Ardea Resources Limited

Goongarrie Hub Feasibility Study Update

ASX & Media Release

15 November 2021

ASX Symbol

ARL

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Issued Capital

Fully Paid Ordinary Shares
138,034,219

Directors/Employee Performance Rights
4,667,000

ABN 30 614 289 342

Ardea is pleased to present an update of the current Feasibility Study programs:

- A uniform Material Types model has been completed for the Goongarrie Hub resource, allocated on the basis of mineralogy for processing by either High Pressure Acid Leach (**HPAL**) or Atmospheric Leach (**AL**).
- Metallurgical Drilling completed, 3,204m of HQ3 core drilling in 39 holes.
- Bench-scale metallurgical testing to commence on receipt of drill core multi-element assay data.
- Previous PFS programs by Vale Inco in 2005 to 2009 and Ardea in 2017 to 2019 confirm Goongarrie South stands out as premium HPAL plant feed.
- Goongarrie Hill and Highway were identified from re-evaluation of Vale Inco data as being well suited to Atmospheric Leach. Accordingly, these deposits are the current test-work focus with the aim of providing increased nickel-cobalt production through optimising full resource utilisation.
- The metallurgical program is designed to assess a Goongarrie Hub flow-sheet with two HPAL autoclaves with each rated at 1.5Mtpa, as well as an Atmospheric Leach of some 0.5Mtpa.
- The modelled leach feed grade is currently 1% Ni and 0.07% Co, reflecting the 0.8% Ni cut-off resource grade (ASX release 16 June 2021). The current bench-scale metallurgy also aims to quantify the likely screen beneficiation performance, notably at Goongarrie Hill and Highway.

The final decision for the Goongarrie Hub Definitive Feasibility Study (**DFS**) production rate will be made on the basis of the current metallurgical programs.

Ardea's Managing Director, Andrew Penkethman, said:

"The Goongarrie Hub Material Types upgrade allows the mineralisation to be matched to the HPAL and AL circuits, maximising resource utilisation from a well understood hydrometallurgical flow-sheet. Plant feed which in previous schedules was stockpiled for late project HPAL processing, is now designed to feed the AL circuit contemporaneously with mining and is expected to result in increased nickel-cobalt production.

Significantly, the additional sulphuric acid now required for the AL circuit leads to a larger sulphur burning acid plant, with consequent increase in steam and thus off-grid energy production which facilitates a material de-carbonising of the project.

In terms of ESG, the proposed KNP Goongarrie Hub flowsheet is a bench-mark for nickel-cobalt production.

The total KNP MRE is now 830Mt at 0.71% Ni and 0.046% Co (5.9Mt nickel, 380kt cobalt). This is a world-significant asset located in an infrastructure rich location, within the best operating jurisdiction in the world."

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1. Background

The Kalgoorlie Nickel Project (**KNP**) (Figure 1) is undergoing a Feasibility Study for a High Pressure Acid Leach (**HPAL**) and Atmospheric Leach (**AL**) processing operation initially producing Mixed Hydroxide Precipitate (**MHP**) as an ethical and sustainable supply chain for the Lithium Ion Battery (**LIB**) sector. Ardea has 100% unencumbered project offtake rights.

The full Goongarrie Hub was re-modelled using a single Material Types algorithm as a basis for pit optimisations, metallurgical flow sheet and engineering designs to maximise resource utilisation and nickel-cobalt production.

Most importantly, Material Types at the Goongarrie Hub are now segregated into HPAL feed, AL feed, and Neutraliser based on XRD quantitative mineralogy determinations for over 350 representative samples selected from diamond and RC drilling (refer ASX release 5 October 2021, slide 10 for enhanced KNP flow-sheet).

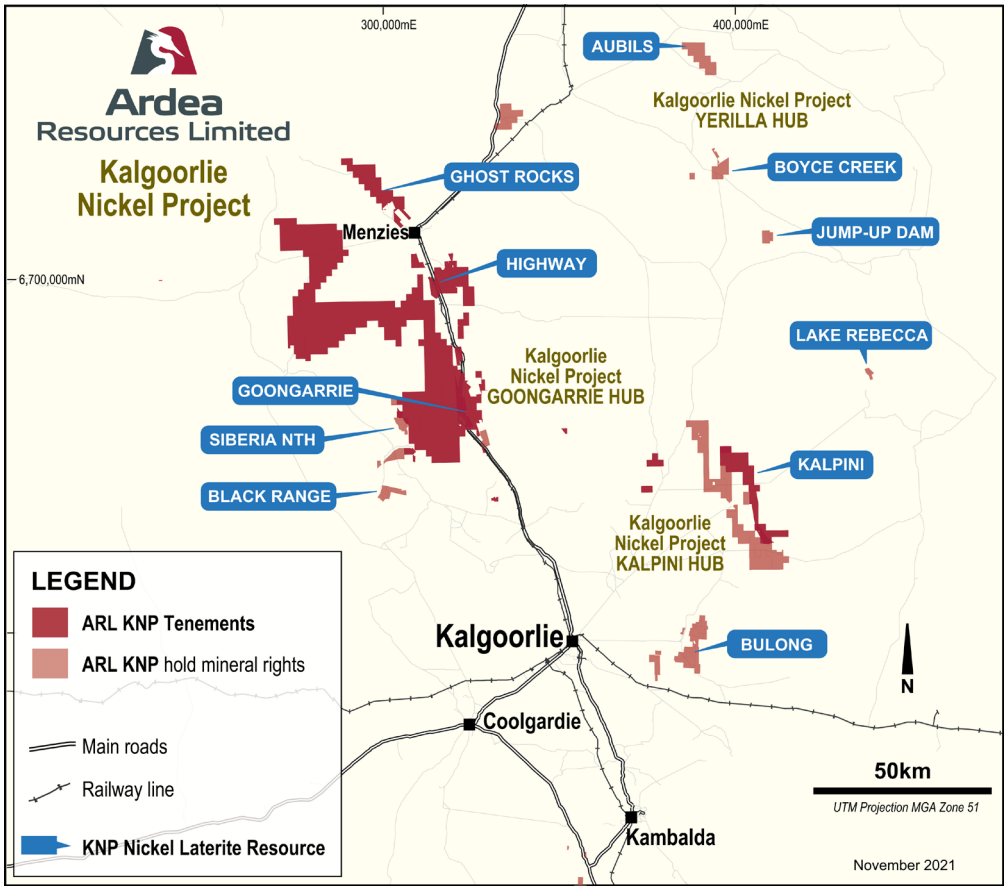
The Material Types algorithm also allows the optimum comminution circuit to be identified. Siliceous ores are amenable to beneficiation by rejection of the coarse barren hard silica (**Beneficiation circuit**). Non-siliceous soft ores do not benefit from beneficiation and are processed on a whole Run of Mine basis (**Grind circuit**). Non-siliceous ores are dominantly fine-grained soft goethite and require less comminution than siliceous ore types, so reducing ore preparation operating costs.

Based on the Ardea PFS (ASX release 28 March 2018), the Goongarrie goethite mineralisation can support a 1.5Mtpa autoclave feed tonnage. Upgrading to two autoclaves optimises operation of the acid plant, as well as significantly increasing the metal production rate in response to the rapidly growing demand for nickel and cobalt.

Previous hydrometallurgical bench-scale test work by Vale Inco confirmed high magnesium mineralisation is amenable to Atmospheric Leaching, but has not yet been subject to PFS level evaluation.

Engineering consultant Wood is currently reviewing the production model in their Gap Analysis Study with an update to be provided once this study has been completed (expected before year end).

Figure 1: Kalgoorlie Nickel Project (KNP) location plan.



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2. Drilling Program

Goongarrie Hub metallurgical drill holes were selected on the basis of detailed geo-metallurgical interpretation. The program was managed by the Ardea West Kalgoorlie office between July and October 2021. All core (Table 1) has been processed and submitted to the laboratory for multi-element assay ahead of bench-scale metallurgy.

Pit Area	Holes Drilled	Metres
Highway	23	1,351
Goongarrie South	8	1,468
Goongarrie Hill	8	385
Grand Total	**39**	**3,204**

Table 1: Goongarrie Hub metallurgical drilling completed.

3. Resource and Metallurgy

The following high grade resource (Table 2) is being used as the basis for studies that will feed into the DFS to define the optimum mine plan and production strategy for the Goongarrie Hub.

Deposit	Resource Category	Tonnes (Mt)	Ni %	Co %	Contained Metal Ni (kt)	Contained Metal Co (kt)
Goongarrie (GH, GS, BF & SD)	Measured	11.0	1.13	0.106	125	11.6
	Indicated	41.5	0.97	0.070	404	29.0
	Inferred	7.1	0.95	0.051	67	3.6
	Subtotal	59.6	1.00	0.074	595	44.3
Highway	Indicated	15.1	1.01	0.053	152	8.0
	Inferred	3.7	0.98	0.053	36	2.0
	Subtotal	18.8	1.00	0.053	188	10.0
Combined Deposits	Measured	11.0	1.13	0.106	125	11.6
	Indicated	56.5	0.98	0.066	556	37.1
	Inferred	10.8	0.95	0.051	103	5.6
	Grand Total	**78.3**	**1.00**	**0.069**	**784**	**54.3**

Table 2: Goongarrie and Highway (ASX release 15 February and 16 June 2021) nickel and cobalt Mineral Resource Estimate (MRE) using a 0.8% Ni cut-off grade.

The indicative process circuit allocation of the above 0.8% Ni cut-off MRE is as follows (ASX releases 15 February 2021 and 16 June 2021):

- HPAL Grind (mine, ball mill comminution & HPAL feed) 36.4Mt at 1.05% Ni and 0.102% Co
- HPAL Bene (mine, trommel beneficiate & HPAL feed) 26.8Mt at 0.95% Ni and 0.044% Co
- AL Grind (mine, ball mill comminution & AL feed) 4.3Mt at 0.97% Ni and 0.039% Co
- AL Bene (mine, trommel beneficiate & AL feed) 6.3Mt at 0.96% Ni and 0.036% Co
- Neutraliser (mine, comminution, neutraliser after HPAL & AL circuit) 4.5Mt at 0.98% Ni and 0.031% Co

With the beneficiation ("Bene") and high cobalt plant feed, a 0.5% Ni cut-off grade is envisaged in order to meet targeted production levels, subject to current metallurgical work. Additionally, the metal recovery estimate from neutraliser will be quantified by the current metallurgical work.

The metallurgical process flowsheet was updated to reflect Ardea's improved understanding of the resource, as well as market demand for utility type MHP.

4. Next Steps

Completion of the Goongarrie Hub DFS is the priority for Ardea with the aim of defining and developing an industry leading nickel-cobalt producer that can ensure ethical and sustainable mineral supply for the rapidly expanding LIB sector. Upcoming news flow over the next three months will include completion of the Wood Gap Analysis Study, and metallurgical and DFS updates (e.g. Water supply study, Process model verification, Logistics studies, Preliminary engineering documentation, Testwork results, Energy study).

Authorised for lodgement by the Board of Ardea Resources Limited.

For further information regarding Ardea, please visit https://ardearesources.com.au/ or contact:

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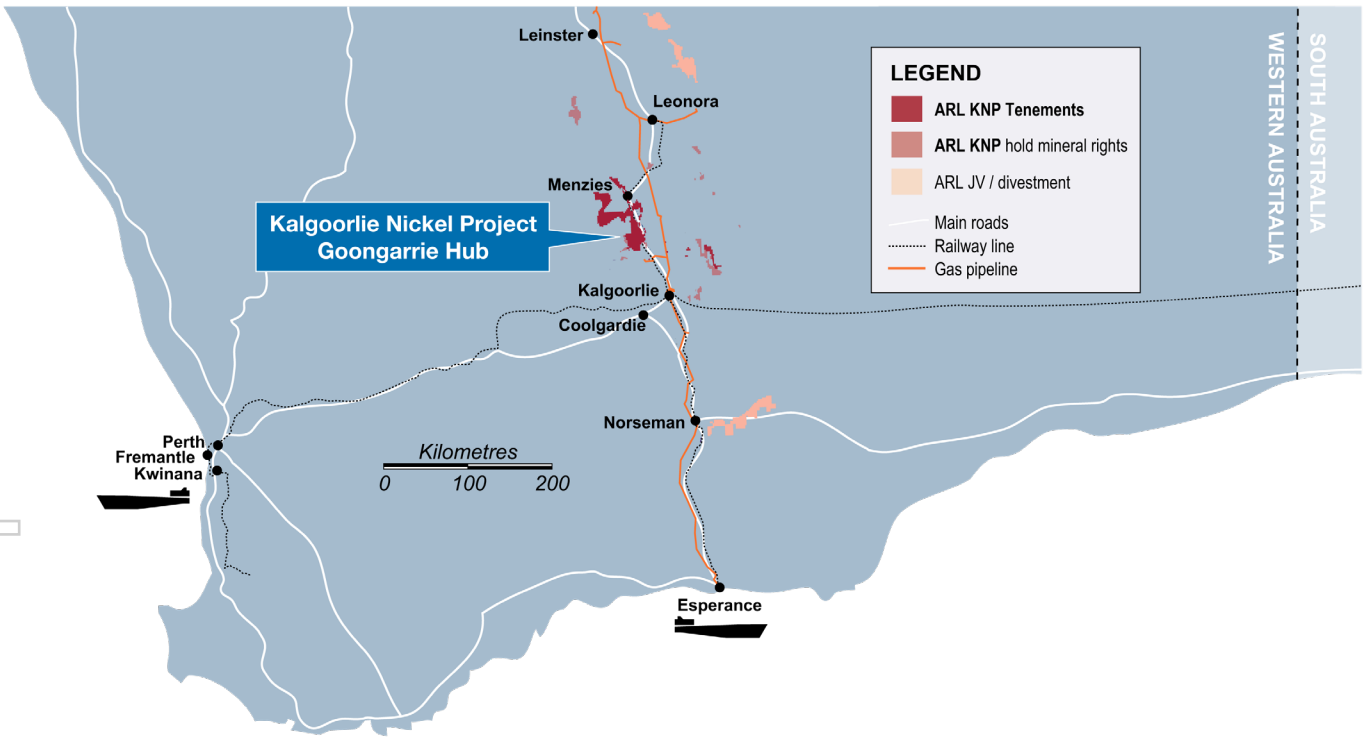
About Ardea Resources

Ardea Resources (ASX:ARL) is an ASX-listed resources company, with a large portfolio of 100%-controlled West Australian-based projects, focussed on:

- Development of the Kalgoorlie Nickel Project (**KNP**) and its sub-set the Goongarrie Hub, a globally significant series of nickel-cobalt and Critical Mineral deposits which host the largest nickel-cobalt resource in the developed world at **830Mt at 0.71% nickel and 0.046% cobalt for 5.9Mt of contained nickel and 380kt of contained cobalt** (ARL ASX announcement 15 February, 16 June 2021) located in a jurisdiction with exemplary ESG credentials.
- Advanced-stage exploration at compelling nickel sulphide and Critical Minerals targets within the KNP Eastern Goldfields world-class nickel-gold province, with all exploration targets complementing the KNP nickel development strategy.



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CAUTIONARY NOTE REGARDING FORWARD-LOOKING INFORMATION

This news release contains forward-looking statements and forward-looking information within the meaning of applicable Australian securities laws, which are based on expectations, estimates and projections as of the date of this news release.

This forward-looking information includes, or may be based upon, without limitation, estimates, forecasts and statements as to management's expectations with respect to, among other things, the timing and amount of funding required to execute the Company's exploration, development and business plans, capital and exploration expenditures, the effect on the Company of any changes to existing legislation or policy, government regulation of mining operations, the length of time required to obtain permits, certifications and approvals, the success of exploration, development and mining activities, the geology of the Company's properties, environmental risks, the availability of labour, the focus of the Company in the future, demand and market outlook for precious metals and the prices thereof, progress in development of mineral properties, the Company's ability to raise funding privately or on a public market in the future, the Company's future growth, results of operations, performance, and business prospects and opportunities. Wherever possible, words such as "anticipate", "believe", "expect", "intend", "may" and similar expressions have been used to identify such forward-looking information. Forward-looking information is based on the opinions and estimates of management at the date the information is given, and on information available to management at such time.

Forward-looking information involves significant risks, uncertainties, assumptions, and other factors that could cause actual results, performance or achievements to differ materially from the results discussed or implied in the forward-looking information. These factors, including, but not limited to, the ability to create and spin-out a gold focussed Company, fluctuations in currency markets, fluctuations in commodity prices, the ability of the Company to access sufficient capital on favourable terms or at all, changes in national and local government legislation, taxation, controls, regulations, political or economic developments in Australia or other countries in which the Company does business or may carry on business in the future, operational or technical difficulties in connection with exploration or development activities, employee relations, the speculative nature of mineral exploration and development, obtaining necessary licenses and permits, diminishing quantities and grades of mineral reserves, contests over title to properties, especially title to undeveloped properties, the inherent risks involved in the exploration and development of mineral properties, the uncertainties involved in interpreting drill results and other geological data, environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins and flooding, limitations of insurance coverage and the possibility of project cost overruns or unanticipated costs and expenses, and should be considered carefully. Many of these uncertainties and contingencies can affect the Company's actual results and could cause actual results to differ materially from those expressed or implied in any forward-looking statements made by, or on behalf of, the Company. Prospective investors should not place undue reliance on any forward-looking information.

Although the forward-looking information contained in this news release is based upon what management believes, or believed at the time, to be reasonable assumptions, the Company cannot assure prospective purchasers that actual results will be consistent with such forward-looking information, as there may be other factors that cause results not to be as anticipated, estimated or intended, and neither the Company nor any other person assumes responsibility for the accuracy and completeness of any such forward-looking information. The Company does not undertake, and assumes no obligation, to update or revise any such forward-looking statements or forward-looking information contained herein to reflect new events or circumstances, except as may be required by law.

No stock exchange, regulation services provider, securities commission or other regulatory authority has approved or disapproved the information contained in this news release.

Compliance Statement (JORC 2012)

The information in this report that relates to KNP Exploration Results is based on information originally compiled by previous full time employees of Heron Resources Limited and or Vale Inco. The Exploration Results and data collection processes have been reviewed, verified and re-interpreted by Mr Ian Buchhorn who is a Member of the Australasian Institute of Mining and Metallurgy and currently an executive director of Ardea Resources Limited. Mr Buchhorn has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the exploration activities undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Buchhorn consents to the inclusion in this report of the matters based on his information in the form and context that it appears. Mr Buchhorn owns Ardea shares.

The information in this report that relates to Mineral Resources is based on information compiled by Mr James Ridley who is a Member of the Australasian Institute of Mining and Metallurgy, a full time employee of Ardea Resources and has sufficient experience 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 Ridley consents to the inclusion in the report of the matters based on this information in the form and context in which it appears. Mr Ridley owns Ardea shares.

The information in this report that relates to Metallurgy is based on information compiled by Mr Mike Miller who is a Member of the Australasian Institute of Mining and Metallurgy, a consultant of Ardea Resources and has sufficient experience 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 Miller consents to the inclusion in the report of the matters based on this information in the form and context in which it appears. Mr Miller owns Ardea shares.