

**ASX Announcement | 26 October 2020**  
**Rafaella Resources Limited (ASX:RFR)**

**Santa Comba metallurgical test-work confirms high recoveries  
and clean high-grade concentrate**

**Announcement Highlights**

- ① Grinding Solutions Ltd has provided results on Phase 2 gravity concentration testing for the Santa Comba tungsten mine in Galicia, Spain.
- ① High recovery of tungsten minerals can be achieved from Santa Comba disseminated ores with results showing recoveries of at least 70% of the WO<sub>3</sub>, significantly de-risking the Project.
- ① The ore will be able to produce a highly marketable clean concentrate of up to 68% contained WO<sub>3</sub>.
- ① Material upside remains to further improve the overall recovery factors and the Company will focus on such optimisation over the coming months.

**Rafaella Resources Limited (ASX:RFR) ('Rafaella' or 'the Company')** is pleased to announce the results of Phase 2 metallurgical testing programme by Grinding Solutions Ltd based in Cornwall UK. The testing regime encompassed the entire processing cycle of Santa Comba ores after preliminary concentration by X-Ray ore sorting by TOMRA GmbH, which rejected approximately 50% barren rock from the ROM feed.

The latest test-work has demonstrated that high recoveries can be achieved from the disseminated ores producing a very clean concentrate for sale to third parties:

- Overall results showed recoveries from gravity separation of 70% of the WO<sub>3</sub>.
- The Santa Comba disseminated ore is highly amenable to gravity concentration and flotation cleaning to remove penalty elements.
- Over 98% of arsenic removed from gravity concentrates by sulphide flotation.
- The use of enhanced gravity concentration techniques was successful, enabling the simplification of the process flowsheet through the elimination of jigging, spirals and shaking tables in the main concentration sections.
- Enhanced gravity concentration by Falcon concentrators also proved highly effective at extraction of tungsten minerals in the -25 to +10 micron size range which is below the capability of spirals and shaking tables and this area will be investigated further due to tungsten minerals softness and potential losses to the "slimes" fraction which is endemic in tungsten and tin processing.
- Additional work is planned for maximising recovery in the lower recovery sections of the testing, including the micron size fractions due to the importance of recovery of ultra-fine tungsten minerals and the ability of these units to use up to 600G (600 x force of gravity) to separate fine heavy tungsten minerals from light quartz and clay even finer than 10 microns (1mm = 1,000 microns).
- Test-work also included optimising the grinding of the ores and reduction of recirculating loads to the mill and the use of fine screening versus hydrocyclones, the main cause of over grinding of tungsten minerals.
- The company is reviewing a small "locked cycle" pilot scale test programme using rod milling and fine screening and Knelson, Falcon and MGS enhanced gravity concentrators (Figure 1) to fine-tune the process design and operating parameters.



**Figure 1 - Typical modular layout By Sepro™ for coarse, medium, and fine-grained tungsten mineral recovery using “Falcon” enhanced gravity concentrators ~50G to 600G**

The programme was based upon approximately 500kgs of pre-concentrate grading 0.25% WO<sub>3</sub> which was subject to the following tests:

- Mineralogical investigation to determine economic mineral size distribution and penalty mineral associations
- Detailed analysis of ore sorter products and rejects to calculate ore sorting process balance and recovery
- Fine crushing tests to determine fragmentation and stage reduction using impact crushing at different impeller velocities to produce a -5mm product
- Wear rates of impact crushing tests to determine fine crushing costs
- Fine screening of crushed product to a product size of -5mm
- Rod milling Bond index tests in closed circuit with fine screens to reduce passing sizes to -355 microns
- Calculation of grinding energy required for Rod Milling (grinding) of the ores
- Gravity concentration tests for rougher, cleaning, and scavenging modes
- Flotation cleaning of gravity concentrates to remove metal sulphides, but focused upon removal of arsenopyrite
- Chemical analysis of the 3 pass gravity concentration tests to develop the metallurgical balance
- Agglomeration testing for co-mingling of tailings slurry (50% solids) and waste rock from Santa Comba to produce a solid agglomerate (Figure 2) for co-disposal on the waste dump, thereby reducing or completely eliminating the requirement for a tailings disposal dam and associated capital, operating and environmental costs.



**Figure 2 - Agglomerated co-mingled tailings and waste rock for disposal to waste rock storage**

As a result of the metallurgical test work, the following conclusions regarding the process flow sheet have been determined:

- Impact crushing of ore sorter products can produce a -5mm product as feed to a rod mill.
- Rod mill grinding energy consumption is a low 12.5 kWhrs/tonne (Rod mill index).
- High recovery of tungsten minerals can be achieved from Santa Comba ores, with higher recoveries expected using enhanced gravity tests on separately sized streams in future locked cycle tests.
- Enhanced gravity concentrators are successful in concentrating tungsten minerals from 300 microns down to 10 microns, future testing will lower the target size threshold for recovery to -5 microns.
- The process plant design is drastically simplified using high throughput, high recovery units that effectively eliminate jigs, spirals and shaking tables thereby substantially reducing capital cost, installation engineering and infrastructure, with fewer plant operators leading to lower operating costs.
- Flotation cleaning of the arsenic bearing minerals is exceptional with over 98% of As removed from the concentrates.
- The test concentrate grade was assayed at 68% WO<sub>3</sub> and showed that the Santa Comba wolframite is a Hubernitic (Manganese (Mn) rich) form of wolframite.

**Table 1 - Detailed concentrate quality table (note Fe/Mn ~50:50)**

<b>Cu</b>	0.013 %	<b>Te</b>	<0.001 %	<b>Ba</b>	0.01 %
<b>Pb</b>	0.012 %	<b>Se</b>	<0.0001 %	<b>Be</b>	<0.01 %
<b>Zn</b>	0.013 %	<b>SiO<sub>2</sub></b>	<b>1.08 %</b>	<b>Mo</b>	0.03 %
<b>As</b>	0.018 %	<b>Al</b>	0.21 %	<b>P</b>	0.057 %
<b>Cd</b>	<0.0001 %	<b>Fe</b>	<b>7.56 %</b>	<b>Sn</b>	1.01 %
<b>Ni</b>	0.078 %	<b>Mg</b>	0.06 %	<b>WO<sub>3</sub></b>	<b>68.01 %</b>
<b>Co</b>	<0.001 %	<b>Cr</b>	0.14 %	<b>Ta</b>	0.003 %
<b>Mn</b>	<b>7.69 %</b>	<b>Ca</b>	<b>1.16 %</b>	<b>Nb</b>	0.008 %
<b>Bi</b>	0.0157 %	<b>S</b>	0.06 %	<b>U</b>	0.17 %
<b>Sb</b>	0.0152 %	<b>K</b>	0.73 %	<b>Th</b>	0.056 %
<b>Hg</b>	<0.001 %	<b>Na</b>	<0.05 %	<b>Zr</b>	0.12 %

- Very little cassiterite (SnO<sub>2</sub>) reported to the concentrates (1%).
- Tailings agglomeration trials were successful indicating that additional testing would be justified for further optimising the plant design, material balance, operational parameters and costs.

Preliminary process plant design and estimated capital costs have been carried out and work is continuing with manufacturers of enhanced gravity concentrators for input into the final design and cost estimates to feed into the feasibility study.

Rafaella management has located used, refurbished, and new equipment for rapid installation of a modular style process plant using pre-packaged equipment allowing significant sections of the process plant to be “plug and play” thereby significantly reducing installation time and costs.

**Rafaella’s Managing Director Steven Turner said:** *“We are extremely pleased with the results from the Stage 2 metallurgical test work, as the overall recoveries were in line with expectation and significantly de-risk the project. With the resource upgrade announced in July and the metallurgical test-work for the feasibility study complete, the Project is now rapidly progressing to a development decision. Furthermore, the drilling programme and the metallurgical studies have all indicated significant upside remains to be realised and such optimisation work will continue as the Project advances through to construction.”*

This announcement has been authorised by the Board of Directors of the Company.

**Ends**

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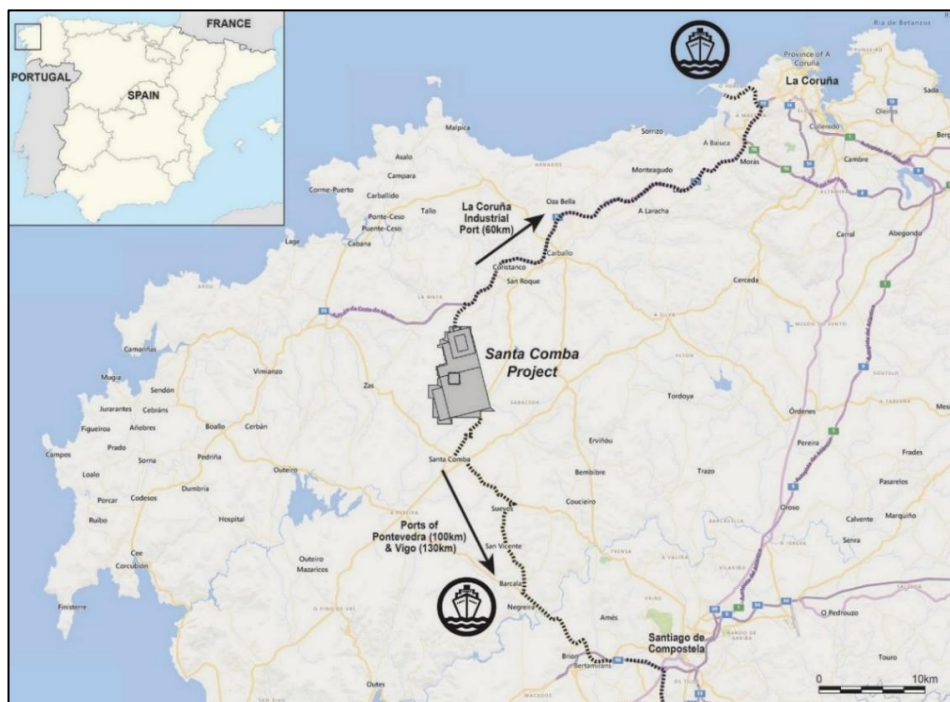
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**About Rafaella Resources Limited**

Rafaella Resources Limited (ASX:RFR) is an explorer and developer of world-class mineral deposits. Rafaella owns the Santa Comba tungsten and tin development project in Spain and the McCleery cobalt and copper exploration project in Canada. Santa Comba is located in a productive tungsten and tin province adjacent to critical infrastructure and the McCleery project was previously under-explored and holds significant potential.



*Location of the Santa Comba Project, Galicia, Spain.*

To learn more please visit: [www.rafaellaresources.com.au](http://www.rafaellaresources.com.au)

### **Forward Looking Statements Disclaimer**

This announcement contains forward-looking statements that involve a number of risks and uncertainties. These forward-looking statements are expressed in good faith and believed to have a reasonable basis. These statements reflect current expectations, intentions or strategies regarding the future and assumptions based on currently available information. Should one or more of the risks or uncertainties materialise, or should underlying assumptions prove incorrect, actual results may vary from the expectations, intentions and strategies described in this announcement. No obligation is assumed to update forward looking statements if these beliefs, opinions and estimates should change or to reflect other future developments