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## EUROPEAN PRODUCT TRIALS DEMONSTRATE FYI'S HPA QUALITY

### Key points:

- **A leading European HPA market participant has completed detailed testwork on samples supplied by FYI**
- **The results indicate FYI's premium quality HPA product with ultra-low impurities is of exceptional quality and characteristics**
- **Detailed HPA product finishing tests confirm suitability for many market applications**
- **Tests highlight additional commercial advantages for FYI's HPA**
- **Further detailed work to be completed to increase FYI's HPA market appeal**

FYI Resources Ltd (**ASX: FYI**) ("**FYI**" or "**the Company**") is pleased to announce the findings of the high purity alumina (HPA) market participant led product development and testwork. The testwork is designed to confirm the suitability of FYI's HPA for use in established product applications.

FYI generated HPA material from the Company's pilot plant trials (see ASX release 3 August 2020) and supplied a European based HPA marketing group with the intention for them to undertake detailed product and market testing with the objective to establish a joint sales and distribution model for FYI's HPA.

The testwork, conducted at the market participant's expense, was tailored to test FYI's HPA material for compatibility with both general and niche market applications within existing product sales lines of their established customers.

Encouraged by the results from the initial trial samples that FYI delivered from the Stage One pilot plant production (see ASX release 6<sup>th</sup> November 2019), this series of testwork is the extension of those prior studies using larger sample volumes (see ASX release 23<sup>rd</sup> June 2020). The larger HPA sample size (20kg) provided for a greater level of confidence and broader range of tests. The series of tests involved proprietary product specification and included detailed purity analysis, consistency of product and the equally important assessment of the characterisation and morphology (the particular form, shape, size, density and fundamental crystalline structure etc) of FYI's HPA. The testwork also included specialty milling of FYI's HPA to suitable size fractions for various market applications.

Results of the detailed testwork by the market participant concluded that purity of FYI's HPA material is well above benchmark and that the overall quality of the product is very high and well within ideal product specifications. In particular, the extremely low values of the deleterious elements Fe, Na and Pb make FYI's HPA very attractive.

The testing protocols undertaken were extensive and include X-ray Powder Diffraction (XRD). This is an analytical technique which determines the atomic and molecular structure of a the HPA crystal. This detailed testing revealed that the elemental trace pattern for FYI's HPA has an extremely close correlation to a number of the existing HPA products – which means the potential compatibility for multiple existing customers is very high. This result is particularly encouraging as it demonstrates the market opportunity for the Company is substantial.

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A significant positive to emerge from the testing is the surprise morphology characteristics of FYI's HPA material which possesses a substantially higher particle surface area and density to traditional HPA product. This could offer commercial advantages in certain applications and that may increase the market attraction for FYI's HPA.

The testwork on FYI's HPA also focused on trialling and developing a defined product specification for several other potential customers to meet their respective application requirements. Following the positive results from this work on FYI's HPA, additional product acceptance testing and evaluation will be undertaken on the material. Details of the results of this work is expected in the next two weeks.

The staged assessment and testing process ensures that the Company's HPA material fulfils the requirements and specifications of the procuring customers. Further work will be undertaken to facilitate a more favourable and expedient qualification process.

FYI Managing Director Roland Hill said "The results from the detailed testing are tremendously encouraging. Not only do the results demonstrate our product is first rate, it also means that the market opportunities are potentially significant and the pathway to commercialisation for our HPA may be expedited.

From a customer perspective, we can confidently demonstrate we are able to reliably deliver a premium, high purity specification product with warranted consistency and quality due to the provenance of our fully integrated and controlled production chain in a sustainable and environmentally friendly manner".

#### **HPA Market is Growing Significantly**

Demand for HPA, as a specialised product used in a multitude of high-tech applications including lithium-ion batteries and LED lights, is growing at an annualised rate of >17% pa according to CRU Consulting Group (CRU).

In their July 2019 HPA Market Report, CRU estimated that the ~60,000 tonnes per year '4N' (99.99%purity) HPA market would stay in relative balance until this year, after which supply deficits build to nearly 30,000 tonnes a year by 2028:

Interestingly, the HPA market is currently responding well to the current global post-COVID-19 stimulus into the nascent electric vehicle (EV) sector. The leverage for HPA in Lithium -ion batteries is considerable with up to ~5kg of HPA in every EV. Benchmark Mineral Intelligence principal James Clark said during a recent HPA market conference in which FYI presented (see ASX release 28<sup>th</sup> August 2020), with the multiplier effect of EV growth "means high purity alumina demand in 5 and 10 years will be very significant".

Authorised for release by Managing Director, Roland Hill.

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### **About FYI Resources Limited**

FYI is developing a long life fully integrated high quality, high purity alumina (HPA) production project for both general and traditional markets. FYI's corporate objective is to position itself to be a significant producer of HPA within these rapidly developing markets which include applications in LED, electric vehicle, smartphone and television screens as well as other associated high-tech product markets.

On the basis of its recently released DFS and the robust economic business case for production of HPA, FYI's Cadoux project, north-east of Perth in Western Australia, entails controlled production of a 100%-owned feedstock source, mined on a schedule to match supply requirements of a proposed refinery at Kwinana, south of Perth. FYI's ability to control the integrated process should ensure product quality, consistency and provenance – an increasingly important product selection criteria for customers who rely on knowing the origins and record of ownership in a product's supply chain.

The foundation of FYI's HPA strategy is the innovative and integrated processing flowsheet utilising moderate temperature and atmospheric pressure technologies. These factors combine resulting in world class HPA project potential.

### **Cautionary Statements**

#### **Substance of DFS**

The DFS referred to in this announcement is a study of the potential viability of the Cadoux Kaolin Project. It has been undertaken to understand the technical and economic viability of the Project. The DFS assumes a 25-year Project life based only on Proved and Probable Ore Reserves (100%). The DFS is based on the material assumptions outlined elsewhere in this announcement and the appended summary of the DFS. These include assumptions about the availability of funding. While the Company considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by this DFS will be achieved.

To achieve the range of outcomes indicated in the DFS, funding in the order of A\$189 million will likely be required. Investors should note that there is no certainty that the Company will be able to raise the amount of funding when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of the Company's existing shares.

It is also possible that the Company could pursue other "value realisation" strategies such as a sale, partial sale or joint venture of the Project. If it does, this could materially reduce the Company's proportionate ownership of the Project.

#### **General and forward-looking statements**

The contents of this announcement reflect various technical and economic conditions, assumptions and contingencies which are based on interpretations of current market conditions at the time of writing. Given the nature of the resources industry, these conditions can change significantly and without notice over relatively short periods of time. Consequently, actual results may vary from those detailed in this announcement.

Some statements in this announcement regarding estimates or future events are forward-looking statements. They include indications of, and guidance on, future earnings, cash flow, costs and financial performance. Such forward-looking statements are provided as a general guide only and should not be relied on as a guarantee of future performance. When used in this announcement, words such as, but are not limited to, "could", "planned", "estimated", "expect", "intend", "may", "potential", "should", "projected", "scheduled", "anticipates", "believes", "predict", "foresee", "proposed", "aim", "target", "opportunity", "nominal", "conceptual" and similar expressions are forward-looking statements.

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Although the Company believes that the expectations reflected in these forward-looking statements are reasonable, such statements involve risks and uncertainties, and no assurance can be given that actual results will be consistent with these forward-looking statements.

The contents of this release are also subject to significant risks and uncertainties that include but are not limited to those inherent in mine development and production, geological, mining, metallurgical and processing technical problems, the inability to obtain and maintain mine licences, permits and other regulatory approvals required in connection with mining and processing operations, competition for among other things, capital, acquisitions of reserves, undeveloped lands and skilled personnel, incorrect assessments of the value of projects and acquisitions, changes in commodity prices and exchange rates, currency and interest rate fluctuations and other adverse economic conditions, the potential inability to market and sell products, various events which could disrupt operations and/or the transportation of mineral products, including labour stoppages and severe weather conditions, the demand for and availability of transportation services, environmental, native title, heritage, taxation and other legal problems, the potential inability to secure adequate financing and management's potential inability to anticipate and manage the foregoing factors and risks.

All persons should consider seeking appropriate professional legal, financial and taxation advice in reviewing this announcement and all other information with respect to the Company and evaluating the business, financial performance and operations of the Company. Neither the provision of this announcement nor any information contained in this announcement or subsequently communicated to any person in connection with this announcement is, or should be taken as, constituting the giving of investment or financial advice to any person. This announcement does not take into account the individual investment objective, financial or tax situation or particular needs of any person.

### **Competent Persons Statements**

#### **Metallurgy**

The information in this report that relates to metallurgy and metallurgical test work is based on information reviewed and compiled by Mr Daryl Evans, a Competent Person who is a Fellow of the Australian Institute of Mining and Metallurgy (AusIMM).

Mr Evans is an employee of Independent Metallurgical Operations Pty Ltd, and is a contractor to FYI. Mr Evans has sufficient experience that is relevant to this style of processing and type of deposit under consideration, and to the activity that he has undertaken to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves". Announcements in respect to previous metallurgical results are available to view on the Company's website at [www.fyiresources.com.au](http://www.fyiresources.com.au).

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## JORC Code, 2012 Edition – Table 1

### Section 1 Sampling Techniques and Data

Criteria	Commentary
<b>Sampling techniques</b>	<p>Drilling sampling was previously reported (ASX: 9.7.2018).</p> <p>Metallurgical test work applied to the recovered drilling samples is intended to determine aluminium leach and precipitation characteristics of the kaolin. Sample preparation and metallurgical test work was performed by Independent Metallurgical Operations Pty Ltd (IMO) in Perth, Western Australia.</p>
<b>Drilling techniques</b>	Previously reported (ASX: 9.7.2018).
<b>Drill sample recovery</b>	Previously reported (ASX: 9.7.2018).
<b>Logging</b>	Previously reported (ASX: 9.7.2018).
<b>Sub-sampling techniques and sample preparation</b>	<p>Drilling sampling was previously reported (ASX: 13.3.2019).</p> <p>The sampling techniques for the metallurgical test work was in line with industry standards in determining composite samples representative of the resource. This included drying and splitting of individual samples and then compositing into representative samples.</p> <p>The sampling procedures were under the control of qualified and experienced IMO employees and considered adequate for the intended metallurgical test work.</p> <p>Master composite samples were prepared representing the initial three years of the Cadoux life of mine resource.</p> <p>The composites underwent a stage of attritioning with the products screened to generate fine and coarse size fractions.</p> <p>The fine attritioned product underwent one stage of calcination to convert kaolin clay to metakaolin. The calcined product was leached with hydrochloric acid at temperature.</p> <p>The leach liquor underwent a series of precipitation stages, involving hydrogen chloride gas being sparged through the leach liquor allowing the precipitation of solid aluminium chloride.</p> <p>Conversion of the final solid aluminium chloride to alumina involved a two-stage calcination process with the final product achieving an average of 99.99% Al<sub>2</sub>O<sub>3</sub> purity.</p> <p>Sizes and representative nature of the samples is considered appropriate.</p> <p>All procedural work and preparation was conducted under strict controls and supervision. All testwork was conducted under test conditions by qualified and experienced technicians and overseen by qualified managers including Mr Alex Borger and Mr Daryl Evans (Independent Metallurgical Operations Competent Person).</p>
<b>Quality of assay data and laboratory tests</b>	<p>Analysis for the leach test work was deemed appropriate for the detailed test work as it was undertaken in laboratory environment with precision equipment and included worldwide accepted controls.</p> <p>Metallurgical reviews and testwork has been overseen and approved by Mr Alex Borger – Metallurgical Project Manager and Metallurgical Competent Person – Mr Daryl Evans.</p>



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Criteria	Commentary
<b>Verification of sampling and assaying</b>	<p>The metallurgical test work was supervised by suitably qualified personnel under laboratory conditions.</p> <p>Primary data is captured on paper in the laboratory and then re-entered into spreadsheet format by the supervising metallurgist, to then be loaded into the company's database.</p> <p>No adjustments are made to any assay data.</p>
<b>Location of data points</b>	All samples used in the metallurgical test work have been accurately recorded by the laboratory technician and checked by the supervising metallurgist.
<b>Data spacing and distribution</b>	Industry standard sample distribution and source material representation methodology has been applied.
<b>Orientation of data in relation to geological structure</b>	Industry standard sample distribution and source material representation methodology has been applied. The risk of sample bias is considered to be low.
<b>Sample security</b>	All samples were under supervision at the laboratory. All residual sample material is stored securely in sealed bags.
<b>Audits or reviews</b>	Mr Evans has reviewed QAQC results and found these to be acceptable.

## Section 2 Reporting of Exploration Results

Criteria	Commentary
<b>Mineral tenement and land tenure status</b>	Previously reported (ASX: 9.7.2018).
<b>Exploration done by other parties</b>	Previously reported (ASX: 9.7.2018).
<b>Geology</b>	<p>The project area is underlain by weathered granitoid Archaean rock of the Yilgarn Granites is the likely parent material for the kaolin. Here, deep weathering of the feldspathic and ferromagnesian minerals within the metamorphosed granitic has resulted in the formation of kaolinite. There is no outcrop but recognizable granitoid fragmental rocks are sometimes present just below surface. The crust of the overburden comprises gravel and sands over reddish to off white clay. White kaolin underlies the overburden followed by weathered, partial oxidised and then fresh granitoids at depth. The recent drilling at the property has revealed a weathering profile which is very common in Western Australia with the granitoid rocks, deeply weathered forming a leached, kaolinized zone under a lateritic crust. Analysis at the Laboratory shows particle size distributions are typical of "primary style" kaolins produced from weathered granites. The crust of overburden comprises gravel and sands over reddish to off-white clay to an average depth of 5m. White kaolin then averages approximately 16 m before orange to yellow sandy and mottled clays are intersected which are followed by recognizable rounded granitoid material. The thickness of the kaolin profile varies from less than 1m to a maximum of 28m. Fresh granitoids are found at depths of between 10 and 30m. All kaolin resources are within 4 to 11 metres of the surface. All holes are drilled vertically. Intersected kaolin thickness ranges from 4-28m.</p>
<b>Drill hole Information</b>	Sample and drill hole coordinates are provided in market announcements.
<b>Data aggregation methods</b>	The nature of the metallurgical testwork did not require data aggregation, however all data points were noted and recorded in the appropriate data base to be used in continued test work and product development.

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Criteria	Commentary
<b>Relationship between mineralisation widths and intercept lengths</b>	Previously reported (ASX: 9.7.2018).
<b>Diagrams</b>	Project related diagrams are presented in various previous ASX announcements released to the market at the relevant time.
<b>Balanced reporting</b>	The reporting is considered to be balanced.
<b>Other substantive exploration data</b>	<p>As per notice to the market (see FYI ASX announcement 14<sup>th</sup> February 2019) and Definitive Feasibility Study (DFS), IMO completed a pilot plant trial for the refining of HPA following the flowsheet design that has been proposed and innovated by FYI to produce and refine aluminium leaching and precipitation characteristics of the kaolin to produce &gt; 99.99% HPA.</p> <p>The pilot plant trial involved the 7 day commissioning and training of the plant and equipment immediately followed by a 7 day continuous "end to end" hydrometallurgical production trial utilising feedstock of composited kaolin samples of the latest drilling program (see FYI ASX announcement dated 9<sup>th</sup> June 2018)</p> <p>The pilot trial run followed the exact flowsheet procedure (as has been previously reported) so as to replicate the final designed flowsheet.</p> <p>General analysis solution sampling was taken at set times throughout the 24 hour a day (2 shifts), on a 7 day a week schedule.</p> <p>Samples sent for GDMS analysis were selected on the basis of at least one sample per day following steady state of operations being achieved (i.e. cessation of day 1) with the aim of the samples spread evenly across the pilot duration. This provided a systematic approach to tracking the product and impurity grades within the pilot run.</p> <p>Samples were prepared by the collection of intermediate product sub sampling followed by two stage batch calcination.</p> <p>The HPA assays were conducted by GDMS analysis at EAG Laboratories in New York, USA. The results of the first phase of analysis is reported in this ASX release.</p> <p>Detailed HPA product testwork undertaken for product qualification and market acceptability included the following analytical techniques:</p> <ul style="list-style-type: none"> <li>• Atomic and molecular structure - X-ray Powder Diffraction (XRD)</li> <li>• Particles size (Static light scattering)</li> <li>• Particle Morphology (scanning electron microscopy)</li> <li>• Surface area and Pore volume via N<sub>2</sub> adsorption</li> <li>• Purity via ICP-OES</li> <li>• Loose bulk density and tapped density</li> <li>• Loss on ignition (LOI)</li> <li>• Behavior when suspended in water/acid</li> <li>• Dry milling via jet mill (Picoline)</li> <li>• Wet milling via ball mill (Getzmann)</li> </ul>
<b>Further work</b>	FYI is likely to continue metallurgical test work to further refine and improve the HPA process design with any work undertaken to be announced to the market as required.

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