HPA PROJECT
DFS PRECURSOR PRIORITIES

Australian Securities Exchange Announcement **8 September 2021**

King River Resources Limited (ASX:KRR) is pleased to provide this update and new Definitive Feasibility Study (DFS) strategy. KRR released its Kwinana HPA Prefeasibility Study on 16 June 2021, and has recently reported producing a 5N (≥99.999%) purity aluminium Precursor compound (type 1 Precursor) using the ARC HPA process and an aluminium chemical compound feedstock (KRR ASX release 27 July 2021).

Summary

Work has progressed on the build of a Mini-Pilot Plant to demonstrate the ARC process works at a larger scale for the DFS and to produce batch marketing samples. Most of the component parts have been delivered with some long lead items pending final product certification. Mass, temperature, and timing measurements are being compiled from scaled up laboratory tests to help modify the design and address reagent and product handling issues.

KRR has commenced sourcing detailed information on the various precursor needs from end-users and will complete further investigations through international market agencies.

Further metallurgical testwork has also been ongoing to optimise the ARC process, including;

1. Further refinement of the type 1 Precursor product to reduce remaining contaminants.
2. Desiccation/drying experiments to increase the aluminium content of type 1 Precursor and improve its flowability in the calcination process.
3. The new 1500°C rotary tube furnace, used for the HPA calcination stage of the process, is undergoing some low temperature trials to establish flow rates and improve the removal of off-gases.

Como Engineers have also been engaged to rescope a modular process design for an initial Precursor only refinery.

As outlined in the 16 June 2021 PFS, a very high purity type 1 Precursor is calcined to produce HPA product at ≥4N (99.99%) purity.

Different specifications of Precursor types do have other high value applications in the manufacture of numerous battery components, and the value of these bespoke precursors can exceed the value (per tonne) of standard HPA product despite the process of manufacture being simpler and unit cost cheaper.

Therefore, in parallel to our other ongoing studies, KRR will be considering opportunities to reduce the initial scale of the first commercial operation, and thereby reduce capital and operating costs.

This announcement outlines some of these opportunities and KRRs plans.

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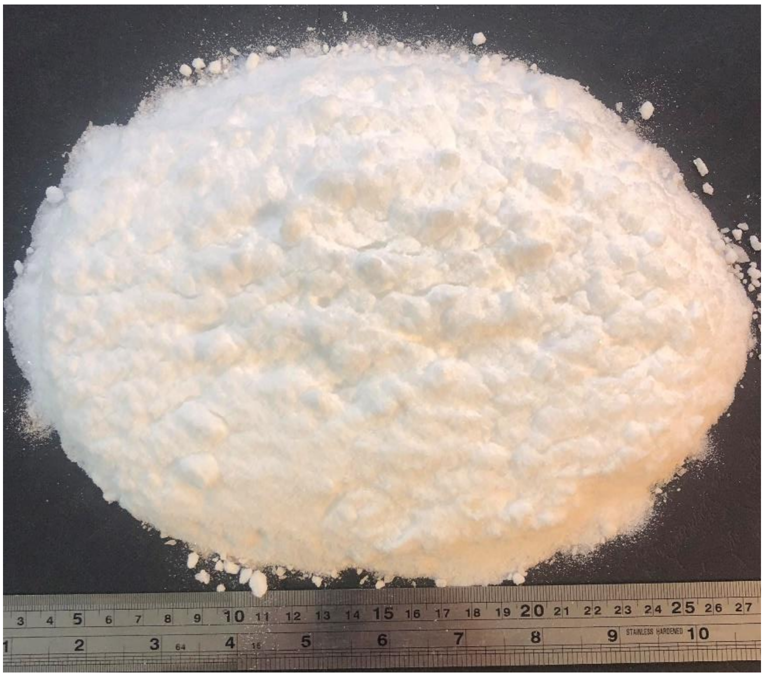

Precursor 1 (>99.999% purity) produced by the ARC Process

Type 1 Precursor used directly to make P-CAM

Source Certain International (SCI) is investigating whether type 1 Precursor can also be used to produce precursor Cathode Active Materials (P-CAM), an intermediate mixed metal hydroxide used in the manufacture of Lithium Ion Battery (LiB) cathodes. P-CAMs are made by a co-precipitation process where nickel, cobalt, manganese and aluminium salts are precipitated as a mixed metal hydroxide of specific composition, morphology and particle size distribution. KRR is targeting P-CAMs with nickel-cobalt-aluminium (NCA) and nickel-cobalt-manganese-aluminium (NCMA) chemistries, forecast to dominate the LiB electric vehicle (EV) market to 2030. Adding aluminium into the CAM plays a key safety role and increases the lifecycle of the LiB by improving the physical, thermal and cycling stability of the cathode for a small capacity loss. It is not KRRs intention to become a P-CAM manufacturer but rather supply its Precursor as the high purity aluminium source to this expanding market.

SCI have completed two experiments to produce NCA type P-CAM. The results are encouraging (Table 1) with more testwork, sizing analyses, and morphological studies required. The process controls to make P-CAMs are complex and the final product quality can only be determined after converting the P-CAM to CAM by adding lithium, then building and testing the LiB cell. The P-CAM process details and reagents used by SCI are not provided in this announcement. Tests 3 and 4 are underway.

Table 1: Composition of P-CAM produced

Test No.	P-CAM Type	Target Composition Mole % Ni:Co:Al	Chelating Agent	Assayed Composition Mole % Ni:Co:Al
1	NCA	85:14:1	A	82.3:13.4:1.0
2	NCA	80:15:5	B	75.33:13.50:5.15

Note: The mole ratio has been normalized assuming 100% of the Ni, Co and Al are in the hydroxide form.

Type 1 Precursor converted into other Aluminium Precursor compounds

Testwork is underway to convert type 1 Precursor into a more diverse suite of aluminium precursor compounds used in the battery and LED supply chains. These products are used in coating LiB cathodes and anodes, alternative coatings on LiB separators, alternative aluminium sources for the P-CAM process, and phosphors in LED lighting.

This testwork is at the stage of optimising type 2 Precursor.

Other DFS Developments

The Company will use the outcomes from these testwork programmes and studies to make the final decision on a Stage 1, Type 1 Precursor only operation with HPA production deferred to Stage 2, or other combinations of this exciting new opportunity.

Further DFS updates will be provided as they come to hand.

Director comments

Directors are pleased to confirm that KRR is strategically pivoting its DFS strategy towards the production of high value Al precursor compounds that are utilised in the manufacture of Li-ion battery (LiB) cathodes, an essential component of the fast growing electric battery vehicle market.

The development is being driven by the ability of KRR to leverage off its accumulated IP to date and the expectation of being able to further significantly reduce capex and opex costs (compared to full HPA production) and potentially generate higher rates of financial return.

This announcement was authorised by the Chairman of the Company.

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Statement by Competent Person

The information in this report is based on information compiled by Mr Ken Rogers (BSc Hons) and fairly represents this information. Mr Rogers is the Chief Geologist and an employee of King River Resources Ltd, and a Member of both the Australian Institute of Geoscientists (AIG number 2359) and The Institute of Materials Minerals and Mining (IMMM number 43552), and a Chartered Engineer of the IMMM. Mr Rogers has sufficient experience in the activities undertaken to qualify as a Competent Person 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. Mr Rogers consents to the inclusion in this report of the matters based on information in the form and context in which it appears.

Appendix 1: King River Resources Limited HPA Project JORC 2012 Table 1

Section 1 : Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling Techniques	*Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.* *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* *Aspects of the determination of mineralisation that are Material to the Public Report.* *In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.*	This ASX Release dated 8 September 2021 provides an update on KRR HPA Project, including the production of 5N Precursor used to make precursors for Cathode Active Materials (P-CAM) for LiB cathodes and as the precursor for high purity alumina (HPA). The feedstock for these products is an Aluminium chemical compound produced from other industrial chemical processes. The process used is KRRs ARC HPA Process. Chemical precipitation and recrystallisation purification methods have been used in the separation and precipitation of the high purity Aluminium Precursor compound reported in this announcement. The Precursor compound is then further processed to make P-CAM. The process details are a trade secret and Commercial-in-Confidence. The Precursor product used to make P-CAM reported in this announcement was made from 423.45g sample of the industrial aluminium chemical feedstock. The Precursor was produced by the KRR ARC HPA process purification stages. The details of the ARC HPA process, the reagents used and the composition of the Precursor are a trade secret and commercial in confidence. The nickel salt used in the P-CAM testwork was an analytical grade sample at >99% purity. The cobalt salt used in the P-CAM testwork was made by SCI from metallic cobalt.
Drilling techniques	*Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).*	Not Applicable. The samples were generated from a feedstock of an industrial chemical.
Drill sample recovery	*Method of recording and assessing core and chip sample recoveries and results assessed.*	Not Applicable.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	Not Applicable.
	Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	Not Applicable.
Logging	*Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.*	Not Applicable.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Not Applicable.
	The total length and percentage of the relevant intersections logged.	Not Applicable.
Sub-sampling techniques and sample preparation	*If core, whether cut or sawn and whether quarter, half or all core taken.*	Not Applicable.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	Not Applicable.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Not Applicable.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Not Applicable.

Criteria	JORC Code explanation	Commentary
	Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.	Not Applicable.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Sample sizes are considered appropriate to the grain size of the material being sampled.
Quality of assay data and laboratory tests	*The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*	Source Certain International (SCI), previously TSW Analytical, Testwork Testwork on the Aluminium chemical feedstock includes chemical precipitation, solid liquid separations, purification steps and calcination and washing processes, that produce purified intermediate Precursor precipitates and final high purity alumina (HPA) calcine products. Assays are conducted on solutions and solid precipitates and calcines. SCI is an established analytical service provider that has developed a reputation for providing accurate analyses of complex samples. The company's expertise has assisted with the development of hydrometallurgical flow-sheets for multi-element ore concentrates. The Aluminium Precursor products have been assayed using ICP-AES and ICP-MS. Samples are digested in nitric acid and then suitably diluted prior to analysis using ICP-AES and ICP-MS instrumentation. The primary and mother liquors have been analysed using ICP-AES and ICP-MS. The samples were diluted suitably for the appropriate ICP based analysis. Dilutions are used to bring the analyte concentration into the optimum analytical range of the ICP instrument used and to reduce matrix interference complications during quantification. Precipitation efficiency has been determined using the mass of the total analyte in the Precursor product divided by the mass of the total analyte in the initial liquor solution used. The resulting fraction is multiplied by 100 to give a percent precipitation efficiency. SCI uses in-house standards and Certified Reference Materials (CRMs) to ensure data are "Fit-For-Purpose".
	For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.	Not Applicable.
	Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.	Source Certain International (SCI) SCI reports concentrations as micrograms per gram (µg/g) in the solid (unless otherwise stated). Instrumental response is measured against AccuTrace High Purity multi-element standards (Choice Analytical) to achieve quantitation. Data are subjected to in-house QA and QC procedures where an independent analyst recalculates instrumental output and compares the newly generated data set with the original. Lack of equivalence between the two data sets triggers an internal review and if necessary re-analysis of the entire data set. Under these circumstances a third independent analyst will assess all generated data prior to sign off. Initial equivalence between the two data sets, generated by the analyst and reviewer, will clear data for remittance to the customer. In addition to these procedures, samples are regularly sent to selected analytical laboratories in Western Australia for confirmation of the analytical data obtained. Once completed, all reports are then reviewed by an independent analyst prior to submission to the customer and where necessary, relevant changes such as wording that may give rise to possible ambiguity in interpretation will be modified prior to the final report being sent to the customer. In order to validate analytical data, SCI circulates duplicate samples to selected analytical laboratories in Western Australia for confirmation of their results.
	The verification of significant intersections by either independent or alternative company personnel.	Assay results have been verified by alternative SCI laboratory company personnel. SCI has completed analytical duplicate analyses on all HPA batches produced.
	The use of twinned holes.	Not applicable - no drilling.

Criteria	JORC Code explanation	Commentary
Verification of sampling and assaying		Multiple samples have been produced and assayed.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Not applicable
	Discuss any adjustment to assay data.	Not applicable.
Location of data points	*Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.*	Not Applicable.
	Specification of the grid system used.	Not Applicable.
	Quality and adequacy of topographic control.	Not Applicable.
Data spacing and distribution	*Data spacing for reporting of Exploration Results.*	Not Applicable.
	Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.	Not Applicable.
	Whether sample compositing has been applied.	Not Applicable.
Orientation of data in relation to geological structure	*Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.*	Not Applicable.
	If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	Not Applicable.
Sample security	*The measures taken to ensure sample security.*	Chain of Custody is managed by the Company until feedstock samples pass to Source Certain International, for subsampling, assaying, and hydrometallurgical test work. The Aluminium feedstock sample was delivered to the metallurgical laboratory by the Company or a competent agent. The chain of custody passes upon delivery of the samples to the metallurgical laboratory. Products, Residues and Duplicates of all samples are retained at the Company's Perth laboratory to insure against any sample loss
Audits or Reviews	*The results of any audits or reviews of sampling techniques and data.*	No external audits have been completed.

Section 2 : Reporting of Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	*Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	Not Applicable.
Exploration done by other parties	*Acknowledgment and appraisal of exploration by other parties.*	Not Applicable.
Geology	*Deposit type, geological setting and style of mineralisation.*	Not Applicable.
Drill hole Information	*A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill*	Not Applicable.

Criteria	JORC Code explanation	Commentary
	holes: ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* ○ *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	
Data aggregation methods	*In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.*	Not Applicable.
	Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.	Not Applicable.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	Not Applicable.
Relationship between mineralisation widths and intercept lengths	*These relationships are particularly important in the reporting of Exploration Results. If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported. If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	Not Applicable.
Diagrams	*Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	Not Applicable.
Balanced reporting	*Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	Reports on previous metallurgical and study results can be found in ASX Releases that are available on our website, including announcements 1 April 2010, 15 July 2010, 9 November 2010, 8 February 2012, 21 April 2017, 21 August 2017, 9 October 2017, 4 December 2017, 30 January 2018, 27 February 2018, 21 March 2018, 25 June 2018, 23 July 2018, 15 October 2018,19 November 2018, 18 January 2019, 1 March 2019, 21 March 2019, 22 March 2019, 9 May 2019, 7 June 2019, 27 September 2019, 26 November 2019, 6 December 2019, 22 January 2020, 24 March 2020, 23 April 2020, 13 May 2020, 17 June 2020, 7 September 2020 and 13 October 2020, 11 November 2020, 19 November 2020, 26 November 2020, 15 December 2020, 25 March 21, 30 April 2021, 21 May 2021, 16 June 2021, 22 July 2021 and 27 July 2021.
Other substantive exploration data	*Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	Not Applicable.
Further work	*The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling). Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	Further metallurgical tests are planned to refine the ARC process and produce Precursor, P-CAM and HPA products.