

# VANADIUM AND FLUORITE UPDATE

## **Australian Securities Exchange Announcement**

10 September 2018

King River Copper Limited (ASX: KRC) is pleased to provide this update on its 100% owned Vanadium, Titanium, Iron and Fluorite projects at Speewah, located in the East Kimberley of Western Australia.

## **Highlights**

- Vanadium Scoping Study anticipated end of September.
- Fluorite Scoping Study planned for mid-late September.
- Vanadium metallurgical testwork will still continue on several fronts to identify the most optimum and commercially practical process route to pursue.

#### **Vanadium Project**

- CSA Global has completed a concept mining pit study already reported (KRC ASX 20 June 2018).
- Primero Group has now completed an internal desktop report for use in the Vanadium Scoping Study, providing a detailed beneficiation plant design, with operating and capital cost estimates.
- CSA Global has been mandated with the finalisation of the Vanadium Scoping Study anticipated towards the end of September 2018.
- Metallurgical testwork and research have been ongoing on a number of fronts into the production of high purity Vanadium Pentoxide powder (>99.5 V<sub>2</sub>O<sub>5</sub>) and standard grade Vanadium Pentoxide flake (>98% V<sub>2</sub>O<sub>5</sub>), as well as Titanium Dioxide products (pigment and high purity >99% TiO<sub>2</sub>), iron oxide hematite and Vanadium Electrolyte (used in vanadium flow batteries):
  - o TSW Analytical testwork completed and/or underway includes:
    - high purity TiO<sub>2</sub> by a thermal hydrolysis process (KRC ASX release 30 January 2018);
    - high purity V₂O₅ by a direct precipitation process (KRC ASX release 27 February 2018);
    - high purity V<sub>2</sub>O<sub>5</sub> by the AMV process (KRC ASX releases 25 June and 23 July 2018);
    - testing underway to produce a standard +98% V<sub>2</sub>O<sub>5</sub> flake;
    - testing underway to produce V<sub>2</sub>O<sub>5</sub> by a new more direct precipitation route; and
    - optimisation of these process routes, to seek higher V, Ti and Fe and HCl acid recoveries, and the production of Fe<sub>2</sub>O<sub>3</sub> (hematite).
  - Nagrom has been undertaking bottle roll sulphuric acid direct leach tests on a magnetite-ilmenite concentrate sample. This test is designed to provide:
    - a leach solution by this direct leach method for preliminary vanadium electrolyte testwork.
    - leach kinetics on V, Ti and Fe recoveries, acid consumption and mass reduction to assess suitability for column leach tests on Speewah lump ore and agglomerated concentrate types.
  - Nagrom are producing additional magnetite-ilmenite concentrate from new core samples for:
    - the additional metallurgical testwork listed above; and
    - new studies to provide samples at different specifications that may be suitable for marketing to potential offtake parties.



 To enable the presentation of comparable data, new V<sub>2</sub>O<sub>5</sub> testwork will also commence shortly with another metallurgical laboratory using the salt roast-water leach-AMV process and acid leachsolvent extraction-AMV process that was previously trialled by KRC in 2011-2012.

KRC is conducting these diverse metallurgical tests and studies with the objective of assessing which of the process routes, or which combination of these processes, may prove the most prudent direction to be taking to develop the vanadium, titanium and iron deposits at Speewah.

#### **Fluorite Project**

KRC owns the Windsor fluorite deposit at Speewah with a combined Indicated and Inferred Mineral Resource of 6.7 million tonnes at 24.6% CaF<sub>2</sub> (at 10% CaF<sub>2</sub> cut-off grade), comprising Indicated Resource of 4.1 million tonnes at 25.3% CaF<sub>2</sub> and Inferred Resource of 2.6 million tonnes at 23.6% CaF<sub>2</sub> (refer KRC ASX release 23 February 2018).

CSA Global has completed a concept mining pit study on the Windsor fluorite deposit at Speewah, and is now managing the finalisation of the Fluorite Scoping Study for mid-late September 2018.

#### **Directors Comment**

The evaluation of the best direction to be taking to develop and/or market the Speewah deposits relies materially on the detailed process routes and economic studies currently being undertaken. Development planning may very well include the option to export portions of concentrate production.

While direct leaching testwork is at a very early stage, there may also be an opportunity to heap leach lump ore, or an agglomerated crude concentrate, to extract  $V_2O_5$  and  $Fe_2O_3$  and then reprocess the remaining dump material in a manner that would extract the residual ilmenite to produce  $TiO_2$ .

The Board is very focussed on maximising the key strategic variables of the Speewah deposits, namely, their massive size, the outcropping flat lying geometry, the overall consistency of grades amenable to large scale mining methods and the unique tenor of the magnetite that enables the generation of a higher  $V_2O_5$  grade concentrate compared to most peers.

### **Background on the Speewah Vanadium Project**

KRC's Vanadium Project is based on the largest vanadium-in-magnetite deposit in Australia with the highest vanadium grade in the magnetite-ilmenite concentrate. KRC's vanadium deposit is 100% owned and located at Speewah in the East Kimberley of Western Australia. The deposit comprises a Measured, Indicated and Inferred Mineral Resource of 4,712 million tonnes at 0.3%  $V_2O_5$ , 2% Ti and 14.7% Fe (reported at a 0.23%  $V_2O_5$  cut-off grade from the Central, Buckman and Red Hill deposits). This combined resource total comprises Measured Resources of 322 million tonnes at 0.32%  $V_2O_5$ , 2% Ti and 14.9% Fe, Indicated Resources of 1,054 million tonnes at 0.33%  $V_2O_5$ , 2% Ti and 14.9% Fe, and Inferred Resources of 3,335 million tonnes at 0.29%  $V_2O_5$ , 2% Ti and 14.6% Fe (Refer to KRC ASX announcement 26 May 2017 for the full resource statement details).

KRC envisages an open cut mining operation based on the Central Vanadium deposit which outcrops and has shallow dipping geometry (refer KRC ASX announcement 20 June 2018 for an initial conceptual pit modelling study). KRC's Vanadium Concept Study is examining a process flow sheet to produce vanadium pentoxide, titanium dioxide and iron oxide products (KRC ASX release 20 June 2018). Initially



a magnetite concentrate grading 2.11-2.15% vanadium pentoxide ( $V_2O_5$ ) is produced by crushing, grinding and magnetic separation methods (KRC ASX announcements 21 August 2017 and 21 March 2018). The vanadium and titanium enriched concentrate is then leached in hydrochloric acid to release the V, Ti and Fe metals into solution for separation by hydrothermal and chemical precipitation methods followed by purification steps to produce high purity vanadium pentoxide ( $V_2O_5$ ) and titanium dioxide ( $TiO_2$ ) products (KRC ASX announcements 30 January 2018, 27 February 2018, 25 June 2018 and 23 July 2018).

#### **Statement by Competent Person**

The information in this report that relates to Exploration Results, Mineral Resources and Metallurgy 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 Copper 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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