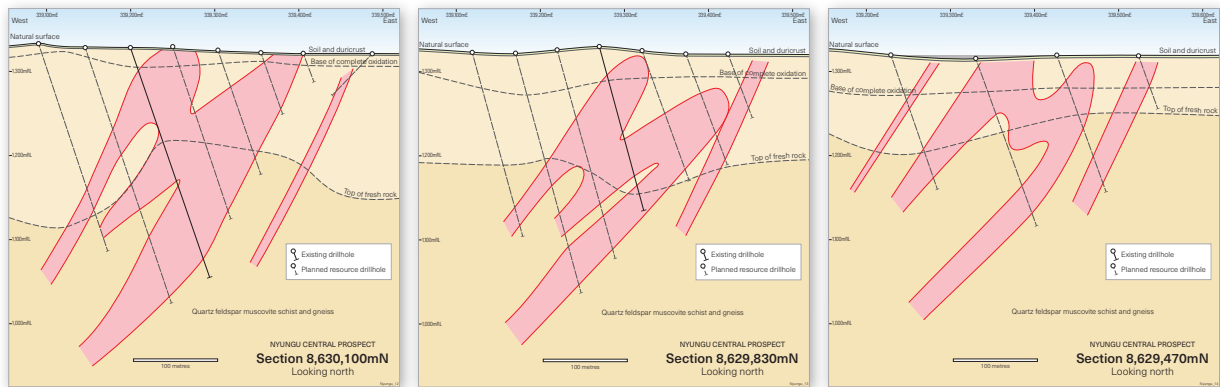


Figure 4 Nyungu Central cross sections showing existing and planned drill holes.

## Copper and Cobalt Exploration Targets

Argonaut has previously estimated Exploration Targets for both copper and cobalt mineralisation at Nyungu using an independent consultancy. These estimations are shown below in Table 1.

Table 1: Nyungu Exploration Target.

Commodity	Tonnage Range (Mt)	Grade Range (%)	Contained Metal Range (kt)
<b>Copper*</b>	130 to 180	0.45 to 0.65	580 to 1,150
<b>Cobalt^</b>	15 to 20	0.08 to 0.12	12 to 24

\* Copper Exploration Target announced to the ASX by Argonaut on 9 April 2013.

^ Cobalt Exploration Target announced to the ASX by Argonaut on 27 March 2017.

Both Exploration Targets are estimated to JORC standards.

*The potential quantity and grade of the Exploration Target is conceptual in nature. There has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource.*

## Earthworks

Upgrades to the drilling access track made in June and July 2021 include the installation of box culverts at major creek crossings and the sheeting of the track using laterite. These upgrades will improve access conditions in both the dry and wet seasons in the event Argonaut elects to continue drilling past the commencement of rains in November 2021.

During June 2021, the Zambian Government declared a total of 17 days of public holidays in relation to the death of former Zambian President, Kenneth Kaunda. These days of mourning were in addition to two scheduled public holidays. This has led to slight delays in the completion of earthworks, hence the commencement of drilling.

## Metallurgical Testwork

Argonaut has been testing the metallurgical properties of oxide, transitional zone and fresh (sulphide) ores for the past 18 months. This information is driving the development of process flowsheets and scoping economic studies into the various processing options.

The metallurgical testwork program is extensive. Argonaut has completed testing of the following properties: mineralogy, comminution, flotation and oxidation (including both roast/leach and Albion process). The Company is currently completing a suite of orientation leach tests on small samples of oxide and transitional ores. Future tests will include large-scale leach tests, bio-leach tests and solvent extraction/electrowinning (SX/EW) tests.

## Mining Study

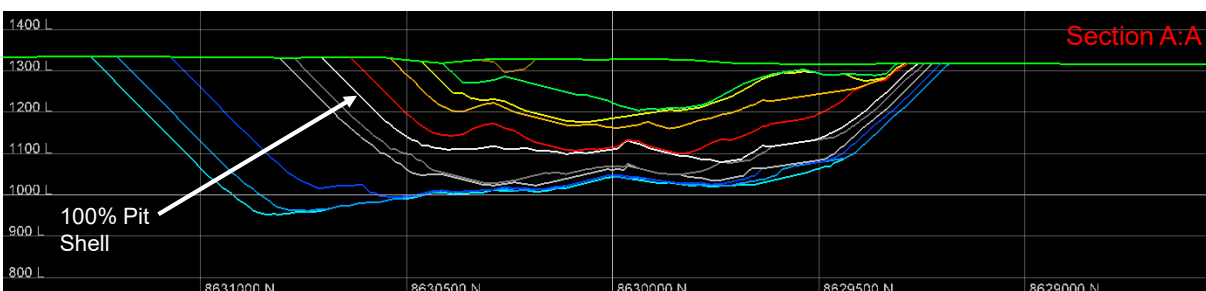
A preliminary open pit optimisation study was conducted for the Nyungu Central and Nyungu South deposits. The modelling was for copper production only, using costs from similar mines. The results were highly encouraging.

Modelling shows excellent deposit geometry via a very low stripping ratio (Figure 5).

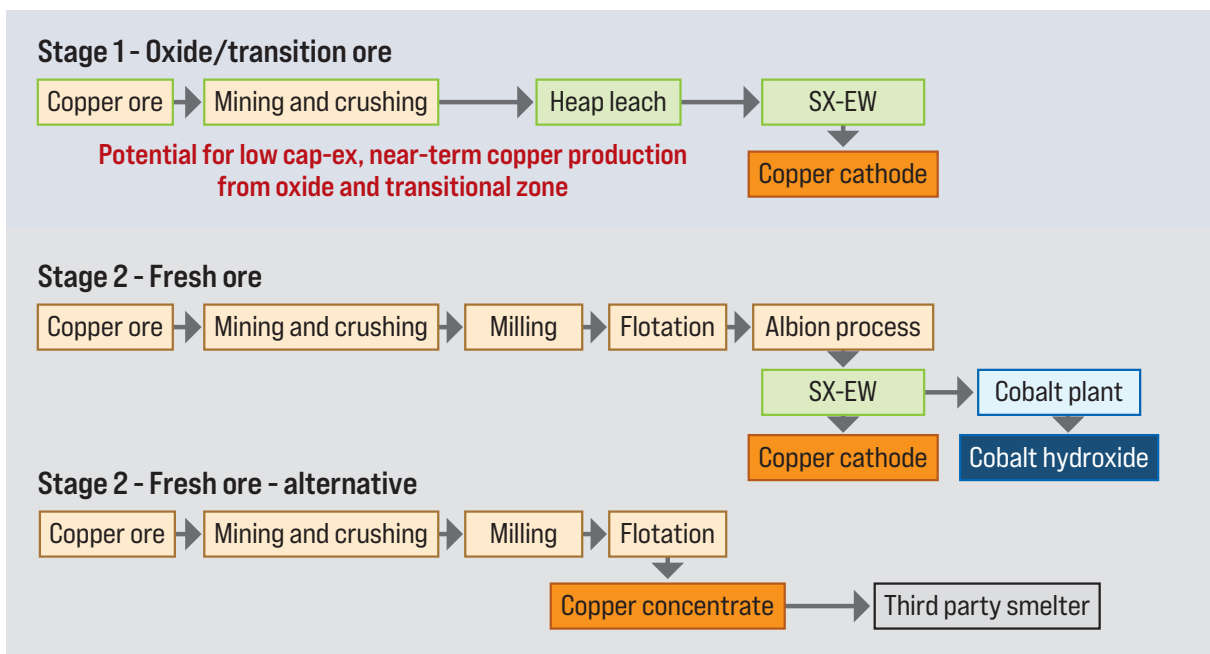
- **Stripping ratio of 1.5 to 1** for the optimum pit at a copper price of US\$7,151; and
- Stripping ratio of 2.3 to 1 for depths greater than 300m at 150% of the current copper price, indicating the deposit has a low sensitivity to stripping ratio.

## Mineral Processing

The conceptual mineral processing flowsheets for a two-stage operation are shown below. Stage one involves oxide and transitional zone ores. Stage two involves the fresh, predominantly chalcopyrite ore in the deeper primary zone. Two alternative processes are shown for the second stage. One involves the production of copper metal and cobalt hydroxide and the other involves the sale of copper concentrate to local smelters.



**Figure 5** Nyungu Central long-section, looking east. Preliminary pit optimisation open pit shells. White shell has a stripping ratio of 1.5 to 1 and reflects the optimisation at US\$7,151. The light blue shell has a stripping ratio of 2.3 to 1 and is economic at 150% of that price.



**Figure 6** Conceptual mineral processing flowsheet for a two-stage operation at Nyungu.

## Cobalt Production Impediments – why Zambia?

Recent battery-related demand for cobalt has exposed the fragile nature of cobalt supply. Over 70% of the world's cobalt is coming from the DRC, one of the world's riskiest and most opaquely administered mining jurisdictions.

There are two main reasons why the majority of the world's cobalt supply comes from the DRC: mineral endowment and favourable metallurgy.

Southern DRC and North-western Zambia (including the Zambian Copperbelt) cover the geological domain known as the Central African Copperbelt. Deposits in both countries commonly contain cobalt.

Of the 190 countries assessed for 'ease of doing business' by the World Bank in 2019, Zambia ranked 85. DRC ranked near the bottom at 183. Zambia is a far safer and lower-risk jurisdiction that benefits from political stability, robust mining law and functioning courts.

Other countries with significant cobalt endowment include Australia (nickel-cobalt laterites) and Canada (polymetallic copper-nickel-cobalt). The main reason cobalt production lags in these countries is metallurgy. The processing of cobalt in Australia and Canada is either metallurgically complex or prohibitively expensive (or both).

Zambia represents a blend of lower political risk, excellent mineral endowment and favourable metallurgy.

## About Argonaut

Argonaut Resources NL is an Australian Securities Exchange listed exploration and development company focused on the Murdie copper project in South Australia and copper development at the Nyungu copper-cobalt deposit at the Lumwana West project in North-western Zambia.

Authorised for release by:

**Lindsay Owler**

Director and CEO

ARGONAUT RESOURCES NL

*Sections of information contained in this report that relate to Exploration Results were compiled or supervised by Mr Lindsay Owler BSc, MAusIMM who is a Member of the Australasian Institute of Mining and Metallurgy and is a full-time employee of Argonaut Resources NL. Mr Owler holds shares and options in Argonaut Resources NL, details of which are disclosed in the Company's 2020 Annual Report. Mr Owler has sufficient experience which is relevant to the style of mineral deposits 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 Mineral Resources and Ore Reserves". Mr Owler consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.*