

31 May 2021

#### Jaguar Nickel Sulphide Project – Value-Add Scoping Study

#### VALUE-ADD STUDY SHOWS POTENTIAL FOR JAGUAR TO BE A LONG-LIFE, HIGH-MARGIN & LOW-EMISSION PRODUCER OF BATTERY-GRADE NICKEL SULPHATE

Completion of high-quality Base Case and Value-Add Scoping Studies allow Centaurus to move directly to a Definitive Feasibility Study (DFS)

#### **Cautionary Statements**

The Value-Add Scoping Study referred to in this announcement has been undertaken for the purpose of the further evaluation of a potential development of the **Jaguar Nickel Sulphide Project**. It is a preliminary technical and economic study (±40%) of the potential viability of producing a nickel sulphate product from the Jaguar Nickel Sulphide Project for the growing electrification supply chain. The Value-Add Scoping Study outcomes, production target and forecast financial information referred to in this announcement are based on low accuracy level technical and economic assessments that are insufficient to support estimation of Ore Reserves. While each of the modifying factors was considered and applied, there is no certainty of eventual conversion to Ore Reserves or that the production target itself will be realised. Further exploration and evaluation work and appropriate studies are required before Centaurus is in a position to estimate any Ore Reserves or to provide any assurance of an economic development case.

The JORC compliant Mineral Resource Estimate (MRE) was updated at the time of the Jaguar Base Case Scoping Study ASX Release on 29 March 2021. The MRE also forms the basis for this Value-Add Scoping Study, the subject of this announcement. Over the life of mine considered in the Value-Add Scoping Study, 52% of the Production Target originates from Indicated Mineral Resources and 48% from Inferred Mineral Resources. Importantly, more than 83% of the Production Target over the first 3 years of the Project will be from Indicated Mineral Resources. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the Production Target itself will be realised. Centaurus confirms that the financial viability of producing a nickel sulphate product from the Jaguar Nickel Sulphide Project is not dependent on the inclusion of Inferred Resources in the production schedule.

The Mineral Resources underpinning the production target in the Value-Add Scoping Study have been prepared by a competent person in accordance with the requirements of the JORC Code (2012). The Competent Person's Statement is found below in this announcement. For full details of the Mineral Resources Estimate, please refer to Centaurus' ASX releases dated 4 February 2021 and 29 March 2021. Centaurus confirms that it is not aware of any new information or data that materially affects the information included in these releases. All material assumptions and technical parameters underpinning the estimate continue to apply and have not materially changed.

No Ore Reserve has been declared. This announcement has been prepared in compliance with the current JORC Code (2012) and the ASX Listing Rules. All material assumptions, including sufficient progression of all JORC modifying factors, on which the production target and forecast financial information are based have been included in this ASX release.

This Value-Add Scoping Study was completed to an overall  $\pm$  40% accuracy using the key parameters and assumptions outlined elsewhere in this announcement. Assumptions also include assumptions about the availability of funding. While Centaurus considers that all the material assumptions are based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by this study will be achieved.

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To achieve the range of outcomes indicated in the Scoping Study, pre-production funding in the order of US\$288M will likely be required. There is no certainty that Centaurus will be able to source that amount of funding when required. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Centaurus's shares. It is also possible that Centaurus could pursue other value realisation strategies such as a sale, partial sale or joint venture of the Jaguar Nickel Sulphide Project. This could materially reduce Centaurus's proportionate ownership of the Jaguar Nickel Sulphide Project.

This announcement contains a series of forward-looking statements. Generally, the words "expect," "potential", "intend," "estimate," "will" and similar expressions identify forward-looking statements. By their very nature forward-looking statements are subject to known and unknown risks and uncertainties that may cause actual results, performance or achievements, to differ materially from those expressed or implied in any forward-looking statements, which are not guarantees of future performance. Statements in this release regarding Centaurus's business or proposed business, which are not historical facts, are forward-looking statements that involve risks and uncertainties, such as Mineral Resource estimates, market prices of metals, capital and operating costs, changes in project parameters as plans continue to be evaluated, continued availability of capital and financing and general economic, market or business conditions, and statements that describe Centaurus's future plans, objectives or goals, including words to the effect that Centaurus or management expects a stated condition or result to occur. Forward-looking statements are necessarily based on estimates and assumptions that, while considered reasonable by Centaurus, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies. Since forward-looking statements address future events and conditions, by their very nature, they involve inherent risks and uncertainties. Actual results in each case could differ materially from those currently anticipated in such statements. Investors are cautioned not to place undue reliance on forward-looking statements, which speak only as of the date they are made.

Centaurus has concluded it has a reasonable basis for providing these forward-looking statements and believes it has reasonable basis to expect it will be able to fund development of the project. However, a number of factors could cause actual results or expectations to differ materially from the results expressed or implied in the forward-looking statements. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of this study.

The project development schedule assumes the completion of a Definitive Feasibility Study (DFS) by Q4 2022. Environmental permitting and development approvals are the main time determining factors to first production, which is scheduled for the end of 2024. The key document for the environmental approval process is the Environmental Impact Assessment (EIA/RIMA) and this is due to be lodged by the end of Q2 2021. Delays in the environmental approval process or any other development approval could result in a delay to the commencement of construction (planned for Q3-2023). This could lead to a delay to first production. The Company's stakeholder management and community engagement programs will reduce the risk of project delays. These dates are indicative only.

It is anticipated that finance will be sourced through a combination of equity from existing shareholders, new equity investment and debt providers. In July 2020, the Company completed a A\$25.5 million share placement of which A\$7.0 million was cornerstoned by highly experienced Canadian resource investment house, Dundee Goodman Merchant Partners, who remain very supportive of the Company and development of the Jaguar Nickel Sulphide Project. Further, strong indications of equity support exist from broking groups who have research coverage on the Company. The Board considers that the project cash flows and key financial metrics outlined in the Value-Add Scoping Study are supportive of debt funding of the Project on normal commercial terms.

The Board considers the Company has sufficient cash on hand to undertake the next stage of planned work programs, including the 2021 DFS activities, continued metallurgical testing and ongoing exploration of the project area.



Centaurus Metals (ASX Code: **CTM**) is pleased to announce the results of an independent Value-Add Scoping Study for the development of its **100%-owned Jaguar Nickel Sulphide Project** in Brazil which highlights the outstanding financial and economic returns that would be generated by Centaurus becoming a **globally significant sustainable**, **long-term and low-cost producer of battery-grade nickel sulphate** for the growing electrification supply chain.

Located in Brazil's infrastructure-rich Carajás Mining Province with easy access to established mining communities, federal highways, rail and national grid power (running +80% renewables), the Jaguar Project is expected to have a low-carbon emission footprint and the ability to generate strong financial returns while also delivering significant long-term social and economic benefits for the local communities around the Project.

The Value-Add Scoping Study was conducted by a group of leading independent consultants from Australia and Brazil including Entech Pty Ltd, Re-Metallica and DRA Global, overseen by in-house Centaurus personnel.

#### VALUE-ADD SCOPING STUDY RETURNS OUTSTANDING RESULTS

#### **Key Study Parameters**

- Open pit and underground mines supplying a 2.7Mtpa nickel sulphate plant over an initial 13-year mine life
- Production of +20,000tpa of recovered nickel in sulphate and +9,600tpa of a mixed sulphide precipitate (MSP)
- > Base Case nickel price assumption of US\$7.50/lb (US\$16,530/tonne)
- Nickel sulphate premium of US\$0.50/lb (US\$1,102/tonne)

#### Strong Financial Returns<sup>1</sup>

- Post-tax NPV<sub>8</sub> of ~US\$831 million (~A\$1.11 billion)
- Post-tax IRR of ~52%
- Post-tax capital payback of ~1.8 years from first nickel sulphate production
- Net Revenue totalling ~US\$4.53 billion (~A\$6.04 billion)
- EBITDA totalling ~US\$2.44 billion (~A\$3.25 billion)
- Average Annual Free Operating Cash Flow (Pre-tax) of ~US\$189 million (~A\$252 million)

#### **Physical Parameters**

- Production Target of 45.0Mt @ 0.80% Ni for 361,700t of contained nickel
- Production Target comprises 52% Indicated Mineral Resources and, importantly, more than 83% of the Production Target over the first three years of the Project is from Indicated Resources
- Initial 13-year Mill Feed<sup>2</sup> of 33.7Mt @ 1.01% Ni for 341,300t of contained nickel
- LOM recovered nickel in sulphate of ~262,100t (~20.3ktpa annual average nickel in sulphate grading 22.3% Ni)
- LOM production of ~135,700 tonnes of MSP
- > First production targeted for the end of 2024, based on current environmental approvals timeline
- > Positioned to meet forecast growth in demand for battery-grade Class-1 nickel for the EV battery market

#### **Operating Costs & Capital Costs**

- Low LOM C1 cash costs of operations of ~US\$3.29/lb of Ni
- High LOM Cash Operating Margin of ~US\$4.27/lb of Ni
- LOM AISC of ~US\$3.94/lb of Ni
- Pre-production CAPEX of ~US\$288 million (including ~US\$42 million contingency)

<sup>&</sup>lt;sup>1</sup> The range of results of the study are set out on page 5 of this Scoping Study Release.

<sup>&</sup>lt;sup>2</sup> Mill Feed includes the Ore-sorter product which has been processed pre-concentrator. Refer Table 10 in the JNP Value-Add Scoping Study Executive Summary that forms part of this ASX Release.



#### Uniquely Positioned to be a Long-Term Sustainable Battery-Grade Nickel Sulphate Producer

- Power to be delivered from predominantly renewable sources (hydro-electric and solar generation) through the Brazilian national power grid (+80% renewables)
- > Targeting a low-carbon footprint from processing of sulphide ore, using renewable power to produce a highvalue nickel sulphate product
- Well positioned to use the established infrastructure in the Carajás and Brazil to supply the growing battery grade nickel supply chain in the US, Europe and China
- Strong social programs implemented within the local municipalities where the Company operates, currently focused on health, water quality and road upgrades
- Strong COVID-19 protocols adopted to protect employees, as well as to make a contribution to local health services to assist in their COVID-19 response
- > 80% of exploration and early development work awarded to local suppliers and contractors
- > Two land possession agreements recently completed to significantly de-risk future project development activities, with a further two agreements currently being negotiated

#### **Significant Upside Potential**

- Mineralisation part of a deep plumbing system, with all deposits remaining open at depth and untested
- > Four diamond drill rigs currently operating on double-shift at Jaguar, targeting further resource growth
- > Up to three additional diamond rigs to arrive by mid-June
- > New RC rig on site and drilling greenfield prospects, targeting shallow discoveries
- Over 65,000m of drilling targeted to be completed in 2021

#### **Next Steps and Cash Position**

- The Centaurus Board has decided to immediately proceed to a Definitive Feasibility Study (DFS) on the Jaguar Project following the exceptional economic outcomes delivered by the Value-Add Scoping Study
- > DFS will focus on the production of a nickel sulphate product, though this by its very nature will require a study of the production of a nickel concentrate as the feed for the hydrometallurgical (nickel sulphate) circuit
- Centaurus is already well advanced on many of the key components of the proposed project development, positioning the Company well to complete the DFS by Q4 2022
- > Key Environmental and mining lease approval documents are on target to be lodged in the next 2 months
- Strong cash position of ~A\$21 million to drive ongoing drilling, DFS activities and early-stage development work

#### **Investor Webinar**

Centaurus' Managing Director, Mr Darren Gordon, will be hosting a live webinar today for shareholders, investors, analysts and media to discuss the results of the Value-Add Scoping Study and provide an update on ongoing exploration and development activities at the Jaguar Nickel Sulphide Project.

The webinar will commence at **12.00pm (AWST) / 2.00pm (AEST) today, Monday 31 May 2021**. Participants can register to join the webinar by clicking on the link below:

#### https://www.bigmarker.com/read-corporate/Centaurus-Metals-Investor-Briefing-31-May-2021-Value-Add-Scoping-Study

We recommend that you register at least 10 minutes beforehand. You can log questions during the webinar by using the Q&A tab on the webinar platform.

#### Management Comment and Value-Add Scoping Study Results Summary

Centaurus' Managing Director, Mr Darren Gordon, said the exceptional economic outcomes of the Value-Add Scoping Study demonstrate the compelling case to develop Jaguar as a sustainable long-life, high margin and low-carbon emission supplier of battery grade nickel sulphate to the growing electric vehicle market.



"It's not often a new resources project has a trifecta of strong financial and economic returns, exceptional ESG outcomes and a project ideally suited to supply one of the world's fastest growing 'green energy' industries," he said. "At Jaguar, we believe we definitely have all three."

"The Value-Add Scoping Study shows that a strategic investment in downstream processing to produce a nickel sulphate product tailored for the clean energy market adds very significantly to the already strong economics seen in the Base Case study released in late March. By further processing our nickel concentrate to a sulphate product on site at Jaguar, the project NPV increases by over 80% to approximately A\$1.1 billion with an IRR of 52% - an outstanding result from a truly global-scale project.

"Since acquiring Jaguar in late 2019 we have set a goal to transform Centaurus into a low-cost, high-margin and emissions-friendly nickel mining company, capable of delivering more than 20,000 tonnes per annum of batterygrade nickel to global markets for many years to come. The Value-Add Scoping Study clearly shows Jaguar has all the attributes required to achieve this goal, and to do so in a sustainable and responsible manner, ensuring we meet the highest possible ESG standards.

"Brazil, and specifically the Carajás region, has many attributes that makes the downstream process highly attractive, including low-cost renewable energy from the national grid, extensive road, rail and port infrastructure servicing the Carajás Mineral Province and a strong local workforce from well-established mining communities.

"This Scoping Study is an important milestone for our Company and an outstanding platform to launch directly into a Definitive Feasibility Study for both the conventional nickel concentrate case and the downstream nickel sulphate case, though the latest results from the Value-Add Study are pointing us strongly in the direction of downstream processing. At a nickel price of US\$9/lb, which could reasonably be expected by the time the Jaguar Project is planned to come into production in the middle of the decade, the NPV of the sulphate project would lift to A\$1.62 billion and the IRR to 70%, demonstrating the amazing leverage the Jaguar Project has to rising nickel prices.

"We are also now close to submitting our updated mining and environmental licence applications with all field studies complete and the Company having a clear path towards the development of one of the world's biggest nearsurface high-grade nickel sulphide deposits.

"Our Scoping Studies are underpinned by this globally significant resource which currently stands at 58.8Mt at 0.96% Ni for more than 562,000 tonnes of contained nickel. The Jaguar mineralisation comes from a deep and extensive plumbing system and our geologists are confident that we will continue to grow the resource base through both step-out drilling and greenfields exploration drilling targeting new discoveries. We currently have four diamond rigs on site with a further three to arrive in June and an RC rig dedicated to greenfields drilling."

The Key Assumptions underpinning the Jaguar Value-Add Scoping Study economics (Table 1) and the key financial results from the study (Tables 2 and 3) are summarised below:

Table 1 – Value-Add Case Financial Model Assumptions and Floddction Target						
Assumptions	Units	Value-Add Case				
Average LOM Exchange Rate	USD/BRL	5.00				
Average LOM Exchange Rate	USD/AUD	0.75				
Average LOM Exchange Rate	EUR/BRL	5.80				
Ni Price	US\$/t	16,530				
Ni Sulphate Premium	US\$/t	1,102				
Ni Price	US\$/lb	7.50				
Ni Sulphate Premium	US\$/lb	0.50				
Corporate tax rate, Year 1-10	%	15				
Corporate tax rate, Year 11 Onwards	%	34				
Discount Rate - Real	%	8				

#### Table 1 – Value-Add Case Financial Model Assumptions and Production Target



#### Table 1 – Value-Add Case Financial Model Assumptions and Production Target (Cont....)

Physicals		
Production Target	45.0Mt @ 0.80%	6 Ni for 361,700t Contained Ni
Mill Feed	Mt	33.7
Contained Ni in Mill Feed	t	341,300
Mill Feed Head Grade	% Ni	1.01%
Recovered Ni to Concentrate	t	278,300
Nickel Recovery to Concentrate	%	81.5%
Recovered Ni in Sulphate	t	262,100
Recovered Zn in MSP	t	80,500
Recovered Co in MSP	t	7,300
Recovered Ni in MSP	t	3,100

#### Table 2 – Value-Add Case Key Project Results – Capital and Operating Costs

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Key Cost Information	Units	Mid-point	Ra	nge
Capital Costs				
Pre-Production Development Capital	US\$M	288	259	317
Sustaining and Deferred Capital	US\$M	213	192	234
<b>Operating Costs</b> (100% payable basis)				
C1 Cash Costs	US\$/lb	3.29	2.96	3.62
Royalties	US\$/lb	0.28	0.25	0.31
Total Operating Costs	US\$/lb	3.57	3.21	3.93
Sustaining and Deferred Capital	US\$/lb	0.36	0.32	0.40
All-in Sustaining Costs (AISC)	US\$/lb	3.94	3.55	4.33
Pre-Production Development Capital	US\$/lb	0.49	0.44	0.54
All-in Costs	US\$/lb	4.43	3.99	4.87

#### Table 3 – Value-Add Case Key Project Results – Financial Outcomes

Key Financial Outcomes	Units	Mid-point	Rai	nge
Total Net Revenue	US\$M	4,532	4,079	4,985
EBITDA	US\$M	2,443	2,199	2,687
Project Cashflow – pre-Tax	US\$M	1,942	1,748	2,136
NPV <sub>8</sub> - pre-Tax	US\$M	1,030	927	1,133
IRR – pre-Tax	%	60%	54%	66%
Tax Paid	US\$M	376	338	414
Project Cashflow – post Tax	US\$M	1,566	1,409	1,723
NPV <sub>8</sub> – post Tax	US\$M	831	748	914
Project Cashflow – post Tax	A\$M	2,088	1,879	2,297
NPV <sub>8</sub> – post Tax	A\$M	1,108	997	1,219
IRR – post Tax	%	52%	47%	57%
Capital Payback Period – post Tax	Years	1.8	1.6	2.0

The results of the Value-Add Scoping Study provide the Company with a high level of confidence that the production of a nickel sulphate product on site at Jaguar is a highly viable option and one that should be aggressively pursued. The results have also allowed the Centaurus Board to commit to proceeding directly to a Definitive Feasibility Study (DFS) for the production of +20,000 tonnes per annum of nickel sulphate at the Jaguar Project over an initial mine life of ~13 years. The DFS by its very nature will also incorporate the study of the production of nickel concentrate, as this will be the product feed to the hydrometallurgical (nickel sulphate) circuit.

Comparison of the Base Case Scoping Study (nickel concentrate product) and the Value-Add Scoping Study are summarised in Table 4. The investment in the downstream processing of an additional ~US\$110 million (including US\$18.2 million contingency) adds considerable value to the project via the recovery of additional nickel from Resource to Production Target and higher nickel sulphide recoveries to concentrate.



When combined, these higher recoveries raise the recovered nickel to product by approximately 30% to 262,000 tonnes of nickel. This additional contained nickel (in sulphate) then attracts a higher product payability, raising the total revenue by 87% to ~US\$4.53 billion (A\$6.04 billion).

Table 4: Comparison of Jaguar Base C	Units	Mid-Point	Mid-Point
Rey Thysical Results	Onits	Base Case	Value-Add
Production Target - Physicals			
Mining	Mt	32.8	45.0
Grade	%	0.84	0.80
Contained Nickel	t	275,600	361,700
Milling	Mt	24.0	33.7
Grade	%	1.08	1.01
Contained Nickel	t	260,300	341,300
Production			
Nickel Concentrate/Sulphate	t	1,285,000	1,175,500
Grade	% Ni	15.8	22.3
Contained Nickel	t	203,300	262,100
Production of by-products		In Conc	In MSP
Zinc	t	N/A	80,500
Cobalt	t	2,800	7,300
Nickel	t	N/A	3,100
Project Life	Years	10.0	12.9
Key Capital and Operating Cost Results	Units	Mid-Point	Mid-Point
	Onits	Base Case	Value-Add
Capital Costs			
Development Capital	US\$M	178	288
Sustaining and Deferred Capital	US\$M	138	213
<b>Operating Costs</b> (100% payable basis)			
C1 Cash Costs	US\$/lb	2.41	3.29
Royalties	US\$/lb	0.25	0.28
Total Operating Costs	US\$/lb	2.66	3.57
Sustaining and Deferred Capital	US\$/lb	0.31	0.36
All-in Sustaining Costs (AISC)	US\$/lb	2.97	3.94
Development Capital	US\$/lb	0.40	0.49
All-in Costs	US\$/lb	3.37	4.43
Cash Operating Margin	US\$/lb	2.74	4.27
Key Financial Outcomes	Units	Mid-Point Base Case	Mid-Point Value-Add
Total Revenue	US\$M	2,422	4,532
EBITDA	US\$M	1,230	2,443
Average Annual pre-tax Operating Cash Flow	US\$M	123	189
Project Cashflow - pre-Tax	US\$M	914	1,942
NPV <sub>8</sub> - pre-Tax	US\$M	543	1,030
IRR - pre-Tax	%	62%	60%
Tax Paid	US\$M	137	376
Project Cashflow - post Tax	US\$M	778	1,566
NPV <sub>8</sub> - post Tax	US\$M	452	831
Project Cashflow - post Tax	A\$M	1,036	2,088
NPV <sub>8</sub> - post Tax	A\$M	603	1,108
IRR - post Tax	%	54%	52%



Trade-off studies of both options in the early stages of the DFS will allow the Company to complete the required analysis that will allow a more informed decision as to how to maximise value for the Company at an acceptable risk level. Work conducted through the course of the DFS has the ability to further improve the already robust economics by optimising factors such as mine sequencing, fleet selection and process route selection.

The DFS will move forward in parallel to project licensing where all baseline environmental surveys have been completed. Furthermore, exploration programs targeting resource development and extensional drilling as well as new greenfields discoveries are ongoing with five rigs on site and a further three to arrive in the coming weeks.

The Company is pleased to present the Executive Summary of the Jaguar Nickel Sulphide Project Value-Add Scoping Study in the following booklet, with the booklet forming an integral part of this Value-Add Scoping Study announcement. For information on the Company's Base Case Scoping Study please refer to ASX Announcement 29 March 2021.



# The Jaguar Nickel Sulphide Project VALUE-ADD SCOPING STUDY

EXECUTIVE SUMMARY MAY 2021



THE JAGUAR NICKEL SULPHIDE PROJECT

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This Jaguar Nickel Sulphate Project (JNP) Value-Add Scoping Study has been prepared by Centaurus Metals with assistance from the following engineering and technical advisors:

Plant Engineering: DRA Global (Australia)
Mining & Geotech: Entech (Australia) & ReMetallica (Brazil)
Resource Estimation: Trepanier Pty (Australia)
Metallurgical Testwork: ALS Metallurgy (Australia)
Mineralogy: McArthur Ore Deposit Assessments (Australia)
Power: Malc Engenharia Ltda. & Conexão Energia (Brazil)
Tailings Storage Facility: L&MGSPL (Australia)
Environmental Study: Bicho do Mato (Brazil)

#### The Centaurus Jaguar Nickel Sulphide Project team included:

Managing Director: Darren Gordon Country Manager & Executive Director: Bruno Scarpelli Operations Manager: Roger Fitzhardinge CFO & Company Secretary: John Westdorp Principal Metallurgist: John Knoblauch Principal Geoscientist: Grant 'Rocky' Osborne Exploration Manager: Gaudius Montresor Environmental Manager: Antonio Kalil OHS Manager: Antonio Campos Administration Coordinator (Brazil): Bianca Peloso Braga

## 1. Executive Summary

#### **1.1 INTRODUCTION**

Centaurus Metals Ltd (CTM) has completed a Value-Add Scoping Study for the development of the Jaguar Nickel Sulphide Project (JNP), located in the State of Pará, Brazil. The Value-Add Scoping Study assesses the construction of a Nickel Sulphate Plant which comprises a conventional flotation concentrator and a hydrometallurgical circuit to produce nickel sulphate and a zinc rich Mixed Sulphide Precipitate (MSP) from open pit and underground mining operations.

In September 2019, CTM through its subsidiary Aliança Mineração Ltda (Aliança) executed a Sales & Purchase Agreement with Vale Metais Básicos SA (Vale) that transferred 100% of the JNP to Aliança. Drilling at Jaguar commenced in November 2019.

In March 2021, the Company updated the JORC 2012 Indicated and Inferred Mineral Resource Estimate (MRE) to 58.9Mt at 0.96% Ni for 562,600 tonnes of contained nickel.

CTM engaged DRA Pacific Ltd (DRA) and Entech Pty Ltd (Entech) to complete the JNP Value-Add Scoping Study based on the March 2021 MRE. Resource development and greenfields drilling is ongoing and further MRE updates are planned for Q4 2021 and Q2 2022. Future Mineral Resource updates will underpin the JNP Definitive Feasibility Study planned for completion towards the end of 2022.

The JNP is 100% owned by Aliança, a wholly owned Brazilian subsidiary of Centaurus Metals Ltd.





#### **1.2 PROJECT LOCATION**

The JNP is located within a 30km<sup>2</sup> tenement package in the São Félix do Xingú municipality in the western portion of the world-class Carajás Mineral Province in the state of Pará (Figure 1). The Carajás Mineral Province is Brazil's premier mining hub, containing one of the world's largest known concentrations of bulk tonnage IOCG deposits as well as hosting the world's largest high-grade iron ore mine at S11D.

The JNP is ideally located close to existing infrastructure, just 35km north of the regional centre of Tucumã (population +35,000) where a 138kV power sub-station is located.

The commercial airports closest to the project area are in the cities of Marabá and Parauapebas, accessible by paved roads from Tucumā, 380km and 270km respectively. There is a regional airport for smaller flights in Ourilândia do Norte (population +30,000), which is 9km east of Tucumã. The project is located about 640km to southwest of Belém, the capital of Pará State. The project is centred at 6°29'15" S latitude and 51°12'10" W longitude.

#### **1.3 PROJECT BASIS**

The development of the JNP Value-Add Scoping Study comprises the following project concepts:

- → The establishment of a conventional open pit, and from year 4, underground mining operations to supply 2.7Mtpa of ore to a nickel sulphide flotation plant and hydrometallurgical circuit for approximately 13 years;
- → The construction of a nickel sulphate plant which includes a conventional nickel sulphide flotation plant and hydrometallur-gical circuit capable of processing up to 2.7Mtpa of ore;
- → The building of a tailings storage facility (TSF) that is integrated within the mined waste (IWL);
- → The upgrade works required for the 40km access road from Tucumã to the site;
- → The inclusion of a 39km 138kV power line from the Tucumã sub-station to site to supply up to 50MW peak power demand;
- → The construction of a village to accommodate 400 workers for the project implementation stage;
- → The inclusion of all non-processing infrastructure including office and administration buildings, gate house, warehousing, heavy vehicle workshop, ponds and general facilities.



Figure 1 - The Jaguar Nickel Sulphide Project location in the Carajás Mineral Province, Brazil



#### **1.4 KEY PROJECT METRICS**

Assumption	Units	Value-Add
Average LOM Exchange Rate	USD/BRL	5.00
Average LOM Exchange Rate	USD/AUD	0.75
Average LOM Exchange Rate	EUR/BRL	5.80
Ni Price	US\$/t	16,530
Ni Sulphate Premium	US\$/t	1,102
Ni Price	US\$/lb	7.50
Ni Sulphate Premium	US\$/lb	0.50
Corporate tax rate, Year 1-10	%	15
Corporate tax rate, Year 11 Onwards	%	34
Discount Rate - Real	%	8
Physicals		
Production Target		45.0Mt @ 0.80% Ni for 361,700t Contained Ni
Mill Feed	Mt	33.7
Contained Ni in Mill Feed	t	341,300
Mill Feed Head Grade	% Ni	1.01%
Recovered Ni to Concentrate	t	278,300
Nickel Recovery to Concentrate	%	81.5%
Recovered Ni in Sulphate	t	262,100
Recovered Zn in MSP	t	80,500
Recovered Co in MSP	t	7,300
Recovered Ni in MSP	t	3,100

Table 1 - Financial Model Assumptions

The outcomes of the JNP Value-Add Scoping Study are summarised in Table 2. These metrics confirm that further processing of concentrate to create a higher value nickel suplphate product significantly increases the value of the JNP and delivers outstanding financial outcomes including an estimated project post tax NVP<sub>8</sub> of A\$1,108M, a post-tax IRR of 52% and a rapid post tax capital payback of 1.8 years.

C1 cash costs of US\$3.29/lb of nickel in sulphate (including by-product credits) reflect both the significant open pit volumes and the low operating cost environment in Brazil and provide the JNP with a significant competitive advantage over other much deeper underground nickel sulphide projects and nickel laterite projects.

Whilst the C1 cash cost for the production of nickel sulphate is higher than the C1 cash cost for the base case, the cash operating margin has increased from USD\$2.74/lb Ni to USD\$4.27/lb Ni and the net revenue to C1 cost ratio has increased to 2.4, reflecting the higher margin and demonstrating that the production of nickel sulphate from Jaguar further protects the Company from unfavourable movements in nickel price and exchange rates.

Key Results	Units	Value-Add
Capital Costs		
Development Capital	US\$M	288
Sustaining and Deferred Capital	US\$M	213
<b>Operating Costs</b> (100% payable basis)		
C1 Cash Costs	US\$/lb	3.29
Royalties	US\$/lb	0.28
Total Operating Costs	US\$/lb	3.57
Sustaining and Deferred Capital	US\$/lb	0.37
All-in Sustaining Costs (AISC)	US\$/lb	3.94
Development Capital	US\$/lb	0.49
All-in Costs	US\$/lb	4.43
Financial Metrics		
Total Revenue	US\$M	4,532
Project Cashflow - pre-Tax	US\$M	1,942
NPV <sub>8</sub> - pre-Tax	US\$M	1,030
EBITDA	US\$M	2,443
IRR - pre-Tax	%	60
Tax Paid	US\$M	376
Project Cashflow - post Tax	US\$M	1,566
NPV <sub>8</sub> - post Tax	US\$M	831
Project Cashflow - post-Tax	A\$M	2,088
NPV <sub>8</sub> - post Tax	А\$М	1,108
IRR - post Tax	%	52
Capital Payback Period – post Tax	Years	1.8

Table 2 - Key Project Results

Project NPVs are estimated from the assumed Financial Investment Decision (FID) date for the project which for the purposes of the Study, coincides with the commencement of construction activities. Project cashflows are on a real, pre finance basis.

#### 1.5 CONCLUSIONS AND RECOMMENDATIONS

The JNP Value-Add Scoping Study confirms that the development of an open pit and underground mining operation supplying a 2.7Mtpa flotation concentrator and hydrometallurgical circuit to produce a high purity nickel sulphate and MSP by-product, containing zinc, cobalt, nickel and copper is technically and commercially feasible.

Given the outstanding results delivered by the JNP Value-Add Scoping Study, the Board of Centaurus has approved the Company to proceed immediately to Definitive Feasibility Study (DFS) for the production of +20,000 tpa of nickel in sulphate at Jaguar over the initial mine life of ~13 years.

The DFS by its very nature will also incorporate the study of the production of a nickel concentrate, as this is the product feed to the hydrometallurgical (nickel sulphate) circuit.

Comparison of the Base Case Scoping Study (sulphide concentrate product) and the Value-Add Scoping Study is shown in Table 3. The investment in the downstream processing of an additional US\$110 million (including US\$18.2 million contingency) adds considerable value to the project via the recovery of additional nickel from Resource to Production Target and higher nickel sulphide recoveries to concentrate. When combined, these higher recoveries raise the recovered nickel to product by ~30% to 262,000 tonnes of nickel. The additional contained nickel (in sulphate) then attracts a higher product payability, raising the total revenue by 87% to US\$4.53 billion (~A\$6.04 billion).

Key Results	Units	Base Case	Value-Add
Production Target - Physicals			
Mining	Mt	32.8	45.0
Grade	%	0.84	0.80
Contained Nickel	t	275,600	361,700
Milling	Mt	24.0	33.7
Grade	%	1.08	1.01
Contained Nickel	t	260,300	341,300
Production			
Nickel Concentrate/Sulphate	t	1,284,700	1,175,500
Grade	% Ni	15.8	22.3
Contained Nickel	t	203,300	262,100
Production By-products in MSP			
Cobalt	t	2,800	7,300
Zinc	t	N/A	80,500
Nickel	t	N/A	3,100
Project Life	yrs	10.0	12.9
Capital Costs			
Development Capital	US\$M	178	288
Sustaining and Deferred Capital	US\$M	138	213
Operating Costs (100% payable basis)			
C1 Cash Costs	US\$/lb	2.41	3.29
Royalties	US\$/lb	0.25	0.28
Total Operating Costs	US\$/lb	2.66	3.57
Sustaining and Deferred Capital	US\$/lb	0.31	0.36
All-in Sustaining Costs (AISC)	US\$/lb	2.97	3.94
Development Capital	US\$/lb	0.40	0.49
All-in Costs	US\$/lb	3.37	4.43
Cash Operating Margin	US\$/lb	2.74	4.27
Financial Metrics			
Total Revenue	US\$M	2,422	4,532
Project Cashflow - pre-Tax	US\$M	914	1,942
NPV <sub>s</sub> - pre-Tax	US\$M	543	1,030
EBITDA	US\$M	1,230	2,443
IRR - pre-Tax	%	62%	60%
Tax Paid	US\$M	137	376
Project Cashflow - post Tax	US\$M	778	1,566
NPV <sub>8</sub> - post Tax	US\$M	452	831
IRR - post Tax	%	54%	52%
Capital Payback Period – post Tax	Years	1.9	1.8
Table 3 - Comparison of Base Case an			

 Table 3 - Comparison of Base Case and Value-Add Scoping Studies



### 2. Geology & Resources

The various deposits at the JNP differ from most nickel sulphide deposits mined to date globally because they are of hydrothermal origin, with the nickel sulphide mineralisation being of high tenor (tenor referring to the Ni concentration in 100% sulphides) with low Cr and Mg content and not directly associated with mafic-ultramafic rocks. It is interpreted that the JNP mineralisation represents a hybrid hydrothermal style between magmatic Ni-Cu-PGE sulphide and IOCG mineralisation.

#### 2.1 GEOLOGY

The JNP is located in the Carajás Mineral Province (Carajás), which contains one of the world's largest known concentrations of large tonnage IOCG deposits. The Igarapé Bahia Cu-Au deposit was discovered in 1985 and it was recognised that the deposit belonged to the IOCG deposit class. Since then, many IOCG deposits of three principal ages (NeoArchean- 2.72-2.68Ga, 2.6-2.45Ga and PaleoProterozoic 1.8Ga) have been discovered making the Carajás one of the world's premier IOCG regions.

The Carajás also hosts the world's largest source of high-grade iron ore, as well as being a significant source of gold, manganese and lateritic nickel, testament to its mineral endowment.

The JNP is located at the intersection of the WSW-trending Canaã Fault and the ENE-trending McCandless Fault, immediately south of the NeoArchean Puma Layered Mafic-Ultramafic Complex, which is host to the Puma Lateritic Nickel deposit (Figure 2). The Jaguar mineralised bodies are hosted within sheared sub-volcanic porphyritic dacites of the Serra Arqueada Greenstone belt, adjacent to the boundary with a tonalite intrusive into the Xingu basement gneiss, while Onça Preta and Onça Rosa are tabular mineralised bodies hosted within the tonalite. The hydrothermal alteration and mineralisation form sub-vertical to vertical bodies structurally controlled by regional ductile-brittle mylonitic shear zones.

Sulphide assemblages are similar in both ore types, differing only in modal sulphide composition and structure. The mean sulphide assemblage (in order of abundance) is pyrite, pentlandite, millerite, violarite, pyrrhotite and sphalerite with trace vaesite, nickeliferous pyrite and chalcopyrite (Figure 3).



Figure 2 - The Jaguar Nickel Sulphide Project Geology

#### THE JAGUAR NICKEL SULPHIDE PROJECT





#### Figure 3 - Core photos from drill hole JAG-DD-20-034; 128.2.2 to 131.9m: Semi-massive and massive sulphides

(metallic bronze/yellow) with magnetite (black) mineralisation hosted in altered dacite. Sulphides comprising pyrite, pentlandite, millerite, chalcopyrite and minor sphalerite. Interval returned 3.7m at 8.55% Ni, 0.43% Cu and 0.12% Co from 128.2m

The most abundant type constitutes low-grade nickel mineralisation, occurring within veins concordant with the foliation, that is associated with the biotite-chlorite alteration. The target high-grade nickel mineralisation is associated with the magnetite-apatite-quartz alteration. It occurs as veins and breccia bodies consisting of irregular fragments of extensively altered host rocks within a sulphide-magnetite-apatite rich matrix. Mineralised breccias form semi-massive sulphide bodies up to 30m thick parallel to, or crosscutting, biotite-chlorite rich zones (Figure 4).



Figure 4 - Cross-Sections of the Jaguar South Deposit 477940mE (left) and Jaguar Central Deposit 477080mE (right) (showing a number of significant drill intersections (in yellow) with DHEM conductor plates in blue)

#### THE JAGUAR NICKEL SULPHIDE PROJECT



Mineralisation at the Onça Preta and Onça Rosa deposits is predominantly of the second type, forming tabular semi-continuous to continuous bodies both along strike and down dip (Figure 5).

Regolith at the deposit is in-situ and comprises a thin soil layer overlying a decomposed saprolite transitional zone. The thickness to the base of the transitional zone generally varies from 5m to 25m (max. 34m). Within the JNP tenement there are also several untested targets characterised by magnetic and/or electromagnetic anomalies located along favourable structures.





#### 2.2 GEOTECHNICAL

Entech completed a geotechnical study for the JNP to determine the pit slope angles to be used for the pit and stope optimisation runs and final design of the mine.

The typical rock mass can be characterised as 'Good' in the near-surface open-pittable environment. Final pit slopes have 10m (oxide) – 20m (fresh) benches and 5-10 m wide berms. The final pit walls of the deepest pit (Jaguar South) reach maximum heights of 290m at the highwall located on the southern side of the pit. Final slopes are expected to have average inter-ramp angles of between 40° - 49° in fresh rock and 33° in oxide material.

For the underground mining environment, the rock mass conditions improve with depth and can be generally classified as 'Good' to 'Very Good'. The orebody geometry and rock mass conditions at the Jaguar deposits favours the use of a top down longhole open stoping method. For the proposed stope heights of 25m, preliminary stope open spans ranging from 30-50m have been recommended, dependent on the deposit.



#### 2.3 RESOURCES

The JORC 2012 Mineral Resource Estimate (MRE) update was completed by independent resource specialists Trepanier Pty Ltd in March 2021. The updated JORC 2012 Indicated and Inferred Mineral Resource Estimate (MRE) is 58.9Mt at 0.96% Ni for 562,600 tonnes of contained nickel. The Value-Add Scoping Study uses the same resource block model as the Base Case Scoping Study.

The Jaguar MRE is based on 169 Vale drill holes for a total of 56,592m of drilling and 98 Centaurus drill holes for a total of 17,941m of drilling (total project drilling 74,533m). All drill holes were drilled at 55°-75° towards azimuth of either 180° or 360°.

The JNP is unique in terms of nickel sulphide orebodies as the high-grade nickel sulphide mineralisation comes almost to surface and continues at depth. More than 80% of the nickel metal in the maiden MRE is within 200m of surface, demonstrating the strong open pittable potential of the Project. Over 97% of the Resource is comprised of fresh sulphides, with no oxide material being reported (Table 4).

Potential mining methods include a combination of open pit and underground. As such, a 0.3% Ni cut-off grade has been applied to material less than 200m vertical depth from surface to reflect potential open cut mining opportunities. A Ni cut-off grade of 1.0% Ni was applied below 200m from surface to reflect higher cut-offs expected with potential underground mining. The JNP MRE at various cut-off grades is shown in Table 5, with the reported JNP MRE highlighted in dark grey.

The estimate was resolved into 10m (E) x 2m (N) x 10m (RL) parent cells that had been sub-celled at the domain boundaries for accurate domain volume representation. Indicated Mineral Resources are defined nominally on 50m E x 40m N spaced drilling (predominantly where CTM has completed infill drilling) and Inferred Mineral Resources nominally 100m E x 40m to 100m N with consideration given for the confidence of the continuity of geology and mineralisation. The Jaguar Mineral Resource has therefore been partially classified as Indicated with the remainder being Inferred according to JORC 2012 (Figure 6).

	Tonnes		Grade			Metal Tonnes		
Classification	Ore Type	Mt	Ni %	Co ppm	Zn %	Ni	Co	Zn
Indicated	Transition Sulphide	0.7	0.96	250	0.52	6,900	200	3,640
	Fresh Sulphide	19.4	1.13	326	0.48	218,900	6,300	93,120
	Total Indicated	20.1	1.12	323	0.48	225,800	6,500	96,760
Inferred	Transition Sulphide	0.9	0.79	239	0.24	6,800	200	2,160
	Fresh Sulphide	37.9	0.87	230	0.32	330,000	8,700	121,280
	Total Inferred	38.8	0.87	230	0.32	336,800	8,900	123,440
Total		58.9	0.96	262	0.37	562,600	15,400	220,200

#### Table 4 - The Jaguar JORC Mineral Resource Estimate (MRE)

\* Within 200m of surface cut-off grade 0.3% Ni; more than 200m from surface cut-off grade 1.0% Ni; Totals are rounded to reflect acceptable precision. Subtotals may not reflect global totals.

Ni% Cut-of	f Grade	Tonnes		Grade			Metal Tonnes	
Surface - 200m	+ 200m	Mt	Ni %	Co ppm	Zn %	Ni	Co	Zn
0.3	1.0	58.9	0.96	262	0.37	562,600	15,400	220,200
0.4	1.0	56.0	0.99	270	0.39	552,200	15,100	217,400
0.5	1.0	49.9	1.05	287	0.37	524,900	14,300	208,100
0.6	1.0	42.0	1.15	311	0.45	481,200	13,100	191,000
0.7	1.0	34.8	1.25	339	0.49	434,500	11,800	172,300
0.8	1.0	28.6	1.36	367	0.53	388,400	10,500	151,200
0.9	1.0	23.8	1.46	394	0.55	347,700	9,400	131,000
1.0	1.0	20.0	1.56	419	0.56	311,100	8,400	111,300
1.1	1.1	16.1	1.68	468	0.60	270,700	7,500	96,200
1.2	1.2	13.0	1.81	526	0.64	235,300	6,900	84,000
1.3	1.3	10.8	1.92	581	0.68	208,100	6,300	74,200

#### Table 5 - The Jaguar JORC Indicated and Inferred MRE at various Ni% Cut-Off Grades\*

Totals are rounded to reflect acceptable precision; subtotals may not reflect global totals.

#### THE JAGUAR NICKEL SULPHIDE PROJECT



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#### Figure 6 - The Jaguar MRE Block Model

Resource Classification, Indicated Resources in yellow and Inferred Resources in green.





#### 2.4 NEAR MINE RESOURCE & EXPLORATION UPSIDE

The JORC MRE for the JNP considers the six Jaguar Deposits and two Onça Deposits. There is significant potential to expand both the shallow and deeper high-grade Resources within the Project via several growth fronts.

#### 2.4.1 Mineral Resource Growth

Drilling in 2021 will focus on the following target areas ahead of the next Resource update expected in Q4 2021 to support planned Pre-Feasibility Study activities:

#### $\rightarrow$ Jaguar Central

- Step-out drilling is planned to test the DHEM conductors and potential down-dip extensions of the high-grade mineralisation shoot; and
- Further drilling is planned along strike and down-plunge to test new DHEM and FLEM conductors to the west and east where drilling on historical sections is wide-spaced (over 100m between holes).

#### $\rightarrow$ Jaguar South

- Step-out drilling is planned to test the DHEM conductors and potential down-dip extensions of the high-grade mineralisation within the main mineralised zones; and
- Drilling is planned along strike to test an interpreted high-grade plunge to the east-northeast, targeting new DHEM conductors.

#### → Jaguar Central North

- In-fill drilling to upgrade the resource category within the Scoping Study open pit limits; and
- Drill the target 'Z-structure', part of a set of newly identified fold axis and high-grade mineralisation shoots at the intersections of the Jaguar Central North Deposit with the Jaguar Central and Jaguar North Deposits;

#### → Jaguar West & Jaguar North-east

• Maiden in-fill and extensional drilling is planned to target historical high-grade zones and EM conductor plates with a focus on potential in-pit resources.

#### $\rightarrow$ Jaguar North

- Step-out drilling is planned to test the DHEM conductors and potential down-dip extensions of the high-grade mineralisation; and
- Drilling is planned along strike to test new FLEM conductors coincident with large ground magnetic anomalies to the northwest and southeast (at the 'Z-structure'), both untested areas.

#### → Onça Preta & Onça Rosa

 Step-out drilling is planned to test DHEM conductors and potential down-dip extensions of the high-grade mineralisation. The Onça deposits are less than 250m from the Puma Layered Mafic-Ultramafic Complex which is interpreted to be the potential source of the hydrothermal nickel, and itself representing an outstanding target for more high-grade nickel sulphide mineralisation.

#### 2.4.2 Exploration Upside

The JNP sits at the intersection of two of the most important mineralising structures in the Carajás Mineral Province, the Canãa and McCandless Faults. There are multiple prospects and targets that have yet to be drill-tested within the JNP, characterised by magnetic and/or electromagnetic (EM) anomalies coincident with significant soil geochemical support.

Detailed soil sampling and FLEM surveys and identified multiple priority drill targets. The first four priority targets to be tested are (Figure 7):

- → The Filhote Prospect A 200m Fixed Loop Electromagnetic (FLEM) conductor plate coincident with a broad (+1.1km) ground magnetic signature and PGE-Ni-As-Cr-Cu soil geochemical anomaly. Recent exploratory holes returned grades of up to 1.3g/t Pd, 0.34g/t Pt and 0.48% N;
- → The Leão Prospect more than 2.5km strike target that hosts multiple GeoTEM, FLEM and ground magnetic anomalies coincident with Ni-Cu-Cr-V-Au soil anomalism. Only three holes have ever been drilled at Leão, with one hole returning 3.0m at 1.06% Ni and 0.21% Cu;
- → The Tigre Prospect a strong discrete (+800m) GeoTEM anomaly coincident with multiple ground magnetic anomalies and supported by a +1.0km continuous Ni-Cr-As-Au geochemical signature. There are no historical drill holes in the Tigre Prospect; and
- → The Puma Contact Prospect a 750m long Ni/Cu anomaly along the southern contact of the Puma mafic-ultramafic intrusive with the basement granite, coincident with a 950m long conductor dipping 78° to the north-northeast and extends down to 500m. This plate is coincident with the southern contact between the Puma ultra-mafic intrusive and the basement granite, an outstanding target for structurally-controlled zones of high-grade nickel sulphide.

RC drilling of the greenfields targets is underway with results expected to be received in Q3 2021. Any new discoveries will be followed up and included in the Pre-Feasibility resource update expected later in 2021.





Figure 7 - The Jaguar Nickel Project – Soils Geochemistry (Ni) over Ground Magnetics (Analytic Signal)





# 3. Production Targets & Mine

The Value-Add Scoping Study for the JNP considers an integrated open pit and underground Production Target estimate of 45.0 Mt at 0.80% Ni for a total of 361,700t of contained nickel metal. The deposits will deliver a Mill Feed of 33.7Mt at 1.01% Ni to a nickel sulphate processing facility at a nominal rate of 2.7Mtpa for 13 years.

Centaurus engaged Australian mining specialist Entech to undertake the Mining and Geotechnical studies for the Scoping Study. Re-Metallica, a Brazilian mining engineering consultancy firm, was engaged to undertake a peer review and advise Entech on local mining productivities and costs.

#### 3.1 OPEN PIT

#### **Pit Optimisations**

Pit optimisations were based on the Indicated and Inferred Mineral Resource categories only. The Mineral Resource models for Jaguar and Onça were re-blocked to a Smallest Mining Unit (SMU) dimension of 5 mE x 4 mN x 5 mR. Re-blocking dilutes out the narrow-modelled lodes from the original MRE into larger blocks resulting in an ore dilution of 22% and ore loss of 17% for the Jaguar Deposits and ore dilution of 37% and ore loss of 19% for the Onça Deposits.

Various pit optimisations were run, and the pit shells derived at conservative nickel prices of US\$13,800/t (Jaguar – Pit 92) and US\$13,500/t (Onça – Pit 90) were selected. These shells were selected to provide the basis for a robust and conservative pit design. In total there are eight (8) open pit mining areas within the Onça and Jaguar deposits, see Figure 8 and Figure 9 below.



**Figure 8** - Selected Optimisation Shells and Proposed Mine Design – Onça Pits

**Figure 9** - Selected Optimisation Shells and Proposed Mine Design – Jaguar Pits



#### **Pre-Operations Preparation**

An initial stage of mine development will prepare the site to ensure the continuity of production during operations.

The focus will be to construct the required access roads from the mine to the process plant, waste dumps, low grade ore stockpiles and the Integrated Waste Landform (IWL) tailings facility. The starting IWL requires 3.58M bcm of waste material to be delivered and compacted in place ahead of the start of processing.

Additionally, the removal of the necessary topsoil and preparation of waste dumps and low-grade stockpiles will be completed. The topsoil will be stockpiled in areas that will allow easy access for future rehabilitation of degraded areas. Pre-strip will be completed by the chosen mining contractor.

#### **Mine Design**

A minimum mining width of 20m was used as a guide to open pit design when dealing with small mining areas within the open pit. Pit floor working areas and "goodbye cuts" at the base of pits respect the same minimum mining width. A bench height of 20m within all fresh material and 10m within all weathered materials was employed for all open pit designs completed for Jaguar and Onça. The haul road width is determined to be 15m wide for a single lane ramp and 25m wide for a dual lane ramp.

Pit exit ramps have been designed to allow access to the ROM-pad area (for high-grade and low-grade material), primary crusher, and the primary waste storage areas including the Integrated Waste Landform (IWL) whilst maintaining a minimum haulage distance. Where possible, ramp development has been restricted to the footwall side of the pit to minimise the strip ratio.

#### **Mining Operations**

All open pit mining operations are proposed to be undertaken by a mining contractor. The mine operations will be run by the mining contractor working from Monday to Sundays (inclusive) in three shifts of eight hours with four operational teams. Results show the best equipment combination to be 45t excavators loading 45t capacity trucks on 5m flitch heights and blasting on a 10m bench height. All the proposed equipment is common in the local Brazilian mining industry.

The mining contractor will also provide all auxiliary support services such as maintenance of roads and accesses, dust control and site drainage. It is expected that the mining contractor will start with roughly 500 employees working on three shifts.

#### Waste Dumps and Stockpile Management

Three waste dumps have been planned, all being designed to be as flat as possible, with one of those being part of the Integrated Waste Landform (IWL) tailings storage facility. The lifts are planned to be a maximum of 10m with berms of 6m. Each lift is constructed at an approximate angle of repose of 33°. The maximum waste dump height will be 90m.





#### 3.2 UNDERGROUND

#### **Stope Optimisations**

Stope optimisations were based on the Indicated and Inferred Resource categories only. Cut-off grades (COG) are based on a Net Smelter Return (NSR) and were determined using NSR revenue, operating costs and processing information provided by CTM, with benchmarked mining costs from the Entech database and publicly available data on mining costs in South America.

Mineable Shape Optimiser (MSO) was used to generate economic stope shapes, based on cut off grades. Two scenarios were run for both the Onça and Jaguar mineral resource models. COGs were rounded to \$50 and \$80. Stope design inputs were from the Entech database and assumed a long-hole open stoping mining method.

Stope Optimiser Parameters	Units	Values
Minimum Mining Width	m	3.0
HW / FW Dilution	m	0.6/0.6
Maximum Footwall Angle	degrees	40
Stope Section Length	m	2.5
Sub-Level Height	m	25
Minimum Interstitial Pillar	m	10
Cut-off Grade	NSR (USD)	50, 80

 Table 6 - Stope Optimisation Inputs

Scenarios were run excluding weathered material and value

generated from material with an unclassified resource class was removed. A summary of the parameters used to generate the MSO shapes is shown in Table 6.

Although positive MSO optimisations were achieved for five separate deposits Centaurus decided to focus only on the underground deposits with more than 10,000t of contained nickel metal. Consequently, the Onça Preta, Jaguar South, Jaguar Central and Jaguar North Deposits were considered for the purpose of the Value-Add Scoping Study.

#### (A) OPTIMISATION RESULTS - ONÇA DEPOSITS

At the Onça Deposit, the MSO \$80 inventory was adjusted by removing material that will either be depleted through open-pit mining or determined uneconomic when considering access development requirements. The resulting inventory was infilled with stope designs generated on the incremental cut-off grade (NSR \$50), constrained to the fully costed cut-off grade boundaries. The resulting inventory was used as the basis of mine design and evaluation.

#### (B) OPTIMISATION RESULTS - JAGUAR DEPOSITS



Figure 10 - Section View - Onça Preta Underground Deposit (Looking North)





Figure 11 - Section View Jaguar South, Central and North Underground Deposits (Looking West)

The Production Target was determined for Jaguar deposits using MSO optimisation in the same manner as the Onça deposits. The resulting inventory was used as the basis of mine design and evaluation, see Figure 11 above.

#### 3.3 MINING OPERATIONS

The proposed underground mining method is top down longhole open stoping. Stopes are extracted in a longitude mining direction from the orebody with levels to be accessed from the hangingwall. To reduce capital development, portals have been designed close to the bottom of the pits.

Declines have been designed using a 1:7 gradient, on the hanging wall side of the orebody, having a 50m stand off from the orebody, and aiming for central access to the orebody for a more efficient mine. Operating lateral development represents ore drives which are driven along strike. Development design definitions are outlined in Table 7.

The underground productivities were based on benchmark data for the proposed mining fleet and are sourced from the Entech database of similar equipment and mining methodology. Productivity rates are shown in Table 8.

Development	Dimension	Profile
Decline	5.5 mW x 5.8 mH	Arched
Escapeway Drive	4.5 mW x 4.5 mH	Arched
Level Access	5.0 mW x 5.0 mH	Arched
Ore Drive	5.0 mW x 5.0 mH	Arched
Escapeway Rise	1.3 m Diameter	Circle
Return Air Rise	4.0 mW x 4.0 mH	Square

Table 7 - Development Profiles and Dimensions

Equipment Description	Max individual Task Rate	Maximum monthly rate
Twin Boom Jumbo	6 m/d	240m/month
50 t Truck	N/A	100,000tkm/month
21 t Loader	1,000 t/d	50,000t/month
Production Drill	180 m/d	5,000m/month
Raise bore Slot (760mm)	4 m/d	90m/month
Charge-up Unit	N/A	N/A
Raisebore	3 m/d	90m/month

Table 8 - Productivity Rates



#### 3.4 INTEGRATED MINE SEQUENCING

The conceptual mine production schedule is illustrated in Figure 12. It has been assumed that mobilisation of the mining fleet will begin in Q1 2024 which is 6 months ahead of first production. This will allow time for the mine contractor to carry out pre-strip and construction of the IWL. The integrated open pit and underground mine scheduling, as set out in Table 9, was carried out targeting the production of approximately 2.7Mt of ROM ore to the crusher per annum.

The high-grade material (>0.6% Ni) goes directly to the ROM stockpile whilst low-grade open pit (0.3-0.6% Ni) material goes to the ore-sorter stockpile. High-grade material is fed to the crushed ore stockpile preferentially over the ore-sorter product.

The underground mines commence once the associated open pits are near completion to allow portals near the pit base, however, no underground mining is scheduled within the first three years of open pit operations. A steady flow of ore is mined and fed to the mill assuming a maximum throughput rate of 2.7Mtpa whilst maintaining ROM stocks of approximately three to eight months of feed.



Figure 12 - Integrated Mine Production Schedule

Calendar Year	Units	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
	Open Pit															
Waste Moved	Mt	239.3	22.2	30.1	32.4	22.3	21.2	23.5	23.6	10.4	10.0	10.7	9.9	10.1	10.5	2.4
Ore Mined	Mt	36.6	2.1	3.8	3.6	4.1	2.2	2.6	3.9	3.3	2.2	2.8	2.5	1.3	1.5	0.7
Nickel Grade	%	0.76	0.78	0.81	0.78	0.82	0.85	0.70	0.74	0.74	0.76	0.70	0.69	0.61	0.74	0.63
	Underground															
Ore Mined	Mt	8.5				0.1	0.4	1.1	0.6	0.5	0.9	0.9	1.1	1.5	1.2	0.1
Nickel Grade	%	1.01				0.88	0.98	1.23	1.18	1.36	1.14	0.82	0.90	0.89	0.92	1.00

Table 9 - Integrated Mine Production Schedule Annual Results



#### 3.5 PRODUCTION TARGET & MILL FEED

The life of mine open pit Production Target, based on the Jaguar and Onça open pits, is 36.6Mt at 0.76% Ni for a total of 276,300 tonnes of contained nickel metal (see Table 10 below). The high-grade ROM (>0.6% Ni cut-off) material component is 20.4 Mt @ 1.02% Ni and the low-grade ore-sorter feed component (0.3-0.6% Ni cut-off) is 16.2 Mt @ 0.42% Ni. The total waste movement from the open pit mining operation is expected to be 239.3Mt at a strip ratio of 6.5:1 during the life of mine (including pre-strip waste material).

The life of mine Production Target for the Jaguar South, Jaguar Central, Jaguar North and Onça Preta underground operations is 8.5 Mt at 1.01% Ni for a total of 85,400t of contained nickel metal.

The total Production Target for the JNP is 45.0Mt at 0.80% Ni for a total of 361,300 tonnes of contained nickel metal. Approximately 52% of the contained nickel metal in the Production Target is in the Indicated Resource Category. Importantly, 83% of the first three years of operations are in the Indicated Resource Category.

The low-grade open pit ore-sorter feed will be processed by an ore-sorter circuit at the ROM. The ore-sorter product, estimated at 4.8 Mt @ 0.98% Ni, will be fed to the crushed ore stockpile. The ore-sorter reject will be back-loaded to waste deposits.

The integrated open pit and underground mill feed for the JNP is 33.7 Mt at 1.01% Ni for a total of 341,300t of contained nickel metal, see Table 10 below.

Mining Method	Material Type	Resource Category	Ore Mt	Ni %	Ni Metal kt
Open Pit	High-grade	IND	12.8	1.09%	140.2
	> 0.6% Ni	INF	7.6	0.90%	68.1
		Mill Feed	20.4	1.02%	208.3
	Low-grade	IND	7.2	0.42%	30.2
	0.3-0.6% Ni	INF	9.0	0.42%	37.8
		Total	16.2	0.42%	68.0
		IND	20.0	0.85%	170.4
		INF	16.6	0.64%	105.9
Open Pit Production Target		Total	36.6	0.76%	276.3
Underground		IND	1.4	1.30%	17.6
		INF	7.1	0.96%	67.9
Underground Production Target		Mill Feed	8.5	1.01%	85.4
		IND	21.4	0.88%	187.9
		INF	23.7	0.73%	173.8
Total Production Target		Total	45.0	0.80%	361.7
Ore-sorter Product*		Mill Feed	4.8	0.98%	47.3
LOM Mill Feed		Total	33.7	1.01%	341.3

\*Ore-sorter product is processed pre-concentrator from open pit low grade material

Table 10 - Production Target & Mill Feed Estimation

4. Metallurgy

The key metallurgical goal of the Value-Add Scoping Study was to investigate and test the viability of producing a relatively low nickel grade bulk sulphide concentrate through a conventional flotation process and further processing this concentrate into a high value nickel sulphate product.

#### 4.1 ORE CHARACTERISATION

To date 105 mineralogical composites reflecting over 1,300m of diamond core drilling from within the significant ore zones have been selected (56 from Jaguar South, 7 from Onca Preta, 27 from Jaguar Central and 15 from Jaguar North) for testing. The composites are comprised of ½ NQ drill core sourced from CTM's drilling campaigns with the samples selected packed and air freighted to Perth. These samples are the basis of the mineralogical understanding of the JNP. Each composite has been analysed with a combination of some or all the following analytical techniques:

- → Comprehensive assaying adopting the same assay protocol as the geological block model with water soluble nickel, non-sulphide nickel, fluorine, chlorine and silica added to the assay suite;
- → Xray diffraction (XRD) quantitative mineralogy to determine the nature of the minerals and their relative concentrations;
- $\rightarrow$  Microprobing of minerals for trace element determination;
- Optical mineralogy to understand texture, grain size and mineral associations for metallurgical performance estimations; and
- → Comminution testing (SMC, BWi and Ai) of composites to evaluate the scale and energy requirements of the different ore types to achieve test work metallurgical outcomes.

A general summary of the ore characteristics of the main individual deposits are outlined below:

#### **Jaguar South**

- → Grain size of the nickel sulphides (3:1 millerite to pentlandite) is coarse suggesting a modest 75µm grind should be targeted.
- → The ore in this zone is the hardest and will determine the milling circuit design.
- $\rightarrow$  Biotite, chlorite and quartz makeup ~60% of this zone.
- → Iron sulphides (in particular pyrite) has the lowest concentration of all zones tested (less than 5%).
- $\rightarrow$  Talc levels are minimal at less than 1%.
- $\rightarrow$  Iron oxide (magnetite) concentrations in this zone are ~5%.

#### **Jaguar Central**

- → Grain size of the nickel sulphides (almost entirely millerite) is very coarse suggesting a modest 75µm grind is acceptable, as per the recommended grind size for Jaguar South.
- → The ore hardness in this zone does not influence the milling circuit design.
- → Biotite, chlorite and quartz have similar compositions to those of Jaguar South (~53%).
- → Iron sulphides (in particular pyrite) is similar to Jaguar South (7%).
- $\rightarrow$  Talc levels are more significant than Jaguar South at ~4%.
- → Iron oxide (magnetite) concentrations in this zone are similar to Jaguar South (7%).

#### **Jaguar North**

- → Grain size of the nickel sulphides (almost exclusively millerite) is very coarse indicating a grind of 75µm is acceptable, as per the recommended grind size for Jaguar South and Jaguar Central.
- → As with Jaguar Central the ore in this zone will not influence the design of the milling circuit.
- → Biotite, chlorite and quartz are one-third of the levels identified in Jaguar South and Jaguar Central (22%).
- → Iron sulphides (mainly pyrite) is similar to both Jaguar South and Jaguar Central (5%).
- → Talc becomes more significant at Jaguar North at ~8% concentration.
- $\rightarrow$  Iron oxide (magnetite) concentrations increase (25%).



#### **Onca Preta**

- → Grain size of the nickel sulphides (mainly pentlandite) is similar to Jaguar South reconfirming that a 75µm grind is suitable.
- → The ore in this zone, like Jaguar Central and Jaguar North, will not influence milling circuit design.
- $\rightarrow$  Biotite, chlorite and quartz are similar to Jaguar North (22%).
- $\rightarrow$  Pyrite concentrations are the highest of all zones tested (9%).
- $\rightarrow$  Talc concentrations are similar to Jaguar Central (8%).
- → Iron oxide (magnetite) levels are highest in this zone making up 50% of the ore zone.

#### 4.2 ORE SORTING TESTING

Within the Jaguar ore deposits the high-grade mineralised zones are part of a broader mineralised system which contains lenses of narrower equally high-grade mineralisation. When the minimum mining block size estimations are coupled with the mining recovery and dilution adopted for the resource, this type of material is consequently diluted resulting in lower block grade values.

Ore sorting has been considered as it is a commercially validated process that can concentrate these lower grade mining blocks resulting in products with similar grades to the high-grade mineralisation. This has significant advantages including;

- · the processing capacity can be reduced,
- the tailings volume produced will be less,
- significantly less potentially acid forming waste will be created for surface disposal, and most importantly
- the risk of mining dilution on process plant feed grade will be reduced.

Pilot testing of low-grade (0.47% Ni) samples was carried out at Steinert's ore sorting facility located in Perth, Western Australia. Testing included trialing of different sorting sensors (inductive and x-ray) and programming settings to allow mass recovery to metal recovery relationships to be developed. The results are tabulated below (Table 11).

	Mass (%)	Nickel Grade (%)	Nickel Recovery (%)	Sulphur Grade (%)	Sulphur Recovery (%)
Feed		0.47		0.36	
High Grade Test	25.1	1.23	65.2	1.09	73.5
High Recovery Test	68.3	0.66	95.3	0.52	99.0
High Recovery Tailings	31.7	0.07	4.7	0.01	1.0

Table 11 - Ore Sorting Results

Modelling of the data generated from the pilot testing allowed a mass recovery curve to be developed. For the purposes of this study, Centaurus has selected a mass recovery of 30% for the low-grade mining blocks providing a total nickel recovery of ~70% and a nickel sulphide recovery of ~79% for inclusion in the production schedule. Likewise, cobalt recovery has been reviewed with a recovery of ~71% applied to the product generated from the ore sorting process. More detailed testing in future studies is planned.

#### 4.3 FLOTATION TESTING

Flotation test work has been completed on five composites from the main deposits (adopting a conventional grind and float flowsheet). The objective of this test work was to produce a high sulphur recovery concentrate with the ensuing concentrate being predominately sulphides of varying nickel grades. Recoveries are expected to improve with cleaner tests. Figure 13 illustrates the sulphide nickel responses of the rougher tests of the various composites.

The results align with the mineralogy, in that the nickel sulphides are fast floating and high initial grades can be expected, particularly with the Jaguar Central and North composites containing millerite as the dominate nickel sulphide.

The non-sulphide nickel content of the individual orebodies is variable across the deposits and has been estimated from the non-sulphide nickel assays collected from mineralogical investigations. The resultant non-sulphide nickel relationship (Figure 14) has been developed on material below the oxidisation layer in fresh ore.

The resultant analysis has determined even though the Jaguar zones have differing non-sulphide gangue minerals and variable nickel concentrations within these gangue minerals, a relationship between the percentage of non-sulphide nickel of a sample and the total nickel grade of the sample is able to be modelled. The modelling indicates the Jaguar ore zones appear to have good correlation to each other, however, the Onca ore tested, due to its different deposition environment has lower levels of non-sulphide nickel present for a given nickel grade.

Table 12 summarises the sulphide nickel recoveries of each ore zone tested. These composites have higher than modelled non-sulphide nickel (and resulting total nickel recoveries) due to the inclusion of some metallurgical sub-samples being derived from within the transition and oxide (shallow) zones of the respective ore zones. Examining the tabulated data below the simple bulk rougher flotation flowsheet selected can achieve high nickel sulphide recoveries at suitable nickel grades for further site-based processing.

Deposit	% Ni Feed	% Non- sulphide Ni in Feed	Sulphide Ni Recovery	Total Ni Recovery
Jaguar South	1.03	0.14	95%	82.1%
Jaguar Central	1.03	0.16	95%	80.2%
Jaguar North	0.86	0.14	95%	79.5%
Onça Preta	1.28	0.12	95%	86.1%

Table 12 - Scoping Study Recovery Estimation Summary



#### THE JAGUAR NICKEL SULPHIDE PROJECT



#### Nickel Sulphide Grade - Recovery Relationship

Figure 13 - Rougher Floatation Results

#### NSNi Relationship



Figure 14 - Non-Sulphide Nickel Estimation



#### 4.4 HYDROMETALLURGICAL TESTING

Hydrometallurgical testing was completed to determine if a high sulphide concentrate produced from a traditional base metal flotation circuit could be successfully leached to extract nickel into solution. The proposed flowsheet included oxidation, neutralisation, solid/liquid separation, solution impurity removal, production of an intermediate high value mixed metal sulphide and nickel sulphate crystallisation. These unit operations have so far been developed from existing design data available from commercial operations. This process flowsheet add-on has numerous advantages compared to production of a bulk sulphide concentrate including:

- → Allows the flotation circuit to maximise nickel, cobalt and zinc recoveries through targeting high sulphur recoveries at lower concentrate grades (in comparison to the Base Case whereby final grade and recovery need to be jointly considered).
- → High-quality nickel sulphate products attract higher nickel equivalent values compared to sulphide concentrates;
- → Nickel sulphate is likely to attract a premium of at least US\$1,000/tonne over the LME nickel metal contract value;
- → Centaurus expects rising demand for nickel sulphates from the ongoing electrification of industry and the growing demand for key battery metals;
- $\rightarrow$  Eliminates the risk of potential concentrate payability issues;
- $\rightarrow$  Trucking and shipping volumes are reduced; and
- → Importantly, the combined residue from both the flotation and hydrometallurgical processes have orders of magnitude fewer sulphides present compared to a conventional sulphide concentrate project, further reducing the potential environmental impact of the surface storage of the tailings.

Testing of both atmospheric and pressure leaching (POx) was completed to determine the appropriate leaching method to be studied. The testing was conducted on a blend of flotation concentrates sourced from Onça Preta and Jaguar South Deposits.

The testing concluded (Table 13) that pressure leaching clearly provided the best extractions for nickel, copper and cobalt (+99%) and therefore this process was selected for the study. This process testing was followed by four (4) additional larger scale POx tests confirming previous metal extractions and sulphur extractions.

In addition to further pressure oxidisation testing, additional testing, as set out below, has been planned to confirm the flowsheet:

- → Neutralisation and impurity reduction testing prior to solvent extraction stages;
- → Solvent extraction testing;
- → Mixed precipitate confirmation testing;
- → Nickel sulphate crystallisation confirmation testing;
- $\rightarrow$  Investigating the value of adding copper into the MSP;
- → Investigating if there is value in separating copper, cobalt and zinc within the MSP into multiple products or specifications; and
- → Completing a technical and economic evaluation of producing fertiliser by-products (ammonia sulphate).



**Figure 15** - Jaguar Nickel Sulphide Pressure Oxidation images. The POx residue material would be sent to tailings. The green POx nickel solution will be crystalised to produce a nickel sulphate product



Table 13 - Preliminary Leach Selection Results



# 5. Process Plant

#### 5.1 PLANT DESIGN

The JNP process facility has been designed to treat 2.7Mtpa of ore in a flotation concentrator with an additional hydrometallurgical process to produce nickel sulphate hexahydrate crystals and a mixed sulphide precipitate (MSP) of cobalt, zinc and nickel. The proposed process plant flowsheet design was based on commercially available unit operations.

ROM high and low-grade ores are crushed through two (2) separate crushing circuits with the low-grade ore further processed via an X-ray ore sorting circuit to remove waste from the low-grade ore. The crushed and stockpiled ore is ground in a SAG mill and Ball mill circuit including pebble crushing (SABC) with a grind size P80 of 75  $\mu$ m.

The ground slurry is conditioned with reagents and processed in a rougher and scavenger flotation circuit to produce a, low grade/high sulphur recovery concentrate that is thickened and stored in agitated tanks providing a 72-hour buffer to the downstream (POx) operations. The tailings is thickened and disposed of in a purpose-built tailings storage facility.

The flotation concentrate is pressure leached with oxygen (1 hour residence time at 30bar pressure and temperature of 220°C) and the pressure leached slurry returns to atmospheric pressure via a flash vessel, including off-gas scrubbing, and this slurry is neutralised with limestone to remove some solution impurities. The partially neutralised slurry is later "washed", the solution is separated from the solid residue in a  $\delta$ -stage counter current decantation circuit (CCD), the washed solution further neutralised to remove additional solution contaminants and the waste directed to the flotation tailings stream.



Figure 16 - Nickel Sulphate (Value-Add) Flowsheet



The purified solution (containing nickel, cobalt, and zinc) is processed in a solvent extraction circuit to preferentially extract cobalt and zinc from the solution with nickel remaining in solution. The extracted cobalt and zinc are finally stripped, washed, precipitated, filtered and bagged in 2t bags as an intermediate mixed sulphide precipitate (MSP).

The solution, containing primarily nickel, is pumped to a further solvent extraction (SX) stage that preferentially extracts the nickel from the solution. The extracted nickel is stripped and washed; the high grade, high purity resultant nickel solution is evaporated in a draft tube crystalliser that concentrates the solution (growing ~2mm, 99.5% nickel sulphate hexahydride crystals). These nickel sulphate crystals are continuously harvested, filtered and finally bagged for sale.

From operational year 4 underground activities require a 40,000m<sup>3</sup> per month paste backfill plant. The addition of paste backfill underground has many benefits, allows greater extraction of ore from underground, improves the stability/safety of underground mining and reduces the amount of tailings stored in the IWL. The paste backfill plant is designed to filter live tailings (up to 30% of the process production), mixing this material with a cement binder and depositing this material in exhausted underground stopes.

A simplified flowsheet for the flotation and hydrometallurgical processes are displayed in Figure 16 with notable design output values summarised in Table 14.

Average Annual L	.0M Metrics	Units	Value
Concentrate Thro	ughput	tpa	266,000
Concentrate	Nickel	% Ni	8.10
Feed Grade	Copper	% Cu	0.56
	Cobalt	% Co	0.22
	Zinc	% Zn	2.46
Nickel Sulphate	Nickel Grade	% Ni	22.3
Production	Nickel Recovery	% Ni	94.2
	Tonnes	tpa	91,000
MSP Production	Nickel Grade	% Ni	2.3
	Nickel Recovery	% Ni	1.1
	Cobalt Grade	% Co	5.4
	Cobalt Recovery	% Co	95.0
	Zinc Grade	% Zn	59.3
	Zinc Recovery	% Zn	95.0
	Tonnes	tpa	10,500

**Table 14**- Summary of Hydrometallurgical Performance





#### 5.2 GLOBAL USE OF PRESSURE OXIDATION (POX)

Whilst there are numerous examples of POx autoclaves operating around the world the vast majority are in gold operations with ores that are highly refractory and therefore are not overly analogous to the key consideration for their use at the Jaguar Nickel Project.

These refractory gold operations oxidise the sulphide present to "free" the gold for traditional CIL leaching of gold. Examples of these circuits are Lihir in PNG (46Moz reserve) and Pueblo Viejo Mine in the Dominican Republic (6.55Moz in reserve producing 500koz/yr). These operations are only viable due to the following metrics; long mine lives, increased precious metal recoveries which significantly increase annual revenues, low neuralising costs, lower (compared to Australia) labour costs, and lower unit power costs.

There are only a few examples of POx autoclaves being used in the nickel industry, most notably Harjavalta in Finland, which has been leaching nickel/copper/cobalt mattes for more than 20 years (similar chemistry although a higher-grade sulphide intermediary to that of Jaguar concentrate), Murrin Murrin in Western Australia (operating for more than 15 years), Vale's Long Harbour refinery in Newfoundland, Canada and a recent project, Terrafame, also in Finland.

The scarcity of site-based nickel value-adding projects is not due to the technical or chemistry complexity (the separation of these elements has been well understood for +20 years) but rather a result of the underlying economics combined with the low overall demand for nickel salts. The more recent interest in producing higher value nickel products on mine sites has been driven by the anticipated demand from the EV sector and therefore the additional revenue and margin that can be achieved when selling a nickel sulphate product to this EV market compared to cost (payability factor) of selling a nickel concentrate product to traditional nickel smelters.

Despite the increased margin for nickel suphate products, the fundamental underlying economic constraints of committing

additional and significant capital to implement sulphate production processes still exist, usually due to high operating costs (labour, power, and neutralising costs) that significantly reduce the incremental revenue to a level that makes the return on investment too low (or negative) to justify the capital risk.

These impediments do not apply to the Jaguar Nickel Project with its mine life of more than 13 years, low-cost renewable power (hydro and solar), low-cost neutralising limestone and a low-cost labour force of highly trained operational personnel (compared to Australia).

There are, however, some very large, low-cost nickel sulphide operations world-wide that could adopt this technology (Norilsk, Vale and Jinchuan for example), however, these operations/provinces are not generally incentivised to do so given the jurisdictions have all already committed significant capital to build nickel smelters and refineries. There is no immediate economic incentive for these existing operations to change current products/processes.

BHP Nickel West is currently commissioning a nickel sulphate crystallising plant at Kwinana, south of Perth WA, treating a fraction of the solution generated from their matte leaching process to produce 100,000t (22.3kt nickel in sulphate).

#### 5.3 PLANT PROCESSING PROFILE

The treatment profile for the Value-Add Scoping Study was developed to process 2.7Mtpa run-of-mine ore, equivalent of 225,000t per month or up to 22,300 tonnes of nickel in sulphate per annum.

High-grade ROM feed from open pit and underground operations represents 86% of the mill feed and the schedule is modelled to preferentially treat this material in preference to ore-sorted feed. This option creates an operational schedule at a relatively constant feed grade for 13 years, as illustrated in Figure 17.



Figure 17 - Tailings Storage Facility and Mine Waste Stockpile Locations



### 6. Mine Site Infrastructure & Services

The JNP process plant location was selected by CTM based on the current pit layout with the aim of minimising earthworks and taking advantage of the local topography. The location of the Tailing Storage Facility (TSF) was selected by CTM to minimise the tailings pumping duty using a single stage of centrifugal pumping, and to ensure natural water flows in the area were not impeded.

#### 6.1 TAILINGS STORAGE FACILITY

Tailings expert Mr Chris Lane of L&MGSPL supported the Company in the completion of the conceptual tailings design study. An Integrated Waste Landform (IWL) was selected as it meets world's best practice; achieving the highest safety factors of any TSF design through using mine waste appropriately, minimising disturbance areas, allowing for reliable long-term storage of potentially acid forming waste and allowing for significant rehabilitation prior to closure. Due to permitting requirements, the Company is proceeding with the detailing of this design for inclusion in the approval process.

- $\rightarrow$  Up to 25.3Mt of ore being milled from open-pit mining.
- → Up to 8.5Mt of ore being milled from underground mining.
- $\rightarrow$  90% of underground stope void will be backfilled with tailings.

Using the above criterion and assumed settled density of 80% solids, the volume storage requirement of the project is 14.8Mm<sup>3</sup>. Including both the designed TSF and tailings deposition in an available, completed open pit (Jag West of 6Mm<sup>3</sup>), 19Mm<sup>3</sup> of tailings storage volume has been identified (+25% additional volume over current requirements).

DRA has completed a preliminary design of an IWL tailings facility using conservative, Western Australian, design principals:

- → Upstream wall slope 2.5H:1V.
- → Downstream wall slope 3.5H:1V.
- → Crest of wall 56m of compacted/select fill waste (plus an internal clay liner).





#### 6.2 ACCESS ROAD

The study has identified that the 40km access road between Tucumã and the project site requires upgrading. The site access road upgrade scope will be a combination of upgrading existing municipal roads and a section of new road into the JNP infrastructure area. These upgrades will improve the road surface and drainage to facilitate reliable transport of consumables/equipment, and the safe transiting of personnel to and from site.

#### 6.3 POWER

Power will be supplied to site by a 138kV transmission line (approximate length 39km) which is connected to the national energy grid at Tucumã (see Figure 19) to the JNP. The 138kV power will be reduced to 13.8kV and reticulated to the high voltage sub-station that reticulates the power to high voltage loads (i.e. Mill Motors, Oxygen Plant Compressors and underground mine ventilation fans) and various step-down transformers distributed around the JNP. The 13.8kV power will be distributed around the site via a combination of above ground aerials and direct buried cables as required.

#### 6.4 NON-PROCESSING INFRASTRUCTURE

Allowance for the following non-processing infrastructure has been included within the study:

- → Gatehouse/security facilities;
- → Administration building;
- → Training buildings;
- → Laundry, change house and ablution facilities;
- → Control room and communication infrastructure;
- → Crib/meal and restaurant facilities;
- → Emergency services (firefighting and medical) buildings and equipment;
- → Workshops and warehouse;
- → Laboratory;
- → Reagent stores; and
- $\rightarrow$  Mining magazines and emulsion plant.

Other allowances include:

- → Temporary facilities specific to implementation activities;
- → Mobile plant required to support the process plant operations (excluding mining vehicles and earthmoving equipment);
- → Water supply for construction and operations. These have been designed to source water from the local river and distribute to all processes and infrastructure areas within the project;
- $\rightarrow$  Solid waste temporary storage; and
- $\rightarrow$  Potable and waste water treatment plants




# 7. Project Implementation

A preliminary construction schedule was developed for the project based on an Engineering, Procurement, Construction, and Management (EPCM) basis for all aspects of the project.

The schedule indicates an overall duration of approximately 15 months from commencement of construction to the practical completion of the project prior to commissioning and ramp-up. Lead times for critical long-lead items were confirmed from equipment suppliers. Other equipment package lead times were based on similar previous projects. Twenty four months have been allowed for the DFS, including all reserve drilling and to complete front-end engineering design (FEED), attaining all commercial pricing and financing.

To deliver and implement the most cost-effective project, the Value-Add Scoping Study has identified that it is critical that early FEED works are completed (including designing/specifying and procurement some major equipment components with extended lead times) within the study phase. Metso/Outotec has completed scoping level budgetary pricing and lead time estimates for the equipment identified in this study, based on their recent in-country experience.

Environmental approvals remain on the critical path with the Installation Licence (LI) required before construction can commence. The LI is presently targeted for the end of Q1 2023, such that construction can commence in Q3 2023.



# 8. Operations & Human Resources

Once in operation, the Jaguar mine will require a total of 250 direct staff. Most of these staff have been assumed to be located in the local towns of Tucumã or Ourilândia do Norte or recruited from the surrounding Carajás Mineral Province. Training of the unskilled work force will occur during the construction and project implementation phase. The mine operations will be run by the mining contractor and work from Monday to Sundays (inclusive) in three shifts of 8 hours with 4 operational teams. The mine contractor work force is expected to vary between 300-500 people.

The processing department, the largest direct employer of personnel, will work the industry standard 8 hour shifts with 4 operational teams, with a workforce of 165 people. The administrative and technical services workforce is estimated to be 80 people and will work 44 hours per week, according to Brazilian labour laws.



# 9. Environmental & Mining Approvals

The key approvals for the JNP are the Mining Lease Grant from ANM (National Mining Agency) and the Environmental Approvals that are a three (3) stage approval process from the State Environmental Agency (SEMAS). The process to source these licences/ approvals and some other considerations are set out below:

#### 9.1 MINING LICENCE (PAE – PLAN OF ECONOMIC ASSESSMENT)

The JNP comprises one Exploration Lease (EL), 856.392/1996, that covers an area of 30km<sup>2</sup> which has a valid Mining Lease Application (PAE). The license is 100% owned by Aliança, a wholly owned Brazilian subsidiary of CTM.

The current PAE, which envisaged a large bulk-tonnage open pit mine and processing plant, was lodged with the Brazilian Mines Department (ANM) in March 2013 and is currently pending approval. The Company will lodge an updated PAE in Q2 2021 based on the findings of the Value-Add Scoping Study. The ANM can grant the Mining Lease only after the Company has received the Installation Licence (LI) from the State Environmental Agency (SEMAS).

## 9.2 ENVIRONMENTAL LICENCES

#### **PRELIMINARY LICENCE (LP) APPROVAL**

The Preliminary Licence is the key environmental approval required for the Project and takes the most time to secure. The application for the LP comes from the lodgement of an Environmental Impact Assessment (EIA/RIMA).

The lodgement of the EIA/RIMA is planned for Q2 2021. All of wet and dry season environmental studies (water, flora, fauna, air quality, noise, archaeology, malaria etc) are completed with lodgement awaiting technical information from this Scoping Study.

Approval of the LP demonstrates that the Pará State considers the overall project definition to be socially and environmentally sound and can go ahead. The LP is also the main license required by project financiers. It is expected that SEMAS will take ~12 months to approve the EIA/RIMA from the time it is lodged and this approval will grant the Company the LP.

#### **INSTALLATION LICENCE (LI) APPROVAL**

In order to make application for the Installation Licence (LI), the Company is required to lodge an Environmental Control Plan ("RCA/ PCA") document with SEMAS and this will be done as soon as the LP is approved. The RCA/PCA report also has more detail of the environmental programs that flow from the plant layout, particularly in relation to emissions and pollution control and also covers how flora/fauna will be managed during the operations phase.

The approval of the RCA/PCA and LI grant allows project construction to commence. It is expected that SEMAS will take ~9 months to approve the RCA/PCA and grant the LI. The LI is therefore expected to be approved by the end of Q1 2023 at which point construction is able to commence, though actual construction commencement is targeted for Q3 2023. All pre-strip, mine preparation activities and plant commissioning can also commence under the LI approval

#### **OPERATING LICENCE (LO) APPROVAL**

Once the project is built, an inspection of the project by SEMAS officers is required to ensure the plant was built in accordance with the specifications advised to SEMAS during the LI Process. It is the final approval to start commercial production. Approval will grant the Company its Operational Licence (LO). Construction is expected to take 15 months from the commencement of work and therefore the LO is expected to be granted in Q4 2024. Once the LO is issued commercial production from the plant can occur.



Figure 20 - JNP Project ANM and SEMAS Approvals Process



# 10. Social Responsibility & Sustainability

Centaurus has operated in Brazil for more than 13 years and understands the importance of social responsibility. The Company is integrating all the social issues (which have been defined by the industry as Environmental, Social and Governance issues), into an overall risk management strategy across all operations.

## **10.1 LOCAL EMPLOYMENT**

The Jaguar Project is located 40km from local towns of Tucumã or Ourilândia do Norte, with a combined population of ~70,000 people. The workforce will be mainly sourced from the local population that reside in these towns, supplemented by experienced external operational and technical staff as required. The project will have a positive social impact by providing additional job opportunities and training in mining skills. The JNP will create an estimated 1,000 construction jobs and then maintain an operational workforce of circa 250 company employees and approximately 500 mining contractors for the 13-year operational duration. This will not only provide direct employment, but will also stimulate the local economies creating a number of indirect employment and business opportunities. The project will also bring royalties and tax incomes to the municipal and state governments.

More than 90% of the workforce currently working on the project, including employees and outsourced labour, are from the south eastern region of the State of Pará.

## **10.2 COMMUNITY INITIATIVES**

Centaurus has partnerships with the two villages closest to the project site in order to improve their sanitation systems, including waste disposal, water supply and sewage treatment. Furthermore, the Company has carried out the construction of bridges, installation of culverts and upgrade of road between Tucumã and the site. The upgrade is planned to continue during the upcoming dry season (June – Nov 2021).

## **10.3 COVID RESPONSE**

Centaurus has taken a number of important steps to safeguard the health and safety of the Company's workers, their families and the wider community while at the same time maintaining business continuity during the COVID-19 pandemic.

These include the introduction of a number of new protocols, revised working arrangements and social distancing practices as well as making a significant contribution to the local municipal health services of Tucumã and São Félix do Xingu through the purchase of masks, gowns, hand sanitiser and COVID-19 test kits to better equip them for the delivery of health services into their respective communities whilst COVID-19 remains active.

A nurse dedicated to the management of the Company's COVID-19 activities test employees routinely and any personnel who are feeling unwell or showing COVID-19 like symptoms. A dedicated site camp for field employees to stay during the course of the working week has been established, enhancing social distancing measures by limiting employee contact with the broader community during the working week.

To date, COVID-19 has had relatively minimal impact on the Company's operations and the tight protocols adopted by the Company have been highly effective in managing the risk of transmission.

# **11.** Product Logistics

The nickel sulphate hexahydrate and MSP products are filtered, dried and bagged (2t) for transport. Considering the estimated production volume of these products, the logistic alternatives between the JNP and ports have been reviewed. For local haulage transportation there are two port load-out possibilities:

- → Vila do Conde; located 903km from the Project site. This port is a well-organized industrial port, with ample area which can be leased directly from the port authority or from other third parties. The products would have to be trucked the whole distance.
- → Itaqui Port (São Luís); this would require access to Vale's rail infrastructure (Parauapebas, ~250km via road).



For the Value-Add Scoping Study, the Company has allowed for the transportation of the products from JNP to the Vila do Conde port, shown in Figure 21, where the products would be loaded on to export vessels using a containerised solution for the nickel sulphate and MSP. This methodology is applicable for use in either port in the future. Access to Vale's rail infrastructure will be explored in future studies.



# 12. Market & Nickel Pricing Assumptions

## **12.1 NICKEL MARKET**

Nickel is mainly used in the production of stainless steel and other alloys and can be found in food preparation equipment, mobile phones, medical equipment, transport, buildings, power generation and increasingly in battery usage. The current size of the nickel market size is approximately 2.5Mtpa with overall nickel use growing at an annual rate of 4% over the last decade.

Nickel demand for batteries has grown fourfold in the 6-year period from 2012 to 2018, with the growth occurring from a low base of approximately 33,000tpa or 2% of the market. Scenarios for the increased rate of adoption of electric vehicles (EVs) conservatively forecast required additional nickel volumes of between 750,000 tonnes and 2 million tonnes per annum.

Nickel demand from EV use will far exceed nickel production from existing operations in any scenario of EV adoption.

EV nickel demand requires Class-1 nickel principally provided by sulphide projects and as well as laterite projects using HPAL. NPI production typically provides nickel for stainless steel production.

Importantly, sulphide projects have carbon footprints significantly lower than HPAL and NPI Projects which will drive end users of Class 1 nickel to seek out sulphide nickel where it is available. The forecast rapid increase in the adoption of electric vehicles and the growing importance of battery technology will logically drive increased demand for higher purity nickel. Stated government policy in relation to renewable energy and EVs and strategic targets for EV production set by global automotive manufacturers all support this paradigm.







### **12.2 NICKEL PRICE ASSUMPTION**

Figure 23 shows the historical LME nickel price for the 10-year period from 2010 to 2020. The nickel price closed the 2020 year at US\$16,540/tonne and is presently around US\$17,000/tonne.



Figure 23 - Historical Nickel Price

Global stimulus spending has resulted in strong demand for stainless-steel, while forecasts of stronger and quicker uptake of electric vehicles in the future continues to firm support for the view of a positive outlook for Class 1 nickel, particularly nickel sulphate that is proposed to be produced at Jaguar under this study option.

The JNP Value-Add Scoping Study assumes a nickel sulphate price of US\$17,632/tonne. This assumption is based on a conservative (especially when referenced against a number of major investment bank nickel price forecasts for the middle of the decade) estimate of the LME nickel price of US\$16,530/tonne (US\$7.50/lb) from the time of planned first production from Jaguar in the second half of 2024. In addition to the LME price assumption (which was the same price assumption used in the Jaguar Base Case Scoping Study), a conservative sulphate premium of US\$1,102/tonne (US\$0.50/lb) has been applied to arrive at the nickel sulphate price assumption for this Value-Add Scoping Study.

The sulphate premium being applied is less than the current estimated cost of producing nickel sulphate by dissolving nickel briquettes in acid, a significant likely source of nickel sulphate if more nickel sulphide mines are not developed.

## **12.3 JAGUAR PRODUCTION**

#### **Nickel Sulphate Product**

The Jaguar project is forecast to produce up to 100,000 tpa of nickel sulphate hexahydrate (99.5% purity) over the life of the project (13 years) for a total of 262.1kt of contained nickel in sulphate at an average annual production rate of 20,300t of nickel in sulphate, see Figure 24.

#### **Mixed Sulphide Precipitate Product**

The indicative specifications of Jaguar MSP are summarised in Table 15.

Metal	MSP Grade	Payability
Zinc	59.3%	85%
Cobalt	5.4%	30%
Nickel	2.3%	Nil
Copper	0.1%	Nil

 Table 15 - Jaguar Average LOM MSP Concentrate Specification

The Company anticipates that it will sell the MSP in its current form to zinc smelters, either in Brazil or in the international markets. The payabilities applied in the Scoping Study economics are both consistent with other known zinc rich and iron deficient sulphide precipitates and standard zinc sulphide concentrate terms which are indicatively 85% payable subject to a minimum deduction of 8 units. Given the zinc smelters can and do recover cobalt in the form of a cake and the cobalt content in the Jaguar MSP is significant, it is reasonable to assume a payability of 30% for cobalt.

The Company will investigate further processing of the MSP during the DFS phase of work and investigate whether it is economic to prepare two MSPs, one for cobalt/copper and one for zinc to further enhance the economics of the project.

#### Offtake

Under the terms of the Jaguar Sale and Purchase Agreement (SPA), Vale have a first right to 100% of offtake from the Jaguar project priced on an arm's length basis. This feature of the SPA provides some measure of offtake risk mitigation. Notwithstanding this, the Jaguar nickel sulphate products will be highly sought-after, given the growing demand from the EV battery market, resulting in a low marketing risk to the JNP.

Sulphide logistic terms have been assumed to also be applicable for nickel sulphate; CIF delivery with the seller meeting the costs of transport and discharge to the buyer's port and insurance. An allowance of US\$70/tonne of nickel sulphate has been provided for these costs.



Figure 24 - Nickel in sulphate



# 13 Capital Cost Estimate

## **13.1 PRE-PRODUCTION CAPITAL**

The pre-production capital cost estimate developed for the JNP includes costs associated with the procurement, construction and commissioning required to establish the project facilities prior to achieving commercial production.

The capital cost estimate has been completed by Entech (Mining operations) and DRA (Process plant and infrastructure) with CTM input where necessary. Formal enquiries to several process plant suppliers based on technical and commercial scope of works support the estimate. Table 16 summarises the total project capital costs including direct costs, indirect costs and contingency required prior to the commencement of commercial production.

#### Pre-strip, TSF, Waste Dump & Mine Access

No capital has been included for mining fleet as the operation is proposed to be undertaken by a mining contractor. Costs for pre-strip waste removal and development of the TSF are included. The initial lift of the TSF requires 3.58M bcm of waste which will be taken from the pit area pre-strip at a total cost of US\$32.9M. The mining contractor will also establish the pits, waste dumps and site haul roads.

The same mining contractor would be responsible for the pre-operation's infrastructure earthworks including the preparation for the contractor facilities, plant and weighbridge sites.

#### **Processing and Non-Process Infrastructure**

The nickel sulphate processing and non-processing capital cost estimate is presented in first quarter 2021 United States dollars (US\$) to an accuracy of ±40%. The estimated capital cost for the Jaguar Nickel process plant and process plant infrastructure has been produced using a priced mechanical equipment list as the basis. Earthworks, electrical and instrumentation costs have been developed from material take-offs and validated database rates.

#### Access Road & Power Line

Approximately 40km of road between Tucumã and the project site will be upgraded as part of the project. This will be undertaken by a local civil contractor and is presently estimated to cost US\$6.2M.

Power will be supplied to site by a 138kV line connected from site to the national energy grid at Tucumã. The total length of the transmission line route is 39km with an estimated total cost of US\$8.6M, sourced from a local power company proposal.

## **13.2 SUSTAINING AND DEFERRED CAPITAL**

Total sustaining and deferred capital costs for the project are US\$212.8M.

The principal deferred capital costs are associated with open pit and underground mining as follows:

- → US\$98.2M associated with overburden removal and cut-backs; and
- → US\$87.0M for decline development, mine infrastructure and ventilation.

The IWL requires future dam raisings which are estimated to be US\$7.8M. This does not include the costs of delivering and spreading waste material at the TSF site which is included in mine waste movement operating costs. The estimated cost of the paste plant is USD\$8.8M, to be incurred in year 5 & 6. The JNP tenement is part of a Sale & Purchase Agreement with Vale, which includes a deferred payment of US\$5.0M million on commencement of commercial production.

The Scoping Study assumes that the salvage value of the plant will offset the mine closure costs estimated to be incurred for environmental rehabilitation, plant removal and disposal and labour retrenchment costs at the completion of mining and processing activities.

Pre Production Capital Cost	Units	Value Add
Mining (IWL & Pre-Strip)	US\$M	33.6
Flotation Circuit Equipment	US\$M	38.4
Electrical	US\$M	20.8
In-Plant Piping	US\$M	6.3
General Site - Earthworks	US\$M	3.4
Hydrometallurgical Circuit Equipment	US\$M	66.4
Contractor Mobilisation Allowance	US\$M	1.9
Engineering Design/Draft Labour	US\$M	9.3
Project & Construction Management	US\$M	13.6
Commissioning	US\$M	2.0
Project Support Infrastructure	US\$M	31.7
Owners Costs	US\$M	17.9
Sub total	US\$M	245.3
Contingency	US\$M	42.2
TOTAL	US\$M	287.5

Table 16 - Pre-Production Capital



# 14. Operational Cost Estimate

Operating costs vary over the life of the mine as the strip ratio changes. The operating cost estimate has been determined from the mining contractor proposals, supplier quotations and complementary data from recent studies of similar operations and database information.

The larger components of operating costs comprise contract mining, diesel fuel, oxygen, reagents and grinding media, labour and power. The operating cost estimate is presented in first quarter 2021 United States Dollars (USD) to an accuracy of  $\pm 40\%$ . The project operating costs are outlined in Table 17 below. Figure 25 provides a further breakdown of costs.

Operating Cost	US\$/t ore milled	US\$/t metal	US\$/lb Ni
Mining	33.20	4,221	1.91
Processing	28.02	3,562	1.62
Logistics	2.61	332	0.15
General & Administration	1.98	252	0.11
By-product Credit	(8.75)	(1,113)	(0.50)
Total C1 Costs	57.06	7,254	3.29

Table 17 - Value-Add Scoping Study Operating Costs

General & Administration costs include a provision for ongoing rehabilitation expenditure estimated at US\$15.1M over the life of the project.

## 14.1 MINING

The mining contractor will be responsible for all open pit and underground mining and auxiliary operations. The mine operation costs are outlined in Table 18 and 19 below.

Open Pit Mining Operating Cost	LOM US\$M	US\$/t ore mined
Waste Mining	532.4	14.55
Ore Mining	106.0	2.90
Dayworks	14.6	0.40
Grade Control	36.2	0.99
Overheads	28.6	0.78
Total	717.8	19.62

#### Table 18 - Open Pit Operating Costs

Underground Mining Operating Cost	LOM US\$M	US\$/t ore mined
Ore Drive	61.0	7.22
Stope	231.9	27.43
Op Access	1.3	0.16
Dayworks	6.2	0.74
Grade Control	8.5	1.01
Mine Services	11.7	1.38
Mine Overheads	81.2	9.59
Total	401.8	47.53

Table 19 - Underground Operating Costs

Minor additional mining costs are primarily related to technical staffing and grade control costs. The average mining cost for the complete operation was estimated to be US\$33.20/t of ore milled.



Figure 25 - Value-Add Scoping Study LOM Operating Costs (US\$)



## **14.2 PROCESS**

The estimates have been divided into key cost categories, summarising the average annual operating costs for processing ore at 2.7Mtpa for the designed sulphide concentrator and hydrometallurgical circuit. The key cost categories summarised in Table 20.

Operating Cost	LOM US\$M	US\$/t ore milled
Labour	66.9	1.98
Power	209.2	6.20
Maintenance	80.2	2.38
Reagents and Consumables	525.0	15.57
Paste Plant	26.9	0.80
Miscellaneous	36.5	1.07
Total	944.7	28.02

Table 20 - Processing Operating Costs

### **14.3 LOGISTICS**

The Jaguar products are proposed to be transported via the existing road network 903km from site to the Villa de Conde Port near Belem. Based on benchmarking of similar operations in Brazil the costs of bulk material logistics which include storage at Port and stevedoring are estimated at US\$61.0/tonne of concentrate. Sea freight is estimated to be US\$70/tonne of concentrate to the Asian market.

## 14.4 GENERAL & ADMINISTRATION (G&A)

The cost of direct G&A activities consists of the site G&A team (including HSEC personnel and contractors) and the services provided by them. Excluding rehabilitation costs, G&A costs are estimated to be US\$4.0M per year.





# **15.** Financial Analysis

## **15.1 KEY ASSUMPTIONS**

A comprehensive financial model for the JNP has been created as a key part of the Value-Add Scoping Study activities. The financial model incorporates physical, timing, cost and financial assumptions. The timing and financial assumptions are presented below with physical and cost assumptions detailed in the preceding sections of this report.

#### **Commodity Prices**

The key revenue assumption is the nickel price for the nickel sulphate which has been estimated at US\$17,632/tonne, being a long-term LME nickel price of US\$16,530/tonne plus a sulphate premium of US\$1,102/tonne. The current LME nickel price is approximately US\$17,000/tonne. Refer to Section 12.2 above for further comment on the nickel price assumption.

#### **Royalties**

The government royalty (CFEM) rate for base metals is 2% on the value of concentrate sales revenue, less certain allowable deductions for taxes charged in Brazil. For the purpose of the Value-Add Scoping Study a rate of 80% of the CFEM rate (ie 1.6% rate) is being applied to the nickel sulphate production revenue.

It is also assumed for the purpose of the study that there are no landowner royalties as Centaurus has already executed two possession agreements for land over the Jaguar Project with further agreements pending.

The tenement on which the JNP is located was acquired under a Sale & Purchase Agreement (SPA) with Vale. The terms of the SPA include a Net Operating Royalty (Gross) of 0.75% payable to Vale. Aliança also assumes the original obligation of Vale to BNDES for a 1.8% Net Operating Revenue royalty.

The Vale and BNDES royalty rates were based on the sale of a nickel concentrate with a reduced rate to be applicable for any value-added product produced so as to ensure the royalty burden was no more than applicable under the production of a nickel concentrate. At this point in time no specific negotiation of a lower royalty rate for nickel sulphate production has been undertaken with either party so a conservative reduction in the applicable royalty rates to 80% of the nickel concentrate royalty rate has been applied.

#### **Foreign Exchange Rates**

The foreign exchange assumptions used in the study are set out in Table 21 below:

	Assumption for Value-Add SS	Current May 2021
USD/BRL	5.00	5.40
EUR/BRL	5.80	6.50
AUD/USD	0.75	0.77
USD/CAD	1.33	1.21
EUR/USD	1.16	1.22

 Table 21 - Foreign Exchange Rates

Whilst these rates represent conservative assumptions compared to current rates, management considers that these rates are more appropriate long-term assumptions given the significant recent volatility on financial markets. The rates used in the Value-Add Scoping Study are the same as those used in the Base Case Scoping Study.

#### **Income Tax**

The JNP is expected to be eligible for a 75% taxation concession which would be applied to the 25% corporate income tax rate. The Social Contribution Tax on Profits (CSLL) of 9% results in a total notional tax rate of 15.25%. This rate is applicable for the first 10 years of operations before reverting to the full tax rate of 34%.



## **15.2 FINANCIAL OUTCOMES**

Table 22 summarises the key financial outcomes of the Value-Add Scoping Study based on the assumptions detailed in this section and throughput this document. Cashflows are discounted using a rate of 8% real with NPVs presented from FID.

## **15.3 SENSITIVITY ANALYSIS**

Sensitivity analysis has been completed for NPV by assuming a 10% movement above and below the value of specified Value-Add study assumptions. The variables chosen for analysis and the outcome on project economics are shown in Figure 27 below.

Key Results	Units	Value-Add Case
Pre-Production Capex	US\$M	287.8
Sustaining & Deferred Capex	US\$M	212.8
Nominal Production Rate	Mtpa	2.7
Nickel Production	t	265.2
Gross Revenue	US\$M	4,531.6
LOM Opex (net of by-product credits)	US\$M	2,088.8
EBITDA	US\$M	2,442.8
NPV8 – Pre-Tax	US\$M	1,030.0
NPV8 – Post-Tax	US\$M	830.8
NPV8 – Post-Tax	A\$M	1,107.7
Internal Rate of Return – Pre-Tax	%	60%
Internal Rate of Return – Post-Tax	%	52%
Payback - Pre-Tax	years	1.6
Payback – Post-Tax	years	1.8
Table 22 - Key Financial Results		



Variable	Value-Add Assumption	Sensitivity		NPV <sub>a</sub> after US\$830.8		
Ni Price	US\$17,632/t	+/- 10%	608.9			1,057.3
Ni Recovery	81%	+/- 10%	615.1			1,046.4
Operating Costs	LOM US\$ 2,088M	+/- 10%		769.8	894.1	
Exchange Rates	EUR/USD 1.16 EUR/BRL 5.80 USD/BRL 5.00	+/- 10%		797.5	856.9	
Capital Cost (Development)	US\$287.8M	+/- 10%		806.6	854.9	
Figure 27 - Sensitivity (	Chart - Base Case	5	550.0 650.0	750.0	850.0 950.0	1,050.0



# 16. Conclusion & Recommendations

The Value-Add Scoping Study confirms that the development of a 2.7Mtpa mining operation and nickel sulphate processing plant at the JNP is technically and commercially feasible. The Centaurus Board has decided to immediately proceed to a Definitive Feasibility Study (DFS) on the project following the delivery of the exceptional economic outcomes seen in the Value-Add Scoping Study.

The DFS will focus on the production of a nickel sulphate product, though this by its very nature will require a study of the production of a nickel concentrate as the feed for the hydrometallurgical (nickel sulphate) circuit. As the Base Case Scoping Study is simply the concentrator component of the Value-Add Scoping Study the study of both options in the DFS stage will allow the Company to complete the required trade-off analysis to a level that will allow an informed decision on how the project should move forward into production.

There are a number of work fronts that can bring opportunities and growth to the JNP, the primary being resource growth and process development.

The March 2021 JORC Indicated and Inferred MRE of 58.9Mt at 0.96% Ni for 562,600 tonnes of contained nickel metal underpins the Production Target of 45.0Mt at 0.80% Ni for a total of 361,700 tonnes of contained nickel metal, representing a conversion of approximately 65% of resources to Production Target. The Production Target in turn supports a Mill Feed of 33.7Mt at 1.01% Ni for 341,300 tonnes of contained nickel.

Pit optimisation work demonstrated that the cut-off grade can be lowered under the same technical parameters and cost scenarios that would result in larger conceptual open pits, longer mine life and additional metal tonnes. Further cut-off grade analysis will be carried out in the DFS. The JNP hosts multiple prospects and targets that have yet to be drill-tested, characterised by magnetic and/or electromagnetic (EM) anomalies coincident with significant soil geochemical support. The Company will continue with an aggressive drilling plan focusing on resource development (infill) drilling as well as resource extension drilling at the six Jaguar deposits and two Onça deposits. There is significant potential to expand both the shallow and deeper high-grade Resources within these Deposits. This will be complemented with greenfields RC drilling to identify new discoveries.

Process development testwork focusing on process flow sheet optimisation will be ongoing, designed to optimise recovered nickel and achieve a high-quality nickel sulphate product with a valuable MSP product. In respect to the MSP, assessment of an additional process step of producing a separate copper/cobalt MSP and zinc MSP will be undertaken.

Additional ore sorting testwork will be undertaken which may increase the volume of economic nickel as well as further reducing the amount of potentially acid forming (PAF) waste reporting to the mine waste stockpiles thereby reducing environmental risks. These studies will be part of the DFS which will assist in determining the Project's optimal throughput size and economics.

The DFS will study the production of both nickel sulphate and nickel concentrate and is expected to be completed and delivered to the market in Q4 2022 with project financing targeted and to be in place by the end of Q2 2023.





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#### Detailed Technical Discussion and Supporting Information Required Under ASX Listing Rules, Chapter 5

In accordance with ASX Listing Rules and the 2012 JORC reporting guidelines, a summary of the material information used to estimate the Mineral Resource is detailed below (for more detail please refer to JORC Table 1, Sections 1 to 3 included below).

It is noted that for the reported Mineral Resource in this announcement, there have been no changes to the interpretation of the mineralisation domains, to the estimation of metals or to the classification from the Mineral Resource announced 4 February 2021 and updated in the Base Case Scoping Study released to the market on 29 March 2021.

#### Geology and Geological Interpretation

The Jaguar Nickel Deposit differs from most nickel sulphide deposits mined to date because it is of hydrothermal origin, with the nickel sulphide mineralisation being of high tenor (tenor referring to the Ni concentration in 100% sulphides) with low Cr and Mg contents, and not directly associated with mafic-ultramafic rocks. It is understood that the Jaguar mineralisation represents a hybrid hydrothermal style between magmatic Ni-Cu-PGE sulphide and IOCG mineralisation.

The Project is located in the Carajás Mineral Province (CMP), which contains one of the world's largest known concentrations of large tonnage IOCG deposits. The CMP also hosts the world's largest source of high-grade iron ore, as well as a significant source of gold, manganese, and lateritic nickel.

Jaguar is located at the intersection of the WSW-trending Canaã Fault and the ENE-trending McCandless Fault, immediately south of the NeoArchean Puma Layered Mafic-Ultramafic Complex, which is host to the Puma Lateritic Nickel deposit (see Figure 2). The Jaguar mineralised bodies are hosted within sheared Sub-Volcanic Dacitic Porphyries of the Serra Arqueada Greenstone belt, adjacent to the boundary with a tonalite intrusive into the Xingu basement gneiss, while Onça Preta and Onça Rosa are tabular mineralised bodies hosted within the tonalite. The hydrothermal alteration and mineralisation form sub-vertical to vertical bodies structurally controlled by the regional ductile-brittle mylonitic shear zone. The hydrothermal alteration appears to be synchronous with, or post-date, deformation.

Three main types of alteration assemblages are recognised in the Jaguar deposit: biotite-chlorite, amphibole-biotite and magnetite-apatite-quartz. These hydrothermal mineral assemblages are variably developed around the mineralised bodies being influenced by the composition of the host rocks.

The Jaguar deposits are hosted within a subvertical mylonite zone trending EW which is interpreted to represent one strand of the regional Canaã Fault. Bedding has been transposed by the main foliation which dips 88°/177°, with subsidiary foliations dipping 90°/143° and 56°/282°. Both the Onça Preta and Onça Rosa deposits are hosted within tonalite along the contacts where it has been intruded by the older dolerite suggesting the mineralisation was emplaced during a stage of dilation. The mean orientation of the Onça Preta mineralisation is 78°/008° and 72°/013° at Onça Rosa.

Two types of nickel sulphide mineralisation occur in the Jaguar deposit. Sulphide assemblages are similar in both ore types, differing only in modal sulphide composition and structure. The mean sulphide assemblage (in order of abundance) is pyrite, pentlandite, millerite, violarite, pyrrhotite and sphalerite with trace vaesite, nickeliferous pyrite and chalcopyrite.

The most abundant type constitutes low-grade nickel mineralisation and is associated with the biotite-chlorite alteration as well as amphibole, magnetite, quartz, apatite and talc, and occurs as veins and stringer sulphides. Sulphides usually occur within veins concordant with the foliation but may also infill discordant fractures or occur as disseminated grains in alteration zones.



At Jaguar, the target high-grade nickel mineralisation is associated with the magnetite-apatite-quartz alteration. It occurs as veins and breccia bodies consisting of irregular fragments of extensively altered host rocks within a sulphide-magnetite-apatite rich matrix. Mineralised breccias form semi-massive sulphide bodies up to 30m thick parallel to, or crosscutting, biotite-chlorite rich zones. The breccias are predominantly clast-supported, but matrix-supported sulphide breccias are also recognised. Mineralisation at the Onça Preta and Onça Rosa deposits is predominantly of the second type, forming tabular semi-continuous to continuous bodies both along strike and down dip.

Regolith at the deposit is in-situ and comprises a thin soil layer overlying a decomposed saprolite transitional zone. The thickness to the base of the transitional zone generally varies from 5m to 25m (max. 34m).

#### Drilling Techniques

All Jaguar mineralisation to-date was sampled using diamond drill holes (HQ/NQ). The Resource uses 169 Vale drill holes for a total of 56,592m and 98 Centaurus drill holes for a total of 17,941m of drilling on the project. All drill holes were drilled at 55°-75° towards either 180° or 360°. Core recoveries were logged and recorded in the database for all historical and current diamond holes. To date, overall recoveries are >98% and there are no core loss issues or significant sample recovery problems.

#### Sampling and Sub-sampling Techniques

Diamond core was cut using a core saw, ¼ core was sampled. Sample length along core varies between 0.3m to 4.0m, with an overall average of 1.5m. Within the modelled mineralised domains, the average is 1.0m. Sampling was done according to lithological contacts and generally by 1m intervals within the alteration zones and 1.5m to 2m intervals along the unaltered rock.

QAQC Standards (multiple standards are used on a rotating basis) are inserted every 20 samples. Blanks have been inserted for every 20 samples. Field duplicates are completed every 30 samples. Additionally, there are laboratory standards and duplicates that have been inserted. Centaurus has adopted the same sampling QAQC procedures which are in line with industry standards and Centaurus' current operating procedures.

#### Sample Analysis Method

Current samples are sent to independent laboratories where they are dried, crushed and pulverised to 85% passing 75µm and split further to 250g aliquots for chemical analysis. Samples are then analysed for 48 elements by multi element using ME-MS61 (multi-acid digestion); ore grade analysis was completed with ICP-AES (multi-acid digestion); sulphur analysis was completed with Leco, and Au and PGEs completed via Fire Assay.

Historical samples were dried, crushed and pulverised to 90% passing 4mm and reduced to 400g. The samples were pulverised to 95% passing 150µm and split further to 50g aliquots for chemical analysis. Multi element analysis using ICP-AES (multi-acid digestion) was complete; ore grade analysis was completed with Atomic Absorption (multi-acid digestion); sulphur analysis was completed with Leco, and Au and PGEs completed via Fire Assay. Given the grain size and mineralogy of the samples, the methods are considered total and appropriate.

#### Estimation Methodology

Mineralized domains and oxidation surfaces were modelled using Leapfrog<sup>™</sup> software's vein and geological modelling tools. Grade estimation was by Ordinary Kriging for Ni, Cu, Co, Fe, Mg, Zn and As using GEOVIA Surpac<sup>™</sup> software. Samples were composited to 1m within each estimation domain, using fixed length option and a low percentage inclusion threshold to include all samples. Top-cuts were decided by completing an outlier analysis using a combination of methods including grade histograms, log probability plots and other statistical tools. Based on this statistical analysis of the data population, no top-cuts were applied.



Estimation parameters were based on the variogram models, data geometry and kriging estimation statistics. Variogram calculations were carried out on the 1m composites from domains with significant numbers of samples and then the parameters applied to other domains that had too few samples for variography. The estimate was resolved into 10m (E) x 2m (N) x 10m (RL) parent cells that had been sub-celled at the domain boundaries for accurate domain volume representation. Elements were estimated in three passes with the first pass using optimum search distance of 75m and the second run was set at 150m. A final pass used a large search distance in order to populate all remaining blocks.

#### Resource Classification Criteria

The Mineral Resource has been classified on the basis of confidence in the geological model, continuity of mineralized zones, drilling density, confidence in the underlying database, a combination of search volume and number of data used for the estimation plus availability of bulk density information.

Indicated Mineral Resources are defined nominally on 50m E x 40m N spaced drilling (predominantly where Centaurus has completed infill drilling) and Inferred Mineral Resources nominally 100m E x 40m to 100m N with consideration given for the confidence of the continuity of geology and mineralisation. The Jaguar Mineral Resource in part has been classified as Indicated with the remainder as Inferred according to JORC 2012.

#### Cut-off Grade(s), Including the Basis for the Selected Cut-off Grade(s)

Potential mining methods include a combination of open pit and underground. A 0.3% Ni cut-off grade has been applied to material less than 200m vertical depth from surface in the estimation of the Global MRE with this being consistent with mineralisation domain modelling and reported significant intersection cut-off grades. A 1.0% Ni cut-off grade has been maintained for resources below 200m from surface to reflect the need for this mineralisation to be mined via underground mining methods.

### Mining and Metallurgical Methods and Parameters (and other material modifying factors considered to date).

It is assumed that the Jaguar deposits will be mined by a combination of open pit and underground mining methods. Conceptual pit optimisation studies have been completed by independent mining consultants Entech. The results demonstrate that there are reasonable prospects for the eventual economic extraction of the mineralisation by open pit mining methods. Input parameters were benchmarked from similar base-metal operations in Brazil and Australia.

Metallurgical test work has been undertaken on multiple composite samples sourced from the Jaguar South, Jaguar Central, Jaguar North and Onça Preta deposits. Material selection for test work was focused on providing a good spatial representation of mineralisation for the deposits to date. Bench scale test work to date has demonstrated that a conventional crushing, grinding and flotation circuit will produce good concentrate grades (16% Ni) and nickel recoveries (+78%)<sup>3</sup>).

Blended nickel sulphide concentrate samples have been tested using both Pressure Oxidation (POx) and Atmospheric Leaching at ALS Metallurgy in Perth. The POx returned excellent results with extractions of nickel, copper, and cobalt all exceeding 99%. Metallurgical test work remains ongoing.

This announcement includes the Executive Summary of the Jaguar Nickel Sulphide Project Value-Add Scoping Study that included information on mining parameters by consultants Entech Pty Ltd and metallurgical testwork completed by ALS Metallurgy.

<sup>&</sup>lt;sup>3</sup> Refer ASX Announcements of 18 February 2020, 17 March 2020, 31 March 2020 and 24 September 2020 for metallurgical and hydrometallurgical test results



In accordance with ASX Listing Rules, the following is a summary of all material assumptions and associated financial information related to the JNP Value-Add Scoping Study, including consideration of the modifying factors under the JORC 2012 code. Additional detail on the material assumptions can be found in the JNP Value-Add Scoping Study Executive Summary document, part of this release.

#### Mineral Resource estimate for conversion to Production Targets

The Production Target estimates are based on the Mineral Resource updated on 29 March 2021, by Centaurus Metals' competent persons: Mr Roger Fitzhardinge (Operations Manager – Centaurus Metals) and Mr Lauritz Barnes (Resource Consultant - Trepanier Pty Ltd).

Entech completed an audit of the geological block model ahead of mine planning work to estimate the Production Target. Entech provided open pit and underground engineering services. The work included open pit and underground optimization studies final mine designs and integrated mine schedule. Re-Metallica, a Brazilian mining engineering consultancy firm, was engaged to review and advise Entech on local mining productivities and costs.

#### Site visits

No site visit was conducted by Entech due to travel restrictions. A site visit was conducted by Re-Metallica competent person Ruy Lacourt Rodrigues in December 2020 and May 2021. In the course of preparing this estimate the Competent Persons ensured the data and analysis used is appropriate for the proposed operating conditions for the project.

#### Study status

The Production Target estimates are based on a Scoping Study level study. The study, including capital estimates and operating cost estimates was completed to an accuracy of  $\pm 40\%$ , which is considered appropriate for a Scoping Study. As the study is based on low-level technical and economic assessments it is insufficient to support the estimation of an Ore Reserve.

#### *Cut-off parameters – refer to Chapter 3 of the JNP Value-Add Scoping Study for additional information.*

The Mineral Resource is a geologically domained resource model that used a nominal 0.30% Ni as a lower grade cut-off. The resource model was re-blocked and modified for ore loss and dilution and evaluated to determine which mineralized blocks produced a cash surplus when treated as ore. The Production Target was estimated using the Net Smelter Return (NSR) method. The marginal economic cut-offs were estimated to be between 0.3% Ni grade (open pit) and NSR \$80 per tonne (underground). NSR \$50 blocks were used to infill the stopes. The cut-off grade contemplates all pre-tax costs associated with the mining, processing and transport of nickel concentrate.

The metal recoveries are deposit specific life of mine forecasts based on metallurgical test work results received to date, for which the average nickel recovery to nickel sulphate was 81.5%. A conservative Nickel price of \$15,000/t (payability 100%), Zinc price of \$2,500/t (payability 75%) and cobalt price of \$30,000/t (payability 75%) was used for the pit optimisations that generated a series of nested pit shells. Pit shells with revenue factors equivalent to nickel prices of US\$13,800/t (Jaguar – Pit 92) and US\$13,500/t (Onça – Pit 90) were selected for scheduling.

#### Mining factors or assumptions – refer to Chapter 3 of the JNP Value-Add Scoping Study for additional information.

The Scoping Study assesses both open pit and underground mining operations using conventional drill and blast, load and haul to the ROM and waste deposit to be undertaken by local experienced mining contractors. The preconcentrate stage includes a jaw crusher to the crushed ore stockpile for the high-grade ROM; and the low-grade ROM goes to a jaw crusher ahead of ore sorters with product going to the crushed ore stockpile, and ore-sorted waste back loaded to waste deposits. The JNP process plant design is based on the treatment of 2.7Mtpa of ore. Geotechnical logging and testwork was completed as part of the studies. The typical rock mass can be characterised as 'Good' in the near-surface open-pittable environment. Final pit slopes have 10m (oxide) – 20m (fresh) benches



and 5-10 m wide berms. Average inter-ramp angles of between 40° - 49° in fresh rock and 33° in oxide material. The rock mass conditions improve with depth and can be generally classified as 'Good' to 'Very Good'. The orebody geometry and rock mass conditions at the Jaguar deposits favours the use of a top down longhole open stoping method.

The Mineral Resource model was re-blocked to a Smallest Mining Unit (SMU) dimension of 5mE x 4mN x 5mR. The impact of re-blocking is that the narrow-modelled lodes from the original MRE are diluted out into larger blocks resulting in an ore dilution of 22% and ore loss of 17% for Jaguar, and ore dilution of 37% and ore loss of 19% for Onça. For the underground, a 90% mining recovery factor was applied to the stoping tonnage to account for the pillars and ore losses (2%).

For pit optimisations average LOM mining costs of US\$2.50 per tonne of material moved, US\$10.65 per tonne of ore processing, US\$205 per tonne of concentrate POx treatment and G&A costs of US\$1.50 per tonne of ore processed were used. Concentrate transport costs of US\$131.0 per tonne of sulphate product were applied.

The proposed open pit mining methods are assumed to be on 5m benches, with 2.5m fitches in ore, using 45t trucks, 45t excavators and associated ancillary fleet. Mining costs are based on contract mining, include clearing, topsoil removal, drill, blast, load, haul, dewatering and rehabilitation. The proposed underground mining method is top down longhole open stoping. Stopes are extracted in a longitude mining direction from the orebody with levels to be accessed from the hangingwall. Declines have been designed using a 1:7 gradient, on the hanging wall side of the orebody, having a 50m stand off from the orebody.

Open pit grade control will be based on sampling from surface RC drilling. Underground grade control definition is assumed to consist of underground diamond drilling and geological development mapping. Drilling is assumed to be completed approximately 3-6 months ahead of scheduled mining and is costed in the financial analysis.

High-level infrastructure designs were completed together with the mine design to address the required mine access, mine and waste deposit drainage, mine ventilation, mine dewatering, power supply, controls, and communication requirements for the proposed open pit and underground operations.

Inferred Resources have been included for scoping study assessment with the LOM plan. No Ore Reserves are currently declared for the Jaguar Nickel Sulphide Project. The proportion of Inferred Mineral Resources material accounts for 48% of the Production Target over the life of the presently defined project whilst 18% of the Production Target during the payback period will be from Inferred Mineral Resources. Only fresh and transitional materials are processed, with mineralised oxide material considered to be waste.

Metallurgical factors or assumptions – refer to Chapter 4 of the JNP Value-Add Scoping Study for additional information.

The Jaguar mineralisation is understood to be a hybrid hydrothermal style between magmatic Ni-Cu-PGE sulphide and IOCG mineralisation, the nickel assemblage contains pentlandite and millerite nickel bearing sulphides amongst others. Extensive mineralogy and flotation test work has demonstrated that the deposit is amenable for the production of nickel concentrates via conventional and well-established flotation routes.

To date 105 mineralogical composites reflecting over 1,300m of diamond core drilling from within the significant ore zones have been selected (56 from Jaguar South, 7 from Onca Preta, 27 from Jaguar Central and 15 from Jaguar North) for testing. Flotation testing has been completed on five composites from Jaguar South, Jaguar Central, Jaguar North and one composite from Onça Preta. From the test work completed, the sulphide nickel recovery of the composites tested range from 90-95%, with the total nickel recovery in the range of 79-86% depending upon nickel head grade and non-sulphide nickel grades. For the purposes of this study the non-sulphide nickel was individually estimated for each deposit with a 95% recovery assumed for the nickel sulphide component, this takes into account the recovery of nickel to the MSP product.



Pressure leaching (POx) testing was completed on a blend of flotation concentrates sourced from Onça Preta and Jaguar South Deposits. The testing concluded that pressure leaching clearly provided the best extractions for nickel, copper and cobalt (+99%).

Ore sorting has been included as a pre-concentrate step for the low-grade mineralisation (0.3-0.6% Ni) which makes up 14% of the Mill Feed. A low-grade (0.47% Ni) diamond core sample was pilot tested at Steinert's Perth Laboratory using a dual sensor (X-ray transmission and Electromagnetic) ore sorter. A grade recovery curve has been generated and an estimated 30% mass recovery at 70% nickel recovery has been applied to the ore sorter feed.

Additional analysis relating to concentration quality is ongoing to confirm current assumptions of low deleterious elements. No bulk sample or pilot scale flotation test work completed to date.

### Infrastructure – refer to Chapter 6 of the JNP Value-Add Scoping Study for additional information.

The Project is located in the Carajás mineral district in Brazil where the government and Vale have invested heavily in infrastructure. Large iron ore and base metals mines are operated in the region, which has access to water, power, transport, accommodation and communications as well as to a number of services and goods suppliers who are well established. The JNP is ideally located close to existing infrastructure, just 35km north of the regional centre of Tucumã (population +35,000) where a 138 kV power sub-station is located.

### *Environmental – refer to Chapter 9 of the JNP Value-Add Scoping Study for additional information.*

The Preliminary Licence (LP) is the key environmental approval required for the Project. The application for the LP comes from the lodgement of an Environmental Impact Assessment (EIA/RIMA), with lodgement of the EIA/RIMA planned for the end of Q2 2021. All wet and dry season environmental studies (water, flora, fauna, air quality, noise, archaeology, malaria etc) are completed with lodgement awaiting technical information from the JNP Value-Add Scoping Study.

Three waste deposits will be established in Jaguar, one being part of the Integrated Waste Landform (IWL) tailings storage facility. Waste rock and flotation tailings composites have been tested for Environmental Characterisation and Waste Classification. Results have shown samples are non-corrosive, low-acid generating, and non-reactive. Testwork on the POx residue is ongoing.

### Social – refer to Chapter 10 of the JNP Value-Add Scoping Study for additional information.

The Jaguar Project is located 35km from the local towns of Tucumã or Ourilândia do Norte, with a combined population of 70,000 people. The workforce will be mainly sourced from the local population that reside in these towns, supplemented by experienced external operational and technical staff as required. The social impact of the project will be positive in providing additional job opportunities and training in mining skills. With a construction workforce of over 1,000, full-time operational personnel of 250 and 300-500 mining contractor employees, the Project will not only provide direct employment but will also stimulate the local economies, creating a number of indirect employment and business opportunities.

Centaurus has secured possession rights to two of the properties over the Jaguar Project with other agreements currently being negotiated. The Company has land access agreements in place with all other landowners for exploration access and activities. No further licences other than those indicated under the Environmental section are believed to be contingent to project implementation.



### Revenue factors – refer to Chapter 12 and 15 of the JNP Value-Add Scoping Study for additional information.

Plant feed grades and metal recoveries are derived from the mine plan. Financial assumptions, metal prices, exchange rates and concentrate payabilities assumptions have been made by Centaurus with the assistance of industry consultants with relevant industry experience such as analyst forecasts and commercial terms for similar products.

### Market assessment – refer to Chapter 12 of the JNP Value-Add Scoping Study for additional information.

Global stimulus spending has resulted in strong demand for stainless-steel, while forecasts of stronger and quicker uptake of electric vehicles in the future continues to firm the view of a positive outlook for Class 1 nickel. The nickel price closed the 2020 year at US\$16,823/tonne and continued to rise during January and February 2021 with the LME settlement price increasing to US\$19,690/tonne on 22 February 2021. The LME nickel price is presently around US\$17,000 tonne. The Jaguar Scoping Study assumes a LME nickel price of US\$16,530/tonne. In addition to the LME price assumption, a conservative sulphate premium of US\$1,102/tonne has been applied to arrive at the nickel sulphate price assumption.

### *Costs – refer to Chapters 13 and 14 of the JNP Value-Add Scoping Study for additional information.*

The capital cost estimate has been completed to Scoping Study level by Entech (Mining operations) and DRA (Process plant and infrastructure) with CTM input where necessary. Formal enquiries to several process plant suppliers based on technical and commercial scopes of work were delivered. Processing and non-processing capital cost estimates are presented in first quarter 2021 United States dollars (US\$) to an accuracy of ±40%. A 20% capital contingency allowance has been applied to the cost estimate.

The operating cost estimate has been completed to Scoping Study level by Entech and Re-Metallica (Mining operations) and DRA (Process plant and infrastructure) with CTM input where necessary. The operating cost estimate has been determined from the mining contractor proposals, supplier quotations and complementary data from recent costing of similar operations and database information. Exchange rates were based on forward projections and transportation charges were based on benchmarked operations. Costs include all appropriate government and third-party royalties.

### *Project Economics – refer to Chapter 15 of the JNP Value-Add Scoping Study for additional information.*

A comprehensive financial model for the JNP has been created as a key part of the Value-Add Scoping Study activities. Cashflows are discounted using a rate of 8% real. The estimates are presented in USD with exchange rates outlined in Chapter 15 of the Executive Summary. The project financial outcomes are impacted by tax benefits (SUDAM incentive). There is a risk related to application timing and granting of these benefits. The project Net Present Value (NPV) is most sensitive (at +/-10%) to the nickel price and metallurgical recoveries. The project is less sensitive to variations in operational and capital costs.

### Funding

To achieve the range of outcomes indicated in the Value-Add Scoping Study, pre-production funding of approximately US\$288M will likely be required. There is no certainty that Centaurus will be able to source that amount of funding when required. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Centaurus's shares. It is also possible that Centaurus could pursue other value realisation strategies such as a sale, partial sale or joint venture of the Jaguar Nickel Sulphide Project. This could materially reduce Centaurus's proportionate ownership of the Jaguar Nickel Sulphide Project.



It is anticipated that finance will be sourced through a combination of equity from existing shareholders, new equity investment and debt providers. In July 2020, the Company completed a A\$25.5 million share placement of which A\$7.0 million was cornerstoned by highly experienced Canadian resource investment house, Dundee Goodman Merchant Partners, who remain very supportive of the Company and development of the Jaguar Nickel Sulphide Project. Further, strong indications of equity support exist from broking groups who have research coverage on the Company.

The Board considers the strong project cash flows outlined in the Value-Add Scoping Study are supportive of debt funding of the Project on normal commercial terms.

#### Other

There are no known impediments to the granting of the environmental and mining approvals with the timeframes anticipated in Chapter 9 of the JNP Value-Add Scoping Study. Under the terms of the Jaguar Sale and Purchase Agreement (SPA), the project vendor (Vale) have a first right to 100% of offtake from the Jaguar project priced on an arm's length market-based price basis. This feature of the SPA provides some measure of offtake risk mitigation for the Company.

#### Audits or reviews

The Scoping Study was internally reviewed by Centaurus. No material issues were identified by the reviewers. All study inputs were prepared by Competent Persons identified in this announcement.

#### -ENDS-

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#### **Competent Persons Statement**

The information in this report that relates to Exploration Results is based on information compiled by Mr Roger Fitzhardinge who is a Member of the Australasia Institute of Mining and Metallurgy. Mr Fitzhardinge is a permanent employee and shareholder of Centaurus Metals Limited. Mr Fitzhardinge has sufficient experience which is relevant to the style of mineralisation and type of deposit 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 Exploration Results, Mineral Resources and Ore Reserves'. Mr Fitzhardinge consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The information in this report that relates to the new March 2021 Jaguar Mineral Resource is based on information compiled by Mr Lauritz Barnes (consultant with Trepanier Pty Ltd) and Mr Roger Fitzhardinge (a permanent employee and shareholder of Centaurus Metals Limited). Mr Barnes and Mr Fitzhardinge are both members of the Australasian Institute of Mining and Metallurgy. Mr Barnes and Mr Fitzhardinge have sufficient experience of relevance to the styles of mineralisation and types of deposits under consideration, and to the activities undertaken to qualify as Competent Persons as defined in the 2012 Edition of the Joint Ore Reserves Committee (JORC) Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Specifically, Mr Fitzhardinge is the Competent Person for the database (including all drilling information), the geological and mineralisation models plus completed the site visits. Mr Barnes is the Competent Person for the construction of the 3-D geology / mineralisation model plus the estimation. Mr Barnes and Mr Fitzhardinge consent to the inclusion in this report of the matters based on their information in the form and context in which they appear.



### **APPENDIX A – Compliance Statements for the Jaguar Project**

The following Tables are provided for compliance with the JORC Code (2012 Edition) requirements for the reporting of Exploration Results and Mineral Resources at the Jaguar Project.

### SECTION 1 - SAMPLING TECHNIQUES AND DATA

(Criteria in this section apply to all succeeding sections).

Criteria	Commentary
Sampling techniques	• Historical soil sampling was completed by Vale. Samples were taken at 50m intervals along 200m spaced north-south grid lines.
	• Surface material was first removed, and sample holes were dug to roughly 20cm depth. A 5kg sample was taken from the subsoil. The sample was placed in a plastic sample bag with a sample tag before being sent to the lab.
	Surface rock chip/soil samples were collected from in situ outcrops and rolled boulders and submitted for chemical analysis.
	• The historical drilling is all diamond drilling. Drill sections are spaced 100m apart and generally there is 50 to 100m spacing between drill holes on sections.
	• Core was cut and ¼ core sampled and sent to commercial laboratories for physical preparation and chemical assay.
	• At the laboratories, samples were dried (up to 105°C), crushed to 95% less than 4mm, homogenized, split and pulverized to 0.105mm. A pulverized aliquot was separated for analytical procedure.
	• Sample length along core varies between 0.3 to 4.0m, with an average of 1.48m; sampling was done according to lithological contacts and generally by 1m intervals within the alteration zones and 2m intervals along waste rock.
	• Current drilling is being completed on spacing of 100m x 50m or 50m x 50m. Sample length along core varies between 0.5 to 1.5m
	• Core is cut and ¼ core sampled and sent to accredited independent laboratory (ALS).
	• For metallurgical test work continuous downhole composites are selected to represent the metallurgical domain and ¼ core is sampled and sent to ALS Metallurgy, Balcatta, Perth.
Drilling techniques	• Historical drilling was carried out between 2006 to 2010 by multiple drilling companies (Rede and Geosol), using wire-line hydraulic diamond rigs, drilling NQ and HQ core.
	• Vale drilled 169 drill holes for a total of 56,592m of drilling in the resource area. All drill holes were drilled at 55°-60° towards either 180° or 360°. The resource considers 49 drill holes completed by
	Centaurus for a total of 17,941m of drilling. All drill holes were drilled at 55°-75° towards either 180° or 360°.
	Current drilling is a combination of HQ and NQ core (Servdrill).
Drill sample recovery	<ul> <li>Diamond Drilling recovery rates are being calculated at each drilling run.</li> <li>For all diamond drilling, core recoveries were logged and recorded in the database for all historical</li> </ul>
	and current diamond holes. To date overall recoveries are >98% and there are no core loss issues or significant sample recovery problems.
	<ul> <li>To ensure adequate sample recovery and representativity a Centaurus geologist or field technician is present during drilling and monitors the sampling process.</li> </ul>
	<ul> <li>No relationship between sample recovery and grade has been demonstrated. No bias to material size has been demonstrated.</li> </ul>
Logging	• Historical outcrop and soil sample points were registered and logged in the Vale geological mapping point database.
	• All drill holes have been logged geologically and geotechnically by Vale or Centaurus geologists.
	<ul> <li>Drill samples are logged for lithology, weathering, structure, mineralisation and alteration among other features. Logging is carried out to industry standard and is audited by Centaurus CP.</li> </ul>
	<ul> <li>Logging for drilling is qualitative and quantitative in nature.</li> </ul>
	<ul> <li>All historical and new diamond core has been photographed.</li> </ul>
Sub-sampling techniques and	• Diamond Core (HQ/NQ) was cut using a core saw, ¼ core was sampled. Sample length along core
sample preparation	varies between 0.3 to 4.0m, with an average of 1.48m; sampling was done according to lithological contacts and generally by 1m intervals within the alteration zones and 2m intervals along the waste rock.
	<ul> <li>There is no non-core sample within the historical drill database.</li> </ul>
	• QAQC: Standards (multiple standards are used on a rotating basis) are inserted every 20 samples.
	Blanks have been inserted every 20 samples. Field duplicates are completed every 30 samples.
	<ul> <li>Additionally, there are laboratory standards and duplicates that have been inserted.</li> <li>Centaurus has adopted the same sampling QAQC procedures which are in line with industry</li> </ul>
	standards and Centaurus's current operating procedures.
	Sample sizes are appropriate for the nature of the mineralisation.



Criteria	Commentary
	<ul> <li>All historical geological samples were received and prepared by SGS Geosol or ALS Laboratories as 0.5-5.0kg samples. They were dried at 105°C until the sample was completely dry (6-12hrs), crushed to 90% passing 4mm and reduced to 400g. The samples were pulverised to 95% passing 150µm and split further to 50g aliquots for chemical analysis.</li> <li>New samples are being sent to ALS Laboratories. The samples are dried, crushed and pulverised to 85% passing 75µm and split further to 250g aliquots for chemical analysis.</li> <li>During the preparation process grain size control was completed by the laboratories (1 per 20 samples).</li> <li>Metallurgical samples are crushed to 3.35mm and homogenised. Samples are then split to 1kg sub-samples. Sub-samples are ground to specific sizes fractions (53-106µm) for flotation testwork.</li> </ul>
Quality of assay data and laboratory tests	<ul> <li>Chemical analysis for drill core and soil samples was completed by multi element using Inductively Coupled Plasma ICPAES (multi-acid digestion); ore grade analysis was completed with Atomic Absorption (multi-acid digestion); sulphur analysis was completed with Leco, and Au and PGEs completed via Fire Assay.</li> <li>New samples are being analysed for 48 elements by multi element using ME-MS61 (multi-acid digestion) at ALS Laboratories; ore grade analysis was completed with ICP-AES (multi-acid digestion); sulphur analysis was completed with Leco, and Au and PGEs completed via Fire Assay.</li> <li>ALS Laboratories insert their own standards at set frequencies and monitor the precision of the analysis. The results reported are well within the specified standard deviations of the mean grades for the main elements. Additionally, ALS perform repeat analyses of sample pulps at a rate of 1:20 (5% of all samples). These compare very closely with the original analysis for all elements.</li> <li>Vale inserted standard samples every 20 samples (representing 5%). Mean grades of the standard samples are well within the specified 2 standard deviations.</li> <li>All laboratory procedures are in line with industry standards. Analysis of field duplicates and lab pulp duplicates have returned an average correlation coefficient of over 0.98 confirming that the precision of the samples is within acceptable limits.</li> <li>Vale QAQC procedures and results are to industry standard and are of acceptable quality.</li> <li>All metallurgical chemical analysis is completed by ALS laboratories</li> </ul>
Verification of sampling and assaying	<ul> <li>All metallulgical chemical analysis is completed by ALS laboratories</li> <li>All historical samples were collected by Vale field geologists. All assay results were verified by alternative Vale personnel. The Centaurus CP has verified the historical significant intersections.</li> <li>Centaurus Exploration Manager and Senior Geologist verify all new results and visually confirm significant intersections.</li> <li>No twin holes have been completed.</li> <li>All primary data is now stored in the Centaurus Exploration office in Brazil. All new data is collected on Excel Spreadsheet, validated and then sent to independent database administrator (MRG) for storage (DataShed).</li> <li>No adjustments have been made to the assay data.</li> </ul>
Location of data points	<ul> <li>All historical collars were picked up using DGPS or Total Station units. Centaurus has checked multiple collars in the field and has confirmed their location. All field sample and mapping points were collected using a Garmin handheld GPS.</li> <li>An aerial survey was completed by Esteio Topografia and has produced a detailed surface DTM at (1:1000 scale).</li> <li>The survey grid system used is SAD-69 22S. This is in line with Brazilian Mines Department requirements.</li> <li>New drill holes are sighted with handheld GPS and after completion picked-up by an independent survey consultant periodically. Downhole survey for all the historical drill holes and Centaurus hole up to JAG-DD-19-012 used Maxibor equipment. All new drill holes are being downhole surveyed using Reflex digital down-hole tool, with readings every metre.</li> </ul>
Data spacing and distribution	<ul> <li>Soil samples were collected on 40m spacing on section with distance between sections of 200m and 400m depending on location.</li> <li>Sample spacing was deemed appropriate for geochemical studies.</li> <li>The historical drilling is all diamond drilling. Drill sections are spaced 100m apart and generally there is 50 to 100m spacing between drill holes on sections. Centaurus is in the process of closing the drill spacing to 100m x 50m or 50m x 50m.</li> <li>No sample compositing was applied to the drilling.</li> <li>Metallurgical samples to date have been taken from Jaguar South, Jaguar Central, Jaguar North and Onca Preta.</li> </ul>
Orientation of data in relation to geological structure	<ul> <li>Historical drilling was oriented at 55°-60° to either 180° or 360°. This orientation is generally perpendicular to the main geological sequence along which broad scale mineralisation exists.</li> <li>Mineralisation is sub-vertical; the majority of the drilling is at low angle (55-60°) in order to achieve intersections at the most optimal angle.</li> </ul>
Sample security	<ul> <li>All historical and current samples are placed in pre-numbered plastic sample bags and then a sample ticket was placed within the bag as a check. Bags are sealed and then transported by courier</li> </ul>



Criteria	Commentary
	<ul> <li>to the ALS laboratories in Vespasiano, MG.</li> <li>All remnant Vale diamond core has now been relocated to the Company's own core storage facility in Tucumã, PA.</li> </ul>
Audits or reviews	• The Company is not aware of any audit or review that has been conducted on the project to date.

## **SECTION 2 - REPORTING OF EXPLORATION RESULTS**

(Criteria listed in the preceding Section also apply to this section).

Criteria	Commentary
Mineral tenement and land tenure status	<ul> <li>The Jaguar project includes one exploration licence (856392/1996) for a total of circa 30km<sup>2</sup>. A Mining Lease Application has been lodged that allows for ongoing exploration and project development ahead of project implementation.</li> <li>The tenement is part of a Sale &amp; Purchase Agreement (SPA) with Vale SA. Two deferred consideration payments totalling US\$6.75M (US\$1.75 million on commencement of BFS or 3 years and US\$5 million on commencement of commercial production) and a production royalty of 0.75% are to follow. Centaurus has taken on the original obligation of Vale to BNDES for 1.8% Net Operating Revenue royalty.</li> <li>Mining projects in Brazil are subject to a CFEM royalty, a government royalty of 2% on base metal revenue.</li> <li>Landowner royalty is 50% of the CFEM royalty.</li> <li>Centaurus has secured possession rights to two properties over the Jaguar Project with other agreements currently being negotiated. This first agreements will remove exposure to the landowner royalty over the properties secured.</li> <li>The project is not located within any environmental protection zones and exploration and mining is</li> </ul>
Fundamentaria da una harra ettaria	permitted with appropriate environmental licences.
Exploration done by other parties	• Historically the Jaguar Project was explored for nickel sulphides by Vale from 2005 to 2010.
Geology	<ul> <li>Jaguar Nickel Sulphide is a hydrothermal nickel sulphide deposit located near Tucumã in the Carajás Mineral Province of Brazil.</li> <li>Jaguar is located at the intersection of the WSW-trending Canaã Fault and the ENE-trending McCandless Fault, immediately south of the NeoArchean Puma Layered Mafic-Ultramafic Complex.</li> <li>Iron rich fluids were drawn up the mylonite zone causing alteration of the host felsic volcanic and granite units and generating hydrothermal mineral assemblage. Late-stage brittle-ductile conditions triggered renewed hydrothermal fluid ingress and resulted in local formation of high-grade nickel sulphide zones within the mylonite and as tabular bodies within the granite.</li> </ul>
Drill hole Information	Refer to previous ASX Announcements for significant intersections from Centaurus drilling.
Data aggregation methods	<ul> <li>Refer to ASX Announcement of 6 August 2019 for all significant intersections from historical drilling.</li> <li>Continuous sample intervals are calculated via weighted average using a 0.3 % Ni cut-off grade with 3m minimum intercept width.</li> <li>There are no metal equivalents reported.</li> </ul>
Relationship between mineralisation widths and intercept lengths	<ul> <li>Mineralisation is sub-vertical; the majority of the drilling is at low angle (55-60°) in order to achieve intersections at the most optimal angle.</li> <li>The results in ASX Announcement 6 August 2019 reflect individual down hole sample intervals and no mineralised widths were assumed or stated.</li> </ul>
Diagrams	<ul> <li>Refer to Figures 1 to 27 in the Jaguar Nickel Sulphide Project Value-Add Scoping Study Executive Summary Booklet that forms part of this Value-Add Scoping Study announcement.</li> <li>Refer to previous ASX Announcements for maps and sections from Centaurus drilling included in the resource estimate.</li> </ul>
Balanced reporting	<ul> <li>All exploration results received by the Company to date are included in this or previous releases to the ASX.</li> <li>For the current resource, a revised 0.3% Ni cut-off grade has been applied to material less than 200m vertical depth from surface in the estimation of the Global MRE with this being consistent with mineralisation domain modelling and reported significant intersection cut-off grades.</li> </ul>
Other substantive exploration data	• The Company has received geophysical data from Vale that is being processed by an independent consultant Southern Geoscience. Refer to ASX Announcements for geophysical information.
Further work	Electro-magnetic (EM) geophysical surveys (DHEM and FLEM) are ongoing.



Criteria	Commentary
	<ul> <li>In-fill and extensional drilling within the known deposits to test the continuity of high-grade zones is ongoing. Resource samples are continuously being sent in batches of 150-300 samples and will be reported once the batches are completed.</li> <li>Metallurgical testwork is ongoing.</li> <li>Geotechnical and hydrological studies for the proposed tailings facility and waste deposits have started.</li> </ul>

### **SECTION 3 - ESTIMATION AND REPORTING OF MINERAL RESOURCES**

(Criteria listed in Section 1, and where relevant in Section 2, also apply to this Section.)

Criteria	Commentary
Database integrity	<ul> <li>The drilling database was originally held by Vale and received from them as csv exports.</li> <li>The drilling data have been imported into a relational SQL server database using Datashed<sup>™</sup> (Industry standard drill hole database management software) by Mitchell River Group.</li> <li>All of the available drilling data has been imported into 3D mining and modelling software packages (Surpac<sup>™</sup> and Leapfrog<sup>™</sup>), which allow visual interrogation of the data integrity and continuity. All of the resource interpretations have been carried out using these software packages. During the interpretation process it is possible to highlight drilling data that does not conform to the geological interpretation for further validation.</li> <li>Data validation checks were completed on import to the SQL database.</li> <li>Data validation has been carried out by visually checking the positions and orientations of drill holes.</li> </ul>
Site visits	<ul> <li>The Competent Person responsible for Sampling Techniques and Data and Exploration Results, Mr Roger Fitzhardinge, has visited the site multiple times and overseen exploration activity and assumes responsibility for the sampling and data management procedures.</li> <li>No visits to the Jaguar site have been undertaken by the Competent Person responsible for the Mineral Resource Estimate (MRE), Mr Lauritz Barnes, due to travel restrictions (COVID-19).</li> </ul>
Geological interpretation	<ul> <li>Sufficient drilling has been conducted to reasonably interpret the geology and the mineralisation. The mineralisation is traceable between multiple drill holes and drill sections.</li> <li>Interpretation of the deposit was based on the current understanding of the deposit geology. Centaurus field geologist supplied an interpretation that was validated and revised by the independent resource geologist.</li> <li>Drill hole data, including assays, geological logging, structural logging, lithochemistry, core photos and geophysics have been used to guide the geological interpretation.</li> <li>Extrapolation of mineralisation beyond the deepest drilling has been assumed up to a maximum of 100m where the mineralisation is open.</li> <li>Alternative interpretations could materially impact on the Mineral Resource estimate on a local, but not global basis. No alternative interpretations were adopted at this stage of the project.</li> <li>Geological logging in conjunction with assays has been used to interpret the mineralisation. The interpretation honoured modelled fault planes and interpretation of the main geological structures.</li> <li>Mineralization at Jaguar occurs as veins and breccia bodies set in extensively altered and sheared host rocks. Continuity of the alteration and sulphide mineralisation zones is good, continuity of local zones of semi-massive to massive sulphide is not always apparent.</li> <li>Mineralization at the Onça Preta and Onça Rosa deposits predominantly forms tabular semi-continuous bodies both along strike and down dip.</li> <li>Post-mineralisation faulting may offset mineralisation at a smaller scale than that which can be reliably modelled using the current drill hole data.</li> </ul>
Dimensions	<ul> <li>Jaguar South (primary mineralisation) covers an area of 1,200m strike length by 400m wide by 500m deep in strike length trending ESE-WNW. Individual domains dip sub-vertically with widths up to 20-30m.</li> <li>Jaguar Central (primary mineralisation) covers an area of 800m strike length by 250m wide by 420m deep trending ESE-WNW. Individual domains dip sub-vertically with widths up to 20-30m.</li> <li>Jaguar North (primary mineralisation) has a strike length of 600m by up to 25m wide by 300m deep, trending SE-NW.</li> <li>Jaguar Central North (primary mineralisation) covers an area of 700m strike length by 100m wide by 500m deep, trending E-W. Individual domains dip sub-vertically with widths up to 20-30m.</li> <li>Jaguar Central North (primary mineralisation) covers an area of 700m strike length by 100m wide by 500m deep, trending E-W. Individual domains dip sub-vertically with widths up to 20-30m.</li> <li>Jaguar Northeast (primary mineralisation) covers an area of 1,000m strike length by 300m wide by 420m deep, trending ESE-WNW. Individual domains dip sub-vertically with widths up to 10-15m.</li> <li>Jaguar West (primary mineralisation) has a strike length of 1,000m by up to 80m wide by 350m deep, trending E-W. Individual domains dip sub-vertically with widths up to 10-15m.</li> </ul>



Criteria	Commentary
	<ul> <li>Onça Preta (primary mineralisation) has a strike length of 400m by up to 15m wide by 375m deep, trending E-W.</li> <li>Onça Rosa (primary mineralisation) has a strike length of 500m by up to 10m wide by 250m deep, trending ESE-WNW</li> </ul>
Estimation and modelling techniques	<ul> <li>Grade estimation using Ordinary Kriging (OK) was completed using Geovia Surpac™ software for Ni, Cu, Co, Fe, Mg, Zn and As.</li> <li>Drill hole samples were flagged with wire framed domain codes. Sample data were composited to 1m using a using fixed length option and a low percentage inclusion threshold to include all samples. Most samples (80%) are around 1m intervals in the raw assay data.</li> <li>Top-cuts were decided by completing an outlier analysis using a combination of methods including grade histograms, log probability plots and other statistical tools. Based on this statistical analysis of the data population, no top-cuts were applied.</li> <li>Directional variograms were modelled by domain using traditional variograms. Nugget values are low to moderate (around 15-25%) and structure ranges up to 200 in the primary zones. Variograms for domains with lesser numbers of samples were poorly formed and hence variography was applied from the higher sampled domains.</li> <li>Block model was constructed with parent blocks for 10m (E) by 2m (N) by 10m (RL). All estimation was completed to the parent cell size.</li> <li>Three estimation passes were used. The first pass had a limit of 75m, the second pass 150m and the third pass searching a large distance to fill the blocks within the wire framed zones. Each pass used a maximum of 12 samples, a minimum of 6 samples and maximum per hole of 4 samples.</li> <li>Search ellipse sizes were based primarily on a combination of the variography and the trends of the wire framed mineralized zones. Hard boundaries were applied between all estimation domains.</li> <li>Validation of the block model included a volumetric comparison of the resource wireframes to the block model volumes. Validation of the grade estimate included comparison of block model grades to the declustered input composite grades plus swath plot comparison by easting and elevation.</li> </ul>
Moisture	<ul> <li>Visual comparisons of input composite grades vs. block model grades were also completed.</li> <li>The tonnages were estimated on an in-situ dry bulk density basis which includes natural moisture. Moisture content was not estimated but is assumed to be low as the core is not visibly porous.</li> </ul>
Cut-off parameters	• Potential mining methods include a combination of open pit and underground. A revised 0.3% Ni cut-off grade has been applied to material less than 200m vertical depth from surface in the estimation of the Global MRE with this being consistent with mineralisation domain modelling and reported significant intersection cut-off grades. A Ni cut-off grade of 1.0% Ni was maintained below 200m from surface to reflect higher cut-offs expected with potential underground mining.
Mining factors or assumptions	<ul> <li>It is assumed that the Jaguar deposits will be mined by a combination of open pit and underground mining methods.</li> <li>Conceptual pit optimisation studies have been completed by Entech to ensure that there are reasonable prospects for the eventual economic extraction of the mineralisation by these methods.</li> <li>Input parameters were benchmarked from similar base-metal operations in Brazil and Australia.</li> </ul>
Metallurgical factors or assumptions	<ul> <li>Metallurgical test work has been undertaken on multiple composite samples sourced from the Jaguar South and Onça Preta deposits. Material selection for test work was focused on providing a good spatial representation of mineralisation for the deposits.</li> <li>Bench scale test work to date has demonstrated that a conventional crushing, grinding and flotation circuit will produce good concentrate grades and metal recoveries, see ASX Announcements of 18 February 2020 and 31 March 2020 for more detail.</li> </ul>
Environmental factors or assumptions	<ul> <li>Tailings analysis and acid drainages tests have been completed which underpin the preliminary tailing storage facility design (TSF), which is in progress.</li> <li>Waste rock will be stockpiled into waste dumps adjacent to the mining operation.</li> <li>The TSF and waste dumps will include containment requirements for the management of contaminated waters and sediment generation in line with Brazilian environmental regulations.</li> </ul>
Bulk density	<ul> <li>On the new drilling, bulk densities were determined on 15 to 30 cm drill core pieces every 1m in ore and every 10m in waste. On the historical drilling the bulk densities were determined on drill core at each sample submitted for chemical analysis.</li> <li>Bulk density determinations adopted the weight in air /weight in water method using a suspended or hanging scale.</li> <li>The mineralized material is not significantly porous, nor is the waste rock.</li> <li>A total of 39,313 bulk density measurements have been completed.</li> <li>Of these, 4,040 were included in the analysis and are within the defined mineralised domains – and 4,031 are from fresh or transitional material leaving only 9 measurements from saprolite or oxide</li> </ul>



Criteria	Commentary
	<ul> <li>material.</li> <li>Oxide and saprolite material are excluded from the reported resource.</li> <li>Fresh and transitional measurements from within the mineralised domains we analysed statistically by domain and depth from surface and compared to Ni, Fe and S. A reasonable correlation was defined against Fe due to the magnetite in the system.</li> <li>The bulk density values assigned the mineralised domains by oxidation were as follows: <ul> <li>Oxide: 2.0</li> <li>Saprolite: 2.3</li> <li>Transition: 2.6</li> <li>Fresh: by regression against estimated Fe using: BD = (fe_ok*(0.0323)) + 2.6276</li> </ul> </li> </ul>
Classification	<ul> <li>The Mineral Resource has been classified on the basis of confidence in the geological model, continuity of mineralised zones, drilling density, confidence in the underlying database, a combination of search volume and number of data used for the estimation plus availability of bulk density information.</li> <li>Indicated Mineral Resources are defined nominally on 50mE x 40mN spaced drilling and Inferred Mineral Resources nominally 100mE x 100mN with consideration given for the confidence of the continuity of geology and mineralisation.</li> <li>Oxide and saprolite material are excluded from the Mineral Resource.</li> <li>The Jaguar Mineral Resource in part has been classified as Indicated with the remainder as Inferred according to JORC 2012.</li> </ul>
Audits or reviews	• This is the second Mineral Resource estimate completed by the Company. The current model was reviewed by Entech as part of their independent mining study.
Discussion of relative accuracy/ confidence	<ul> <li>The relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC Code.</li> <li>The statement relates to global estimates of tonnes and grade.</li> </ul>