

HIGH PURITY ALUMINA

Australian Securities Exchange Announcement

26 November 2019

Highlights

❖ A new high purity alumina process development has the potential to provide a positive impact on the economics of the Speewah Specialty Metals ("SSM") project and warrants a redesign of the process flow sheet to be incorporated into the PFS.

King River Resources Limited (ASX: KRR) is pleased to provide this Prefeasibility Study ("PFS") update on the company's 100% owned Speewah Specialty Metals Project in the East Kimberley of Western Australia. KRR has been examining a process route to produce vanadium pentoxide (V_2O_5), titanium dioxide pigment (TiO₂) and iron oxide (Fe₂O₃) products (refer KRR ASX releases 21 and 22 March and 2 April 2019) by a re-scaled operation (KRR ASX release 20 August 2019).

KRR has also identified the potential value of extracting other high value specialty commodities such as high purity alumina ("HPA"), magnesium oxide and vanadyl sulphate.

Study process and highlights

- KRR is now developing a new first step process to recover high purity alumina (HPA) from the metals
 dissolved in the sulphuric acid leach liquors derived from the Speewah magnetite-ilmenite
 concentrates or directly from the lump magnetite gabbro.
- Aluminium metal recoveries from the new process are extremely high, achieving extraction rates exceeding 90% aluminium directly from the leachate feed.
- Based on work completed to date, the new process has the potential to be relatively low cost as it
 utilises readily available reagents and operates at leach temperature and atmospheric pressure.
- This new process route also has the potential to improve the efficiency of extractions of V and Ti by way of an early removal of a significant amount of the Fe from the leach solution.
- Although metallurgical testwork is very well progressed, opportunities remain to optimise the process and the PFS, including (i) process flowsheet refinements, (ii) minimising waste streams by maximising by-products, (iii) site selection, (iv) start up scale and scalability options, and (v) the co-production of various V₂O₅, TiO₂ and Fe₂O₃ products in response to changing market conditions. Optimisation testwork work and trade-off studies are well underway and the PFS is now expected to be completed in the March 2020 quarter.
- As part of the PFS, KRR commissioned a detailed marketing study from a highly respected global authority which shows that over-the-counter transactions of 4N HPA (99.99% Al₂O₃) currently attract a price of ~US\$24,000/tonne. The demand and prices for 4N HPA are expected to improve in coming years as a result of increased demand in new markets.

Metallurgical Testwork

The initial metallurgical refining testwork had focused on developing a process flowsheet to precipitate Fe, V and Ti products from pregnant sulphuric acid leach solutions. This announcement reports on a new method to extract aluminium (Al) directly from the leach solutions as a precursor for making HPA and is a



different route to the HCl sparging method used to produce HPA announced by KRR on 9 May 2019. The HPA precipitation step will occur first in the subsequent extractions of Fe, Ti, and V products.

Our laboratory has extracted AI from an AI, Mg, Fe, Ti and V rich sulphuric acid leach solution that assayed 9.1g/L AI. The process has produced an intermediate aluminium-rich precipitate (see photograph below) at >90% AI precipitation efficiency, with low levels of Fe, and negligible thieving of V and Ti.



The Al rich precipitate is suitable for purification by a series of steps to make a HPA precursor product with very low contaminants, prior to calcination to make HPA.

Testwork is underway to further optimise the HPA process and complete the purification steps to produce 4N HPA (99.99% Al₂O₃).

Importantly, the new process also removes 40-50% of the iron from the leach solution in a second stage to the new process which may assist in the extraction of V, Ti and the remaining Fe by solvent extraction.

HPA Markets

Demand for HPA is growing strongly from two important high technology markets where it is the precursor material for the manufacture of:

- Synthetic sapphire glass used as substrates in light-emitting diode (LED) lights, semiconductors
 and laser markets. The higher the purity of the HPA the better the quality of the synthetic sapphire
 that can be grown. This in turn leads to a higher quality and performance of light produced by the
 LED or laser. With an increasing range of uses for LED's and lasers, particularly in medical and
 scientific applications, the need for high quality performance is becoming more important.
- <u>HPA coated separators</u> used in the manufacture of lithium batteries. Coating separators with HPA has been found to significantly improve safety and efficiency. HPA coated battery separators can withstand the very high temperatures typically generated by lithium battery cells, increasing the battery's discharge rate, lowering self-discharge and thereby lengthening battery life cycle, and also provides greater thermal stability to the battery, reducing the risk of batteries catching fire. This is the fastest growing market for HPA.



The unique physical and chemical properties of HPA make it ideal for use in these and other growing high technology industries.

Directors Comments

The opportunity to produce HPA by this new process, and to recover aluminium directly from the neat leach solutions, is a significant development for our SSM Project. Strong market demand forecasts for higher volumes of 4N+ HPA should have a positive impact on long term pricing. These positive HPA developments, together with the recent Mineral Resource amendment to include alumina (Al₂O₃) (KRR ASX announcement 6 November 2019), have encouraged the Board to ask our engineers to redesign the process flowsheet to include HPA in the PFS engineering design and costings.

Significantly for the SSM project, HPA production should be less constrained by resource grades and metallurgical recoveries, and more by market demand, so it has the potential to add a very valuable revenue stream to our SSM project.

KRR remains committed to its strategy to focus on high value specialty metals and materials critical to high technology industries and clean energy and will continue to explore leveraging its technology developments to create value for our shareholders.

Anthony Barton

Chairman
King River Resources Limited

Statement by Competent Person

The information in this report that relates to Exploration Results, Metallurgy and Prefeasibility Studies is based on information compiled by 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) and The Institute of Materials Minerals and Mining (IMMM), and a Chartered Engineer of the IMMM. Mr. Rogers has sufficient experience of relevance to the styles of mineralisation and the types of deposits under consideration, and to 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.



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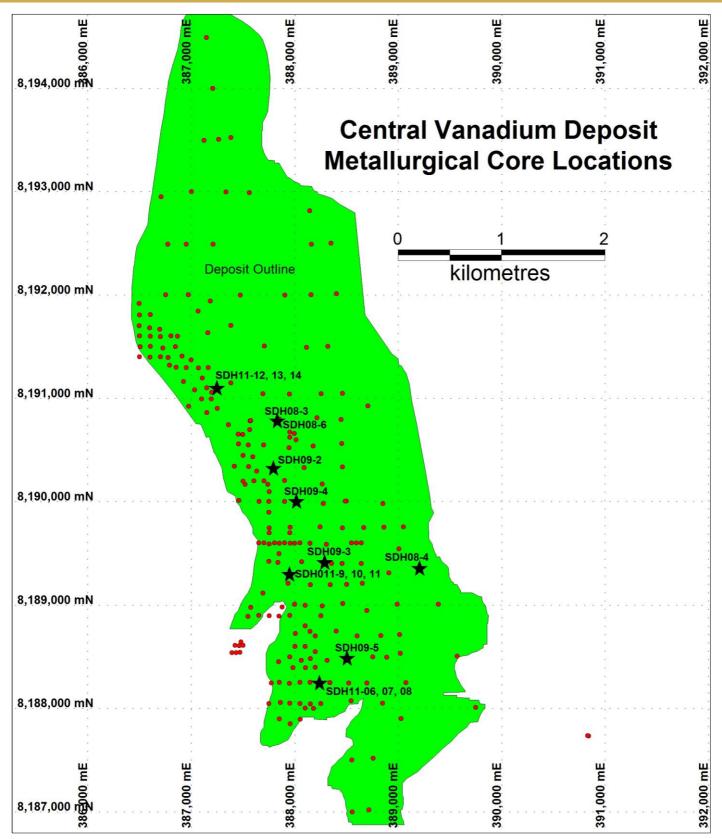


Figure 1: Diamond core hole locations (black stars) and Reverse Circulation drill holes (red dots) within the Central Vanadium Deposit, including metallurgical core hole SDH11-09 referred to in this announcement. Diamond core hole collar data is given in Table 1.



Table 1: Diamond core holes drilled in the Central deposit

Hole_id	Deposit	East_GDA	North_GDA	RL	Depth	Dip	Azimuth	Tenement
		m	m	m	m	degrees	degrees	
SDH08-3	Central	387830.42	8190778.6	197.037	80	-90	0	E80/2863
SDH08-4	Central	389203.71	8189358.8	190.014	75	-90	0	E80/2863
SDH08-6	Central	387831.84	8190783.9	197.187	450.5	-90	0	E80/2863
SDH09-2	Central	387793.53	8190327.7	196.267	50	-90	0	E80/2863
SDH09-3	Central	388287.08	8189417.5	189.987	70.5	-90	0	E80/2863
SDH09-4	Central	388016.74	8190007.5	194.698	42.1	-90	0	E80/2863
SDH09-5	Central	388502.3	8188487.8	186.4	57.1	-90	0	E80/2863
SDH11-06	Central	388234.08	8188240.6	188.018	39.4	-90	0	E80/2863
SDH11-07	Central	388234.04	8188243.7	187.999	41.6	-90	0	E80/2863
SDH11-08	Central	388234.08	8188246.9	187.941	40.9	-90	0	E80/2863
SDH11-09	Central	387946.28	8189294	191.676	40.9	-90	0	E80/2863
SDH11-10	Central	387945.75	8189295.9	191.643	39.4	-90	0	E80/2863
SDH11-11	Central	387945.33	8189297.8	191.706	40.9	-90	0	E80/2863
SDH11-12	Central	387243.47	8191101.7	212.529	41	-90	0	E80/2863
SDH11-13	Central	387242.63	8191101.2	212.467	41	-90	0	E80/2863
SDH11-14	Central	387241.65	8191100.6	212.457	40.1	-90	0	E80/2863



Appendix 1: King River Resources Limited Speewah 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 26 November 2019 reports on high purity alumina (HPA) precipitation from the high grade zone of the Central Vanadium deposit at KRR's Speewah Project. <i>Diamond Core Sample</i> 16 HQ and PQ diamond drill (DD) core holes were drilled in the Central Vanadium deposit (see Figure 1 and Table 1 for locations). One of the PQ core holes from the high grade zone (SDH11-09 - 21-37.5m) has been used in the hydrometallurgical metallurgical tests reported in this announcement. Nagrom received a 60kg composite magnetite gabbro sample of PQ ½ core from the high grade zone of drillhole SDH11-09 - 21-37.5m downhole. The head grade of this sample is 0.36% V ₂ O ₅ , 3.65% TiO ₂ , 21.37% Fe ₂ O ₃ , 12.74% Al ₂ O ₃ , 8.36% CaO, 4.33% MgO and 44.75% SiO ₂ (KRR ASX 1 March 2019). <i>Leachate Sample</i> TSW Analytical Pty Ltd used subsamples from a 1L leachate sample produced by Nagrom by column leaching a 5.6mm lump sample from the high grade zone of SDH11-09 (see KRR ASX announcement 1 March 2019). The leach liquor assayed 34200mg/L Fe, 9120mg/L Al, 3630mg/L Mg, 2840mg/L Ti, 1310mg/L Na, 462mg/L V and 389mg/L K.
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.).	Diamond (NQ and HQ3 size) drilling were completed to support the preparation of the Mineral Resource estimate. Holes drilled vertical. Metallurgical testwork was completed on ¼ PQ core composite sample from one metallurgical diamond drill core hole (Figure 1 and Table 1): SDH11-09 21-37.5m (High Grade Zone).
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	No qualitative recovery data was recorded. Qualitative examination and photography suggested RC and diamond recoveries are very high. Good ground conditions exist which suggests recovery is likely to be very high.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	PQ drilling was used to maximise diamond sample recovery.
	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.	No relationship between grade and recovery has been identified.
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.	DD core and RC chips were geologically logged, with descriptions of mineralogy and lithology noted.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging was generally qualitative in nature. DD core photographed wet.



	The total length and percentage of the relevant intersections logged.	SDH11-09 – 0-40.9m, 100% logged.
Sub-sampling techniques and	If core, whether cut or sawn and whether quarter, half or all core taken.	DD core was cut in half with a core saw. Some half sections sawn in quarters. ¼ core used in testwork.
sample preparation	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	Not applicable as samples used in the reported testwork were DD core.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Whole continuous lengths of DD ¼ core samples collected, composited and used in testwork. These were collected to represent the composite intervals of both the High Grade and Low Grade Zones.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Subsampling is performed during the preparation stage according to the metallurgical laboratories' internal protocol.
	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.	Use of DD core in metallurgical testwork gives a continuous insitu sample. PQ ensures high recovery rates. DD core twinned previous RC drill holes. Whole sample interval used in testwork.
	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.	TSW Analytical Testwork Testwork includes chemical precipitation from of intermediate aluminium compounds from sulphuric acid leachate solutions, solid liquid separations, purification steps and calcination. Assays are conducted on leach solutions and solid residues. TSW Analytical is a well-established analytical service provider that has developed a reputation for producing accurate analyses for complex samples. The company's expertise has assisted with the development of hydrometallurgical flow-sheets for multi-element ore concentrates. The titaniferous vanadiferous magnetite concentrate and leach residues have been assayed using ICP-AES and ICP-MS. Samples were fused in a lithium borate flux, the resultant glass bead was dissolved in hydrochloric acid and suitably diluted for either ICP-MS or ICP-AES analysis. Loss on Ignition (LOI) at 1000 °C was performed for completeness of the analytical data and to give a better indication of the total analytical percentage approximation to 100%. The leach solutions and wash 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 leach residue divided by the mass of the total analyte in the initial leach solution used. The resulting fraction is multiplied by 100 to give a percent precipitation efficiency. TSW Analytical uses in-house standards and Certified Reference Materials (CRMs) to ensure data are "Fit-For-Purpose". Nagrom Testwork All solid samples have been analysed via XRF. The prepared sample is fused in a lithium borate flux with a lithium nitrate additive. The resultant glass bead is analysed by XRF. Loss on Ignition
	For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument	(LOI) is also conducted to allow for the determination of oxide totals. No geophysical data was collected.
	make and model, reading times, calibrations factors applied and their	



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. Standards (Choice Analytical) to achieve quantitation. Data are subjected to in-house OA and OC procedures where an independent analyst recalculates instrumental output and compares the newly generated date 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 at third independent analyst will assess all generated data prior to sign off. Initial equivalence between the two data sets triggers an internal review and if necessary re-analysis of the entire data set. Under these circumstances at 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. All reports are reviewed by an independent analyst prior to submission to the customer. All reports are reviewed by an independent analyst prior to submission to the customer. Nagrom is certified to a minimum of ISO 9001:2008. Verification of significant intersections by either independent or attemptive company personnel. The verification of significant intersections by either independent or attemptive company personnel. The use of twinned holes. The verification of primary data, data entry procedures, data verification, data storage (physical and electronic) protocods. Significant intersections have been verified by alternative company personnel. All metallurgical Do core holes twinned previous RC holes. SDH11-09 has been twinned by SDH11-10 and SDH11-11 (see Figure 1 and Table 1) which is being used in current metallurgical testowork. Templates have been set up to facilitate geological logging. Prior to the import into the central data points of the prior of the prior of the prior of the		derivation, etc.	
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	นเงเทมนแบท	Whether the data spacing and distribution is sufficient to establish the	The Competent Person believes the mineralised domains have sufficient geological and grade



	degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.	continuity to support the classification applied to the Mineral Resources given the current drill pattern.
	Whether sample compositing has been applied.	Metallurgical samples were composited to represent the High Grade and Low Grade Zones within the magnetite gabbro and within the resource envelope. This was considered appropriate given the metallurgical testwork was designed to test the lower and high grade zones of the mineralisation and it provided for a bulk sample suitable for the testwork.
Orientation of data in relation to geological	Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	All metallurgical DD core holes are vertical. This allows the holes to intersect the mineralisation at a high-angle as the magnetite gabbro has a very shallow dip to the east.
structure	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.	The relationship between the drilling orientation and the orientation of key mineralised structures is not considered to have introduced a sampling bias.
Sample security	The measures taken to ensure sample security.	Chain of Custody is managed by the Company until samples pass to a duly certified metallurgical laboratory for subsampling, assaying, beneficiation and hydrometallurgical test work. The DD core samples are stored on secure sites and 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.
Audits or Reviews	The results of ay 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.	The Speewah Project comprises 9 Exploration Licences, three Mining Leases and two Miscellaneous Licences. Details are listed in Table 1 Schedule of Tenements held at 30 September 2019 reported previously in the September 2019 Quarterly Report. The Speewah testwork reported in this announcement are from samples collected entirely within E80/2863. The tenements are 100% owned by Speewah Mining Pty Ltd (a wholly owned subsidiary of King River Resources Limited), located over the Speewah Dome, 100km SW of Kununurra in the East Kimberley. The tenements are in good standing and no known impediments exist. No Native Title Claim covers the areas sampled and drilled. The northern part of the tenements (but not E80/2863) is in the Kimberley Heritage Area.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	No exploration completed by other parties is relevant for the metallurgical testwork reported herein.
Geology	Deposit type, geological setting and style of mineralisation.	The ferrovanadium titanium (Ti-V-Fe) deposits represent part of a large layered intrusion (the Hart Dolerite), which was intruded c1790 Ma into the Palaeo-Proterozoic sediments and minor volcanics of the 1814 Ma Speewah Group in the East Kimberley Region of Western Australia. The deposits occur within the Speewah Dome, which is an elongated antiform trending N-S. The dome is about 30 km long and attains a maximum width of about 15 km. The Hart Dolerite sill forms the core of the dome. Since the deposit discovery in 2006, at least two distinct types of felsic granophyres and three mafic gabbros have been identified in the Hart Dolerite as follows: • K felsic granophyre (youngest) • Mafic granophyre (youngest) • Pegmatoidal gabbro • Magnetite gabbro (host unit) • Felsic gabbro (oldest). The vanadium-titanium mineralisation is hosted within a magnetite bearing gabbro unit of the Hart Dolerite, outcropping in places and forming a generally flat dipping body that extends over several kilometres of strike and width. The layered sill is up to 400m thick containing the magnetite gabbro unit which is up to 80m thick. Given the mode of formation, mineralisation displays excellent geological and grade continuity which was considered when classifying the Mineral Resource estimate. Exposure is limited and fresh rock either outcrops or is at a shallow depth of a few metres. Ti-V-Fe mineralisation occurs as disseminations of vanadiferous titano-magnetite and ilmenite. Within the tenements the vanadium deposits have been divided into three deposits — Central, Buckman and Red Hill. The test work reported in this announcement was sampled from the Central vanadium deposit (Figure 1).



Criteria	JORC Code explanation	Commentary
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 holes: o easting and northing of the drill hole collar o elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar o dip and azimuth of the hole o 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.	New exploration results are not being reported. Locations of diamond (DD) core holes, including metallurgical core holes used in this announcement, are shown on Figure 1 and Table 1.
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.	Exploration results are not being reported.
	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.	Continuous lengths of ¼ core composited for metallurgical samples from the Low Grade and High Grade Zones.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values are used for reporting.
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').	Due to the very shallow dip of the mineralisation, the vertical metallurgical DD core holes represent almost the true width of the mineralisation.
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.	Figure 1 shows the location of diamond core holes within the Central Vanadium deposit referred to in this announcement.
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 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 and 1 March 2019.
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.	Updated vanadium resource estimates in accordance with the JORC 2012 guidelines were reported in KRR ASX announcement 26 May 2017. 1 April 2019 and xx November 2019.



Criteria	JORC Code explanation	Commentary
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 increase metal recoveries, shorten leach times and reduce acid consumption, and trialing selective chemical precipitation, thermal hydrolysis, ion exchange and solvent extraction methods to precipitate vanadium pentoxide, titanium dioxide, iron oxide and high purity alumina (HPA).