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## This Week's News

### Investing.com - Australian Vanadium's diamond drilling demonstrates highly anomalous copper and coincident PGE anomalism at Coates - 19/12/2022

Australian Vanadium Ltd has fielded highly anomalous copper with coincident PGE anomalism from diamond drilling at the Coates Nickel-Copper-PGE Project, 80 kilometres northeast of Perth in Western Australia.

For the complete story see:

<https://au.investing.com/news/stock-market-news/australian-vanadiums-diamond-drilling-demonstrates-highly-anomalous-copper-and-coincident-pge-anomalism-at-coates-2746612>

### Proactive Investor - NickelSearch starts high-priority drill testing at Carlingup Nickel Sulphide Project - 19/12/2022

NickelSearch Ltd has started drill testing high-priority geochemical and geophysical targets at the Carlingup Nickel Sulphide Project near Ravensthorpe, Western Australia.

For the complete story see:

<https://www.proactiveinvestors.com.au/companies/news/1001568/nickelsearch-starts-high-priority-drill-testing-at-carlingup-nickel-sulphide-project-1001568.html>

### Mining Weekly - Australian resource exports surge as project pipeline grows - 19/12/2022

Australian resources and energy exports will earn a record A\$459-billion in 2022–23, before easing to A\$391 billion in 2023–24.

For the complete story see:

<https://www.miningweekly.com/article/australian-resource-exports-surge-as-project-pipeline-grows-2022-12-19>

## Other Stories

The West Australian - Dart, SQM plot next steps in Vic lithium hunt - 16/12/2022

Mining Technology News - Koba Resources acquires two Canadian lithium-pegmatite projects - 15/12/2022

Proactive Investor - Poseidon Nickel powers ahead towards Black Swan restart - 14/12/2022

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TNG Limited (ASX: TNG) - TNG Update on Mount Peake Offtake Agreements – 16/12/2022

## Latest Research

Recent pegmatite-hosted spodumene discoveries in Western Australia: insights for lithium exploration in Australia and globally - By Zoe Phelps-Barber, Allan Trench, David I. Groves

## Industry Overview

Australia Minerals Industry

## Leading Company Overview

AEON Metals Limited (ASX: AML)

Allkem Limited (ASX: AKE) formerly Orocobre Limited (ASX: ORE, TSX: ORL)

Alkane Resources Limited (ASX: ALK)

Astron Corporation Limited (ASX: ATR)

Aurelia Metals Limited (ASX: AMI)

DGR Global Limited (ASX: DGR)

Diatreme Resources Limited (ASX: DRX)

## Industry SnapShots

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Global Advanced Metals

Group 6 Metals Limited (ASX: G6M) formerly King Island Scheelite Limited (ASX: KIS)

Hastings Technology Metals Limited (ASX: HAS)

Iluka Resources Limited (ASX: ILU)

Korab Resources Limited (ASX: KOR)

Lake Resources NL (ASX: LKE)

Lanthanum Resources Limited (ASX: LNR) formerly Frontier Resources Limited (ASX: FNT)

Metallica Minerals Limited (ASX: MLM)

Neometals Limited (ASX: NMT)

Ramelius Resources (ASX: RMS) formerly Spectrum Metals Limited (ASX: SPX)

TNG Limited (ASX: TNG)

Tyranna Resources Limited (ASX: TYX)

Venture Minerals Limited (ASX: VMS)

Young Australian Mines Limited

**Associate: Danny Cliffson Crispin Benos**

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## News and Commentary

### **Investing.com - Australian Vanadium's diamond drilling demonstrates highly anomalous copper and coincident PGE anomalism at Coates - 19/12/2022**

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For the complete story see:

<https://www.miningweekly.com/article/australian-resource-exports-surge-as-project-pipeline-grows-2022-12-19>

### **The West Australian - Dart, SQM plot next steps in Vic lithium hunt - 16/12/2022**

Dart Mining and earn-in joint venture partner SQM Australia have formed a technical advisory committee to accelerate exploration at the duo's Dorchap lithium project in north-east Victoria.

For the complete story see:

<https://thewest.com.au/business/public-companies/dart-sqm-plot-next-steps-in-vic-lithium-hunt-c-9187006>

### **Mining Technology News - Koba Resources acquires two Canadian lithium-pegmatite projects - 15/12/2022**

Koba Resources has acquired the JB1 and Davidson lithium pegmatite projects in Canada from an undisclosed firm to strengthen its battery metals portfolio.

For the complete story see:

<https://www.mining-technology.com/news/koba-canadian-lithium/>

### **Proactive Investor - Poseidon Nickel powers ahead towards Black Swan restart - 14/12/2022**

Poseidon Nickel Ltd is powering ahead towards the restart of the Black Swan Project in Western Australia.

For the complete story see:

<https://www.proactiveinvestors.com/companies/news/1001293/poseidon-nickel-powers-ahead-towards-black-swan-restart-1001293.html>



### **Australian Mining - Kinkora well-funded to kick off drilling - 13/12/2022**

Kincora Copper has received binding commitments for a \$2.4 million capital raising to commence a high impact and high conviction drilling program.

For the complete story see:

<https://www.australianmining.com.au/news/kinkora-well-funded-to-kick-off-drilling/>

### **Proactive Investor - AuKing Mining on track to complete proposed acquisition of uranium and copper interests in Tanzania - 13/12/2022**

AuKing Mining Ltd is on track to complete the proposed acquisition of uranium and copper interests in Tanzania before the end of this year.

For the complete story see:

<https://www.proactiveinvestors.com.au/companies/news/1001001/auking-mining-on-track-to-complete-proposed-acquisition-of-uranium-and-copper-interests-in-tanzania-1001001.html>

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<https://twitter.com/acquisdata>



## Media Releases

### TNG Limited (ASX: TNG) - TNG Update on Mount Peake Offtake Agreements – 16/12/2022

Following an extensive and ongoing review of offtake agreements for the Mount Peake Vanadium-Titanium-Iron Project (the “Project”), the Board of TNG Limited (ASX: TNG) (“TNG” or the “Company”) advises that:

1. Notice of termination has been provided to Gunvor Singapore Pte Ltd in respect of the Life-of-Mine Offtake and Marketing Agreement (see ASX announcement of 15 October 2020) for 40% of the vanadium pentoxide intended to be produced from the Project, given the conditions precedent have not been satisfied.
2. Agreement has been reached with Vimson Group, through its Singapore-based, wholly-owned subsidiary V.M. SALGAOCAR & Bro. (Singapore) Pte. Ltd, to extend the Life-of-Mine Offtake and Marketing Agreement (see ASX announcement of 27 July 2020), for up to 100% of high purity iron products intended to be produced from the Project.

Comment from Chair

Mr Grant Wilson commented:

“The review that is currently underway is all-encompassing and focused on defining a coherent and credible strategy for Project delivery at Mount Peake. It is fundamentally necessary to include the Company’s offtake and financing arrangements as part of the review, and to ensure that the Company abides strictly by its legal obligations in making decisions. It is also important that such arrangements play a strongly facilitative role in advancing Project delivery. And that the Company’s posture in offtake and project finance is highly attuned to shifting global dynamics in respect of critical minerals and sustainability. I am looking forward to progressing these areas on behalf of the Company next year”.

<https://www.tngltd.com.au/wp-content/uploads/2022/12/61128863.pdf>

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## Latest Research

### **Recent pegmatite-hosted spodumene discoveries in Western Australia: insights for lithium exploration in Australia and globally**

**Zoe Phelps-Barber, Allan Trench, David I. Groves**

#### **Abstract**

The discovery and development of world-class Lithium–Caesium–Tantalum (LCT) spodumene-bearing pegmatites in Western Australia underpins growth of a significant new sector of its mining industry. Recently, several new spodumene discoveries have been delineated in the Yilgarn and Pilbara Cratons. Contrary to exploration narratives that new economic mineral discoveries will generally be made at increasingly greater depths, beneath barren cover rocks, or in remote geological environments, all new lithium discoveries have clear surface expressions in relatively ‘mature’ greenstone belts. The exploration implication is that the search space for pegmatite-hosted spodumene deposits in Western Australia remains immature. These recently discovered LCT pegmatites have geological features relevant to exploration including their age, amphibolite-facies metamorphic setting and syn-metamorphic timing, and 3D geometry, particularly their typically gentle dips, that match other such world-class pegmatites globally. Further spodumene discoveries within pegmatites at or near surface are likely in the Archean terranes of Western Australia based on these consistent exploration criteria and supportive capital market conditions.

<https://www.tandfonline.com/doi/full/10.1080/25726838.2022.2065450>

## The Industry

**Last published date: 2022-07-20**

### Australia - Mining - International Trade Administration

This is a best prospect industry sector for this country. Includes a market overview and trade data.

#### Overview

Mining has long been a cornerstone of the Australian economy. The gold rushes in 1850s were pivotal in the early development of the country. Today, it remains one of the country's most well-established sectors. It is a major contributor to Australia's economy, accounting for around 10% of total GDP in 2020. The industry is strongly export-oriented, with minimal processing onshore. The outlook for Australia's mineral exports continues to improve, as the world economy rebounds from the impact of the COVID-19 pandemic

The Australian government will expand Australia's mining science technology capability, create jobs, and ensure a greater share of raw materials are processed in Australia, through Labor's \$1 billion Value-Adding in Resources Fund.

Australia is the world's largest producer of lithium and a global top five producer of gold, iron ore, lead, zinc, and nickel. It also has the world's largest uranium and fourth largest black coal resources, respectively. As the fourth largest mining country in the world (after China, the United States, and Russia), Australia will have ongoing demand for high-tech mining equipment, representing potential opportunities for U.S. suppliers.

There are over 350 operating mine sites across the country, of which approximately one-third are located in Western Australia (WA), one-quarter in Queensland (QLD) and one-fifth in New South Wales (NSW), making them the three major mining states. By volume, Australia's two most important mineral commodities are iron ore (29 mines) – of which 97% is mined in WA – and coal (over 90 mines), which is largely mined on the east coast, in the states of QLD and NSW. In contrast to most global production, the majority (around 75%) of black coal in Australia is produced from open-cut mines. This ratio of 3:1 open-cut/surface to underground mines also applies to the broader (i.e., non-coal) local mining sector.

The United States is one of the largest exporters of mining equipment to Australia, with Japan, China, and Germany being other important sources of imported equipment. Major players such as Caterpillar, Komatsu, Wirtgen, Joy Global, and Liebherr have a strong presence in the market. Smaller-scale local manufacturers cater to niche and specialized markets and are particularly competitive in mining-related software, fine coal cleaning and process control, and strata reinforcement technology.

Underpinning the growth of the mining industry in Australia is a strong demand for Australia to be a reliable and stable supplier of resources to the United States and the world. Australia and the United States have strengthened bilateral cooperation to improve the reliability and diversity of global critical minerals supplies. Australia's abundant reserves of critical minerals such as antimony, manganese, and rare earths are crucial to communications, renewable energy, and defense industries. In 2019, the United States and Australia formalized their partnership on developing both nations' critical minerals assets between Geoscience Australia and U.S. Geological Survey (USGS). The two partners outlined specific steps to strengthen an existing Memorandum of Understanding by collaborating on research and increasing critical minerals capacity for both countries. There also is an opportunity for Australian mining projects to be funded by the US Government to help support and maintain the security of supply chains.

#### Leading Sub-Sectors

Applications to improve efficiency of maintenance and service of mines

One of the key opportunity areas for U.S. exporters in the Australian mining industry is maintenance and service. Mining companies remain strongly focused on reducing operating costs, so products and services that enhance or extend

existing infrastructure, and improve the bottom line, are likely to be well-received. Heavy construction equipment and drilling equipment are also leading sub-sectors.

### **Carbon Capture and Storage Technologies**

With the growing demand to lower carbon emissions in the Mining Industry, there is a growing demand for technologies that will limit greenhouse gas emissions by otherwise polluting industries. In 2022, the Western Australian Government announced funding for a new bill to allow carbon capture, utilization and storage (CCUS) to be further deployed in Western Australia (WA). The Australian government, the International Energy Agency (IEA) and UN's lead agency for assessing climate science, the Intergovernmental Panel on Climate Change (IPCC) say the technology will be critical to meeting net zero emissions targets to slow the trajectory of global warming.

### **Blue Hydrogen processing technologies**

There's a strong drive to decarbonize mining operations. Hydrogen can be used to store renewable energy to generate electricity, it can power equipment, trucks, and cars, and it can even be used in certain mining processes as a reductant.

### **Opportunities**

With the high cost of labor in Australia, there is strong interest in automation technology such as driverless vehicles (trucks and trains), drills, and excavation equipment. This interest is strongest in the iron ore sector, where the large scale of mine operations justifies the investment in automation. The Australian mining industry is, in many areas, an early adopter of technologies, such as mobile and wearable technologies. There are also moves to convert particular types of heavy moving equipment, e.g., underground loaders, to non-diesel power, for both environmental and occupational health and safety.

The mining sector is set to be an early adopter of blue hydrogen production. In March 2020, four mining giants - BHP, Fortescue, Anglo American and Hatch – formed the Green Hydrogen Consortium, pledging to work together to accelerate renewable energy-powered hydrogen production and its application to the resources sector and other heavy industries. According to the Director of the CSIRO Hydrogen Energy Future Science Platform Dr Daniel Roberts, "There are a whole range of opportunities for hydrogen in the mining sector."

### **Events**

AIMEX – Australasian International Mining Exhibition which is held biennially in Sydney (NSW), next taking place in 2023.

QME – Queensland Mining which is held biennially in Mackay (QLD), next taking place July 19-21, 2023.

Source: *Trade.gov*

<https://www.trade.gov/country-commercial-guides/australia-mining>

**Published May 31, 2022**

### **Mining industry in Australia - statistics & facts**

Australia's mining industry is a pillar of the Australian economy, with the country being one of the world's largest exporters of coal, iron ore, bauxite, alumina, and many other resources. The gross value added by the mining industry was in the hundreds of billions of Australian dollars in the past decade alone. The real gross value added of the mining industry accounted for over 10 percent of the total gross value added in Australia, making it one of the largest economic industries in the country. Over 180 thousand people were employed in the Australian mining industry. Historically, several mining booms have increased investment in mining, leading to higher incomes from mining activities and more immigration to Australia.





The production of many of Australia's metal and mining commodities far exceeded domestic consumption. When looking at coal mining for energy use, the production of coal in Australia amounted to over 12 exajoules in 2020. The gross value added from coal mining reached over 30 billion Australian dollars in 2021.

In terms of metal mining, Australia's many gold rushes have had a long-lasting impact on the country itself. Rapid growth in the population can be attributed to immigrants moving to the country for gold rush opportunities. Further development of industry and infrastructure was made possible following the gold rushes. Today, Australia is estimated to have the largest gold mine reserves in the world. Australia is also a global leader in the mining of lithium, the demand for which is growing on a global scale.

Australia's mining market is diverse, and accordingly, so are its mining companies. BHP and Rio Tinto, both Anglo-Australian multinational mining companies, are two of the biggest names in mining worldwide. In Australia, these companies lead the metals and mining market. Australia's future in mining may include an expansion in the exploration and mining of elements such as cobalt, lithium, and nickel. These are necessary components for battery cells that are required for the development of green technology. The country's proximity to Asia may see it become the leading supplier of critical minerals and metals.

Source: Statista.com

<https://www.statista.com/topics/4671/mining-industry-in-australia/#dossierKeyfigures>

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## Leading Companies

### Iluka Resources Limited (ASX: ILU)

Iluka Resources Ltd was formed through the merger of RGC Ltd and Westralian Sands Ltd in 1998, with the name Iluka adopted in 1999.

The company's historical operations have been centred in the south west of Western Australia, with mining at Yoganup and Capel, as well as other deposits. In the mid west of Western Australia, the Eneabba operation has been a major contributor to both Iluka and the global supply of mineral sands products. The company has mining activities in South Australia at the Jacinth-Ambrosia zircon deposit; and has previously operated several mining and processing assets in Victoria. Mining and processing operations in the United States have been undertaken in Florida, Georgia and Virginia (since completed). The company acquired Sierra Rutile, a multi-mine operation in the south west of Sierra Leone, in December 2016.

Iluka has an in-perpetuity royalty associated with revenue from certain tenements in BHP Billiton's Area C in the Pilbara, Western Australia. This royalty emanates from Consolidated Gold Fields Australia's involvement in the Mount Goldsworthy Mining Associated Joint Venture.

Iluka's Managing Director, Tom O'Leary, was appointed in 2016.

Iluka and its antecedent companies have over 60 years' experience in the mineral sands industry.

<https://iluka.com/about-iluka/company-history>

**20 July 2022**

#### QUARTERLY REVIEW TO 30 JUNE 2022 20 July 2022

##### KEY FEATURES

PHYSICAL AND FINANCIAL Q2 21 SUMMARY		Q1 22	Q2 22	H1 21	H1 22	H1 22 vs H1 21
				%		
PRODUCTION						
kt						
Zircon	71.8	76.3	80.4	141.9	156.7	10.4
Rutile1	43.6	49.4	48.3	79.9	97.7	22.3
Synthetic Rutile	59.9	54.3	60.1	78.9	114.4	45.0
Z/R/SR	175.3	180.0	188.8	300.7	368.8	22.6
Production						
Ilmenite	160.0	118.3	170.7	235.3	289.0	22.8
Monazite concentrate	10.0	-	-	26.2	-	n/a
SALES						
kt						
Zircon	90.8	83.7	106.8	177.2	190.5	7.5
Rutile1	35.6	58.6	36.6	89.0	95.2	7.0
Synthetic Rutile	115.9	46.5	89.2	191.4	135.7	(29.1)

Z/R/SR sales	242.3	188.8	232.6	457.6	421.4	(7.9)
Ilmenite	80.9	46.9	90.6	130.4	137.5	5.4
Monazite concentrate	10.2	-	-	20.7	-	n/a
REVENUE & CASH COSTS						
\$ million						
Z/R/SR revenue	359.9	383.6	491.5	680.0	875.1	28.7
Ilmenite and other revenue	31.2	30.4	49.4	55.6	79.8	43.5
Mineral Sands Revenue	391.1	414.0	540.9	735.6	954.9	29.8
Production cash costs of Z/R/SR				242.2	344.1	42.1
Ilmenite concentrate & by product costs				11.4	7.9	(30.7)
Total cash costs of production				253.6	352.0	38.8
\$ per tonne						
Unit cash production costs Z/R/SR produced				805	933	15.8
Unit cost of goods sold Z/R/SR sold				915	995	8.8
Revenue Z/R/SR sold	1,485	2,032	2,113	1,486	2,077	39.7
AUD:USD cents	77.0	72.4	71.5	77.2	72.0	(6.7)

- Zircon/Rutile/Synthetic Rutile (Z/R/SR) production of 189kt, up 5% from Q1 2022
- zircon production of 80kt, up 5%
- rutile production of 48kt, down 2%
- synthetic rutile production of 60kt, up 11%
- H1 2022 Z/R/SR sales of 421kt exceeded production and further reduced Z/R/SR inventory holding levels by 53kt, resulting in minimal finished goods inventory levels at 30 June 2022
- Weighted average zircon price achieved in Q2 2022 for premium and standard sand was US\$1,910 per tonne, up 25% from H2 2021
- H1 rutile price up 17% to US\$1,506 per tonne
- Weighted average prices for zircon sand increased by approximately US\$140 per tonne, effective 1 July, and all of Iluka's Q3 2022 zircon sales are fully contracted
- Only minimal spot volumes of high grade feedstocks available in H2 2022, with pricing expected to increase
- Rare earths (Eneabba development)
- EPCM contract awarded to Fluor
- Cash production costs are trending ahead of guidance, impacted predominantly by higher fuel, consumable and labour costs
- Full year guidance on cash costs of production for the group is expected to increase by \$55 million from \$660 million, with ~65% of the increase attributable to higher fuel costs
- This cost guidance includes a full year of costs for Sierra Rutile

- Net cash at 30 June was \$600 million, reflecting free cash flow of \$349 million and capital expenditure of \$71 million
- Iluka will contribute US\$45 million to a rehabilitation trust for Sierra Rutile as part of the proposed demerger

## PRODUCTION COMMENTARY

MINERAL SANDS PRODUCTION	Q2 21	Q1 22	Q2 22	H1 21	H1 22	H1 22 vs H1 21
	kt	kt	kt	kt	kt	%
<b>ZIRCON</b>						
Jacinth-Ambrosia/ Mid west WA	60.9	64.3	66.6	131.0	131.0	-
Cataby/South west WA	10.9	12.0	9.8	10.9	21.7	99.1
Sierra Leone	-	-	4.0	-	4.0	n/a
Total Zircon	71.8	76.3	80.4	141.9	156.7	10.4
<b>RUTILE</b>						
Jacinth-Ambrosia/ Mid west WA	6.4	6.4	4.6	16.8	10.9	(35.1)
Cataby/South west WA	7.6	7.6	5.1	7.6	12.7	67.1
Sierra Leone	29.6	35.4	38.6	55.5	74.1	33.5
Total Rutile	43.6	49.4	48.3	79.9	97.7	22.3
Synthetic Rutile (WA)	59.9	54.3	60.1	78.9	114.4	45.0
TOTAL Z/R/SR	175.3	180.0	188.8	300.7	368.8	22.6
<b>ILMENITE</b>						
Jacinth-Ambrosia/ Mid west WA	27.1	39.1	36.2	65.2	75.3	15.5
Cataby/South west WA	123.2	64.3	119.4	149.9	183.7	22.5
Sierra Leone	9.7	14.9	15.1	20.2	30.0	48.5
Total Ilmenite	160.0	118.3	170.7	235.3	289.0	22.8
<b>MONAZITE</b>						
Jacinth Ambrosia/ Mid west WA	10.0	-	-	26.2	-	n/a

## Australian Operations

Mining at Jacinth-Ambrosia in South Australia, produced 66 thousand tonnes of heavy mineral concentrate (HMC), down from 71 thousand tonnes in Q1. Lower HMC production was the result of lower ore treatment volumes and ore grade. Mining at Jacinth-Ambrosia continues to operate at full production settings, with mining to continue at the Jacinth North deposit before moving to the Ambrosia deposit in September 2022.

In Western Australia, the Cataby operation produced 124 thousand tonnes of HMC, up from 117 thousand tonnes in the previous quarter. Higher HMC production was a result of higher ore grade and recovery.

The Narngulu mineral separation plant (MSP) processed both Cataby and Jacinth-Ambrosia HMC, producing 76 thousand tonnes of zircon, in line with the previous quarter; and 10 thousand tonnes of rutile.

Production of synthetic rutile from SR2 at Capel was 60 thousand tonnes, up from 54 thousand tonnes in the previous quarter, with SR2 running at full capacity.



## Sierra Leone Operations

HMC production was 77 thousand tonnes, compared to Q1 production of 98 thousand tonnes. Lower HMC production was due to 18 days downtime associated with the relocation of two scrubbers and two mining units.

Rutile production of 39 thousand tonnes was up 9% compared to Q1 due to higher rutile assemblage within the HMC treated and higher recovery.

On 20 June, Iluka released the Demerger Booklet for the company's previously announced proposal to demerge Sierra Rutile. If approved, the demerger will result in Sierra Rutile becoming an independent ASX listed company. The Extraordinary General Meeting will be held on 22 July 2022.

Delayed capital expenditure in Q2 contributed to Sierra Rutile having net cash at 30 June of US\$58 million and free cash flow for the half year of US\$33 million. As disclosed in the Demerger Booklet, Sierra Rutile will settle an intercompany.

For full release see:

[https://iluka.com/getattachment/406d00b1-275a-43d7-b103-740f008c2472/quarterly-review-to-30-june-2022-\(1\).aspx](https://iluka.com/getattachment/406d00b1-275a-43d7-b103-740f008c2472/quarterly-review-to-30-june-2022-(1).aspx)

## Lake Resources NL (ASX: LKE)

Lake Resources NL (ASX: LKE) is a lithium exploration and development company focused on developing its three lithium brine projects and a hard rock project in Argentina, all owned 100%. The leases are in a prime location among the lithium sector's largest players within the Lithium Triangle, where 40% of the world's lithium is produced at the lowest cost.

Lake holds one of the largest lithium tenement packages in Argentina (approximately 200,000 hectares) which provides the potential for consistent security of supply, scalable as required.

Lake considers it is in a strong position to benefit from the market opportunity in electric vehicles and the batteries that power the energy revolution due to:

1. High purity lithium carbonate samples (99.9%) with very low impurities, recently produced from the pilot plant using a direct extraction process (ion exchange);
2. Increased engagement with off-takers as larger samples are produced, anticipated from late March 2020 onwards, for off-takers to commence qualification testing to then engage to assist in financing;
3. Kachi Project PFS, in the final stages of completion which is anticipated to show projected production costs at the lower end of the cost curve similar to current lithium brine producers. The Kachi project has a resource (announced Nov 2018) considered large enough for long term production and could be potentially scaled to a much larger project is required as leases cover an area 10 times Manhattan.
4. Sustainable and scalable future lithium production, demanded by the larger EV makers and an increasing number of battery/cathode makers, who need to show both the quality and provenance of battery materials for ESG/sustainability and carbon footprint reporting. The direct extraction process reinjects brine once the lithium has been removed using ion exchange beads without affecting the chemistry. This means a much smaller footprint and less water usage because evaporation ponds are not used.

<https://lakeresources.com.au/>

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**31 October 2022**

## **Quarterly Report For the quarter ended 30 September 2022**

### Highlights

David Dickson appointed Chief Executive Officer to lead the company's transition from exploration focus to development, construction and toward production.

Sean Miller appointed as Corporate Development Officer to accelerate activity across Lake's three 100% owned exploration projects Cauchari, Olaroz and Paso.

Following end of quarter Offtake and Strategic Investment Conditional Framework Agreements signed with WMC Energy and SK On for up to 50,000 tpa lithium carbonate from Kachi project.

Demonstration plant construction and commissioning was completed during the quarter. The demonstration plant will be operated by Lilac Solutions as part of their agreement to earn equity in the Kachi Project.

Definitive Feasibility Study (DFS) and Environmental Social Impact Assessment (ESIA) studies continue with demonstration plant validation required prior to completion of the DFS.

Lake is well funded with a cash balance of \$A158.8m and no debt at 30 September 2022.

### Executive Summary

Lake Resources NL (ASX: LKE OTC: LLKKF) is providing a clean solution to the delivery of high quality lithium into the battery materials supply chain powering the energy transition. Lake uses disruptive, ion exchange extraction technology, from Lilac Solutions Inc in California (Lilac), who is earning into the flagship Kachi Project, for efficient production of high purity lithium with significant ESG benefits. No mining is involved in the brine processing.

The Kachi Lithium Brine Project is targeting production at a rate of 50,000 tpa lithium carbonate. Kachi is indicatively financed into production with long dated low-cost project finance from the UK Export Finance and Canada's EDC for approximately 70% of the total finance required for Kachi's development, subject to standard project finance terms (ASX release 11 Aug 2021).

Lake's development plan uses a cost-effective DLE method that enables Lake to come to market quickly at significant scale with strong ESG benefits, a low carbon (CO<sub>2</sub>) footprint, low water and low land use.

High purity battery quality lithium carbonate (99.97% purity) has been produced (ASX release 20 Oct 2020) from pilot plant modules.

The Kachi demonstration plant installation is now in complete with commissioning conducted during the quarter, following extensive and successful test work in California. Whilst the test program is based on operating the demonstration plant for 1000 hours it is anticipated that the first samples of lithium chloride (eluate) produced from the demonstration plant will be sent for conversion into Lithium Carbonate once available. Lake proposes that this final Lithium product will then be qualified by a tier 1 battery maker to validate product specifications.

Producing high purity product on site further de-risks the project for offtakers, financiers and investors. Test work in California, USA continues to produce data for the Definitive Feasibility Study and product samples for testing.

For full release see:

[https://lakeresources.com.au/wp-content/uploads/2022/10/lke\\_quarterly\\_activities\\_appendix\\_5b\\_cash\\_flow\\_report\\_31-oct-22.pdf](https://lakeresources.com.au/wp-content/uploads/2022/10/lke_quarterly_activities_appendix_5b_cash_flow_report_31-oct-22.pdf)



## Young Australian Mines Limited

YAML considers that White Range has strong potential to be brought into production and intends to shortly commence work to bring the project to development.

Ongoing exploration work (e.g., current drilling at the Young Australian deposit) suggests the potential for a higher head grade and additional Resources from existing deposits. This exploration work highlights the substantial prospectivity and the potential value upside associated with the project assets, in addition to the stated JORC Mineral Resources.

The copper market has seen strong supply-demand fundamentals over the past 12 months, underpinned by expectations of strong demand from top consumer China. The metal, used in power and construction, has seen benchmark prices on the London Metal Exchange rise more than 20 per cent this year. Moreover, the consensus view among brokers is that tight supply in the global refined copper market would result in the base case for copper remaining solid, with few indications that demand will slow.

YAML believes that the White Range purchase will allow it to take advantage of this projected strong demand cycle and bring the project into operation during a period of forecast solid copper prices.

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