

# QUARTERLY ACTIVITIES REPORT 30 SEPTEMBER 2019

\_\_\_\_\_

### **Australian Securities Exchange Announcement**

25 October 2019

#### **SUMMARY OF HIGHLIGHTS**

- The Speewah Specialty Metals (SSM) Project Prefeasibility Study has progressed based on a smaller scale Beneficiation-Agitated Tank Sulphuric Acid leaching-precipitation process to produce the following high value products:
  - High purity alumina 99.99% Al<sub>2</sub>O<sub>3</sub> (4N HPA).
  - Vanadium pentoxide (98% V2O5)
  - Titanium dioxide 80% TiO<sub>2</sub>.
  - Iron oxide 67% Fe<sub>2</sub>O<sub>3</sub>.

Testwork and studies are underway to deliver a Prefeasibility Study towards the end of 2019.

- ❖ Additional Mt Remarkable Exploration Licences granted, and field work and drilling commenced.
- Two new Tennant Creek Exploration Licences applied for and drilling is planned for next quarter.

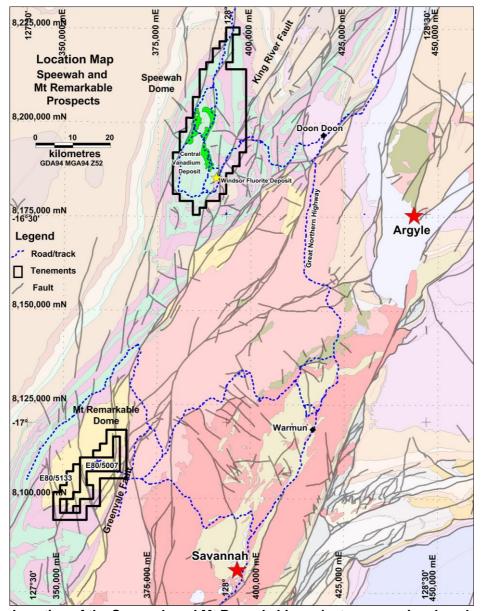


Figure 1: Location of the Speewah and Mt Remarkable projects on a regional geological map



During the September quarter 2019 King River Resources Ltd (ASX:KRR) reported on the Speewah Specialty Metals (SSM) Project and also the high grade Mt Remarkable Gold Project and the Treasure Creek Gold-Copper Project. All these areas are 100% owned by KRR. Speewah and Mt Remarkable are located on the margin of the mineral rich Halls Creek Orogen in the East Kimberley of Western Australia, near the Argyle diamond mine and Savannah nickel mine (Figure 1). Treasure Creek is located in the mineral rich Tennant Creek belt in the Northern Territory.

#### Speewah Specialty Metals (SSM) Project

The Speewah Specialty Metals (SSM) Project is examining the best process route to produce the following high value products:

- High purity alumina 99.99% Al<sub>2</sub>O<sub>3</sub> (4N HPA).
- Vanadium pentoxide (98% V2O5)
- Titanium dioxide 80% TiO<sub>2</sub>.
- Iron oxide 67% Fe<sub>2</sub>O<sub>3</sub>.

A Capex-Opex Scoping Study has demonstrated that agitated tank leaching of a low cost concentrate using sulphuric acid is preferred over heap or vat leaching (KRR ASX releases 21 and 22 March 2019). In August 2019, KRR adopted a recommendation of Como Engineering to reshape the scale and timing of the Speewah Specialty Metals (SSM) Pre-Feasibility Study (PFS). The revised estimated capital costs of constructing a new beneficiation, agitation leaching and metal recovery plant (including direct and indirect costs) would be reduced to ~\$524 million (+/- 30% accuracy) by reducing our start up mining rates to operationally correspond with a more standard sized acid plant installation that is capable of producing over 15 megawatts of electricity per year and 1800 tonnes per day of sulphuric acid. (KRR ASX release 20 August 2019). Accordingly all metallurgical testwork and studies for the PFS have focused on this smaller scale operation and the current plan is to deliver a PFS towards the end of 2019.

In September, KRR provided an update on the PFS, including metallurgical testwork and the status of various PFS studies (KRR ASX release 27 September 2019).

#### Metallurgical Testwork

Metallurgical testwork has focused on developing the simplest, highest recovery and most economical processing methods for the production of  $V_2O_5$ ,  $TiO_2$ ,  $Fe_2O_3$  and HPA, and, reduce acid consumption by optimising the beneficiation and leaching processes. All testwork is on Central deposit samples (Figure 2).

#### Beneficiation

Testwork has involved a two stage LIMS/MIMS magnetic separation on coarse grained 0.5mm crush-grind magnetite gabbro for a mass yield of 32%, then grind to 0.15mm prior to leaching (KRR ASX release 21 and 22 March 2019). The high grade (HG) material produces a concentrate grading about 1%  $V_2O_5$  and the low grade (LG) gives about 0.7%  $V_2O_5$ . The Ti and Fe concentrate grades are slightly lower in the LG zone of the deposit, but the Al and Mg grades are similar for both the HG and LG zones.

Recent testwork has shown that by grinding to 0.4mm initially, the mass yield decreases to 28% and the V and Ti grades increase slightly. This option has the potential to reduce the number or size of leach tanks and possibly lower acid consumption. A trade off study will show which is better.



#### Acid leaching

Sulphuric acid leaching involves a 3 day single stage leach of the magnetic concentrate in tanks. Leach efficiencies on HG concentrates report up to 96.9% V, 61.8% Ti, 89% Fe, 70% Al and 62% Mg extractions for about 1000kg/t acid consumption (KRR ASX announcements 1 March 2019 and 22 March 2019).

Testwork on two stage leaching to reduce acid consumption and increase Ti recovery is underway.

#### Refining and purification

Testwork has involved chemical precipitation, hydrolysis, ion exchange (IX) and solvent extraction (SX) methods to precipitate the four products, to identify the most economical operation. The preferred method is SX as this is an industry standard method, and has the potential to be the most economical and deliver the highest recoveries. This method is the current focus of the testwork.

#### Process Plant Design and Costings

Como Engineers have been appointed to complete the Processing Plant design and costing for the PFS report.

#### Geology and Mining Studies and Reserve Estimate

CSA Global (an ERM Group company) has been appointed to complete the following parts of the PFS:

- Update the existing Speewah Central Zone Mineral Resource estimate to include Al<sub>2</sub>O<sub>3</sub> and MgO.
- Compilation of previous geology and resource work.
- A PFS mining study to align with the Project PFS.
- Tailings storage facility (TSF)
- Camp, haul road, and mining and other associated infrastructure.
- An Ore Reserve estimate based on the results of the PFS and review of all relevant modifying factors.
- ❖ Geotechnical Investigation completed by MineGeoTech partnered with CSA Global.
- Market Study. KRR has appointed CRU International to complete a market study on the four commodities targeted by the SSM Project, namely vanadium pentoxide, titanium dioxide, iron oxide and high purity alumina ("HPA").
- Hydrology Studies. CSA Global will compile the preliminary groundwater investigations by Groundwater Consulting Services and the surface water studies by AECOM.
- Environmental and Permitting. Animal Plant Mineral (APM) has completed an environmental report and detailed the permitting process for the SSM Project. CSA Global will review all aspects of the development, including a preliminary mine closure plan.
- ❖ <u>Heritage Report</u>. Terra Rosa completed an aboriginal heritage study in 2011 over the proposed mine site and access route.



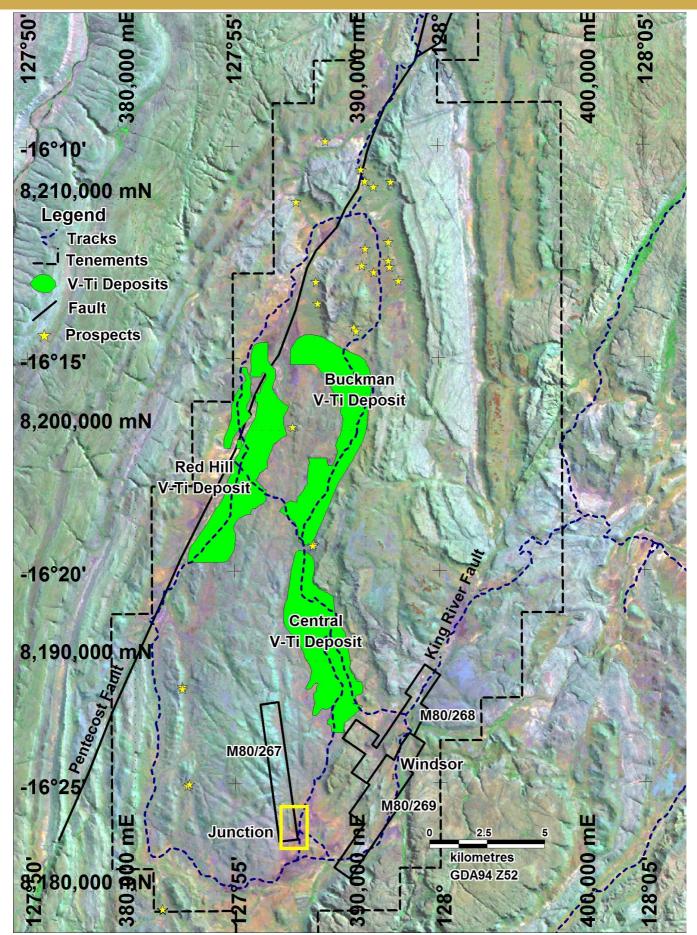


Figure 2: Location of the Central, Buckman and Red Hill vanadium deposits, and the Junction Prospect (yellow box) on Mining Lease M80/267 at Speewah.



#### RC Drilling Results at Junction Vanadium Prospect on Mining Lease M80/267

In September, KRR provided an update on the V, Ti, Fe drill results from the reverse circulation ("RC") programme at the Junction Prospect at Speewah (KRR ASX release 27 September 2019). A total of 34 RC holes (for 1,717m) were drilled on existing Mining Lease M80/267 at the Junction prospect located to the south of the Central vanadium deposit (Figures 2 and 3). Definition of additional resources on a Mining Lease may help expedite a development in the future.

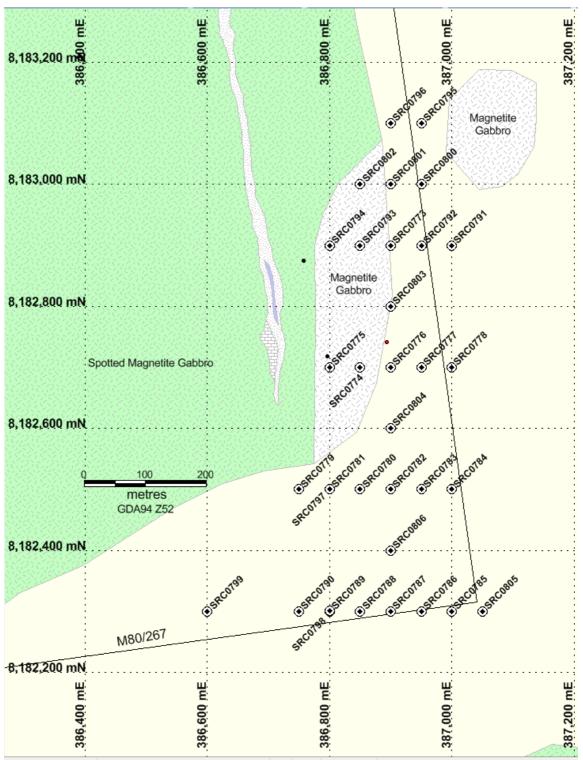


Figure 3: Drill collar plan at the Junction Prospect, black circles new RC drill hole collar positions, black dots historic drill hole positions.



Most holes intersected the magnetite gabbro host unit (Figure 3) and the intersections are similar to the  $V_2O_5$ ,  $TiO_2$  and Fe grades and thicknesses reported in the mineral resources. Vanadium grades average about 0.30%  $V_2O_5$ , ranging from 0.21 to 0.47%  $V_2O_5$ , typical for the Speewah deposit at a 0.12% V cut-off. Titanium dioxide grades range from 3.0-3.6%  $TiO_2$ . The alumina (Al<sub>2</sub>O<sub>3</sub>) and magnesia (MgO) values reported in Table 2 are very consistent as expected for an orthomagmatic gabbro hosted deposit.

#### Mt Remarkable Gold Project

During the quarter, 6 of the 8 exploration licence applications over the Mt Remarkable Gold Project (Figure 1) were granted (KRR ASX release 30 July 2019). These newly granted exploration licences are in addition to E80/5133 granted in April 2019 (Table 1).

These licences cover the primary strike extension of the Whitewater Volcanics; the rock unit that hosts the high-grade gold mineralisation reported within the main Mt Remarkable Project (see Figure 4). The company believes that further high-grade deposits are yet to be discovered along this prospective, sparsely explored trend. The total area of the granted exploration licences is over 2,300 square kilometres (230,000 Hectares).

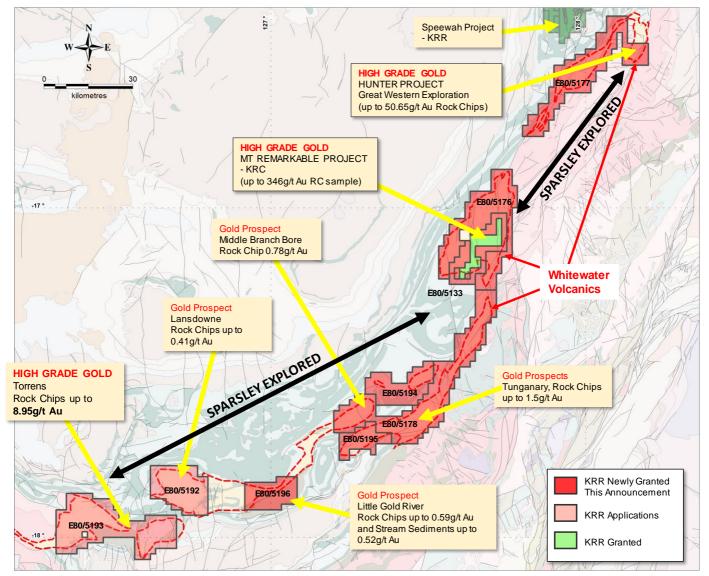


Figure 4: Map showing location of KRR's newly granted exploration licences and relevant gold prospects.



Reconnaissance exploration and soil and rock chip sampling commenced during the quarter on the recently granted E80/5133 and E80/5176, to assist with identifying zones of mineralisation and respective trends for drill targeting later in the year. RC drilling is planned to commence in October 2019 to follow up on high-grade gold intersections returned in 2018 at Trudi on the main Mt Remarkable Project tenement E80/5007 (Figure 5), and to test a selection of the best targets returned from the current reconnaissance programme.

Over 200 rock chip samples and over 250 soil samples have been collected so far from the reconnaissance areas, which has resulted in the discovery of a gold mineralized quartz-adularia vein set on newly granted tenement E80/5133 with rock chip sample grades up to 0.42g/t Au and 11.9g/t Ag (KRR ASX release 23 September 2019) (Figure 5). Follow-up reconnaissance and soil sampling is currently underway.

Drilling at Mt Remarkable is scheduled to start in October (~2,500m RC) and will test the high-grade Trudi Vein where last years' drilling returned multiple, very high gold intersections (e.g. 4m @ 113.29g/t Au including 1m @ 346g/t Au in KMRC78, refer KRR ASX 4 June 2018, Figure 6). Drilling will target extensions to known high-grade gold zones as well as test for new high-grade zones along strike and at depth (Figure 6). Other drill targets will include the Jeniffer Vein (Figure 7), a new gold mineralised vein discovered last year, as well as any prioritised targets from recent and ongoing reconnaissance work.

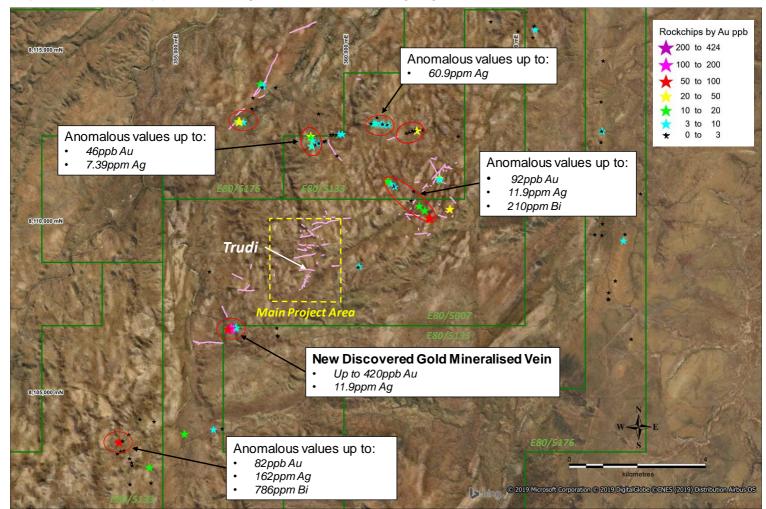


Figure 5: Rock Chip sampling results Mt Remarkable, red ellipses around new anomalous vein targets.



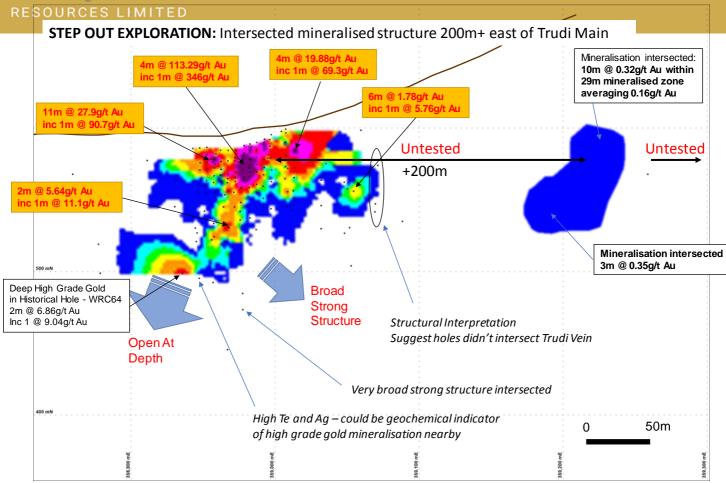


Figure 6: Long Projection, looking north, of Trudi high grade area and step out exploration 200m east. Significant results labelled, previously reported in 2018.

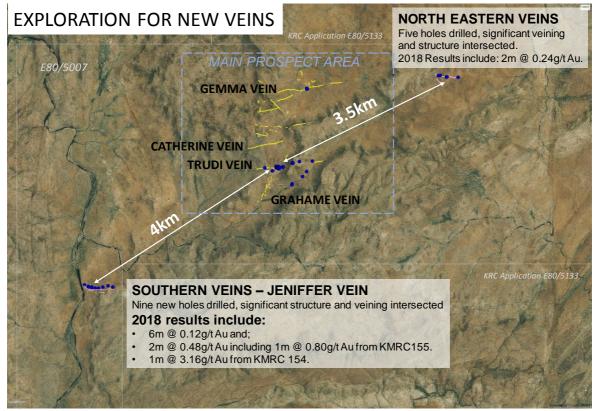


Figure 7: Map showing the location of the main veins within the main project area, and the two new mineralised vein sets discovered in 2018 in relation to the Trudi vein.



#### **Treasure Creek Gold Project**

During the quarter, KRR's wholly owned subsidiary Treasure Creek Pty Ltd applied for two highly prospective tenements in the Tennant Creek Region (Figure 7) (KRR ASX release 2 August 2019). These new exploration licence applications will supplement the company's existing Treasure Creek Iron Oxide Copper Gold (IOCG) exploration holdings, which consists of 12 other granted exploration licences, in the Tennant Creek/Rover/Davenport Region. The holdings now cover a total area of over 6,800 square kilometres (see Figure 8 and Table 1).

The Tennant Creek and Rover gold fields are host to high-grade Iron Oxide Copper Gold deposits with over 5.5M ozs Au mined from Tennant Creek and a resource of 1.2M ozs Au at Rover 1. The Treasure Creek holdings cover areas along strike of the Tennant Creek and Rover Gold Fields as well as covering areas of similar stratigraphic and structural settings to the south east of these fields. Past exploration in these areas has been brief, sporadic and disjointed, with many target areas likely to be under shallow cover. KRR believes that, with the application of systematic exploration and new/advanced geophysical techniques, significant gold discovery could be made.

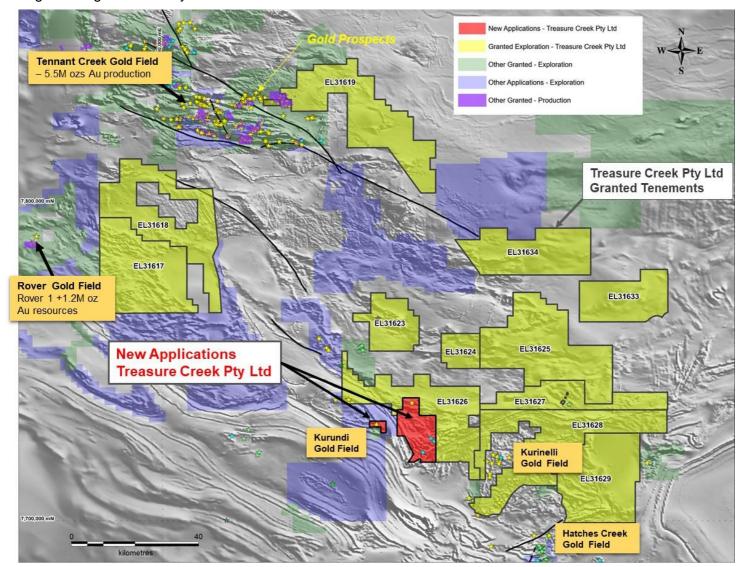


Figure 8: Map showing location of KRR's new exploration licence applications, granted exploration licences and relevant gold prospects.



The two new exploration licence applications cover some very prospective ground for high grade copper gold mineralisation (Figure 9). New application EL32199 covers the Whistle Duck–Edmirringee trend (where historic rock chip sampling returned 5% Cu and 13g/t Au) which continues into KRR's tenement, EL31626, to the east. Also the northern part of the application covers Warramunga formation rocks (which are host the Tennant Creek and Rover gold fields) and includes the Davidson Gold prospect. New application EL31626 covers a part of the Kurundi Anticline and covers the Kurundi historic gold mine (historic underground mine and open pit) where historic rock chip sampling over 5g/t Au and Copper values up to 9.7%. NTGS reports that an estimated 25-75kg of gold was mined from historic workings in the Kurundi Gold field.

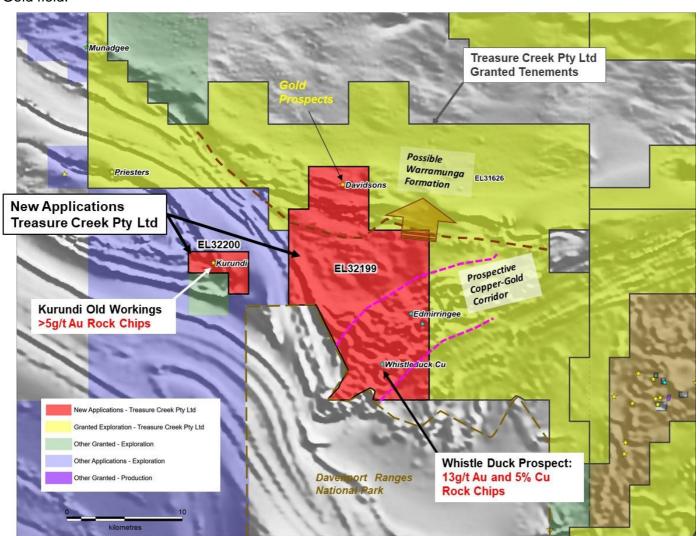


Figure 9: Map showing KRR's new applications EL32199 and EL32200 and relevant prospects.

Exploration is scheduled to start at Treasure Creek in October with initial reconnaissance and ground geophysics followed by RC drilling (planned for November subject to approvals) (KRR ASX release 23 September 2019).

KRR is engaging in a detailed geological and geophysical review of all its Treasure Creek tenements and has already identified multiple iron oxide copper-gold targets within the granted licences. Figure 10 shows preliminary 3D images of magnetic/gravity inversion modelling for priority targets showing RC drillable depths.



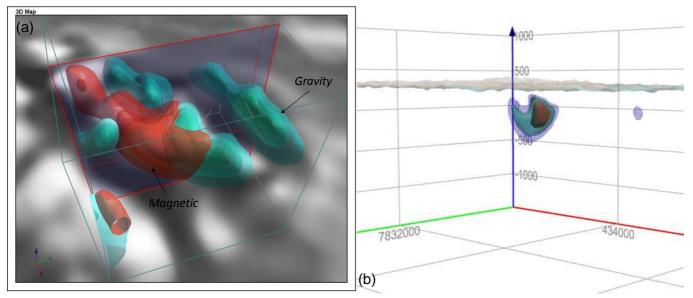


Figure 10 Preliminary Inversion Modelling of IOCG priority Targets on (a): EL31617 magnetic and gravity models and (b):EL31619 east target magnetic model.

On ground reconnaissance and geophysical surveys are planned to commence at the most mature of these targets on two priority granted tenements (EL31617 and EL31619) in October followed by drilling in November (subject to approvals). Environmental approvals for the planned drilling are currently being reviewed by the NT Mines Department.

EL31617 covers the under-explored eastern extension of the Rover Gold Field that hosts numerous ironstone bodies with characteristic copper-gold +/- cobalt, silver and bismuth mineralisation. EL31619 covers the under-explored eastern extension of the Tennant Creek Mineral Field and includes part of the Lone Star IOCG trend.

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

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



## TABLE 1: SCHEDULE OF TENEMENTS HELD AT 30 SEPTEMBER 2019 SPEEWAH MINING PTY LTD and WHITEWATER MINERALS PTY LTD

(wholly-owned subsidiaries of King River Resources Limited)

Tenement	Project Project	Ownership	Change During Quarter
E80/2863	Speewah (held by Speewah Mining Pty Ltd)	100%	
E80/3657		100%	
E80/4468		100%	
E80/4741		100%	
E80/4831		100%	
E80/4961		100%	
E80/4962		100%	
E80/4972		100%	
E80/4973		100%	
L80/43		100%	
L80/47		100%	
M80/267		100%	
M80/268		100%	
M80/269		100%	
E80/5007	Mt Remarkable (held by Whitewater Minerals Pty Ltd)	100%	
E80/5133		100%	
E80/5176		100%	Granted 17 July 2019
E80/5177		100%	Granted 17 July 2019
E80/5178		100%	Granted 17 July 2019
ELA80/5192		100%	
ELA80/5193		100%	
E80/5194		100%	Granted 16 July 2019
E80/5195		100%	Granted 16 July 2019
E80/5196		100%	Granted 16 July 2019

#### Note:

E = Exploration Licence (granted) ELA = Exploration Licence (application)
M = Mining Lease (granted) L = Miscellaneous Licence (granted)



### TREASURE CREEK PTY LTD (wholly-owned subsidiary of King River Resources Limited)

Tenement	Project Project	Ownership	Change During Quarter
EL31617	Tennant Creek	100%	
EL31618		100%	
EL31619		100%	
EL31623		100%	
EL31624		100%	
EL31625		100%	
EL31626		100%	
EL31627		100%	
EL31628		100%	
EL31629		100%	
EL31633		100%	
EL31634		100%	
ELA32199		100%	Applied 22 July 2019
ELA32200		100%	Applied 22 July 2019

#### Note:

EL = Exploration Licence (granted) ELA = Exploration Licence (application)



254 Adelaide Tce Perth WA 6000

PO Box Z5518, Perth WA 6831

PHONE: +61 (0)8 9221 8055 FAX: +61 (0)8 9325 8088 WEB: www.kingriverresources.com.au