

## POTENTIALLY SIGNIFICANT BENEFITS FROM BY-PRODUCT CREDITS UPDATE ON DEFINITIVE FEASIBILITY STUDY

### Highlights

- Mica has been identified as a potentially significant commercial opportunity for the Borborema project.
- Initial analysis and testwork has been positive and supported entering into a more definitive stage of enhancement and commercial testwork.
- It is expected that mica may be recovered at a low cost from the tails to provide saleable products comprising both a high quality coarse grained phlogopite mica and a bulk concentrate.
- The Borborema Definitive Feasibility Study (DFS) continues to consider a gold only plant and operation, and will be completed in Q4, 2019.
- The DFS and plant can be updated subsequently at low cost if required after results from the mica enhancement testwork and marketing analysis are received.
- Big River continues to focus on procuring debt funding to fund construction of the Borborema Project as soon as possible.

Big River Gold Ltd (ASX: BRV) (**Company** or **Big River**) wishes to advise that the Definitive Feasibility Study (DFS) for the Borborema Project is progressing well and is on target for completion this quarter. Finalisation of tenders from equipment suppliers and contractors along with preparation of documentation is being undertaken to complete the DFS.

The Company also wishes to advise shareholders that arising from the studies being managed by Wave International (**Wave**), an opportunity has been identified that could see significant additional upside from the Borborema Project by way of credits from the sale of mica as a separate commercial product.

### ***Mica at Borborema – Initial testwork on possible commercial by-product***



As noted in previous Company announcements, there is abundant mica in the mineralised shear system, both within the schistose ore zone and the surrounding host rocks. The mica comprises up to 30% of the mill feed and carries about half the gold grade. Gold recoveries of 93% to 95% have been obtained in testwork for whole of ore processing using conventional methods.

The mica will be processed via the standard milling and CIP/CIL circuit after which it will be dewatered and detoxified as part of the tailings treatment. At this stage the mica could be recovered from the tails through flotation, with or without gravity or magnetic separation, for minimal additional cost as most of the treatment costs will be incurred in recovering the gold.

Early analytical testwork undertaken by Nagrom Pty Ltd in Perth, WA has been encouraging in identifying potential saleable products, in particular a high quality phlogopite<sup>1</sup> product in which:

- Concentrate produced in initial tests was not yet pure and saleable product needs to be >90%
- Good crystallinity and particle size were indicative of a good product.
- Brightness value was relatively low and testwork is focussed on improving it for a higher sale price.

The world market for this type of mica product is estimated to be 300,000 to 500,000 tonnes per annum at prices above several hundreds of dollars per tonne with larger flake sizes attracting higher prices.

In addition, a muscovite-rich bulk concentrate could be produced for which the global market is approximately 3 million tonnes per annum with prices around several hundreds of dollars per tonne



*Figure 2a. Muscovite and biotite quartz schists in Borborema drill core*



*Figure 2b. Micaceous schist in wall of Borborema pit*



*Figure 2. View to the south over Borborema project site showing gold mineralisation exposed in the pit*

<sup>1</sup> Phlogopite is a form of mica that is a magnesium rich member of the biotite mica mineral series.

### ***Future Potential and Ongoing Testwork***

Given this encouragement the Company has moved to assessing the upgrade of these products to recover commercial quantities. Additional samples have been sent to ANZAPLAN in Germany, which is a world leader in the analysis, production and marketing of industrial minerals with proven expertise in the mica sector.

Given the mica content of the mill feed, Wave estimates that up to 100,000 to 200,000 tonnes of mica product could be recovered per year from a planned 2 Mtpa throughput, after recovery of the contained gold.

This does not consider treating the approximately 500,000 tonnes of micaceous, low gold grade heap leach pads left on site from historical mining and for which mining costs have already been met. These have not previously been considered or included in the DFS for processing to recover either gold or mica.

No assessment has been made of the mica occurring in the waste host rocks at this stage.

### ***The Mica Market – a Summary***

The mica market is relatively small and, subject to confirming commercial production is feasible, Big River would be keen to maintain an orderly market and interested in co-operative agreements with companies that have expertise in the marketing of this specialised product.

Mica has numerous properties in terms of providing electrical and electronic performance, flexibility of plastic and rubber compounds, lustre and shine in paints and cosmetics as well as being a filler and lubricant. Its uses are surprisingly widespread and while Table 1 is indicative it summarises the type of product that Borborema might produce and possible uses.

Product (Various classes)	Global Market Annual Capacity	Uses
Coarse phlogopite-rich	300 – 500,000 tonnes	Electronics, high-end cosmetics, metallic (auto) paints, rubber & plastic compounds, brake linings
Bulk mica (muscovite-biotite)	~3 million tonnes	Excellent electrical and electronic performance, fillers and extenders in a variety of rubber compounds and adhesives, insulation, automotive plastic compounds, paints, lubricants, electrical capacitors, gypsum wallboard, oil drilling muds, some soaps and cosmetics, insulation, glitter, faux jewellery etc

The types of mica potentially sourced from Borborema may fetch prices above several hundreds of dollars per tonne with larger flakes commanding a premium. This would mostly be margin as the production costs of this by-product are expected to be low.

### ***Opportunity and Timeline for Borborema***

A significant portion of the global supply of mica is beset by small mines and social and child labour issues. If feasible, Borborema could ethically produce significant tonnages of low cost mica, for sale in Brazil or overseas, as a natural by-product of recovering the gold. The values of these by-product credits to Borborema are potentially significant.

The results from ANZAPLAN's testwork and analysis are expected by Q1 2020.

In the meantime the DFS will be completed in Q4, 2019 and remains focussed on considering a gold only plant and operation. Any modifications to the DFS and plant to recover commercial mica products are expected to be made subsequently with relatively little cost or effort, if justified by the results of the enhancement testwork and marketing analysis. If necessary, this material could be stockpiled separately until a suitable later date.

Yours sincerely,



**Andrew Richards**  
Executive Director

### About Big River Gold

Big River Gold Ltd (ASX:BRV), is a mineral exploration and development company listed on the Australian Securities Exchange. Its major focus is Brazil; a country the Company believes is underexplored and offers high potential for the discovery of world class mineral deposits. The Company's key asset is the Borborema Gold Project.

### Borborema Gold Project

Borborema is located in the Seridó area of the Borborema province in north-eastern Brazil. It is 100% owned by Big River and consists of three mining leases covering a total area of 29 km<sup>2</sup> including freehold title over the main prospect area.

The Project benefits from a favourable taxation regime, existing on-site facilities and excellent infrastructure such as buildings, grid power, water and sealed roads. It is close to major cities and regional centres and the services they can provide. The project's measured, indicated and inferred Mineral Resource Estimate of 2.43Moz @ 1.10 g/t gold, remains open in all directions (refer to ASX Announcement of 24 July 2017).

<b>Borborema Gold Project</b>			
Mineral Resource by Multiple Indicator Kriging (MIK) estimation			
<b>Category</b>	<b>Tonnes (Mt)</b>	<b>Grade (g/t Au)</b>	<b>Contained Gold (Moz)</b>
Measured	8.2	1.22	0.32
Indicated	42.8	1.12	1.55
<b>Total Measured + Indicated</b>	<b>51.0</b>	<b>1.14</b>	<b>1.87</b>
Inferred	17.6	1.00	0.57
<b>Total Mineral Resources</b>	<b>68.6</b>	<b>1.10</b>	<b>2.43</b>

**Table 1. Mineral Resource (JORC 2012) table**, reported above 0.5 g/t Au cut-off. Parent Block 25mE x 25mN x 5mRL. Selective Mining Unit 5mE x 6.25mN x 2.5mRL. Note, appropriate rounding has been applied, subtotals may not equal total figures. (refer ASX Announcement of 24 July 2017).

## **Competent Person Statements**

### ***Borborema mineral resource estimate***

The information in this announcement that relates to the mineral resource estimate for the Borborema Project was first reported in accordance with ASX Listing Rule 5.8 on 24 July 2017. Big River confirms that it is not aware of any new information or data that materially affects the information included in the announcement of 24 July 2017 and that all material assumptions and technical parameters underpinning the Mineral Resource estimate continue to apply and have not materially changed.

### ***Borborema ore reserve estimate***

The information in this announcement that relates to the Ore Reserve estimate for the Borborema Gold Project was first reported in accordance with ASX Listing Rule 5.9 on 6 March 2018, 29 March 2018 and 11 April 2018. Big River confirms that it is not aware of any new information or data that materially affects the information included in these previous announcements and that all material assumptions and technical parameters underpinning the Ore Reserve estimate continue to apply and have not materially changed.

### ***Borborema Exploration results***

The information in this announcement that relates to exploration results for the Borborema Gold Project was first reported in accordance with ASX Listing Rule 5.7 on 28 January 2015. Big River confirms that it is not aware of any new information or data that materially affects the information included in the announcements of 28 January 2015 and 24 July 2017.