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## COMPLETION OF POSITIVE PRELIMINARY SCOPING STUDY FOR McDERMITT LITHIUM PROJECT

- **Technical Studies completed by independent experts**
- **Study confirms potential to produce high quality lithium carbonate, supplying US battery makers for decades**
- **Multiple processing options identified for further optimisation**
- **Full operational and financial metrics have not been included due to regulatory constraints**
- **Infill drilling and metallurgical testwork planned for Q4 2021 expected to enable publication of more detailed Project metrics mid-2022**

Jindalee Resources Limited (**Jindalee**, the **Company**) is pleased to announce the completion of a preliminary Scoping Study (**Study**) at the Company's 100% owned McDermitt Lithium Project, currently the largest lithium resource in the US<sup>3</sup>. The key outcomes of the Study highlight the potential of the Project to support a viable standalone lithium mining and processing operation and reinforce the significance of McDermitt as a possible long-life source of future supply to the rapidly growing US battery manufacturing industry.

### Cautionary Statement

*The preliminary Scoping Study referred to in this announcement has been undertaken to determine the viability of an open pit mining operation with on-site extraction and purification facilities for the production of lithium carbonate and provide Jindalee confidence and guidance in ongoing development activities. It is a preliminary technical and economic study of the potential viability of the McDermitt Lithium Project. It is based on low level technical and economic assessments that are not sufficient to support the estimation of Ore Reserves or to provide assurance of an economic development case at this stage, or to provide certainty that the conclusions of the preliminary Scoping Study will be realised. Further exploration and evaluation work and appropriate studies are required before Jindalee will be in a position to estimate any Ore Reserves or to provide any assurance of an economic development case.*

*Having regard to ASX Listing Rules Guidance Note 31 Reporting on Mining Activities (ASX GN31), the Company does not disclose in this announcement any production targets, forecast financial information or income-based valuations related to the preliminary Scoping Study, but instead the Company discloses appropriate information of a technical nature to ensure that the market is properly informed of the Company's prospects. Accordingly, the Company hereby makes certain aspirational statements and discloses the parts of the preliminary Scoping Study that do not contain production targets. The aspirational statements are based on the Company's current expectations of future results or events and should not be solely relied upon by investors when making investment decisions.*

Cautionary Statement (continued)

*The study is based on an Indicated and Inferred Mineral Resource. 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 further Measured or Indicated Mineral Resources or that the production targets or preliminary economic assessments will be realised.*

*The preliminary Scoping Study is based on the material assumptions outlined below. These include assumptions about the availability of funding. While Jindalee considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the Scoping Study will be achieved.*

*To achieve the range of outcomes indicated in the preliminary Scoping Study, significant funding will likely be required. Investors should note that there is no certainty that Jindalee will be able to raise that amount of funding when needed. It is also likely that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Jindalee's existing shares.*

*It is also possible that Jindalee could pursue other 'value realisation' strategies such as a sale, partial sale or joint venture of the Project. If it does, this could materially reduce Jindalee's proportionate ownership of the Project.*

*Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the preliminary Scoping Study.*

**Summary:**

- **Preliminary Scoping Study completed on the McDermitt Lithium Project with results indicating positive operational and economic outcomes**
- **The Study envisages an open pit mining operation processing ore by means of sulphation roasting to produce battery grade lithium carbonate**
- **The Study identifies opportunities for further optimising the processing flow sheet to reduce operating costs**
- **Given the proportion of Inferred Mineral Resource used in the Study, full operational and financial metrics have not been released due to regulatory constraints**
- **Independent consultants for the study include GR Engineering Services (GRES) for process engineering, capital and operating cost estimation; Cube Consulting (Cube) for mining; and MineGeoTech for geotechnical assessment**
- **The results support the Company's ongoing focus on de-risking the project through drilling, metallurgical and environmental studies**

## Background

The McDermitt Project is located in Malheur County located on the Oregon-Nevada border, approximately 35 km west of the town of McDermitt at the northern end of the McDermitt volcanic caldera. The property is located upon and bordered by federally owned lands administered by the Bureau of Land Management (BLM).

The Project comprises unpatented mineral claims owned 100% by HiTech Minerals Inc., Jindalee's wholly owned US subsidiary. There are no private royalties on any of the claims.

## Geology and Resources

The McDermitt Project is located within a Miocene aged volcanic caldera that forms a prominent oval-shaped geographic feature approximately 40km north-south by 25km east-west. Tuffaceous sediments were deposited within a lacustrine moat around a resurgent dome in the central part of the caldera. These lacustrine sediments are the host to lithium mineralisation in the caldera, and consist of glass shards, fine pumice, and mineral and rock fragments. Drilling in the northern and southern caldera has encountered as much as 210m thickness of sediments, and up to 186m was encountered in the 2020 drilling within the central part of the McDermitt project area.

Hydrothermal systems related to the emplacement of ~16Ma near-surface rhyolitic intrusions along caldera ring structures have resulted in localised zones of alteration and concentrations of Hg, U, Ga and minor Au. Mercury was historically extracted from several localities including the Bretz, Opalite, Cordero, Moonlight and McDermitt mines on the margins of the caldera and the Aurora uranium resource occurs on the northern margin of the caldera. In contrast to the other mineralisation types, lithium is hosted in illite and smectite clays in stratiform lenses within the tuffaceous sediments.

To date, Jindalee has completed a total of 29 reverse circulation and diamond drill holes into the McDermitt deposit. Every drill hole has intercepted significant zones (greater than 1000ppm lithium) of flat lying mineralisation<sup>6</sup>.

On 8 April 2021 Jindalee announced an updated Mineral Resource Estimate (MRE) of **1.43 Bt @ 1,320ppm Li** (0.28% Li<sub>2</sub>O) at 1,000ppm Li cut-off<sup>3</sup> had been estimated at McDermitt (Table 1):

Cut-off Grade (ppm Li)	Indicated Resource			Inferred Resource			Indicated & Inferred Resource		
	Tonnage (Mt)	Li Grade (ppm)	LCE (Mt)	Tonnage (Mt)	Li Grade (ppm)	LCE (Mt)	Tonnage (Mt)	Li Grade (ppm)	LCE (Mt)
500	283	1,340	2.0	2,020	1,130	12.1	2,300	1,150	14.1
1,000	233	1,430	1.8	1,200	1,300	8.3	1,430	1,320	10.1
1,500	73	1,910	0.7	240	1,750	2.2	313	1,790	3.0
1,750	44	2,110	0.5	85	2,000	0.9	129	2,040	1.4
2,000	23	2,310	0.3	34	2,200	0.4	57	2,240	0.7

**Table 1. Summary of McDermitt Mineral Resource Estimate at varying cut-off grades, with preferred reporting cut-off of 1,000ppm highlighted. Note: totals may vary due to rounding.**

The results of the MRE at a full range of cut-off grades demonstrate the scalability of the project.

### Geotechnical Study

The geotechnical study consisted of a review of drillhole data and geology wireframes. There has been no specific geotechnical data collection program completed at this stage. Diamond core photographs were reviewed to gain an overall appreciation for the rockmass quality. Additionally, the case study of the Thacker Pass project, located 30km to the south of McDermitt, was used to validate the empirical assessment as both projects are in a similar geological setting.

### Mining Study

The open pit optimisation resulting from the Mineral Resource model and input parameters formed the basis of the mine production schedule. No detailed pit designs were undertaken at this level of study. A series of shells were selected in ascending order to represent a mining cutback sequencing strategy to provide the schedule with the opportunity of targeting the higher-grade material first. Pit optimisations were performed based on an average Life of Mine lithium carbonate price of ~US\$11,000 per tonne, versus the current spot price of lithium carbonate of ~US\$19,350<sup>1</sup> per tonne.

The mining schedule was staged to enable the plant feed grade to be maximised in the earlier years of the project life and steadily decline towards the end of the mine life. The proportion of Mineral Resource by classification in the optimised pit shell is approximately 22% Indicated to 78% Inferred, in line with the current breakdown of the overall Mineral Resource classification (Table 1).

One of the major scheduling constraints in relation to practical mining is a limit on the vertical rate of advance. This schedule was limited to a vertical advance rate of no more than 60 metres in a 12-month period. However, it is notable that this limit was not reached throughout the schedule which implies that the mining production is capable of much higher production rates and subsequent ore feeds, should future plans or strategies include increased processing capacities.

Key operational metrics that can be released in line with ASX Guidance Note 31 are summarised in Table 2.

<b>Metric</b>	<b>Unit</b>	<b>Base Scenario</b>
Head Grade	ppm Li	1,793
Metallurgical Recovery	%	81
Strip Ratio	(waste:ore)	1.2

**Table 2. Results for key operational metrics from preliminary McDermitt Scoping Study**

### Mineral Processing Study

To date, test work for the McDermitt deposit has focussed primarily on the sulphuric acid leaching of both whole and beneficiated ore.

A significant portion of the leach test work completed by Jindalee in 2019 and 2020 is based on a 44kg sample of 2,350ppm Li which was representative of the McDermitt deposit at a 1,750ppm cut-off grade (from the 2019 Mineral Resource update<sup>4</sup>). Whilst the sulphuric acid leaching yields high recoveries of lithium, it is also accompanied by high levels of base and alkali metals, which increase proportionally as lithium grade decreases.

Initial modelling of the leaching flowsheet in SysCAD (a process engineering software program) using the 2021 Mineral Resource<sup>3</sup> grade of around 1,400ppm lithium indicated that the comparatively low lithium tenors of the solution achieved through leaching, coupled with high leach extractions of impurity elements, complicated the flowsheet for this level of assessment even after beneficiation.

In light of these results, it was determined that an alternative processing flowsheet employing sodium sulphate roasting might have the potential to produce more optimal lithium recoveries with reasonable operating costs. This flowsheet was first modelled with beneficiation, but due to the upfront loss of approximately 15% of the lithium, beneficiation was removed from the flowsheet, resulting in higher lithium recovery overall. Sulphation roasting is the processing route proposed for the Sonora Lithium Project<sup>5</sup> being developed by Bacanora Lithium PLC (LON: BCN), currently under acquisition by Ganfeng Lithium.

As noted above, beneficiation prior to roasting was considered and investigated, however higher recoveries were achieved using SAG Milling and whole of ore roast.

The flowsheet that was carried forward into the Study was therefore based on sodium sulphate roasting, utilising assumed recoveries based on similar projects within the GRES database and publicly available information. However, further testwork is required in order to confirm the amenability of McDermitt ore to this processing method (see “Recommendations” below).

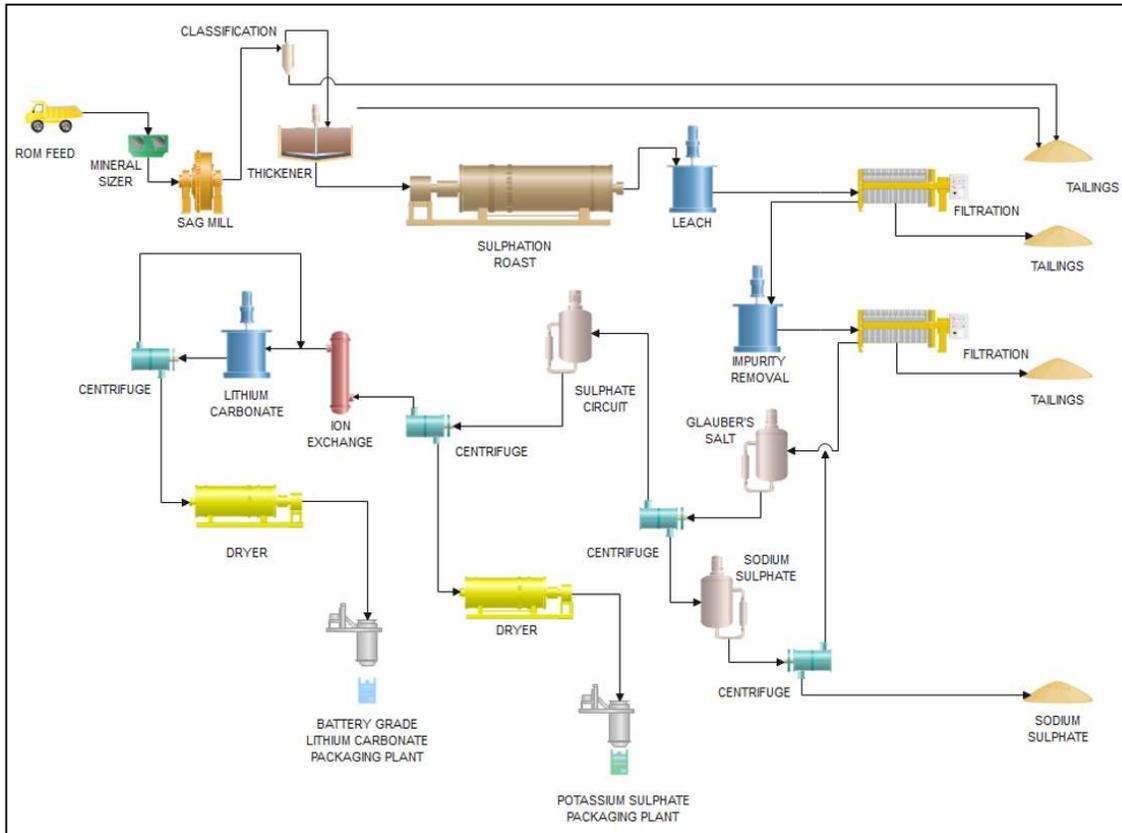
The flowsheet (Figure 1) consists of the following unit processes:

- Comminution to recover lithium into a fine ground stream while rejecting coarse gangue,
- Sodium sulphate roasting, which converts the lithium to water soluble  $\text{Li}_2\text{SO}_4$  at 900°C, in the presence of gypsum, sodium sulphate and limestone,
- A hydrometallurgical section where the roast product is repulped in water to form an impure  $\text{Li}_2\text{SO}_4$  Pregnant Leach Solution (PLS). Impurities are then removed from the PLS using precipitation and ion exchange prior to the evaporation and precipitation of battery grade lithium carbonate,
- Potassium sulphate is recovered from the barren liquor using crystallisation and selective dissolution. The filtrate is returned to the sodium sulphate circuit; and
- Sodium sulphate is produced from the PLS via crystallization and stockpiled for either reclaim for reuse in the roasting circuit or for disposal.

A key benefit of the sulphation roast flowsheet is the production of sulphate of potash (SOP) as a by-product. SOP ( $\text{K}_2\text{SO}_4$ ) contains 50-52%  $\text{K}_2\text{O}$  and ~18% S (both essential trace elements for plants) and is the world’s most widely used low-chloride fertiliser. In 2020 the global SOP market was worth an estimated US\$3.68B and this is expected to reach US\$4.57B by late 2027. The SOP price in July 2021 was ~US\$550 per tonne<sup>9</sup>.

The final choice of flowsheet is likely to be dependent on a number of factors including:

- The results from recommended metallurgical test programs (see “Recommendations”),
- Availability of consumables for large scale operations,
- The environmental impact of each processing route and resulting implications for permitting and approvals, and
- Ability to target higher grade lithium areas for mining (with higher grade material likely to be more amenable to acid leach).



**Figure 1. Simplified flowsheet**

### Capital Costs

The Study produced capital cost estimates based on the following sources of information:

- Engineering, Procurement and Construction Management (EPCM) execution for construction of the process plant and infrastructure
- Process design criteria,
- Equipment List,
- Process flow sheets
- Block flow diagram, and
- Plant layout drawing

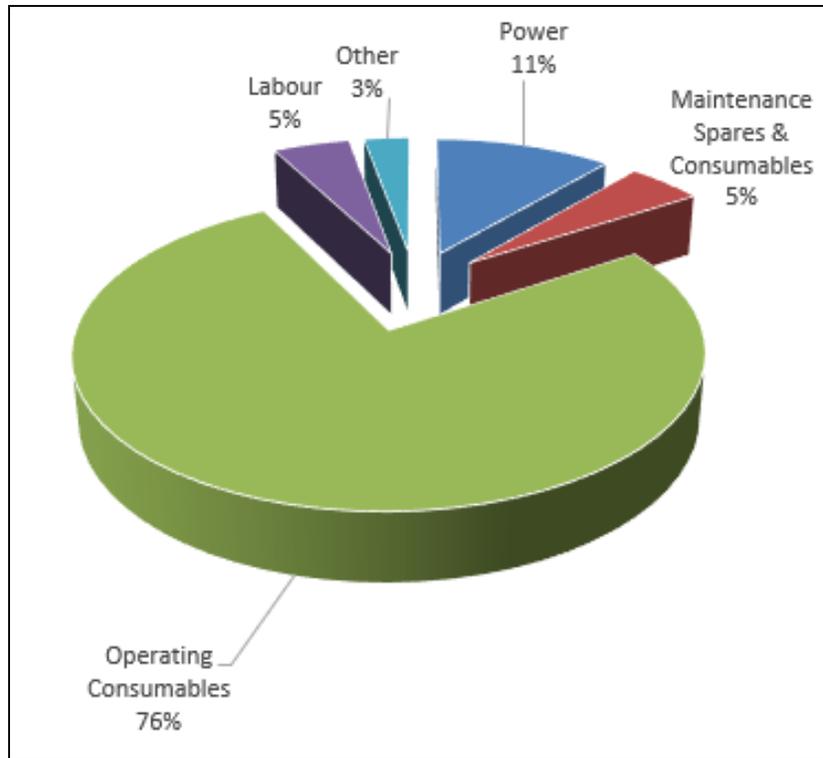
The capital cost estimates in the Study are in the Phase 1 (Scoping Study) class, with a nominal accuracy of  $\pm 50\%$ . Jindalee considers the capital cost estimates in the Study to be broadly in line with expectations, having regard to published estimates by other listed companies seeking to develop lithium-sediment projects and the large-scale, long-life nature of the McDermitt Project.

### Operating Costs

The operating cost estimates in the Study use prices obtained in Q2 2021 and are considered to have an accuracy of  $\pm 35\%$ . The estimates include all site-related operating costs associated with the production of battery grade lithium carbonate and potassium sulphate for sale as a sulphate of potash fertiliser.

The mining operating costs were developed by Cube, the process plant and administration operating costs were developed by GRES, in conjunction with Jindalee, with the Head Office costs developed by Jindalee.

The process plant operating cost estimate makes use of SysCAD mass balance numbers based on steady state operating conditions (that is, on the assumption that the plant has been fully commissioned and ramped up to design parameters). The breakdown of process plant costs is summarised in Figure 2.



**Figure 2. Breakdown of process plant operating costs**

The change in preferred processing flowsheet from beneficiation and acid leaching to sulphation roasting of unbeneficiated ores resulted in operating costs which were higher than those published by peer companies due primarily to:

- higher amounts of operating consumables (sodium carbonate and gypsum) required due to a relatively lower feed grade compared to peers, and
- higher demand for power from the roasting kiln.

These costs were offset to some extent by the additional income derived from the production and sale of sulphate of potash.

However, even with higher operating costs, the results were encouraging and provide a starting point for the Project in a strong lithium market (discussed below). Furthermore, the Study identified opportunities for further optimisation of the processing flow sheet, including ongoing detailed test work on both the leaching and sulphation roasting methods.

### Environmental & Permitting

The McDermitt Project is located on the Oregon-Nevada border, and the land is federally managed by the Bureau of Land Management (BLM). The Project is in the high desert (approximately 1500m above sea level) and the area is used for cattle grazing in the spring months.

Mineral exploration activities are currently being carried out under ‘Notice’ level permits with the BLM, and Exploration Permits through the Oregon Department of Geology and Mineral Industries (DOGAMI).

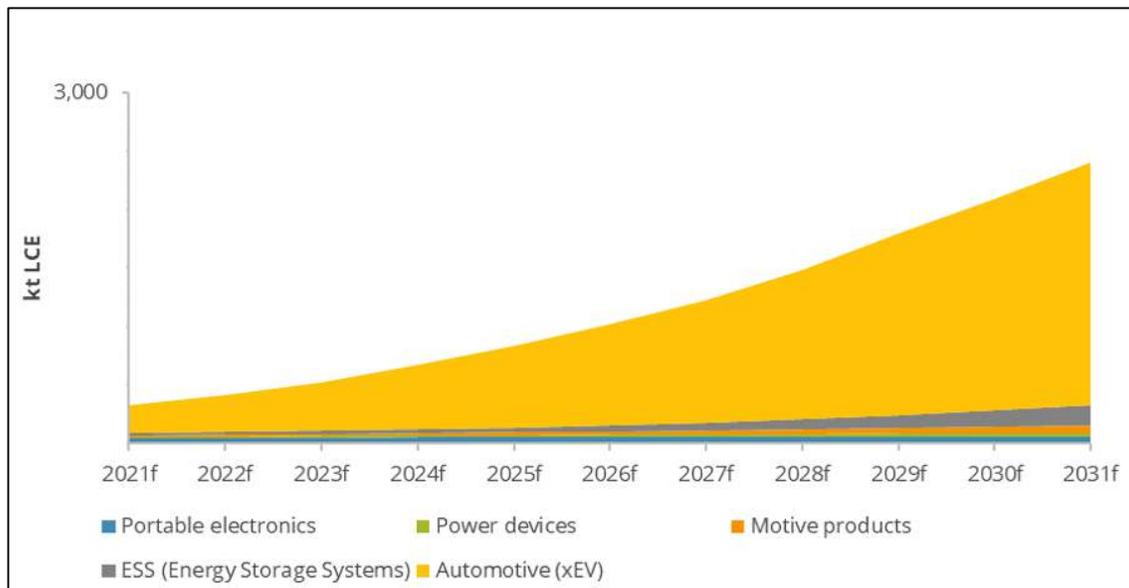
Jindalee has not yet initiated any process with federal, state, or local regulatory agencies for permits and approvals for the further advancement of the McDermitt Project.

The next phase of permitting is an Exploration Plan of Operations which will involve commencing a series of baseline environmental studies. These studies will also feed into an Environmental Impact Assessment as development of the McDermitt Project continues.

Market

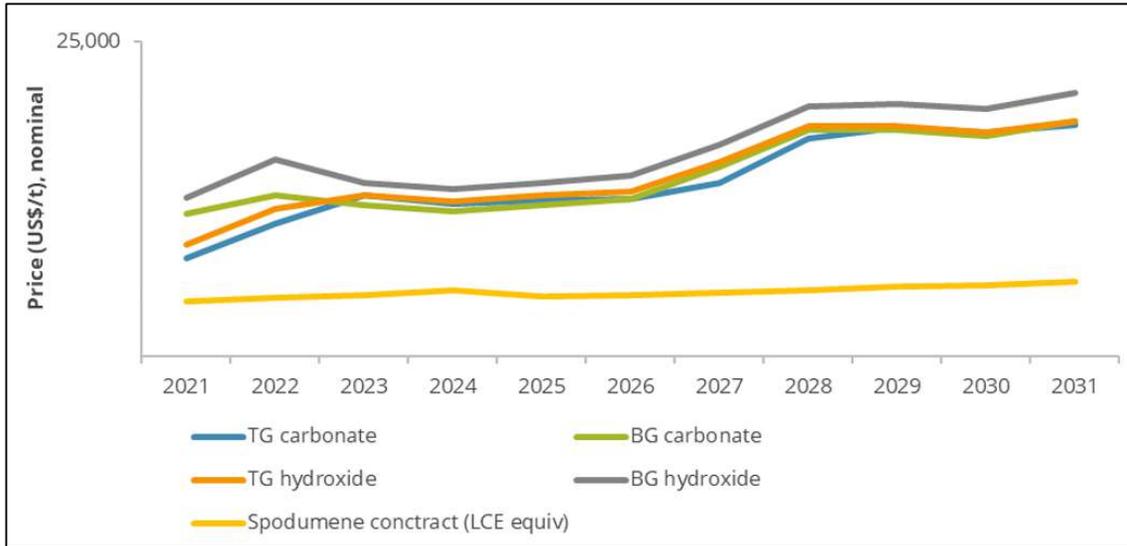
The lithium market has experienced a significant uplift in the last 12 months, driven by the global political and social push for electrification of the transport sector. A crucial component for the Electric Vehicle revolution is the raw materials such as lithium required for battery production. The United States currently produces 5,000tpa lithium carbonate equivalent (LCE) with demand forecast to reach 331,000tpa LCE by 2030.

Roskill are forecasting demand in the battery sector to be dominated by the automotive industry over the next 10 years as indicated in Figure 3.



**Figure 3. Forecast lithium demand by Li-ion battery application, 2021-2031 (kt LCE)**  
 Source: Reproduced from Roskill, Lithium Outlook to 2031<sup>7</sup>.

The most recent forecasts for lithium carbonate indicate prices will be relatively flat through to 2026, then will increase in line with the predicted supply deficit placing upwards pressure on the price (Figure 4).



**Figure 4. Lithium product contract price forecast, 2021-2031(\$US/t)**  
**Source: Reproduced from Roskill, Lithium Outlook to 2031<sup>7</sup>.**

### Economic Model

A comprehensive economic model has been prepared as part of the Study, assuming a three-year pre-production period before the commencement of mining operations.

The results from the economic model were positive and justify Jindalee’s continued investment and commitment to the next stage of exploration and development at McDermitt.

## Recommendations

The key recommendations from the Study are summarised by technical component in Table 3 and discussed further below.

Technical Component	Recommendations
Geology	Infill drill to upgrade resource confidence
	Increase density data measurements
	Complete additional drill hole twinning on diamond and reverse circulation
Geotechnical	Geotechnical logging of future diamond drill holes
	Targeted geotechnical drilling of proposed pit walls
	Acoustic Televiewer surveys of all geotechnical holes
	Sampling of selected rock core intervals and clay bands for laboratory strength testing
	Hydrogeological investigation into the standing water table and hydraulic conductivities of major geotechnical domains
	Hydrological investigation aimed at understanding impact of surface water flows across the deposit area
Mining	Ongoing optimisations based on the results of metallurgical test work
Metallurgical	Testing of the limestone-gypsum roasting flow sheet
	Investigate attrition versus flotation to determine most suitable beneficiation method for either leach or roast to maximise lithium recovery and gangue mineral rejection and reduce operating costs
	Testing sulphuric acid and other leach technologies, including chloride leaching on beneficiated ore (selective chlorination), as a means of reducing alkali metals and impurities in the leach solution
	Modelling and testing of pregnant leach solution for each of the leach and roast flowsheets to determine downstream impurity removal
	Set up of a pilot test work campaign based on results of above
Environmental	Commence baseline study program
	Commence Environmental Impact Assessment
Permitting	Submit Exploration Plan of Operation to Bureau of Land Management

**Table 3. Summary of recommendations from preliminary Scoping Study**

The upcoming diamond and reverse circulation drill program at McDermitt are expected to address most of the geological and geotechnical recommendations in the Study, in addition to supplying additional sample material for metallurgical testwork.

Identification of the optimal processing flowsheet remains the most important factor determining the preferred development route for the McDermitt Project.

Whilst the Study assumed a sulphation roast flow sheet, it is important to note that this is not fixed. One of the objectives of a scoping study is to identify the uncertainties in a project to be resolved in the next stage of study, and the data required to achieve this, and as noted above, several phases of test work have been recommended to inform the next study phase.

External environmental consultants have commenced work on the environmental and permitting actions.



Authorised for release by the Board of Jindalee Resources Limited.

- ENDS -

For further information please contact:

LINDSAY DUDFIELD  
**Executive Director**

T: + 61 8 9321 7550

E: [enquiry@jindalee.net](mailto:enquiry@jindalee.net)

KAREN WELLMAN

**Chief Executive Officer**

T: + 61 8 9321 7550

E: [enquiry@jindalee.net](mailto:enquiry@jindalee.net)

### About Jindalee

Jindalee Resources Limited (ASX: JRL) is an exploration company with direct and indirect exposure to lithium, gold, base and strategic metals, iron ore, uranium and magnesite through projects generated by the Company's technical team. Jindalee has a track record of rewarding shareholders, including priority entitlements to several successful IPO's and payment of a special dividend.

Jindalee's strategy is to acquire prospective ground, add value through low cost exploration and, where appropriate, either introduce partners to assist in funding further progress, or fund this activity via a dedicated company in which Jindalee retains a significant interest.

At 30 June 2021 Jindalee held cash and marketable securities worth approximately \$13.3M<sup>7</sup>. This funding, combined with the Company's tight capital structure (only 53.4M shares on issue), provides a strong base for advancing projects currently held by Jindalee and leveraging into new opportunities.

### References:

Additional details including JORC 2012 reporting tables, where applicable, can be found in the following releases lodged with ASX and referred to in this announcement:

1. Fastmarkets MB 03/09/2021: "Global Lithium Wrap: Chinese lithium carbonate prices post strongest weekly gains of all time". Accessed: <https://www.metalbulletin.com/Article/4006070/Latest-news/GLOBAL-LITHIUM-WRAP-Chinese-lithium-carbonate-prices-post-strongest-weekly-gains-of-all-time.html>
2. ASX 01/11/2016 "ASX interim guidance: Reporting scoping studies" Accessed: <https://www.asx.com.au/documents/asx-compliance/asx-guidance-on-reporting-scoping-studies-with-checklist.pdf>
3. Jindalee Resources ASX announcement 08/04/2021: "McDermitt Lithium Resource confirmed as largest in USA".
4. Jindalee Resources ASX announcement 19/11/2019: "Maiden Lithium Resource at McDermitt".
5. Bacanora Minerals Ltd 25/01/2018: "Technical Report on the Feasibility Study for the Sonora Lithium Project, Mexico" Accessed: <https://www.bacanoralithium.com/pdfs/Bacanora-FS-Technical-Report-25-01-2018.pdf>
6. Jindalee Resources ASX announcement 14/12/2020: "McDermitt Lithium Project – Drilling Update".
7. Roskill Market Reports 31/08/2021: "Lithium Outlook to 2031"
8. Jindalee Resources ASX announcement 29/07/2021: "Quarterly Activities & Cashflow Report".
9. Agrimin Presentation 16/07/2021. Accessed: <https://agrimin.com.au/wp-content/uploads/2021/07/Noosa-Mining-Conference-Presentation.pdf>

#### Competent Persons Statement

The information in this report that relates to Exploration Results and Mineral Resources is based on information compiled by Mr Lindsay Dudfield and Mrs Karen Wellman. Mr Dudfield is consultant to the Company and a Member of the Australasian Institute of Mining and Metallurgy and the Australian Institute of Geoscientists. Mrs Wellman is an employee of the Company and a Member of the Australasian Institute of Mining and Metallurgy. Both Mr Dudfield and Mrs Wellman have sufficient experience relevant to the styles of mineralisation and types of deposits under consideration, and to the activity being undertaken, to qualify as Competent Persons as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves.' Mr Dudfield and Mrs Wellman consent to the inclusion in this report of the matters based on this information in the form and context in which it appears.

The information in this report that relates to the Exploration Target and the Mineral Resource Estimate for the McDermitt deposit is based on information compiled by Mr. Arnold van der Heyden, who is a Member and Chartered Professional (Geology) of the Australasian Institute of Mining and Metallurgy and a Director of H&S Consultants Pty Ltd. Mr. van der Heyden has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity being 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' (JORC Code). The Company confirms that it is not aware of any further new information or data that materially affects the information included in the original market announcements by Jindalee Resources Ltd (JRL) entitled "McDermitt Lithium Resource confirmed as largest in USA" released on 8 April 2021 and in the case of estimates of Mineral Resources, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. To the extent disclosed above, the Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

#### Forward-Looking Statements

This document may contain certain forward-looking statements. Forward-looking statements include but are not limited to statements concerning Jindalee Resources Limited's (Jindalee's) current expectations, estimates and projections about the industry in which Jindalee operates, and beliefs and assumptions regarding Jindalee's future performance. When used in this document, the words such as "anticipate", "could", "plan", "estimate", "expects", "seeks", "intends", "may", "potential", "should", and similar expressions are forward-looking statements. Although Jindalee believes that its expectations reflected in these forward-looking statements are reasonable, such statements are subject to known and unknown risks, uncertainties and other factors, some of which are beyond the control of Jindalee and no assurance can be given that actual results will be consistent with these forward-looking statements.